Betting market efficiency implications of different structures: bookmakers vs. exchanges

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Outline

• (i) Quick definition of market efficiency
• (ii) Theoretical models lead to general predictions...
• (iii) ...which lead to specific predictions about betting markets
• (iv) Results of testing the predictions using real betting market data
• (v) Implications and conclusion
Market efficiency

• Market efficiency is the extent to which available market prices reflect the true value of the assets they represent.

• Efficient markets are important for the ordinary retail investor (but not the hedge fund manager or professional gambler).

• What effect does the structure of a market have on its efficiency? What about the types of traders involved?
The theoretical models

- We derive economic models of asset pricing while varying two factors:
  - (i) the type of market – *perfect* (exchange) or *market-maker driven* (bookmaker)
  - (ii) the type of trader – *rational* (expected utility) or *behavioural* (prospect theory)

- Thus we have four separate models from which we can make general predictions about decision making under risk.
The general predictions

- A perfect market with rational traders is near-efficient
- A perfect market with behavioural traders is biased (inefficient)
- A market-maker driven market with rational traders is biased
- A market-maker driven market with behavioural traders is very biased
- If we introduce rational traders to a market with behavioural traders, the bias is only likely to be eliminated in a perfect market (i.e., market-maker driven markets are always inefficient)
(Horserace) Betting markets

• An ideal situation in which to test market efficiency, with many similarities to wider financial markets:
  • Large number of traders with access to widely available information.
  • Small number of traders adept at processing information.
  • Very small number of traders with inside information.
  • All uncertainty is resolved at one point in time.
  • Different types of market operate in parallel.
Bookmaker vs. exchange

- Together account for 94% of UK betting turnover.

- **Bookmakers**
  - odds set by the bookmaker (therefore market-maker driven)
  - must manage risk, so higher operating costs

- **Exchanges**
  - odds set by the bettors (therefore ‘perfect’)
  - no risk management, so lower operating costs
**Competing markets**

![Horse Racing Odds](image)

**Source:** bookies.com (betgenius)
The favourite-longshot bias

- The *favourite* is the horse considered most likely to win the race. They have a high probability of winning and low odds.

- *Longshots* are horses considered least likely to win. They have a low probability of winning and high odds.

- However, often we find that there is the *favourite-longshot bias (FLB).* Odds for favourites are higher than what we would expect. Odds for longshots are lower than what we would expect.
The favourite-longshot bias

• This makes betting on longshots relatively unfair.

• For example, on average for each £1 bet, you expect to receive £0.72 back.

• However, for favourites this number is £0.92 and for longshots this number is £0.38.

• The FLB is an example of market inefficiency.
The general predictions again

- Perfect + rational = near efficient
- Perfect + behavioural = biased
- Market-maker + rational = biased
- Market-maker + behavioural = very biased
- Perfect + mix of both = biased or near efficient
- Market-maker + mix of both = always biased
The specific predictions

• Rational bettors only bet late in the market (more liquidity, more information, desire to hide information). Therefore, early betting is behavioural and late betting is a mix of rational and behavioural.

• Exchange + early = FLB
• Exchange + late = near efficient
• Bookmaker + early = FLB (high)
• Bookmaker + late = FLB
Data and method

• 6,058 horseraces in the UK and Ireland, August 2009 – August 2010.

• Bookmaker (mean of 9 bookmakers) and exchange (Betfair) odds at different times in the market.

• Method: Measure quantitatively the level of FLB (i.e., the level of market bias/inefficiency) at different times and compare across time and across markets.
Trading volume and accuracy

- Pseudo-$R^2$ (Exchange)
- Pseudo-$R^2$ (Bookmaker)
- Volume

Graph showing the relationship between time before race start (mins) and various metrics.
Results - FLB over time

FLB $\beta$

- Exchange
- Bookmaker
- FLB $\beta$ at race start

95% confidence intervals

Time before race start (mins)
Summary of results

- Significant FLB in early stages of exchange market
- FLB is eliminated over time as rational traders participate in the exchange market
- However, FLB present *at all times* throughout the bookmaker market.
Implications and conclusion

• Exchanges allow for a more efficient market overall - however, attracting rational traders is also important.

• Market-maker driven prices are never efficient, even if we could (in theory) reduce costs to attract more rational traders.

• If we extrapolate to wider financial markets, opaque over-the-counter (OTC) derivatives should be moved to regulated exchanges – there is actually strong support for this since the 2008 crisis.
Thank you

• Any questions?
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