

2009/11/06, Joseph Tao-yi Wang

## PREDICTION MARKETS

### Markets Reveal Information

- ◆ Markets can aggregate information about buyers (valuations) and sellers (costs)
  - High valuation ( $>$  market price) buyers buy
  - Low cost ( $<$  market price) sellers sell
- ◆ Outcome of Trade is "Efficient"
  - Those who need it most would receive it

### Markets Reveal Information

- ◆ This is also true for items with uncertainty
  - Stocks, antiques, iPods on eBay, permits, etc.
- ◆ The Efficient Market Hypothesis
  - All information (about a stock/item) is already contained in the market price
  - Revealing information does not change prices

### Markets Reveal Information

- ◆ Why? Because of "Non-Arbitrage":
  - If I really think the stock price is too low based on my information, I should buy like crazy
  - If I really think the stock price is too high, I should sell (or "short") like crazy
- ◆ But these "crazy" trading will affect prices
  - Buying like crazy would drive the price up
  - Selling like crazy would drive the price down

### Markets Reveal Information

- ◆ The price change reveals your private information
- ◆ In equilibrium, the final price reveals everyone's private information
- ◆ As if the market knows all information

### Prediction Markets

- ◆ Markets can aggregate information about buyers (valuations) and sellers (costs)
  - Efficient Market Hypothesis
- ◆ Can markets gather other information?
  - EX: Tradable permit markets gather private information about pollution reduction costs
- ◆ Yes, by creating markets of "new items"
  - What are these items?
- ◆ Futures about an event!

## Prediction Markets

- ♦ Winner-take-all: (~看好度)
  - H stock: Pay \$100 if Frank Hsieh wins the Taiwan presidential election, \$0 otherwise.
  - M stock: Pay \$100 if Ying-Jeou Ma wins the Taiwan presidential election, \$0 otherwise.
- ♦ Vote share markets: (~支持度)
  - HVS: Pay \$y if Frank Hsieh earns y% of the votes in the Taiwan presidential election
  - MVS: Pay \$z if Ying-Jeou Ma earns z% of the votes in the Taiwan presidential election

## What Do These Predict?

- ♦ Winner-take-all: (Probability of winning)
  - If H stock has price \$10, but you believe the chances of Hsieh winning is 70%, you should buy a lot of H stock (since they are a bargain)
- ♦ Vote share:
  - If MVS has a price of \$40, but you believe Ma would win 60% of the votes, you should buy a lot of MVS (since they are a bargain)

## Better Than the Polls?

- ♦ Polls do not sample the population evenly
  - Some people are not reachable by phone
  - Some people decline to answer
- ♦ Polls weight all samples equally
  - Some know more information than others
- ♦ "Good" polls try to correct for these biases
  - Taiwan polls don't, and are way off
- ♦ But these corrections are ad hoc

## Better Than the Polls?

- ♦ Prediction markets do not sample the population either, but
- ♦ Prediction markets encourage those who have more information to participate
  - You will earn more if you are "right" and buy more M stocks and HVS
- ♦ Prices aggregate information, and put more weight on "better information"

## Prediction Markets in the World

- ♦ Iowa Electronic Market: (academic, real money with a limit of US\$500)
- ♦ <http://www.biz.uiowa.edu/iem/>
- ♦ TradeSports: (in Ireland; real money)
- ♦ <http://www.tradesports.com/>
- ♦ Hollywood Stock Exchange:
  - (movie box office; play money)
- ♦ <http://www.hsx.com/>

The screenshot shows the Iowa Electronic Markets (IEM) website. At the top, it features the IEM logo and the text "Iowa Electronic Markets". To the right, it says "THE UNIVERSITY OF IOWA HENRY B. TIPPIE COLLEGE OF BUSINESS". Below this, there are navigation links: "Login and Trade", "Open an Account", and "Current Market Quotes". The date "November 27, 2007" is displayed. The main content area is divided into two columns. The left column contains a sidebar with links: "About the IEM", "FAQ", "Current Markets", "Instructor Resources", "Account Maintenance", "Trader's Manual", and "Data Archive/Research". The right column contains a main text area with the following text: "The Iowa Electronic Markets are real-money futures markets in which contract payoffs depend on economic and political events such as elections. These markets are operated by faculty at the University of Iowa Tippie College of Business as part of our research and teaching mission. We invite you to [join us in this mission](#)." Below this text are several links: "Political Markets", "Economic Indicator Markets", "Classroom Markets", "Related Markets", and "Influenza Prediction". To the right of the main text area is a box titled "Announcements" with the following text: "On March 2, 2007, trading opened in markets based on the 2008 U.S. Political Conventions of the Democratic and Republican parties. Visit the market home page, [2008 Nomination Markets](#) for details." Below the announcement box is another text block: "Trading continues in our U.S. Presidential Election markets and our market based on the monetary policy decisions of the [Federal Open Market](#)."

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- Western Conference Winner 2006/2007
- Eastern Conference Winner 2006/2007
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**NCAA Football**

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**The Box Score** The weekend box office was Enchanted with the

**TVStocks** Now you can trade all the new network TV series for

## Prediction Markets in Taiwan

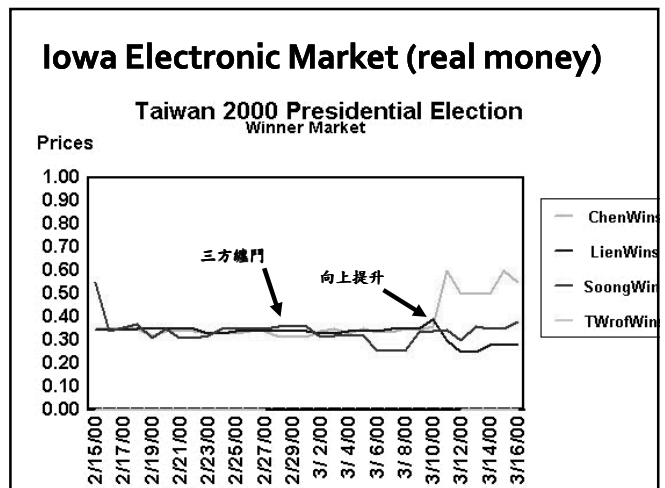
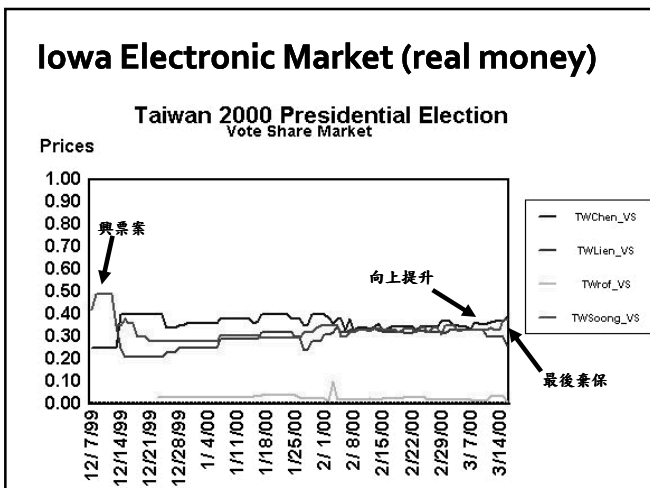
- Taiwan Political Exchange:
- <http://socioecono.phys.sinica.edu.tw/>
- NCCU Prediction Market Center:
- <http://nccupm.wordpress.com/>
- 未來事件交易所 (Swarchy)
- <http://nccu.swarchy.org/>
- Note: Unfortunately, all use play money.

## Are Prediction Markets Accurate?

• Source: NCCU Prediction Market Research Center

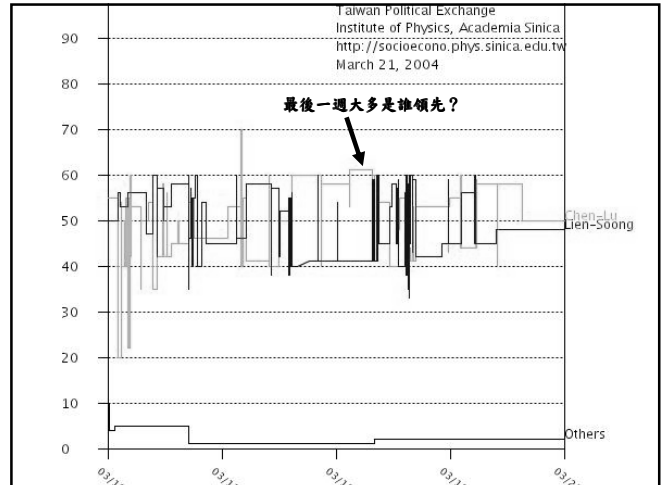
準確度隨合約到期時間接近而提高

距離清算日的天數



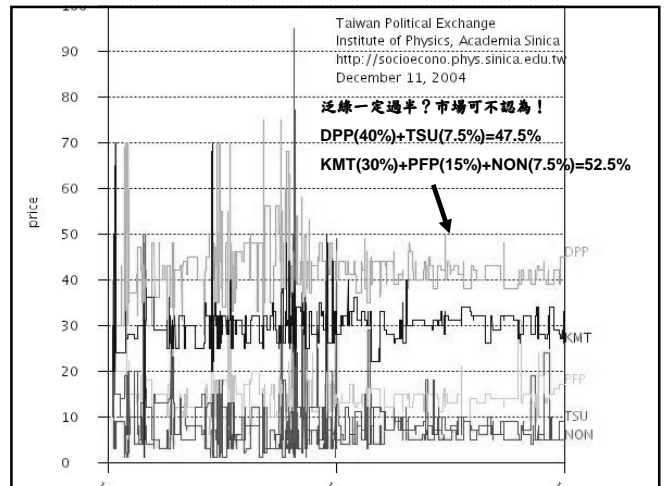
## Are These Prediction Accurate?

- ◆ Possible...
- ◆ What about "319"?
- ◆ Unfortunately, Iowa Electronic Market did not host Taiwan's 2004 election
  - Reminder: This is a play money market...
- ◆ But, Taiwan Political Exchange did!
  - Reminder: This is a play money market...



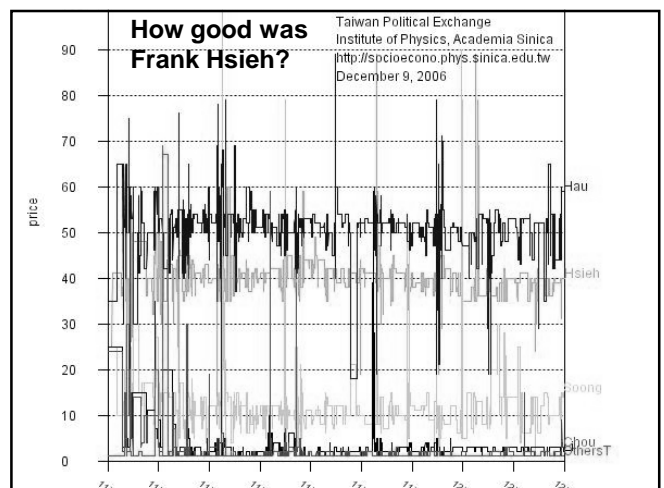
## What Does the Market Tell Us?

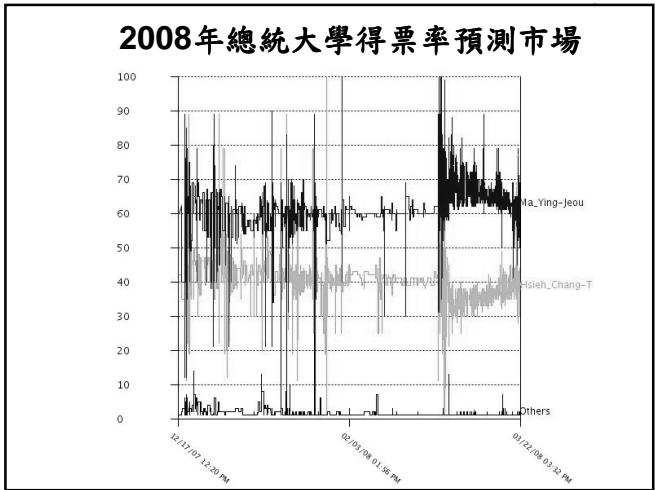
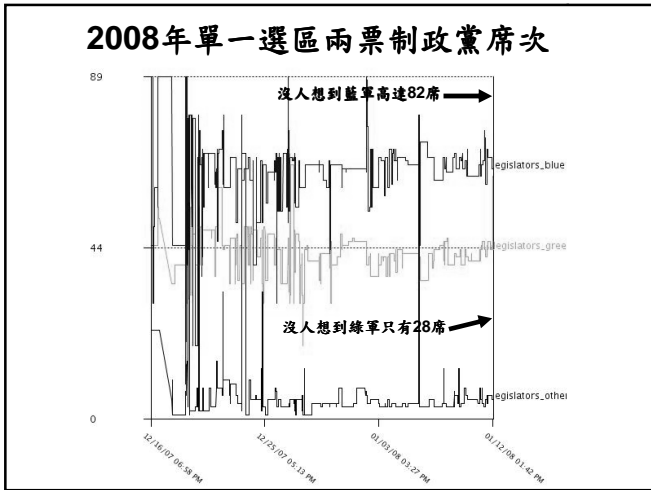
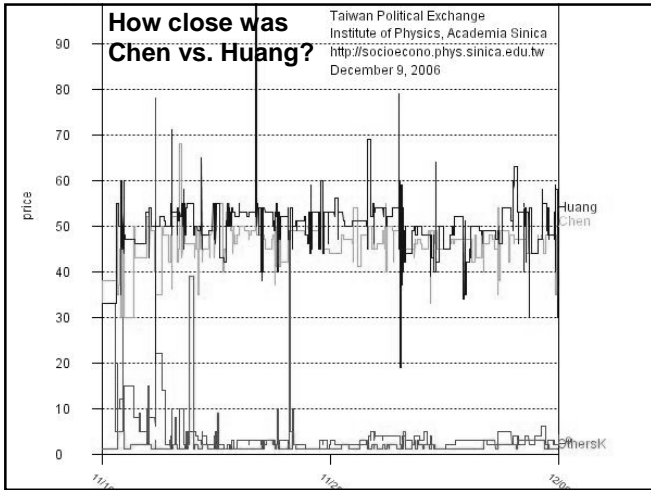
- ◆ Chen-Lu were leading even BEFORE 319.
- ◆ 319 boosted turn-out from both camps
- ◆ Overall effect on winning is indetermined
  - Markets show Chen-Lu would win anyway
- ◆ NOTE: This is a play market
  - What are possible problems with play money?
- ◆ How about other events? 2004 Legislation:



## What Does the Market Tell Us?

- ◆ "Pan-Green will pass a Half (泛綠過半)" was just a myth
- ◆ DPP + TSU was never significantly > 50%
- ◆ More recently, you can watch Taipei and Kaohsiung's mayoral elections in 2006:





### Are Prediction Markets Accurate?

- ◆ Markets only "aggregate" information of all participating traders
  - Participation barriers matters
  - Credit constraints
  - Short-selling restrictions
- ◆ Reaction speed also affects the extent prices reflect information
  - Liquidity matters

### Conclusion

- ◆ Markets aggregate information
- ◆ Prediction markets utilize this to make predictions about future events
- ◆ Open Questions:
  - ◆ Do play money or real money matter?
  - ◆ Can one manipulate prediction markets?
  - ◆ How is information aggregation done?