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Prediction accuracy of different market structures — bookmakers versus a betting exchange

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Abstract

There is a well-established body of literature on separately testing the prediction power of different betting market settings. This paper provides an inter-market comparison of the forecasting accuracy of bookmakers and a major betting exchange. Employing a dataset covering all football matches played in the major leagues of the "Big Five" (England, France, Germany, Italy, Spain) during three seasons (5478 games in total), we find evidence that the betting exchange provides more accurate predictions of a given event than bookmakers. A simple betting strategy of selecting bets for which bookmakers offer lower probabilities (higher odds) than the betting exchange generates above average, and in some cases even positive returns.
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Keywords: Prediction accuracy; Betting; Bookmaker; Bet exchange; Probit regression

1. Introduction

Similarly to financial securities, betting markets trade contracts on future events. The price of a contract reflects the owner's claim, which is tied to the event's outcome. Therefore, the market price can be interpreted as a prediction of the future event. According to Vaughan Williams (1999), betting markets are particularly well suited to the investigation of forecasting accuracy because – in contrast to most financial markets – the contracts have a definite value that becomes observable after a clear termination point.

The traditional form of gambling on sports events is bookmaker betting. In this market setting, the book-

maker acts as a dealer announcing the odds against which the bettor can place his bets. However, in recent years a different market structure has evolved: betting exchanges. Whereas the bookmaker defines the odds ex ante, the prices in the bet exchange are determined by a multitude of individuals trading the bets among themselves. This form of person-to-person betting has lately experienced rapid growth.

Empirical research on the prediction accuracy of bookmaker odds is well established in the literature. While some papers document a good forecasting performance of bookmaker odds (e.g., Boulier & Stekler, 2003; Forrest, Goddard, & Simmons, 2005), other research provides evidence of biases in bookmaker predictions. However, these biases turn out to be rather small, and thus hardly provide opportunities to sys-

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tematically beat the odds (e.g., Cain, Law, & Peel, 2000; Dixon & Pope, 2004; Goddard & Asimakopoulos, 2004).

Furthermore, there is a growing body of literature concerned with the predictive power of bet exchange markets. It is found that these markets exhibit high predictive accuracy, as they regularly outperform non-market forecasting methods (e.g., Berg, Nelson, & Rietz, 2008; Forsythe, Nelson, Neumann, & Wright, 1992; Snowberg, Wolfers, & Zitzewitz, 2008; Spann & Skiera, 2003; Wolfers & Leigh, 2002.

The coexistence of different betting markets offering quotes on the very same event enables us to compare their predictive power. Surprisingly, examples of this kind of research are rare.[1] To the best of our knowledge, this paper is the first to contrast the forecast accuracy of the bookmaker market with that of a major betting exchange. Using a dataset covering all football matches played in the major leagues of the "Big Five" (England, France, Germany, Italy, Spain) during three seasons (5478 matches in total), we compare the prediction accuracy of eight different bookmakers' odds with the forecasting power of the corresponding odds traded at *Betfair*, a common bet exchange platform. Our results indicate that the prices of the bet exchange market exhibit higher power than the bookmaker odds. Furthermore, we develop a simple betting strategy in order to test the economic relevance of our findings. We show that a strategy of selecting bets for which the bookmaker announced lower probabilities (and thus, offered higher odds) than the person-to-person market, is capable of yielding above average, and in some cases even positive returns. This betting strategy is not restrictive in terms of betting opportunities.

Our findings contribute to the ongoing discussion about the predictive properties of different market structures by providing empirical evidence of the superiority of exchange betting in delivering more accurate forecasts of the outcomes of sporting events.

2. Different betting market structures

In this section, we present some preliminary background information on how to interpret betting odds as outcome probabilities. We then outline the structures of the bookmaker market and the bet exchange and summarize the literature on their relative forecasting effectiveness.

2.1. Betting odds and outcome probabilities

In football matches, there are three different outcomes $e \in \{h, d, a\}$ – home win, draw and away win – on which a bet can be placed. The market prices of these outcomes are typically presented as 'decimal odds' o_e, which stand for the payout ratio of a winning bet. The inverse of the decimal odds $\frac{1}{o_e}$ can be interpreted as the probability of occurrence of the underlying event, which is offered to the betting audience. These market probabilities on all possible outcomes of an event usually sum to greater than one because of the transaction costs, the so-called 'overround'. Thus, $\sum_e \frac{1}{o_e} \geq 1$ holds. In order to obtain the market's prediction of the outcome, we assume that the overround is equally distributed over the outcome probabilities.[2] Therefore, we obtain the market's 'implicit probabilities' by a linear transformation,

$$Prob_e = \frac{1}{o_e} \frac{1}{\sum\limits_e \frac{1}{o_e}}.$$

In what follows, we refer to this expression as the market's prediction of a future event.

2.2. The bookmaker market

Bookmaker betting is among the most popular forms of sports gambling. In this setting, the bookmaker acts as a market maker. He determines the odds on a given event and takes the opposite side of every transaction.[3] The bettor is left with a take-it-or-leave-it decision: he can either hit the market quotes

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[1] Comparing bookmaker odds and bet exchange odds in UK horse races, Smith, Paton, and Vaughan Williams (2006) discover that person-to-person betting is more efficient, as it lowers transaction costs for consumers. Spann and Skiera (2008) compare the predictions of a bookmaker (*Oddset*) with the prices of a virtual football stock exchange market (www.bundesligaboerse.de), and find that they perform equally well.

[2] This assumption is in line with the literature. See, for example, Forrest et al. (2005).

[3] The bookmakers have the right to change the odds after the market has opened, but they rarely make adjustments (Forrest et al., 2005). The bettor's claim is tied to the initially taken odds, and does not depend on subsequent price changes. We therefore speak of 'fixed-odds betting'.