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FINANCIAL MARKETS AUTHORITY
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# Factors influencing insurance policy survival

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# Executive summary

In our study of what factors influence policy survival, we used the Cox proportional hazard model to identify key factors. We found that commission structure was consistently the most significant factor influencing policy survival rates and, within the commission structure, clawback was a major factor.

Policies not subject to clawback are more likely to lapse than policies which are, when there is commission being paid. Policies not subject to clawbacks are between 1.6 and 2.2 times more likely to lapse, depending on the policy's commission structure.

Other key influences were:

- new in period
- provider product scores
- sponsorship
- trips.

## Disclaimer

This paper is intended for an analytical audience who are interested in how we analysed policy survival using the data received as part of the insurance replacement business project. Readers should read the public paper published in June 2016 if they are interested in the final results and the implications for the industry.

The statistical approach was externally peered reviewed by an expert in the field.

# Section 1: Modelling results

## Commission structure has the biggest impact

The model covers all life policies that were active from 1 April 2011 until 31 March 2015, which were linked to a Financial Service Provider (FSP) number. Providers with limited adviser business were excluded as there were no product scores available for them. Around 41% of policies could be linked to an FSP number.

Figure 1 shows the hazard ratios for when policies are not subject to clawback compared with when they are. The segments are proportional to the volume of data at each level (except for the trips layer). The hazard ratios start at the left and then drill into the lower levels moving towards the right hand side. The variables were ordered by the variation explained in hazard ratios from the analysis of variance (ANOVA) model (Table 14, page 25).

**Figure 1: Data volumes and hazard ratios for policies with clawback vs. no clawback**

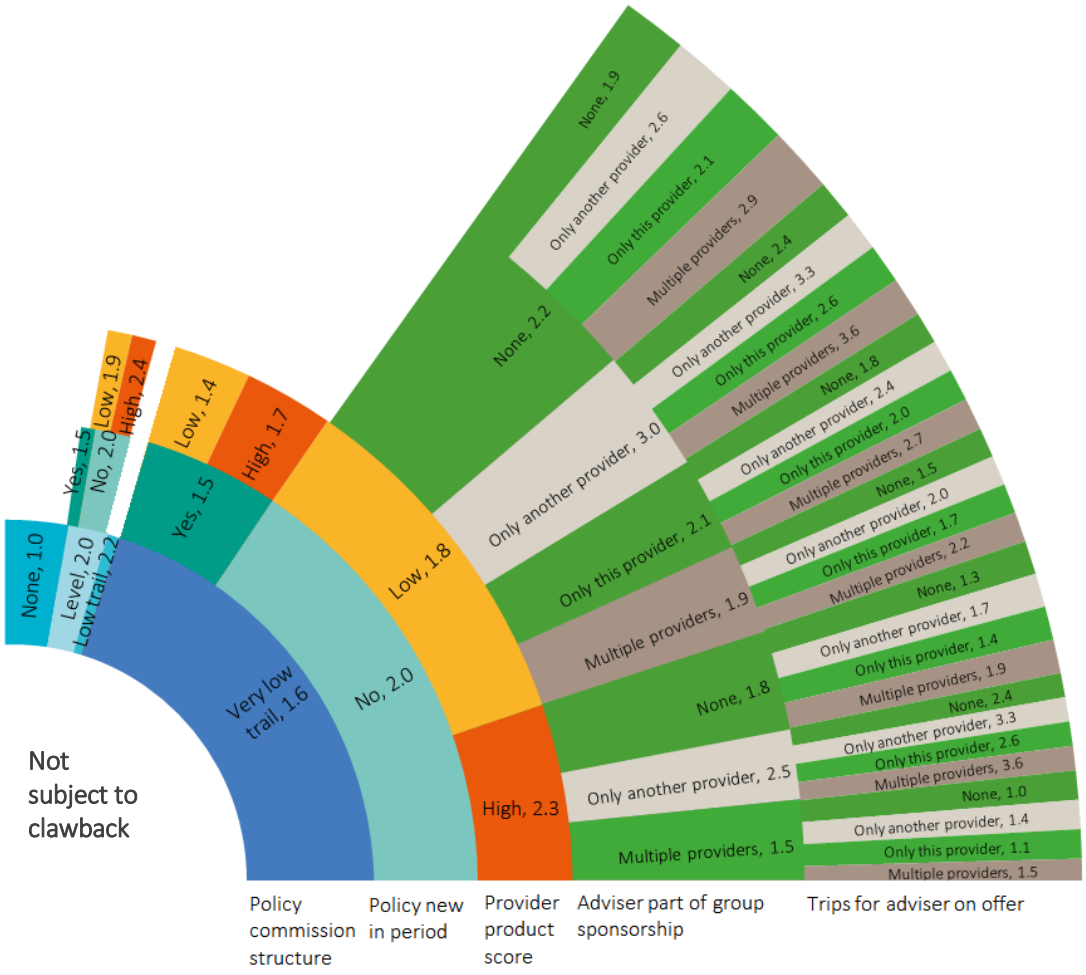


Figure 1 shows that commission structure explains more than half (56%) of the variation in hazard ratios when we look at the effect of clawbacks. Only the policies written with no commission showed no difference to the likelihood of lapsing due to the clawback period (that is, a hazard ratio of 1).

The policies written since 1 April 2011 were twice as likely to lapse when they were not subject to clawback. Product quality is often used as a reason for changing a policy but even the recent policies on very low trail commissions from the higher-scoring providers' products were 1.7 times more likely to lapse when not subject to clawback.

**Sponsorship and overseas trips on offer increase the likelihood of policies lapsing when they are not subject to clawback compared to when they are subject to clawback.**

Of note, bonus commission (grouped by 'at least persistency' or 'at least volume') was not a significant factor in modelling the policy lapses when all the other variables were taken into account.

**Table 1: Hazard ratios for multiple trips on offer compared with no trips on offer[1]**

| Very low trail commission structures | | Subject to clawback | |
|---|---|---|---|
| | | Yes | No |
| New policy in period | Yes | 1.08 (1.02-1.14) | 1.38 (1.31-1.44) |
| | No | 1.71 (1.58-1.84) | 2.18 (2.11-2.25) |

When overseas trips are on offer, the likelihood of a policy lapsing is higher than when no trips are offered to advisers (see Table 1).The likelihood of lapsing was significantly higher if the policy was written prior to 1 April 2011.

[1] Only with commission structure, trips, new in period and clawback fitted.

# Section 2: Introduction

## Project background

This work is part of a large research project undertaken by us to look at the issue of insurance churn. Replacing one insurance policy with another can be in a consumer's best interest. However, if the move is driven by what the adviser will earn in incentives and commission, and there is no clear benefit to the consumer, it is known as 'churn'. We are particularly interested in whether there is conflicted interest when a policy is lapsed and rewritten with another provider.

The primary objective of the project was to determine whether insurance churn exists in the New Zealand market and, if it does, whether it harms consumers.

For the purposes of analysis, our approach focused on advisers, using basic policy information to monitor lapses and new business written during the period. By monitoring the new business rates and lapse rates at the adviser level, a group of advisers with higher lapsed rates and new business rates were identified for further consideration – this is a separate analysis to this paper. This paper's models are based on basic policy, adviser and provider data.

# Section 3: The approach

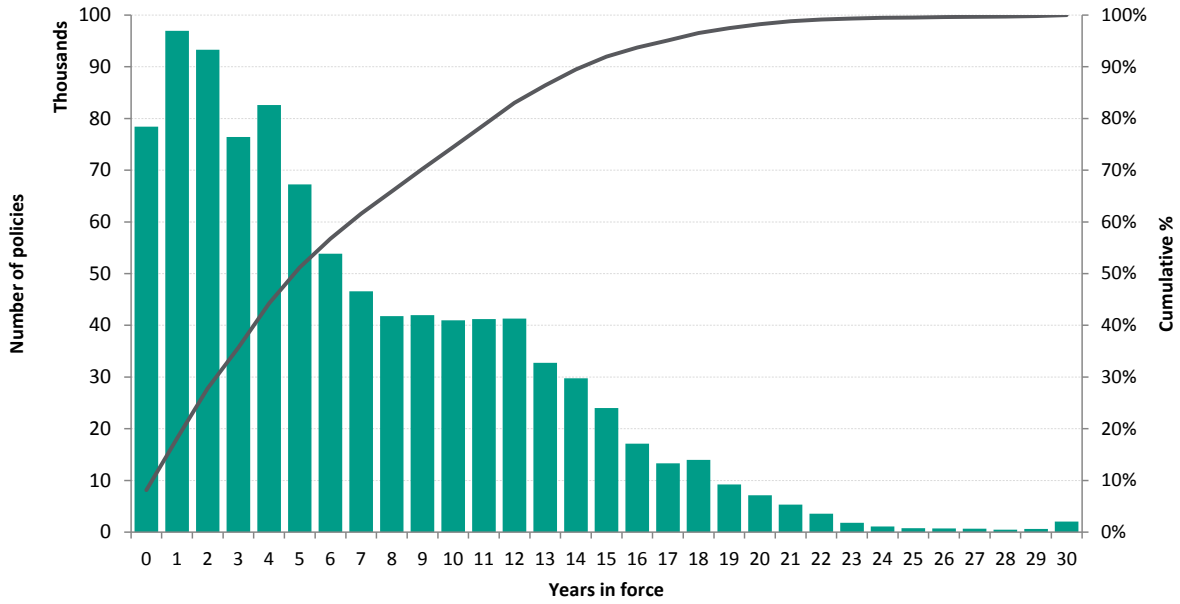
## Policy lapses

This work is part of a large research project undertaken by us to look at the issue of insurance churn. We are interested in conflicted interests, particularly when a policy is lapsed and rewritten with another provider.

Using a cohort of all new life policies written between 1 April 2011 and 31 March 2012, the initial analysis showed that 31% of those policies were lapsed before the three-year mark. Between 11% and 12% of active policies were lapsed each year[2].

The median age for active life policies as at June 2014 was five years, and 28% of the policies were active for less than three years. The distribution of policy age[3] is shown in Figure 2.

**Figure 2: Age of life insurance policies (in June 2014)**




This analysis examines the relationships between policy lapses and remuneration factors. To explore this issue, the model looked at the impact of commission structures and soft incentives, such as overseas trips, on a policy's survival.

[2] This excludes policies lapsed within three months of inception.
[3] Policies active for more than 30 years are grouped at 30, excluding policies lapsing within three months of inception.

## Why survival models?

The advantages of survival models are:

- Time-dependent factors can be included in the models – for example, the time periods providers are offering overseas trips can be factored in.
- Censoring — not all policies will lapse during the study period; however, we can use the data for modelling up until it is either lapsed or 'censored' at the end of the study.

The survival models used in this paper were Cox proportional hazard regression models with some time-dependent covariates, using the SAS software PHREG procedure.

The output from the Cox proportional hazard regression models is usually expressed as a hazard ratio. The most common hazard ratio used in this paper compares the likelihood of policies lapsing when they are not subjected to clawback against when policies are subjected to clawback[4]. For example, a hazard ratio of 1.6 for policies on the very low commission structure when not subjected to clawback may be interpreted as: policies on the very low commission structure are 1.6 times more likely to lapse when they are not subjected to clawback compared to when they are subjected to clawback.

The survival models with a large number of variables that are of interest produce large volumes of output. The hazard ratios for each key variable were analysed using an ANOVA model to determine which variables explained most of the variation in the hazard ratios.

## Competing risks

The models are focused on policy lapses. We have not distinguished the different reasons for lapses, such as client/adviser cancellation, lapses through non-payment, policies maturing or policy claims. This is because the reasons for policies lapsing were not always recorded in the providers' systems and when they were recorded, the data was sparsely populated.

**Table 2: Policy lapsed or claimed upon**

| | |
|---|---|
| Life policies at 31 March 2015 | 1 million |
| Life policy lapsed during 1 April 2011 – 31 March 2015 | 390,000 |
| Total number of accepted claims during 1 April 2011 – 31 March 2015 | 28,000 |

[4] Note that clawback is a time-dependent variable.

# Section 4: The data

## Data used

We asked for data on policy, premium, commission, claims, overseas travel, bonus, and other 'soft' commissions from 12 providers of life insurance. The data from the 12 providers was loaded and formatted into standard structure, and collated into a large dataset using SAS software. The data included policy, premiums and commissions information for all active policies, written or lapsed from 1 April 2011 until 31 March 2015.

For the policy data, the focus was when policies started and ended, and the values of the covariates through time. Then the premiums and commissions data was used to understand the commission structures applied to each policy.

The models use the premium and commission payments data to determine the level of trail commission. This helped separate the policies likely to have a level commission structure from the other structures. This data was available for all policies. This approach was used as some providers were unable to provide data linking individual policies and the rates used.

The travel data was provided separately to the policy data, and entailed a list of advisers eligible for each trip and those who actually travelled.

Sponsorship data provided was a mixture of businesses, advisers and adviser groups who received sponsorship.

## Short-dated policies

There were some policies that appear to be quotes, identified by the lapse reason being 'client did not accept terms', for instance. One provider's data include a large number of short-duration policies which were active for less than three months. For the purpose of these models, any policy lasting less than three months was excluded.

## Financial Service Provider (FSP) numbers

To link the policies written with different providers back to an adviser, each provider was asked to provide the FSP number for each adviser on their books. Unfortunately most providers were not recording the FSP number on their systems at the time of our request. As a result, we undertook manual matching and checking to populate FSP numbers for each adviser with active policies during the study period.

Some of the issues identified with the FSP numbers provided to us included:

- Problems with locating adviser names on the FSP register (FSPR). There were two common reasons for this – advisers who left the industry before the FSPR requirement, and adviser names provided could not be matched with names in the FSPR.
- Qualifying financial entities (QFE) advisers do not require an FSP number. The employee ID was used for the analysis, and these advisers were not a focus of the study.
- Advisers with more than one FSP number (old numbers and a current one, all different). We conducted a matching exercise and where we were confident that they were likely to be the same person (using email addresses, for example) we linked them.
- The trip data was linked by using FSP numbers but not everyone who went on the trips had an FSP number. Of the 1,767 adviser trips, 102 did not have FSP numbers. The majority of these were either staff or dealer group non-adviser staff members.

## Data features relating to modelled variables

Some assumptions or data cleaning were required:

- If the trip eligibility dates provided were just year (eg, 2011) we assumed the eligibility period was the full calendar year (eg, from 1 Jan 2011 until 31 Dec 2011).
- Some providers provided policy lapse dates that were prior to policy start dates. These policies were treated as having been cancelled at inception, and were excluded from the analysis under the short duration criteria.

# Section 5: Potential modelling variables

## Potential variables

Table 3 outlines the potential variables considered for modelling and a brief description of how the variable was compiled. Some variables were complex in their determination.

**Table 3: Variables considered for modelling policy lapses**

| Variable | Variable level | Description | Time dependent |
|---|---|---|---|
| **Provider** | policy | The provider the policy was written with. | |
| **Policy age** | policy | How long the policy had been active as at 1 April 2011 or policy start (whichever is later). | |
| **Short-duration policy** | policy | Flag policies which were active for less than three months or cancelled at inception. | |
| **Insured age** | policy | The age of the life insured (or policy holder) as at 1 April 2011 or policy start (whichever is later). | |
| **Policy written during period** | | Flag policies started during the study period. | |
| **Provider policy scope** | client | Indicating the different covers on the same policy number (ie, life, income protection, trauma and other). Limited to where the different covers share a common policy ID or client ID by the same provider. If different benefit types are on different policy IDs without a client ID, then the link could not be made.<br>'Client' has: life only; life & trauma; life & income replacement; life, trauma & income replacement. | *Y* |
| **Renewal month** | policy | The month the policy renews in, Jan-Dec. | |
| **New adviser** | FSP number | Flag if an adviser wrote no policies prior to 1 April 2012. | |
| **Old adviser** | FSP number | Flag if an adviser wrote no policies after 1 April 2014. | |
| **Clawback** | provider | Flag if the policy is still inside the clawback period. For most policies it was not possible to determine what period is applied to a policy unless it was activated. Most providers had a two-year structure, which is believed to be the most common structure used. There were three providers who do not use clawbacks. | *Y* |
| **Regulatory status** | FSP number | The regulatory status of the adviser or whom the policy was linked to: licensed AFA, FSPR registered, or employee without an FSP number. | |
| **AFA** | FSP number | Flag if the adviser (FSP number) was a licensed AFA during | |

| | | | |
|---|---|---|---|
| | | the study period (was or now is). | |
| **RFA** | FSP number | Flag if adviser is likely to be an RFA; has an FSP number but is not a licensed AFA. | |
| **Employee** | policy | Flag if policy was sold by an employee without an FSP number, if an employee number was provided. | |
| **FSP Number** | policy | Flag if the policy has an FSP number for the adviser who sold or is servicing the policy. | |
| **Bank – no FSP number** | policy | Flag if the policy was written with a bank but there is no FSP number for the adviser who sold the policy or is servicing the policy. | |
| **Level commission** | policy | Flag if the policy was likely to have been written with a level commission structure, see pages 15-18 for more details. | |
| **Upfront commission** | | Flag if the policy was written under a high upfront commission with small trail commissions. Unfortunately we cannot determine this from the data for all providers. | |
| **Hybrid commission** | | Flag if the policy was written on a hybrid commission structure (ie, not level and not high upfront). Unfortunately we cannot determine this from the data for all providers. | |
| **Very low trail commission** | policy | Flag if the policy is likely to have a very low trail commission rate (<10%). These structures usually have high upfront commissions, see pages 15-18 for more details. | |
| **Low trail commission** | policy | Flag if the policy is likely to have a low trail commission rate (between 10% and 20%). These structures usually have a slightly lower upfront commissions, see page 15-18 for more details. | |
| **No commission** | policy | Flag if premiums but no commission were paid for the policy, see pages 15-18 for more details. | |
| **Bonus commission** | FSP number & provider | Given the complex structures of the bonus commissions across providers, for the policy lapse perspective, the focus was on whether the provider has a persistency requirement as part of the bonus commission structure, or was the structure just growth/revenue/volume based. This is applied at the adviser & policy level of this provider, and any other providers the adviser has policies with. This approach is similar to the one used for overseas trips. | *Y* |
| **Overseas trip offered** | FSP number & provider | Flag if the adviser who sold/servicing the policy is eligible for any trips during that month, see page 18 for more detail. | *Y* |
| **Overseas trip – same provider** | FSP number & provider | Flag if the adviser who sold/servicing the policy is eligible for multiple trips from the provider of the policy and no other trips during that month. | *Y* |
| **Overseas trip – another provider** | FSP number & provider | Flag if the adviser who sold/servicing the policy is eligible for multiple trips from another provider and not the provider of the policy during that month. | *Y* |

| | | | |
|---|---|---|---|
| **Overseas trip – multiple providers** | FSP number & provider | Flag if the adviser who sold/servicing the policy is eligible for multiple trips from the provider of the policy and another provider during that month. | *Y* |
| **Overseas trip taken** | FSP number & provider | Flag the eligibility period for a trip which the adviser who sold/servicing the policy took. | Y |
| **Overseas trip taken – same provider** | FSP number & provider | Flag the eligibility period for a trip which the adviser who sold/servicing the policy took. The only trip eligible was for the policy provider. | Y |
| **Overseas trip taken – another provider** | FSP number & provider | Flag the eligibility period for a trip which the adviser who sold/servicing the policy took. The only trip eligible was for another provider and not the policy provider. | Y |
| **Overseas trip taken – multiple providers** | FSP number & provider | Flag the eligibility period for a trip which the adviser who sold/servicing the policy took. Where the adviser took trips from multiple advisers. | Y |
| **Overseas trip locations** | FSP number & provider | Indicate where the trip was to: USA, Europe, Asia, Australia & Pacific Islands and other[5]. | Y |
| **Provider policy score** | provider | The relative policy provider score. Quality Product Research Limited has a product performance score. The scores vary slightly depending on the age of the life insured but there are were two clear groups: those with scores over 105 for 30 & 45 year olds; and those with scores below 105. Only have product scores for adviser products. | |
| **Sponsorship – same provider** | FSP number & provider | Was the adviser who sold the policy a member of a group which received sponsorship from that policy's provider? | |
| **Sponsorship – other providers** | FSP number & provider | Was the adviser who sold the policy a member of a group which received sponsorship from other providers and not that policy's provider? | |
| **Sponsorship – many providers** | FSP number & provider | Was the adviser who sold the policy a member of a group which received sponsorship from that policy's provider and at least one other provider? | |
| **Adviser Group A** | FSP number & provider | Was the adviser who sold the policy a member of this adviser group? | |
| **Adviser Group B** | FSP number & provider | Was the adviser who sold the policy a member of this adviser group? | |

[5] Trips to South America (1), South Africa (1), travel vouchers, Spurs (1 ) and NZ live like a Rock star (1)

## Group sponsorship

The sponsorship data was collated to the insurance group level, and the groups receiving more than $50,000 from all providers during the study period were flagged as having received a substantial sponsorship. From the provider information and the AFA returns (using FSP numbers) advisers were identified as belonging to a group which received substantial sponsorship.

The information was used to determine whether the adviser who sold any particular policy was a member of a group receiving substantial sponsorship only from the provider of the policy; only another provider; or the provider of the policy and at least one other provider.

## Commission structures

There were a large number of possible commission structures and it was not possible to match all the policies to the providers' commission structures from the data provided. The payments data was used to map a policy to the most likely commission structure.

The commission and premium payments were mapped to each policy's renewal period and used to estimate the initial commission rate (when the policy started during the study period) and the trail commission rates for each policy period. Then using the maximum, minimum and average rate for the trail commission, the policies were allocated to a level structure, very low trail, and low trail commission structures. For some policies, the trail commission data will not identify the likely structure (ie, no trail commission payments yet). In those cases, the initial commission payment was used. Some providers also have no commission option for policies.

As there are a few different values that could be used to determine the likely commission structure for any policy, Figure 3 shows the order in which the rules and data were used. Table 4 (page 17) shows the number of policies that were classified into a likely commission structure under each rule. The high confidence rules will override the medium or low confidence rules. Table 5 shows the completeness of assigned commission structure[6].

[6] Note that these numbers are for all policies not just policies with life cover.

**Figure 3: Approach for assigning each policy to a commission structure:**

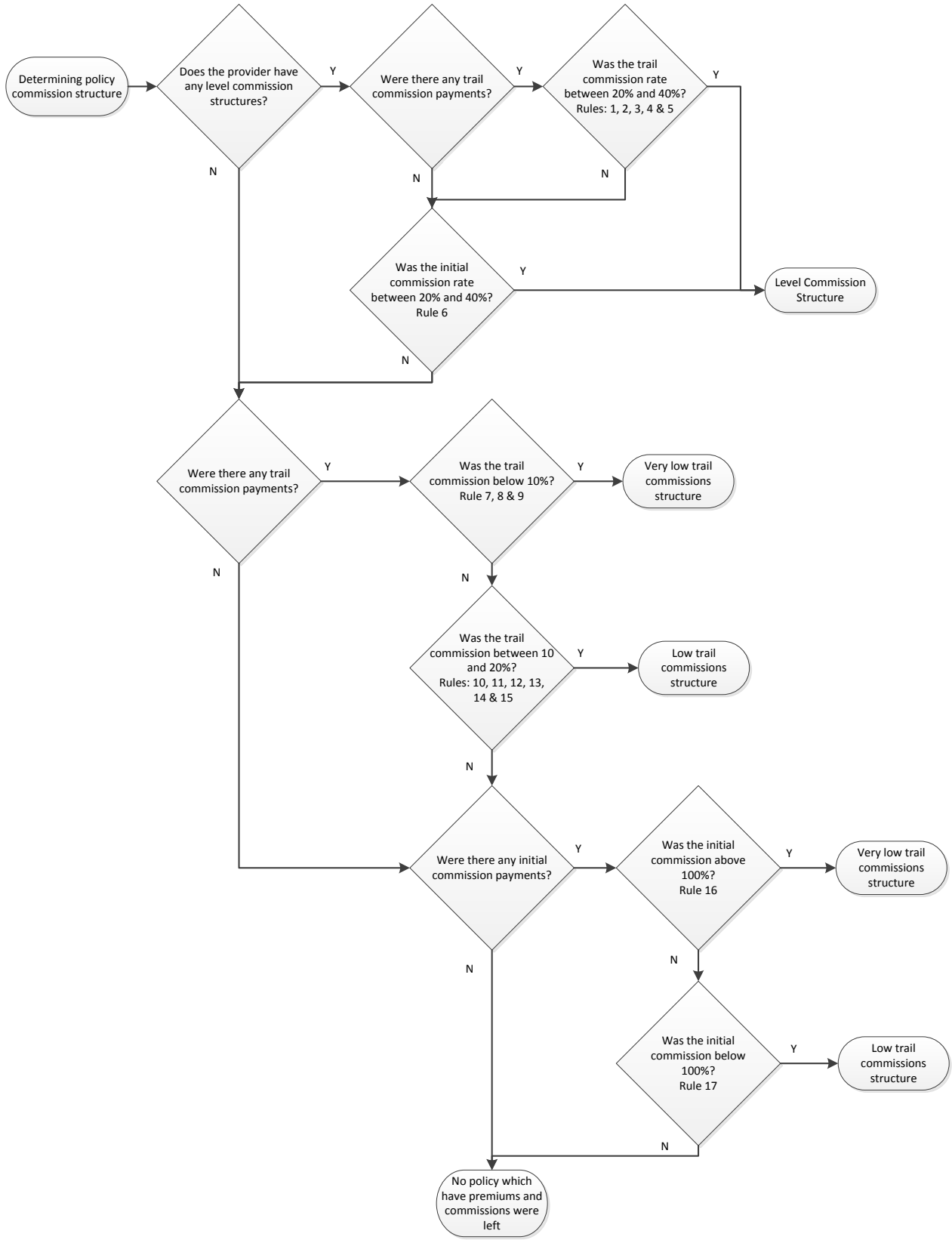


**Table 4: The number of policies placed in a commission structure based on premium and commission payments**

| Rule | Data | Specifics | Confidence | Structure | | | |
|---|---|---|---|---|---|---|---|
| | | | | Low commission rate | Very low commission rate | Level commission | No commission payments |
| | No commission payments | | | 0 | 0 | 0 | 510,136 |
| **1** | Trail service commissions | min & max | H | 0 | 0 | 14,117 | 0 |
| **2** | Trail service commissions | average | M | 0 | 0 | 0 | 0 |
| **3** | Trail commissions | min & max | H | 0 | 0 | 79,411 | 0 |
| **4** | Trail commissions | average | M | 0 | 0 | 0 | 0 |
| **5** | Initial service commissions | max | M | 0 | 0 | 0 | 0 |
| **6** | Initial commission | max | M | 0 | 0 | 139 | 0 |
| **7** | Trail service commissions | max | H | 0 | 714,196 | 0 | 0 |
| **8** | Trail commissions | max | H | 0 | 8 | 0 | 0 |
| **9** | Initial service commissions | max | H | 0 | 177,819 | 0 | 0 |
| **10** | Trail service commissions | min & max | H | 12,766 | 0 | 0 | 0 |
| **11** | Trail commissions | min & max | H | 8 | 0 | 0 | 0 |
| **12** | Initial service commissions | max | M | 0 | 0 | 0 | 0 |
| **13** | Trail service commissions | average | M | 137 | 0 | 0 | 0 |
| **14** | Trail commissions | Average | M | 3 | 0 | 0 | 0 |
| **15** | Initial service commissions | average | M | 183 | 0 | 0 | 0 |
| **16** | Initial commission | max | L | 0 | 9,700 | 0 | 0 |
| **17** | Initial commission | max | L | 2,829 | 0 | 0 | 0 |

**Table 5: The completeness of commission variable**

| | Policies with commission variable[7] | Policy count | |
|---|---|---|---|
| **Total** | 1,521,452 | 1,760,924 | 86% |
| ***Note this is all policies not just life.*** | | | |

## Time-dependent covariates

Time-dependent covariates are variables whose value may change through time. There were several time-dependent covariates which were used to explore the influences on policy lapses. The following variables are two examples of how time-dependent covariates have been used for this analysis.

### Overseas travel variables

There were 40 different overseas trips that occurred during the study period. The trip data included when, where, trip cost, who was eligible to qualify, and who actually went.

There are several different overseas covariates that change through time but they are all set up in a similar way. As an example, the following paragraphs describe how the overseas travel offered to an adviser by another provider (not the provider of that the policy) was determined.

By combining the trip eligibility periods with the providers the advisers sold policies for, and when the policy was active, a variable is created for each month the policy was active during the study period. This variable would have the value of '0'. But if the adviser for that policy was eligible for an overseas trip offered by another provider during the eligibility period, a value of '1' was given.

For example, adviser X sells products from provider A and B; provider A offers no trips during the study period but adviser B has a trip with an eligibility period from 1 April 2013 to 31 March 2014. That variable will have a value of '1' for all policies with provider A from 1 April 2013 until 31 March 2014, and otherwise a value of '0'.

### Clawback

The clawback period for most policies will be 24 months. There were a few other clawback periods but from the data provided it is not always possible to say whether a different period was used, so 24 months was assumed for all providers operating a clawback regime.

[7] This includes policies with premium payments and no commission payments.

# Section 6: Modelling policy survival

The modelling was performed using SAS software, see Appendix for more details.

The final survival model developed to explore the relationships between the adviser remuneration and policy survival used all the policies linked to an FSP number where provider product scores were available.

All policies active for less than three months were excluded because some appeared to be quotes, the policy was rejected by the client, or the policy was cancelled at inception.

**Table 6: Survival model variables**[8]

| | | |
|---|---|---|
| **Significant variables** | | |
| Age at policy start | AFA licensed | Commission structure |
| Clawback(t) | Group sponsorships | Overseas trip offered(t) |
| Low product score | Advisers part of group A | Advisers part of group B |
| Policy duration at 1 April 2011 | New in period | clawback(t)* commission structure |
| clawback(t)* AFA licensed | AFA licensed* commission structure | Low product score* commission structure |
| Low product score* clawback(t) | New in period* commission structure | Low product score* AFA licensed |
| New in period* clawback(t) | New in period* Low product score | New in period* AFA licensed |
| Group sponsorships* clawback(t) | Group sponsorships* New in period | Overseas trip offered(t)* AFA licensed |
| Overseas trip offered(t)* clawback(t) | Overseas trip offered(t)* Low product score | Overseas trip offered(t)* New in period |
| Advisers part of adviser group A* clawback(t) | Advisers part of adviser group A* AFA licensed | Advisers part of adviser group A* overseas trip offered(t) |
| Advisers part of adviser group A* low product score | Advisers part of adviser group B* clawblack(t) | Advisers part of adviser group B* commission structure |
| Advisers part of adviser group B* AFA licensed | Advisers part of adviser group B* new in period | Advisers part of adviser group B * low product score |
| **Categorical variables significant at some levels** | | |
| Group sponsorships* AFA licensed | Group sponsorships* commission structure | Overseas trip offered(t)* commission structure |
| Overseas trip offered(t)* Group sponsorships | Advisers part of adviser group A* commission structure | Advisers part of adviser group B* overseas trip offered(t) |
| Client coverage | | |
| **Variables removed because they were not significant**[9] | | |
| Bonus commission structure | Advisers part of adviser group A* new in period | Advisers part of adviser group A* advisers part of adviser group B |

As there were a lot of significant variables in the survival model, ANOVA models were used to determine which variables have the greatest impact on changing the hazard ratios. Table 8 (page 23) shows the ranking of the variables for each ANOVA model for each hazard ratio variable comparison. Table 14 (page 25) shows the ANOVA output for comparing policy survival when not subject to clawback against when subject to clawback.

[8] Interaction terms are represented by a '*' and time dependant covariates with a (t)

[9] Not all non-significant variables are listed here, just the variables that were significant for some of the earlier models or of particular note (such as bonus commission).

## Model data limitations

- Most of the AFAs' policies were on very low trail commission structures.
- Most of the policies for employees (with no FSP numbers) have no commission. There are some life-only policies with level, low trail and very low trail commissions.
- Most of the policies for FSPR-registered advisers are on the very low trail commissions. For the other commission structures, some variable combinations had only a few policies and hence not explored to the same depth.

There were a few variable combinations which resulted in low numbers of policies. They were as follows:

- Not AFA licensed — low trail commission, policies written before 1 April 2011
- AFA licensed — level commission structure, policies written before 1 April 2011, subject to clawback
- AFA licensed — low trail commission, policies written before 1 April 2011
- AFA licensed — no commission, policies written before 1 April 2011, low product scores, out of clawback
- AFA licensed — no commission, policies written after 1 April 2011, subject to clawback.

# Appendix: Selected SAS information

## SAS data preparation overview

Here is the data flow from the combined policy dataset to the dataset used for the survival modelling in SAS software:

- Select all life insurance policies
    - Join in the estimated commission structure data (see pages 15-18)
    - Link as many policies to FSP numbers as possible
    - Create the monthly policy dataset:
        - add in the clients monthly coverage (life, income protection, TPD, trauma) — can vary by month, using client identities
        - flag policies started during the study period
        - add in the sponsorship flags using FSP numbers
        - add in the overseas trips flags using FSP numbers
        - add in the bonus commission structures through time at the provider level
        - flag the short-dated policies for exclusion during modelling
        - restructure the data as required for PROC PHREG (software procedure) for modelling.[10]

[10] Codes used are available on request.

# SAS variable names

**Table 7: SAS variables used**

| Variable | SAS variable names |
|---|---|
| Provider | s_Provider |
| Policy age | n_time_policyStart |
| Short duration policy | s_PolicyShort |
| Insured age | n_ageStartPeriod |
| Policy written during period | n_NewinPeriod |
| Provider policy scope | n_coverLifeTrauma n_coverLifeIncRep n_coverLifeIncRepTrauma n_coverLifeOnly |
| Renewal month | s_PolicyMonth |
| New adviser | b_NewSellingAdviser |
| Old adviser | b_StoppedSellAdviser |
| Clawback | n_clawback (or n_Outclawback) |
| Regulatory status | s_regStatus |
| AFA | n_AFAlicenced |
| RFA | n_RFA |
| Employee | n_employee |
| FSP number | n_FSPNumber |
| Bank no FSP number | n_BanknoFSP |
| Level commission | n_LevelComms (and n_notLevelComms) |
| Upfront Commission | |
| Hybrid commission | |
| Very low trail commission | n_vLowTrail |
| Low trail commission | n_LowTrail |
| No commission | n_NoComms |
| Bonus commission | n_BC_PP n_BC_PV n_BC_Pn n_BC_VP n_BC_VV n_BC_Vn n_BC_nP n_BC_nV n_BC_nn<br>decoding:<br>• n_= number (1 or0)<br>• BC_=bonus commission<br>• V=volume, P=persistency, n=none<br>• First V/P/n – this policy's provider<br>• Second V/P/n – other providers the adviser has policies with |
| Overseas trip offered | n_OST_Offered or s_TripOfferings |
| Overseas trip — same provider | n_OST_SameProv |
| Overseas trip — another provider | n_OST_AnotherProv |
| Overseas trip—multiple providers | n_OST_many |
| Overseas trip taken | n_OST_Taken |
| Overseas trip taken — same provider | n_OST_T_SameProv |
| Overseas trip taken — another provider | n_OST_T_AnotherProv |
| Overseas trip taken — multiple providers | n_OST_T_many |
| Overseas trip locations | Offered:<br>n_Trip_USA n_Trip_Other n_Trip_Europe n_Trip_ASIA n_Trip_AustPacific<br>Taken:<br>n_Trip_T_USA n_Trip_T_Other n_Trip_T_Europe n_Trip_T_ASIA n_Trip_T_AustPacific |
| Provider policy score | n_ProductScore105 |
| Sponsorship—same provider | n_spons_Same |
| Sponsorship — other providers | n_spons_otherP |
| Sponsorship —multiple providers | n_spons_Many |
| Adviser group A | n_grp_A |
| Adviser group B | n_grp_B |

## Model selected output details

**Table 8: Summary of the ANOVA results on the hazard ratios**

| Hazard ratio | n_AFAlicenced | | n_grp_A | | n_grp_B | | n_NewinPeriod | | n_Outclawback | | n_ProductScoreLow | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANOVA Model SS[11] | 90 | Variable Rank | 16 | Variable Rank | 48 | Variable Rank | 4,796 | Variable Rank | 1,765 | Variable Rank | 214 | Variable Rank |
| | n_grp_A | | n_AFAlicenced | | n_AFAlicenced | 4 | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | |
| | n_Outclawback | | n_Outclawback | 4 | n_Outclawback | 3 | n_Outclawback | 4 | n_grp_A | | n_Outclawback | 3 |
| | n_grp_B | 5 | n_grp_B | | n_grp_A | | n_grp_A | | n_grp_B | 6 | n_grp_A | 6 |
| | n_ProductScoreLow | | n_ProductScoreLow | 2 | n_ProductScoreLow | 2 | n_grp_B | | n_ProductScoreLow | 3 | n_grp_B | 5 |
| | n_NewinPeriod | 3 | n_NewinPeriod | | n_NewinPeriod | | n_ProductScoreLow | 5 | n_NewinPeriod | 2 | n_NewinPeriod | 4 |
| | s_CommStructure | 2 | s_CommStructure | 3 | s_CommStructure | 1 | s_CommStructure | 1 | s_CommStructure | 1 | s_CommStructure | 1 |
| | s_Sponsorships | 1 | s_TripOffers | 1 | s_TripOffers | 5 | s_Sponsorships | 7 | s_Sponsorships | 4 | s_TripOffers | 2 |
| | s_TripOffers | 4 | | | | | s_TripOffers | 2 | s_TripOffers | 5 | | |
| | | | | | | | s_CommStructure * s_TripOffers | 3 | | | | |
| | | | | | | | n_grp_A * n_ProductScoreLow | 6 | | | | |

| Hazard ratio | s_CommStructure Level vs Low tail | | s_CommStructure Level vs None | | s_CommStructure Level vs Very low tail | | s_CommStructure Low tail vs None | | s_CommStructure Low tail vs Very low tail | | s_CommStructure None vs Very low tail | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANOVA Model SS | 201,203 | Variable Rank | 664 | Variable Rank | 283 | Variable Rank | 446 | Variable Rank | 559 | Variable Rank | 135,067 | Variable Rank |
| | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | |
| | n_Outclawback | | n_Outclawback | 1 | n_Outclawback | | n_Outclawback | 2 | n_Outclawback | 4 | n_Outclawback | 3 |
| | n_grp_A | | n_grp_A | | n_grp_A | | n_grp_A | | n_grp_A | | n_grp_A | |
| | n_grp_B | 6 | n_grp_B | 2 | n_grp_B | 1 | n_grp_B | | n_grp_B | | n_grp_B | |
| | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | |
| | n_NewinPeriod | 3 | n_NewinPeriod | | n_NewinPeriod | 3 | n_NewinPeriod | 1 | n_NewinPeriod | 2 | n_NewinPeriod | 1 |
| | s_Sponsorships | | s_Sponsorships | | s_Sponsorships | 2 | s_Sponsorships | | s_Sponsorships | | s_Sponsorships | |
| | s_TripOffers | 1 | s_TripOffers | 3 | s_TripOffers | 4 | s_TripOffers | 3 | s_TripOffers | 1 | s_TripOffers | 2 |
| | n_NewinPeriod * s_TripOffers | 2 | n_Outclawback * n_NewinPeriod | 4 | n_NewinPeriod * s_Sponsorships | 5 | n_Outclawback * n_NewinPeriod | 4 | n_NewinPeriod * s_TripOffers | 3 | n_NewinPeriod * s_TripOffers | 4 |
| | n_grp_B * s_TripOffers | 4 | n_Outclawback * s_TripOffers | 5 | | | n_Outclawback * s_TripOffers | 5 | | | n_Outclawback * n_NewinPeriod | 5 |
| | n_ProductScoreLow * s_TripOffers | 5 | n_NewinPeriod * s_TripOffers | 6 | | | | | | | n_Outclawback * s_TripOffers | 6 |

| Hazard ratio | s_Sponsorships Multiple providers vs None | | s_Sponsorships Multiple providers vs Only another provider | | s_Sponsorships Multiple providers vs Only this provider | | s_Sponsorships None vs Only another provider | | s_Sponsorships None vs Only this provider | | s_Sponsorships Only another provider vs Only this provider | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANOVA Model SS | 25 | Variable Rank | 122 | Variable Rank | 305 | Variable Rank | 70 | Variable Rank | 353 | Variable Rank | 422 | Variable Rank |
| | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | 1 | n_AFAlicenced | | n_AFAlicenced | 1 | n_AFAlicenced | 1 |
| | n_Outclawback | | n_Outclawback | 2 | n_Outclawback | | n_Outclawback | 1 | n_Outclawback | 5 | n_Outclawback | 4 |
| | n_grp_A | | n_grp_A | | n_grp_A | | n_grp_A | | n_grp_A | | n_grp_A | |
| | n_grp_B | | n_grp_B | | n_grp_B | 2 | n_grp_B | | n_grp_B | | n_grp_B | |
| | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | |
| | n_NewinPeriod | 2 | n_NewinPeriod | | n_NewinPeriod | | n_NewinPeriod | | n_NewinPeriod | 4 | n_NewinPeriod | |
| | s_CommStructure | 1 | s_CommStructure | 1 | s_CommStructure | 3 | s_CommStructure | 2 | s_CommStructure | 2 | s_CommStructure | 2 |
| | s_TripOffers | 3 | s_TripOffers | 3 | s_TripOffers | 4 | s_TripOffers | 3 | s_TripOffers | 3 | s_TripOffers | 3 |

| Hazard ratio | s_TripOffers Multiple providers vs None | | s_TripOffers Multiple providers vs Only another provider | | s_TripOffers Multiple providers vs Only this provider | | s_TripOffers None vs Only another provider | | s_TripOffers None vs Only this provider | | s_TripOffers Only another provider vs Only this provider | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANOVA Model SS | 153,280 | Variable Rank | 10,910 | Variable Rank | 170 | Variable Rank | 159 | Variable Rank | 115 | Variable Rank | 115 | Variable Rank |
| | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | | n_AFAlicenced | |
| | n_Outclawback | 5 | n_Outclawback | | n_Outclawback | 2 | n_Outclawback | 3 | n_Outclawback | | n_Outclawback | |
| | n_grp_A | | n_grp_A | | n_grp_A | | n_grp_A | 2 | n_grp_A | | n_grp_A | |
| | n_grp_B | | n_grp_B | | n_grp_B | | n_grp_B | | n_grp_B | | n_grp_B | |
| | n_ProductScoreLow | | n_ProductScoreLow | | n_ProductScoreLow | 3 | n_ProductScoreLow | 4 | n_ProductScoreLow | 2 | n_ProductScoreLow | |
| | n_NewinPeriod | 3 | n_NewinPeriod | 2 | n_NewinPeriod | | n_NewinPeriod | | n_NewinPeriod | 3 | n_NewinPeriod | 2 |
| | s_CommStructure | 1 | s_CommStructure | 1 | s_CommStructure | 1 | s_CommStructure | 1 | s_CommStructure | 1 | s_CommStructure | 1 |
| | s_Sponsorships | | s_Sponsorships | 4 | s_Sponsorships | | s_Sponsorships | | s_Sponsorships | | s_Sponsorships | |
| | n_NewinPeriod * s_CommStructure | 2 | n_NewinPeriod * s_CommStructure | 3 | | | | | | | n_NewinPeriod * s_CommStructure | 3 |

[11] Sum of squares of the model error

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n_Outclawback * s_CommStructure | 4 | s_CommStructure * s_Sponsorships | 5 | | | | | | | | |

**Table 9: Hazard ratios for Figure 1 - layer 1**

| Hazard ratio comparison | Commission structure | Hazard ratio | Wald lower | Wald upper | Data percentages |
|---|---|---|---|---|---|
| n_Outclawback Unit=1 | Level | 2.049 | 1.897 | 2.212 | 2% |
| n_Outclawback Unit=1 | Low tail | 2.216 | 2.07 | 2.372 | 1% |
| n_Outclawback Unit=1 | None | 0.983 | 0.965 | 1.002 | 9% |
| n_Outclawback Unit=1 | Very low tail | 1.62 | 1.596 | 1.644 | 88% |

**Table 10: Hazard ratios for Figure 1 - layer 2**

| Hazard ratio comparison | Commission structure | Policy new in period | Hazard ratio | Wald lower | Wald upper | Data percentages[12] |
|---|---|---|---|---|---|---|
| n_Outclawback Unit=1 | Level | no | 2.022 | 1.828 | 2.237 | 77% |
| n_Outclawback Unit=1 | Level | yes | 1.546 | 1.398 | 1.709 | 23% |
| n_Outclawback Unit=1 | Very low tail | no | 2.004 | 1.952 | 2.058 | 78% |
| n_Outclawback Unit=1 | Very low tail | yes | 1.532 | 1.499 | 1.566 | 22% |

**Table 11: Hazard ratios for Figure 1 - layer 3**

| Hazard ratio comparison | Commission structure | Policy new in period | Provider product score | Hazard ratio | Wald lower | Wald upper | Data percentages[13] |
|---|---|---|---|---|---|---|---|
| n_Outclawback Unit=1 | Level | no | high | 2.42 | 2.183 | 2.682 | 17% |
| n_Outclawback Unit=1 | Level | no | low | 1.886 | 1.702 | 2.088 | 83% |
| n_Outclawback Unit=1 | Very low tail | no | high | 2.317 | 2.246 | 2.39 | 34% |
| n_Outclawback Unit=1 | Very low tail | no | low | 1.805 | 1.755 | 1.857 | 66% |
| n_Outclawback Unit=1 | Very low tail | yes | high | 1.749 | 1.705 | 1.794 | 55% |
| n_Outclawback Unit=1 | Very low tail | yes | low | 1.363 | 1.327 | 1.399 | 45% |

**Table 12: Hazard ratios for Figure 1 - layer 4**

| Hazard ratio comparison | Commission structure | Policy new in period | Provider product score | Adviser part of group sponsorship | Hazard ratio | Wald lower | Wald upper | Data percentages[14] |
|---|---|---|---|---|---|---|---|---|
| n_Outclawback Unit=1 | Very low tail | no | low | Multiple providers | 1.856 | 1.794 | 1.92 | 18% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only this provider | 2.126 | 2.01 | 2.25 | 19% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only another provider | 3.047 | 2.927 | 3.172 | 25% |
| n_Outclawback Unit=1 | Very low tail | no | low | None | 2.241 | 2.16 | 2.325 | 38% |
| n_Outclawback Unit=1 | Very low tail | no | high | Multiple providers | 1.515 | 1.462 | 1.57 | 32% |
| n_Outclawback Unit=1 | Very low tail | no | high | Only another provider | 2.487 | 2.392 | 2.587 | 28% |
| n_Outclawback Unit=1 | Very low tail | no | high | None | 1.83 | 1.769 | 1.892 | 40% |

[12] For the variable added from previous layer, policy new in period
[13] For the variable added from previous layer, provider product score
[14] For the variable added from previous layer, adviser part of a group receiving substantive sponsorship

**Table 13: Hazard ratios for Figure 1 - layer 5**

| Hazard ratio comparison | Commission structure | Policy new in period | Provider product score | Adviser part of group sponsorship | Adviser trips on offer | Hazard ratio | Wald lower | Wald upper | Data percentages[15] |
|---|---|---|---|---|---|---|---|---|---|
| n_Outclawback Unit=1 | Very low tail | no | low | Multiple providers | Multiple providers | 2.247 | 2.169 | 2.329 | 77% |
| n_Outclawback Unit=1 | Very low tail | no | low | Multiple providers | Only this provider | 1.661 | 1.586 | 1.739 | 6% |
| n_Outclawback Unit=1 | Very low tail | no | low | Multiple providers | Only another provider | 2.04 | 1.938 | 2.148 | 15% |
| n_Outclawback Unit=1 | Very low tail | no | low | Multiple providers | None | 1.534 | 1.427 | 1.65 | 2% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only this provider | Multiple providers | 2.663 | 2.509 | 2.826 | 43% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only this provider | Only this provider | 1.967 | 1.856 | 2.086 | 42% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only this provider | Only another provider | 2.417 | 2.253 | 2.593 | 8% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only this provider | None | 1.817 | 1.674 | 1.973 | 6% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only another provider | Multiple providers | 3.583 | 3.439 | 3.733 | 82% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only another provider | Only this provider | 2.648 | 2.519 | 2.784 | 3% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only another provider | Only another provider | 3.253 | 3.067 | 3.45 | 14% |
| n_Outclawback Unit=1 | Very low tail | no | low | Only another provider | None | 2.446 | 2.266 | 2.64 | 1% |
| n_Outclawback Unit=1 | Very low tail | no | low | None | Multiple providers | 2.854 | 2.741 | 2.971 | 60% |
| n_Outclawback Unit=1 | Very low tail | no | low | None | Only this provider | 2.109 | 2.019 | 2.203 | 24% |
| n_Outclawback Unit=1 | Very low tail | no | low | None | Only another provider | 2.59 | 2.448 | 2.741 | 10% |
| n_Outclawback Unit=1 | Very low tail | no | low | None | None | 1.948 | 1.815 | 2.091 | 6% |
| n_Outclawback Unit=1 | Very low tail | no | high | Multiple providers | Multiple providers | 1.502 | 1.449 | 1.557 | 79% |
| n_Outclawback Unit=1 | Very low tail | no | high | Multiple providers | Only this provider | 1.11 | 1.059 | 1.164 | 2% |
| n_Outclawback Unit=1 | Very low tail | no | high | Multiple providers | Only another provider | 1.363 | 1.294 | 1.436 | 17% |
| n_Outclawback Unit=1 | Very low tail | no | high | Multiple providers | None | 1.025 | 0.951 | 1.105 | 2% |
| n_Outclawback Unit=1 | Very low tail | no | high | Only another provider | Multiple providers | 3.583 | 3.439 | 3.733 | 81% |
| n_Outclawback Unit=1 | Very low tail | no | high | Only another provider | Only this provider | 2.648 | 2.519 | 2.784 | 14% |
| n_Outclawback Unit=1 | Very low tail | no | high | Only another provider | Only another provider | 3.253 | 3.067 | 3.45 | 4% |
| n_Outclawback Unit=1 | Very low tail | no | high | Only another provider | None | 2.446 | 2.266 | 2.64 | 1% |
| n_Outclawback Unit=1 | Very low tail | no | high | None | Multiple providers | 1.907 | 1.84 | 1.977 | 61% |
| n_Outclawback Unit=1 | Very low tail | no | high | None | Only this provider | 1.409 | 1.354 | 1.467 | 30% |
| n_Outclawback Unit=1 | Very low tail | no | high | None | Only another provider | 1.731 | 1.641 | 1.827 | 5% |
| n_Outclawback Unit=1 | Very low tail | no | high | None | None | 1.302 | 1.213 | 1.397 | 4% |

**Table 14: Summary of the ANOVA not subject to clawback**

| Variable | DF | ANOVA SS | % explained | Cumulative % | Pr > F |
|---|---|---|---|---|---|
| Commission structure | 3 | 993 | 56.0% | 56% | <.0001 |
| New in period | 1 | 166 | 9.4% | 65% | <.0001 |
| Low product score | 1 | 135 | 7.6% | 73% | <.0001 |
| Sponsorship | 3 | 122 | 6.9% | 80% | <.0001 |
| Trips offered | 3 | 112 | 6.3% | 86% | <.0001 |
| Group B | 1 | 54 | 3.0% | 89% | <.0001 |
| New in period*commission structure | 3 | 37 | 2.1% | 91% | <.0001 |
| Low product score*commission structure | 3 | 30 | 1.7% | 93% | <.0001 |
| Commission structure*sponsorship | 9 | 27 | 1.5% | 95% | <.0001 |
| Commission structure*trips offered | 9 | 25 | 1.4% | 96% | <.0001 |
| Other interaction terms | 60 | 64 | 3.6% | 4% | |
| Error | 1,951 | 8 | 0.5% | 100% | |

[15] For the variable added from previous layer, adviser eligible for overseas trips

# References


- The data analysis for this paper was generated using SAS software. Copyright, SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA.
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