

*Game, set and match: The favorite-long shot bias in tennis betting exchanges.*

**Isabel Abinzano, Luis Muga and Rafael Santamaria**

**Public University of Navarre**

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**Abstract:** We test for the existence of Favorite-Longshot Bias (FLB) in tennis betting exchanges. Despite these being order-driven markets, with no direct participation from bookmakers, we have found very similar results to those obtained by Lahvička (2014) for bookmakers' betting markets: the bias is stronger in matches between lower ranked players, in later round matches and in high profile tournaments. This suggests that bookmakers' adjustments to respond to informed betting are not the main driver of FLB. The varying magnitude of the bias across different types of event in the main market also weakens arguments linking FLB to gamblers' risk preferences, and suggests the need to consider the microstructure features of the market together with the cognitive biases highlighted in the behavioral finance literature.

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**Corresponding author:** Luis Muga. Dpto Gestión de Empresas. Universidad Publica de Navarra. Campus de Arrosadia s/n. 31006 Pamplona (Spain). Phone: 34 – 948 166079. Fax: 34 – 948169404. e-mail: luis.muga@unavarra.es.

## **Game, set and match: The favorite-long shot bias in tennis betting exchanges.**

### **1.- Introduction.**

The favorite-long shot bias is one of the most widely studied topics in the economic literature on sports betting markets. Basically, it can be explained as the phenomenon by which bettors obtain lower returns when betting systematically on long shots and higher returns when betting on favorites, and has been consistently reported for a wide range of sports and competition structures.

Diverse arguments have been used to explain this phenomenon. It is attributed by Hurley and McDonough (1995) to the market presence of uninformed agents, who bet too much on unlikely outcomes and not enough on more likely ones. These authors find evidence to support their arguments in the horse racing betting market, where there are many potential winners and little is known about the participants. Others, such as Snowberg and Wolfers (2010) claim that it is due to the risk preferences of bettors', some of whom will be what the Cumulative Prospect Theory (Tversky and Kahneman, 1992) terms as local risk lovers. A third strand of theory (Lahvička, 2014) claims it to be the result of bookmakers altering the odds in response to informed betting, in the same way as market makers respond to informed trading by widening bid-ask spreads in price-driven financial markets (Easley and O'Hara, 1987). The presence of heterogeneous beliefs among bettors may also generate FLB (see Ghandi and Serrano-Padial, 2015). Finally, various authors have proved that cognitive biases among bettors can skew market probability estimates, thereby altering the odds (Makropoulou and Markellos, 2011 or Abinzano et al., 2014).

Recent evidence of the presence of FLB in traditional (bookmakers') professional tennis betting markets appears in Forrest and McHale (2007) or Lahvička (2014). The latter argues that biased odds<sup>1</sup> are the result of bookmakers' actions to back themselves against informed bettors.

However, if this is in fact the explanation for the FLB phenomenon, it should not occur in betting exchanges where the odds are not set by bookmakers. We address this issue by testing for the presence of FLB in Tennis Betting Exchanges, where the odds are set by agents betting for and against a given outcome, as occurs in an order-driven market, thus, with no intervention by bookmakers. Past evidence shows that odds-setting efficiency is, in fact, higher in this type of betting market than in those where the odds are set by bookmakers (Franck et al. 2010 and 2013).

It is important to note that evidence of the presence of FLB in the odds in a tennis match betting exchange would rule out explanations based on the dispersion of probability distributions over numerous outcomes (Hurley and McDonough, 1995) or the possibility of

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<sup>1</sup> The role of bookmakers in setting odds has also been documented by Kock and Shing (2008) and Rossi (2011).

it being mainly due to bookmakers' odds-setting practices (Rossi, 2011; Kock and Shing, 2008; and Lahvička, 2014). Furthermore, the examination of the magnitude of the bias across different types of tournaments will enable us to corroborate, modify or deny the explanation linked to bettors' risk preferences (Snowberg and Wolfers, 2010). If this were to be ruled out, the FLB might plausibly be linked to microstructure features, the degree of heterogeneity in agents' beliefs or cognitive biases among bettors in these markets.

## **2.- Database**

The data, which were drawn from the betfair.com database, consist of bets placed in 28,595 professional tennis singles matches played between June 2004 and June 2013. The Betfair database includes both pre-event (PE) and in-play (IP) betting data for each event. We have not however used the odds on match outcomes once the event is underway (IP), because these would capture not only gamblers' prior beliefs but also match result information.

The database contains an entry for every odd taken in every market. For every match, we extracted or calculated the following variables: Event identification, Event description, Winner selection, Result (1, winner or 0, loser), Total bets, Total volume (pounds sterling), Average Bet (pounds sterling), number of different odds taken, odds standard deviation, value-weighted average odd, equal-weighted average odd, and high-volume odd.

Also, following Lahvička (2014), we constructed dummy variables for whether the match was between players seeded below the top 50 in the professional ranking (LOWRANK), whether it took place after the first round (LATEROUND), and whether it was part of a major or grand slam event<sup>2</sup> (GS).

Every bet place in this type of market involves one agent betting on the favorite and another betting on the longshot, therefore the random procedure model used by Lahvička (2014) is unnecessary in our case. It is important to note that for every match, the Betfair Company will, in addition, take bets on either the favorite or the longshot winning (or losing). Thus, there are two parallel markets: the "main market" where the bets are on the favorite and an "alternative market" where the bets are on the longshot. This alternative market proves particularly useful for testing whether markets with the same information, but with different types of gamblers, different expectations, or a varying degree of heterogeneity in agents' beliefs, generate similar patterns of odds.

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<sup>2</sup> By major events, we mean the four Grand Slam (GS) events and the ATP and WTA final tournaments.

### **3.- Methodology and results.**

To test for the presence of FLB, we estimate the implied probabilities based on the odds in each market. In line with standard procedure in the literature, implied probability is estimated by inverting the odds (Forrest and McHale, 2007; Lahvička, 2014; and Abinzano et al., 2014). We define the AbRIP as the difference between the result of the bet and the implied probability. Under the null hypothesis of absence of FLB, the difference between the two variables (AbRIP) should be no different from 0<sup>3</sup>. Table 1 presents the results for the variable constructed from the value-weighted average odds, equal-weighted average odds and high-volume odds, for the main and alternative markets.

**Table 1.FLB in professional tennis matches 2004-2013**

		VWODD	EWODD	HVOLODD
MAIN Market	AbRIP	0.0141**	0.0364**	0.0035
	t-stat	(5.67)	(14.95)	(1.43)
ALTERNATIVE Market	AbRIP	-0.0428**	-0.0396**	-0.0507**
	t-stat	(17.00)	(16.00)	(19.99)

This table gives the test results of the variable AbRIP (Result – Implied probability) for the different odds considered and the main and alternative markets. \*\* and \* denote coefficients significant at the 5% and 10 % levels according to the t statistic adjusted by the White (1980) procedure.

As can be seen, for all three odds estimates in the alternative market and for two of them (value- and equal-weighted average odds) in the main market, the evidence is consistent with the presence of FLB, allowing us to conclude that the basic explanation for this phenomenon does not lie in odds being set by bookmakers in other markets, as suggested by Lahvička (2014), since, in betting exchanges, there are no bookmakers to influence odds setting.

In line with the same author, we then analyze the role played by bettors' risk preferences in explaining FLB by measuring FLB levels in matches with different levels of uncertainty. For this, we run the following regression:

$$AbRip_t = \alpha_t + \beta_1 * LOWRANK_t + \beta_2 * LATEROUND_t + \beta_3 * GS_t + \varepsilon_t \quad (1)$$

<sup>3</sup> The result of the variable needs to be positive to indicate the presence of FLB in the main market, and negative to indicate it in the alternative market.

**Table 2.FLB in professional tennis matches, 2004-2013, by event type**

MAIN	VWODD	EWODD	HVOLODD
$\alpha$	-0.0092 *	0.0084 *	-0.0135 **
$\beta_1$	0.0348 **	0.0366 **	0.0185 *
$\beta_2$	0.0111 *	0.0158 **	0.0097 *
$\beta_3$	0.0109 *	0.0164 **	0.0165 **
ALTERNATIVE	VWODD	EWODD	HVOLODD
$\alpha$	-0.0163 **	-0.0152 **	-0.0298 **
$\beta_1$	-0.0511 **	-0.0539 **	-0.0424 **
$\beta_2$	-0.0144 **	-0.0078	-0.0091 *
$\beta_3$	-0.0003	0.0045	0.0043

This table gives the test results for equation (1) for the various odds estimates considered and for both the main and alternative markets. We use the OLS estimation method with White (1980) standard errors. \*\*and \* indicate levels of significance of 5% and 10%, respectively.

Table 2 contains results for the main and the alternative market. The main finding is that the effect is significantly stronger for matches between lower-ranked players and for matches in later rounds of the tournament in both markets, and for matches in major tournaments in the main market only. Liquidity differences between the two markets (main and alternative) might explain this finding, but further examination is beyond the scope of our present objective. Another possibility, as suggested by Abinzano et al. (2014), is that the two markets attract gamblers of different types or different degrees of heterogeneity of beliefs.

In any event, the confirmation of variation with the type of event in the main market weakens arguments linking FLB to gamblers' risk preferences, which should not, in theory, vary by match type. Thus, although such explanations may hold some weight, their role cannot be decisive if, as shown, they lack the power to explain the results for tennis betting exchanges.

#### **4.- Conclusions**

This study has turned up evidence of FLB in tennis betting exchanges. The presence of this bias in such a setting clearly rules out explanations based on the dispersion of probability distributions over numerous outcomes (Hurley and McDonough, 1995).

Meanwhile, the detection of this bias in markets uninfluenced by the direct participation of bookmakers shows that, in contradiction to the claims of Lahvička (2014), bookmaker intervention is not the essential condition for the FLB phenomenon. Furthermore, the result obtained for the main market, confirming that the effect is stronger in some types of event, enables us to downgrade explanations linking FLB to bettors' risk preferences (Snowberg and Wolfers, 2010).

The differences between the results for the main market (where the betting is on the favorite) and those for the alternative market (where the betting is on the longshot) suggest an interesting area for future analysis, which might reveal a mix of factors, including microstructure features, the type of gambler, or the degree of heterogeneity in agents' beliefs in each market, acting in conjunction with the cognitive biases documented in the behavioral finance literature.

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