Summary 1

PROJECT L6 – GREYHOUND RACING

The purpose of this project is to calculate winning odds and "1-2" odds for each of six greyhounds using data from recent races. These odds are then also adjusted to reflect additional information provided.

DATA

Data was provided on the most recent 30 races.

This was checked for completeness and two different potential problem areas were identified:

- Data missing – in two races fewer than six dogs were recorded. It was assumed that the missing dogs came last as this will have no impact on the odds being calculated.
- Data repeated – in two races one dog was recorded twice and one dog missed out. It was assumed that one of the repeated entries should have been recorded as the missing dog and so the data was adjusted to reflect this. In doing so, it was assumed that the relative performance of the two dogs in this race was consistent with that observed in the other races.

APPROACH: WINNING ODDS

The number of times each dog finished in each position was calculated.

The number of wins for each dog was converted into the first "probability of success" measure by dividing by the total number of races (i.e. 30).

These probabilities were converted to odds by first dividing by 0.95 to reflect the bookmaker's requirement for 5% profit. The following formula was then used:

Adjusted probability p converts to odds "X to 1" where X = 1/p – 1

The whole process was then repeated, but this time using a "probability of success" measure calculated by assigning a score to each dog depending on their position: 10, 5, 3, 2, 1 points respectively to 1st, 2nd, 3rd, 4th, 5th places. The total score for each dog was used to determine the distribution of points between the dogs and hence the "probability of success". This is the alternative "fastest" (scoring system) approach. The allowance for the bookmaker's profit and the conversion to odds were the same as for first place calculations.

All probability and odds calculations were subject to checking processes.

It was assumed that odds would be rounded to the nearest 1. In practice, the bookmaker may prefer to round down the odds offered.

If the probability of success is zero then the normal formula fails, so it was assumed that long odds would be offered, say 30 to 1.

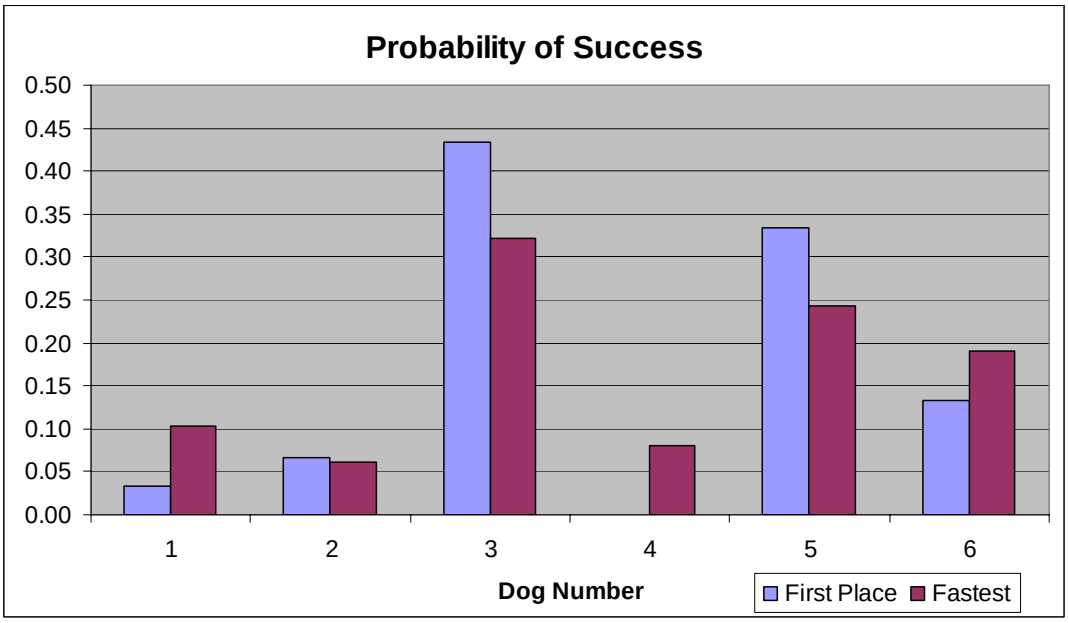
It has been assumed throughout that past racing performance is a good guide to future racing performance.

Summary 2

RESULTS: WINNING ODDS

Probability of Success

The probabilities of success for each dog (numbers 1 to 6) under the two systems are illustrated in the chart below:



Winning Odds

The "to win" odds that the bookmaker should consider under the two systems are:

Dog	"First place"	"Fastest" (scoring system)
1	28 to 1	8 to 1
2	13 to 1	15 to 1
3	1 to 1	2 to 1
4	30 to 1 *	11 to 1
5	2 to 1	3 to 1
6	6 to 1	4 to 1

* Dog 4 failed to register any wins and so the odds have been set to 30 to 1; these odds could be lengthened but as Dog 1 only won once, only slightly higher odds would be appropriate.

Comments

- There is some broad consistency between the two approaches in terms of the relative ranking of the six dogs, although it is notable that Dog 2 appears to be fourth best under the "first place" approach but worst under the "fastest" approach. This reflects a couple of wins that appear to be out of line with his form in other races.
- The actual odds are materially different between the two approaches.

Summary 3

"1-2" ODDS

Methodology

The aim is to set odds for bets on which two dogs will finish first and second, in either order.

Joint probabilities were calculated from:

*P(X and Y are fastest two dogs) = P(X fastest) * P(Y fastest of all other than X)*
*+ P(Y fastest) * P(X fastest of all other than Y)*

where *P(Y fastest of all other than X) = P(Y fastest)/{1 – P(X fastest)}*

All individual probabilities were sourced from the "fastest" (scoring system) approach.

The joint probabilities were then adjusted for the bookmaker's profit margin and converted to odds using the same method as for the "to win" odds.

Results

Odds are all shown in the form "to 1":

Dog	1	2	3	4	5	6
1	-	69	10	51	15	20
2	-	-	18	89	26	35
3	-	-	-	13	3	5
4	-	-	-	-	19	26
5	-	-	-	-	-	7
6	-	-	-	-	-	-

These are consistent with the "to win" odds using the "fastest" system. For example, the shortest odds are for a bet on Dogs 3 and 5, and these can be seen from the previous results to be the fastest two dogs individually.

Summary 4

ADJUSTED RESULTS

Background

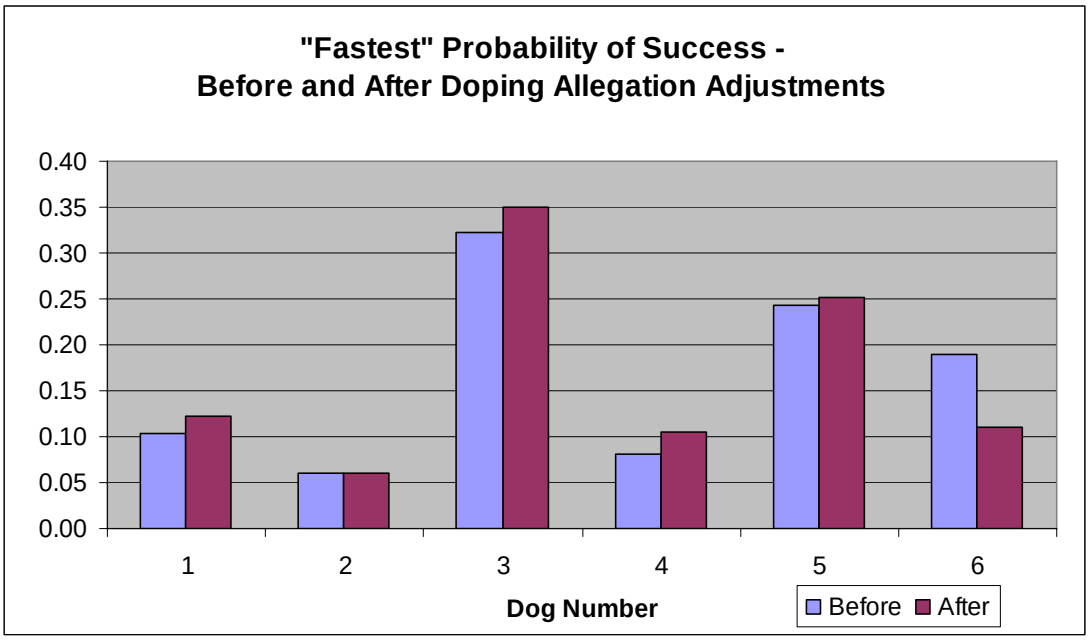
A kennel girl has suggested that Dog 6 may have benefited from performance powder which improved the dog's results. She claims that the first 12 races were affected and her estimate is that Dog 6 received an unfair advantage of two positions.

Methodology

It has been assumed that the information given by the kennel girl is correct. Hence for the first 12 races the finishing positions of Dog 6 were each demoted by two places, and the finishing positions of the two dogs finishing just behind Dog 6 were promoted by one place. The odds were then recalculated as before.

Probability of Success

The adjusted probability of success for each dog (numbers 1 to 6) under the "fastest" scoring system is illustrated in the chart below:



Winning Odds

A comparison of the "to win" odds on the "fastest" (scoring system) approach, with and without the Dog 6 adjustments is as follows:

Dog	No adjustment	With adjustment
1	8 to 1	7 to 1
2	15 to 1	15 to 1
3	2 to 1	2 to 1
4	11 to 1	8 to 1
5	3 to 1	3 to 1
6	4 to 1	8 to 1

As expected, the adjustment increases the potential payout on Dog 6 but reduces it for other dogs (particularly 1 and 4) whose performance has been promoted due to Dog 6's demotions.

Summary 5

CONCLUSIONS

- There are some consistencies within the odds derived using the two different approaches, but overall the odds are very different.
- It seems sensible to look at more than just first places, given the paucity of data. However, the results are very sensitive to the approach taken and the bookmaker could lose money if an inappropriate system is used.
- The allegations about Dog 6 would impact the odds that the bookmaker would be prepared to offer and so he should take them into account if proven.

Potential next steps include:

- Talk to the kennel owner about the data discrepancies to check whether the assumptions made were accurate.
- Investigate further the allegations about Dog 6 to ascertain their accuracy and how the potential impact on performance was assessed.
- Consider using somewhere between the two proposed approaches.
- Test the sensitivity by trying different scoring methods (e.g. 10, 7, 4, 1, 0, 0).
- Discuss with the bookmaker whether he might require a higher profit margin to reflect the sensitivity of the results and the potential for further dodgy dealings by the kennel staff.
- Look at trends in the results and consider whether an approach that weights the scoring system more heavily towards the more recent races could be implemented.
- Investigate whether more historical race data is available and assess if it would be relevant (i.e. not too old).
- Develop a process to update the calculations as newer data becomes available.