BETTING MARKETS: OPPORTUNITIES FOR MANY?

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Abstract: *The paper deals with the opportunities to make risk free profits from sports arbitrage betting and bonuses. Different questions arise around the topic: how common are these chances? Can these really be considered as free risk investments? Can cooperation among bettors influence them? Answers involve betting markets, which have received much attention in the recent economic literature due the fact that betting has become a multi-billion dollar industry. Betting markets have experienced an extraordinary growth over the last years due to extensive deregulation, abolition of national monopolies and the advent of internet gambling. Part of published research has focused on agents behaviour (typically bookmakers and bettors) and markets inefficiency. A betting market is expected to be efficient, since it involves public information and numerous participants; it is usually quite large; it is characterized by limited transaction costs; it offers readily observable market expectations and outcomes; its odds and payoffs are fixed and they cannot be influenced by bettors. Despite of these characteristics, sports arbitrage opportunities happen regularly, hundreds of times every day in a betting market. Adjustment processes are usually rapid but not instantaneous. Specific software applications exist which show sport arbitrage situations in real time. Hence creating an income via sports arbitrage betting is possible, even if this can not be considered as a riskless investment. Suitable preparation and knowledge, enough time spent in the activity, adequate financial resources are indeed necessary. Essentially risk free profits can be made by bettors from bonuses (particularly deposit bonuses and risk free bets) offered by bookmakers, by means of the adoption of specific profitable cover strategy. Cooperation among bettors may help in realizing greater advantages both from sports arbitrage betting and from bonuses. Cooperation may allow bettors to share information and knowledge about the sports arbitrage betting. This may enhance the effectiveness and efficiency of this activity by reducing the so called "execution risk". Moreover, if some conditions take place, a bettor could achieve higher profits cooperating with other punters rather than using a bonus alone.*

Keywords: betting markets; arbitrage; cover strategy.

JEL classification: D03; D84; L83.

1. Introduction

Scholars have long been interested in the economics of betting markets as exemplified by Sauer (1998) and Vaughan Williams (1999). Over the past few years researchers have invested an increasing amount of effort to the study of betting markets. The interest of economists has generated from the fact that betting has become a multi-billion dollar industry.

Betting markets have experienced an extraordinary growth over the last years due to extensive deregulation, abolition of national monopolies and the advent of internet betting. Particularly the availability of online betting leading to a higher liquidity and reduced transaction costs, this was the main reason why betting has grown from minor black markets into large legal markets.

Part of published research has focused on social benefits and costs of gambling (among others, Goodman, 1994; Thompson et al., 1997; Walker and Jackson, 2011). The supposed economic benefits from betting include tax revenues, increased employment, higher wages and enhanced economic growth. Unfortunately, these benefits are not necessarily produced without some undesirable socio-economic problems. For example, the betting industry may partially or entirely "cannibalize" other industries; individual expenditures on betting markets and compulsive sports gambling may cause financial, physical and emotional problems that must be addressed by public support programs; big businesses usually attract criminal elements and foster corruption.

Other studies have focused on agents behaviour (typically bookmakers and bettors) and markets inefficiency (among others, Pope and Peal, 1999; Franck et al., 2009; Vlastakis et al., 2009). Like a classical capital market, a betting market is expected to be efficient, since it involves public information and numerous participants; it is usually quite large; it is characterized by limited transaction costs; it offers readily observable market expectations and outcomes; its odds and payoffs are fixed and they cannot be influenced by bettors. In this context, arbitrage opportunities and risk free profits should be not considerable.

In a betting market, arbitrage may occur when two or more bookmakers set different odds for the same event and a bettor can make a risk free profit by placing a combined bet on all outcomes of an event. For example, consider a basketball match (with no draw option); Team A has the odds 2.10 at Bookmaker 1 and Team B has the odds 2.10 at Bookmaker 2. By betting € 500 at both bookmakers (for a total bet of € 1.000), the bettor has a net profit of € 50 regardless of the outcome of the event (with a return of 5%).

This paper will focus on the sports arbitrage betting as potential risk free activity (see par. 2), on the function that bonuses assigned by bookmakers could have in creating risk free profits (see par. 3) and on the potential effects of bettors cooperation on the two previous factors (see par. 4). Could these elements create more and/or greater opportunities of risk free profits for many people in a betting market?

2. Searching for betting arbitrages: software applications

The wide diffusion of web gambling has not passed unnoticed by the betting industry. The traditional barriers of entry are not applicable in the online gambling. The increase in the number of bookmakers has generated a more intense competition, pushing their margins down for the benefits of bettors. Nowadays situations for betting arbitrage profits are more common than in the past in betting markets.

From a formal point of view, given a sport event with *n* outcomes, an arbitrage occurs if

$$\sum_{i=1}^{n} \frac{1}{O_i} < 1 \qquad [1]$$

where O_i is the maximum odds on outcome *i* reported by all the available bookmakers.

Sports arbitrage opportunities happen regularly, hundreds of times every day (see Figure 1 and Figure 2). Usually each arbitrage will have a short duration, especially if its rate of return is relatively high (in other words, the age of sports arbitrage is negatively related with its own rate of profits). Marshall (2009: 913) states: "The market does not instantly converge to an efficient level after mispricing occurs, but the adjustment process is rapid. Arbitrageurs remove many of these opportunities within minutes of them being created and the majority are gone within an hour". Moreover, it is very hard to find sports arbitrage bets manually by a sole bettor (he should compare the odds proposed by dozens of bookmakers on hundreds of sport events!).

Specific software applications exist which indicate sports arbitrage situations in real time. These powerful tools (Rebelbetting and Mathbet are probably the most common) provide the bettor with useful details about each arbitrage: the bookmakers with the highest odds, the kind of bet, the rate of return, the division of stakes (depending on the bettor's budget), the age, etc.

The monthly price of these software applications is between $ 70 and $ 130 (the bettor should theoretically easily cover this cost with the profits provided by the arbitrage activity). Anyway, free versions of the tools are also available, with some restrictions with respect to full editions (particularly, free versions only provide the bettor with details about sports arbitrages with a rate of return lower than a specific level).

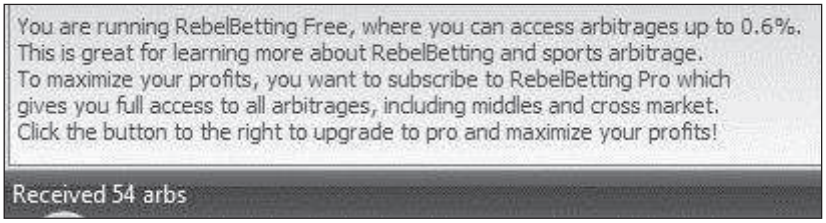

Figure 1: Number of sports arbitrages found by the free version of Rebelbetting (rate of return up to 0.6%) on April 6th, 2013 (h. 10:00)
Source: www.rebelbetting.com

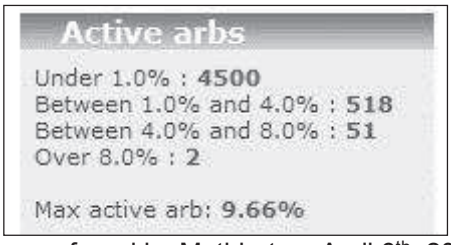

Figure 2: Sports arbitrages found by Mathbet on April 6th, 2013 (h. 10:00)
Source: www.mathbet.com

Could sports arbitrage trading, also by using these tools, really be considered as a risk free activity? In other words, is sports arbitrage betting a riskless investment?
As in a financial market (Thaler and Ziemba, 1988), the main risk involved with sports arbitrage betting is the so called "execution risk" (among others, Engle and Ferstenberg, 2006; Kozhan and Tham, 2010). A bettor could make mistakes (accidentally betting on the wrong team; not being aware of specific rules regarding betting on some sports; etc.). A bookmaker can void a bet if he made an obvious error (reversed odds on a match; typing error in quoting odds; etc.). Odds can change (moving down) during the execution of a sports arbitrage, so that any profit can disappear or a small loss may result. A bookmaker can close a bettor's account or limited stake amount.
However, Marshall (2009), by examining arbitrage opportunities in internet sports betting markets, shows that average arbitrage revenues of 3.35% are available; moreover, relatively low transaction costs and the short time horizon of sports bets allow arbitrageurs to reinvest and earn sizeable annual returns. Hence creating an income via sports arbitrage betting is possible, even if this can not be considered as a riskless investment. Suitable preparation and knowledge, enough time spent in the activity, adequate financial resources are indeed necessary.

3. "Creating" risk free profits: the bonuses

Many bookmakers offer bonuses to attract customers. These offers have different rules depending on the bookmaker providing them (conditions are usually related to a minimum deposit, to a wager amount, to minimum odds, etc.). There are different types of bonuses, even if the most common are deposit bonus and risk free bet (this last will be introduced in the par. 4). A deposit bonus is a bonus related to a deposit in a certain percentage α up to a maximum amount; for example, a bookmaker offers a deposit bonus of 50% (α); the maximum amount of the bonus is € 50; therefore, after depositing € 100, the bettor will play with € 150 (€ 100 deposited plus € 50 bonus).
Bonuses can be useful for making risk free profits (in these cases, the "execution risk" is normally very low), as shown below. In the next algebra, stakes/deposits are denoted with *S*, odds with *O*, deposit bonuses with *B*, profits with Π, and subscripts indicate the related outcome of a sport event. Moreover, for an easier exposition, suppose that the whole available sum (deposit plus bonus) is wagered on the outcome x of a sport event, so that if x happens, the bettor will realize the profit:

$$\Pi_x = (S_x + B)O_x - S_x \Rightarrow$$
$$\Rightarrow \Pi_x = (S_x + \alpha S_x)O_x - S_x \Rightarrow . \quad [2]$$
$$\Rightarrow \Pi_x = S_x[(1+\alpha)O_x - 1]$$

The bonus can not guarantee a risk free profit without any cover bet (bettor loses his stake/deposit plus the bonus if *x* does not happen). Consider however that it is usually possible to bet against *x* (say *y*) somewhere else (also in a betting exchange market), with the profit:

$$\Pi_y = S_y O_y - S_y \Rightarrow$$
$$\Rightarrow \Pi_y = S_y (O_y - 1) . \quad [3]$$

By the adoption of a full cover strategy (that is, by playing a complete cover bet), if *x* happens the new net profit will be:

$$\Pi'_x = S_x[(1+\alpha)O_x - 1] - S_y . \quad [4]$$

If *x* does not happen, the new net profit will be:

$$\Pi'_y = S_y(O_y - 1) - S_x . \quad [5]$$

It is possible to equal [4] and [5] in order to obtain the stake S_y so that the same net profit is achieved, regardless of the outcome of the event:

$$S_y = \frac{S_x(1+\alpha)O_x}{O_y} . \quad [6]$$

For example, a bookmaker provides a first deposit bonus of 50% (α); the maximum amount of the bonus is € 50 (i.e. deposit € 100 and play with € 150). Given a two outcomes sport event, outcome *x* has odds 2.00 on the bookmaker providing the bonus, while the opposite outcome *y* has its best odds 1.90 somewhere else.
Applying the previous equations [4] or [5] and [6], yields that S_y = € 157.89 and Π'_x = Π'_y = € 42.10. Roughly speaking, adopting the full cover strategy, the bettor gains € 42.10 with respect to the original bonus amount of € 50, essentially without risk.
Note that, in absence of arbitrage opportunities and deposit bonuses, a full cover strategy generates a loss *c* whose amount depends on the odds.

4. Bettors cooperation

Cooperation may allow bettors to share information and knowledge about the sports arbitrage betting. This may enhance the effectiveness and efficiency of this activity by spreading good ideas and practices. Knowledge may be developed and then re-used by many bettors. Cooperation may also generate time savings, since the bettor might learn from his mistakes and those of others. More sophisticated ideas are applied to problems resulting in better solutions.

Cooperation may generate advantages for joined bettors also in using a bonus, such as, for example, a risk free bet. This is obviously a riskless bet; suppose that a bookmaker offers the bettor a risk free bet and the punter bets it on the outcome *x*. If *x* happens, the bettor will win and could normally withdraw his winnings; stake will be refunded otherwise, and (usually) it should be bet again (in a second step), before any withdrawal will be possible.

The sole risk free bet can not guarantee a sure profit without any cover strategy. If *x* does not happen, the bettor will have back the stake but he will risk to lose it in the second step.

In absence of arbitrage opportunities and deposit bonuses, the adoption of a full cover strategy (see par. 3) will be profitable only if *x* does not happen, but not otherwise. Hence the bettor should adopt a partial cover strategy (bet against *x* only partially) in the first step and, in case, a full cover strategy in the second one (with a loss of *c*), in order to achieve a profit, no matter of the outcome of the event.

If *x* happens, the net profit will be:

$$\begin{aligned} &\Pi''_x = S_x O_x - S_x - S_y \Rightarrow \\ &\Rightarrow \Pi''_x = S_x (O_x - 1) - S_y \end{aligned} \quad . \qquad [7]$$

If *x* does not happen, the net profit will be:

$$\begin{aligned} &\Pi''_y = S_y O_y - S_y - S_x + S_x - c \Rightarrow \\ &\Rightarrow \Pi''_y = S_y (O_y - 1) - c \end{aligned} \quad . \qquad [8]$$

Note that, in this last case, stake S_x is lost but later refunded; once back, it must be bet again, with the adoption of a full cover strategy in this second step, generating a loss *c*.

Knowing the amount of S_x (that is the risk free bet), it is possible to equal [7] and [8] in order to obtain the stake S_y so that the same net profit is achieved, regardless of the outcome of the event:

$$S_y = \frac{S_x (O_x - 1) + c}{O_y} \quad . \qquad [9]$$

Inserting equation [9] into [7] or [8], the same net profit is obtained, no matter of the outcome of the sport event:

$$\Pi''_x = \Pi''_y = \Pi^L = \frac{S_x(O_x - 1)(O_y - 1) - c}{O_y}. \quad [10]$$

Suppose now that, given a risk free bet, two bettors decide to cooperate, everyone betting on each side of a two outcomes event proposed by the bookmaker. In order to achieve the same maximum shared profit, regardless of the outcome of the event, they will search for the maximum

$$O_x = O_y^* \quad [11]$$

with

$$S_x = S_y^*. \quad [12]$$

Note that in identities [11] and [12] odds and stakes concern the same bookmaker (particularly underlined by the use of * for odds and stake related to *y*).
Regardless of the outcome of the event, each bettor achieves the shared profit from cooperation:

$$\Pi^C = \frac{S_x(O_x - 1) - c}{2}. \quad [13]$$

In absence of sports arbitrage opportunities, the difference $\Pi^C - \Pi^L$ may be positive, that is a bettor might be interested in cooperating rather than betting alone.
Particularly, all odds being equal,

$$\Pi^C - \Pi^L = \frac{S_x(O_x - 1) - c}{2} - \frac{S_x(O_x - 1)(O_y - 1) - c}{O_y} \Rightarrow$$

$$\Rightarrow \Pi^C - \Pi^L = \frac{S_x(O_x - 1) - c}{2} - \frac{S_x(O_x - 1)^2 - c}{O_x} \Rightarrow \quad [14]$$

$$\Rightarrow \Pi^C - \Pi^L = \frac{S_x(O_x - 1)(2 - O_x) + c(2 - O_x)}{2O_x}$$

which is always positive, since S_x and c are positive, O_x is greater than 1 by definition and, in absence of arbitrage, based on condition [1]

$$2\frac{1}{O_x} > 1 \Rightarrow O_x < 2. \quad [15]$$

For example, suppose that a bookmaker offers a risk free bet of € 100. A punter can

wager one of the two outcomes of a sport event, with all odds 1.90 (no arbitrage opportunities). Playing alone, he can adopt a partial cover strategy (in case, suppose c = € 10 in the second step). The opposite outcome has odds 1.90 somewhere else and, based on equation [9], the punter should bet € 52.63 on it. Regardless of the outcome of the event, the bettor achieves a profit of € 37.37.
Suppose now that two bettors agree on taking advantage from the same bonus. Each bettor uses his risk free bet on one side of the two outcomes event, sharing a riskless profit of € 40 (based on equation [13]). The difference between the two profits can also be calculated by equation [14].
In the end, by the adoption of a partial cover strategy, a bettor can achieve a sure riskless profit from this particular kind of bonus (the risk free bet); cooperating with another punter, both could realize a greater advantage if specific conditions take place.

5. Conclusions

Betting markets have received much attention in the recent economic literature due to the increasing importance of the related industry. Betting markets have experienced an unprecedented growth over the past few years due to extensive deregulation, abolition of national monopolies and, overall, the advent of online betting.
Sports arbitrage opportunities are very common in betting markets, despite their characteristics (typical of efficient markets). When an arbitrage occurs, the adjustment process is usually rapid but not instantaneous: as a result, there are chances to make profits. Specific software applications can help in finding arbitrage opportunities. Nevertheless, sports arbitrage betting can not be considered as a riskless investment, due to the presence of the so called "execution risk". Essentially risk free profits can be made by bettors from bonuses (particularly deposit bonuses and risk free bets) offered by bookmakers, by means of the adoption of specific profitable cover strategy.
Cooperation among bettors may help in realizing greater advantages both from sports arbitrage betting and from bonuses. Cooperation may allow bettors to share information and knowledge about the sports arbitrage betting. This may enhance the effectiveness and efficiency of this activity by reducing the "execution risk". Moreover, as formally demonstrated, if some conditions take place, a bettor could achieve higher profits cooperating with other punters rather than using a bonus alone.

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