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# Relative pricing of binary options in live soccer betting markets

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## Abstract

Live soccer betting markets differ from other binary options markets in that all fundamental information is observable, the options mature in less than two hours and the markets are highly liquid. This study presents a new method for the identification of hidden information in market prices. The method is based on two independent Poisson distributions and on a numerical algorithm for the aggregation of all market price information into one rational number. The method is applied to an empirical dataset of real time market prices in 29,413 soccer games. The results indicate that the method selects the most profitable markets and allows for a significant improvement in average investment returns.

*Keywords:*

Binary options, sports betting, gambling, sports betting analytics

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## 1. Introduction

Sports bets are cash-or-nothing binary options whose payout depends on the results of sporting events. The total annual volume of the sports betting market is estimated to be one trillion US dollars, of which 70% is soccer betting (Keogh and Rose, 2013). Sports bets are traded before the sporting event takes place or during the course of the event. The latter are called live, “in running” or “real-time” bets. Live betting makes up 70% of all trading volume (Pantheon-Sorbonne and the International Centre for Sport Security, 2014). Information technologies have changed the sports betting market substantially over the past decade and have served to make live betting much more relevant. Traces of this evolution can be found in the literature. For instance, about a decade ago Levitt (2004) and Kuypers (2000) stated that once bookmakers announce market prices they hardly adjust them at all. Nowadays, many bookmakers and betting exchanges provide datafeeds of their market prices via their own application programming interfaces. Market participants have easy internet-based access to automated odds comparison services that publish highest odds and arbitrage opportunities for games across hundreds of providers. Companies such as Betradar supply information on events (red cards, fouls, etc.) directly from the soccer stadium to bookmakers within seconds. This information is published on the bookmakers’ websites and prices adapt immediately to crucial events (see Croxson and Reade (2014)). **Sports betting markets are affected by market inefficiencies. The**

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