



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

David C J McDonald  
Ming-Chien Sung  
Johnnie E V Johnson  
John Peirson

Centre for Risk Research  
School of Management  
University of Southampton, United Kingdom

School of Economics  
University of Kent, United Kingdom

29<sup>th</sup> May 2013

15<sup>th</sup> International Conference on  
Gambling and Risk Taking



- (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 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)

- 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

Home » Horse Racing » 03 April 2011 » Doncaster » 16:25 »



Doncaster: 4:25 PM

1m 4f Weights **£14,500**













williamhill.com Doncaster Shield (Conditions Stakes) (Class 2) Flat

Win: £9,390, Going: Good

Best Odds All Odds Exchanges Historic Odds

ODDS FORMAT: 7/4 2.75 +175

LAST ODDS CHANGE: LONGER SHORTER

		Form	NO	A-Z	ODDS	32RED	888sport	bet365	BETCHRONICLE	BETFRED	betinternet	BLUESQ	Boylesports	CANBET	CORAL	corbett sports	Ladbrokes	Paddy Power	SKY BET	StanJames.com	totesport	Victor Chandler	William HILL	BETDAQ	betfair
		144221-	4	Times Up		9/5	SP	7/4	17/10	7/4	SP	SP	7/4	SP	SP	7/4	15/8	15/8	SP	7/4	7/4	13/8	7/4	19/10	2
		753276-	5	Prompter		7/3	SP	5/2	9/5	5/2	SP	SP	5/2	SP	SP	5/2	9/4	9/4	SP	11/4	5/2	5/2	5/2	13/5	11/4
		503554-	3	Nanton		11/2	SP	5	4	5	SP	SP	5	SP	SP	5	5	5	SP	9/2	4	5	5	11/2	6
		2861/12-	1	Merchant of Dubai		11/2	SP	5	5	5	SP	SP	5	SP	SP	11/2	5	11/2	SP	11/2	11/2	11/2	11/2	6	6
		0/7302D-	2	Moyenne Corniche		9/2	SP	12	8	14	SP	SP	14	SP	SP	11	14	14	SP	14	14	14	12	13	13
		697410-	6	Cracking Lass		11/2	SP	12	11/2	14	SP	SP	14	SP	SP	14	14	14	SP	14	14	14	14	17	17
Place terms (Highlight E/W)							2	2		2	2	2	2			2	2	2	2	2	2				
							1/4	1/4		1/4	1/4	1/4	1/4			1/4	1/4	1/4	1/4	1/4	1/4				

Best Price Percentage: 101.6%, Bookies Only: 105.7%



# 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

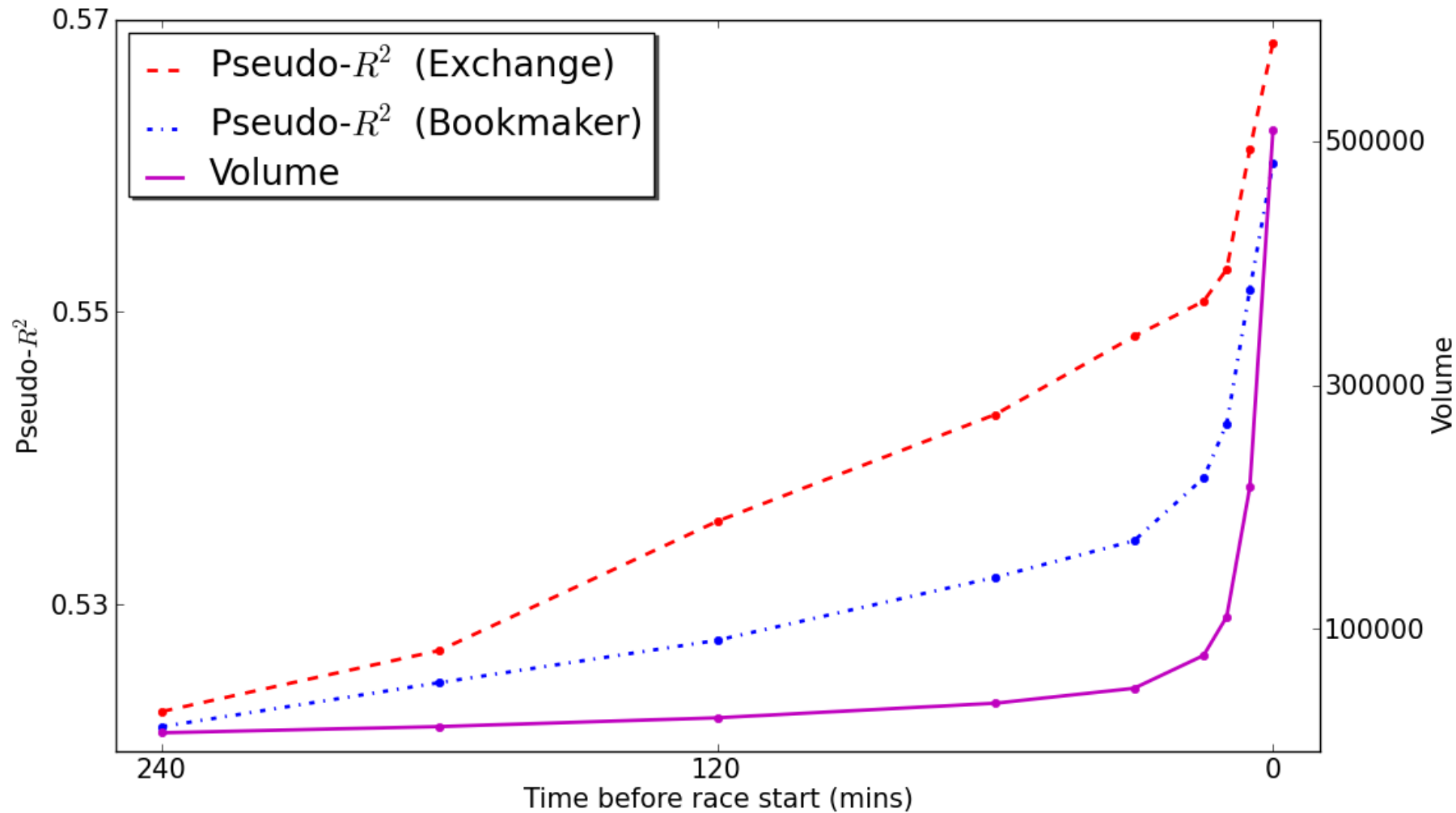
- Perfect + rational = near efficient
- Perfect + behavioural = biased
- Market-maker + rational = biased
- Market-maker + behavioural = very biased
- Perfect + mix of both = biased or near efficient
- Market-maker + mix of both = always biased

# The specific predictions

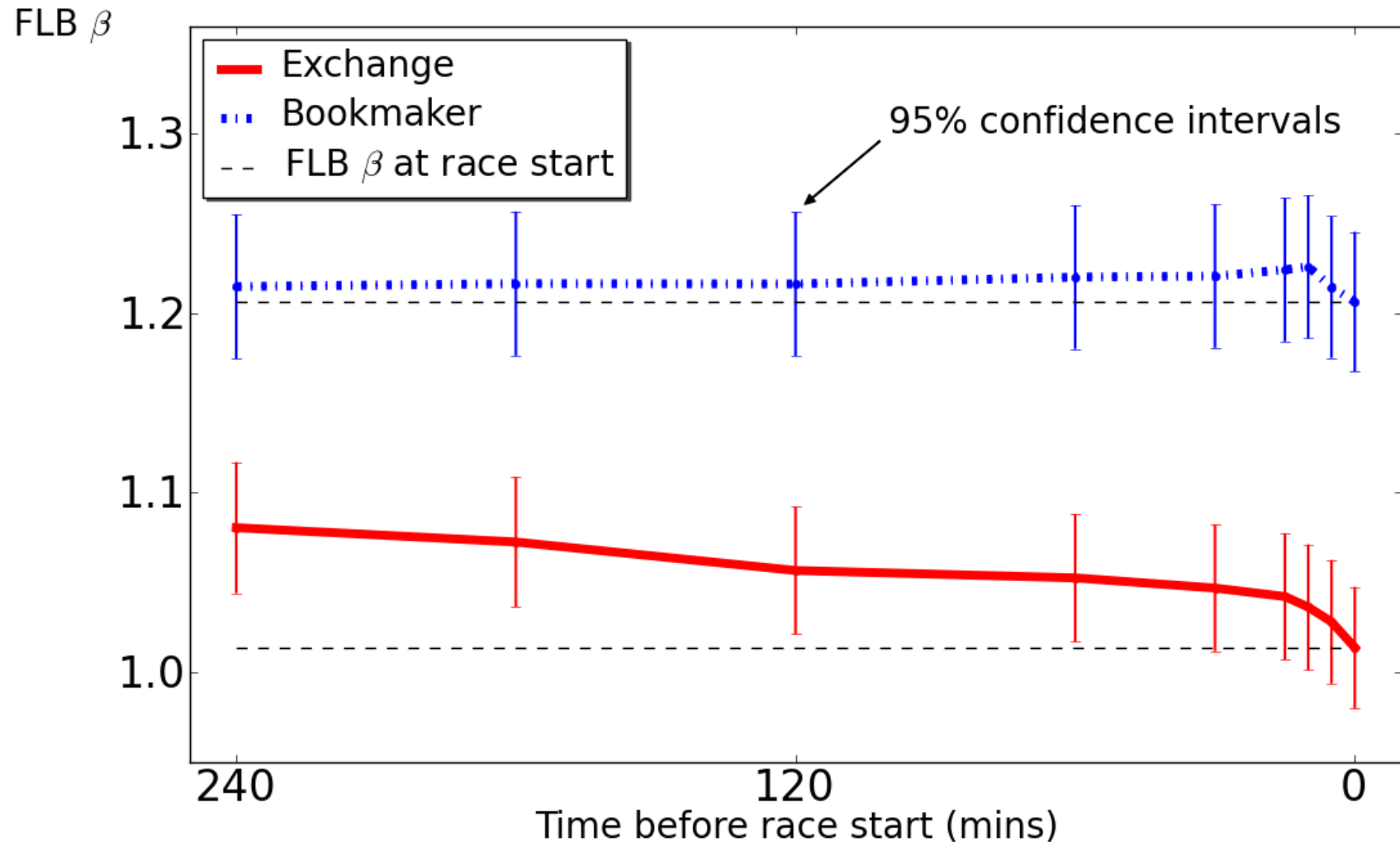
- Rational bettors only bet late in the market (more liquidity, more information, desire to hide information). Therefore, early betting is behavioural and late betting is a mix of rational and behavioural.
- Exchange + early = FLB
- Exchange + late = near efficient
- Bookmaker + early = FLB (high)
- Bookmaker + late = FLB

- 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



# Results - FLB over time



# 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.



- 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?
- [d.mcdonald@soton.ac.uk](mailto:d.mcdonald@soton.ac.uk)