Using Group Behavior to Forecast Distribution of Economic Outcomes

Ellen Hughes-Cromwick
Chief Economist, Ford Motor Company

President, National Association for Business Economics

World Health Organization

THE INSTITUTE FOR TRIPLE HELIX INNOVATION

Panel Remarks Topics Today

- Collaboration between National Association for Business Economics (NABE) and the California Institute of Technology (CalTech)
- Experimental Economics at Work
- Forecast Aggregation Experiments

CalTech and Professor Charlie Plott

- Pioneer in experimental economics
- Has established information aggregation mechanisms
- Used to collect information widely distributed in small amounts
- Similar to parimutuel betting but it is not “gambling” — forecasters do not pay and they do not risk their own money

Properly Designed Markets Work

- Extensive work has been conducted using markets as such devices
- Tradesports.com
- Markets well suited for some purposes (large number of participants, continuously changing circumstances), but have some disadvantages:
  - **More complex**
  - **More time**
  - **More participants**
- Parimutuel mechanism works well as a proxy in providing speed, ease, and accuracy

Economists' Consensus Forecasts

Status Quo

- Economists develop forecasts
- Average of forecasts reported – the "consensus"
- After report of "actuals," users compare it to the consensus
- Investors may use this information in gauging financial market activity

Disadvantages of consensus

- Average of each forecaster's mode – "most likely"
- Not an average of the forecaster's entire probability distribution of outcomes

Forecast Aggregation Experiments

- Example of nonfarm payroll employment
- Group of 15 NABE forecasters
- All forecasters access CalTech website during a set one-hour period
- Experiment takes place 48 hours prior to the release of actual data from the U.S. Department of Labor

Game Rules

- Forecasters compete for a share in the $2,000 prize
- Each forecaster is given a budget of “game dollars”
  - **Budget used to purchase tickets at known price**
- Forecasters places tickets in buckets representing range of job changes
- Forecasters can place as many tickets in that “bucket” as they would like; may also place tickets in buckets for other job gain or loss ranges

Game Rules

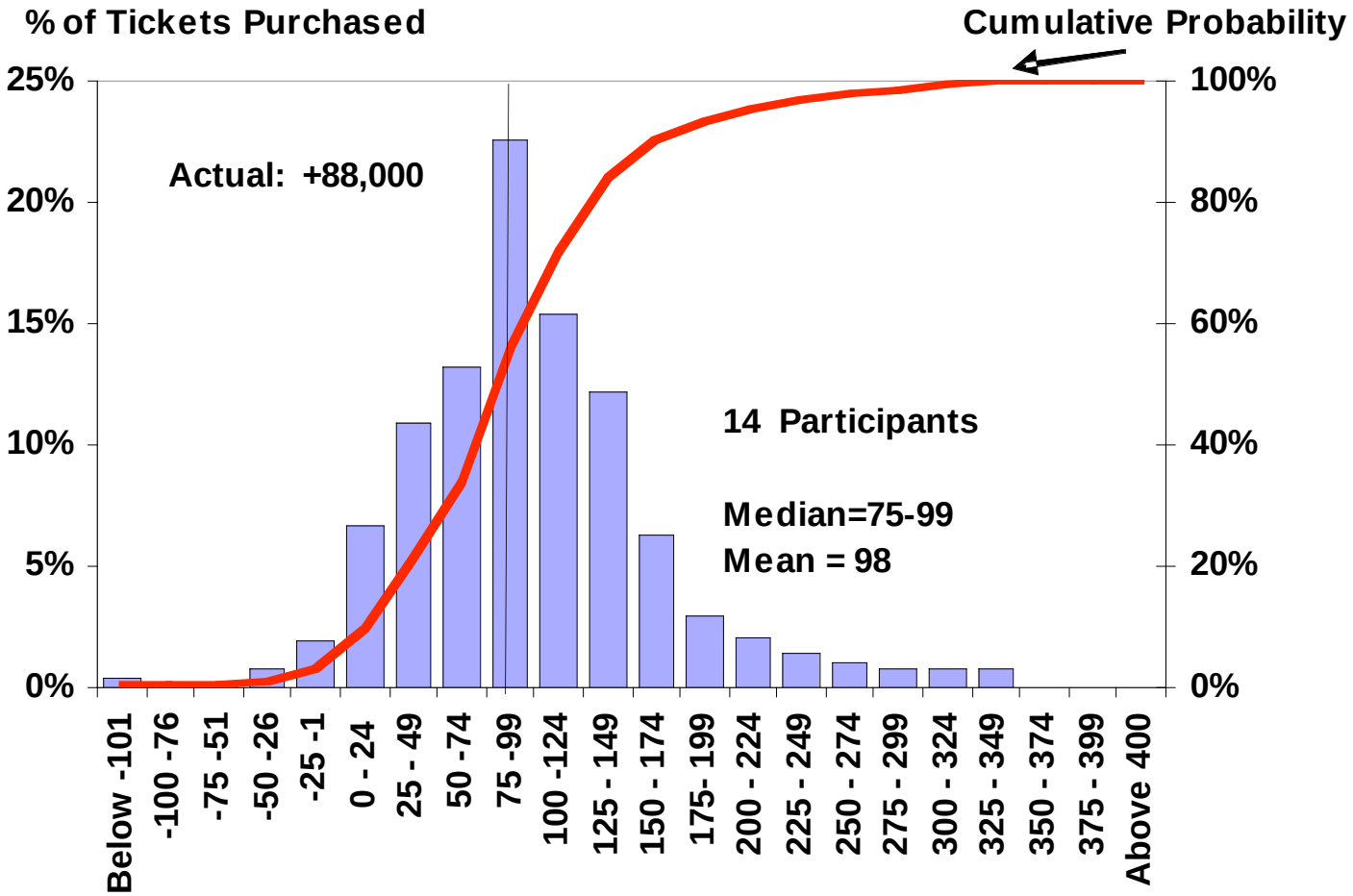
- Here is an example of “buckets” or ranges for total nonfarm payroll employment:
  - **Under 50,000**
  - **50,000 - 75,000**
  - **75,000 - 100,000**
  - **100,000 - 125,000**
  - **125,000 and above**
- It pays to purchase tickets associated with the employment gain for which the subjective expected value is greatest, and it pays to spend the entire budget
- Risk aversion plays no role because the game dollars have no outside value

Outcomes

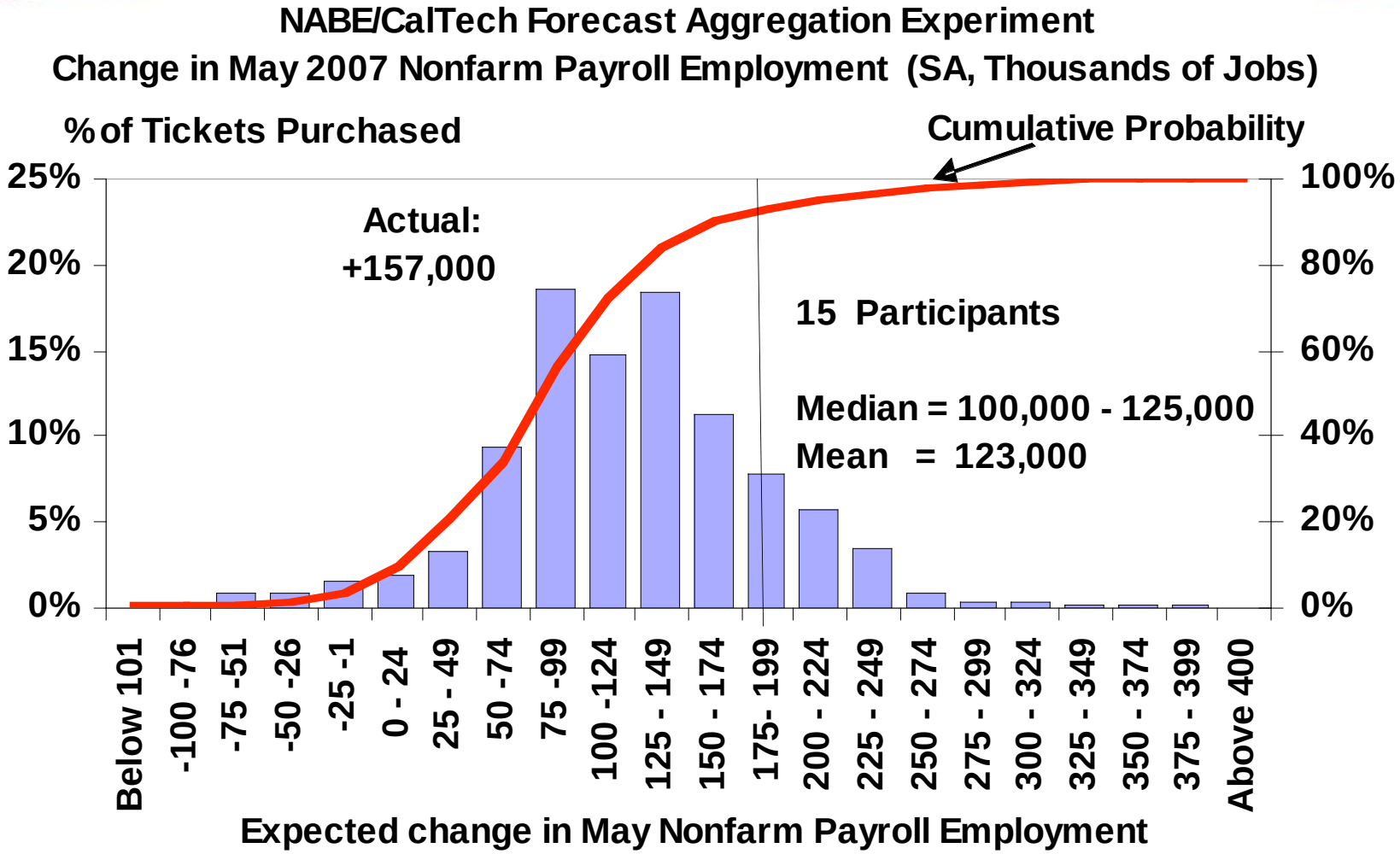
- At the end of experiment, the distribution of tickets purchased in each “range” can be translated into probabilities
- Thus, the final output of the experiment is an equally weighted average probability distribution
- This can be compared to the consensus and actual results when released by U.S. Department of Labor
- The prize is distributed in proportion to how many tickets each forecaster had in the winning bucket

Results

NABE/CalTech Forecast Aggregation Experiment
Monthly Change in April 2007 Nonfarm Payroll Employment (SA, 000s)



Results


NABE/CalTech Forecast Aggregation Experiment
Change in May 2007 Nonfarm Payroll Employment (SA, Thousands of Jobs)
% of Tickets Purchased
Cumulative Probability
25%
20%
15%
10%
5%
0%
100%
80%
60%
40%
20%
0%
Actual:
+157,000
15 Participants
Median = 100,000 - 125,000
Mean = 123,000
Below 101
-100 -76
-75 -51
-50 -26
-25 -1
0 - 24
25 - 49
50 -74
75 -99
100 -124
125 - 149
150 - 174
175- 199
200 - 224
225 - 249
250 - 274
275 - 299
300 - 324
325 - 349
350 - 374
375 - 399
Above 400
Expected change in May Nonfarm Payroll Employment

Next Steps

- NABE/CalTech are in the process of implementing these experiments over a series of months in order to assess the accuracy of the mechanism as compared to standard consensus and econometrics techniques
- These experiments require seed funds under the auspices of the NABE Foundation

World Health Organization

Second Annual

Triple Helix Summit

February 2 – 5, 2008

Sheraton Waikiki Hotel
Honolulu, Hawaii