

# Who Trades?

## The Structure of the Equity Trading in the UK

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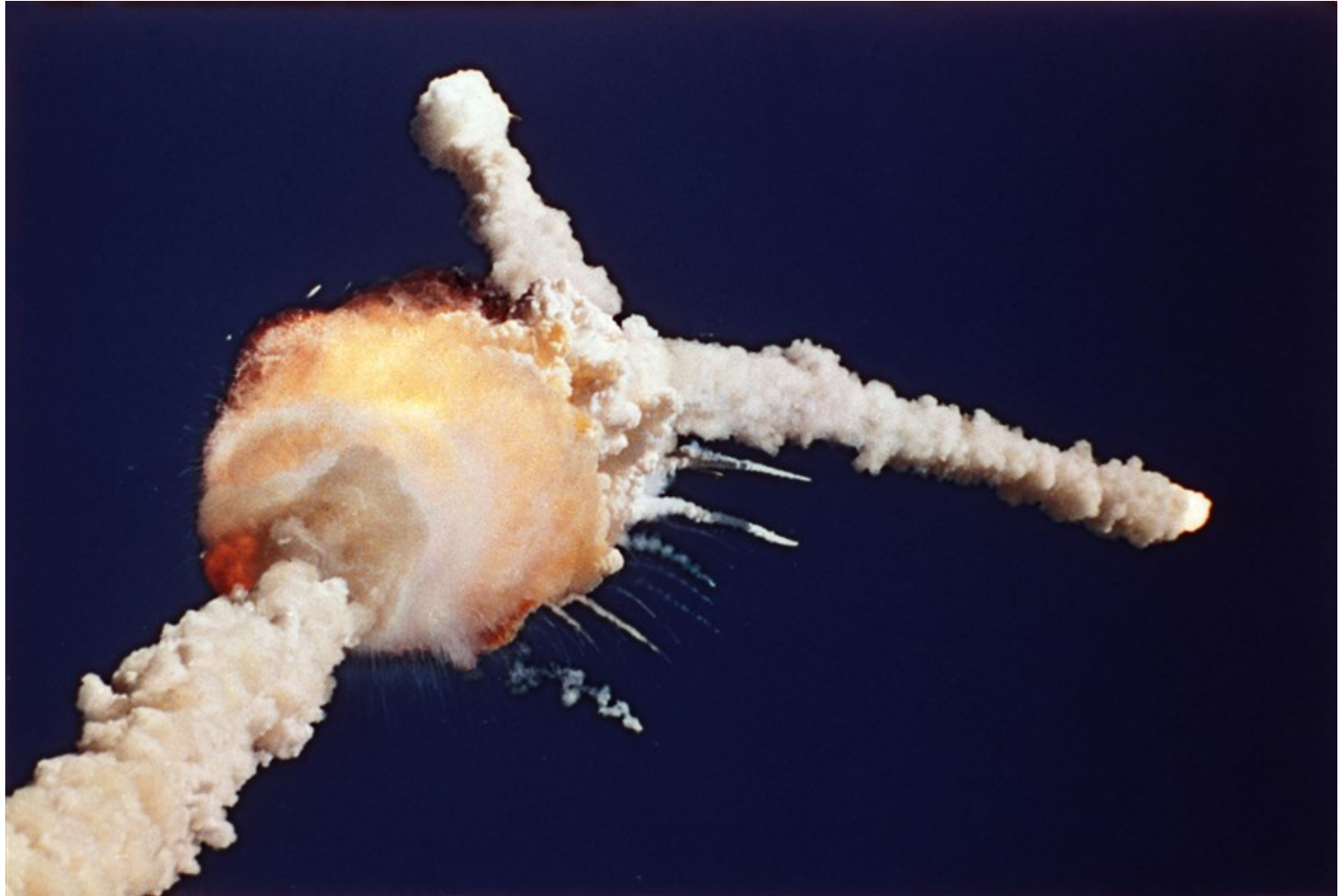
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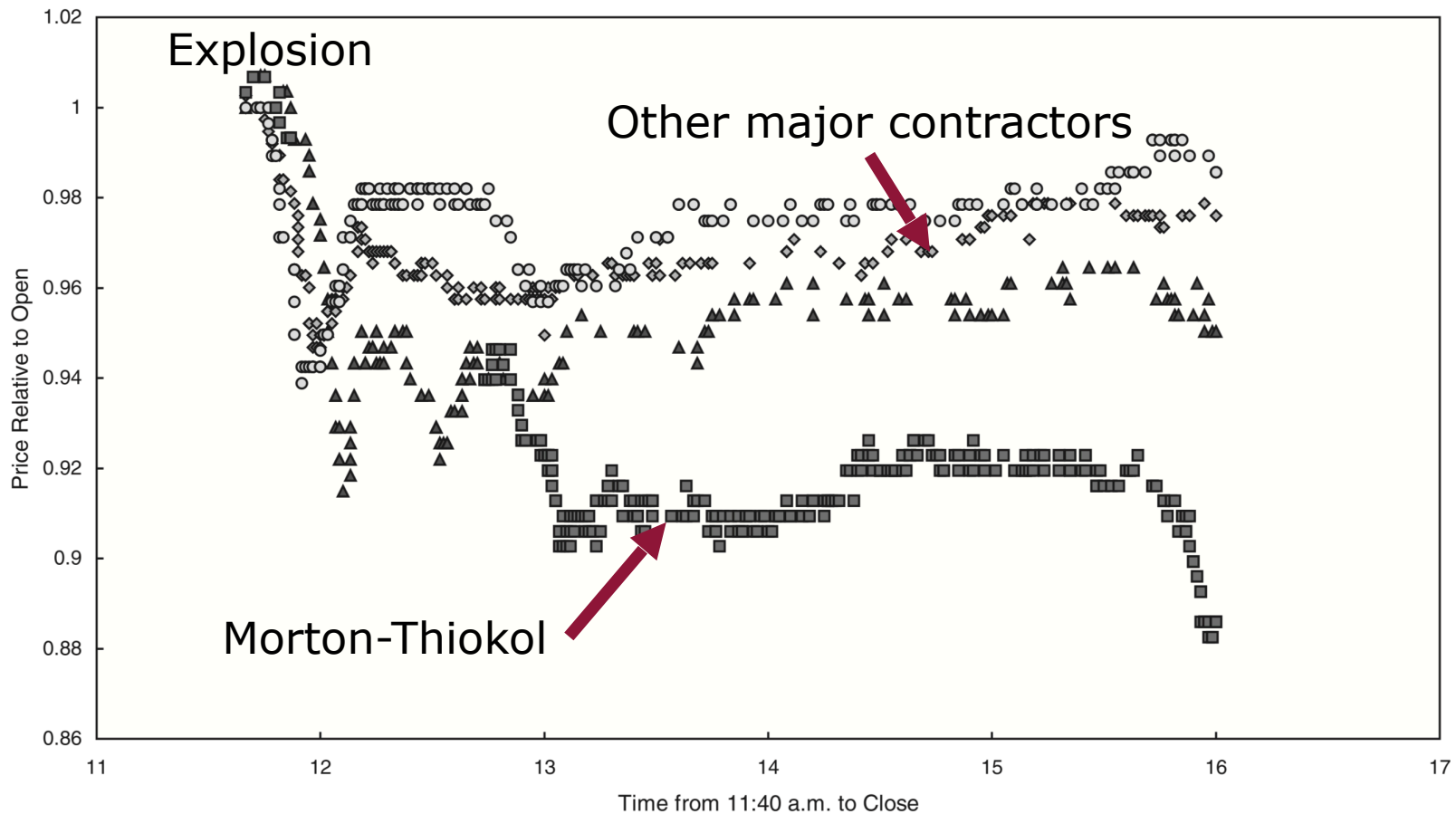
# Introduction: The Miracle of Market Efficiency

**On 28 January 1986, the space shuttle Challenger exploded shortly after lift-off**



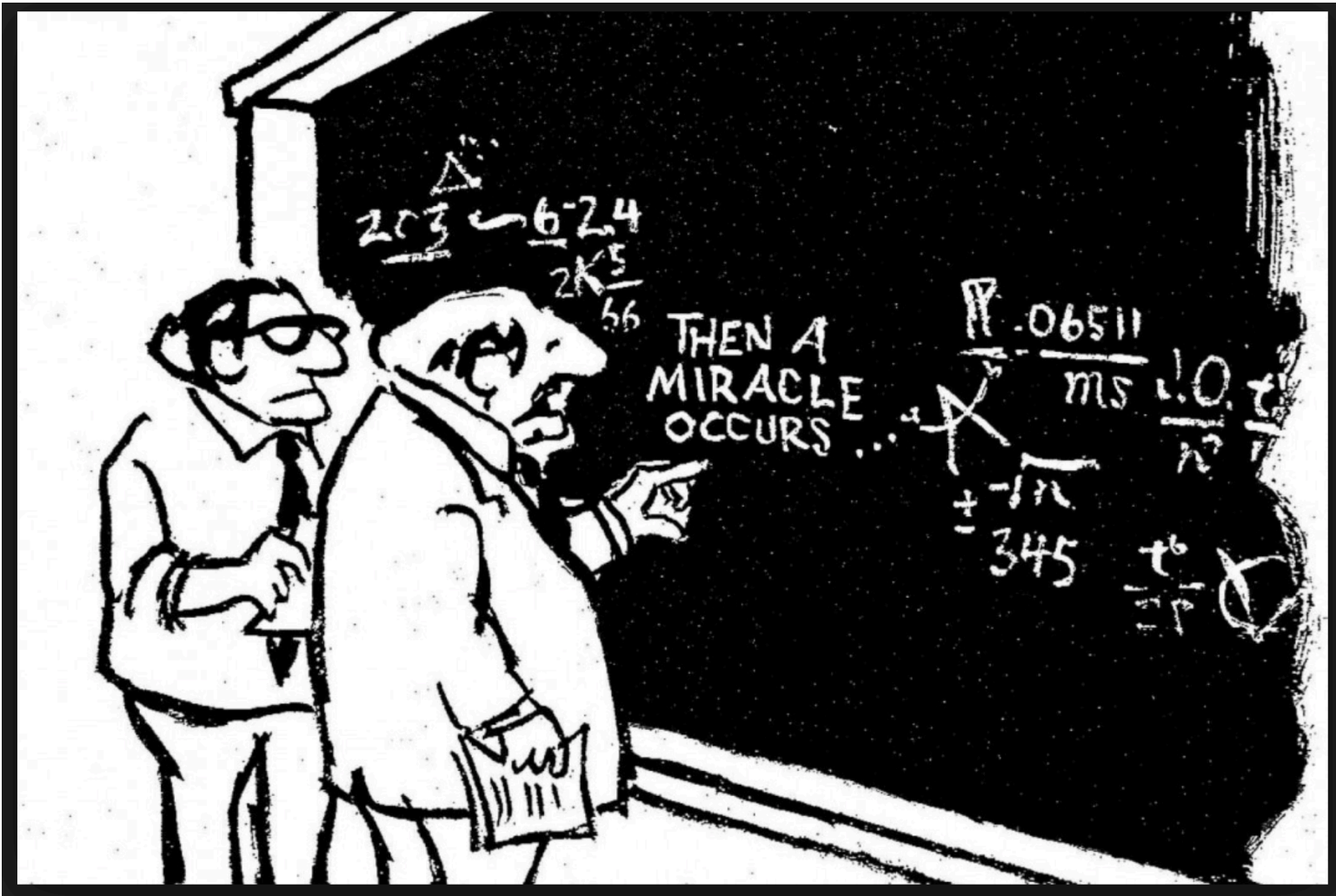
# The Market Reaction to the Challenger Explosion

*M.T. Maloney, J.H. Mulherin / Journal of Corporate Finance 9 (2003) 453–479*



# Why did the explosion happen?

- A defect in a part produced by Morton-Thiokol led to the explosion;
- The market figured out that Morton-Thiokol was responsible in about 20 minutes;
- A NASA inquiry published on June 6, 1986 reached the same conclusion;
- That is an efficient market.



Our goal: Use FCA trading data to get some insight into how this miracle happens.

# First Step: The structure of equity trading in the UK

- Trading in UK equities is highly concentrated;
- About 2.5 bp of MCap/Month changes hands as a result of intraday trading;
- A small number of traders actively trade in many equities, a large number of traders actively trade in a small number of equities;
- Traders specialize;
  - A trader who would have a 1% chance of actively trading in an equity that they have not traded in the previous 6 months has a 28% of actively trading that equity if they have actively traded that equity in 3 of the previous 6 months.



Data

# Equity Trading Data: 1

FCA collects trading data:

- At a high level, the FCA obtains data for each side of each trade in UK equities;
- Each transacting party reports:
  - Equity;
  - Time;
  - Price;
  - Quantity;
  - Buy or Sell;
  - Reporting Firm;
  - Counterparty;
  - Whether they were acting as a Principal or Agent; and
  - If acting as an Agent, who they were acting for (Counterparty 2);
  - Ultimate Transactor = Reporting Firm if acting as principal, CP2 if acting as agent;

# Equity Trading Data: 2

- For each transaction we obtain:
  - Buy: {Equity, Price, Quantity, Ultimate Buyer}; or
  - Sell: {Equity, Price, Quantity, Ultimate Seller}
- By looking at both sides, we collect the Ultimate Buyer and Ultimate Seller for each trade;
- We see traders on the Legal Entity level;
  - So, we see a trades on a Fund Family level rather than individual fund level;
- In practice, organizing the data is not always as simple as the above may make it sound.

# Sample

- July 2013 to Sept 2014
- FTSE 350 Firms
  - We use the 297 firms that were in the FTSE 350 for the entire sample period
- 4965 Traders appear at least once;

# The Concentration of Trading Activity By Equity

# Just how concentrated is trading activity?

- Questions
  - How concentrated is trading in a typical equity?
  - How does trader concentration vary as equity market cap varies?
  - How concentrated are intraday trading profits?
  - How big is the intraday trading revenue pot (total gains for all traders)?

# Observations

- We sort all transactions into Equity/Trader/Month buckets;
- Each bucket consists of  $O_{E,T,M}$  observations;
- $O_{E,T,M} = \{GrossVol_{E,T,M}, NetVol_{E,T,M}, TradingRev_{E,T,M}\}$ , with
  - $GrossVol_{E,T,M} =$  Total of shares Of E bought and sold by T in M;
  - $NetVol_{E,T,M} =$  Total Shares of E Bought – Total Shares E Sold by T in M;
  - $TradingRev_{E,T,M} =$  Intraday Trading Gains
- For each transaction  $\tau$  that T participates in, we compute  $TradingRev_{\tau}$ , with

$$TradingRev_{\tau} = Q_{\tau} (P_{\tau} - P_{Close})$$

- So

$$TradingRev_{E,T,M} = \sum_{\tau} Q_{\tau} (P_{\tau} - P_{Close})$$

# Measuring Concentration: 1

- We sort traders into the sets:
  - GrossVol: All Traders
  - NetPositive: All Traders with Net Purchases
  - NetNegative: All Traders with Net Sales
  - Trading Gain: All Traders with Positive Trading Revenue
  - Trading Loss: All Traders with Negative Trading Revenue
- For each set, we compute the standard HHI measure of concentration;
  - Suppose that each trader accounts for  $Z_T$  of the total activity of  $Z_{Total}$ ; then

$$HHI = \left( \sum_{Traders} \left( \frac{Z_T}{Z_{Total}} \right)^2 \right) \times 10,000$$

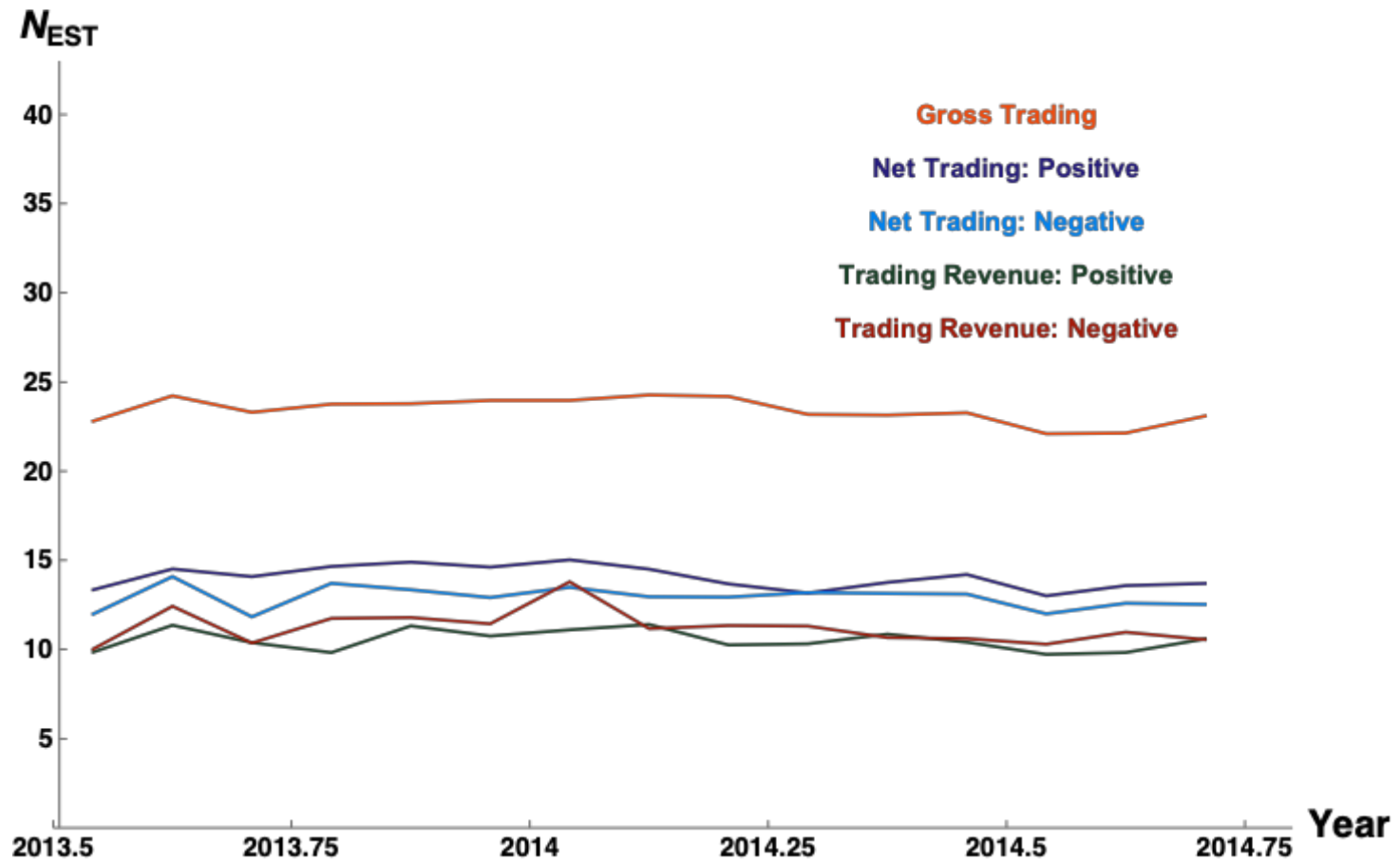


## Measuring Concentration: 2

- The HHI ranges from 0 for a market in which no single Trader has a significant share of activity to 10,000 if a single Trader accounts for all activity;
- The HHI itself is not that intuitive, but it does have a nice feature:
  - $10,000/\text{HHI} = N_{\text{EST}}$ ;
  - $N_{\text{EST}}$  = Number of Equal Sized Traders that generate that HHI;
    - For example: 10 traders of equal size produce an HHI of 1000 (10,000/10);
  - We report our results in terms of  $N_{\text{EST}}$  rather than the raw HHIs.

# Overall Concentration of Trading Activity

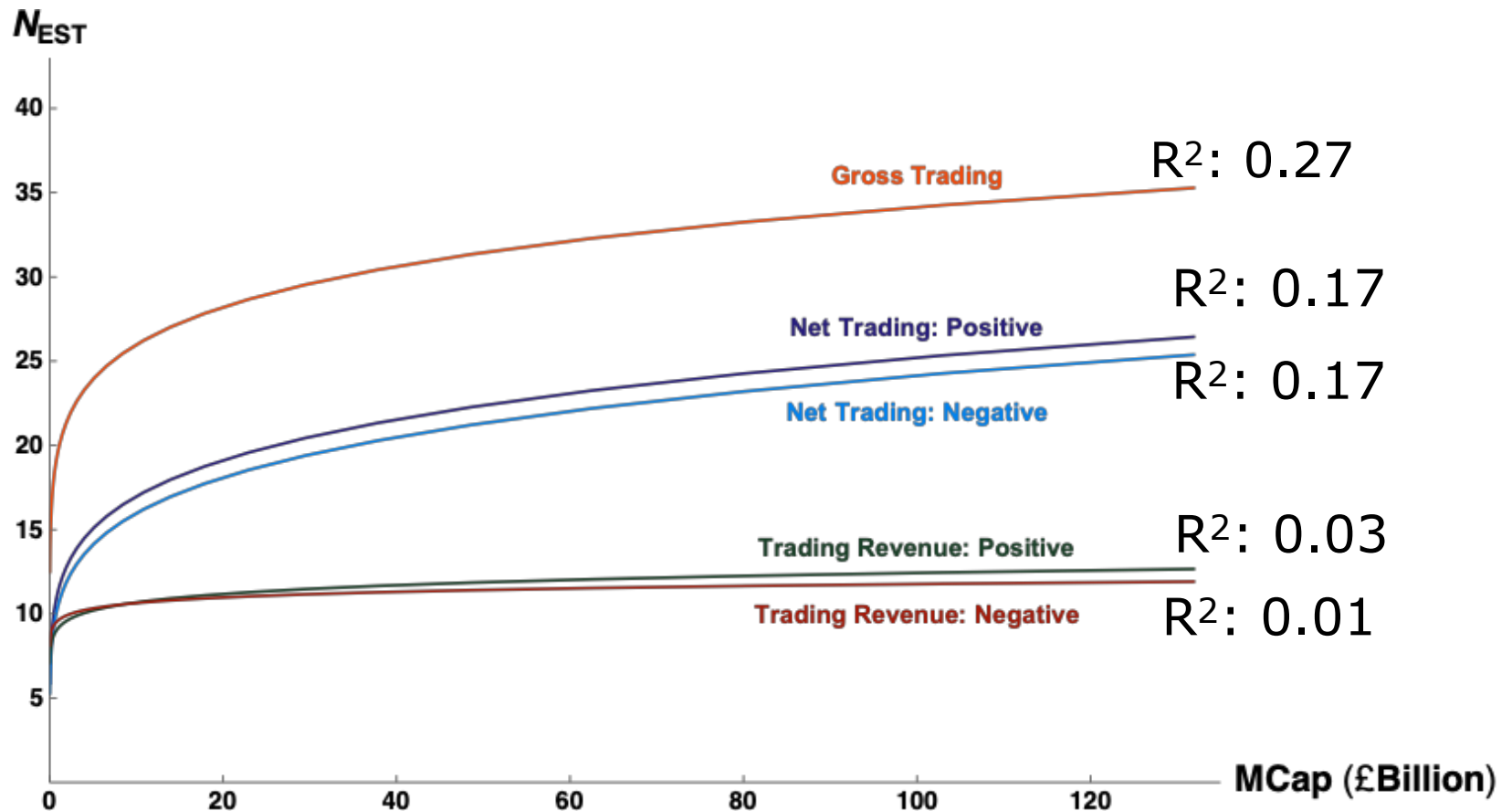
## Sample Medians



# Overall Concentration of Trading Activity

- Trading activity is astonishingly concentrated;
  - Our dataset contains about 5000 Traders;
  - Yet, NEST is about 22 for Gross Trading Volume, 14 for Net Trading Volume (both buys and sells), and only 10 for Trading Revenue (gains and losses);
  - Trading revenue is more concentrated than either Gross or Net Trading Volume;

# Concentration of Trading Activity By Market Cap



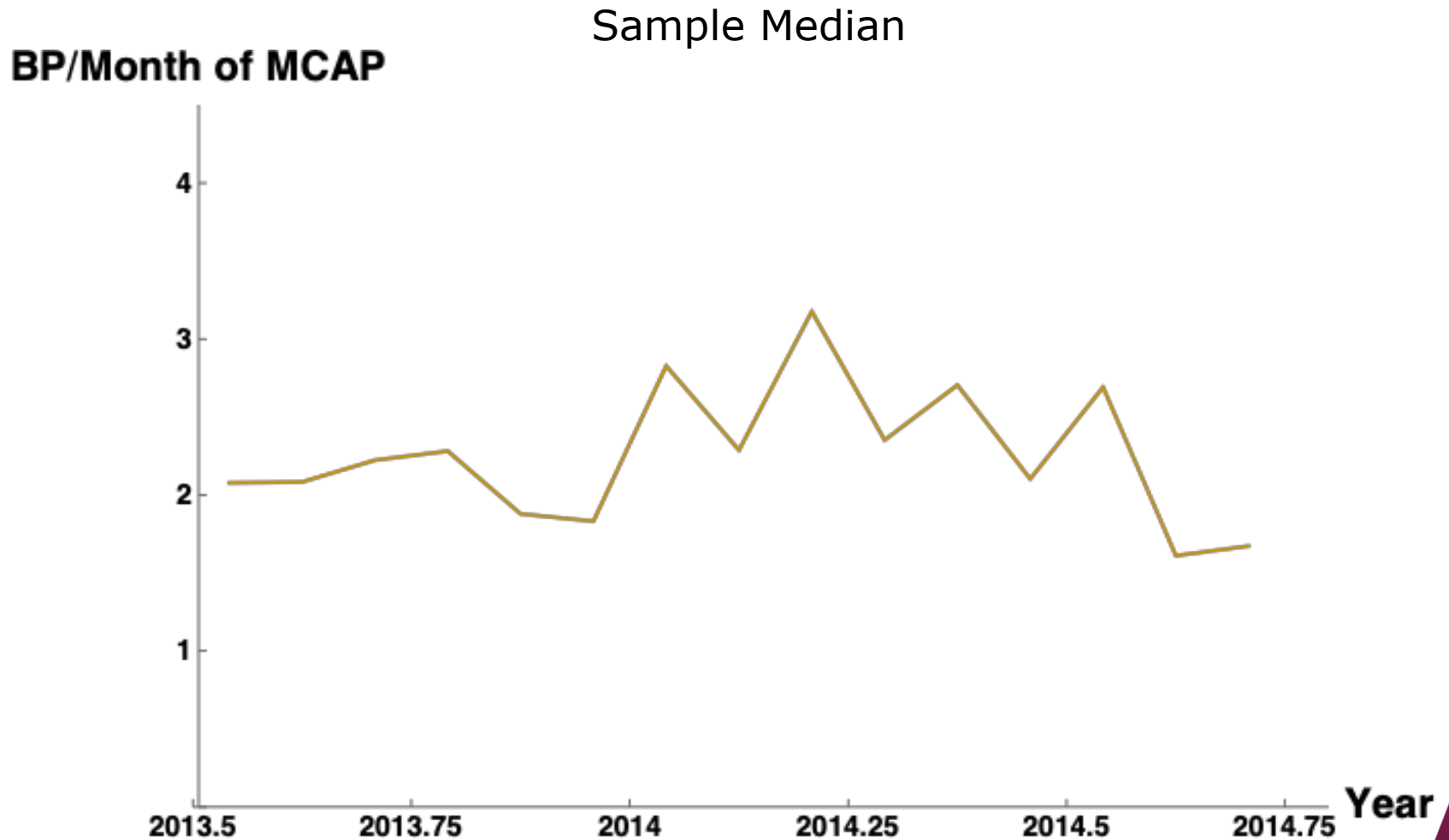
# Concentration of Trading Activity by Market Cap

- We estimate

$$\ln[HHI] = \alpha + \beta_1 \ln[MCAP] + \beta_2 RND$$

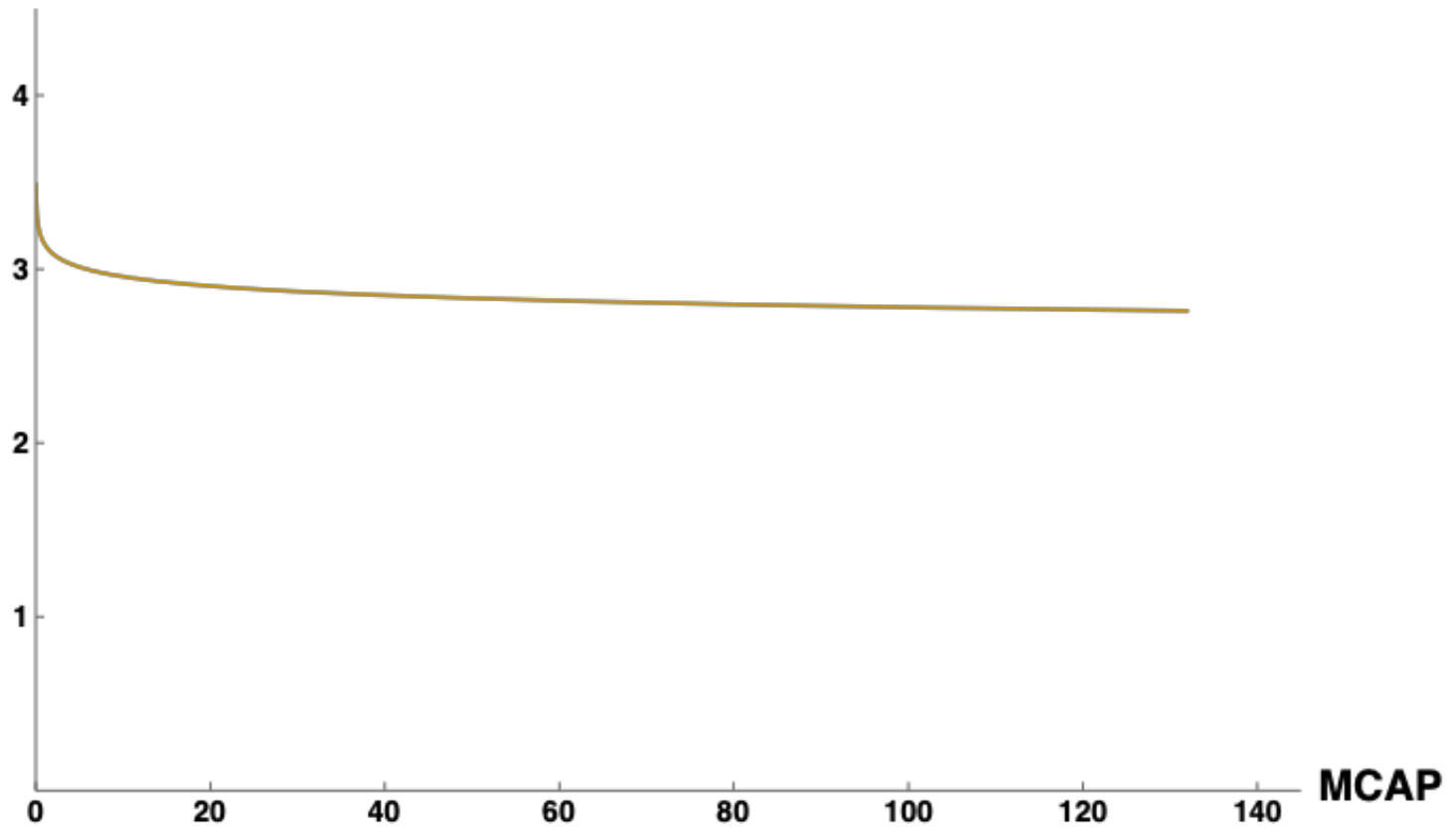
- We use a panel with equity and time random effects (we reject fixed effects);
- RND is a dummy which = 1 if  $E$  reports positive R&D spending, and 0 otherwise;
- Results
  - The concentration of Gross Trading Volume and Net Trading Volume decline slowly as firm size increases;
  - The concentration of Trading Revenue is independent of Market Cap;

# The Magnitude of The Trading Revenue Pot



# The Trading Revenue Pot and MCAP

BP/Month of MCAP



# The Trading Revenue Pot and MCAP

- We estimate

$$\ln[TRP] = \alpha + \beta_1 \ln[MCAP] + \beta_2 RND$$

- We use a panel with equity and time random effects (we reject fixed effects);
  - RND is a dummy which = 1 if  $E$  reports positive R&D spending, and 0 otherwise;
  - We then use this regression to compute TR/MCAP
- Results
    - The Intraday Revenue Pot is about 2.5 bp of MCAP/Month;
    - It does not vary much as MCAP increases;

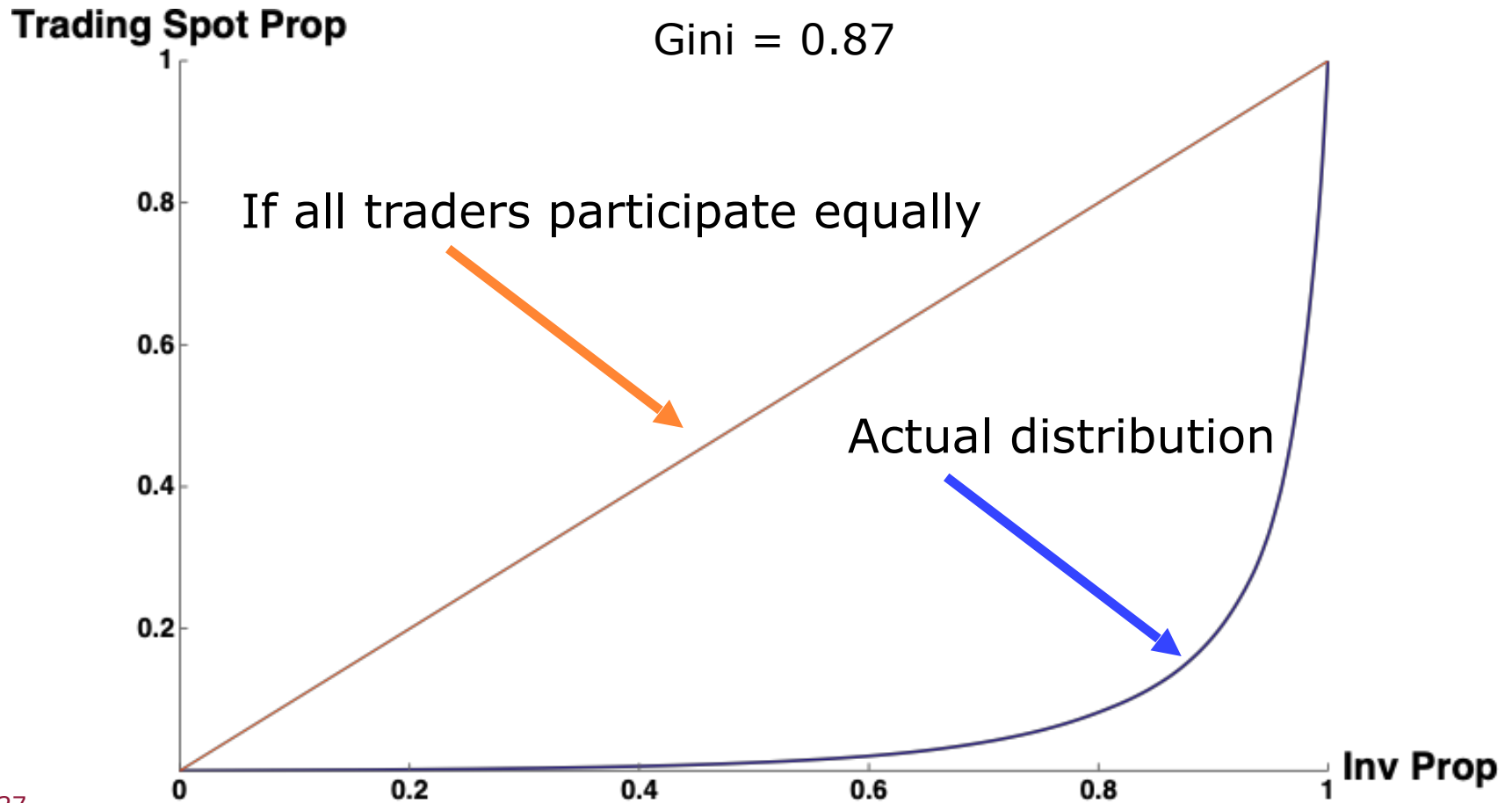


# Equity Market Concentration by Trader

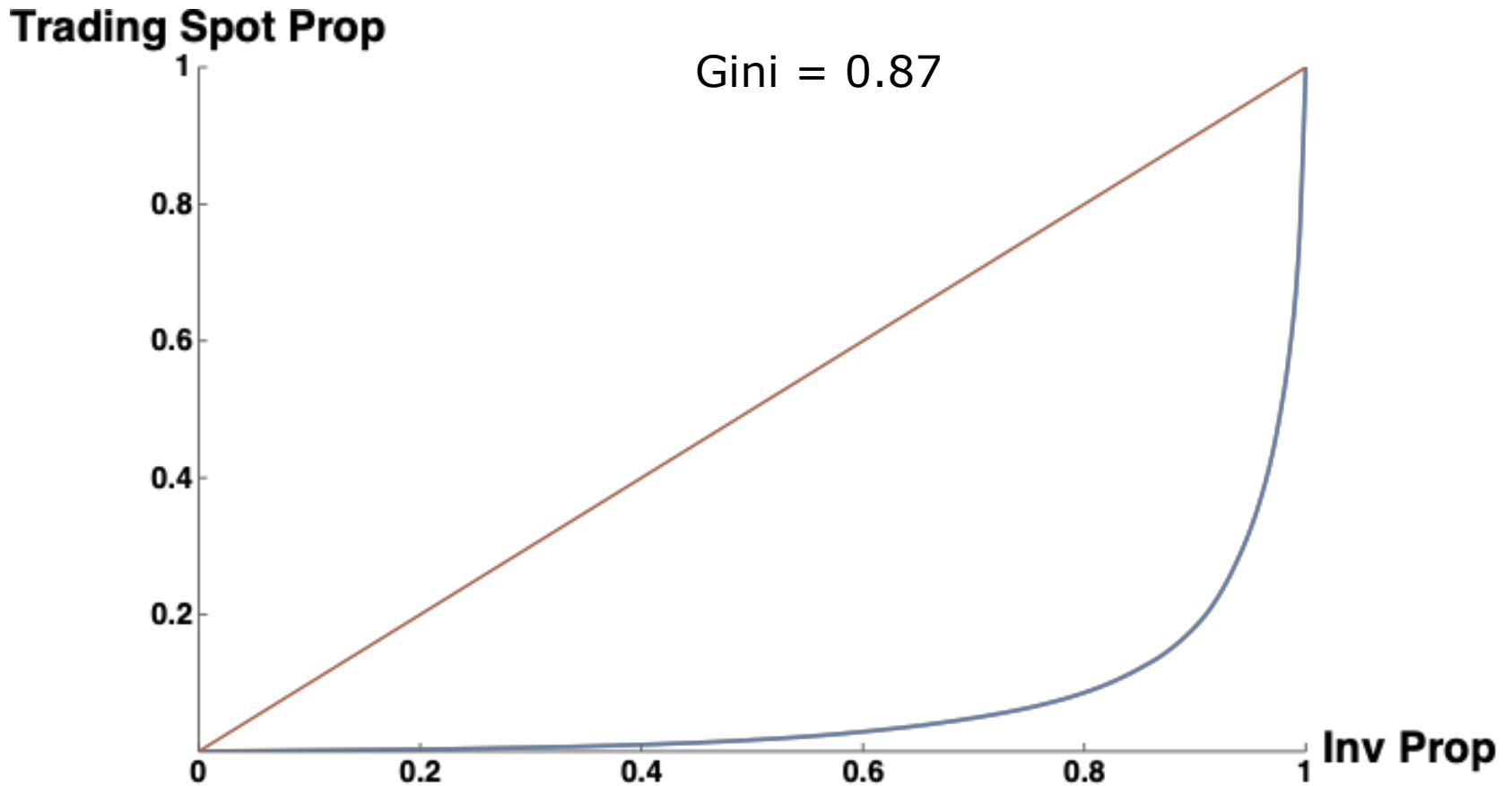
# How many active traders are there?

- A trader T is an active trader in equity E in month M if that trader is among the set of 100 (or 25) traders in E/M with the largest absolute net trade position;
- So, we have  $100 \text{ T} \times 15 \text{ M} \times 297 \text{ E} = 445,000 \text{ T/E/M spots}$ ;
- We analyze the distribution of those spots across traders;
  - To measure how concentrated trading activity is, we compute a trading Gini Coefficient;
    - Think of each T/E/M spot as \$1, and the number of spots a trader takes as that trader's income;
    - The Gini Coefficient measures how unequal the "income" is across traders.

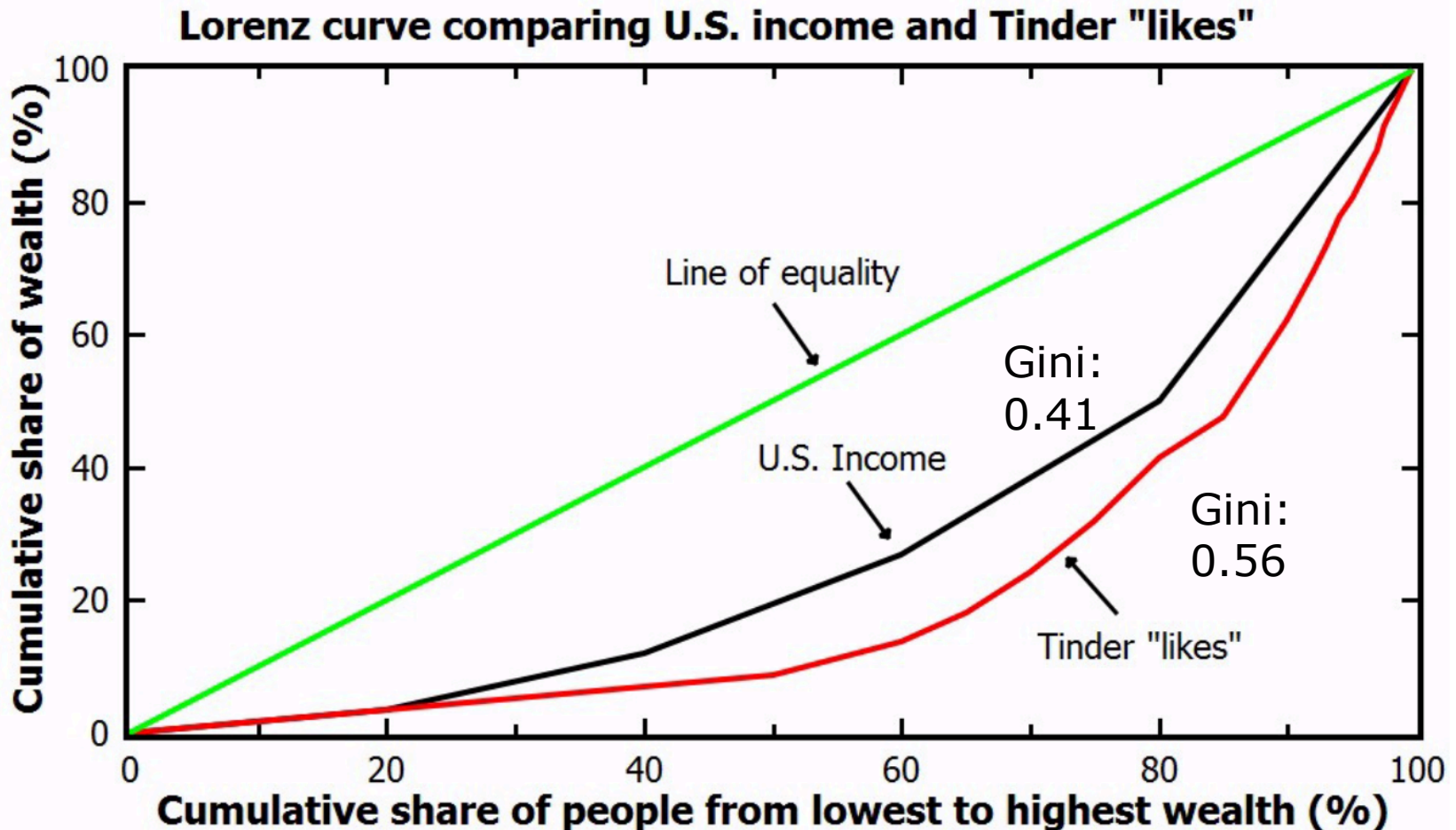
# Gini Analysis: Top 100 Traders for Each Equity/Month



# Gini Analysis: Top 25 Traders for Each Equity/Month



## For comparison...



# Just how unequal is the trading spot distribution?

- The Gini Coefficient for Income is 35% the UK and 42% in the US;
  - [World Bank Analysis](#)
- The Tinder Gini Coefficient (distribution of female likes for males) is 58%;
- So, 87% is pretty high.

# Trading Specialization

# Information and Trading

- One motivation for trading is to exploit (perceived) mispricing;
- Research (broadly defined) identifies mispricing events (which leads to trading);
- One hypothesis: research is general, and so identifies trading opportunities across all equities;
  - In this case, traders will actively trade at random across equities as their research identifies opportunities;
- Alternative hypothesis: research is specific;
  - Traders will develop a specific expertise in a limited number of equities and will identify mispricing episodes in only those equities;
  - In this case, we will observe that traders specialize in specific equities;
  - Some traders will be able to specialize in a broader set of equities than others;



# General or Specific?: A Test

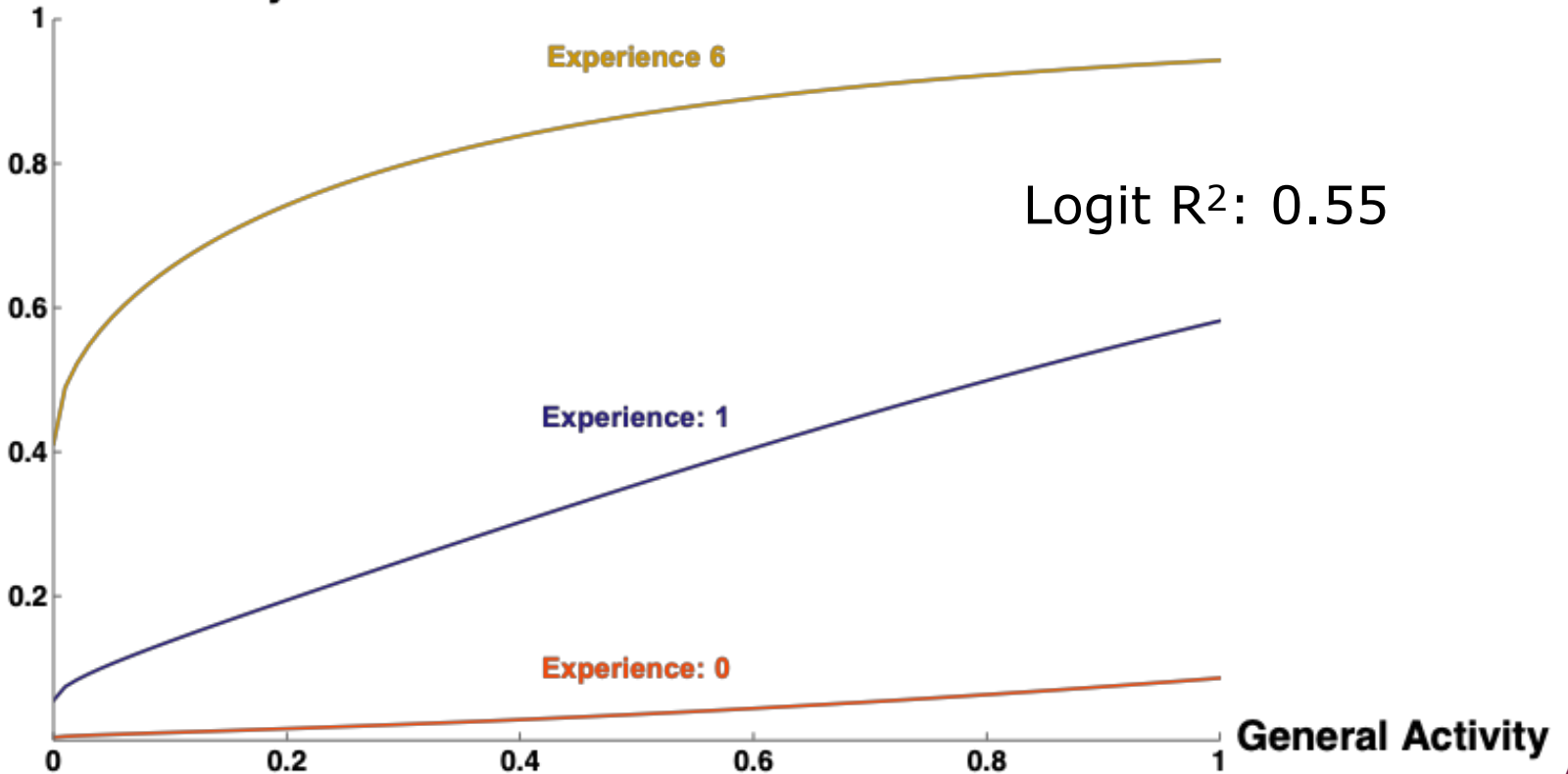
- We use our T/E/M sample of the 100 largest net traders for each Equity/Month;
- We estimate the probability that T participates in an equity Z in M as a function of:
  - T's general level of trading activity;
  - The number of times T has been an active trader in Z in the previous 6 months (so, 0 to 6 times);
  - If research is General, then a trader's general level of trading will predict the probability that T participates in Z;
  - If research is Specific, then traders will tend to specialize in specific equities, so the probability that T participates in Z will increase if T has actively traded Z in the past;

# Estimating Participation Probabilities

- We use a logit
  - Dependent Variable: 1 if T participates in equity Z in M;
  - GA (General Activity): Number of times T appears in the list of the top 100 active traders in any E/M pair in the previous 6 months / Total number of E/M pairs
  - Experience: Number of times T appears in the list of the top 100 active traders in Z in the last six months (0 to 6);
  - To avoid overlaps, we :
    - estimate participation in Jan 2014, measuring GA and Experience with data from July 2013 to December 2013;
    - Estimate participation in Aug 2014, measuring GA and Experience with data from Feb 2014 to July 2014;
    - The results are the same for each period, so we just report the first set here.

# Trader Participation Probabilities

Participation Probability



# Trader Specialization

- Traders do specialize;
- This result suggests that research is specific rather than general;

# Conclusions

# The Structure of Equity Trading In the UK

- Equity trading is highly concentrated;
  - Our data contains about 5000 traders, but the NEST for the concentration of Gross Trading Volume is about 23;
  - The concentration of trading activity falls slightly as a firm's Market Cap increases;
  - About 2.5 bp of MCap/Month changes hands in intraday trading;
- A small proportion of traders account for a significant proportion of total active traders in multiple equities;
  - The Gini Coefficient of T/E/M active trading spots is 0.87;
- Traders specialize;
  - A trader is vastly more likely to take a significant net position in an equity if that trader has experience in trading that equity;



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