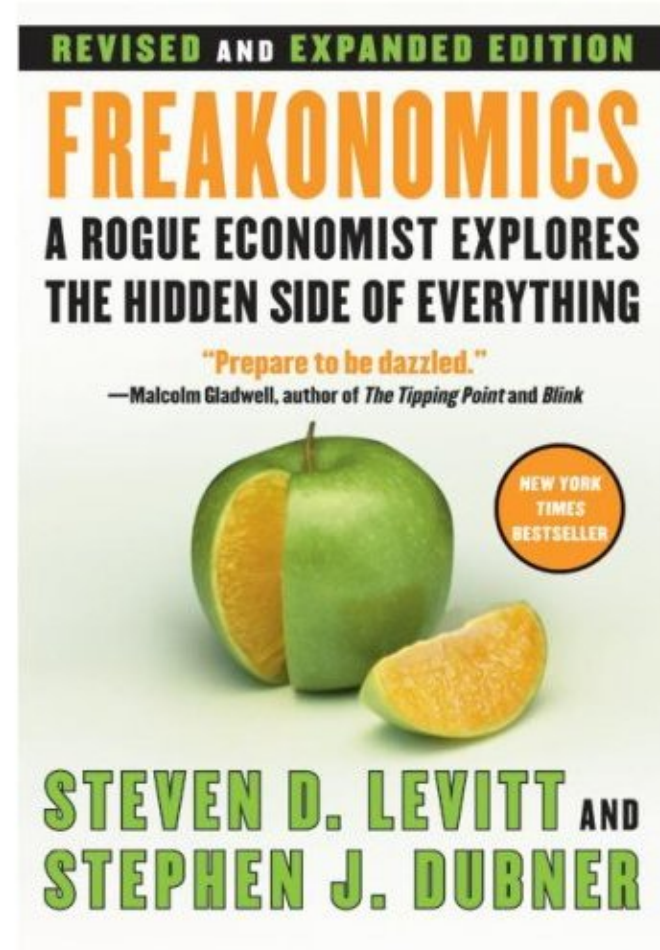


Cooperation within Competition: Match-Rigging in Sumo Wrestling

Maddie Mitchell

Background

- *Freakonomics* (2005)
- Duggan & Levitt (2002)
- Dietl, Lang & Werner (2009)



Freakonomics

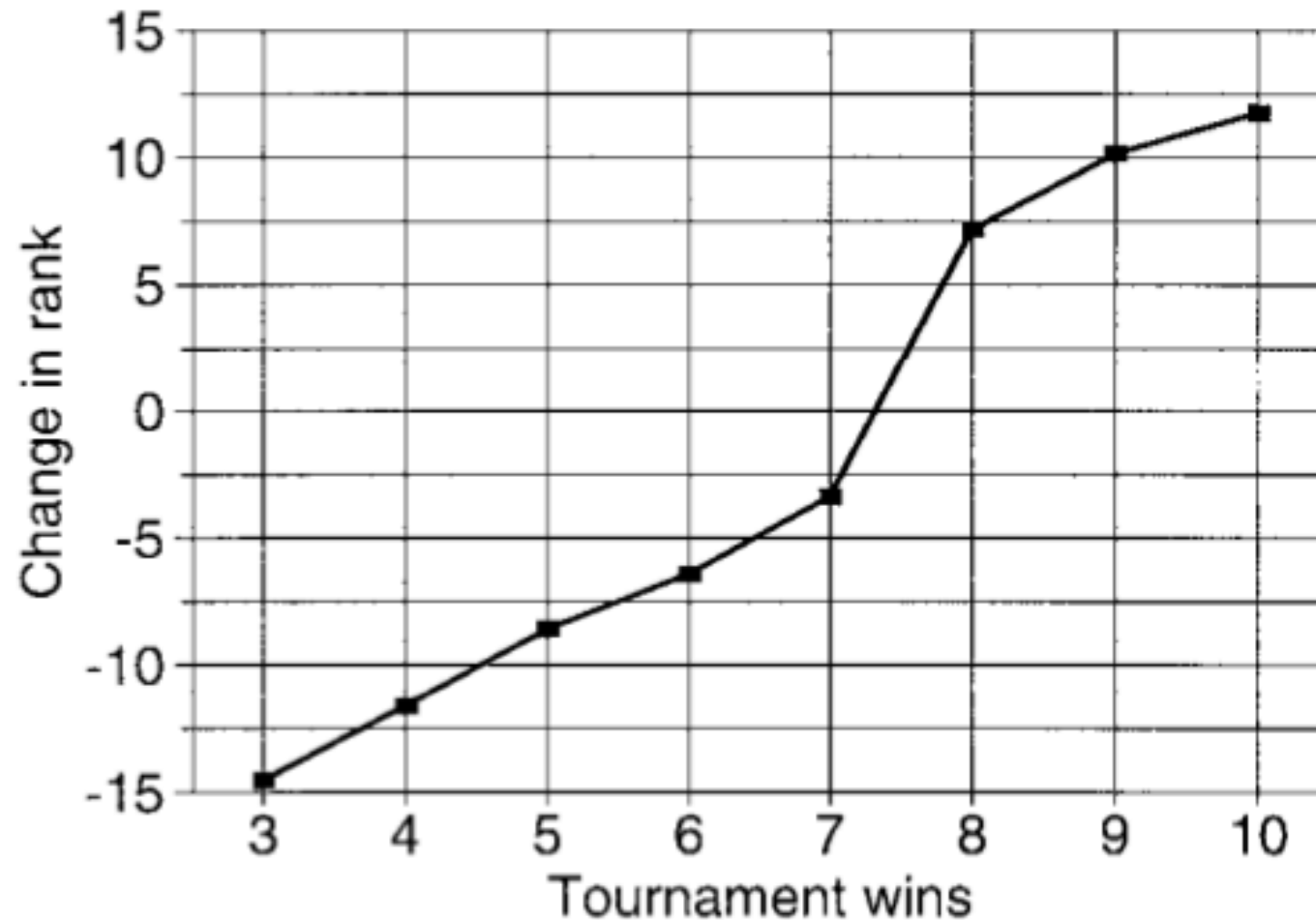
- Study of incentives
- “Cheating is a primordial human act”
- Cheating to win vs. cheating to lose



Sumo Wrestling: Intro

- Player rankings & sumo elite
- Tournaments & bouts
- Winning record vs. losing record
- Entering final match with 7-7 vs. 8-6
- “You let me win today, I let you win next time”
- Not only at individual level

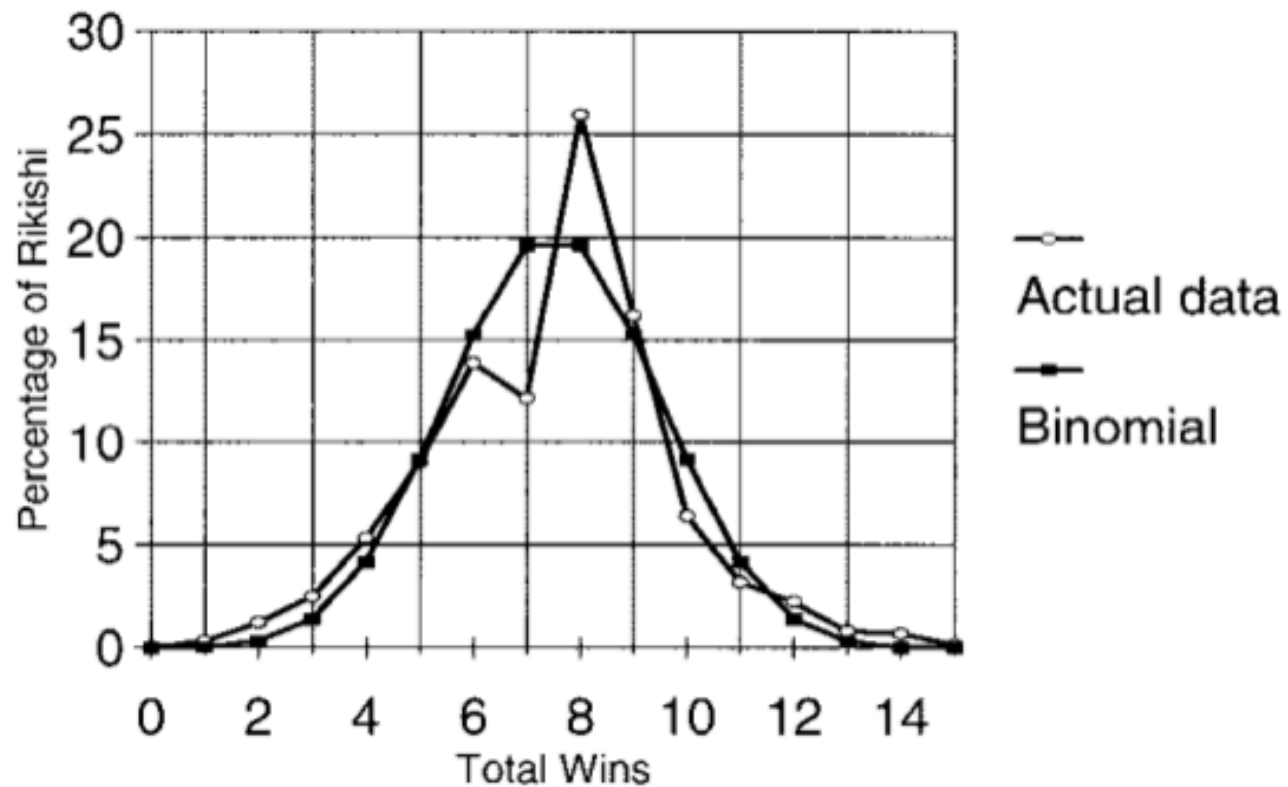
Modeling the Incentive Structure



Data

- 1989-2000
 - 6 tournaments/yr
 - 60 wrestlers/tournament, 15 bouts/wrestler
- Over 64,000 wrestler-matches (32,000 bouts)
- 281 wrestlers
 - Avg. 10 matches between same two wrestlers

Strong Performance on the Bubble



Multiple Regression Model

- Whether either wrestler is on the margin
- Gap between wrestler rankings entering tournament
- Wrestler-opponent interactions
- Wrestler fixed effects

$$Win_{ijtd} = \beta \mathbf{Bubble}_{ijtd} + \gamma Rankdiff_{ijt} + \lambda_{ij} + \delta_{it} + \epsilon_{ijtd}$$

Excess Win Percentages for Wrestlers on the Margin

On the Margin on:	(1)	(2)	(3)	(4)	(5)	(6)
Day 15	0.244 (0.019)	0.249 (0.019)	0.249 (0.018)	0.255 (0.019)	0.260 (0.022)	0.264 (0.022)
Day 14	0.150 (0.016)	0.155 (0.016)	0.152 (0.016)	0.157 (0.016)	0.168 (0.019)	0.171 (0.019)
Day 13	0.096 (0.016)	0.107 (0.016)	0.110 (0.016)	0.118 (0.016)	0.116 (0.019)	0.125 (0.019)
Day 12	0.038 (0.017)	0.061 (0.018)	0.064 (0.017)	0.082 (0.018)	0.073 (0.020)	0.076 (0.021)
Day 11	0.000 (0.018)	0.018 (0.018)	0.015 (0.018)	0.025 (0.018)	0.010 (0.021)	0.012 (0.021)
Rank difference	—	0.0053 (0.0003)	—	0.0020 (0.0003)	—	−0.0020 (0.0004)
Constant	0.500 (0.000)	0.500 (0.000)	—	—	—	—
R^2	0.008	0.018	0.030	0.031	0.0634	0.0653
Number of observations	64,272	62,708	64,272	62,708	64,272	62,708
Wrestler and opponent fixed effects	No	No	Yes	Yes	Yes	Yes
Wrestler-opponent interactions	No	No	No	No	Yes	Yes

Extensions

- Match-Rigging vs. Extra Effort
 - Probability that behavior will be detected
 - Monetary prizes
 - Coordination among stables of wrestlers
- How are the “losers” repaid?
- Corrupt wrestlers
- Dietl, Lang & Werner (2009)