Home Bias and International Betting Markets:
Can Institutional Constraints and Behavioral Biases Lead to Arbitrage Profits?

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With Special Thanks to Christina Contreras

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Outline

I.   Introduction and Motivation

II.   Data

III.   Results

IV.   Issues and Discussion

V.   Conclusion

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I.   Introduction and Motivation

- 7-year old kids at the Amusement Park

I.   Introduction and Motivation

- Young lad in Italy – Grandma's 200,000 Lire

Note: Tennis Ball only fits in the Center Cup!

I. Introduction and Motivation

- NFL Betting (Rosenfeld & Hausman)

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I.   Introduction and Motivation

- World Cup and Germany-Mexico

I. Introduction and Motivation

- Caribbean Gambling (Craps, Blackjack, Poker) – Card counting in Basel

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I.   Introduction and Motivation

I believe that this nation should commit itself to achieving the goal before this decade is out of landing a man on the moon and returning him safely to the earth. No single space project will be more impressive to mankind, or more important for the long-range exploration of space. And none will be so difficult or expensive to accomplish.

--- John F Kennedy (May 25, 1961)

I.   Introduction and Motivation

London's Organized Betting Organizations offered
100-1 (Ladbrokes) and **1000-1** (William-Hill) from the early 1960s until 1969.

I suppose people born in the 1920s and 1930s could just not fathom a man-on-the-moon. The odds did not change much throughout the 1960s, despite the amazing progress NASA was making.

--- Paraphrase of Ron Pollard, ex-PR Director of Ladbrokes of phone conversation with LBC

I. Introduction and Motivation

Other Fun Stuff:

- Beckham and Spice (20 – 1 of not divorce)

- Political Elections

- MIT Bridge Club and the Blackjack Geniuses (*Bringing Down the House*)

- Students at Pomona and Texas Hold Em' (*free option that people fail to exercise*)

I. Introduction and Motivation

Example:

Frank Bruno (England) vs. Mike Tyson (USA) for WBC Heavyweight title.

March 16, 1996 Las Vegas

- Las Vegas Odds: 20-1 for Mike Tyson
- British Betting Organizations: 1-1

- Home Bias? Arbitrage Opportunity?

I.   Introduction and Motivation

- **Idea**: Gambling houses wish to balance books and for the most part limit their exposures.

- US Gambling House: Clientele mainly US gamblers. British Gambling House: Clientele mainly British

- If gambling house balances books and gamblers favor own team either due to "loyalty bias" or "informational bias", then odds in Britain will favor Bruno, odds in US will favor Tyson more.

I. Introduction and Motivation

- These odds will be different from the actual objective true odds due to the biases.

- In this case, an investor could have had an account in Britain and gone to Las Vegas.

  Question: What's the strategy?

I. Introduction and Motivation

- Strategy:

  Buy Bruno in Las Vegas and Sell him in England.

  For $1000, if Bruno wins: Payoff = $19,000 (20-1)

  For $1000, if Bruno loses: Payoff = $0 (1-1)

  [*Note*: Can reorganize to divide up gains.]

I. Introduction and Motivation

Other Reasons to expect arbitrage:

(1) New markets with relatively inexperienced clientele.

(2) Liquidity limitations keep away smart money.

(3) Lots of complicated, non-traditional bets.

I. Introduction and Motivation

The 2000 Presidential Election

- Bush bet for popular vote (Bought REP at 61, Shorted DEM at 48)

- The evening of election day, it was clear Gore had got popular vote.

- A bright analyst, positive attitude, and turning loss into profit.

I. Introduction and Motivation

The 2000 Presidential Election

Question: What happened?
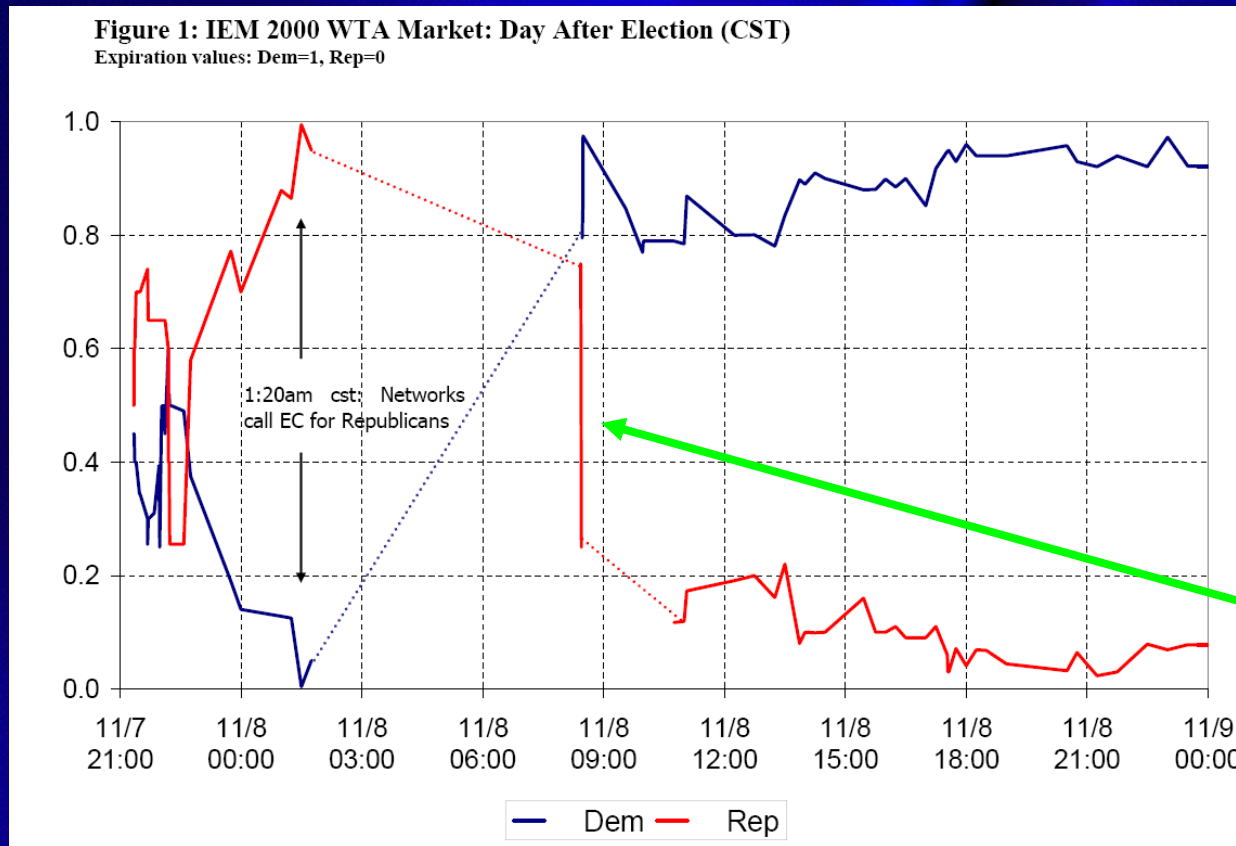
I. Introduction and Motivation

The 2000 Presidential Election

- Professor Strumpf who studies the **manipulation** of these markets believes that:

  (a) we're too kind to the limit order story – people in these markets are uninformed

  (b) after studying the data he believes that our trades restored the market to equilibrium – we were Walras in the flesh – the arbitrageur.

[12]Democrat shares expired at $1 when the market closed as scheduled three days after the election. At that time it was still possible to buy a Democrat share for $0.969. The large price correction at 8:30AM on 11/8 was due to a single trader, who sent use copies of his official trading records.

I. Introduction and Motivation

The 2000 Presidential Election

Figure 1: IEM 2000 WTA Market: Day After Election (CST)
Expiration values: Dem=1, Rep=0
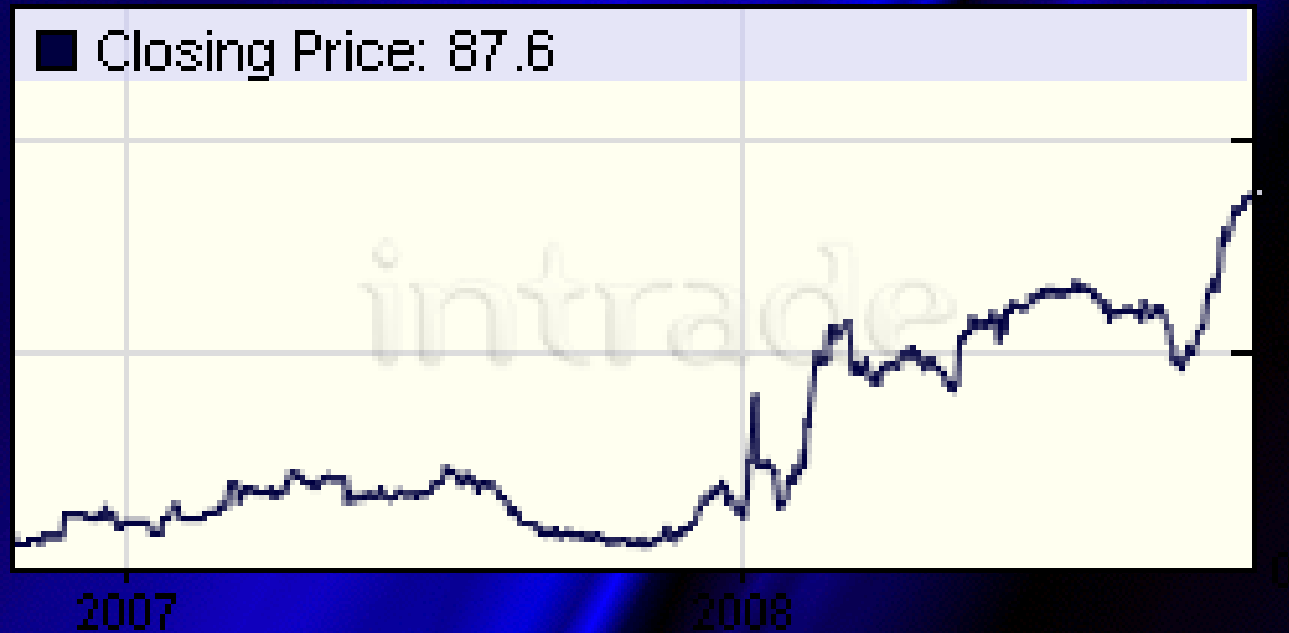
One Trader's Arbitrage

I.   Introduction and Motivation

<u>The 2008 Presidential Election</u> (Obama)

I. Introduction and Motivation

The 2008 Presidential Election (Gore?)

I. Introduction and Motivation

The 2008 Presidential Election (Recession in 08)

II. Data

- Obtain data on odds of various matches involving nationals of <u>different countries</u> and determine whether there is a more <u>general home bias</u> and whether arbitrage profits or riskless position could be taken.

- Types of Sporting Events:

  Boxing

  Tennis

  Golf

  Soccer (Football)

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II. Data

- <u>Key</u>: To find betting houses whose clientele is predominantly from a particular country.

- Preliminary Online Websites:

    1. <u>Australia</u>: www.acttab.com [provides gambling odds for Casino Canberra and other Australian casinos on sports betting]

    2. <u>England</u>: www.betfair.com [many other websites in England, like sportindex.com, tradesports.com, willhill.com, etc]

II. Data

- Preliminary Online Websites:

  3. Denmark: www.danskespil.dk

  4. USA: www.vegasinsider.com [provides odds for many Las Vegas casinos]

  5. Austria: www.bwin.ag [providers of information sportradar.ag]

  6. Sweden: www.unibet.com [not clear if the clientele is Swedish, location is Malta]

  7. South Africa: www.casasa.org

  8. Netherlands: www.ciga.an

II. Data

- Preliminary Online Websites:

  9. Switzerland: www.swisslos.ch

  10. Germany: www.digibet.com

  11. Various: www.tip-ex.com [May have data on various sites comparing the best odds]

  General Information Sites

  1. www.igwb.com [International Gaming and Wagering Business]

  2. American Gaming Association

  3. World Lottery Association

II. Data

Data Gathering

- It was extremely difficult to get these websites to give me their historical odds data on sporting events. I wrote numerous emails, made many phone calls.

- Christina Contreras helped call at unreasonable hours.

- A couple of sites finally gave me some limited historical data.

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II. Data

Only Data Available at this stage

- 2008 US Open Golf

- 2008 US Open Tennis

- 2008 PGA Championship

- 2008 European Cup

- Very limited and insufficient

III. Results

Question 1: Is there home bias in betting?

Question 2: Can this be arbitraged?

An Audience Moment brought to you by Lehman Brothers

What is an arbitrage?

What is the home bias?

III. Results

Question 1: Is there home bias in betting?

Method: Take odds on outright winner and determine whether odds are higher on players of the country of the betting house.

III. Results

<u>PGA Championship Golf</u>

		HOME	OTHERS	**DIFFERENCE**
Australia Average		$ 13,900.00	$ 11,846.88	**$ 2,053.13**
England Average		$ 6,931.67	$ 12,893.89	$ (5,962.22)
USA Average		$ 7,224.51	$ 7,036.05	$ 188.46

- Only evidence for England

- Other countries with less known players (effect is in Australia when unknowns removed)

   Note: Dollars are what one wins if that player wins the tournament. *Less means a favorite*.

III. Results

US Open Tennis

		HOME	OTHERS	**DIFFERENCE**
Australia Average		10100.00	11364.00	-1264.00
England Average		900.00	1037.00	-137.00
USA Average		5700.00	14233.11	-8533.11

- Evidence in all countries

III. Results

Euro Cup 2008

Greece vs Sweden	Win	Draw	Lose
Sweden	3.15	3	2.5
Australia	2.9	3.05	2.45
England	3.25	3.15	2.62
Germany	2.85	3.05	2.6
Austria	2.75	3.15	2.5
Home	3.15	3	2.5
Foreign	2.9375	3.1	2.5425
			-0.0425

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III. Results

Euro Cup 2008

Austria vs Croatia	Win	Draw	Lose
Austria	4.35	3.35	1.8
Australia	4.6	3.3	1.88
England	4.5	3.3	1.9
Germany	5	3.4	1.94
Sweden	4.45	3.25	1.85
Home	4.35	3.35	1.8
Foreign	4.6375	3.3125	1.8925
	-0.2875		

III. Results

Euro Cup 2008

	Win	Draw	Lose
Austria vs Poland			
	Win	Draw	Lose
Austria	3.1	3.3	2.2
Australia	3.1	3.2	2.25
England	3.35	3.3	2.38
Germany			
Sweden			
Home	3.1	3.3	2.2
Foreign	3.225	3.25	2.315
	-0.125		

III. Results

Euro Cup 2008

Austria vs Germany			
	Win	Draw	Lose
Austria	8	4.1	1.4
Australia	8	3.75	1.45
England	8.4	4.3	1.5
Germany			
Sweden			
Home	8	4.1	1.4
Foreign	8.2	4.025	1.475
	-0.2		

III. Results

- There is a small positive bias in all of these European cup matches.

Question 2: Is there an arbitrage?

- Cannot test with the golf and tennis outright winner. *Can't short players in gambling markets for this event.*

- Can only test in head-to-head matches, like Euro Cup

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III. Results

- Recent Olympic 2008 Soccer Match

- Sweden vs. Germany

- Odds at Unibet: 2 1.28 1.18
- Odds at Digibet: 6 3.80 1.53

- Clearly, a home bias. Can it be arbitraged?

III. Results

- **Strategy**: Short in home market, go long in foreign market and hedge draw possibility.

Croatia Wins Payoff: $0.8\alpha X - (1-\alpha)X - \beta Y - (1-\beta)Y$

Austria Wins Payoff: $-\alpha X - (1-\alpha)X + \beta Y - (1-\beta)Y$

Draw Payoff: $-\alpha X + (1-\alpha)X * 3.35 - \beta Y + (1-\beta)Y * 3.30$

Optimize so that no loss with positive expected profit.

III. Results

- **<u>Strategy</u>**: Short in home market, go long in foreign market and hedge draw possibility.

  Cannot be done for this game.

III. Results

- **<u>Bottom Line</u>**: An arbitrage position cannot be created with these odds.

- Need the bias to be on *both sides* of the bet.

IV. Issues and Discussion

- One or two examples not enough.

- Need to retrieve more data, but difficult without cooperation of gambling houses.

IV. Issues and Discussion

<u>Type of Data</u>

- Historical odds on variety of sporting events where nationality of contestants can be uniquely determined (at least 10 years of data)

- Information on the dollars bet at various houses and percentage of clientele from that particular country

- Volume information. Some of these markets may not allow arbitrage on a large scale due to limits on liquidity

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IV. Issues and Discussion

Type of Data

- More details on the commission structure (if any) at various gambling houses

- More understanding on the ability to sign up for accounts and transact at these different venues

- Acquiring more websites, more companies in more countries

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V. Conclusion

- Home Bias in sports betting markets seems to be present in a very small sample of data

- Arbitrage possibilities might be possible, although in our small sample there were no obvious candidates

- Need to gather more data and examine these possibilities in greater detail (*research requires perseverance*)

- RAs, who want to work hard to get data could get a thesis and/or co-authorship.

V.   Conclusion

Questions?

Questions?

Comments?