

Spread-betting and reserving

Paul Johnson illustrates the similarities between spread-betting and general insurance reserving techniques.

The typical cradle-to-grave life-cycle of the loss ratio for a given class of business goes through the following stages:

- ◆ business plan;
- ◆ incurred Bornhuetter-Ferguson method;
- ◆ incurred chain-ladder method;
- ◆ paid chain-ladder development;
- ◆ paid claims.

Some stages last longer than others, some are bypassed, and sometimes exposure-based methods are required. What has any of this got to do with spread-betting? (See the box 'Spread-betting markets' below.)

Business planning

For our purposes we are going to focus on a simple supremacy bet in a typical super league rugby match. The average score in St Helens' first 17 matches is a win for Saints by 32–16, and in Wakefield matches it is a loss for the Wildcats by 21–26. Let us say that the St Helens supremacy market is quoted at 20–23.

The factors that will go into the initial supremacy market offered by a spread-betting firm will include:

- ◆ recent performances and results;
- ◆ relative impact of home advantage;
- ◆ predicted weather conditions;
- ◆ continuity of players;
- ◆ experience of players;
- ◆ injuries;
- ◆ suspensions;
- ◆ head-to-head records;
- ◆ relative importance of outcome;

- ◆ forthcoming fixtures;
- ◆ market prices.

There is an obvious translation for certain of these issues into business planning in general insurance.

Tracking expectations

Thinking about the development of the supremacy margin from t (time) = 0, to 0 at $t = \text{final hooter}$ at any point during the game, it is possible to take the current score and add the unearned supremacy margin to get the mid-market price.

Events such as tries (or hurricanes) have an impact on expectations. They shift them in a discontinuous fashion. A penalty will immediately shift the actual supremacy margin by two points, and also the market price by two. Land-falling major hurricanes will do the same thing to ultimate loss ratios, and usually by more than two points.

Initial expectations and early doors

Before we get to the final outcome after 80 minutes of end-to-end action, we are confronted by the most interesting part of the issue. Between kick-off and the final whistle the market is 'in-running'.

At all points during the game the spread-betting company will quote a bid-offer spread for the St Helens supremacy. Primarily the price will be related to the current score and the time left in the game. Basically there is a predetermined decay pattern that the additional supremacy margin above the current score will

Spread-betting markets

Spread-betting

There are many different spread-betting markets. They all function in the same way, in that for a given market there is a buy price, a sell price and a bid-offer spread. The two most common types of betting market are supremacy and index bets. In all instances the counterparty to every trade is the spread-better. This situation is different from fixed-odds betting with betting exchanges, where the counterparty is another individual.

Supremacy bets

A supremacy bet can be a simple 'winning-margin' bet. So, using a rugby example, if St Helens were playing the Wakefield Trinity Wildcats the spread-betting firm might quote a supremacy market of St Helens 20–23. That is to say, they think that St Helens will win the match by 21.5 points and that there is a three-point bid-offer spread.

So if you buy St Helens at 23 for £10 a point and

they go on to win the match by 40 points, you will win £170, being: $(\text{final price} - \text{buy price}) \times \text{unit stake}$, or $(40 - 23) \times £10$. This is referred to as 'going long' on St Helens.

If you fancy Wakefield to do better than lose by 20 points then you could sell St Helens at 20 for £15 a point. If St Helens win by 40 then you will lose £300, being: $(\text{sell price} - \text{final price}) \times \text{unit stake}$, or $(20 - 40) \times £15$. This is referred to as 'going short' on St Helens.

The final price is the price at which you close out your position: if you bought then it is the final selling price, if you sold then it is the final buying price. There is no spread on the final price.

Index bets

An index bet can be a simple win/lose bet, often but not always with only a binary outcome. An example of a binary market would be Chelsea vs Liverpool, with Chelsea conceding a half-goal handicap with an index

of 50 for a win and nothing for a loss. There being half a goal handicap ensures that a draw is not possible.

Alternatively if Liverpool was playing Chelsea then the spread-betting firm might quote an index market of Liverpool 10–13. The index is 50 points for a win, 25 points for a draw, and no points for a loss. The Chelsea index market would have to be priced at 37–40 in order to be consistent with the pricing of the Liverpool index market.

So if you buy Liverpool at 13 for £20 a point and they manage a draw (no doubt through a dodgy last-minute penalty at the Kop end) then you will win £240, ie $(25 - 13) \times £20$.

More markets

Many other markets exist; however, they are all tweaks of the above markets or sometimes combinations of supremacy and index markets. A typical combination might be a football index based on 20 points for winning plus 10 points per goal scored.

techniques

follow. The decay pattern can be plotted over time and will form a continuous line from 21.5 at $t = 0$, to 0 at $t =$ final hooter.

As it turns out there is no score after 15 minutes, and the St Helens supremacy at that point was expected to be four points. As such the market price is now St Helens 16–19.

At such an early stage of development the spread-betting firm is relying on its prior expectations and an expected development pattern of St Helens supremacy; a rugby league Bornhuetter–Ferguson method, if you will.

Changing positions

If you opened a position, say buying St Helens before kick-off, you do not have to wait for the final hooter to close out your bet. You can do so at any time, although you have to pay the full bid–offer spread rather than just half of it.

During the game you can close out part of your position or all of your position, you can also increase your position or even reverse your position. All actions are possible.

So you can lock into a given level of profit or put in place stop-loss protection. You can use your judgement at every point to take advantage of any perceived value in the market price.

Unfortunately no such equivalent readily exists for the ultimate loss ratio for an underwriting year. The closest you could get would be a mid-year stop-loss reinsurance policy, whether things were either going well or going badly.

Red card?

Back to the action, just before half-time a high tackle is committed by feisty Wakefield Trinity Wildcats prop forward, Adam Watene. The referee as per usual did not have a good view of the incident and takes the easy way out and places the incident ‘on report’. What would have happened if the player had been sent off? The score at that point was 12–4 with a market price of 19–22, ie an eight-point lead plus a 12.5 expected future ‘cost’ plus the bid–offer spread.

Playing a full half of football without a player is quite difficult and will typically lead to gaps opening up wide later in the game. The loss is incurred at the point when the player is sent off, but the final cost is only reported over the next 40 minutes.

Spread-betting firms are prepared and have an estimate of the value of losing any given player for 40 minutes; the value here might be 18 points. So if Adam had been sent off, the market price would have moved from 19–22 to 37–40.

Suffice it to say that hurricanes, among other



Sean Long of St Helens surges forward during the Engage Super League match with Wakefield in September 2006

things, have a lot in common with red cards. Large risk losses are more like yellow cards: ten minutes in the sin bin. Hurricane Katrina was to loss ratios what Adam Watene almost was to St Helens’ supremacy margin.

Reaching ultimate

Moving along to the last quarter of the game, St Helens has just broken loose and is now leading by 36–10 thanks to a Jon Wilkin hat trick. The St Helens supremacy at that point was expected to be 13.5 points. As such, the market price at that point is St Helens 32.5–35.5.

At such a late stage of development the spread-betting firm is still stubbornly relying on its prior expectations. You might think that if a team was playing well on the day, the betting firm would switch to the chain-ladder method, ie if Wakefield was 12 points ahead with a quarter of the match to go then the market quoted would be something like Wakefield 14.5–17.5, that is 4/3 times the current supremacy margin plus the bid–offer spread.

Typically the spread-betting firms do not change their view of the ability of a team during a single match. Such a short period of observation is regarded as not being sufficiently credible.

Ultimately the final score in the game is reached after the full 80 minutes. In our example, St Helens broke down a tired Wakefield defence and ran in three converted tries in the last 20 minutes, including one on the final play of the game, to win by a score of 54–10, giving a final supremacy of 44 points. Anyone who

bought St Helens at any point has won, and anyone who sold them has lost.

A difference with reserving is that, short of a scheme of arrangement, an underwriting year never actually gets to ultimate. Rugby games actually conclude.

From rugby to insurance

So there we are, I have highlighted some of the (few) similarities between rugby league and general insurance. The same approach works for most sports.

For the record, Wakefield pulled off a bit of a surprise by beating St Helens 29–22 at home, but they did lose at St Helens later in the season by 34–14. Adam Watene was neither sent off nor placed on report. □

Jargonbuster

Scheme of arrangement

a compromise or arrangement between a company and some or all of its creditors, governed by section 425 of the Companies Act 1985. A scheme needs to be sanctioned by the court. It is a way of achieving finality.

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