



Price optimisation

Price optimisation is one of the hottest topics in personal lines pricing. In this article, previously published in *The Actuary*, James Tanser looks at the benefits and challenges.

Price optimisation has become established in the UK and a small number of other markets as the best way to build or maintain a profitable business. The price should be set so that the costs of doing business are covered, and include a reasonable margin for profit. Set the price too low and not only does each policy cost you money, you end up selling more unprofitable policies; too high and you lose market share and hence sacrifice efficiencies of scale.

In personal lines there has been a technological and informational arms race to find the perfect balance between inadequate and excessive premiums. Finding this balance is what price optimisation is all about.

What is price optimisation?

The term 'price optimisation' can describe a whole family of techniques that combine information about expected claims experience and customer behaviour to calculate premiums with regard to a particular business objective. It uses the following as building blocks:

- information on how customer characteristics affect claims experience
- retention and conversion behaviour
- propensity to purchase additional cover and products.

These components are then combined in a model which allows a company to investigate how different pricing strategies might affect the profitability of the company and the number of policies written.

The final pricing strategy selected will depend just as much on the company's objectives as on the data and models used. The same models and data will produce radically different premiums if the target is to grow volume at 10 per cent per annum rather than to maintain current volume and increase profitability. Similarly, models which consider cross-selling may lead to premiums different from those calculated by models which do not.

Why optimise?

So why should a company optimise their premiums? What is wrong with simply charging the expected costs plus a profit margin (the 'cost-plus' approach)?

Optimisation offers the possibility of achieving higher profitability than a straight-forward cost-plus approach. The method allows potentially profitable segments of the market to be identified and targeted with attractive premium rates, for example by accepting low profitability on a policy because of its future cross-selling potential. In particular, these methods enable a company to adjust premiums to allow for differing price sensitivities in different segments of the market.

The key to making this work is information. The more information you hold on an individual, the more accurately you can predict their behaviour. This means that affinity groups and similar intermediaries have a key advantage. An intermediary has much lower uncertainty over the costs (their cash flow involves a fixed net premium rather than an unknown claims cost), and often a wealth of customer information not available to the insurer. With this advantage it is relatively straightforward to optimise the commission rates, and monitor the effectiveness of the resulting premiums.

Direct writers, although they have less information than some intermediaries, are also well placed to benefit from optimisation. The ability to change rates and monitor the resulting changes in customer behaviour in close to real time allows the construction of accurate models of customer behaviour. It seems likely that optimisation will continue its move into the mainstream for this area of business.

Other insurers may find themselves struggling to build accurate models because of these information asymmetries. Small insurers may simply not have sufficient volume or flexibility to apply these methods. For larger companies who place a significant portion of their business through intermediaries, the problems will relate to the amount of data their partners are willing to give them. In the worst case, these companies may be forced back to a bare-bone, cost-plus model, producing a completely commoditised policy at the lowest cost possible, effectively ceding all the customer value to the intermediary.

There are, of course, other business models in use in the market. Not everyone is willing to join in this arms race. A number of companies are simply pricing to achieve a given market position. This approach sees prices in each segment raised or lowered so that a certain target volume is achieved, regardless of the profitability of the segment. These companies are relying on the market to get the overall price levels right, and are willing to ride the market cycle.

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BDG-EU-8053



Practical considerations

So, if optimisation is right for your company, what are the key areas to consider? Before you even start the work there are a number of issues which need careful thought. These include legal considerations, price promises, brand positioning and market positioning.

In the UK, the FSA has indicated that it is not seeking to be a price regulator, but this attitude may not be the case in other jurisdictions. If there is a requirement to file a rating structure, the optimisation had better produce a rating structure to file! This can affect the type of optimisation performed. In the EU, the gender directive allows (subject to the local implementation) the use of gender as a rating factor, but only if accompanied by published information on the underlying risk characteristics. While it seems unlikely that any one individual will challenge the price differential between two policies, it remains a possibility that a pressure group will require an insurance company to explain its practices. If the optimisation assumes different price elasticity for men and women, the resulting premium differential may be hard to justify on the basis of the published risk data.

Marketing material often includes price promises, such as '10 per cent off if you buy online'. Where this is the case you will need to include this restriction into the optimisation model, as it is unlikely that the exact promised differential will hold equally across all policies.

A very similar issue relates to insurers having multiple brands. There is often an implicit price promise in the brand positioning, so that it might be desirable for a 'premium' brand to have a higher cost even if the optimisation implies a lower value is appropriate.

For companies with multiple brands, there is some danger of cannibalisation, where a company competes with itself for a given risk. To some extent this can be managed by careful use of restrictions and by clever use of information. However, for large organisations with a complex mix of direct, broker and affinity channels, some cannibalisation is inevitable.

Finally, a company will often also have a market position in mind, wanting to achieve a certain level of performance in terms of competitiveness by segment.

It should be remembered that placing additional constraints on the optimisation model will dampen the improvement in the final position. It is always worth running several versions of the model with some of the constraints removed to understand how these limitations affect the results. This sensitivity testing can show that some of the constraints should be removed, and this may of course require changes to the corresponding marketing messages.

It is important that the customer does not see confusing price changes following minor policy changes (and this is true at the quotation stage as well as mid-term). It is not unusual for policyholders to ask about different excess levels or additional drivers. This problem can be managed by optimising only once for each customer, and then using a schedule of adjustments (based, for example on the risk relativities) for these minor alterations. For larger changes, for example a change of address or a change of vehicle, it is probably reasonable to re-optimize to ensure that the quotation remains competitive.

Implementation

There are two main ways to implement optimisation: 'back-office' and 'point-of-sale'.

The back-office approach involves conducting the optimisation at regular intervals, alongside the regular rate review. At this point, all the key models are updated, and the optimisations run over a suitable portfolio. The output from this is an individually tailored premium for every policy looked at. This output can then be used in one of two ways. It can be used directly for renewal premiums, with the tailored premium being fed straight into the renewal systems. Alternatively, a model can be fitted to the optimised premium in order to derive a traditional rating structure which approximates the true optimal premium. In reality, the approximation can be poor, but the rating structure will give premiums which are likely to perform better against the key targets than premiums calculated under the cost-plus approach. The results of the model of optimised premium can be used to price all business, or it can be used just for new business (using the fully optimised premium for renewals).

The back-office approach is useful where a rating structure is still required – for example where intermediaries do not have access to a live pricing system, or where it is necessary to file rates. In reality, most companies will have some systems which assume the existence of a rating structure, and so the back office approach allows rapid implementation of price optimisation at relatively low cost.

The point-of-sale approach seeks to set a premium using the most up-to-date information available at the time the quotation is prepared. This potentially means that an identical risk is automatically offered



different premiums on different days only because the system's perception of the market is different. This makes the premium responsive to the market, and the model will move quickly to take advantage of changes. The point-of-sale algorithm still requires regular calibration, however, and it will need careful monitoring.

One problem with the point-of-sale approach is the extent of resources needed to compute the optimised premium. Care needs to be taken that the customer does not experience unacceptable delays when asking for a quotation.

In reality, larger companies often use both approaches, with the method varying depending on the sales

channel. This gives rise to increased risk of cannibalisation, and careful monitoring is needed.

Conclusion

Price optimisation is here to stay and many companies have been using these techniques with great success. There remain considerable challenges for small and medium sized companies, and it seems likely that some of these will decide that optimisation is not the right choice for them. Intermediaries are the surest winners where they have a strong relationship with, and good data about, the customer. For all who decide to follow the optimisation route, there are considerable technological and management hurdles, and careful thought and preparation is vital to ensure success.