



# The impact of insider trading on forecasting in a bookmakers' horse betting market

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## Abstract

This paper uses a new variable, which is based on estimates of insider trading, to forecast the outcomes of horse races. We base our analysis on the work of Schnytzer, Lamers, and Makropoulou (2008), who showed that insider trading in the 1997–1998 Australian racetrack betting market represented between 20% and 30% of all trading in this market. They showed that the presence of insiders leads opening prices to deviate from the true winning probabilities. Under these circumstances, forecasts of race outcomes should take into account an estimate of the extent of insider trading for each horse. We show that the added value of this new variable for profitable betting is sufficient to reduce the losses when only prices are taken into account. Since the only variables taken into account by either Schnytzer et al. (2008) or this paper are price data, this is tantamount to a demonstration that the market is, in practice, weak-form efficient.

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## 1. Introduction

The successful forecasting of horse race outcomes requires the forecaster to have a clear understanding of the variables at his disposal. The most common, and arguably the most important, variables in a horse betting market are the odds on the horses in a race. Where bookmakers operate in such a market,

it seems reasonable to suppose that the fixed odds they provide would be reasonably unbiased estimators of the horses' winning probabilities, and yet there is a considerable body of literature suggesting that this is not so (see, for example Schnytzer & Shilony, 2003; Shin, 1991, 1992, 1993). It is agreed that the extent of insider trading in the market is what makes bookmakers' odds deviate from winning probabilities, even though different authors characterize both the mechanism underlying the concomitant distortion and its extent differently.

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Accordingly, the forecasting of race outcomes should take into account an estimate of both the extent of insider trading for each horse, and the way in which this extent of insider trading in a bookmakers' horse betting market may be measured. Schnytzer, Lamers, and Makropoulou (2008, SLM hereafter) developed a model for measuring the extent of insider trading in horse betting markets with bookmakers.<sup>1</sup> They develop a theoretical framework that examines the optimal price setting by bookmakers in the racetrack betting market, and then use it to measure the extent of insider trading in the market. Bookmakers are faced with the risk that insiders will account for information they might have after the opening odds (which may be assumed to contain most public information) have been set, and will thus exploit any mis-pricing by the bookmaker by betting on horses whose prices present an expected profit for the insider. The model is an extension of that developed by Makropoulou and Markellos (2007) and applied to the European soccer betting market. The basic intuition underlying the model is that the fixed odds<sup>2</sup> offered by bookmakers at the track are examples of call options, and that, while bookmakers hope to offer only net of premium out-of-the-money options, when they err by underestimating a particular horse's true winning probability, they are liable to offer a net in-the-money option, which the insider (who is assumed to know her horse's true winning probability) will be glad to snap up.

Throughout this paper, we use the working assumption that the insider knows her horse's true winning probability, and this requires some elaboration. Indeed, it is difficult to come up with a precise definition of an insider trade for which data may ever be available. Thus, in reality, an insider is one who is more familiar with her horse than others, and therefore has an informational edge over outsiders, and, *ceteris paribus*, is in a better position to evaluate the horse's winning probability. However, *ceteris* is not *paribus*! There are optimistic and pessimistic insiders, just as there are different kinds of outsiders. Some people know more about forecasting and some less, and

these kinds of differences are never measurable in the kinds of data sets that are available from horse betting markets. This is why we make the assumptions we do about insiders, while, with respect to outsiders, we assume that they bet according to the opening odds set by bookmakers, these being the best available estimate of public information prior to the start of betting at the track.

The way in which insiders bet involves the so-called plunge. This is where several agents of the insider approach different bookmakers simultaneously and back the same horse at the best odds available. The reason why a single bettor is usually insufficient is that bookmakers are permitted to refuse bets which would leave them with large contingent debts.<sup>3</sup> Accordingly, an insider wishing to place really large sums of money on a particular horse will need to spread the bet across bookmakers. It should be noted that on-course bookmakers are small, independent firms who compete in selling a homogeneous product. Accordingly, competition among them is fierce and the trend in prices during the betting is always downwards unless a horse is plunged.<sup>4</sup> However, since all bookmakers need to determine initial odds and all bookmakers in Australia must be members of the relevant state bookmakers' Association, they tend to save on research costs by obtaining a set of opening odds from the Association. These are not obligatory, but tend to be widely used. The important thing about these prices is that they contain a high built-in expected mark-up which serves as a cushion of sorts against insiders. Of course, once a plunge arrives, every bookmaker is on his/her own, and the prices of all horses in the race fluctuate freely. For our purposes, any fall in odds (increase in price) is taken as evidence of a plunge, and we use this variable as a predictor for the outcome of the race.

We proceed as follows: in Section 2, the data are described and we provide a brief discussion of our

<sup>1</sup> Theirs is not the first such method. Shin (1993) developed a similar method using a very different model.

<sup>2</sup> For the purpose of this paper, by odds, we mean that odds of, say, 5 to 1 represent a net profit of \$5 for every \$1 bet on the winning horse.

<sup>3</sup> The precise size of the maximum bet which a bookmaker must accept varies from place to place, but is rarely above a thousand dollars.

<sup>4</sup> For the purposes of this paper, prices are defined in their economic sense as the amount which must be bet on a horse to ensure a total payback (including the initial outlay) of \$1. Odds, on the other hand, have their traditional meaning; i.e., if the odds on a winning horse are  $X$  to 1, then a \$1 bet on the winning horse yields a total payback (including the \$1 outlay) of  $X + 1$ .

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