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Impact of the 52-week Unemployment Benefit Reapplication Process Update 2: Technical report

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PREPARED BY
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Glossary

Anniversary date	Annual date from benefit grant.
Benefit exit	Exit from main benefit lasting for at least one day (ie, excludes transfers between main benefits).
Comprehensive Work Assessment (CWA)	As part of an Unemployment Benefit reapplication, clients complete a CWA. The CWA is designed to identify any employment issues that the client faces in gaining employment.
Confidence interval	The range that an estimate is likely to fall within. Intervals in this report are based on a 95 percent probability that the estimate will be in the stated confidence interval.
Counterfactual	Estimated outcomes if clients had not participated in the intervention.
52-week reapplication process	Clients reaching their anniversary of an Unemployment Benefit grant are required to reapply for their benefit.
Future Focus	Package of policy changes introduced in 2010, including the introduction of the 52-week reapplication.
Hazard rate	The probability of exiting from an outcome at interval t, given that the client has remained in that outcome up to the exit interval (eg, t-1).
Impact	Difference an intervention makes to an outcome. Impact is the difference between the modelled and observed outcomes.
Main benefit	Income support is divided into three levels: main benefit, supplementary and ad hoc assistance.
Modelled	Estimated outcomes for participating clients based on a regression model.
Observed	Events as they are empirically observed.
Off-benefit spell	Not on a main benefit, spell ends when a client returns to main benefit for more than one day.
On-benefit spell	Period that a client is on a main benefit (eg, Unemployment, Sickness or Domestic Purposes). Clients who transfer to retirement-related benefits are also included as being on a main benefit.
Percentage point (ppt)	The additive difference between 2 percentage values (eg, 12 percent minus 10 percent equals 2 ppt).
Supplementary (second tier) assistance	Includes assistance for accommodation and disability costs. Clients can continue to receive second tier assistance without receiving a main benefit.
Survival	The time that a client remains in an outcome.
Third tier (ad hoc) assistance	Assistance to meet unexpected costs.
Unemployment Benefit	Main benefit paid to people who meet the criteria for being unemployed and require financial assistance.

Summary

Introduction

This report updates our estimate of the impact of the Unemployment Benefit 52-week reapplication process introduced in October 2010. Our analysis looks at the amount of time affected clients spend on benefit. In this report, we use 'reapplication process' to refer to the Unemployment Benefit 52-week reapplication process.

Unemployment Benefit 52-week reapplication process

From October 2010, all clients on an Unemployment Benefit are required to reapply for their benefit every 52 weeks. As part of the process, clients complete a Comprehensive Work Assessment (CWA) interview that assesses their commitment to finding work and what help they need. Clients who do not complete the reapplication process, without good reason, have their benefits cancelled on their anniversary.

Main findings

These findings cover the period from September 2010 to the end of December 2012.

Reapplication process reduced clients' average time on benefit by 41 days

The 52-week reapplication process reduced the time participating clients spent on benefit (see **Figure 1**). **Figure 1** shows the proportion of clients on a main benefit before and after starting their first reapplication process (interval 0). The figure has three lines:

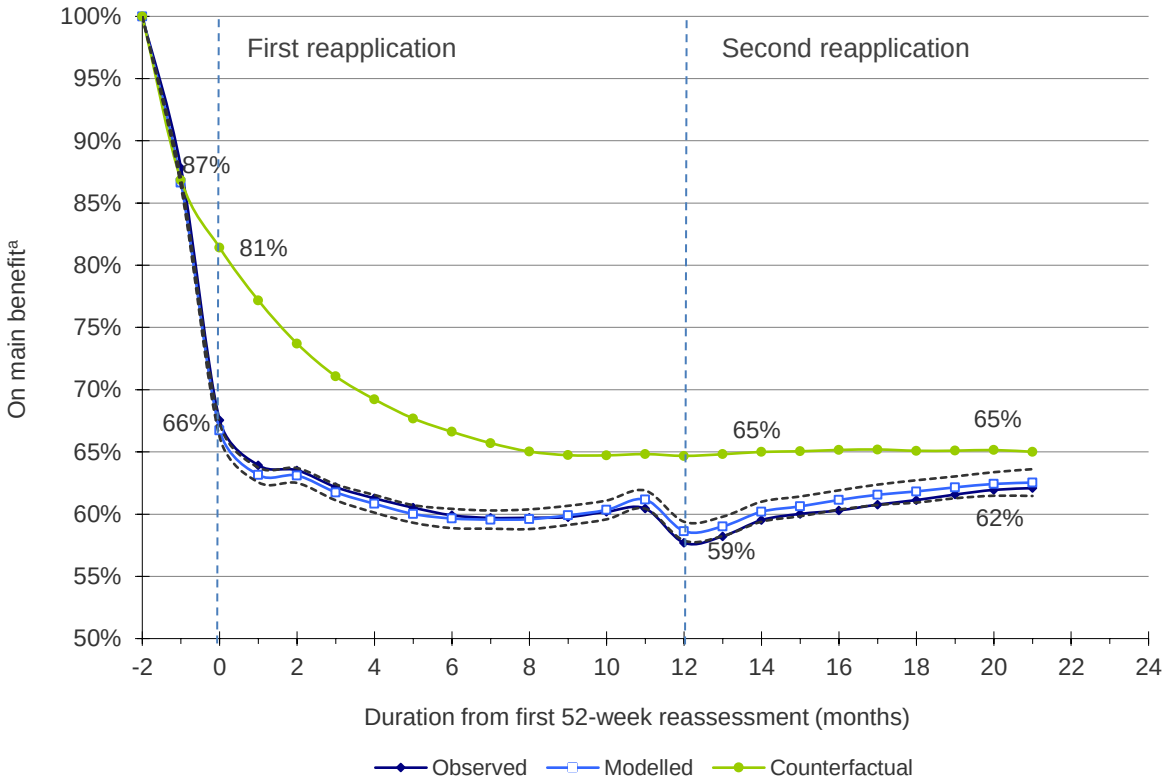
- **observed** is the actual proportion of clients on main benefit
- **modelled** is the estimated proportion of clients on main benefit. This estimate is based on a model that accounts for the factors that determine whether a client is on main benefit, including participation in the reapplication process
- **counterfactual** is the estimated proportion of clients on main benefit if clients had **not** been required to participate in the reapplication process based on the model estimates.

Comparing the observed and model lines allows us to assess how good the model is at representing the benefit outcomes of clients going through the reapplication process. Because the observed and modelled lines are similar, we are confident that our model was successful in characterising the observed trend.

The difference between the model and counterfactual lines is the estimated impact of the reapplication process.

From **Figure 1**, we can see that the reapplication process has its largest impact at the point when participants reached their anniversary date. At this point, the proportion of clients on a main benefit was 14.7 percentage points (or 18 percent) lower than the counterfactual (ie, 66.7 percent compared with 81.4 percent). At the second reapplication date (month 12), we see a further reduction in the proportion of clients on main benefit. Nevertheless, by month 21, the modelled and counterfactual lines have begun to converge, indicating that we are seeing the full impact of the reapplication process on clients' benefit outcomes.

Figure 1: Impact of the 52 week reapplication process on the probability of being on a main benefit



Notes:
a: These are not survival curves, because they account for clients returning to main benefit after exit.
b: The dotted lines indicate the 95 percent confidence interval.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Based on these results, we estimate the reapplication process has reduced the time on benefit by an average of 41 (±8.8) days. In other words, over the 21-month follow-up period, the reapplication process reduced the average time that affected clients spent on benefit from 471 to 430 days, a 9 percent reduction.

Reapplication process has decreased by 3,300 the number of clients on a main benefit each month

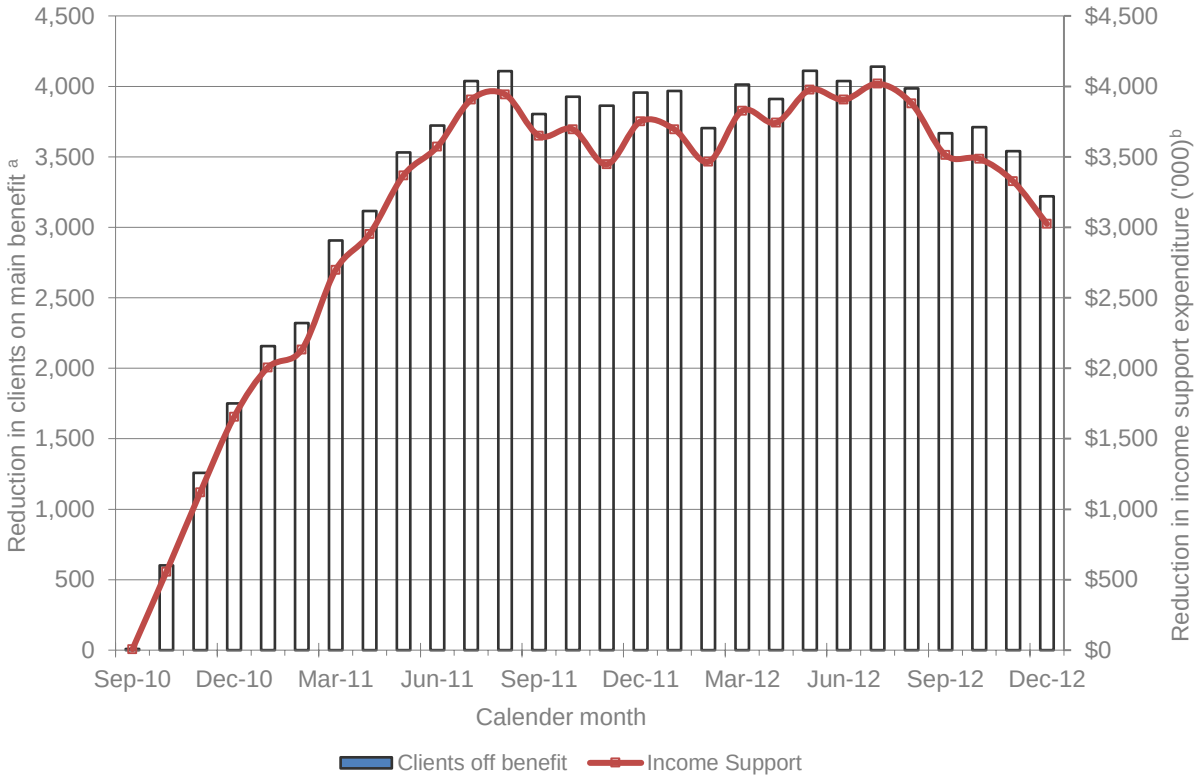
To the end of December 2012, we estimate the reapplication process has reduced the average number of clients on a main benefit by 3,300 (±600) each month. **Figure 2** shows the monthly reduction in client numbers and income support expenditure. The fall in the number of clients coming onto Unemployment Benefit is the reason for the decrease in the overall impact of the reapplication process after June 2012.

To the end of December 2012, the reapplication process reduced main benefit expenditure by an estimated $86 million

By reducing the number of clients on a main benefit, we estimate the reapplication process has reduced main benefit expenditure by $86,300,000 (±$16,500,000)[1] over the same period. On an individual client level, this translates to $1,328 (±$277) for each client reaching 10 months on an unemployment-related benefit.

[1] In 2012 dollars.

Figure 2: Estimated impact of the 52 week reapplication process on the average number of clients on benefit and income support expenditure by calendar month



Notes:
a: Estimated reduction in the number of clients on benefit during the month as a result of 52-week reassessment.
b: Based on the reduction in clients on benefit multiplied by the average main benefit rate (in 2012 dollars) for clients on unemployment-related benefits (excludes supplementary and third tier assistance).

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Impact of the reapplication is primarily through benefit cancellation at 52 weeks

The reapplication process has its largest impact at the anniversary date, through the automatic cancellation of benefits. At this anniversary, we see a 21 percent fall in the number of clients on an Unemployment Benefit. However, 16 percent of these automatically cancelled clients return to benefit within 30 days, compared with 7 percent without the reapplication process. For this reason, the impact of the reapplication process on the overall time on benefit had to account for the impact on returning to benefit after exit as well as on exits from benefit.

Findings are consistent with international evidence

These results are consistent with international evidence that show low-cost compliance activities, such as compulsory case manager interviews, to increase benefit exits primarily through non-attendance.

Administrative cost of reapplication process

While the reapplication process achieved a reduction in the time that affected clients spend on main benefit, the policy does incur administrative costs. The first cost is participation in the CWA interview. Of affected clients, 58 percent participate in the first CWA, while a further 21 percent participate in the second CWA and 10 percent in the third within the same spell on an Unemployment Benefit (see **Figure 1**). Therefore, for every affected client, Work and Income conducts 0.90 CWA interviews in the following 24 months. We estimate these interviews to cost $135 (2012) in case manager time.

In addition to the cost of the CWA, the reapplication process results in an increased number of benefit applications, where clients have their benefits automatically cancelled and then immediately reapply. For clients who are automatically cancelled, 16 percent return to benefit within 30 days. This is around 2.4 times greater than we would have expected without the reapplication process. Therefore, for every 100 affected clients, we estimate there are an additional 1.6[2] benefit reapplications because of the benefit automatic cancellation.

Conclusion

From our analysis, we conclude that the reapplication process has reduced the time that affected clients spend on benefit by 41 days over the 21-month follow-up period. The impact of the reapplication process is primarily through the automatic cancellation of benefits for non-attendance. The introduction of the reapplication is cost effective, with a return on investment of $9.84 based on reduced income support costs offset by increased benefit administration.

[2] This figure is based on the additional benefit exits at 52 weeks because of the reapplication process (14.4), multiplied by the proportion of these exits that return to benefit within 30 days in excess of what we would expect in the absence of the reapplication process (1.4 = 10%*14.4). For the second reapplication at 12 months, an additional 2.3 clients are auto-cancelled, of which we estimate 0.2 would return to benefit within 30 days (0.2 = 2.3 * 10%).

Analysis

This section presents the analysis of the estimated impact of the Unemployment Benefit 52-week reapplication process. The analysis is divided into the following parts:

- an outline of how the reapplication process is expected to operate
- a brief discussion of the expected impact of the reapplication process on benefit outcomes
- an analysis of whether the reapplication process altered the time that clients spend:
  - on unemployment-related benefits
  - on any main benefits
  - transferred to other benefits
  - off main benefit when they exit
- an estimation of the overall change in the time on benefit
- an examination of the international evidence on similar interventions.

The technical notes section (page 36) provides more detail on the methodology and modelling that underpins the analysis presented here.

Unemployment Benefit 52-week reapplication process

In brief, the Unemployment Benefit 52-week reapplication process has the following features.

Affected group

- The Unemployment Benefit 52-week reapplication process applies to all clients on unemployment-related benefits who reach their Unemployment Benefit commencement anniversary from 27 September 2010 onwards.
- Unemployment-related benefits include Unemployment Benefit Hardship, Unemployment Benefit Hardship (in Training), Unemployment Benefit Student Hardship and in Training.
- Both primary beneficiaries and partners are required to participate in the reapplication process.

Anniversary date

- Each anniversary date is at 52-week intervals after commencement of an unemployment-related benefit. If a person transfers to another unemployment-related benefit this does not change their 52-week anniversary date.
- However, for clients already on a benefit before 27 September 2010, the 52-week anniversary date is from their last benefit commencement date (irrespective of whether this was a transfer between unemployment-related benefits).
- Suspended or expired benefits do not change when the 52-week reapplication process commences.

Before the 52-week anniversary

- Twenty-five working days (5 weeks) before reaching the 52-week anniversary date clients on a benefit (or suspended for work test reasons) are sent a letter from Work and Income informing them that they have to reapply for their benefit.

- If a client has not commenced the reapplication process, another letter is sent 7 days before the 52-week anniversary date.
- Reapplication involves:
  - completing a Comprehensive Work Assessment (CWA)
  - completing an Unemployment Benefit application form with supporting evidence
  - updating the client's JOBZ4U profile and service plan
  - referral to appropriate job-seeking activities or vacancies.

  In addition, the case manager has to be satisfied that the client is meeting their obligations to be an active job seeker. If the case manager is not satisfied then the reapplication remains incomplete.
- If the application process is not complete by the expiry date, the case manager can extend the process for a further 10 days before the benefit is suspended.

After the 52-week anniversary

- If the client has not completed their reapplication by the expiry date, their benefit will stop (be suspended). In cases where a client is still completing their reapplication, the case manager can activate the benefit for a further 10 days. In exceptional circumstances, case managers can increase the extension period to 20 days.
- If a client applies after the expiry date and there are no exceptional circumstances, the client's benefit is cancelled and they have to apply as a new client with the required stand-down periods.
- If the client makes no contact, the benefit is suspended on the expiry date and cancelled 20 days later. The benefit end date is the expiry date.

Expected impact of the 52-week reapplication process

The reapplication process could influence client behaviour in several ways (see **Figure 3**).

A: Between the initial reminder letter and anniversary date, clients could:

- A_e: declare they are already in work (and therefore exit benefit)
- A_e: choose to exit benefit rather than participate in the reapplication process
- A_t: transfer to another benefit rather than participate in the reapplication process.

B: If they have not contacted Work and Income before their anniversary date, we expect:

- B_e: clients who received their letter to allow their benefit to suspend and cancel
- B_e: those who had not responded or not been contacted (ie, change of address) to contact Work and Income when they did not receive their income support payment. Depending on circumstances, these clients may have their benefit cancelled
- B_t: through the reapplication process, a client may be transferred to another benefit.

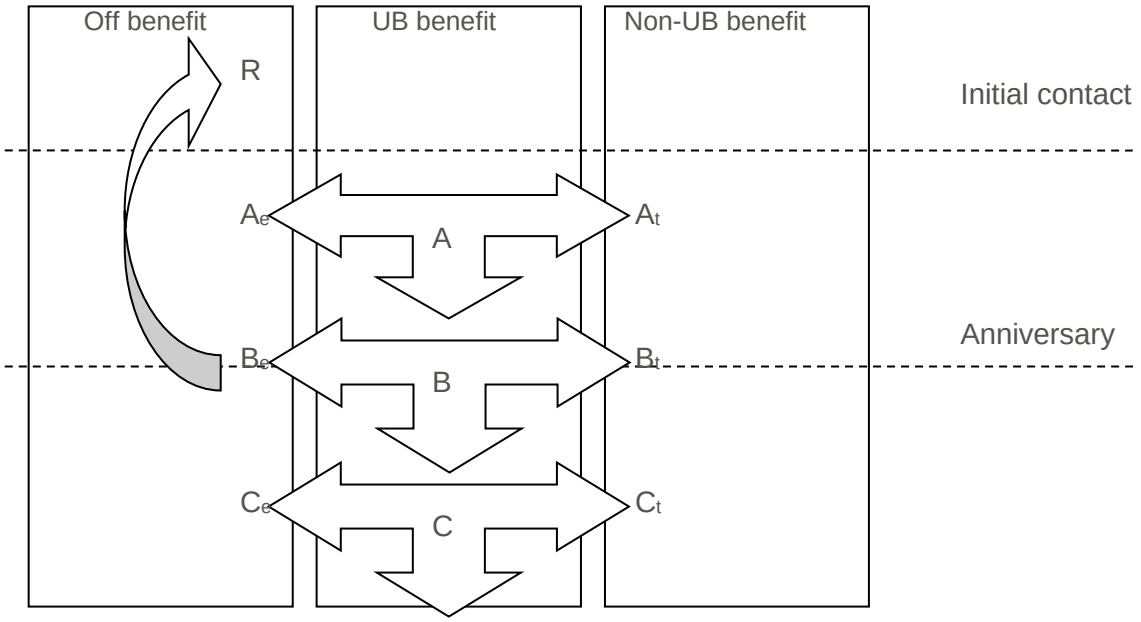
C: Of those who participate in the reapplication process, we expect:

- C_e: cancellation of benefit because the client does not show commitment to finding employment
- C_e: participation in employment and training programmes and services increasing their chances of exiting benefit
- C_t: transfers to other benefits because of a change in client circumstances (eg, medical condition).

R: If clients exit benefit during the reapplication process, we may see:

- that those who had not contacted Work and Income to reapply for benefit may return to benefit reasonably quickly.

Figure 3: Potential responses of clients to the reapplication process



Note: UB = Unemployment Benefit.

Impact of the reapplication process

Because the reapplication process occurs at a fixed point in a client's benefit spell, we can easily examine how clients respond to the reapplication process compared with previous cohorts of clients reaching their anniversary on Unemployment Benefit. The following section looks at the impact of the reapplication process on four benefit outcomes:

- duration on current Unemployment Benefit spell
- duration on current main benefit spell
- time on main benefits other than the Unemployment Benefit within the current main benefit spell
- time spent off a main benefit.

For each, we present a descriptive analysis of the outcome by client cohort before summarising the duration models used to estimate the impact of the reapplication process.

Duration on unemployment-related benefit

The first outcome we examine is the time that clients spend on their current spell on the Unemployment Benefit. We anticipate that clients who participate in the reapplication process will be more likely to end their current Unemployment Benefit spell, because:

- some clients will choose to exit benefit or transfer to another benefit
- those who fail to comply in time will have their current benefit cancelled.

Definition of duration on Unemployment Benefit

In this analysis, we combine any consecutive spells of unemployment-related benefit into a single spell. Unemployment-related benefits include Unemployment, Unemployment Training and Student Hardship. Any change in partner status has no effect on spell duration, so a client changing from single to a partner on an Unemployment Benefit will not end their current spell. If there is more than one day between Unemployment Benefit spells, these are treated as separate spells.[3]

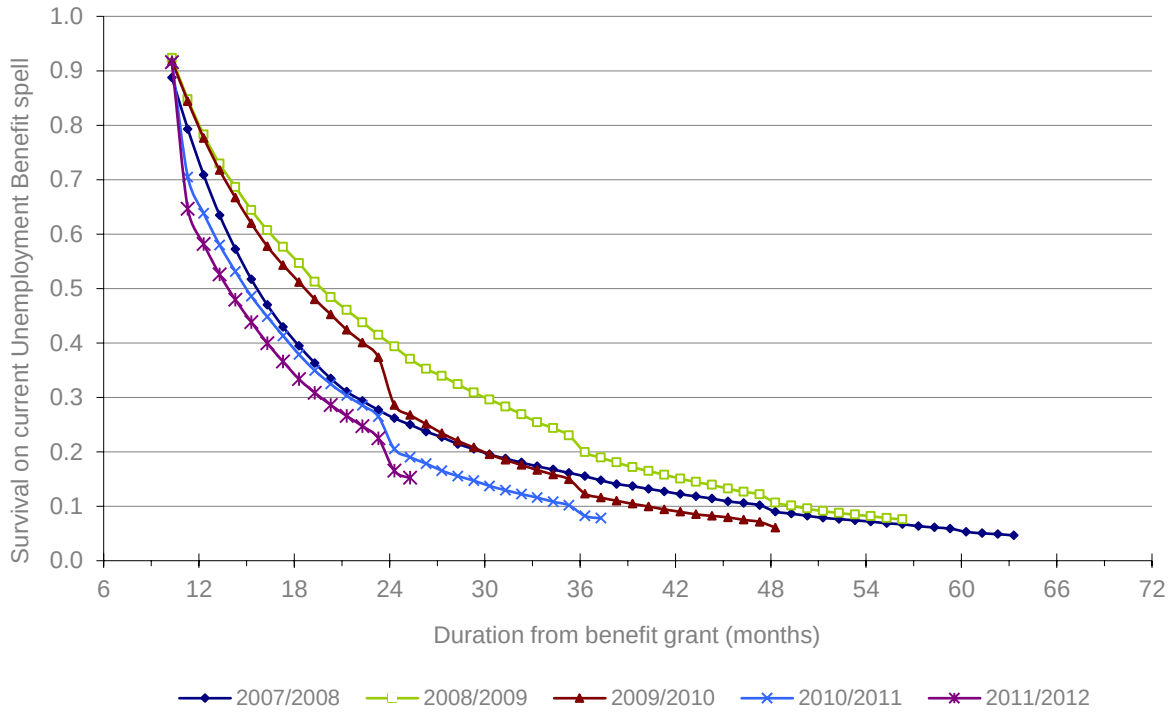
Spells reflect the most current version of the administrative data and therefore include retrospective changes to spell history. As a result, some clients affected by the reapplication process have spells that end before the start of the reapplication process. These occur when, through the reapplication process, Work and Income finds they are ineligible for an Unemployment Benefit for some period before they reached their anniversary date. In such instances, the spell ends when eligibility ceased and any overpayments are transferred as a debt against the client.

Observed duration on Unemployment Benefit

For this analysis, we selected all clients who reached or exceeded 43 weeks on their Unemployment Benefit spell from 1 January 2006. **Figure 4** shows the survival on an Unemployment Benefit for the selected clients.

[3] This differs from the standard practice of combining spells separated by less than 14 days. In the current analysis, we chose not to adopt this practice, to better identify if clients are being auto-cancelled at their anniversary date but return to benefit soon afterward. In addition, we explicitly model any impact of the reapplication process on off-benefit spells.

Figure 4: Survival curve for time on current unemployment related benefit spell for clients whose spell lasted for at least 43 weeks duration



Notes:
a: Proportion who remain on their current unemployment-related benefit (Unemployment, Unemployment Training and Student Hardship); that is, they have not exited main benefit or transferred to a benefit other than unemployment benefit.
b: Year starts from June.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Each cohort is selected according to whether they reached the qualifying duration in each year starting in June[4] (ie, 2008/09 means from June 2008 to May 2009). Survival curves plot the proportion of clients who remained on their current Unemployment Benefit spell after reaching 43 weeks on benefit.

The impact of the reapplication process can be seen by the decrease in survival for cohorts at their first anniversary date after September 2010. Which anniversary the first reapplication falls depends on when clients commenced their Unemployment Benefit spell. For example, for those in the 2010/11 cohort the reapplication process occurred at one year, for the 2009/10 cohort at 2 years and so on.

Because we have more than one year of data for the post-September 2010 period we can also see the effect of the second and third reapplication. The figure clearly shows there is a further reduction in the survival of clients on an Unemployment Benefit after each subsequent reapplication.

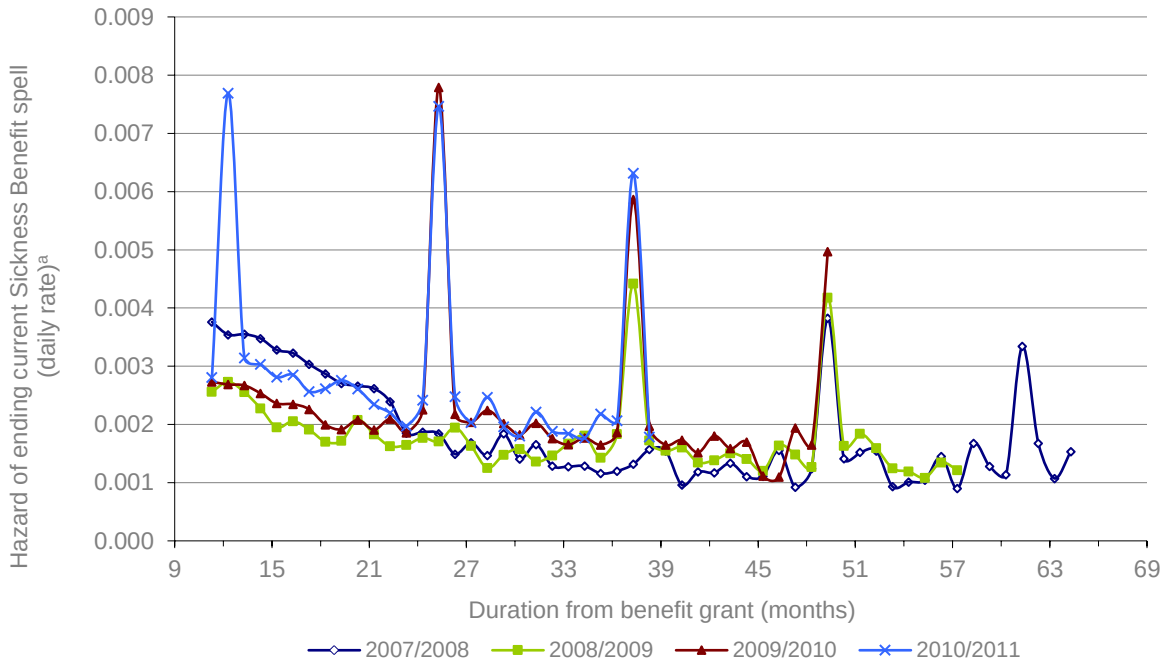
To better show the impact of the reapplication process, we convert survival curves into hazard rates (**Figure 5**). The hazard rate is the probability a client will end their Unemployment Benefit spell in each day, given they have remained on an Unemployment Benefit up to that day.[5] In **Figure 5**, the sharp increase in hazard rate at each anniversary period (year 1, 2, 3 ...) corresponds to each group's drop in survival in **Figure 4**. A further point to note in **Figure 5** is there is no evidence that, before the introduction of the reapplication process, there was an increased hazard of ending an unemployment benefit at these anniversary dates. That is, the hazard of exiting benefit at one year

[4] The cohort start month is based on when clients reach 52 weeks. Those reaching 30 weeks on benefit in June of the year will reach 52-weeks after September of the year (the month the reapplication process was introduced).

[5] In the figures, the hazard rate is given as the daily average over the interval.

only increases for the 2010/11 cohort and not for any of the previous cohorts reaching one year duration.

Figure 5: Hazard rates for duration on current Unemployment Benefit spell for clients whose spell lasted at least 43 weeks duration



Notes:
a: Probability of exiting their current spell of Unemployment Benefit in the interval through either cancelling the benefit entirely or transferring to a benefit other than the Unemployment Benefit.
b: Year starts from September.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Finally, we can compare the increase in hazard between the first, second and third reapplication. For each cohort, we can see the second application results in a smaller increase in hazard than the first. For example, for the 2010/11 cohort the increased hazard at first reapplication was 0.77 percent, while at the second the hazard increased to 0.75 percent and with the third at 0.63 percent.

Impact of the reapplication process on ending Unemployment Benefit spells

The descriptive analysis shows the reapplication process increased the likelihood that a client would exit from an Unemployment Benefit at anniversary. To quantify this impact, we used duration modelling to separate the impact of the reapplication process from other factors that influence a client's duration on benefit. The technical notes section provides detail on this modelling work (see page 46).

Table 1 summarises the model estimate of the impact of the 52-week reapplication process on the probability of clients ending their current Unemployment Benefit spell. The reapplication process was represented by a time-varying categorical variable. The values of this variable are:

- 52wks: interval in which the client's 52-week anniversary date falls
- Post52wks 1: the first 90 days after the 52-week anniversary
- Post52wks 2: 91 to 180 days after the 52-week anniversary
- Post52wks 3: 181 days to commencement of subsequent 52-week reapplication process
- Not Applicable: intervals in which the reapplication process is not applicable.

If more than one level falls within an interval, then '52wks' is always selected over other levels.

Table 1: Parameter estimates for the 52 week reapplication process on the hazard of ending a current spell on Unemployment Benefit

	Number of reapplications		
Variable	1	2	3
52wks	*** 1.75	*** 1.44	*** 0.91
Post52wks 1	*** 0.10	** 0.10	
Post52wks 2	*** 0.10		
Post52wks 3	*** –0.09		
Not Applicable	0.00		

Notes: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

The estimates in Table 1 show the change in the probability of exiting from the Unemployment Benefit. A positive value indicates that the state increases the hazard of exit, while a negative value decreases the hazard (all else being equal). For categorical variables, such as reapplication, the estimate is relative to the reference group (in this case, not participating in the reapplication process: Not Applicable).

From Table 1 we can see that the reapplication process changes the hazard of exiting from an Unemployment Benefit through a substantial increase in the probability of exit at anniversary (52wks), followed by a much smaller increase in the first 3 months after reapplication (Post52wks 1), falling further for the period between 3 months and 11 months after the anniversary.

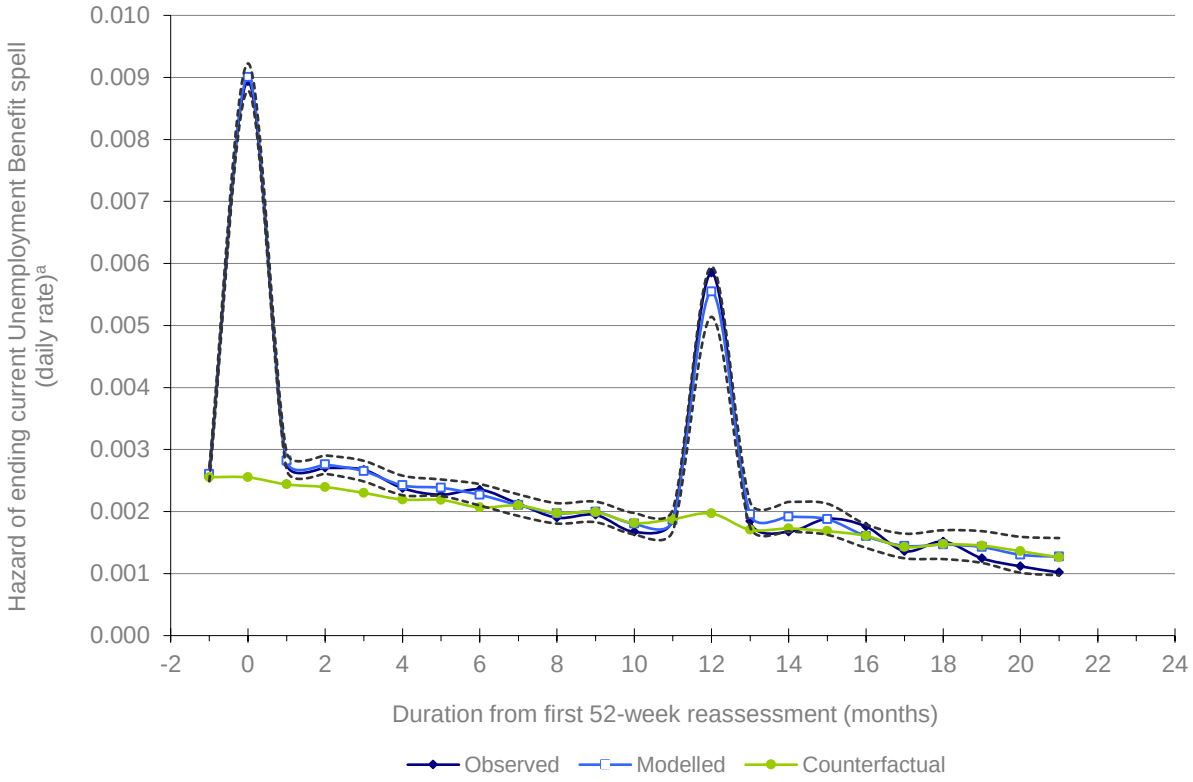
Table 1 also shows the impact of the first, second and third reapplications within the same Unemployment Benefit spell. As noted in the descriptive analysis, the impacts of the second and third reapplications are somewhat smaller than for the first reapplication. In the case of the post-reapplication periods after the second and third reapplications, we found these were not statistically significant and were set to Not Applicable.

Estimated impact on hazard of exiting current Unemployment Benefit spell

Based on the duration model results in **Table 1**, **Figure 6** shows the estimated impact of the reapplication process on ending an Unemployment Benefit spell. **Figure 6** shows the hazard rate of exiting an Unemployment Benefit before and after the first reapplication anniversary. For each interval, we show the estimated hazard of ending a current Unemployment Benefit spell based on two scenarios. The first is that participants went through the reapplication process and reflects the observed outcomes (called the modelled hazard). The second is the counterfactual, representing what we would expect to have happened if participants had not taken part. The counterfactual was estimated by applying the same hazard model to participants but defining them as non-participants (ie, the 52-week reapplication categorical variable in the model is switched to not participating – Not Applicable). All other characteristics and model parameters remain unchanged. **Figure 6** also shows the observed hazard rate for those clients included in the analysis.

By comparing the modelled and observed hazard rate, we can get a sense of how well we could represent the actual hazard of exiting from Unemployment Benefit for affected clients. While the model performs well overall, it does not exactly follow the observed hazard. The main issue is that the model fails to capture fully the increased hazard of ending an Unemployment Benefit as part of the second reapplication. The number of observations was too small to show the impact of the third reapplication.

Figure 6: Modelled impact of the reapplication process on the hazard rate of ending an Unemployment Benefit spell



Notes:
a: Based on model parameter values and observed characteristics of those clients subject to the reapplication process.
Modelled: Model is based on characteristics of clients who participated in the reapplication process using model estimates.
Counterfactual: The counterfactual is estimated by setting the variable for participating in the reapplication process to non-participation.
Observed: The actual benefit outcomes of clients affected by the reapplication process.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

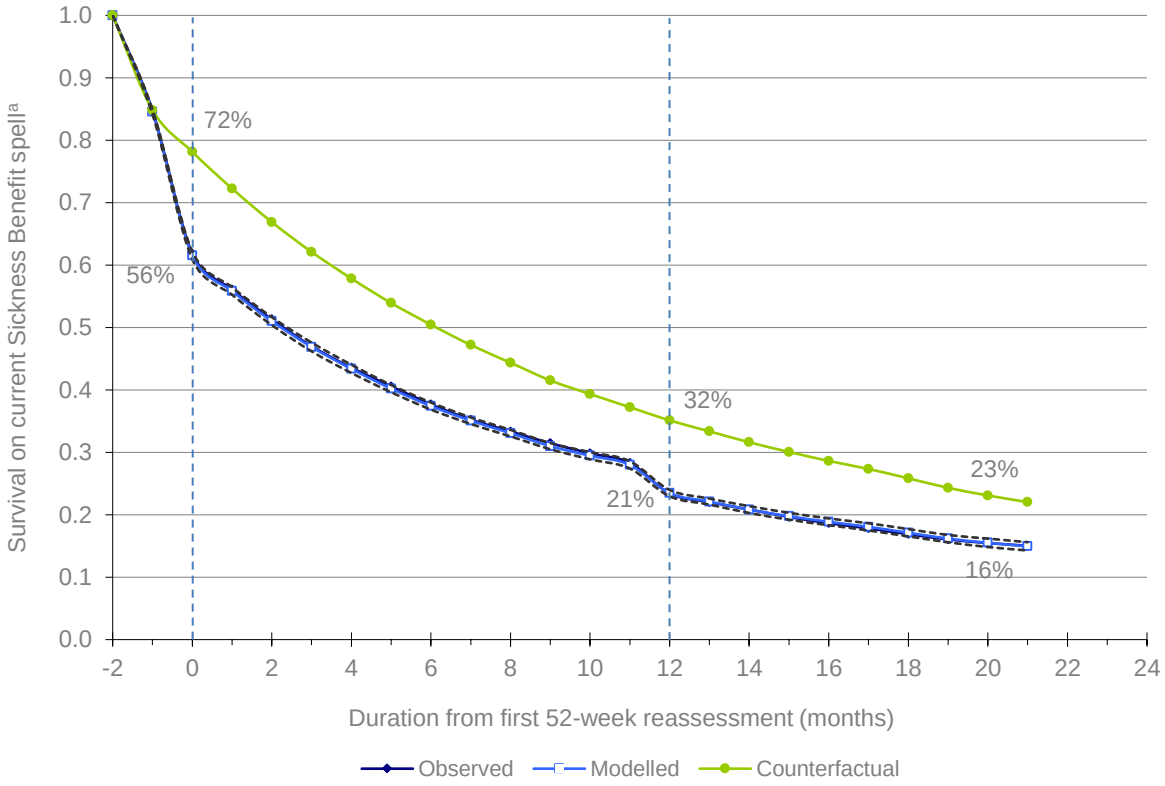
Impact of the reapplication process on survival on current Unemployment Benefit spell

From a policy and operational perspective, hazard rates are not particularly meaningful. Therefore, the next step is to convert these into more easily interpreted values. **Figure 7** converts the hazard rates in **Figure 6** to survival curves. The observed curve represents the actual survival of clients who participated in the reapplication process, while the model curve represents our estimate based on our duration model.

Comparing the counterfactual and model curves, we can see the estimated impact of the reapplication process on the duration on the Unemployment Benefit. The largest impact is at interval 0, with 61.5 percent remaining on an Unemployment Benefit after participating in the reapplication process, while we estimate 78.1 percent would have been on an Unemployment Benefit if they had not participated. Therefore, we can say that the immediate impact of the reapplication process was to reduce the proportion of clients on Unemployment Benefit by 16.6 percentage points or 21 percent. This reduction continues throughout the observed period, with a further noticeable drop at the second reapplication. At the end of the analysis period (month 21), the difference has increased to 32 percent (7.1 percentage points (ppt) / 22.0 percent).

Finally, because there is still a difference between the modelled and counterfactual at the end of the series (21 months), we have not yet observed the full impact of the reapplication process on the time that affected clients spend on their current Unemployment Benefit spell.

Figure 7: Modelled impact of the 52 week reapplication process on survival on current Unemployment Benefit spell



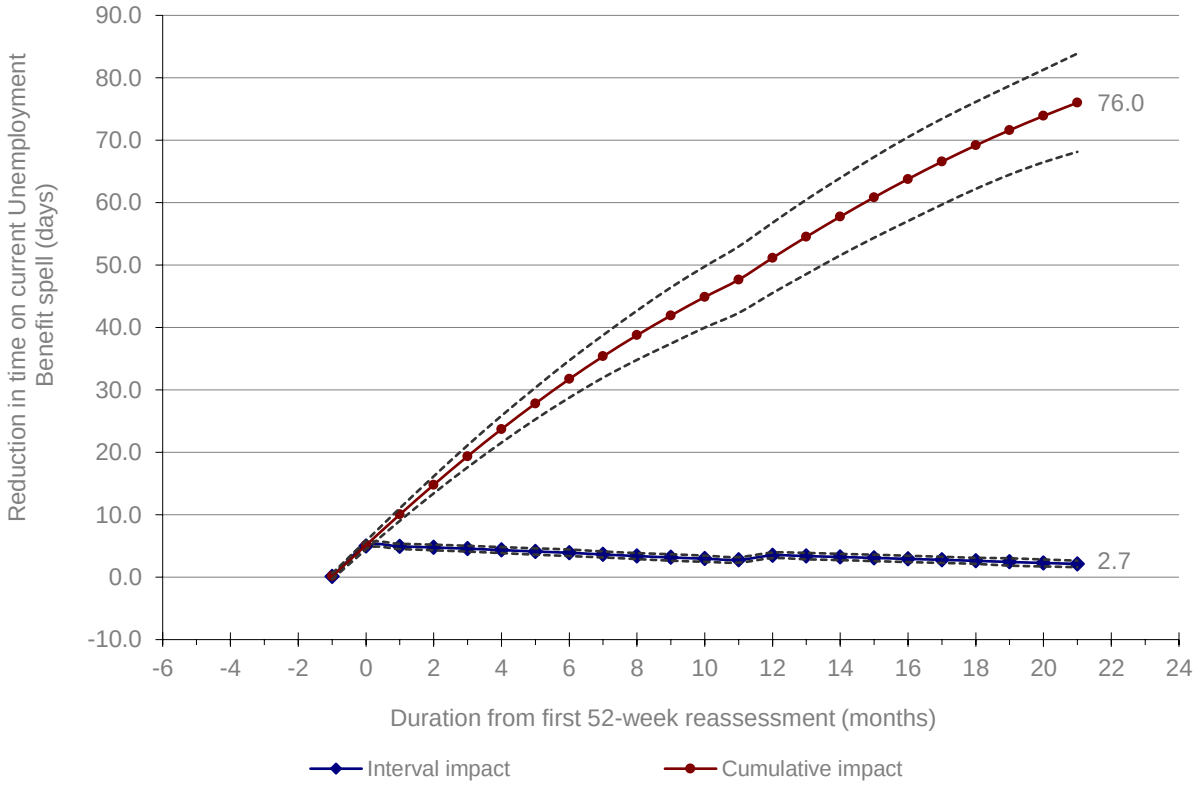
Notes:
a: Proportion who remain on their current unemployment-related benefit (Unemployment, Unemployment Training and Student Hardship); that is, they have not exited main benefit or transferred to a benefit other than Unemployment Benefit.
Observed: The actual benefit outcomes of clients affected by the reapplication process.
Modelled: Number of exits from unemployment-related benefits (Unemployment, Unemployment Training and Student Hardship) divided by the number of individuals with at least one period with each characteristic.
Counterfactual: Proportion who remain continuously off any main benefit.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics).

Impact of the reapplication process on time spent on current Unemployment Benefit spells

Based on the survival curves in **Figure 7**, we can represent the impact of the reapplication process as a reduction in the average time clients spent on their Unemployment Benefit spell. **Figure 8** shows the reduction in the time clients spend on an Unemployment Benefit in each interval (interval impact) and the total time over the entire period (cumulative impact). Before interval 0, the reapplication process has a negligible impact. At interval 0, participation in the reapplication process reduced the time on an Unemployment Benefit spell by 4.98 (±0.41) days on average. Over successive intervals, this impact steadily falls, reaching 2.44 (±0.52) days by 21 months. The cumulative impact measures the reduction up to the end of each interval. For example, by 21 months, clients participating in the reapplication process are estimated to have spent 76.01 (±7.88) fewer days on the Unemployment Benefit in total.

Figure 8: Interval and cumulative impact of the 52 week reapplication process on time spent on current Unemployment Benefit spell



Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics).

Duration on any main benefit

Having established that clients are more likely to exit their current Unemployment Benefit spell because of the reapplication process, the next question is whether they exit completely from any main benefit.

Duration on any main benefit

In this analysis, we combine any consecutive spell on any main benefit (ie, Unemployment, Sickness, Invalid's, Domestic Purposes and retirement related) into a single spell. Spells separated by more than one day are defined as separate spells. Any change in partner status has no effect on spell duration, so a client changing their status from single to a partner will not end their current spell on main benefit.

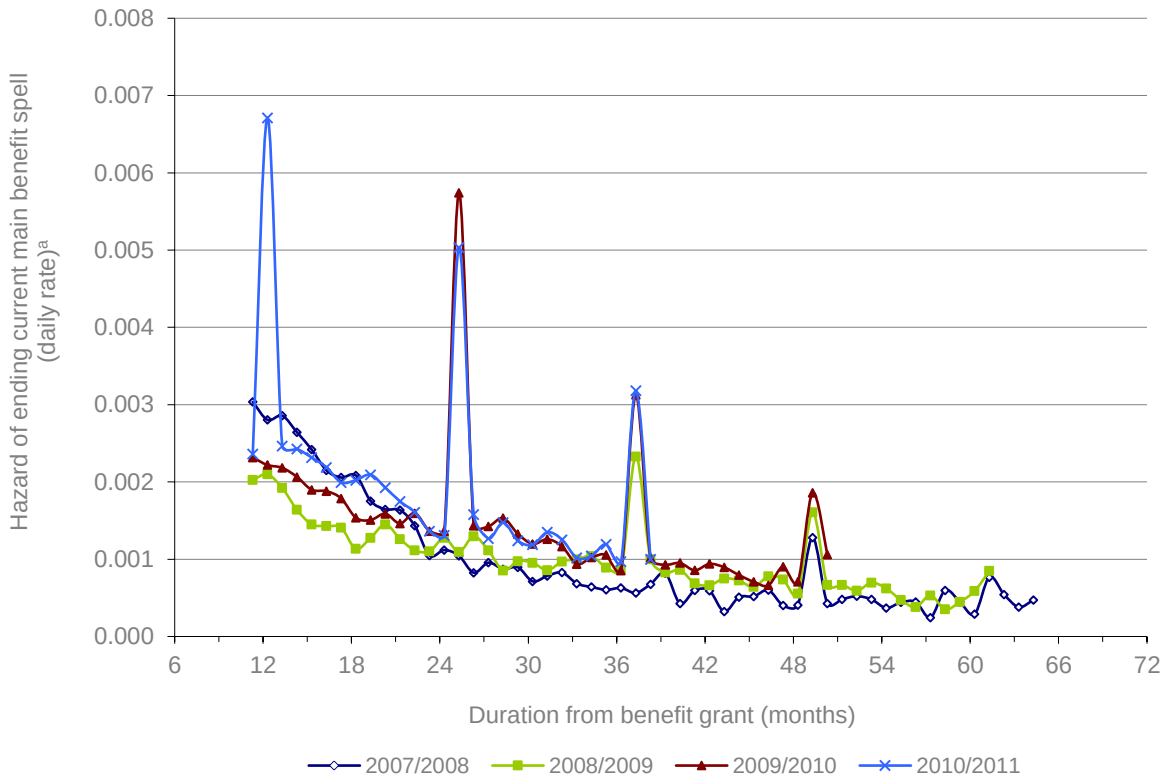
The data is based on the most current version of the administrative data and therefore spells include retrospective changes to spell history. This means some clients affected by the reapplication process appear to have short spells. These instances occur when, through the reapplication process, Work and Income finds that they were ineligible for benefit for some period before they reached their anniversary date. In such instances, the benefit spell ends when eligibility ceased and any overpayments are transferred as a debt against the client.

Hazard of exiting from a current spell on main benefit

Figure 9 shows the observed hazard rate for exiting from any main benefit after reaching 43 weeks on an Unemployment Benefit, for the **same** sample of clients shown in **Figure 4**. The pattern of hazard rates is similar for the exit from current Unemployment Benefit, but the increased hazard associated with the reapplication process is lower for ending a spell on any benefit. There are two

reasons for this. The first is that some clients may transfer from an Unemployment Benefit to other main benefits in response to the reapplication process. Here, clients exit unemployment but not a main benefit. The second reason is that, at each anniversary period, fewer clients are on the Unemployment Benefit and therefore subject to the reapplication process. In other words, they had already transferred to another benefit before reaching their first reapplication anniversary. This also explains why the impact of second and third reapplications diminishes much more quickly than for duration on Unemployment Benefit.

Figure 9: Hazard rates for duration on any main benefit for clients whose Unemployment Benefit spell was at least 43 weeks duration



Notes:
a: Probability of exiting their current spell on any main benefit in the interval through cancelling benefit entirely.
b: Year starts from June.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Impact of the reapplication process on exit from main benefit

To quantify the reapplication impact, we used duration modelling to separate the impact of the 52-week reapplication process from other factors that influence a client's duration on benefit. The technical notes section provides detail on this modelling work (see page 52).

Table 2 summarises the model estimate of the impact of the 52-week reapplication process on the probability of clients ending their current main benefit spell. The reapplication process was represented by a time-varying categorical variable. The values of this variable are:

- 52wks: interval in which the client's 52-week anniversary date falls
- Post52wks 1: the first 90 days after the 52-week anniversary
- Post52wks 2: 91 to 180 days after the 52-week anniversary
- Post52wks 3: 181 days to commencement of the subsequent 52-week reapplication process
- NotApp: intervals where the reapplication process is not applicable.

If more than one level falls within an interval, the '52wks' is always selected over other levels.

Table 2: Parameter estimate for the 52 week reapplication process variable on the hazard of ending current spell on any main benefit

	Number of reapplications		
Variable	1	2	3
52wks	*** 1.75	*** 1.44	*** 0.91
Post52wks 1	*** 0.10	** 0.10	
Post52wks 2	*** 0.10		
Post52wks 3	*** -0.09		
Not Applicable	0.00		

Notes: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

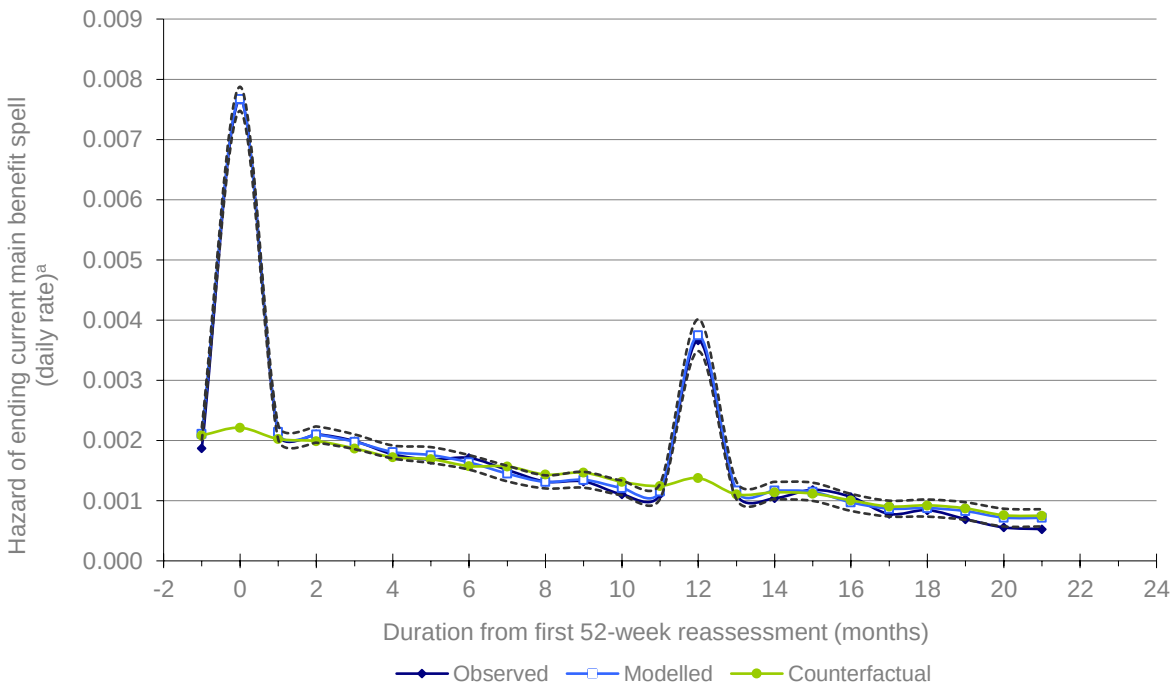
Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

The impact of the reapplication process is similar to the hazard of ending an Unemployment Benefit (**Table 1**, page 16). The second and third reapplications have a smaller impact on the hazard of ending a main benefit spell than the first reapplication.

Estimated impact on the hazard of exiting from main benefit

Based on the duration model and results in **Table 2**, **Figure 10** shows the estimated impact of the reapplication process on ending a current main benefit spell.

Figure 10: Modelled impact of the 52 week reapplication process on the hazard rate of ending a current spell on main benefit



Notes:
a: Probability of exiting their current spell on any main benefit in the interval through cancelling benefit entirely.
Observed: The actual benefit outcomes of clients affected by the reapplication process.
Modelled: Number of exits from unemployment-related benefits (Unemployment, Unemployment Training and Student Hardship) divided by the number of individuals with at least one period with each characteristic.
Counterfactual: Proportion who remain continuously off any main benefit.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Figure 10 shows the hazard rate from 5 months before reaching a client's first anniversary date until 21 months afterwards (the maximum period we can currently estimate the impact for). For each interval, we show the estimated hazard of ending the current main benefit spell based on two scenarios. The first is that clients went through the reapplication process (the model) and

represents the observed outcomes. The second is the counterfactual, representing what we would expect to have happened if clients had not participated in the reapplication process. The counterfactual in this case is estimated by applying the same hazard model to participants, but defining them as non-participants (ie, the 52-week reapplication categorical variable in the model is switched to not participating – Not Applicable, in **Table 2**). All other characteristics and model parameters remain unchanged.

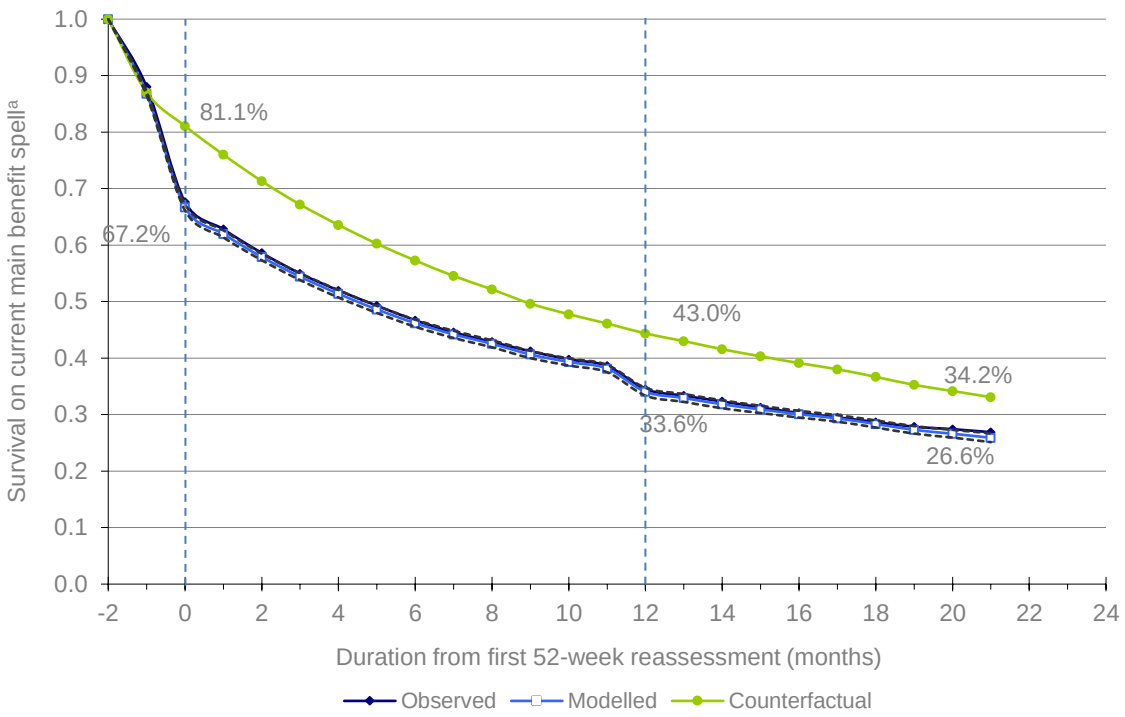
Like the Unemployment Benefit duration model, the duration on any main benefit model reflects the observed hazard of exiting main benefit, with only small discrepancies around the second reapplication event.

Impact of the reapplication process on the duration of a main benefit spell

Figure 11 shows the survival on any main benefit based on the hazard rates in **Figure 10**. Comparing the observed and modelled curves, we can assess how well the duration modelling is able to reflect the survival of clients on a main benefit.

The difference between the model and counterfactual proportions on a main benefit is the estimated impact of the reapplication process. The reapplication process has its largest impact at interval 0 with 14.4 percentage points or 18 percent. The difference between the modelled and counterfactual curves decreases over subsequent intervals, so by 21 months the difference is 7.2 percentage points (22 percent). Because the model and counterfactual lines have not converged, we have not seen the full impact of the reapplication process on the probability of being on a main benefit.

Figure 11: Modelled impact of the 52 week reapplication process on duration on any main benefit spell



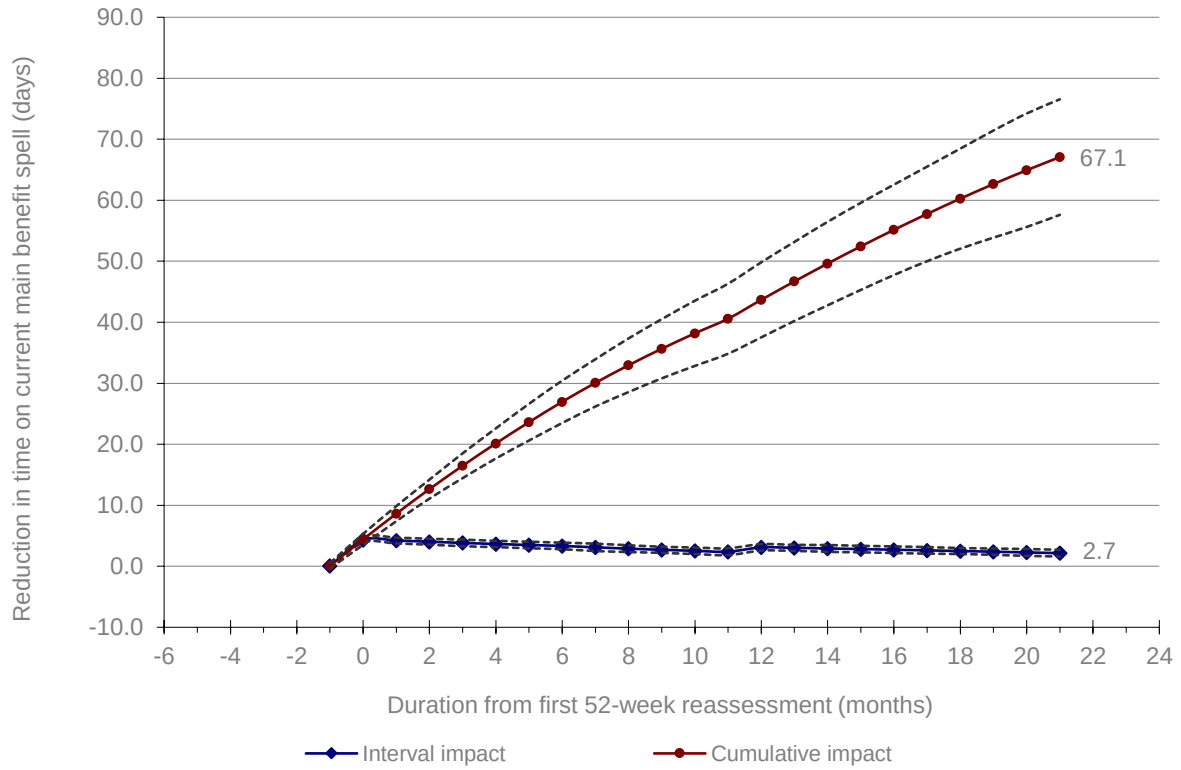
Notes:
a: Proportion who remain continuously on any main benefit.
Observed: The actual benefit outcomes of clients affected by the reapplication process.
Modelled: Number of exits from unemployment-related benefits (Unemployment, Unemployment Training and Student Hardship) divided by the number of individuals with at least one period with each characteristic.
Counterfactual: Proportion who remain continuously off any main benefit.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Impact on time spent on a main benefit spell

Based on the survival curves in Figure 11, we can represent the impact of the reapplication process as a reduction in the average time clients spent on their main benefit spell. Figure 12 shows the reduction in time clients spend on a main benefit in each interval (interval impact) and the total time over the entire period (cumulative impact). Before interval 0, the reapplication process has a negligible impact. At interval 0, participation in the reapplication process reduced the time on main benefit spell by 4.32 (±0.54) days on average. Over successive intervals this impact steadily falls, reaching 2.39 (±0.55) days by 21 months. The cumulative impact measures the reduction up to the end of each interval. For example, by 21 months, clients participating in the reapplication process are estimated to have spent 67.08 (±9.47) fewer days on a main benefit in total.

Figure 12: Interval and cumulative impact of the 52 week reapplication process on time spent on a current main benefit spell



Note: The dotted lines indicate the 95 percent confidence interval.

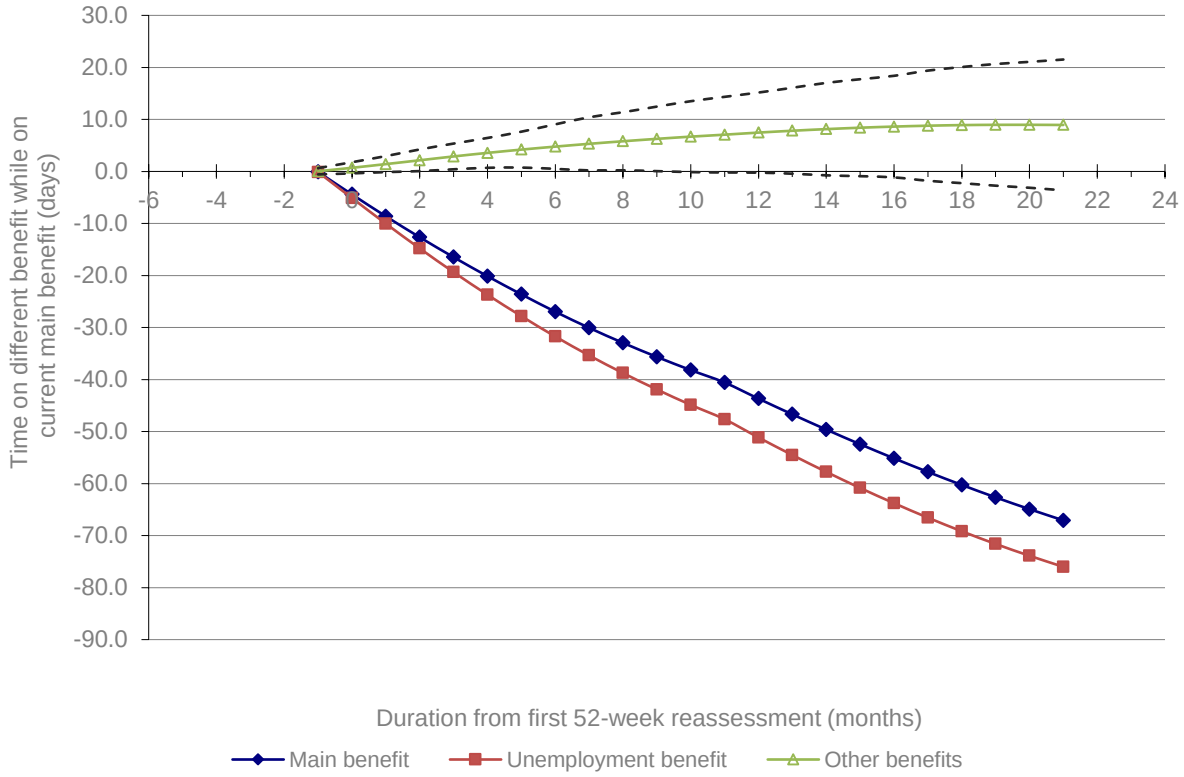
Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Clients transferring to other benefits

By calculating the difference in average time on an Unemployment Benefit and a main benefit, we can estimate the impact of the reapplication process on benefit transfers. These occur when a client participates in the reapplication process and then transfers to another main benefit. Note that this does not deal with those cases where a client exits from benefit and then later returns onto a benefit other than unemployment.

Figure 13 plots the cumulative impact for time on Unemployment Benefit (**Figure 8**) and main benefit (Figure 12), the difference is the time spent on benefits other than Unemployment Benefit. The reapplication process has not resulted in a large increase in transfers from Unemployment Benefit to other benefits (eg, Sickness Benefit). At 21 months, the reapplication process increased the time on non-unemployment-related benefits by 8.96 (±11.69) days.

Figure 13: Cumulative impact of 52 week reapplication process on time spent on Unemployment Benefit and other benefits within current spell on main benefit



Note: The dotted lines indicate the 95 percent confidence interval.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics).

Duration off main benefit

The last outcome we examine is how soon clients return after exiting from a main benefit. So far, we have examined the impact of the reapplication process on time spent on benefit. While it appears that the reapplication process has achieved large increases in exits from benefit, these reductions may be short lived if these same clients quickly return to benefit. If this were the case, then increased rates of benefit exit would simply increase the cost of income support administration, rather than increasing the time clients are off benefit.

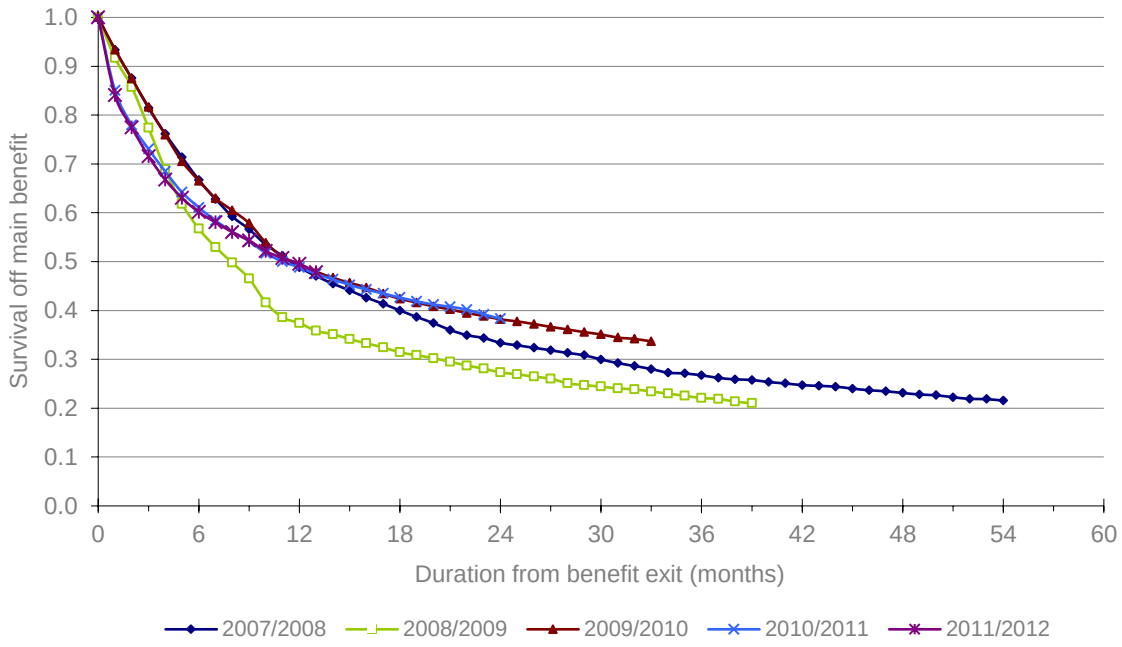
Definition of off-benefit spell

Off-benefit spells are defined as starting when a client exits a main benefit for more than one day. The spell ends when they return to a main benefit.

Observed survival off a main benefit

Because we know that the reapplication process has its largest impact at the benefit anniversary date, we examine the off-benefit spells that occur at this point in a client's benefit spell. **Figure 14** compares the survival off main benefit by year of exit, and **Figure 15** shows the corresponding hazard. Those who exited after September 2010 are subject to the reapplication process (the 2010/11 line). What **Figure 15** shows is a sharp fall in survival off main benefit in the first two months after exit for clients participating in the reapplication process, compared with earlier clients. However, over the subsequent months, the proportion off benefit converges with the historical trend. The much lower survival for those who exited in 2008/09 likely reflects the impact of the economic downturn in 2009.

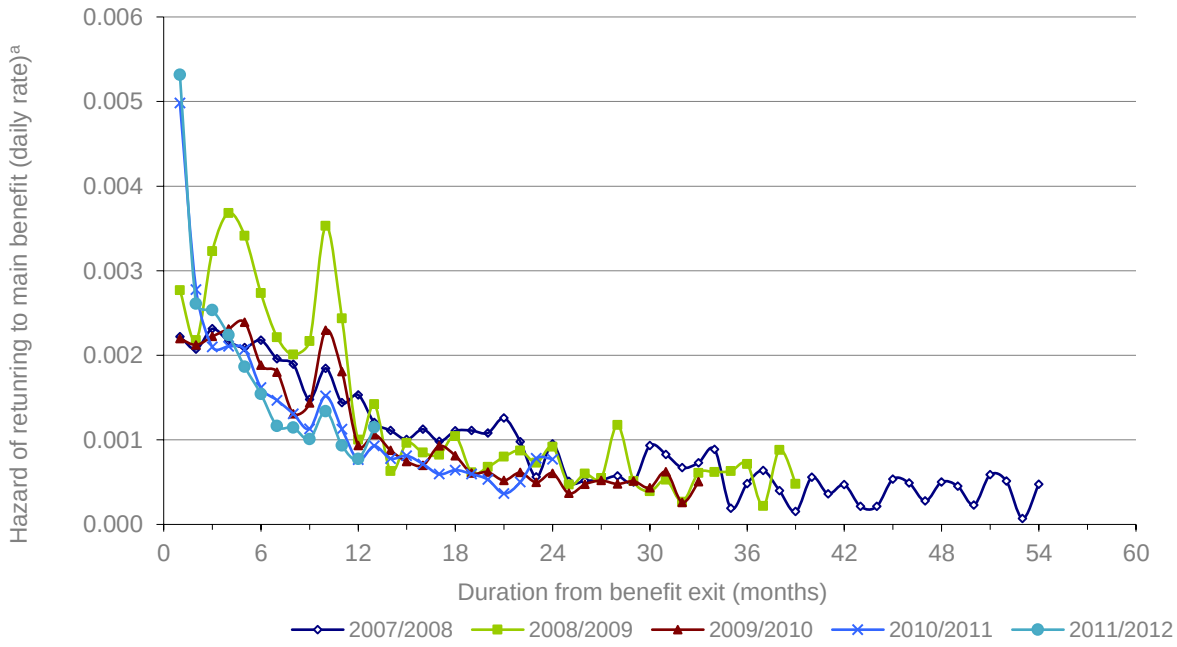
Figure 14: Survival of remaining off main benefit for clients on who reach 43 weeks duration on Unemployment Benefit and exit main benefit at anniversary date



Notes:
a: Proportion who remain continuously off any main benefit.
b: Year starts from September.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Figure 15: Hazard of ending an off main benefit spell for clients on who reach 43 weeks duration on Unemployment Benefit and exit main benefit at anniversary date



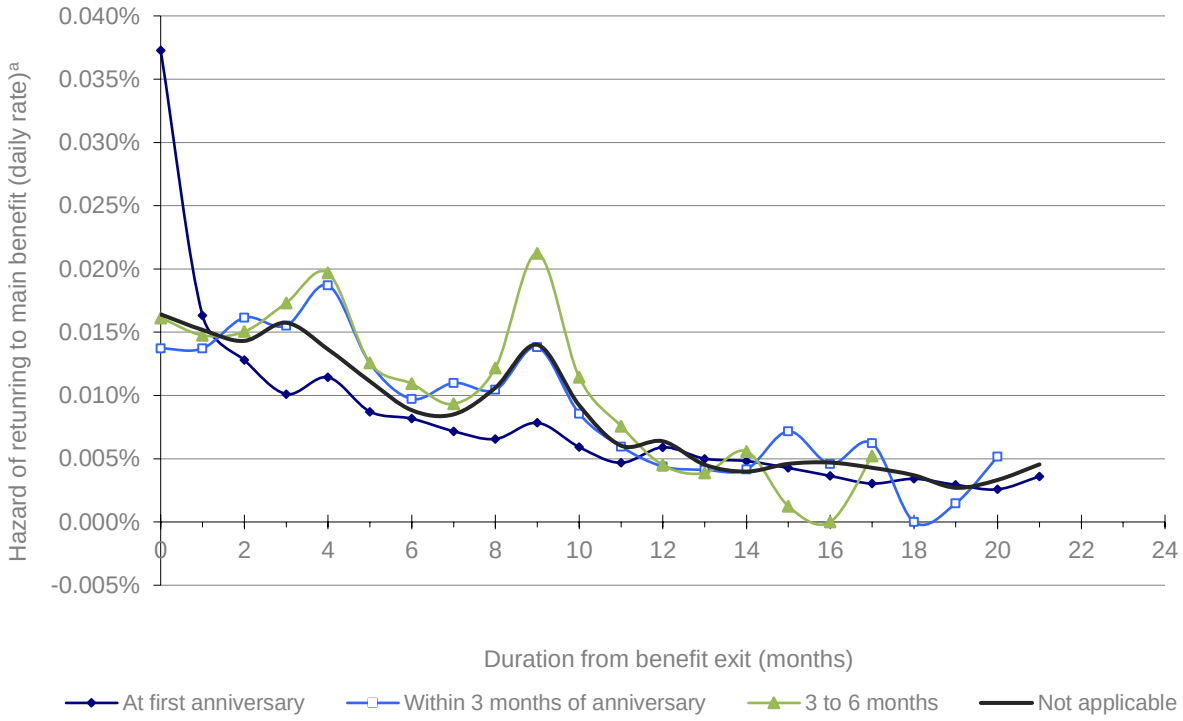
Notes:
a: Probability of returning to main benefit in each interval after exiting main benefit.
b: Year starts from September.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Reapplication process exit and time off benefit

Figure 16 examines survival off main benefit by the stage at which the client exits the reapplication process. For example, 'At first anniversary' refers to those clients whose benefits were automatically cancelled at their reapplication anniversary date. What **Figure 16** confirms is that the reapplication process influences the return to benefit for exits at anniversary, while exits after anniversary do not differ greatly from the pattern observed when clients exited outside of the reapplication process (the 'not applicable' line).

Figure 16: Survival off main benefit by stage in the reapplication process at exit



Note:
a: Proportion who remain continuously off any main benefit.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Automatic cancellation has a different impact at the second anniversary

The impact of the automatic cancellation of benefits at anniversary differs between the first and second anniversary, with affected clients more likely to return to benefit within the first 30 days after exit at the second anniversary. The hazard at interval 0 for first anniversary is 0.037 percent, but at second anniversary this increases to 0.050 percent.

Impact of the reapplication process on time spent off main benefit

To quantify the impact of the reapplication process, we used duration modelling to separate the impact of the 52-week reapplication process from other factors that influence clients' duration off benefit. The technical notes section provides detail on this modelling work (see page 58).

Table 3 summarises the model estimate of the impact of the 52-week reapplication process on the probability of clients returning to benefit after exiting during the reapplication process. Our analysis confirmed that the only significant relationship between returning to main benefit and the reapplication process occurred for clients exiting benefit at their anniversary. Furthermore, the impact of the reapplication process on returning to benefit differed between the first and second anniversary. On the other hand, we saw no change in the probability of returning to benefit if clients exited after their anniversary date.

From Table 3, we can see that the reapplication process increased the hazard of ending an off-benefit spell for those clients who exited at their anniversary date. The impact was initially high within the first month after exit, while for the following 8 months we see a reduction in the probability of returning to benefit. For the second reapplication, we found a higher impact in the first month, while the third had a lower impact. For both the second and third reapplications, exiting at anniversary did not significantly change the probability of returning to benefit after the first month. However, this is likely because of the small number of clients in this group, which limited our ability to detect these effects.

Table 3: Parameter estimates for the 52 week reapplication process variable on the hazard of returning to main benefit

	Number of reapplications		
Variable	1	2	3
Exits at anniversary, month after exit			
01 month	*** 0.98	*** 1.25	** 0.85
02 month	** -0.10		
03 month	*** -0.36		
04 month	*** -0.73		
05 month	*** -0.55		
06 month	*** -0.52		
07 month	*** -0.47		
08 month	*** -0.48		
09 month	*** -0.76		
6 NotApp	0.00		

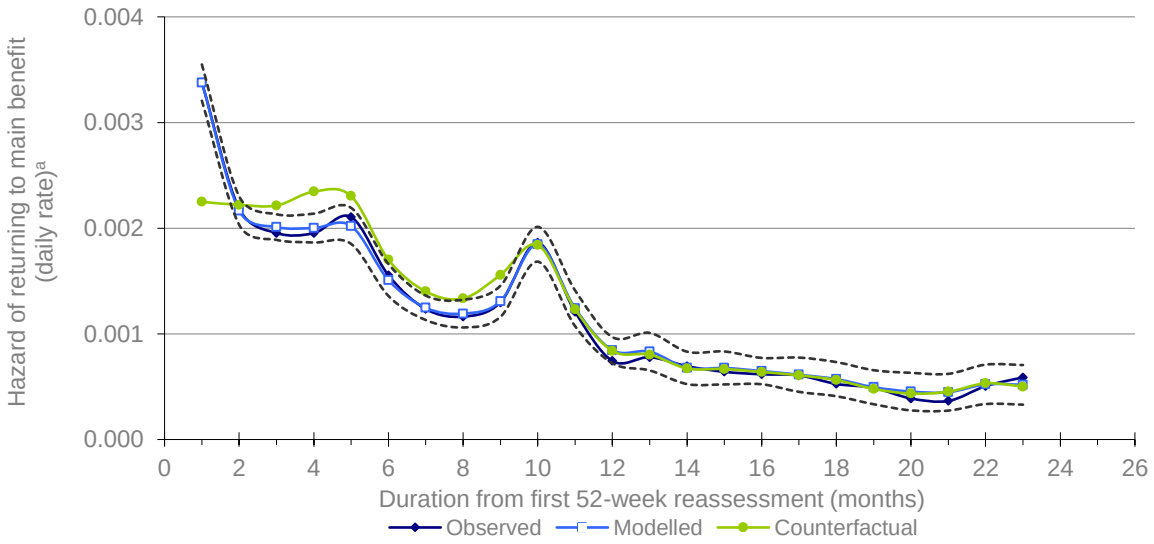
Note: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Impact on the hazard of returning to main benefit

Based on the duration model and results in **Table 3**, **Figure 17** shows the estimated impact of the reapplication process on returning to main benefit.

Figure 17: Modelled impact of the 52 week reapplication process on the hazard rate of ending off main benefit spell



Notes:
a: Probability of returning to main benefit in each interval after exiting main benefit.
Observed: The actual benefit outcomes of clients affected by the reapplication process.
Modelled: Number of exits from unemployment related benefits (Unemployment, Unemployment Training and Student Hardship) divided by the number of individuals with at least on period with each characteristic.
Counterfactual: Proportion who remain continuously off any main benefit.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics).

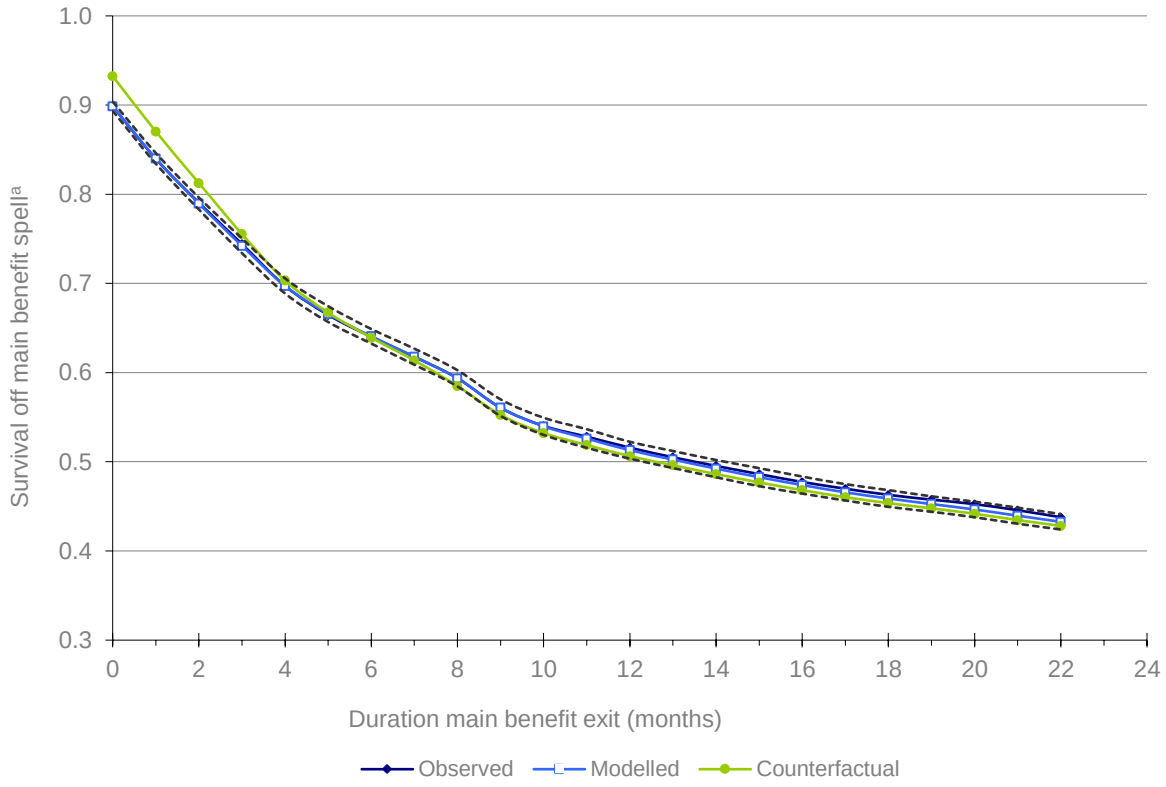
Figure 17 shows the hazard rate of returning to main benefit 23 months after exit (the maximum period we can currently estimate the impact for). For each interval, we show the estimated hazard of returning to a main benefit based on two scenarios. The first is that the client went through the reapplication process. This scenario consists of the observed outcomes. The second is the counterfactual, representing what we would expect to have happened if the client had not participated in the reapplication process. The counterfactual in this case was estimated by applying the same hazard model to participants but defining them as non-participants (ie, the 52-week reapplication categorical variables in the model are switched to not participating). All other characteristics and model parameters remained unchanged.

By comparing the observed and modelled hazards, we can assess how well the model represents the actual pattern in the hazard of clients participating in the reapplication process. Overall, the model reflects the observed pattern in the hazard.

Reapplication process impact on duration off main benefit

Figure 18 shows the duration off main benefit based on the hazard rates in **Figure 17**. By comparing the observed and modelled curves, we can assess how well the duration modelling is able to reflect the time clients remain off main benefit.

Figure 18: Modelled impact of the 52 week reapplication process on duration off main benefit



Notes:
a: Proportion who remain continuously off any main benefit.
Modelled: Number of exits from unemployment-related benefits (Unemployment, Unemployment Training and Student Hardship) divided by the number of individuals with at least one period with each characteristic.
Counterfactual: Proportion who remain continuously off any main benefit.
Total time on benefit includes reduction in time on main benefit and any change in the time off benefit after exit.

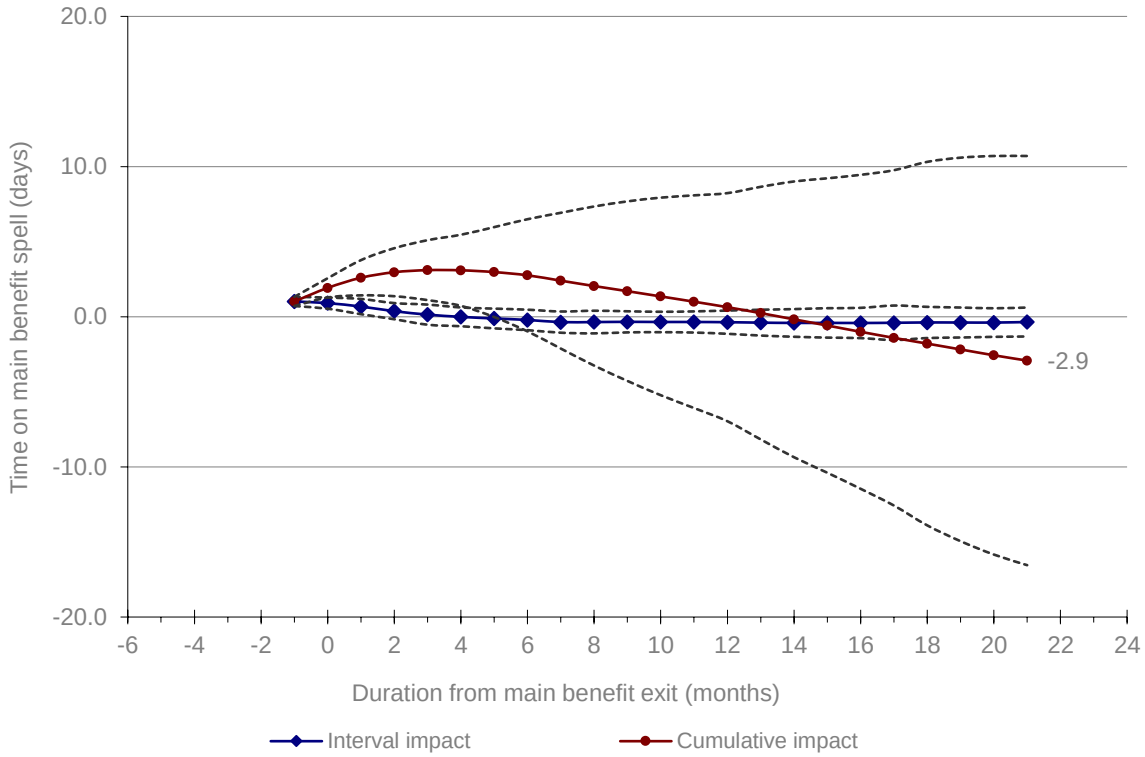
Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Impact on time spent off main benefit

Based on the survival curves in **Figure 18** we can represent the impact of the reapplication process as a reduction in the average time clients spent off main benefit. **Figure 19** shows the reduction in time that clients spent off benefit in each interval (interval impact) and the total time over the entire

period (cumulative impact). By 23 months, clients participating in the reapplication process are estimated to have reduced the time off main benefit by –2.92 (±13.62) days. In other words, other than those clients who return to benefit immediately after automatic benefit cancellation, the reapplication process has not altered the time that clients spend off main benefit.

Figure 19: Interval and cumulative impact of the 52 week reapplication process on time spent off main benefit spell



Note: The dotted lines indicate the 95 percent confidence interval for the impact of the reapplication process compared with the counterfactual.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Total time on main benefit

Because the reapplication process reduces the time clients spend on their current benefit spell, but also the time they remain off benefit after exiting, we need to combine the results to arrive at an estimate of the reduction in overall time on benefit (see the technical notes Summary of impacts for more detail on how this was done).

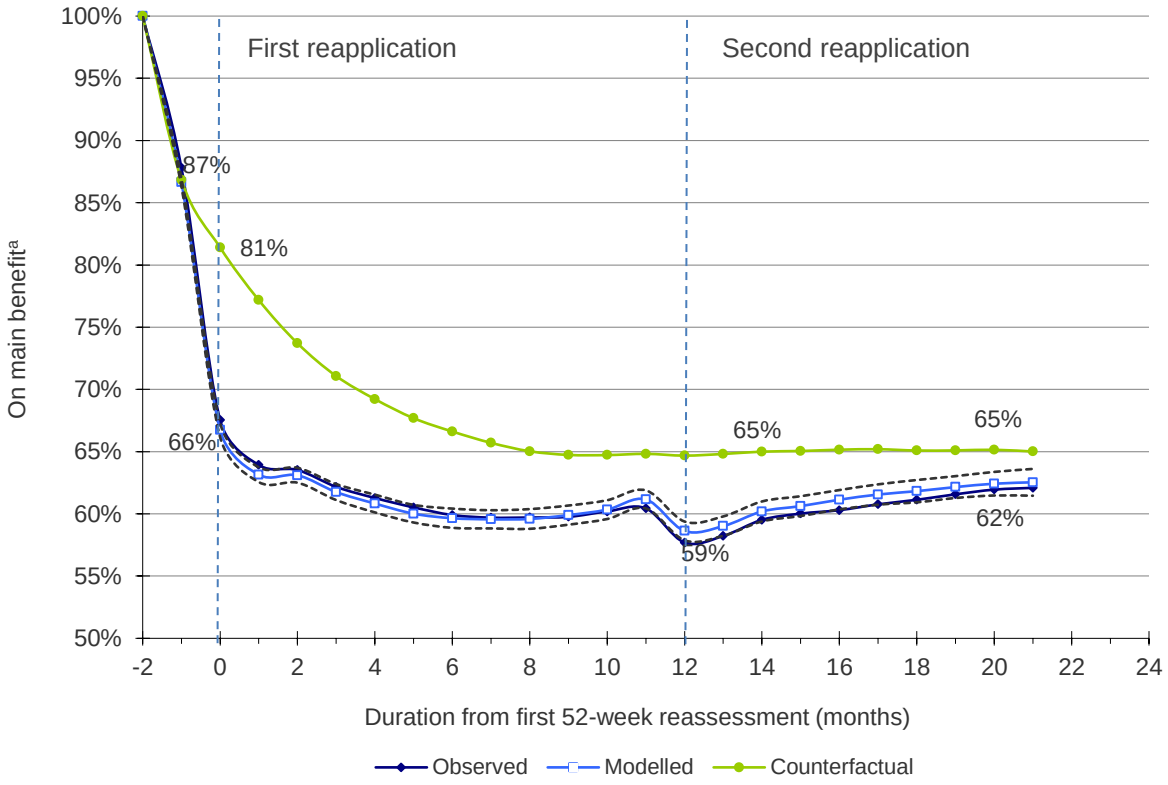
Proportion of clients on main benefit

Figure 20 shows the probability that clients will be on benefit from their first anniversary. Unlike previous analysis, these are not survival curves. Instead, the figures show the probability of being on benefit (ie, they include both the time to benefit exit as well as the time to return to benefit). In doing so, we can account for the impact of the reapplication process on reducing the time on main benefit as well as its variable impact on reducing the time off benefit (ie, clients returning to benefit immediately after automatic cancellation of benefit). If a client returns to benefit, they remain on benefit for the remainder of the outcome period.[6]

[6] This assumes that reapplication process has no impact on duration of subsequent benefit spells.

The modelled proportion on benefit matches the observed proportion (**Figure 20**). We can see the modelled and counterfactual lines are beginning to converge. After 21 months, the modelled proportion on main benefit is 62.5 percent (±2.2 ppt), compared with 65.0 percent for the counterfactual. Once the modelled and counterfactual lines have converged, we will have observed the full impact of the reapplication process on the time spent on main benefit.

Figure 20: Observed, modelled and counterfactual estimates of the proportion of clients on main benefit



Notes:
a: These are not survival curves, because they account for clients returning to main benefit after exit.
b: The dotted lines indicate the 95 percent confidence interval for the impact of the reapplication process compared with the counterfactual.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics).

Duration on main benefit

Looking at the difference between the counterfactual and modelled probabilities, **Figure 21** shows the interval and cumulative impact of the reapplication process on the time on main benefit. At 21 months after first anniversary, we estimate that affected clients spent 40.9 (±8.8) fewer days on a main benefit than if they had not been subject to the reapplication process. At the end of the outcome period, the interval impact is close to zero. The small interval impact at the end of the series suggests that the final impact will be close to what is reported here.

Summary of impacts

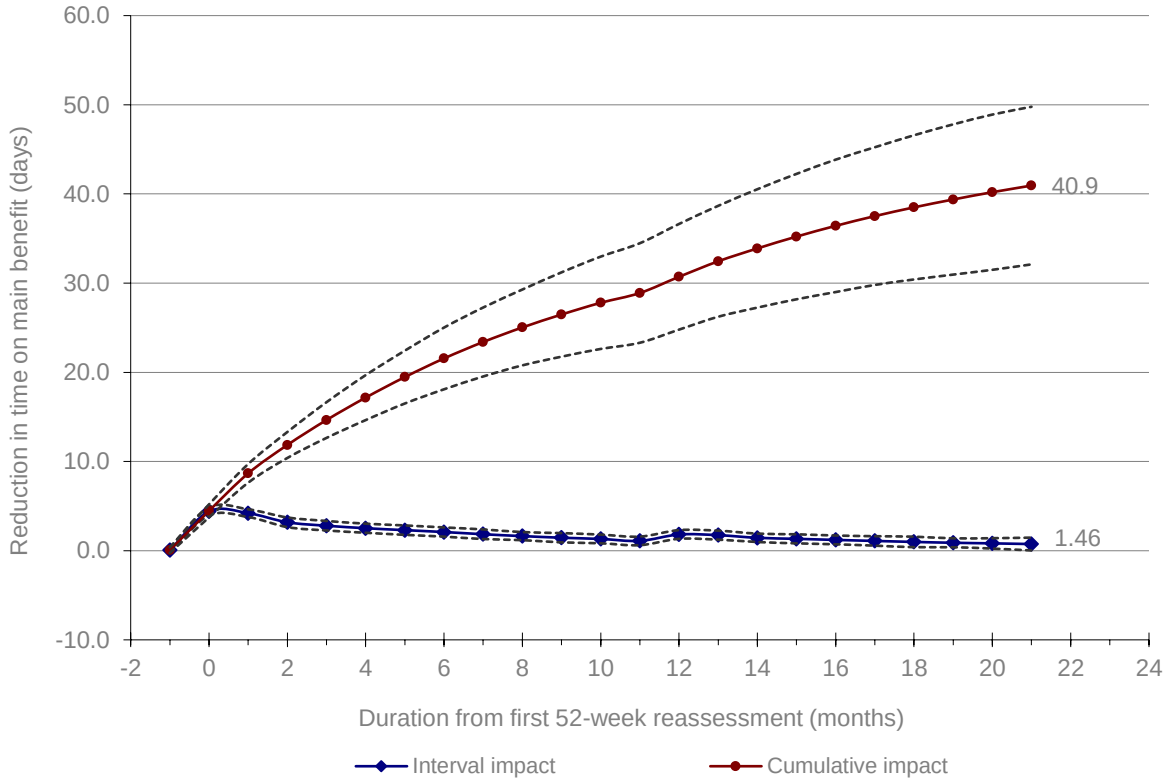
Table 4 summarises the cumulative impact for each of the outcomes covered in this analysis for selected lapse periods.

Automatic cancellation of benefit was the main impact of the reapplication process

Based on the large increase in the hazard of exiting an Unemployment Benefit at anniversary, we can conclude the main impact of the reapplication process was due to the automatic cancellation of benefits at anniversary. The overall result is that the reapplication process reduced by 76 (±7.9)

days the time participating clients spent on their current Unemployment Benefit spell in 21 months after the first reapplication anniversary. In percentage terms, this is a 23 percent decrease over the counterfactual.

Figure 21: Interval and cumulative impact of the reapplication process on time spent on any benefit



Note: The dotted lines indicate the 95 percent confidence interval.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Reapplication process led to a small increase in benefit transfers

In addition to the automatic cancellation of Unemployment Benefits, we are able to identify a small, but not significant, increase in transfers from the Unemployment Benefit to other benefits. At 21 months after first reapplication anniversary, time spent on benefits other than Unemployment Benefits increased by 8.9 (±12.6) days.

Reapplication process increased benefit exits but also decreased time off benefit after exit

Overall time on current main benefit spell decreased by 67 (±9.5) days at 21 months after the first reapplication anniversary. However, many of the clients who exit during the reapplication process are also more likely to return to benefit. At 21 months after benefit exit, clients who exited during the reapplication process spent 3 (±13.6) fewer days off benefit.

The analysis also showed that the clients who exited benefit at anniversary are also the clients who are most likely to return to benefit within 2 months. In these instances, the time off benefit is relatively short (see **Figure 16**, page 26).

Overall, the reapplication process reduced total time on benefit

By accounting for the increased likelihood of returning to benefit, we estimate that the reapplication process reduced the time on main benefit by 41 (±8.8) days at 21 months after the first reapplication anniversary. However, this is not the full impact of the reapplication process, because

the counterfactual and modelled outcomes have not converged. Therefore, the observed impact is an underestimate of the full effect of the reapplication process.

Table 4: Summary of cumulative outcomes and impacts of the reapplication process

Outcome	Estimate (days)	Lapse period (months from first anniversary) 7	14	17	21
Duration on unemployment-related benefit	Observed	165	222	239	258
	Modelled	164 (±2.8)	221 (±4.2)	238 (±5.0)	257 (±6.0)
	Counterfactual	200	278	304	333
	Impact	**-35.4 (±3.4)**	**-57.8 (±6.2)**	**-66.6 (±6.9)**	**-76.0 (±7.9)**
Duration on non-Unemployment Benefit	Observed	20.4	42.4	52.9	67.1
	Modelled	19.0 (±4.2)	40.4 (±6.9)	50.5 (±7.9)	63.8 (±9.7)
	Counterfactual	13.7	32.3	41.7	54.9
	Impact	**5.3 (±5.1)**	**8.1 (±8.9)**	**8.8 (±10.6)**	**8.9 (±12.6)**
Continuous duration on benefit	Observed	185	264	291	325
	Modelled	183 (±2.8)	261 (±5.1)	288 (±5.9)	321 (±7.3)
	Counterfactual	213	311	346	388
	Impact	**-30.1 (±3.9)**	**-49.6 (±6.8)**	**-57.8 (±7.8)**	**-67.1 (±9.5)**
		Lapse period (months from benefit exit) 7	14	17	21
Off benefit after benefit exit	Observed	223	332	374	428
	Modelled	224 (±3.9)	330 (±7.5)	371 (±9.1)	422 (±11.2)
	Counterfactual	226	330	369	419
	Impact	**-2.4 (±4.5)**	**0.2 (±9.2)**	**1.4 (±11.2)**	**2.9 (±13.6)**
		Lapse period (months from first anniversary) 7	14	17	21
On any main benefit	Observed	176	301	355	429
	Modelled	174 (±2.9)	300 (±5.7)	355 (±6.9)	430 (±8.0)
	Counterfactual	198	334	393	471
	Impact	**-23.4 (±3.9)**	**-33.9 (±6.6)**	**-37.5 (±7.7)**	**-40.9 (±8.8)**

Notes:
Observed: Actual duration of clients who have participated in the reapplication process.
Modelled: Estimated duration of participating clients based on regression duration models.
Counterfactual: Estimated duration if clients had not participated in the reapplication process.
Impact: Difference between the modelled and counterfactual duration on benefit.
Bracketed figures provide 95 percent confidence interval for the estimate.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Aggregate impact of the reapplication process

Using the above individual impacts, we calculate the total impact of the reapplication process based on the number of clients commencing the process. To the end of December 2012, 82,123 clients[7] had reached 43 weeks on an Unemployment Benefit (2,933 each month). Using the interval impacts in **Figure 21** (page 31), we calculate when the reduction in time on benefit will occur relative to the month in which participating clients reach their first reapplication anniversary. For example, for clients reaching their first reapplication anniversary in June 2011, the impact of the reapplication process will be distributed between June 2011 and February 2013 (21 months after the first anniversary). **Table 5** summarises the aggregate impact to the end of the report period (October 2012).

[7] Includes partners as well as primary and single clients.

The fall in the impact after June 2012 in **Figure 21** occurs because fewer clients are reaching 43 weeks on an Unemployment Benefit.

Table 5: Estimated reduction in clients on benefit and income support savings from the reapplication process

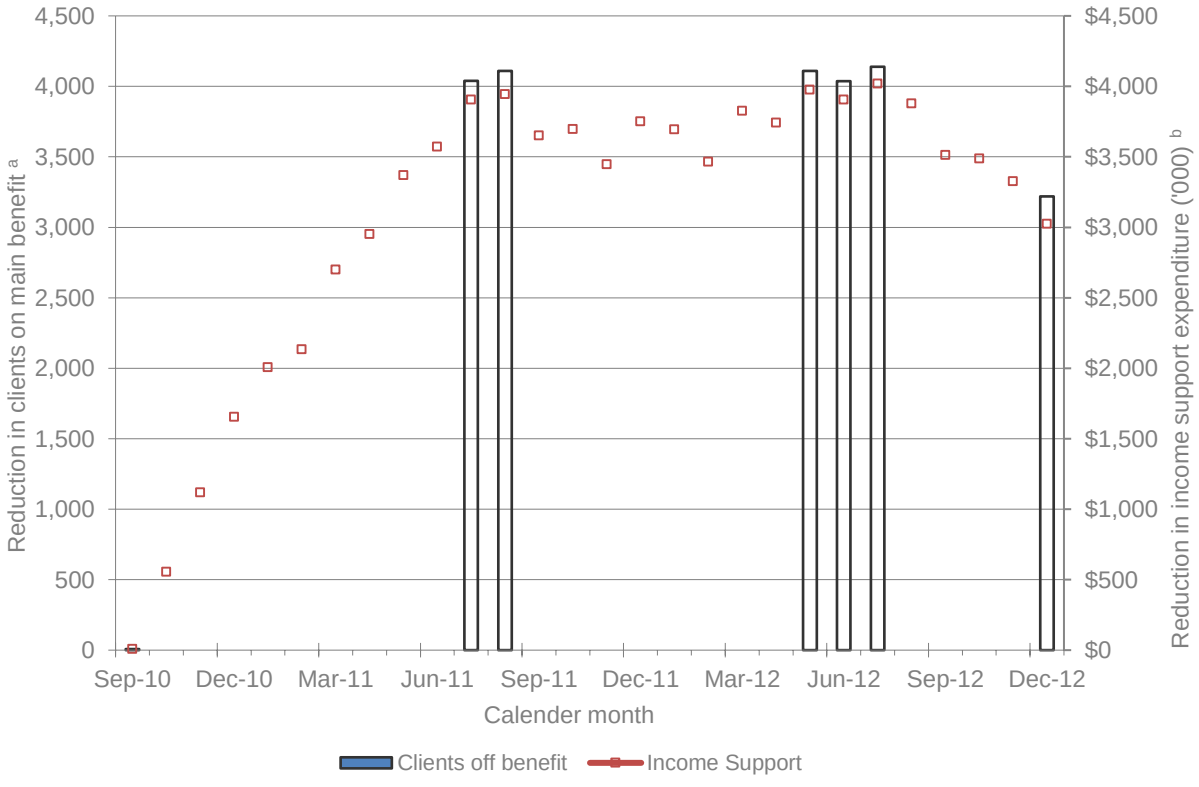
Affected clients	82,123	
Per month	2,933	
Comprehensive Work Assessment reapplications	61,614	
Average reduction in clients on benefit per month	3,300	±600
Reduction in income support expenditure ('000)	$86,300	±$16,500

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Reapplication process has reduced the number of clients on benefit by 3,300

The first result of the reapplication process is to reduce the number of clients on benefit, primarily the Unemployment Benefit, by 3,300 (±600) over the observed period (see also **Figure 22**). We can multiply this reduction by the average real Unemployment Benefit rate to estimate avoided income support expenditure of $86 (±$16.5) million to December 2012 (2012 dollars). For individual participants, the reduction in income support costs would be $1,328 (±$277) over the first 21 months from first anniversary date.

Figure 22: Reduction in clients on benefit and income support savings from the introduction of the 52 week reapplication process



Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Administrative cost of the reapplication process

The reapplication process does impose an administrative cost. All clients are required to attend an interview with a case manager and complete a CWA, as well as reapply for their benefit. Based on administrative data, we can identify which affected clients participate in these interviews. Of all clients, around 58 percent completed a CWA on their first anniversary, while a further 21 percent attended a CWA on their second anniversary and 10 percent on their third. We can therefore state

that affected clients attend 0.90 CWAs over the 21-month follow-up period. The CWA interview lasts for 50 minutes, on average, and would cost $135 (2012) in case manager time to complete.

Is the reapplication process cost effective?

An important question is whether the reapplication process is cost effective. By examining only the departmental costs of administering the reapplication process and the savings in income support expenditure, we can calculate the return on investment at 21 months to be $9.83 in income support savings for every dollar of case manager time spent in administering the reapplication interview.

International evidence

A growing body of evidence is showing that compulsory case management activities like the 52-week reapplication process reduce benefit receipt. Several studies have found that comparatively short job search programmes or compulsory interviews reduce the time clients spend on welfare or Unemployment Insurance in the United States (Benus, Joesch, Johnson, & Klepinger, 1997; Black, Smith, Berger, & Noel, 2003), the United Kingdom (Dolton & O'Neill, 2002), Denmark (Toomet, 2008) and Australia (Borland & Tseng, 2003). However, the Australian study (Borland & Tseng, 2003) found that impacts are sensitive to local labour demand: the strategy had lower impacts for areas with higher unemployment rates.

Participating in planning processes also appears to reduce the time that job seekers spend on benefit in the United Kingdom (Corcoran, 2002) and Ireland (OECD, 2005). However, care needs to be taken when interpreting the impacts, especially large impacts such as those observed from the UK Restart Programme (Dolton and O'Neill, 2002), because they may arise through subsequent assistance received by participants and not solely through activation by the planning process.

Impacts often occur before participation

The impact of these programmes comes about in large part because of the obligation to participate. People often exit benefit **before** starting the programme (the referral or compliance effect). On the other hand, there is less evidence that participating in the compulsory activities themselves improves participants' employment outcomes (Black et al., 2003; Dolton & O'Neill, 2002; OECD, 2005).

Impacts may be short term and exits are not always into employment

Growing international evidence from studies tracking the longer-term impacts of activation measures shows that the early large impacts of activation programmes decrease over time (OECD, 2005). In several of the US welfare-to-work evaluations the initially higher impact of job-search focused programmes decreased over time, while the impact of training plus job search showed better long-term results. However, these studies still conclude that work-first approaches are more cost effective (Greenberg, Deitch, & Hamilton 2009).

Activation strategies can encourage people to leave benefit but not necessarily into paid employment (Schoeni & Blank, 2000).

Do activation measures change the quality of jobs?

Research is increasingly focusing on how reductions in the time looking for work change the quality of work that people targeted by activation measures enter into. At present, the evidence is mixed, with several studies reporting no impact on job quality (Gaure, Røed, & Westlie, 2008; van den Berg, Bergemann, & Caliendo 2008), while others report negative impacts (OECD, 2005). Differences may in part reflect the degree of activation. Increasing the strength of activation may result in faster exits at the expense of suitability of the match. Quality of job matching is important because it not only affects the activated client but also reduces the availability of suitable matches for other job seekers. The worst case would be having activation measures moving higher skilled job seekers into low skilled jobs potentially generating skill shortages and limiting job openings for low skilled job seekers.

Technical notes

Overall approach

Duration (or survival) analysis is a method of analysing the time taken for an event of interest to occur (eg, exit from a benefit). Duration analysis helps us understand how the variation across individuals in the time taken to an event is related to possible explanatory factors (eg, characteristics of the individual). This study extends the approach taken by Dalgety, Dorsett, Johnston and Spier (2010) in evaluating the impact of Working for Families on sole parents in receipt of the Domestic Purposes Benefit–Sole Parent. Specifically, we examine whether participation in the 52-week reapplication process changes how soon clients:

- exit from unemployment-related benefits
- exit from any main benefit
- return after they exit benefit.

Based on these models, we also determine:

- whether the process increases time spent on benefits other than the Unemployment Benefit
- the reduction in the time spent on benefit.

Main assumptions

All impact methods are based on several assumptions. The important ones to be aware of are outlined below.

Omitted variable bias

An important assumption in our approach is that we have accounted for all variables that should be in the model. Of course, we cannot be sure of this. The danger is that we have missed important variables correlated with variables already included in the model. The effect of such an omitted variable is to bias the estimates of the parameters for the variables in the model (ie, our parameter estimates for the model variables do not reflect their true influence on benefit outcomes). This is of greatest concern for the 52-week reapplication process variable in the model. If there is an omitted variable that influences benefit outcomes and is correlated with the introduction of the 52-week reapplication process, this will bias our estimates over its impact. In other words, we will mistakenly attribute the change in duration because of the omitted variable to the introduction of the 52-week reapplication process.

We have undertaken an environmental scan and conclude that no other changes were occurring in tandem with affected clients' anniversary dates that could account for the impacts observed. We have also taken care to reduce the risk of omitted variable bias more generally by including variables in the model to try to control for all theorised influences on benefit duration.

No selection bias

Duration modelling is usually applied to policies and programmes for which clients have little or no control over whether to participate. In other words, people cannot easily select themselves out of the programme or policy. If selection occurs, it may mean that our estimates of programme and policy impacts reflect these selection effects rather than the policy effects. How selection might occur will depend on the specific situation. In the case of the 52-week reapplication process, we do not expect any selection bias, because those subject to the process cannot opt out of it other than

through transferring to benefits other than unemployment. We are examining this response as one of the outcomes in the analysis.

Data sources and variables

The analysis uses several sources of information, primarily data from Ministry of Social Development (MSD) administrative systems housed on the Ministry's Information Analysis Platform (IAP). We also include the Household Labour Force Survey (HLFS) and other labour market information where necessary.

Benefit data

The analysis is based on the Benefit Dynamics Dataset (BDD), a longitudinal dataset assembled from historical benefit administration data. The BDD can be used to create individual benefit histories for each adult or child ever included on a main benefit from 1993 onwards. The BDD has several strengths, including:

- a relatively long study period – at the time of writing, the BDD let us view and analyse 18 years of benefit history at the individual level
- no sampling error, or response or attrition bias – the dataset contains information on all benefit recipients and not a sample, so sampling error, response bias and bias resulting from attrition are not issues for this analysis
- continuous longitudinal data – the continuous nature of the dataset means that we are not limited to monthly or quarterly snapshots of benefit status, which means we are able to observe benefit spells of relatively short duration, making our calculations of total time spent on benefit very precise. Such precision means we can link the timing of events during a benefit spell to the hazard rate.

Defining 52-week reapplication process participants

MSD identifies those who participate in the Unemployment Benefit reapplication process through SWIFTT (MSD administrative system) records. The process followed was as follows.

1. From the SEXPR table, identify clients whose expiry reason is one of:
   - 112 Reapplication for UB Reminder
   - 113 Suspend – Reapplication not completed
   - 114 Suspend – Did not attend
   - 115 Cancel – Reapplication not completed.
2. From SDAT, identify CWA status changes and match these to SEXPR 112 events (matched on when these events were entered into the system, that is, same filedate).
3. From SBEN, determine what their benefit status was on the date the CWA process started.
   - If clients are current (`srvst = '3'`) or suspended for work test failure (`srvst='4' AND rsncd = '132'`) then they are sent a 25-working day letter. Advised date for these clients is the date the CWA process started (file date the SEXPR was created).
   - For other clients (`srvst in ('4' '5') and DATEPART(sbenrepdate) >= expirydt`), their advised date is equal to when the benefit expires (SEXPR `expirydt`).
   - If still not advised date then check when they returned to benefit before 7 day letter date (SEXPR `expirydt`), then the benefit resumption date is the advised date. If they had not retuned before the 7 day letter date then the advised date is the 7 day letter date.
4. For all primary clients (aport = 01), identify their partner (aport = 02) and add them to the participant file.

Because we include partners, the number of participants in the reapplication process will be larger than what is reported in the monitoring information. Monitoring of the reapplication process counts a couple on benefit only once.

Modelling benefit spells

This section describes the broad approach to modelling the time that clients spend on or off main benefit.

Definition of the hazard function

From the IAP, we have exact information on when a client starts and ends a benefit spell. However, for analytical simplicity, we converted these continuous time units into discrete intervals of 30 days' duration. Therefore, the approach we took to modelling the data is an example of 'discrete-time' survival analysis (Kittle, Richardson, & Parker, 1981).

For each individual *i* interval *t* we have a status y_{it} 0 or 1 for whether the individual ended their spell in the interval.

The hazard function (h_{it}) for an individual at each interval is:

$$h_{it} = \Pr(y_{it} = 1 \mid y_{ik} = 0, \text{ for all } k \in \{1,....,t_{-1}\} \quad (1)$$

That is the probability an individual will end their spell at interval *t* given their spell has lasted for *t*-1 intervals. Related to the hazard function is the survival function S_{it}, which is the probability the individual *i* was still on benefit at the end of interval *t*.

$$S_{it} = \Pr(y_{ik} = 0, \text{ for all } k \in \{1,....,t\}) \quad (2)$$

The survival function is the product of terms involving the hazard.

In our model, the hazard function is assumed to relate to the explanatory variables through a logit transformation:

$$\log\left(\frac{h_{it}}{1-h_{it}}\right) = \alpha(t) + \beta' X_{it} \quad (3)$$

where $\alpha(t)$ is the baseline hazard and X_{it} is a vector of covariates representing the values for an individual *i* at interval *t*. The variables for X_{it} are summarised below in the section on explanatory variables.

As the previous equation shows, each model has two parts: the baseline hazard and fixed and time-varying individual characteristics. The baseline hazard characterises the overall pattern of exits over spell duration. Individual characteristics on the other hand identify how an individual's probability of ending a spell varies according to their fixed characteristics (eg, age or education) as well as those that vary over time (eg, labour market demand or policy changes).

Estimation of model parameters

Allison (1982) shows how the parameters of the discrete-time hazard model in equation (3) can be estimated using standard logistic regression procedures, after restructuring the data so there is one record for each time period that each person is at risk of experiencing the event of interest (ie, constructing a 'person–period dataset').

Defining benefit spells

In the analysis, we need to define three benefit spells:

- Unemployment Benefit

- main benefit
- off benefit.

Based on administrative records of benefit spells, we first concatenate all consecutive Unemployment Benefit related spells. Unemployment spells include Unemployment, Student Hardship and Training. For example, if a client starts Unemployment Benefit and then transfers to Unemployment Benefit Training, then the Training spell is defined as a continuation of the initial Unemployment Benefit spell. In addition, we treat partners in the same way as primary or single clients on benefit. Therefore, if a client starts as a partner on Unemployment Benefit and then becomes a single on Unemployment Benefit (technically a new benefit spell) this is also defined as a continuation of the initial spell.

In addition to the continuous spell on Unemployment Benefit, we also calculate the continuous time the client remains on any main benefit. Main benefits include: Unemployment, Sickness, Invalid's, Domestic Purposes (including Widows) and retirement related (eg, New Zealand Superannuation). Any consecutive main benefit spells are combined into a single spell. Therefore, for each Unemployment Benefit spell, the corresponding main benefit spell will either be of equal or longer duration.

The last spell is the spell off main benefit. These occur only for clients who exit main benefit and last until the client returns to main benefit.

Selecting analysis sample

From all concatenated Unemployment Benefit spells, our population includes those who last for at least 43 weeks. We can exclude the large number of short duration Unemployment Benefit spells of clients who are unlikely to remain on benefit for 52 weeks. We identified all clients who reached the qualifying duration from 1 January 2006 to December 2012 (that is, they reached 43 weeks after 1 January 2006). Because of the large number of qualifying records, we needed to select a sample for analysis. Our initial sample consisted of 80,000 spell starts.

The sampling involved two steps. Step one was to randomly select one qualifying spell for each client. In doing so, we insure that each client is represented only once in each model. From this unique client list, step two involved sampling a fixed percentage of spell starts for each calendar month to ensure the sample is representative of clients over the analysis period.

All the models are based on the same sample of client Unemployment Benefit spells.

Creating a person–period dataset

For each spell, we created a 'person–period' dataset. To do this, we divided each spell into evenly spaced intervals of 30 days. Each interval can have one of three statuses:

- no exit (the spell did not end within the interval and the interval end date is less than the censor date)
- exit (the spell ended during the interval and the interval end date is less than the censor date)
- censored (the spell end date is greater than the censor date).

Censoring occurs either because the spell is current to the end of the analysis period (December 2012) or the spell duration exceeds 6 years.

Time varying client characteristics are calculated at the interval start date.

Defining interval duration

The selection of the duration of the interval in the analysis is a trade-off between identifying detailed events and computational resources (primarily to calculate type 3 effects and to run the simulations to calculate confidence intervals). For the initial analysis of the 52-week reapplication process, the interval was 7 days (MSD, 2011), but this limited the analysis sample to 30,000 spell starts. The small sample size meant we lacked sufficient power to model properly the impact of the 52-week

reapplication process. For this reason, we selected 30 days as the duration of each interval in the model and increased the sample size to 80,000 spell starts. By doing so, the models produced more stable parameter estimates.

Long-term Unemployment Benefit clients

Because we select Unemployment Benefit spells commencing after 1 January 2006 and limit the spell duration to 6 years, we will exclude the very long-term Unemployment Benefit clients from the analysis. However, this represents a very small proportion of all clients affected by the 52-week reapplication process.

Final structure of the person–period dataset

Based on the above discussion, the person–period dataset has the following variables:

- Unemployment Benefit spell start: the date the client commenced a qualifying Unemployment Benefit spell
- Unemployment Benefit spell qualifying start date: the date the client reached 43 weeks on Unemployment Benefit spell after 1 January 2006.
- Unemployment Benefit spell end date: the date the client ended their Unemployment Benefit spell, either exiting benefit for one day or transferring to another main benefit
- main benefit end date: the date the main benefit spell ended, if at all.
- off benefit return date: if a client exited from main benefit, the date they return to main benefit, if it all.

Explanatory variables

Below is a summary of the variables that were included in the analysis. Note that not all of these variables were included in the final models.

Labour market variables

Variable	Fixed/Variable	Type	Description
TLA	Varying	Categorical	Territorial Local Authority based on client's district office
ExitRate	Varying	Continuous	Standardised exit rate by month, (TLA) and main benefit group
ExitRateSE	Varying	Continuous	Seasonally adjusted standardised exit rate by month, TLA and main benefit group
EntryRate	Varying	Continuous	Standardised entry rate by month, TLA and main benefit group
EntryRateSE	Varying	Continuous	Standardised entry rate by month, TLA and main benefit group
StEntries	Fixed	Continuous	Standardised entry rate by month, TLA and main benefit group when spell commenced
EmpRate	Varying	Continuous	Regional employment rate from Household Labour Force Survey (HLFS) by quarter
UnempRate	Varying	Continuous	Regional unemployment rate from HLFS by quarter
Month	Varying	Categorical	Month the interval falls in
StartMonth	Fixed	Categorical	Month at spell start date

Calculating benefit entry and exit rates

Benefit entry and exit rates are based on MSD official monthly statistics on the number of clients on main benefit and grants and cancellations during the month. For each main benefit group and Territorial Local Authority (TLA), we calculate the entry, exit and turnover rates. For example, the exit rate would be the number of benefit grants in the month divided by the stock on benefit at the end of the previous month. We standardised these rates by TLA and benefit group (ie, the exit rate in each month divided by the monthly average for the analysis period).

Table 6: Labour market variables of sampled clients at the start of on benefit and off benefit spell

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
EmpRate		0.68	0.00	0.68	0.00
Entries		0.94	0.00	0.97	0.01
EntriesSE		0.94	0.00	0.97	0.00
EntryRate		1.11	0.00	1.10	0.01
EntryRateSE		1.11	0.00	1.10	0.01
ExitRate		1.13	0.01	1.16	0.01
ExitRateSE		1.13	0.00	1.14	0.01
Exits		0.95	0.00	1.01	0.01
ExitsSE		0.96	0.00	0.99	0.00
Month	January	0.08	0.00	0.07	0.00
	February	0.07	0.00	0.11	0.01
	March	0.08	0.00	0.10	0.01
	April	0.08	0.00	0.08	0.00
	May	0.09	0.00	0.10	0.01
	June	0.07	0.00	0.09	0.00
	July	0.07	0.00	0.10	0.01
	August	0.10	0.00	0.09	0.01
	September	0.11	0.00	0.08	0.00
	October	0.10	0.00	0.05	0.00
	November	0.07	0.00	0.07	0.00
	December	0.08	0.00	0.05	0.00

Note: SE= standardised entry.

Demographic variables

Variable	Fixed/Variable	Type	Description
Age	Fixed	Continuous	Age at spell start
Age Group	Fixed	Categorical	Age group at spell start
Gender	Fixed	Categorical	Gender
Ethnicity	Fixed	Categorical	Ethnicity

Table 7: Demographic profile of sampled clients at the start of on benefit and off benefit spell

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
Age		34.90	0.22	33.70	0.23
AgeGroup	Under 18 years	0.00	0.00	0.00	0.00
	16–<18 years	0.00	0.00	0.00	0.00
	18–<20 years	0.12	0.01	0.09	0.01
	20–<25 years	0.20	0.01	0.25	0.01
	25–<30 years	0.13	0.01	0.14	0.01
	30–<35 years	0.09	0.00	0.00	0.00
	30–<50 years	0.00	0.00	0.37	0.01
	35–<40 years	0.09	0.00	0.00	0.00
	40–<45 years	0.09	0.00	0.00	0.00
	45–<50 years	0.09	0.00	0.00	0.00
	50–<55 years	0.08	0.00	0.07	0.00
	55–<60 years	0.06	0.00	0.05	0.00
	60–<65 years	0.05	0.00	0.03	0.00
	Over 65 years	0.00	0.00	0.00	0.00
Ethnicity	NZ European	0.36	0.01	0.35	0.01
	Māori	0.35	0.01	0.35	0.01
	Pacific Island	0.11	0.01	0.13	0.01

Variable	Category	Continuous duration on benefit Average	SE	Off benefit after benefit exit Average	SE
	Other	0.15	0.01	0.15	0.01
	Unspecified	0.02	0.00	0.02	0.00
Gender	Female	0.38	0.01	0.35	0.01
	Male	0.62	0.01	0.65	0.01

Note: SE = standardised entry.

Benefit status variables

Variable	Fixed/Variable	Type	Description
StBenDur	Fixed	Continuous	Duration on current benefit at spell start (same as BenDur)
StBenDurC	Fixed	Categorical	Duration on current benefit at spell start (grouped) (same as BenDurC)
StBenConDur	Fixed	Continuous	Continuous duration on benefit (duration is retained when transferring between benefits) Same as BenConDur
StBenConDurC	Fixed	Categorical	Continuous duration on benefit (duration is retained when transferring between benefits) (grouped) Same as BenConDurC
CurrentServ	Variable	Categorical	Current benefit
StBenType	Fixed	Categorical	Benefit at spell start (Same as CurrentServ)
PreOffBenDur	Fixed	Continuous	Time off benefit prior to current benefit spell
PreOffBenDurC	Fixed	Categorical	Time off benefit prior to current benefit spell
PreBen	Fixed	Categorical	Benefit prior to current spell
PreBenDur	Fixed	Continuous	Duration of previous benefit spell
PreBenDurC	Fixed	Categorical	Duration of previous benefit spell (grouped)
CurrentAport	Variable	Categorical	Partner status (primary, partner or single)
BenDur[main benefit type]	Fixed	Continuous	Total time spent on different benefits (eg, Domestic Purposes Benefit, Unemployment Benefit, Youth Benefit)
BenDurTotal	Fixed	Continuous	Total time spent on any main benefit
BenDurTotalC	Fixed	Categorical	Total time spent on any main benefit (grouped)
AgeFirstBenefit	Fixed	Continuous	Age the client was when starting first recorded benefit spell
AgeFirstBenefitC	Fixed	Categorical	Age the client was when starting first recorded benefit spell (grouped)

Table 823: Benefit status profile of sampled clients at the start of on benefit and off benefit spell

Variable	Category	Continuous duration on benefit Average	SE	Off benefit after benefit exit Average	SE
AgeFirstBenefit		25.44	0.18	24.42	0.18
AgeFirstBenefitC	20–<25 years	0.16	0.01	0.17	0.01
	25–<30 years	0.09	0.00	0.09	0.01
	30–<35 years	0.07	0.00	0.06	0.00
	35–<40 years	0.06	0.00	0.05	0.00
	40–<45 years	0.05	0.00	0.04	0.00
	45–<50 years	0.03	0.00	0.03	0.00
	50–<55 years	0.02	0.00	0.02	0.00
	55–<60 years	0.02	0.00	0.02	0.00
	60–<65 years	0.01	0.00	0.01	0.00
	15–<16 years	0.00	0.00	0.00	0.00
	16–<18 years	0.16	0.01	0.16	0.01
	18–<20 years	0.33	0.01	0.35	0.01
	Over 65 years	0.00	0.00	0.00	0.00
BenDurDPB		842.42	40.91	313.75	19.09
BenDurIB		64.70	8.86	23.26	4.15
BenDurJSAIYB		57.04	3.41	29.35	1.92
BenDurSB		379.44	15.64	141.18	6.95
BenDurTotal		3,724.85	65.67	1,868.69	32.93
BenDurTotalC	>6 months–1 year	0.00	0.00	0.08	0.00

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
	>1–2 years	0.25	0.01	0.27	0.01
	>2–3 years	0.11	0.01	0.16	0.01
	>3–4 years	0.08	0.00	0.10	0.01
	>4–5 years	0.05	0.00	0.06	0.00
	>5–6 years	0.04	0.00	0.05	0.00
	>6–8 years	0.07	0.00	0.07	0.00
	>8–10 years	0.05	0.00	0.05	0.00
	Over 10 years	0.34	0.01	0.16	0.01
BenDurUB		2,378.57	42.23	1,360.25	22.95
CurrentServ	DPB related	0.00	0.00	0.01	0.00
	SB related	0.01	0.00	0.02	0.00
	UB related	0.99	0.00	0.57	0.01
	IB	0.00	0.00	0.00	0.00
	No Benefit	0.00	0.00	0.40	0.01
	NZS VP TRB	0.00	0.00	0.00	0.00
PreBen	DPB related	0.07	0.00	0.05	0.00
	SB related	0.16	0.01	0.12	0.01
	UB related	0.60	0.01	0.67	0.01
	IB	0.00	0.00	0.00	0.00
	JSA IYB	0.01	0.00	0.01	0.00
	No Benefit	0.15	0.01	0.14	0.01
PreBenDur		265.49	8.50	250.29	7.76
PreBenDurC	<3 months	0.29	0.01	0.28	0.01
	>3–6 months	0.20	0.01	0.19	0.01
	>6 months–1 year	0.20	0.01	0.21	0.01
	>1–2 years	0.08	0.00	0.11	0.01
	>2–3 years	0.03	0.00	0.03	0.00
	>3–4 years	0.02	0.00	0.01	0.00
	>4–5 years	0.01	0.00	0.01	0.00
	>5–6 years	0.01	0.00	0.00	0.00
	>6–8 years	0.01	0.00	0.01	0.00
	>8–10 years	0.01	0.00	0.00	0.00
	Over 10 years	0.01	0.00	0.00	0.00
	Unspecified	0.15	0.01	0.14	0.01
PreOffBenDur		1,356.96	29.91	1,436.81	32.38
PreOffBenDurC	<3 months	0.09	0.00	0.11	0.01
	>3–6 months	0.06	0.00	0.07	0.00
	>6 months–1 year	0.27	0.01	0.13	0.01
	>1–2 years	0.21	0.01	0.23	0.01
	>2–3 years	0.04	0.00	0.09	0.01
	>3–4 years	0.04	0.00	0.05	0.00
	>4–5 years	0.05	0.00	0.06	0.00
	>5–6 years	0.03	0.00	0.04	0.00
	>6–8 years	0.05	0.00	0.06	0.00
	>8–10 years	0.03	0.00	0.03	0.00
	Over 10 years	0.12	0.01	0.12	0.01
	Unspecified	0.00	0.00	0.00	0.00
StEntries		0.94	0.00	0.97	0.01
CurrentAport	No Benefit	0.00	0.00	0.00	0.00
	Primary	0.03	0.00	0.03	0.00
	Single	0.84	0.01	0.87	0.01
	Spouse	0.12	0.01	0.10	0.01

Note: DPB = Domestic Purposes Benefit; IB = Invalid's Benefit; JSA IYB = Jobseeker's Allowance, Independent Youth Benefit; NZS VP TRB = NZ Superannuation, Veteran's Payment, Transitional Retirement Benefit; SB = Sickness Benefit; UB = Unemployment Benefit.

Migrant status

Variable	Fixed/Variable	Type	Description
Refugee	Fixed	Binary	Identified as a refugee
TimeInNZ	Fixed	Categorical	Time since immigrating (or born in New Zealand)
Migrant	Fixed	Binary	Recorded as being a migrants to New Zealand
CurrentMigrant	Fixed	Binary	Current migrant for income support eligibility (less than two years in New Zealand)
EnglishPrefered	Fixed	Binary	English is the migrant's preferred language

Table 9: Migrant profile of sampled clients at the start of on benefit and off benefit spell

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
CurrentMigrant	Yes	0.02	0.00	0.01	0.00
EnglishPrefered	Yes	0.97	0.00	0.97	0.00
Migrant	Yes	0.23	0.01	0.23	0.01
Refugee	Yes	0.01	0.00	0.01	0.00
TimeInNZ	<1 year	0.01	0.00	0.00	0.00
	1–2 years	0.01	0.00	0.01	0.00
	2–4 years	0.02	0.00	0.02	0.00
	4–8 years	0.04	0.00	0.04	0.00
	8–12 years	0.04	0.00	0.04	0.00
	12+ years	0.12	0.01	0.12	0.01
	New Zealand	0.77	0.01	0.77	0.01

Note: SE = standardised entry

Family characteristics

Variable	Fixed/Variable	Type	Description
ChildAge	Variable	Categorical	Age of youngest child (0–4, 5–13,14–18, no child)
StChildAge	Fixed	Categorical	Age of youngest child at spell start (same as ChildAge)
NumChild	Variable	Categorical	Number of children
StNumChild	Fixed	Categorical	Number of children at spell start (same as NumChild)
Partner	Variable	Binary	Whether client has a partner
StPartner	Fixed	Binary	Whether the client has a partner at spell start (same as Partner)

Table 10: Family characteristics of sampled clients at the start of on benefit and off benefit spell

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
ChildAge	Under 5	0.11	0.01	0.10	0.01
	5 to under 14	0.06	0.00	0.05	0.00
	Over 14	0.02	0.00	0.02	0.00
	No child	0.81	0.01	0.83	0.01
NumChild	1 child	0.07	0.00	0.06	0.00
	2 children	0.05	0.00	0.05	0.00
	3+ children	0.06	0.00	0.06	0.00
	No child	0.81	0.01	0.83	0.01
Partner	Yes	0.16	0.01	0.13	0.01

Note: SE = standardised entry

Education

Variable	Fixed/Variable	Type	Description
EducationLevel	Fixed	Categorical	Highest recorded education qualification
TertiaryStudy	Variable	Binary	Receiving student loans or allowances
TimeLastSALC	Fixed	Categorical	Time since last recorded student loans and allowances spell at spell start (grouped)
SALtimeC	Fixed	Categorical	Total amount of time receiving student loans or allowances (grouped)
SALtime	Fixed	Continuous	Total amount of time receiving student loans or allowances

Table 1124: Education characteristics of sampled clients at the start of on benefit and off benefit spell

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
EducationLevel	A: No qualifications	0.41	0.01	0.40	0.01
	B: NQF 1: <80 credit	0.16	0.01	0.16	0.01
	C: NQF 1: 80+ credit	0.08	0.00	0.09	0.00
	D: NQF 2: 80+ credit	0.06	0.00	0.07	0.00
	E: NQF 3: 80+ credit	0.11	0.01	0.13	0.01
	F: NQF 4: 72+ credit	0.04	0.00	0.04	0.00
	G: Degree Profession	0.06	0.00	0.06	0.00
	H: Unspecified	0.07	0.00	0.05	0.00
SALtime		419.89	12.99	213.17	7.20
SALtimeC	< 3 months	0.01	0.00	0.02	0.00
	>3–6 months	0.01	0.00	0.06	0.00
	>6 months–1 year	0.06	0.00	0.12	0.01
	>1–2 years	0.12	0.01	0.09	0.01
	>2–3 years	0.05	0.00	0.04	0.00
	>3–4 years	0.04	0.00	0.03	0.00
	>4–5 years	0.02	0.00	0.01	0.00
	>5–6 years	0.02	0.00	0.01	0.00
	Unspecified	0.62	0.01	0.61	0.01
	Over 6 years	0.05	0.00	0.00	0.00
TertiaryStudy	Yes	0.02	0.00	0.10	0.01
TimeLastSALC	< 3 months	0.01	0.00	0.01	0.00
	>3–6 months	0.01	0.00	0.01	0.00
	>6 months–1 year	0.10	0.00	0.04	0.00
	>1–2 years	0.07	0.00	0.09	0.00
	>2–3 years	0.04	0.00	0.05	0.00
	>3–4 years	0.03	0.00	0.03	0.00
	>4–5 years	0.02	0.00	0.02	0.00
	>5–6 years	0.02	0.00	0.02	0.00
	>6–8 years	0.03	0.00	0.03	0.00
	>8–10 years	0.02	0.00	0.03	0.00
	Over 10 years	0.02	0.00	0.02	0.00
	Unspecified	0.64	0.01	0.67	0.01

Note: NQF = National Qualifications Framework; SE = standardised entry

Ex-prisoner

Variable	Fixed/Variable	Type	Description
ExPrisoner	Fixed	Binary	Whether client has a recorded prison event
TimePrison	Fixed	Categorical	Time since last recorded prison event (grouped)

Table 1225: Prison characteristics of sampled clients at the start of on benefit and off benefit spell

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
ExPrisoner	Yes	0.11	0.01	0.11	0.01
TimeSincePrison	Never	0.89	0.01	0.89	0.01
	<3 months	0.00	0.00	0.01	0.00
	>3–6 months	0.00	0.00	0.00	0.00
	>6–12 months	0.03	0.00	0.00	0.00
	>1–2 years	0.01	0.00	0.02	0.00
	>2–4 years	0.02	0.00	0.02	0.00
	>4–6 years	0.01	0.00	0.01	0.00
	>6–8 years	0.01	0.00	0.01	0.00
	>8–10 years	0.01	0.00	0.01	0.00
	Over 10 years	0.02	0.00	0.02	0.00

Note: SE = standardised entry

Part-time work while on benefit

Variable	Fixed/Variable	Type	Description
TotalEarnings	Variable	Continuous	Total declared earnings from work
StTotalEarnings	Fixed	Continuous	Total declared earnings from work at the start of the spell (St)
WorkingPT	Variable	Binary	Whether the client has any declaring earnings from work
StWorkingPT	Fixed	Binary	Whether the client has any declaring earnings from work at spell start

Table 1326: Part time work of sampled clients at the start of on benefit and off benefit spell

		Continuous duration on benefit		Off benefit after benefit exit	
Variable	Category	Average	SE	Average	SE
TotalEarnings		20.33	1.29	26.62	1.48
WorkingPT	Yes	0.11	0.00	0.13	0.01

Note: SE = standardised entry.

Policy and programme interventions

Variable	Fixed/Variable	Type	Description
CWAstatus	Variable	Categorical	Stage of the 52-week reapplication process

Duration on unemployment-related benefit

The following section examines our analysis of the duration of spells on unemployment-related benefits and the impact of the reapplication process.

Defining the baseline hazard

The first outcome we examine is the time that people remain on Unemployment Benefit after reaching 43 weeks' duration. **Figure 273** shows the observed and the modelled predicted hazard rate. Because the hazard rate is not constant and does not have a linear trend, we used a piecewise constant hazard.

Model fitting

For each group of explanatory variables (eg, migrant status, demographic, labour market), we tested each individual variable in a model that included the baseline hazard variable (defined above). From each group, we retained only those variables that showed a significant relationship (type 3, p value <0.05) with the hazard of exiting benefit. For all the significant variables, we ran a full model with all selected variables, then we excluded any that become insignificant (type 3,

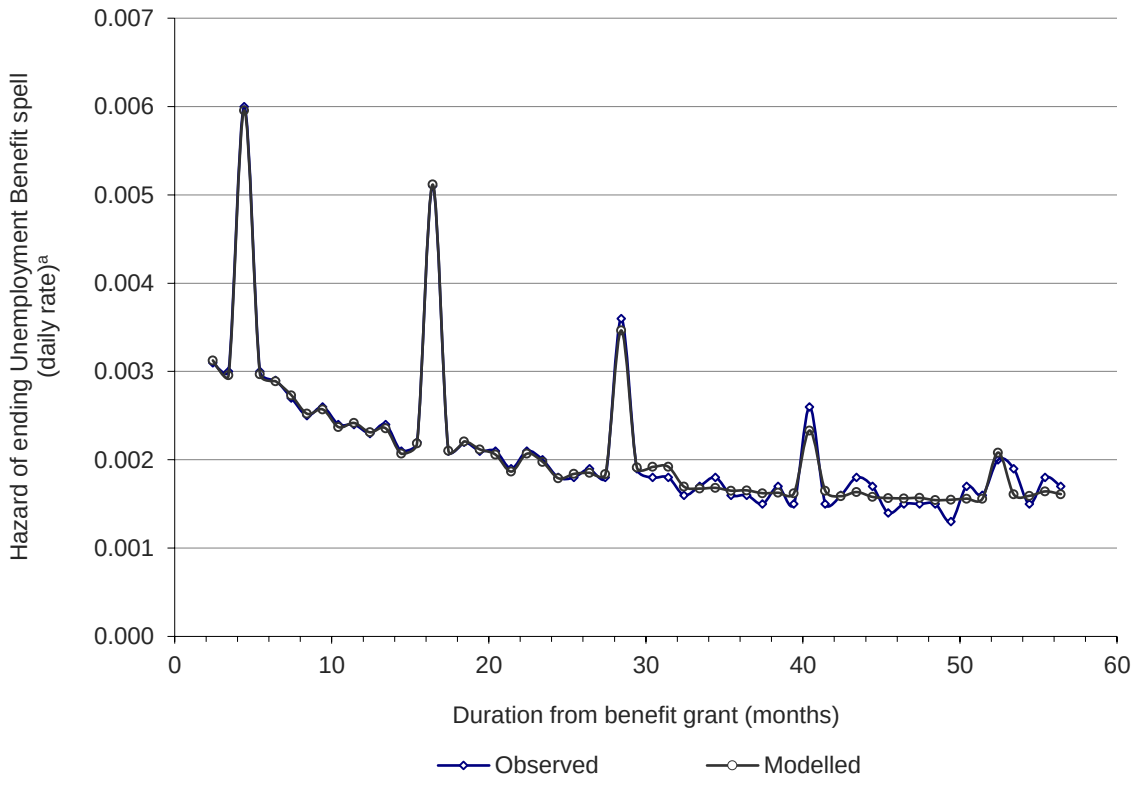
p value >0.05) at this stage. In addition, we collapsed variable categories where the parameter estimates did not differ from each other or were insignificant.

With the full model we checked for high levels of multi-collinearity between the explanatory variables. Where variables showed collinearity we either removed the variable entirely or tested alternatives. An example was replacing age group with age and age squared.

Final model fit

Figure 2733 shows the actual and modelled hazard rate for the full model. The main area of divergence between the observed and modelled hazard was at the third to fifth anniversary intervals. At these instances, the modelled hazard is slightly lower than the observed hazard. However, we do not consider this a significant issue because the numbers of clients at these durations on Unemployment Benefit are very small.

Figure 273: Actual and estimated hazard rate for duration on Unemployment Benefit



Note:
a: Probability of exiting their current spell of Unemployment Benefit in the interval through either cancelling benefit entirely or transferring to a benefit other than Unemployment Benefit.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

What influences time on Unemployment Benefit?

The full model for the duration on Unemployment Benefit contained 16 variables, the type 3 effects are summarised in **Error! Reference source not found.**14. The CWA status variable, which represents the introduction of the 52-week reapplication process, had the largest chi-square value. It was followed by month, regional unemployment rate and duration of spell.

Table 14: Type 3 effects for the Unemployment Benefit spell model

Group	Variable	Type 3 Chi Square	Levels
	BenDurSB	*** 39.1	
	BenDurTotal	*** 931.7	
	BenDurDPB	*** 230.6	
Benefit information	StBenDur	** 4.2	
Demographics	Age	*** 1,851.2	
Interventions	CWAstatus	*** 9,759.5	7
Duration	DurIntCat	*** 1,349.4	30
	EducationLevel	*** 57.1	8
	TertiaryStudy	*** 1,160.9	2
Education history	TimeLastSALC	*** 97.2	12
	EnglishPrefered	*** 46.9	2
Migrant status	TimeInNZ	*** 172.6	7
Part time work	TotalEarnings	*** 340.9	
0	Month	*** 2,302.1	12
0	UnempRate	*** 1,105.3	
Labour market Ben	TLA	*** 2,131.3	56

Note: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics).

Error! Reference source not found.15 summarises those variables included in the full model. For each variable, we have converted the beta estimate into an odds ratio.[8] The odds ratio is designed to show the change in the probability of an event, in this case ending an Unemployment Benefit spell. A value above one indicates an increase in the probability, and a value below one indicates a decrease in the probability. For categorical variables, such as previous benefit, the odds ratio is relative to the reference group (these have an odds ratio of 1.00 in the tables). For continuous variables, we divided the beta estimate by two times the standard deviation of the variable to enable comparison of the relative importance of categorical and continuous variables.

Table 15: Model parameter estimates for Unemployment Benefit duration mode

Group	Parameter	Level	Estimate	Odds
Intercept	Intercept		*** -1.775	0.16955
Benefit information	BenDurSB		*** 0.000	1.02527
	StBenDur		** 0.000	0.95895
	BenDurDPB		*** 0.000	1.0264
	BenDurTotal		*** 0.000	0.96332
Demographics	Age		*** -0.015	0.85783
Interventions	CWAstatus	2 52wks: 1	*** 1.791	5.99479
		2 52wks: 2	*** 1.463	4.32071
		2 52wks: 3	*** 1.161	3.19188
		3 Post52wks 1: 1	*** 0.194	1.21398
		3 Post52wks 1: 2	*** 0.160	1.17313
		4 Post52wks 2: 1	*** 0.139	1.14886
		6 NotApp	0.000	1
Duration	DurIntCat	Month 01	*** 0.566	1.76113
		Month 02	*** 0.515	1.67381
		Month 03	*** 0.505	1.65669
		Month 04	*** 0.484	1.62261

[8] Note that the odds ratio is the change in probability of an event occurring, not the probability itself.

Group	Parameter	Level	Estimate	Odds
		Month 05	*** 0.455	1.57578
		Month 06	*** 0.411	1.50836
		Month 07	*** 0.361	1.43541
		Month 08	*** 0.398	1.48947
		Month 09	*** 0.319	1.37597
		Month 10	*** 0.371	1.44964
		Month 11	*** 0.329	1.38971
		Month 12	*** 0.361	1.43511
		Month 13	*** 0.228	1.25663
		Month 14	*** 0.293	1.33988
		Month 15	*** 0.405	1.49885
		Month 16	*** 0.195	1.21518
		Month 17	*** 0.247	1.28026
		Month 18	*** 0.207	1.23008
		Month 19	*** 0.218	1.24361
		Month 20	** 0.131	1.14022
		Month 21	*** 0.239	1.26946
		Month 22	*** 0.209	1.23282
		Month 23	** 0.111	1.11706
		Month 24	*** 0.153	1.16503
		Month 25	*** 0.167	1.18156
		Month 26 to 30	*** 0.159	1.17271
		Month 31 to 40	0.061	1.06239
		Month 41 to 50	0.011	1.01141
		Month 51 to 60	0.033	1.03359
		Month 60 plus	0.000	1
Education history	EducationLevel	A: No qualifications	0.000	1
		B: NQF 1: <80 credit	-0.014	0.98588
		C: NQF 1: 80+ credit	0.022	1.02272
		D: NQF 2: 80+ credit	0.006	1.00619
		E: NQF 3: 80+ credit	*** 0.044	1.04511
		F: NQF 4: 72+ credit	*** 0.062	1.06448
		G: Degree Profession	*** 0.062	1.06373
		H: Unspecified	*** 0.131	1.14046
	TertiaryStudy	Yes	*** 0.815	2.25862
		No	0.000	1
	TimeLastSALC	<3 months	0.033	1.03386
		>3–6 months	** 0.089	1.09261
		>6 months–1 year	*** 0.065	1.06747
		>1–2 years	*** 0.128	1.13633
		>2–3 years	*** 0.091	1.09575
		>3–4 years	*** 0.118	1.12546
		>4–5 years	** 0.052	1.05312
		>5–6 years	** 0.067	1.06945
		>6–8 years	0.031	1.03146
		>8–10 years	-0.031	0.96971
		Over 10 years	*** 0.162	1.1758
		Unspecified	0.000	1
Migrant status	EnglishPrefered	Yes	0.000	1
		No	*** -0.191	0.82617
	TimeInNZ	<1 year	*** -0.430	0.65079

Group	Parameter	Level	Estimate	Odds
		1–2 years	*** -0.151	0.86005
		2–4 years	*** -0.096	0.90877
		4–8 years	-0.003	0.99658
		8–12 years	** 0.037	1.03819
		12+ years	*** 0.045	1.04592
		New Zealand	0.000	1
Part time work	TotalEarnings		*** 0.001	1.00092
Scale	Scale		1.000	2.71828
Labour market	Month	January	*** 0.199	1.22063
		February	*** 0.431	1.53901
		March	*** 0.217	1.2429
		April	*** 0.177	1.19347
		May	*** 0.143	1.15406
		June	*** 0.167	1.1821
		July	*** 0.081	1.08425
		August	-0.011	0.98954
		September	0.000	1
		October	** 0.041	1.04139
		November	0.021	1.02156
		December	*** -0.456	0.63405
	UnempRate		*** -10.073	4.2E-05
Labour market Ben	TLA	Ashburton	0.092	1.09682
		Auckland City	0.000	1
		Buller	0.020	1.01992
		Christchurch City	*** 0.116	1.12293
		Clutha	*** -0.292	0.74687
		Dunedin City	*** -0.298	0.74262
		Far North	-0.040	0.9611
		Franklin	0.041	1.04136
		Gisborne	*** 0.259	1.29603
		Grey	*** -0.282	0.75405
		Hamilton City	*** 0.131	1.14047
		Hastings	*** 0.448	1.56514
		Hauraki	*** 0.390	1.47721
		Horowhenua	** -0.102	0.90324
		Hutt City	*** -0.125	0.88227
		Invercargill City	*** -0.355	0.70103
		Kaipara	** 0.124	1.132
		Kapiti Coast	*** -0.167	0.84588
		Kawerau	-0.070	0.93249
		Manawatu	** 0.128	1.13692
		Manukau City	0.025	1.02502
		Marlborough	*** 0.245	1.2776
		Masterton	0.049	1.05071
		Matamata–Piako	*** 0.339	1.40331
		Napier City	*** 0.324	1.38327
		Nelson City	-0.029	0.97103
		New Plymouth	*** 0.123	1.13125
		North Shore City	*** 0.348	1.41653
		Opotiki	*** 0.565	1.75973
		Otago Queenstown	*** 0.404	1.49842

Group	Parameter	Level	Estimate	Odds
		Palmerston North City	0.020	1.0197
		Papakura	** 0.081	1.08422
		Porirua City	*** -0.136	0.8732
		Rangitikei	** 0.141	1.15146
		Rodney	*** 0.267	1.30545
		Rotorua	*** 0.144	1.15452
		Ruapehu Waitomo Taupo	*** 0.150	1.16198
		South Taranaki	0.007	1.00708
		South Waikato	*** -0.120	0.88652
		Stratford	0.033	1.03393
		Tararua	0.015	1.01533
		Tasman	** 0.136	1.14561
		Tauranga West Bay of Plenty	*** 0.817	2.26305
		Thames–Coromandel	*** 0.537	1.71041
		Timaru	0.004	1.00399
		Upper Hutt City	*** -0.202	0.81699
		Waikato	*** 0.332	1.39344
		Waimakariri	*** 0.366	1.44173
		Waipa	*** 0.470	1.60055
		Wairoa	*** -0.240	0.78668
		Waitakere City	*** 0.177	1.19341
		Waitaki	0.033	1.03356
		Wellington City	*** -0.126	0.88173
		Whakatane	*** 0.163	1.17664
		Whanganui	*** -0.399	0.67074
		Whangarei	** -0.053	0.94861

Note: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

As noted, the baseline hazard is non-linear. The 52-week reapplication variable indicates a large increase in the likelihood of exiting at anniversary date, with lower likelihoods of exiting in the periods before and after anniversary.

The remaining variables show an expected pattern.

Labour market: an increased regional unemployment rate makes exits less likely.

Seasonality: the anniversary falling within the first 6 months of the calendar year makes exits more likely, while it falling within the period to Christmas makes exits less likely.

Location: there is considerable variation between territorial authority locations in changing the likelihood of exits. Of note, is that often provincial and rural locations are associated with a greater likelihood of exit than the main centres.

Benefit history: in most instances, longer previous periods on benefit and non-unemployment-related benefits tend to be associated with lower likelihood of exiting from main benefit spells.

Age group: the likelihood of exiting decreases with age.

Family: children have mixed effects that may relate to benefit transfers as much as exits from benefit.

Education: the likelihood of exiting increases with higher education, especially for clients with a tertiary qualification or above, as well as those who have recently completed tertiary study. If a client is currently studying while on benefit, the likelihood of them exiting Unemployment Benefit increases.

Working part time: the level of part-time earnings is associated with an increased likelihood of exit.

Migrant status: migrants in general have lower likelihood of exiting than non-migrants.

Duration on any main benefit

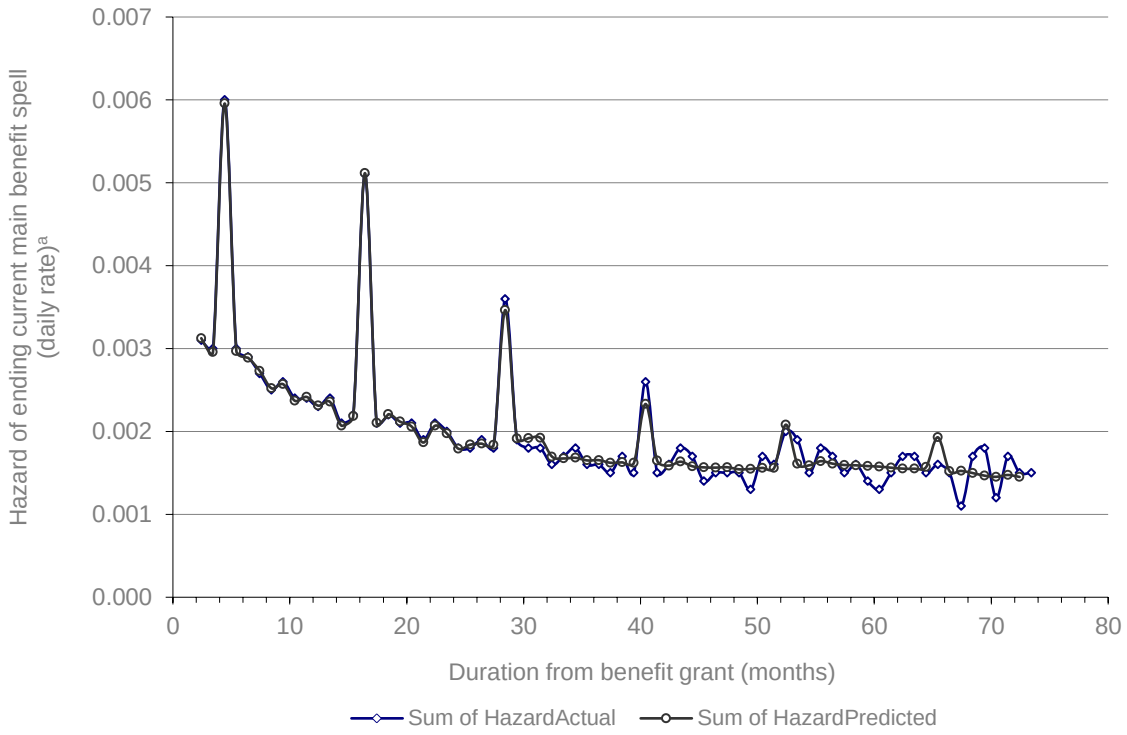
Population and analysis sample

The duration analysis of exits from any main benefit uses the same sample as the duration analysis of exits from Unemployment Benefit. The difference is in the spell duration. For exits from main benefit, spells end when a client exits benefit completely rather than exits from Unemployment Benefit only, where the client may exit onto another kind of benefit.

Final model fit

Figure 24 shows the actual and estimated hazard rate for the hazard of exiting from main benefit. We encountered similar divergence in the main benefit spell model as for the Unemployment Benefit spell model. However, the divergence is smaller.

Figure 24: Actual and estimated hazard rate for duration on main benefit



Note:
a: Probability of exiting their current spell on any main benefit in the interval through cancelling benefit entirely.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

What influences time on main benefit?

Table 16: Type 3 effects for duration on main benefit model

Group	Variable	Type 3 Chi Square	Levels
Benefit information	BenDurSB	*** 65.9	
	BenDurTotalC	*** 786.6	9
	CurrentServ	*** 4,716.8	4
	PreBen	*** 69.1	6
	StBenDur	** 3.0	
Demographics	Age	*** 1,533.1	
	AgeSqr	*** 788.7	
Interventions	CWAstatus	*** 8,618.6	8

Group	Variable	Type 3 Chi Square	Levels
Duration	DurIntCat	*** 2,511.2	38
Education history	EducationLevel	*** 88.6	8
	SALtimeC	*** 146.1	10
	TertiaryStudy	*** 1,472.4	2
	TimeLastSALC	*** 193.6	12
Family status	ChildAge	*** 75.5	4
	NumChild	*** 730.3	4
Labour market	Month	*** 2,266.7	12
Migrant status	EnglishPrefered	*** 60.7	2
	TimeInNZ	*** 166.2	7
Part time work	WorkingPT	*** 994.5	2
Prison	TimeSincePrison	*** 47.9	10
Labour market Ben	TLA	*** 1,473.8	56

Note: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

Error! Reference source not found.17 summarises those variables included in the model. Tables of the variable beta estimates are in appendix 1.

Table 17: Selected variable odds ratio estimates for main benefit duration mode

Group	Parameter	Level	Estimate	Odds
Intercept	Intercept		*** -2.806	0.06044
Benefit information	BenDurSB		*** 0.000	0.96113
	BenDurTotalC	>6 months–1 year	-0.013	0.98715
		>1–2 years	0.000	1
		>2–3 years	*** -0.087	0.9168
		>3–4 years	*** -0.151	0.85955
		>4–5 years	*** -0.232	0.79294
		>5–6 years	*** -0.295	0.74484
		>6–8 years	*** -0.342	0.7102
		>8–10 years	*** -0.368	0.69201
		Over 10 years	*** -0.502	0.60542
	CurrentServ	DPB related	*** -1.409	0.24441
		IB	*** -1.692	0.1841
		SB related	*** -0.801	0.44886
		UB related	0.000	1
	PreBen	DPB related	** -0.046	0.9546
		IB	** -0.137	0.8724
		JSA IYB	0.020	1.02001
		No benefit	0.025	1.02536
		SB related	*** -0.118	0.88888
		UB related	0.000	1
	StBenDur		** 0.000	0.95907
Demographics	Age		*** -0.020	0.82273
	AgeSqr		*** -0.001	0.99003
Interventions	CWAstatus	2 52wks: 1	*** 1.765	5.84384
		2 52wks: 2	*** 1.456	4.28873
		2 52wks: 3	*** 0.928	2.53026
		3 Post52wks 1: 1	*** 0.106	1.11225
		3 Post52wks 1: 2	*** 0.118	1.1249
		4 Post52wks 2: 1	*** 0.106	1.11206
		5 Post52wks 3: 1	*** -0.080	0.92308

Group	Parameter	Level	Estimate	Odds
		6 NotApp	0.000	1
Duration	DurIntCat	Month 01	*** 1.054	2.86846
		Month 02	*** 0.929	2.53185
		Month 03	*** 0.998	2.71173
		Month 04	*** 0.972	2.64305
		Month 05	*** 0.962	2.61674
		Month 06	*** 0.901	2.46223
		Month 07	*** 0.837	2.30938
		Month 08	*** 0.883	2.41844
		Month 09	*** 0.800	2.22631
		Month 10	*** 0.846	2.32973
		Month 11	*** 0.796	2.21622
		Month 12	*** 0.825	2.28238
		Month 13	*** 0.691	1.99497
		Month 14	*** 0.690	1.99302
		Month 15	*** 0.866	2.37854
		Month 16	*** 0.602	1.8251
		Month 17	*** 0.712	2.03733
		Month 18	*** 0.719	2.05311
		Month 19	*** 0.667	1.94828
		Month 20	*** 0.581	1.78852
		Month 21	*** 0.651	1.91688
		Month 22	*** 0.654	1.92332
		Month 23	*** 0.476	1.61023
		Month 24	*** 0.583	1.79158
		Month 25	*** 0.627	1.87248
		Month 26	*** 0.496	1.64237
		Month 27	*** 0.584	1.79251
		Month 28	*** 0.511	1.66629
		Month 29	*** 0.546	1.72688
		Month 30	*** 0.474	1.60712
		Month 31	*** 0.330	1.39031
		Month 32	*** 0.373	1.45226
		Month 33	*** 0.437	1.5474
		Month 34	*** 0.406	1.50014
		Month 35 to 40	*** 0.319	1.3755
		Month 41 to 50	*** 0.181	1.19815
		Month 51 to 60	0.067	1.06916
		Month 60 plus	0.000	1
Education history	EducationLevel	A: No qualifications	0.000	1
		B: NQF 1: <80 credit	0.001	1.00141
		C: NQF 1: 80+ credit	*** 0.055	1.05665
		D: NQF 2: 80+ credit	*** 0.064	1.06643
		E: NQF 3: 80+ credit	*** 0.050	1.05111
		F: NQF 4: 72+ credit	*** 0.125	1.13345
		G: Degree Profession	*** 0.163	1.17761
		H: Unspecified	** 0.047	1.04853
	SALtimeC	<3 months	*** -0.406	0.66663
		>3–6 months	*** -0.432	0.64903
		>6 months–1 year	*** -0.420	0.65678
		>1–2 years	*** -0.392	0.67549

Group	Parameter	Level	Estimate	Odds
		>2–3 years	*** -0.386	0.67969
		>3–4 years	*** -0.400	0.6704
		>4–5 years	*** -0.377	0.68609
		>5–6 years	*** -0.392	0.67582
		Over 6 years	*** -0.418	0.6583
		Unspecified	0.000	1
	TertiaryStudy	Yes	*** 1.046	2.84752
		No	0.000	1
	TimeLastSALC	<3 months	*** 0.371	1.44897
		>3–6 months	*** 0.373	1.45281
		>6 months–1 year	*** 0.435	1.54541
		>1–2 years	*** 0.480	1.61645
		>2–3 years	*** 0.448	1.56584
		>3–4 years	*** 0.444	1.55883
		>4–5 years	*** 0.409	1.50535
		>5–6 years	*** 0.441	1.55416
		>6–8 years	*** 0.353	1.42379
		>8–10 years	*** 0.317	1.37345
		Over 10 years	*** 0.481	1.6171
		Unspecified	0.000	1
Family status	ChildAge	Under 5	*** -0.157	0.85494
		5 to under 14	** -0.058	0.94369
		Over 14	-0.013	0.9875
		No child	0.000	1
	NumChild	1 child	*** -0.068	0.9347
		2 children	** 0.044	1.04503
		3+ children	0.000	1
		No child	0.000	1
Migrant status	EnglishPrefered	Yes	0.000	1
		No	*** -0.242	0.78531
	TimeInNZ	<1 year	*** -0.424	0.65425
		1–2 years	** -0.098	0.90658
		2–4 years	*** -0.110	0.89544
		4–8 years	0.037	1.038
		8–12 years	*** 0.078	1.08071
		12+ years	*** 0.073	1.07569
		New Zealand	0.000	1
Part time work	WorkingPT	Yes	*** 0.426	1.53078
		No	0.000	1
Prison	TimeSincePrison	<3 months	0.102	1.10749
		>3–6 months	** 0.373	1.45158
		>6–12 months	*** 0.141	1.15195
		>1–2 years	0.064	1.06605
		>2–4 years	0.045	1.04577
		>4–6 years	** 0.098	1.10315
		>6–8 years	** 0.085	1.08867
		>8–10 years	0.033	1.03355
		Over 10 years	-0.027	0.97357
		Never	0.000	1
Scale	Scale		1.000	2.71828
Labour market	Month	January	*** 0.300	1.35015

Group	Parameter	Level	Estimate	Odds
		February	*** 0.522	1.68559
		March	*** 0.218	1.2434
		April	*** 0.167	1.18226
		May	*** 0.133	1.14185
		June	*** 0.166	1.18059
		July	*** 0.107	1.11314
		August	0.011	1.01127
		September	0.000	1
		October	0.033	1.03346
		November	0.004	1.00441
		December	*** -0.411	0.66285
Labour market Ben	TLA	Ashburton	** 0.172	1.18792
		Auckland City	0.000	1
		Buller	** 0.191	1.21079
		Christchurch City	*** 0.249	1.28217
		Clutha	-0.099	0.90538
		Dunedin City	*** -0.166	0.84698
		Far North	** -0.057	0.94416
		Franklin	0.006	1.00597
		Gisborne	*** 0.331	1.39236
		Grey	-0.025	0.97551
		Hamilton City	*** 0.207	1.22971
		Hastings	*** 0.408	1.50396
		Hauraki	*** 0.390	1.47708
		Horowhenua	** -0.076	0.92657
		Hutt City	-0.009	0.99087
		Invercargill City	** -0.059	0.94229
		Kaipara	0.082	1.08512
		Kapiti Coast	-0.066	0.93575
		Kawerau	0.063	1.06491
		Manawatu	*** 0.201	1.22323
		Manukau City	0.023	1.02356
		Marlborough	*** 0.449	1.56719
		Masterton	0.078	1.08127
		Matamata–Piako	*** 0.285	1.32948
		Napier City	*** 0.239	1.26934
		Nelson City	*** 0.178	1.19471
		New Plymouth	*** 0.284	1.32887
		North Shore City	*** 0.299	1.34849
		Opotiki	*** 0.656	1.92741
		Otago Queenstown	*** 0.587	1.79804
		Palmerston North City	0.055	1.0566
		Papakura	*** 0.092	1.09658
		Porirua City	0.036	1.03696
		Rangitikei	** 0.187	1.2057
		Rodney	*** 0.225	1.25243
		Rotorua	*** 0.159	1.17261
		Ruapehu Waitomo Taupo	*** 0.226	1.25305
		South Taranaki	*** 0.235	1.26433
		South Waikato	0.024	1.02405
		Stratford	*** 0.230	1.2583

Group	Parameter	Level	Estimate	Odds
		Tararua	0.070	1.07265
		Tasman	*** 0.383	1.46736
		Tauranga West Bay of Plenty	*** 0.732	2.07909
		Thames–Coromandel	*** 0.621	1.8616
		Timaru	*** 0.207	1.23054
		Upper Hutt City	** -0.093	0.91163
		Waikato	*** 0.371	1.44952
		Waimakariri	*** 0.461	1.58493
		Waipa	*** 0.455	1.57574
		Wairoa	*** -0.216	0.80586
		Waitakere City	*** 0.122	1.12979
		Waitaki	** 0.179	1.19615
		Wellington City	-0.010	0.98959
		Whakatane	*** 0.277	1.31869
		Whanganui	*** -0.180	0.83513
		Whangarei	*** -0.173	0.84115

Notes:
*: p value <0.1, **: p value <0.05, ***: p value <0.001.

The 52-week reapplication variable indicates a large increase in the likelihood of exiting at anniversary, with clients being less likely to exit in the periods before and after anniversary.

The remaining variables show an expected pattern.

Benefit history: in most instances, longer previous periods on benefit and non-unemployment-related benefits tend to be associated with clients being less likely to exit from main benefits. Clients who have transferred to benefits other than unemployment were also less likely to exit.

Labour market: an increased regional unemployment rate reduces the likelihood of exiting.

Seasonality: the anniversary falling within the first half of the calendar year increased the likelihood of exiting, while it falling within the period to Christmas decreases the likelihood.

Location: there is considerable variation between territorial authority locations in the likelihood of exiting. Of note, is that often provincial and rural locations have a greater likelihood of exit than the main centres.

Age group: apart from for very young clients (under the age of 20), the likelihood of exiting decreases after 25 years of age.

Ethnicity: of identified ethnicities, European clients have the lowest likelihood of exiting compared with the other three groups, with Pacific people having the greatest likelihood.

Education: higher education increased the likelihood of exiting, especially for those with a tertiary or National Qualifications Framework Level 4 qualification or above.

Children: Having a child under the age of 14 reduces the likelihood of exit. As expected, the likelihood is lowest for those with a child under the age of five.

Working part time: higher levels of part-time earnings are associated with a greater likelihood of exit.

Migrant status: new migrants in general have a lower likelihood of exiting than non-migrants. However, migrants who have been in New Zealand for more than 4 years have a higher likelihood of exiting. Those for whom English is not their preferred language also have a lower likelihood of exiting.

Prison: the likelihood of exiting increases for clients who have spent time in prison, with the greatest likelihood between 3 months to 6 months after release.

Duration off benefit after exiting main benefit

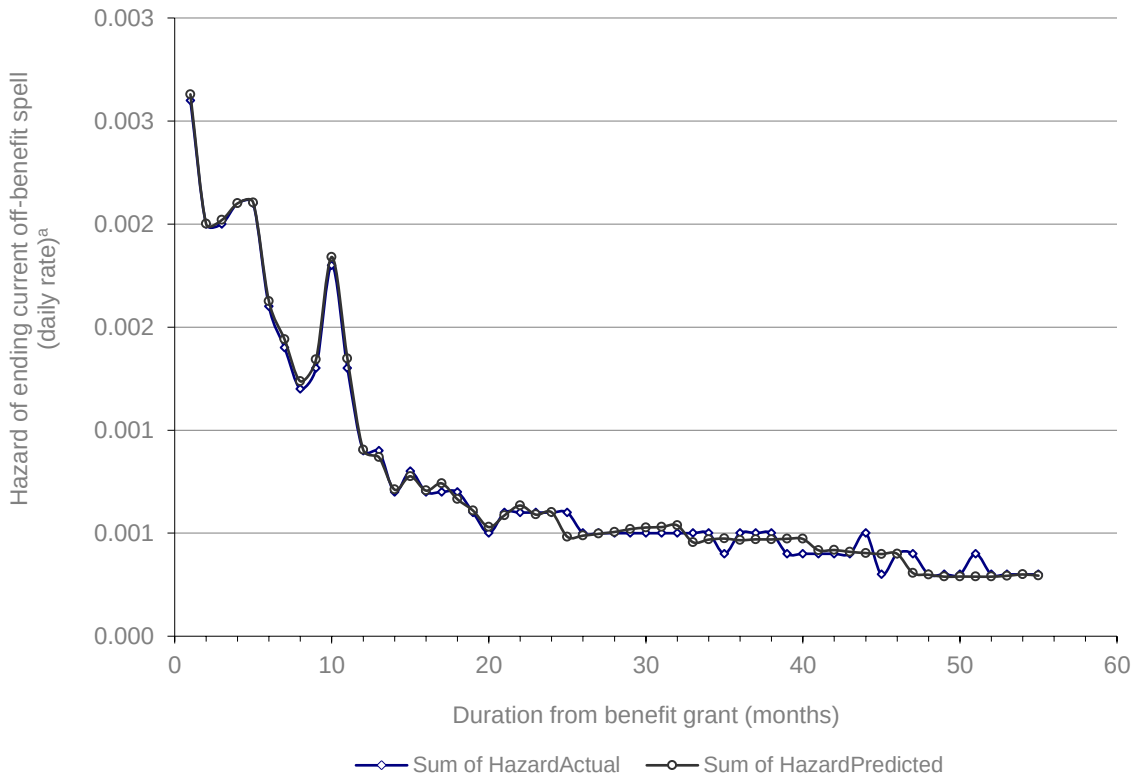
Population and analysis sample

The duration model is based on the sample of main benefit spells with an uncensored exit. For this reason, the number of off-benefit spells is smaller than in the previous two models.

Final model fit

Figure 2825 shows the actual and estimated hazard rate for the full model of the hazard of exiting from a main benefit.

Figure 285: Actual and estimated hazard rate for duration off main benefit



What influences time off main benefit?

In the off-benefit model (table 18), we find that duration since exit is the most important variable in the model, followed by seasonally adjusted TLA entry rate and CWA status (for clients cancelled at 52 weeks).

Table 18: Type 3 effects for duration on off main benefit model

Group	Variable	Type 3 Chi Square	Levels
Benefit information	StBenType	*** 291.8	6
	BenDurTotal	*** 1,121.7	
Demographics	Age	*** 1,322.2	
	AgeSqr	*** 1,051.8	
Interventions	CWAstatus	*** 958.9	12
Duration	DurIntCat	*** 12,726.8	53
Education history	EducationLevel	*** 337.4	8

Group	Variable	Type 3 Chi Square	Levels
Family status	StNumChild	*** 11.5	4
Migrant status	EnglishPrefered	*** 33.9	2
	TimeInNZ	*** 25.3	7
Part-time work	StTotalEarnings	*** 321.8	
Prison	ExPrisoner	*** 326.0	2
Labour market	Month	*** 1,028.1	12
	EntriesSE	*** 2,782.9	
	TLA	*** 617.5	56

Note: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

Error! Reference source not found.9 summarises those variables included in the model.

Table 19: Model parameters and odds ratio estimates for duration off benefit model

Group	Parameter	Level	Estimate	Odds
Intercept	Intercept		*** -5.672	0.00344
Benefit information	StBenType	DPB related	-0.004	0.99646
		IB	*** -1.103	0.33171
		No benefit	*** 1.249	3.48579
		NZS VP TRB	*** -1.527	0.21725
		SB related	*** -0.141	0.86878
		UB related	0.000	1
	BenDurTotal		*** 0.000	1.04934
Demographics	Age		*** -0.026	0.77411
	AgeSqr		*** 0.001	1.01356
Interventions	CWAstatus	2 52wks: 1 01 month	*** 0.986	2.68161
		2 52wks: 1 02 month	-0.088	0.91571
		2 52wks: 1 03 month	*** -0.347	0.70705
		2 52wks: 1 04 month	*** -0.718	0.48769
		2 52wks: 1 05 month	*** -0.540	0.58249
		2 52wks: 1 06 month	*** -0.507	0.6025
		2 52wks: 1 07 month	*** -0.462	0.62975
		2 52wks: 1 08 month	*** -0.474	0.6228
		2 52wks: 1 09 month	*** -0.752	0.47163
		2 52wks: 2 01 month	*** 1.253	3.50097
		6 NotApp	0.000	1
		2 52wks: 3 01 month	** 0.853	2.3473
Duration	DurIntCat	Month 01	*** 2.059	7.83794
		Month 01 FF	*** 2.030	7.6165
		Month 02	*** 1.965	7.13276
		Month 02 FF	*** 2.056	7.81793
		Month 03	*** 2.079	7.9951
		Month 03 FF	*** 2.051	7.77583
		Month 04	*** 2.158	8.65333
		Month 04 FF	*** 2.124	8.36144
		Month 05	*** 2.125	8.37392
		Month 05 FF	*** 2.113	8.27562
		Month 06	*** 1.928	6.87657
		Month 06 FF	*** 1.802	6.05986
		Month 07	*** 1.860	6.42198
		Month 07 FF	*** 1.616	5.03098
		Month 08	*** 1.616	5.03074

Group	Parameter	Level	Estimate	Odds
		Month 08 FF	*** 1.582	4.86689
		Month 09	*** 1.672	5.32355
		Month 09 FF	*** 1.751	5.75757
		Month 10	*** 1.965	7.13613
		Month 10 FF	*** 1.929	6.88507
		Month 11	*** 1.732	5.65212
		Month 11 FF	*** 1.539	4.6599
		Month 12	*** 1.354	3.87208
		Month 12 FF	*** 1.146	3.1455
		Month 13	*** 1.290	3.63306
		Month 13 FF	*** 1.117	3.05505
		Month 14	*** 1.077	2.93543
		Month 14 FF	*** 0.934	2.5453
		Month 15	*** 1.193	3.29732
		Month 15 FF	*** 0.945	2.57334
		Month 16	*** 1.041	2.83189
		Month 16 FF	*** 0.928	2.5297
		Month 17	*** 1.128	3.08969
		Month 17 FF	*** 0.847	2.33148
		Month 18	*** 0.977	2.65604
		Month 18 FF	*** 0.806	2.23951
		Month 19	*** 0.905	2.47243
		Month 19 FF	*** 0.676	1.96634
		Month 20	*** 0.732	2.0793
		Month 20 FF	*** 0.569	1.76678
		Month 21	*** 0.825	2.28083
		Month 21 FF	*** 0.623	1.86458
		Month 22	*** 0.857	2.35557
		Month 22 FF	*** 0.767	2.15285
		Month 23	*** 0.757	2.13244
		Month 23 FF	*** 0.818	2.26709
		Month 24	*** 0.860	2.36261
		Month 24 FF	** 0.449	1.56726
		Month 25 to 32	*** 0.596	1.81416
		Month 25 to 32 FF	*** 0.422	1.52477
		Month 33 to 40	*** 0.413	1.51062
		Month 41 to 46	*** 0.276	1.31796
		Month 47 plus	0.000	1
Education history	EducationLevel	A: No qualifications	0.000	1
		B: NQF 1: <80 credit	** -0.032	0.96831
		C: NQF 1: 80+ credit	*** -0.186	0.83038
		D: NQF 2: 80+ credit	*** -0.242	0.78513
		E: NQF 3: 80+ credit	*** -0.144	0.86552
		F: NQF 4: 72+ credit	*** -0.199	0.81932
		G: Degree Profession	*** -0.330	0.71907
		H: Unspecified	*** -0.379	0.68426
Family status	StNumChild	1 child	0.027	1.02772
		2 children	** -0.045	0.95581
		3+ children	** 0.060	1.06152
		No child	0.000	1
Labour market	Month	January	-0.026	0.97405

Group	Parameter	Level	Estimate	Odds
		February	** -0.077	0.92588
		March	*** -0.150	0.86092
		April	*** -0.099	0.90552
		May	** 0.049	1.05023
		June	*** 0.217	1.24276
		July	0.019	1.01895
		August	-0.008	0.9925
		September	0.000	1
		October	0.013	1.01275
		November	*** 0.491	1.63412
		December	*** 0.217	1.24239
Migrant status	EnglishPrefered	Yes	0.000	1
		No	*** 0.218	1.24372
	TimeInNZ	<1 year	** 0.379	1.46152
		1–-2 years	0.084	1.08742
		2–4 years	*** 0.124	1.13252
		4–8 years	0.036	1.03652
		8–12 years	-0.020	0.98047
		12+ years	*** -0.061	0.94099
		New Zealand	0.000	1
Part-time work	StTotalEarnings		*** -0.001	0.99862
Prison	ExPrisoner	Yes	*** 0.323	1.38189
		No	0.000	1
Scale	Scale		1.000	2.71828
Labour market Ben	EntriesSE		*** 1.513	4.5409
	TLA	Ashburton	** -0.291	0.74737
		Auckland City	0.000	1
		Buller	-0.153	0.85836
		Christchurch City	0.035	1.03521
		Clutha	0.151	1.16251
		Dunedin City	*** 0.165	1.17925
		Far North	** -0.081	0.922
		Franklin	*** -0.377	0.68569
		Gisborne	0.008	1.00796
		Grey	-0.100	0.90451
		Hamilton City	-0.023	0.9774
		Hastings	*** 0.295	1.3435
		Hauraki	0.108	1.11446
		Horowhenua	** -0.136	0.87272
		Hutt City	*** -0.226	0.79746
		Invercargill City	0.016	1.01643
		Kaipara	-0.005	0.99484
		Kapiti Coast	*** -0.178	0.83705
		Kawerau	** -0.163	0.84959
		Manawatu	-0.111	0.89461
		Manukau City	*** -0.227	0.79712
		Marlborough	-0.085	0.91857
		Masterton	** 0.114	1.12068
		Matamata–Piako	0.092	1.0966
		Napier City	*** 0.336	1.39971
		Nelson City	0.085	1.08886

Group	Parameter	Level	Estimate	Odds
		New Plymouth	*** 0.246	1.27868
		North Shore City	** -0.079	0.92371
		Opotiki	0.015	1.01553
		Otago Queenstown	** 0.232	1.26052
		Palmerston North City	0.014	1.01395
		Papakura	*** -0.138	0.87147
		Porirua City	*** -0.166	0.84725
		Rangitikei	** 0.213	1.23764
		Rodney	*** -0.351	0.70434
		Rotorua	0.032	1.03211
		Ruapehu Waitomo Taupo	*** 0.264	1.30232
		South Taranaki	0.085	1.0891
		South Waikato	-0.006	0.99425
		Stratford	-0.016	0.98364
		Tararua	-0.070	0.93212
		Tasman	** 0.183	1.20103
		Tauranga West Bay of Plenty	*** 0.168	1.18282
		Thames–Coromandel	** 0.182	1.19906
		Timaru	** 0.109	1.11473
		Upper Hutt City	*** -0.175	0.83955
		Waikato	0.055	1.05691
		Waimakariri	*** -0.399	0.67126
		Waipa	-0.091	0.91289
		Wairoa	0.055	1.05617
		Waitakere City	*** -0.205	0.8148
		Waitaki	0.077	1.0803
		Wellington City	-0.045	0.95603
		Whakatane	** 0.119	1.12685
		Whanganui	-0.067	0.93526
		Whangarei	*** -0.164	0.84878

Note: *: p value <0.1, **: p value <0.05, ***: p value <0.001.

The 52-week reapplication variable indicates a large increase in the likelihood of exiting at anniversary, and a decrease in the likelihood of exiting in the periods before and after anniversary.

The remaining variables show an expected pattern.

Duration of spell: from **Figure 28**25 we can see that the probability of returning to a main benefit falls as duration off benefit increases. However, there are two peaks in the hazard of returning to benefit at 4 months and 10 months. These peaks are likely to reflect seasonal workers in horticulture and meat processing. We found that the baseline hazard differed between the period October 2010 and afterwards (those classes with an 'FF' suffix). The baseline hazard after October 2010 is lower than that observed before 2010. We do not think this is a result of the introduction of the 52-week reapplication process but reflects changes in overall labour market conditions.

Labour market: an increased benefit entry rate increases the likelihood of returning to benefit.

Seasonality: the anniversary falling within the first half of the calendar year decreased likelihood of returning to benefit, while it falling within the period to Christmas increased the likelihood.

Location: there is considerable variation between territorial authority locations in the likelihood of exiting. Of note is that often provincial and rural locations have a greater likelihood of returning to main benefit than the main centres. These results may reflect the differences in the level of seasonal work across the country.

Benefit history: exiting from benefits other than Unemployment Benefit reduces the likelihood of returning to a main benefit.

Age group: the probability of returning to a main benefit decreases with age, up to 60 years of age or older. For those over the age of 60, the probability increases. However, this is generally because these clients qualify for New Zealand Superannuation. They typically do not return to working age benefits.

Education: having a higher qualification decreases a client's likelihood of returning to main benefit, especially for those with a tertiary degree.

Number of children: number of children has a small influence, with those with two children having a lower probability of returning to benefit.

Migrant status: new migrants in general have a higher likelihood of returning to benefit than non-migrants. Likewise, clients for whom English is not their preferred language are also more likely to return to benefit.

Prison: the likelihood of returning to main benefit increases if a client has been in prison.

Quantifying the impact of the 52-week reapplication process

Having modelled the impact of the reapplication process on the hazard rates for the three outcomes, the next stage of the analysis is to convert the fitted model into more easily understood results. In particular, we want to be able to report on the overall reduction in the time that clients spent on benefit because of the reapplication process. Presenting results in this form allows us to calculate useful metrics such as the reduction in income support expenditure and, ultimately, to estimate the net cost-benefit of the intervention.

The approach involved two linked steps.

- Calculate the impact of the reapplication process for each of the duration models separately. The impact is estimated by using the model estimates for the expected duration of participants for each outcome and compares this to their expected duration if they had not participated in the reapplication process.
- Use the duration model for time on main benefit and off benefit together to obtain an estimate of the total time clients are on benefit. By combining the two models, we can account for the impact of the policy on how long clients stay on benefit as well as on how quickly they return to benefit.

Impact on participants rather than on 'average clients'

A common approach in estimating the impact of policy using duration models is to apply the model beta estimates to a profile of an 'average' client. For example, Dalgety et al. (2010) took this approach in estimating the impact of Working for Families on the duration of Domestic Purposes Benefit clients on main benefit.

We take a different approach in this analysis by using the profiles of those who actually participate in the reapplication process to estimate the impact of the reapplication process. The reasons for doing so are as follows.

- The model parameters are based on the observed spells of clients who do not necessarily reach their 52-week anniversary and, therefore, do not represent the 'typical' clients who are affected by the reapplication process. Likewise, those who reached their anniversary before the policy change may not be the same as clients who participate in the reapplication process currently.
- The estimates are more 'intuitive', because we can say that the results directly represent the experience of clients affected by the reapplication process. Unlike the Working for Families analysis, not all clients included in the analysis will participate in the reapplication process; therefore, the 'average' client profile does not necessarily represent the profile of participants.

- By using the participants, we can check our model estimates against the observed durations of clients who have been subject to the reapplication process. Comparing observed and modelled outcomes provides a direct means to see whether the model estimates are a reasonable reflection of what actually happened during the reapplication process.

Converting model parameter estimates into individual hazard functions

The first step is to combine the observed characteristics of clients participating in the reapplication process with the model beta estimates to calculate the expected hazard rate for each client in each interval. From the estimated hazard, we can then calculate their expected survival and probability density functions.

To achieve this, we need to create a person interval dataset that covers all intervals up to the end period of the analysis. In other words, if a client ends a spell, we need to impute their profile for the unobserved intervals until the end of the analysis period. **Table 20** illustrates how we projected the client's profile for the unobserved intervals. In **Table 20** we have a client who exits at interval 4. However, if they did not exit, their spell would have lasted until interval 9 (the censor interval). The challenge is to impute the client profile for the unobserved spells (intervals 5 to 9).

Table 20: Constructing a full client interval dataset for non censored client spells

Interval	1	2	3	4	5	6	7	8	9
	Observed				Projected				
Events				Exit					Censor
Fixed characteristics	Observed (no projection required)								
Spell duration variables	Calculated directly based on interval								
Reapplication process participation	Observed (all participants have a reapplication start date and anniversary date is a fixed variable)								
Labour market variables	Observed				Based on last observed TLA and main benefit calculate labour market variables				
Individual time varying characteristics	Observed				Constant based on value of last observed interval				

For fixed characteristics (those that are time invariant), we do not need to make any projections. Similarly, any duration variables (ie, the piecewise duration variable) can be calculated based on the interval value.

Because we are analysing clients participating in the reapplication process, we know by definition when they commence the process. In addition, the benefit anniversary date is a fixed variable from which the time varying reapplication process variables can be calculated.

For labour market variables, we need to make two assumptions for the projection period. These are that the client would have remained on the same main benefit and TLA location for the projected period based on the last observed interval. It is then a matter of using the benefit and TLA labour market variables for each calendar month during the projected period. Finally, for individual time-varying characteristics, we assume that these characteristics remain constant during the projected period based on the value in the last observed interval. **Table 21** summarises the variables used in the analysis according to the classification in **Table 20**.

Table 21: Classification of model variables for projection of client profile for unobserved intervals

Variable type	Variable
Fixed	Age, AgeGroup, AgeFirstBenefit, AgeFirstBenefitC, Ethnicity
	BenDurDPB, BenDurIB, BenDurJSAIYB, BenDurSB, BenDurTotal, BenDurTotalC, StBenDur, StBenType, PreBen, PreBenDur
	CurrentMigrant, EnglishPrefered, Refugee, TimeInNZ

	EducationLevel, SALtimeC, TimeLastSALC
	StartMonth
	StNumChild, StPartner
	StTotalEarnings
	ExPrisoner, TimeSincePrison
Spell duration	CWAstatus
	DurIntCat
	Month
Labour market variables	EntriesSE ExitsSE UnempRate
Individual time varying	ChildAge, NumChild, Partner
	CurrentServ
	TLA
	TotalEarnings, WorkingPT
	TertiaryStudy

Converting individual estimated hazard functions into modelled duration

Having calculated the individual hazard for each client, we then select an exit interval based on the estimated hazard. To do this, we first convert the hazard for each individual spell into a probability density function (PDF). A PDF is the unconditional probability[9] that a client would have ended the spell in each interval and can be calculated by multiplying the hazard in interval t by the survival rate at t minus 1. Once we have calculated the PDF for each individual client interval spell, we can randomly select an interval within that spell to represent the modelled exit interval (or censored if no interval is selected). At the end of this process, we arrive at an estimated exit interval for each client spell based on the model beta parameters and the client's characteristics over that spell.

Estimating the policy impact on duration on Unemployment Benefit and main benefit

Here we calculate two expected durations that reflect one of two states:

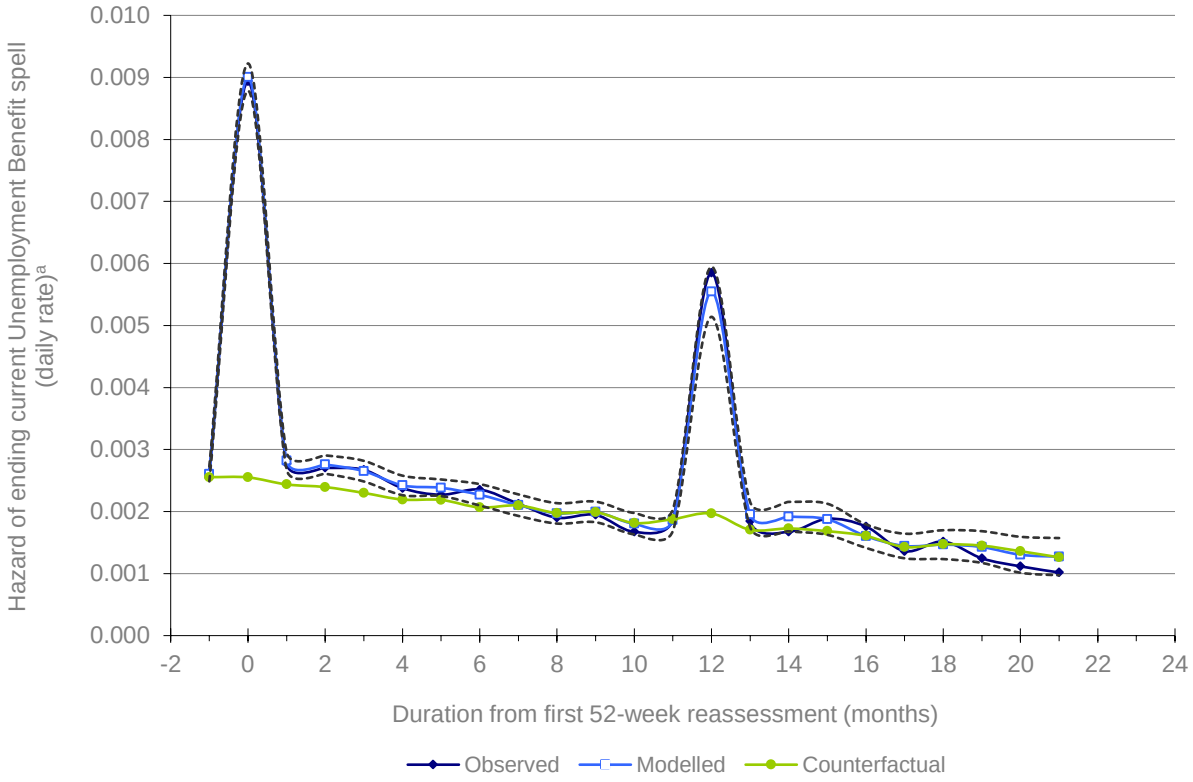
- **modelled**: as participants in the reapplication process that reflect observed durations
- **counterfactual**: as non-participants in the reapplication process.

Using the simulation client interval dataset, we applied the parameter estimates to the participants in the reapplication process. For the counterfactual state, we set their reapplication variable (CWAstatus and CWAstatusAtExit) to 'not applicable' and calculated their expected duration on each benefit (all else being equal). In other words, what would the model estimate of their duration on each outcome if they had **not** been subject to the reapplication process, with all other variables remaining unchanged?

We calculate the modelled and counterfactual exit interval for each participant in the analysis. Based on these modelled and counterfactual durations, we can then calculate the overall hazard and survival rates for all the participants in the same way as for the observed durations on benefit (as illustrated in **Figure**26 for duration on unemployment related benefit). The same process was repeated for duration on any main benefit and duration off main benefit. The difference between the modelled and counterfactual hazard rates represents the impact of the reapplication process.

[9] Unlike the hazard function, which is the conditional probability (ie, probability of exiting at interval t, conditional on having survived to interval t-1).

Figure 26: Estimated impact of the 52 week reapplication process on the hazard of exiting an unemployment related benefit



Notes:
a: Based on model parameter values and observed characteristics of those clients subject to the reapplication process.
b: With 52-week reapplication is based on characteristics of clients who participated in the reapplication process using model estimates.
c: The counterfactual is estimated by setting the variable for participating in the reapplication process to non-participation.
d: The dotted lines indicate the 95 percent confidence interval for the impact of the reapplication process compared with the counterfactual.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Calculating the confidence intervals

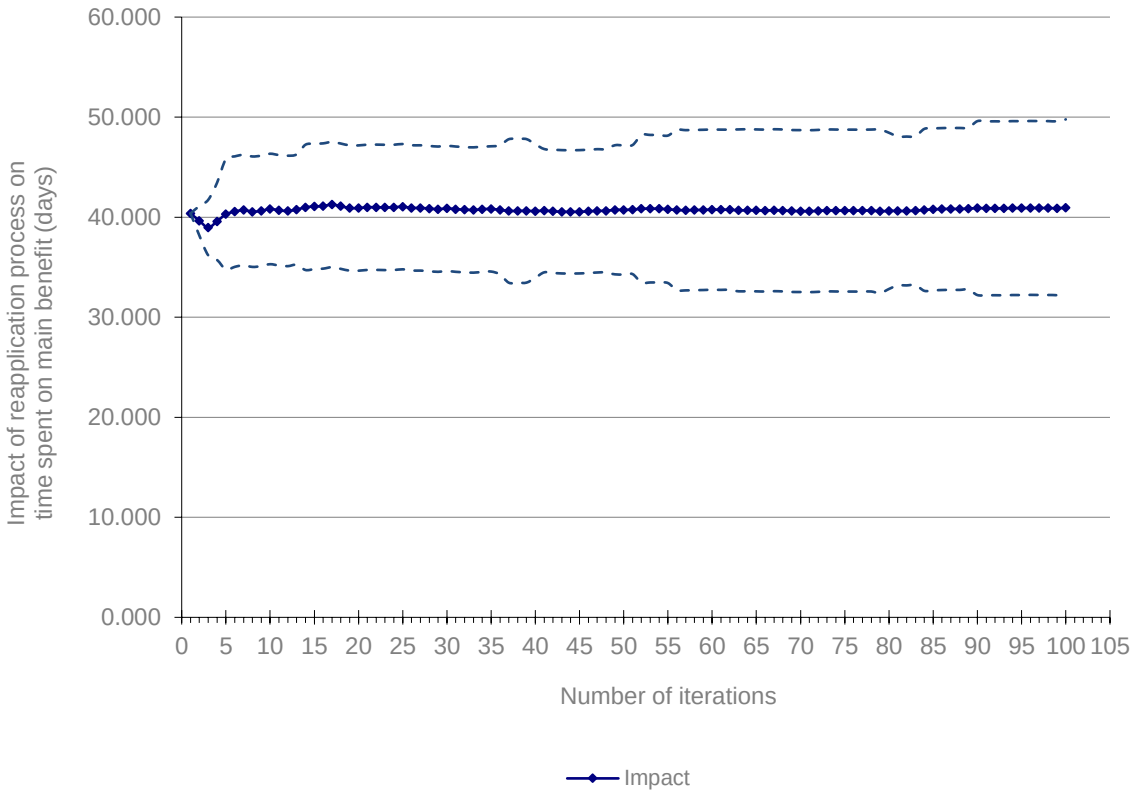
While the above calculation is relatively straightforward for the mid-point values of the beta estimates themselves, it is more difficult to convert the standard errors for the beta estimates into confidence intervals. To overcome this problem, we ran a simulation model to arrive at the range of likely values that the survival curves would fall into based on the parameter space for the beta estimates (Gentle, 2003). The parameter space is defined by the model's beta estimate and associated beta covariance matrix. At the start of each iteration, we took a random draw from the parameter space for each model. Based on this random draw, we would then calculate the modelled and counterfactual durations and associated impact estimates. Repeating this process 100[10] times generates a distribution of expected values based on the parameter space. We took the 97.5 percent and 2.5 percent intervals of this distribution as our confidence intervals for the hazard and survival curves and associated impact estimates (as shown by the dotted lines in **Figure**26). To test whether the number of iterations is sufficient we plotted the final impact estimate (time off any main benefit) by the number of simulations (**Figure** 27). As the number of simulations increases, we expect to see stabilisation in the central estimate and the confidence intervals. Over the first six iterations in **Figure** 27, we see some movement in the central estimate, but this

[10] Running simulations was computationally expensive and this limited the number of simulations we could practically run.

stabilises after iteration 20. The confidence intervals show greater variation at a greater number of simulations, but they also stabilise after 90 intervals.

The confidence intervals for the model estimates reflect the uncertainty of the overall model. On the other hand, the confidence intervals for the impact reflect only the uncertainty of the beta variables for the reapplication process.

Figure 27: Impact of 52 week reapplication by number of simulations



Combining model estimates

Although the individual model results are interesting, on their own, they do not fully answer the main policy question as to the impact of the 52-week reapplication process on total time on benefit. In particular, we want to account for the impact of the reapplication process on the duration on main benefit as well as the duration off benefit after exit. To achieve this goal, we combine the main benefit duration model and off-benefit duration using the following steps (with a more detailed discussion below).

1. For each simulated client-interval main benefit spell calculate the hazard of exiting main benefit and convert the hazard rate into the unconditional probability of exiting benefit in each interval.
2. Based on the estimated probability of exiting benefit in each interval, randomly select an exit interval for each client spell. The selected exits represent a random draw from the expected distribution of exits from main benefit based on the model beta estimates.
3. Use the randomly generated exit from benefit to generate a simulated off-benefit client-interval spell and calculate the hazard of returning to benefit for each interval.
4. Simulate the duration off benefit for each client, based on the calculated probability of returning to benefit in each interval. The selected benefit returns represent a random draw from the expected distribution of clients returning to benefit based on the model beta estimates.

5. From the combined client on- and off-benefit spells we can calculate for each interval the probability a client would be on benefit. These interval probabilities are no longer survival probabilities, because they account for clients returning to benefit after exit. What this can mean is that the probability of being on benefit can increase over intervals (which cannot happen for survival cures).

Simulated exits from main benefit

The first step is to generate the expected duration on main benefit based on the model beta estimates. To do this, we calculated the probability density function (PDF) for each simulated client-interval spell. Unlike the hazard rate, the PDF represents the independent probability a client will end their spell in each interval. The PDF is a simple function of survival and hazard. The PDF at interval t is the multiple of the survival at interval t-1 with the hazard rate at interval t.

Using the PDF for each simulated client-interval spell, we randomly select an exit interval. These randomly selected exits are a draw from the expected distribution of exits based on the model beta estimates and client characteristics over the observation period. In other words, we expect them to have the same distribution as the observed pattern of off-benefit exits.

Simulated client interval off-benefit spell

The next step is to take these randomly selected exits and create a simulated off-benefit client interval spell. To achieve this, we needed to create a simulated client-interval off-benefit spell for each interval the client is on main benefit, up to the censor interval. **Table 22** illustrates how we created the simulated off-benefit spell. In this example, we have a simulated main benefit spell lasting for five intervals. For each on-benefit interval, we create a corresponding off-benefit client-interval spell. The client profile of each of these off-benefit spells is based on the client profile at each on-benefit interval. Therefore, the off-benefit client-interval spell for on-benefit interval 0 reflects the profile of the client at interval 0. In addition, each off-benefit interval spell is censored to match the duration of the on-benefit spell (ie, five intervals in total). Note that the interval of exit and the first off-benefit interval are equivalent. To recap, the point at which a client exits benefit is also the point that they commence their off-benefit spell.

Table 22: Creating simulated off main benefit spells based on client profile at each main benefit interval

Simulated client interval main benefit spell	Simulated client interval off main benefit spell				
	Interval 0	Interval 1	Interval 2	Interval 3	Interval 4
Interval 0	Client profile based on main benefit interval 0				Censor
Interval 1	Client profile based on main benefit interval 1			Censor	
Interval 2	Based on interval 2		Censor		
Interval 3		Censor			
Interval 4 Censor	Censor				

To create these simulated off-benefit spells, we need to make assumptions about the client's off-benefit profiles, because, at best, we observed only one of these off-benefit spells. However, because the off-benefit model relies primarily on fixed characteristics (observed at spell start and therefore at benefit exit) such assumptions are not as strong as they might first appear. **Table 23** summarises the off-benefit model variables and notes any assumptions required to create simulated off-benefit client-interval spells.

Table 23: Off benefit duration variables and required assumptions to create simulated off benefit spells

Type	Name	Description	Assumptions
Fixed characteristics	AgeFirstBenefitC	Age at start of first benefit spell categorical	None, based on client profile
	Ethnicity	Ethnicity	
	TimeInNZ	Time since migrating to New Zealand	
	ExPrisoner	Been in prison	

Type	Name	Description	Assumptions
	CurrentMigrant	Current migrant for income support eligibility	
	EnglishPrefered	English is the migrant's preferred language	
	EducationLevel	Highest education level	
Characteristics at start of spell	StNumChild	Number of children at spell start	None based on the client profile at main benefit exit interval. Same approach used in the created client-interval spells for the duration model
	StPartner	With a partner on benefit at spell start	
	StTotalEarnings	Declared earnings while on benefit at spell start	
	TLA	TLA at spell start	
	CurrentServ	Current benefit at spell start	
	CWAstageAtExit	Stage in the reapplication process the client was when they exited benefit	
	AgeGroup	Age group at spell start	Recalculated using birth date
	BenDurJSAIYB	Time on youth-related benefits at spell start	Durations are increased with each interval (ie, total benefit duration at interval 0 is 300), then at interval 1 this value is 330 (ie, original value plus interval duration x number of intervals)
	BenDurTotal	Time on any main benefit at spell start	
Duration dependent variables	DurIntCat	Duration of interval categorical variable	None calculated form interval
	CWAstatus	Elapsed time since exiting during the reapplication process	
Calendar time dependent variable	Month	Month of interval	None start date of each interval
	EntriesSE	Seasonally adjusted monthly entries to Unemployment Benefit	None interval start date, TLA and benefit at spell start. Same approach used in the created client-interval spells for the duration model

Based on the simulated client-interval off-benefit spell, we select a representative distribution of return to benefit intervals. The steps involved are the same as for selecting intervals for exiting benefit, which we briefly summarise. We calculate the hazard of returning to benefit based on the client profile at each interval and draw from the expected beta values from the off main benefit duration model. Based on the estimated hazard rate at each client-interval we calculate the unconditional probability (PDF) of returning to benefit in each interval. For each client off-benefit spell, we randomly select a return to benefit interval using the probability distribution.

Calculating the total time on benefit

At this stage, we have for each client spell up to three events. The first is the interval they exit main benefit (if not censored) and, if they exit, the interval they return to benefit (if not censored). **Table 24** shows stylised examples of two clients whose outcomes are observed over eight intervals. Client A has an observed main benefit spell that lasts until interval 2. They remain off main benefit from interval 3 to interval 4, returning in interval 5. For the purposes of this analysis, we assume that they remain on benefit until the censor interval. The modelled spell represents the estimated duration on benefit and subsequent duration off benefit. In this case, the client is estimated to remain on benefit until interval 3, remaining off benefit until interval 6, before returning to benefit from interval 7 onward.

Table 24: Example of observed, simulated modelled and counterfactual spells

		Interval								
		0	1	2	3	4	5	6	7	8
Client A	Actual	O	O	O			A	A	A	A
	Modelled	S	S	S	S				A	A
	Counterfactual	S	S				A	A	A	A
Client B	Actual	O	O	O	O	O	O	O	O	O
	Modelled	S	S	S						
	Counterfactual	S	S	S	S	S	S	S	S	S

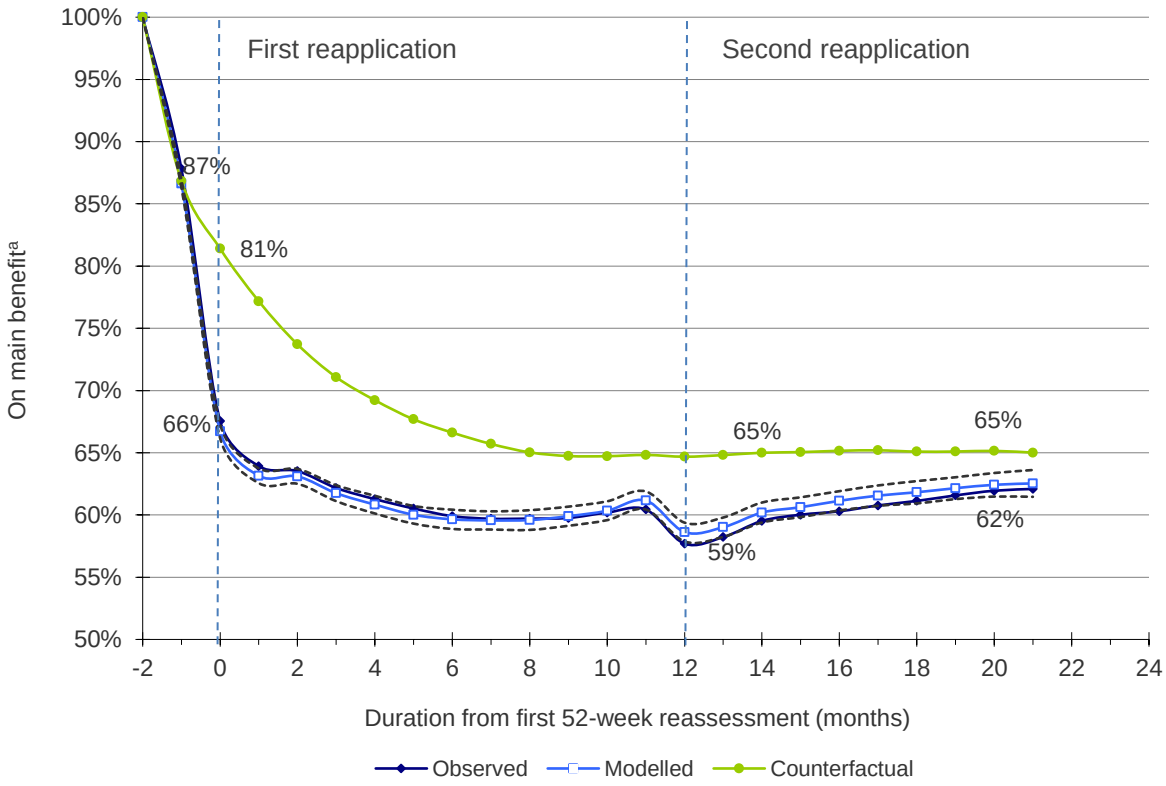
Note: O: observed, S: simulated, A: assumed.

For each iteration of the simulation, we can aggregate these individual results to calculate the probability that the client would be on main benefit in each interval. Figure 28 shows the results for the three states (observed, modelled and counterfactual). These values are the proportion on benefit in each interval divided by the number of observations in the interval (eg, uncensored spells).

Covariance of parameters between models

The reader might be wondering about the covariance in parameter estimates between the models. In other words, how does the parameter space in the duration on main benefit model link to the parameter space of the duration off-benefit model. Because the information used to estimate each of the models was independent, this means the beta estimates for each model are also independent.

Figure 298: Probability of being on main benefit based on observed, modelled and counterfactual spells on and off main benefit



Notes:
a: These are not survival curves, because they account for clients returning to main benefit after exit.
b: The dotted lines indicate the 95 percent confidence interval.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Active on main benefit is not the same as survival on initial main benefit spell

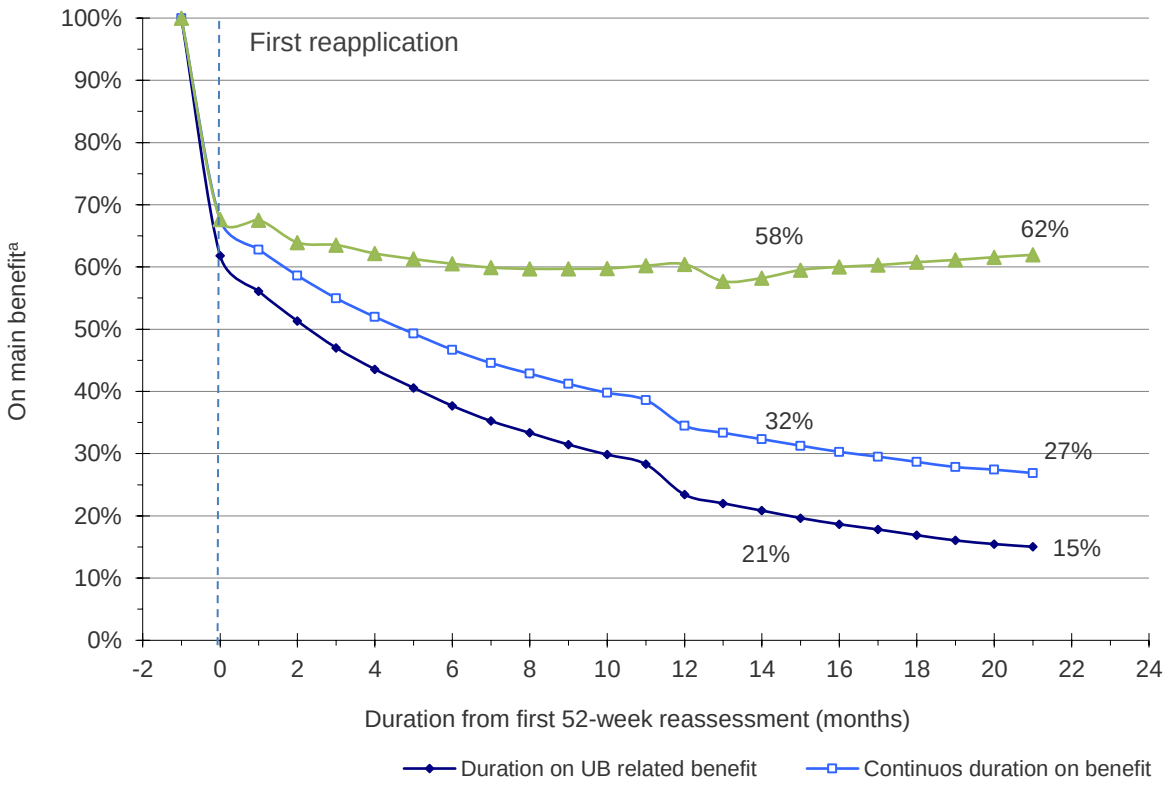
As stated, it is important to remember that the probabilities in figure 28 are not survival probabilities. To illustrate the difference, **Figure** plots the survival on initial Unemployment Benefit and main benefit spell and the probability of being on main benefit in each interval. Both are derived from the actual benefit spells for clients participating in the reapplication process. What is apparent from **Figure** 9 is that looking only at survival on main benefit tends to give the impression that the reapplication process resulted in a rapid reduction in the probability of being on benefit. The active on benefit shows the reduction to be much more modest. By interval 21, 15.0 percent had remained on their initial Unemployment Benefit spell. This increases to 26.9 percent if we include any main benefit spell, but 62.0 percent were active on benefit. The difference (35.1 ppt) between the

proportion active on benefit and those still on their initial main benefit represents the clients who exited main benefit and subsequently returned to main benefit.

However, while the survival on initial main benefit spell underestimates the probability of being on benefit in each interval, our current measure of active on main benefit overstates it. The reason is that we assume that, if a client returns to a main benefit, they remain on a main benefit for the remainder of the observed period (ie, to the censor interval). Our assumption is that the reapplication process has no impact on the time that clients spend on subsequent spells on benefit.

Over longer outcome periods, this over-estimation of the probability of being active on benefit will increase, but it will not have an influence on our estimated impact of the reapplication process.

Figure 29: Survival on main benefit spell and probability of being active on main benefit



Note:
a: Active on main benefit is not survival curve, since it accounts for clients returning to main benefit after exit.

Source: Information Analysis Platform (BDD), CSRE, MSD (research data not official MSD statistics)

Appendix 1: Duration and impact estimates

Table 25: Observed, modelled, counterfactual and impact estimates for duration on current Unemployment Benefit spell

	Hazard (daily rate)				Survival rate				Duration (days)			
Interval	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact
-2	0.269%	0.276% (±0.018%)	0.271%	0.005% (±0.022%)	92%	92% (±0.5%)	92%	0.2% (±0.7%)	28	28 (±0.2)	28	0 (±0.2)
-1	0.262%	0.261% (±0.024%)	0.255%	0.005% (±0.025%)	85%	85% (±0.8%)	85%	0.3% (±0.9%)	53	53 (±0.4)	53	0 (±0.5)
0	0.894%	0.900% (±0.044%)	0.255%	0.645% (±0.049%)	62%	62% (±1.2%)	78%	16.6% (±1.4%)	72	71 (±0.6)	76	5 (±0.7)
1	0.277%	0.282% (±0.028%)	0.244%	0.038% (±0.032%)	56%	56% (±1.2%)	72%	16.4% (±1.4%)	88	88 (±1.0)	98	10 (±1.0)
2	0.271%	0.276% (±0.030%)	0.239%	0.036% (±0.034%)	51%	51% (±1.3%)	67%	15.9% (±1.5%)	104	103 (±1.3)	118	15 (±1.4)
3	0.267%	0.265% (±0.033%)	0.230%	0.035% (±0.039%)	47%	47% (±1.4%)	62%	15.2% (±1.5%)	118	117 (±1.7)	137	19 (±1.8)
4	0.238%	0.242% (±0.031%)	0.219%	0.023% (±0.037%)	44%	43% (±1.3%)	58%	14.5% (±1.6%)	131	130 (±2.0)	154	24 (±2.2)
5	0.227%	0.238% (±0.027%)	0.219%	0.020% (±0.036%)	41%	40% (±1.2%)	54%	13.7% (±1.7%)	143	143 (±2.2)	170	28 (±2.5)
6	0.235%	0.227% (±0.035%)	0.207%	0.020% (±0.039%)	38%	37% (±1.1%)	50%	13.0% (±1.8%)	154	154 (±2.5)	185	32 (±3.0)
7	0.213%	0.210% (±0.035%)	0.210%	0.001% (±0.037%)	35%	35% (±1.0%)	47%	12.1% (±1.6%)	165	164 (±2.8)	200	35 (±3.4)
8	0.190%	0.197% (±0.033%)	0.198%	0.000% (±0.035%)	33%	33% (±1.0%)	44%	11.3% (±1.6%)	175	174 (±3.0)	213	39 (±3.9)
9	0.195%	0.199% (±0.033%)	0.199%	0.000% (±0.050%)	31%	31% (±1.0%)	42%	10.5% (±1.7%)	184	184 (±3.1)	225	42 (±4.5)
10	0.167%	0.181% (±0.034%)	0.182%	-0.001% (±0.044%)	30%	29% (±1.1%)	39%	9.9% (±1.6%)	193	192 (±3.3)	237	45 (±4.9)
11	0.187%	0.186% (±0.035%)	0.188%	-0.002% (±0.051%)	28%	28% (±1.2%)	37%	9.2% (±1.5%)	202	201 (±3.5)	248	48 (±5.3)
12	0.585%	0.554% (±0.081%)	0.197%	0.358% (±0.081%)	23%	23% (±1.0%)	35%	11.6% (±1.5%)	209	208 (±3.7)	259	51 (±5.6)
13	0.184%	0.195% (±0.040%)	0.171%	0.025% (±0.046%)	22%	22% (±1.0%)	33%	11.3% (±1.7%)	215	214 (±4.0)	269	55 (±6.0)
14	0.168%	0.192% (±0.047%)	0.173%	0.019% (±0.059%)	21%	21% (±1.1%)	32%	10.8% (±1.7%)	222	221 (±4.2)	278	58 (±6.2)
15	0.188%	0.188% (±0.050%)	0.168%	0.019% (±0.056%)	20%	20% (±1.1%)	30%	10.3% (±1.7%)	228	227 (±4.4)	287	61 (±6.5)
16	0.176%	0.160% (±0.038%)	0.161%	0.000% (±0.044%)	19%	19% (±1.1%)	29%	9.8% (±1.7%)	233	232 (±4.7)	296	64 (±6.7)
17	0.136%	0.145% (±0.040%)	0.143%	0.002% (±0.051%)	18%	18% (±1.1%)	27%	9.3% (±1.6%)	239	238 (±5.0)	304	67 (±6.9)
18	0.152%	0.147% (±0.047%)	0.147%	-0.001% (±0.051%)	17%	17% (±1.2%)	26%	8.7% (±1.6%)	244	243 (±5.4)	312	69 (±7.0)
19	0.125%	0.143% (±0.051%)	0.145%	-0.002% (±0.061%)	16%	16% (±1.2%)	24%	8.1% (±2.0%)	248	248 (±5.6)	319	72 (±7.1)
20	0.112%	0.130% (±0.058%)	0.136%	-0.006% (±0.062%)	15%	16% (±1.4%)	23%	7.6% (±1.8%)	253	252 (±5.8)	326	74 (±7.4)
21	0.102%	0.127% (±0.060%)	0.126%	0.001% (±0.074%)	15%	15% (±1.3%)	22%	7.1% (±1.7%)	258	257 (±6.0)	333	76 (±7.9)

Table 26: Observed, modelled, counterfactual and impact estimates for duration on current main benefit spell

	Hazard (daily rate)				Survival rate				Duration (days)			
Interval	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact
-2	0.225%	0.244% (±0.017%)	0.239%	0.004% (±0.017%)	93%	93% (±0.5%)	93%	0.1% (±0.7%)	28	28 (±0.2)	28	0 (±0.2)
-1	0.187%	0.211% (±0.022%)	0.208%	0.003% (±0.019%)	88%	87% (±0.7%)	87%	0.2% (±1.0%)	54	54 (±0.3)	54	0 (±0.4)
0	0.766%	0.767% (±0.040%)	0.221%	0.546% (±0.021%)	68%	67% (±1.1%)	81%	14.4% (±1.5%)	75	74 (±0.6)	78	4 (±0.9)
1	0.212%	0.214% (±0.024%)	0.202%	0.012% (±0.022%)	63%	62% (±1.2%)	76%	14.0% (±1.6%)	94	92 (±0.8)	101	9 (±1.2)
2	0.210%	0.210% (±0.027%)	0.199%	0.011% (±0.024%)	59%	58% (±1.2%)	71%	13.4% (±1.6%)	111	110 (±1.2)	122	13 (±1.6)
3	0.199%	0.198% (±0.025%)	0.187%	0.011% (±0.020%)	55%	54% (±1.2%)	67%	12.8% (±1.8%)	128	126 (±1.5)	143	16 (±2.0)
4	0.177%	0.181% (±0.022%)	0.172%	0.009% (±0.023%)	52%	51% (±1.3%)	64%	12.2% (±1.7%)	143	142 (±1.9)	162	20 (±2.5)
5	0.168%	0.176% (±0.027%)	0.169%	0.007% (±0.022%)	49%	49% (±1.3%)	60%	11.6% (±1.8%)	158	156 (±2.2)	180	24 (±3.0)
6	0.171%	0.164% (±0.024%)	0.157%	0.006% (±0.021%)	47%	46% (±1.3%)	57%	11.1% (±1.8%)	172	170 (±2.5)	197	27 (±3.5)
7	0.151%	0.145% (±0.026%)	0.157%	-0.012% (±0.023%)	45%	44% (±1.3%)	55%	10.3% (±2.0%)	185	183 (±2.8)	213	30 (±3.9)
8	0.132%	0.131% (±0.022%)	0.143%	-0.012% (±0.025%)	43%	43% (±1.2%)	52%	9.6% (±1.8%)	198	196 (±3.1)	229	33 (±4.4)
9	0.132%	0.135% (±0.026%)	0.147%	-0.012% (±0.024%)	41%	41% (±1.3%)	50%	9.0% (±1.7%)	211	208 (±3.3)	244	36 (±4.9)
10	0.111%	0.121% (±0.024%)	0.131%	-0.010% (±0.024%)	40%	39% (±1.3%)	48%	8.5% (±1.8%)	223	220 (±3.6)	258	38 (±5.3)
11	0.111%	0.116% (±0.025%)	0.124%	-0.009% (±0.021%)	39%	38% (±1.3%)	46%	8.0% (±1.9%)	234	231 (±4.0)	272	41 (±5.7)
12	0.366%	0.375% (±0.053%)	0.138%	0.237% (±0.023%)	34%	34% (±1.4%)	44%	10.3% (±1.8%)	244	242 (±4.4)	285	44 (±6.2)
13	0.111%	0.117% (±0.029%)	0.111%	0.006% (±0.025%)	33%	33% (±1.4%)	43%	10.1% (±1.6%)	254	252 (±4.7)	298	47 (±6.5)
14	0.104%	0.117% (±0.029%)	0.114%	0.003% (±0.025%)	32%	32% (±1.4%)	42%	9.7% (±1.9%)	264	261 (±5.1)	311	50 (±6.8)
15	0.118%	0.115% (±0.030%)	0.112%	0.003% (±0.024%)	31%	31% (±1.3%)	40%	9.4% (±1.8%)	274	270 (±5.4)	323	52 (±7.1)
16	0.106%	0.097% (±0.028%)	0.101%	-0.003% (±0.027%)	30%	30% (±1.2%)	39%	9.0% (±1.8%)	283	279 (±5.7)	335	55 (±7.4)
17	0.078%	0.087% (±0.026%)	0.090%	-0.004% (±0.025%)	30%	29% (±1.2%)	38%	8.7% (±1.8%)	291	288 (±5.9)	346	58 (±7.8)
18	0.084%	0.088% (±0.028%)	0.092%	-0.005% (±0.023%)	29%	28% (±1.3%)	37%	8.3% (±1.6%)	300	297 (±6.2)	357	60 (±8.2)
19	0.069%	0.083% (±0.029%)	0.087%	-0.004% (±0.026%)	28%	27% (±1.3%)	35%	8.0% (±1.7%)	308	305 (±6.4)	368	63 (±8.8)
20	0.056%	0.072% (±0.030%)	0.076%	-0.004% (±0.031%)	27%	27% (±1.4%)	34%	7.6% (±1.9%)	317	313 (±6.9)	378	65 (±9.3)
21	0.053%	0.072% (±0.029%)	0.075%	-0.004% (±0.030%)	27%	26% (±1.6%)	33%	7.2% (±1.8%)	325	321 (±7.3)	388	67 (±9.5)

Table 27: Observed, modelled, counterfactual and impact estimates for duration off main benefit spell

	Hazard (daily rate)				Survival rate				Duration (days)			
Interval	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact
0	0.000%	0.000% (±0.000%)	0.000%	0.000% (±0.000%)	100%	100% (±0.0%)	100%	0.0% (±0.0%)	30	30 (±0.0)	30	0 (±0.0)
1	0.338%	0.338% (±0.034%)	0.225%	0.113% (±0.032%)	90%	90% (±1.0%)	93%	3.4% (±1.0%)	57	57 (±0.3)	58	1 (±0.3)
2	0.218%	0.217% (±0.027%)	0.222%	-0.005% (±0.031%)	84%	84% (±1.2%)	87%	3.0% (±1.2%)	82	82 (±0.6)	84	2 (±0.6)
3	0.195%	0.201% (±0.024%)	0.221%	-0.020% (±0.037%)	79%	79% (±1.4%)	81%	2.2% (±1.7%)	106	106 (±1.0)	108	3 (±1.2)
4	0.195%	0.200% (±0.027%)	0.235%	-0.035% (±0.038%)	74%	74% (±1.7%)	75%	1.2% (±1.8%)	128	128 (±1.4)	131	3 (±1.6)
5	0.211%	0.202% (±0.034%)	0.230%	-0.028% (±0.035%)	69%	69% (±1.8%)	70%	0.5% (±2.2%)	149	149 (±1.9)	152	3 (±2.0)
6	0.155%	0.151% (±0.030%)	0.170%	-0.019% (±0.035%)	66%	66% (±1.8%)	66%	0.0% (±2.1%)	168	169 (±2.5)	172	3 (±2.4)
7	0.123%	0.125% (±0.023%)	0.140%	-0.015% (±0.033%)	63%	64% (±1.7%)	63%	-0.4% (±2.2%)	187	188 (±2.9)	191	3 (±3.0)
8	0.116%	0.119% (±0.026%)	0.133%	-0.014% (±0.033%)	61%	61% (±1.8%)	61%	-0.7% (±2.3%)	206	206 (±3.4)	209	3 (±3.7)
9	0.130%	0.131% (±0.029%)	0.156%	-0.025% (±0.038%)	59%	59% (±1.9%)	58%	-1.2% (±2.4%)	223	224 (±3.9)	226	2 (±4.5)
10	0.186%	0.185% (±0.033%)	0.184%	0.001% (±0.040%)	56%	55% (±2.0%)	54%	-1.2% (±2.5%)	240	240 (±4.3)	242	2 (±5.3)
11	0.121%	0.124% (±0.034%)	0.123%	0.001% (±0.036%)	54%	53% (±2.0%)	52%	-1.1% (±2.3%)	256	256 (±4.7)	258	2 (±6.0)
12	0.074%	0.085% (±0.025%)	0.084%	0.001% (±0.036%)	52%	52% (±1.9%)	50%	-1.2% (±2.3%)	272	272 (±5.2)	273	1 (±6.6)
13	0.078%	0.083% (±0.036%)	0.080%	0.003% (±0.031%)	52%	50% (±1.8%)	49%	-1.2% (±2.3%)	287	287 (±5.6)	288	1 (±7.1)
14	0.069%	0.068% (±0.031%)	0.067%	0.001% (±0.035%)	51%	49% (±2.1%)	48%	-1.2% (±2.6%)	303	301 (±6.1)	302	1 (±7.6)
15	0.064%	0.068% (±0.031%)	0.067%	0.001% (±0.034%)	50%	48% (±2.2%)	47%	-1.3% (±2.9%)	318	316 (±6.6)	316	0 (±8.4)
16	0.062%	0.065% (±0.025%)	0.064%	0.001% (±0.036%)	49%	47% (±2.3%)	46%	-1.4% (±3.1%)	332	330 (±7.5)	330	0 (±9.2)
17	0.061%	0.061% (±0.032%)	0.061%	0.001% (±0.038%)	48%	46% (±2.4%)	45%	-1.4% (±3.3%)	346	344 (±8.1)	343	-1 (±9.8)
18	0.053%	0.057% (±0.032%)	0.056%	0.001% (±0.035%)	47%	45% (±2.5%)	44%	-1.4% (±3.4%)	361	357 (±8.6)	356	-1 (±10.5)
19	0.049%	0.049% (±0.032%)	0.048%	0.002% (±0.031%)	46%	45% (±2.4%)	43%	-1.3% (±3.8%)	374	371 (±9.1)	369	-1 (±11.2)
20	0.039%	0.045% (±0.036%)	0.043%	0.002% (±0.036%)	46%	44% (±2.4%)	43%	-1.3% (±3.5%)	388	384 (±9.6)	382	-2 (±12.1)
21	0.037%	0.045% (±0.035%)	0.045%	0.000% (±0.036%)	46%	43% (±2.4%)	42%	-1.3% (±3.3%)	402	397 (±10.2)	395	-2 (±12.8)
22	0.051%	0.052% (±0.037%)	0.053%	-0.001% (±0.040%)	45%	43% (±2.5%)	41%	-1.3% (±3.2%)	415	410 (±10.9)	407	-3 (±13.3)
23	0.059%	0.052% (±0.038%)	0.050%	0.002% (±0.055%)	43%	42% (±2.6%)	41%	-1.2% (±3.2%)	428	422 (±11.2)	419	-3 (±13.6)

Table 28: Observed, modelled, counterfactual and impact estimates for duration on non Unemployment Benefits

Interval	Survival rate				Duration (days)			
	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact
-2	1%	1% (±0.7%)	1%	0.0% (±1.0%)	0	0 (±0.2)	0	0.0 (±0.3)
-1	3%	2% (±1.1%)	2%	-0.1% (±1.2%)	1	1 (±0.5)	1	0.0 (±0.6)
0	6%	5% (±1.6%)	3%	-2.2% (±1.8%)	3	3 (±0.7)	2	-0.7 (±1.1)
1	7%	6% (±1.7%)	4%	-2.4% (±1.8%)	5	4 (±1.1)	3	-1.4 (±1.5)
2	7%	7% (±1.7%)	4%	-2.4% (±2.1%)	7	6 (±1.5)	4	-2.1 (±2.1)
3	8%	8% (±1.8%)	5%	-2.5% (±2.4%)	10	9 (±2.0)	6	-2.9 (±2.5)
4	8%	8% (±1.9%)	6%	-2.3% (±2.4%)	12	11 (±2.5)	8	-3.6 (±2.9)
5	9%	8% (±1.9%)	6%	-2.1% (±2.7%)	15	14 (±3.0)	9	-4.2 (±3.4)
6	9%	9% (±1.7%)	7%	-1.9% (±2.6%)	18	16 (±3.6)	11	-4.8 (±4.3)
7	9%	9% (±1.7%)	7%	-1.8% (±2.6%)	20	19 (±4.2)	14	-5.3 (±5.1)
8	10%	9% (±1.6%)	8%	-1.6% (±2.3%)	23	22 (±4.7)	16	-5.8 (±5.6)
9	10%	10% (±1.7%)	8%	-1.5% (±2.3%)	26	25 (±5.3)	18	-6.3 (±6.2)
10	10%	10% (±1.7%)	8%	-1.4% (±2.5%)	29	28 (±5.8)	21	-6.7 (±6.8)
11	10%	10% (±1.7%)	9%	-1.3% (±2.4%)	32	31 (±6.2)	24	-7.1 (±7.3)
12	11%	11% (±1.7%)	9%	-1.3% (±2.4%)	36	34 (±6.3)	26	-7.5 (±7.7)
13	11%	11% (±1.6%)	10%	-1.2% (±2.4%)	39	37 (±6.6)	29	-7.8 (±8.3)
14	11%	11% (±1.7%)	10%	-1.0% (±2.2%)	42	40 (±6.9)	32	-8.1 (±8.9)
15	12%	11% (±1.8%)	10%	-0.9% (±2.4%)	46	44 (±7.2)	35	-8.4 (±9.3)
16	12%	11% (±1.7%)	10%	-0.7% (±2.2%)	49	47 (±7.4)	39	-8.6 (±9.8)
17	12%	11% (±1.9%)	11%	-0.6% (±2.3%)	53	51 (±7.9)	42	-8.8 (±10.6)
18	12%	11% (±1.8%)	11%	-0.4% (±2.2%)	56	54 (±8.1)	45	-8.9 (±11.2)
19	12%	11% (±1.9%)	11%	-0.2% (±2.4%)	60	57 (±8.4)	48	-9.0 (±11.7)
20	12%	11% (±1.9%)	11%	0.0% (±2.7%)	64	61 (±9.0)	52	-9.0 (±12.1)
21	12%	11% (±2.0%)	11%	0.1% (±2.7%)	67	64 (±9.7)	55	-8.9 (±12.6)

Table 29: Observed, modelled, counterfactual and impact estimates for duration on current main benefit spell

	Active on main benefit (interval)				Duration (days)			
Interval	Observed	Modelled	Counterfactual	Impact	Observed	Modelled	Counterfactual	Impact
-1	93%	92% (±0.1%)	92%	0.4% (±0.1%)	49	49 (±0.1)	54	5 (±0.2)
0	72%	72% (±0.4%)	87%	14.9% (±0.4%)	70	69 (±0.3)	78	9 (±0.3)
1	67%	67% (±0.4%)	82%	14.6% (±0.5%)	89	89 (±0.3)	101	12 (±0.5)
2	66%	67% (±0.3%)	77%	10.7% (±0.6%)	109	109 (±0.5)	124	15 (±0.7)
3	64%	65% (±0.5%)	74%	9.3% (±0.6%)	128	128 (±0.6)	145	17 (±0.8)
4	63%	63% (±0.4%)	72%	8.4% (±0.3%)	146	146 (±0.8)	166	20 (±0.8)
5	62%	62% (±0.5%)	70%	7.5% (±0.2%)	165	165 (±0.9)	186	22 (±0.8)
6	62%	61% (±0.4%)	68%	6.9% (±0.1%)	183	183 (±1.0)	206	24 (±0.8)
7	61%	61% (±0.6%)	67%	6.2% (±0.0%)	201	201 (±1.2)	226	25 (±0.8)
8	61%	61% (±0.4%)	66%	5.4% (±0.1%)	220	219 (±1.2)	246	27 (±0.7)
9	61%	60% (±0.2%)	65%	4.7% (±0.1%)	238	237 (±1.3)	265	28 (±0.5)
10	61%	60% (±0.2%)	65%	4.3% (±0.6%)	256	255 (±1.3)	285	29 (±0.3)
11	61%	61% (±0.2%)	64%	3.9% (±0.7%)	274	273 (±1.4)	304	31 (±0.1)
12	60%	60% (±0.2%)	64%	4.9% (±0.7%)	292	290 (±1.5)	323	33 (±0.1)
13	59%	57% (±0.2%)	64%	6.6% (±0.7%)	310	308 (±1.5)	342	34 (±0.3)
14	60%	58% (±0.3%)	64%	5.9% (±0.7%)	328	325 (±1.8)	361	36 (±0.3)
15	61%	58% (±0.7%)	63%	4.6% (±0.1%)	346	343 (±2.1)	380	37 (±0.2)
16	61%	59% (±1.1%)	62%	3.5% (±0.5%)	365	361 (±2.5)	398	38 (±0.1)
17	61%	59% (±1.3%)	62%	2.9% (±1.0%)	383	378 (±2.9)	417	38 (±0.2)
18	62%	59% (±1.3%)	62%	2.4% (±0.3%)	402	396 (±3.2)	435	39 (±0.1)
19	62%	60% (±1.0%)	62%	2.0% (±0.4%)	420	414 (±3.5)	454	40 (±0.2)
20	62%	60% (±1.0%)	62%	2.6% (±1.0%)	439	432 (±4.0)	473	41 (±0.3)
21	63%	61% (±1.6%)	63%	2.5% (±0.4%)	0	0 (±0.0)	0	0 (±0.0)

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