The Homogenization of US Equity Trading

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Main Points

- Competition for order flow now focuses on traders and not on issuers.
  - Fragmentation and homogenization resulted.
- Externalities prevent competition from revealing potentially better consolidated systems.
- Shifting control over market structure back to issuers might help in principle.

Agenda

- The competition for listings
  - Market structure differences between NASDAQ and listed exchanges
- The competition for order flow
- The empirical study
- A policy proposal

Competing Market Structures

- Exchanges compete for listings from issuers. The two main US market structures were:
- Traditional exchanges (NYSE and Amex)
  - Order-driven auction
  - Specialist stabilized
- NASDAQ
  - Quote-driven dealer network

Market Structure Differences

- Volumes in dealer markets often are double counted and thus higher.
- Bid/ask spreads in dealer markets are wider.
  - Wide spreads raise transitory volatility.
- Exchange specialists stabilize prices.
  - Stabilization lowers transitory volatility.

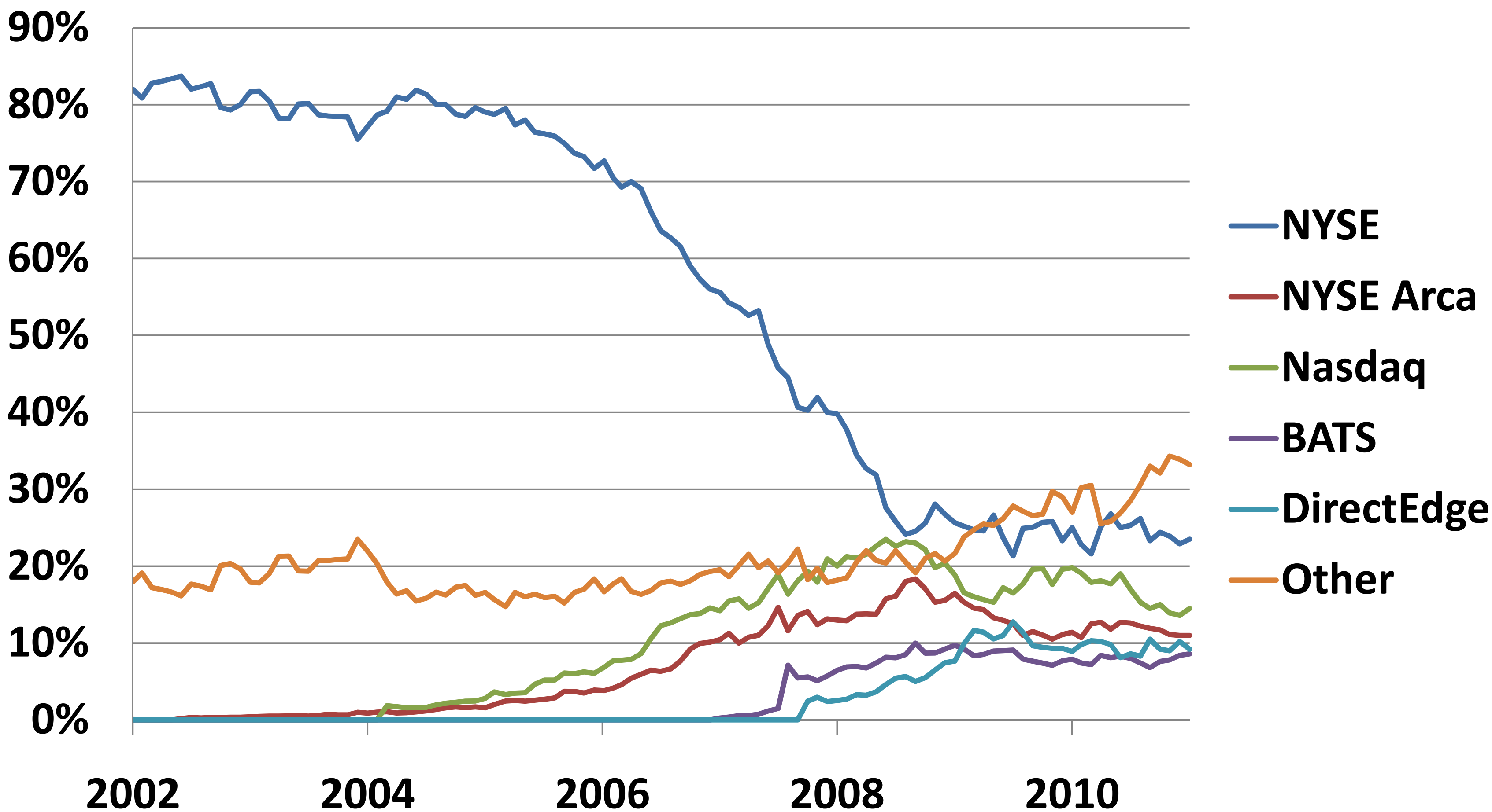
The Competition for Order Flow

- Exchanges now compete for order flow from traders. Major recent changes:
- Regulations in US
  - Unlisted trading privileges
  - Reg ATS
  - Ret NMS
- The growth of electronic trading

Recent Results

- SEC regulations promoting competition for order flow produced innovative systems and decreased trade costs.
- NASDAQ and listed market shares have plummeted.
- Trading has homogenized across stocks into a common blend of many fragmented market segments that serve diverse traders.

NYSE-Listed Market Shares



Source: Angel, Harris, and Spatt, "Equity Trading in the 21st Century"

A Potential Problem

- Some market structures are incompatible with fragmented trading.
  - Universal time precedence and other consolidated matching algorithms
  - Concentrated trading hours
  - Specialist stabilization
- Externalities associated with trader routing decisions undermine these structures.

The Externality Problem

- Traders route orders based only on personal cost/benefit considerations.
  – They do not consider consequences of their order routing decisions on other traders.
- Consolidated trading structures generally cannot compete even if they are socially desirable.

This Empirical Study

- Provide an empirical characterization of the homogenization of trading.
- Compare volumes and transitory volatilities between NASDAQ and listed stocks.
  - Control for cross-sectional determinants.
  - Match samples using weights from a propensity score analysis.
- Repeat every year to identify trends.

Identifying Causal Effects (1)

- Estimate the regressions each year separately for both sets of stocks.
- Predict volumes and transitory volatilities for stocks in each market using the estimates from the other market.

Identifying Causal Effects (2)

- The causal effect is the difference between the actual and the predicted values.
- Weighted means and medians summarize their cross-section distributions.
- Plot results across years.

The Two Dependent Variables

- Log dollar volume
- Transitory volatility: Twice the variance of daily returns minus the variance of 2-day returns.

- $TransVolity = 2 \times \mathrm{Var}(\Delta \mathrm{log} Pt) - \mathrm{Var}(\Delta_2 \mathrm{log} Pt)$

TransVolity Properties

- Proportional to the square of Roll's bid/ask spread estimator.
- Bid/ask bounce increases transitory volatility.
- Positive return serial correlation decreases transitory volatility and can make it negative.

The Models

$$\log Volume_i = \alpha + \beta_1 \log MkCap_i + \beta_2 \log AdjRetVar_i + \beta_3 InvPrice_i + \beta_4 Ret_i + \varepsilon_i$$

$$TransVolity_i = \alpha + \beta_1 \log MkCap_i + \beta_2 AdjRetVar_i + \beta_3 InvPrice_i + \varepsilon_i$$

Propensity Analysis Motivation

- Cross-sectional stock characteristics vary by exchange.
  - NASDAQ has smaller stocks and more technology stocks.
- A balanced design can reduce regression misspecification bias and potential selection bias.

Propensity Analysis Model

- Logit regression:

$$Prob(Nasdaq_{i,t} = 1) = f\begin{pmatrix} \beta_1 \log MkVal_{i,t} + \beta_2 \log AdjRetVar_{i,t} \\ +\beta_2 AdjRetVar_{i,t} + \beta_3 InvPrice_{i,t} \\ +\beta_4 Ret_{i,t} + \boldsymbol{\beta}_5 \cdot \mathbf{SIC}_{i,t} \end{pmatrix}$$

- Obtain propensity scores (predicted probabilities)

The Weighting Scheme

- Sort all stocks by their propensity scores into 50 groups.
- Within each group, count the NASDAQ and listed stocks.
- Give a weight of 1 to each stock from the market with the smaller count.
- Give equal weights to each remaining stock so that the total weights assigned to each market are the same.

Weighting Scheme Properties

- The aggregate weight of a group depends on the degree to which propensity scores from the two markets overlap.
- Within each group, and thus overall, the stocks in both markets have the same aggregate weights.

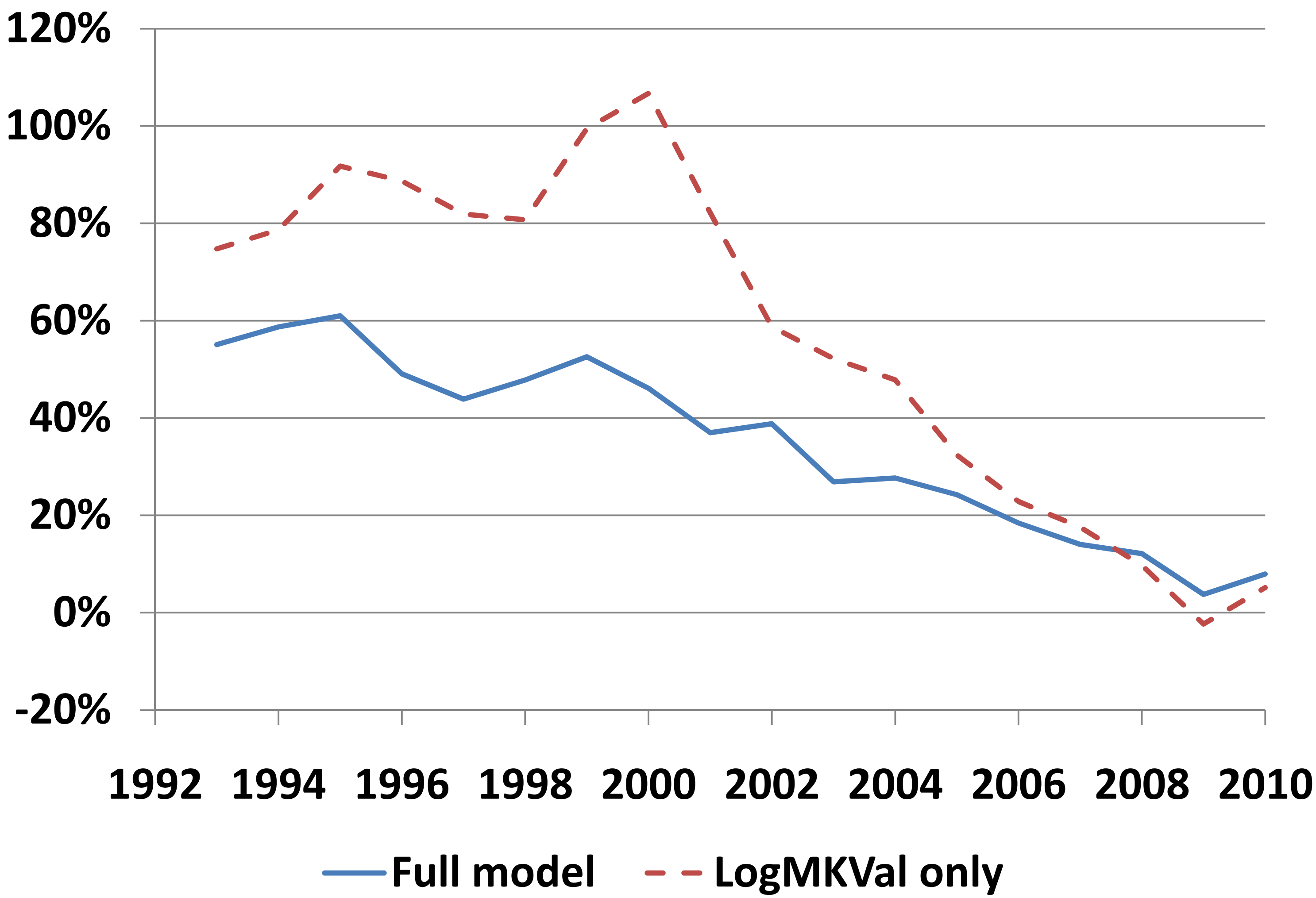
The Data

- 1993-2010 CRSP daily returns
  - NASDAQ data reporting procedures changed in 1992.
- Filters
  - All trades at or above $1
  - No stocks with less than 120 annual trades
  - 10 or more stocks in the same 2-digit SIC code
  - No stocks that changed market mid year

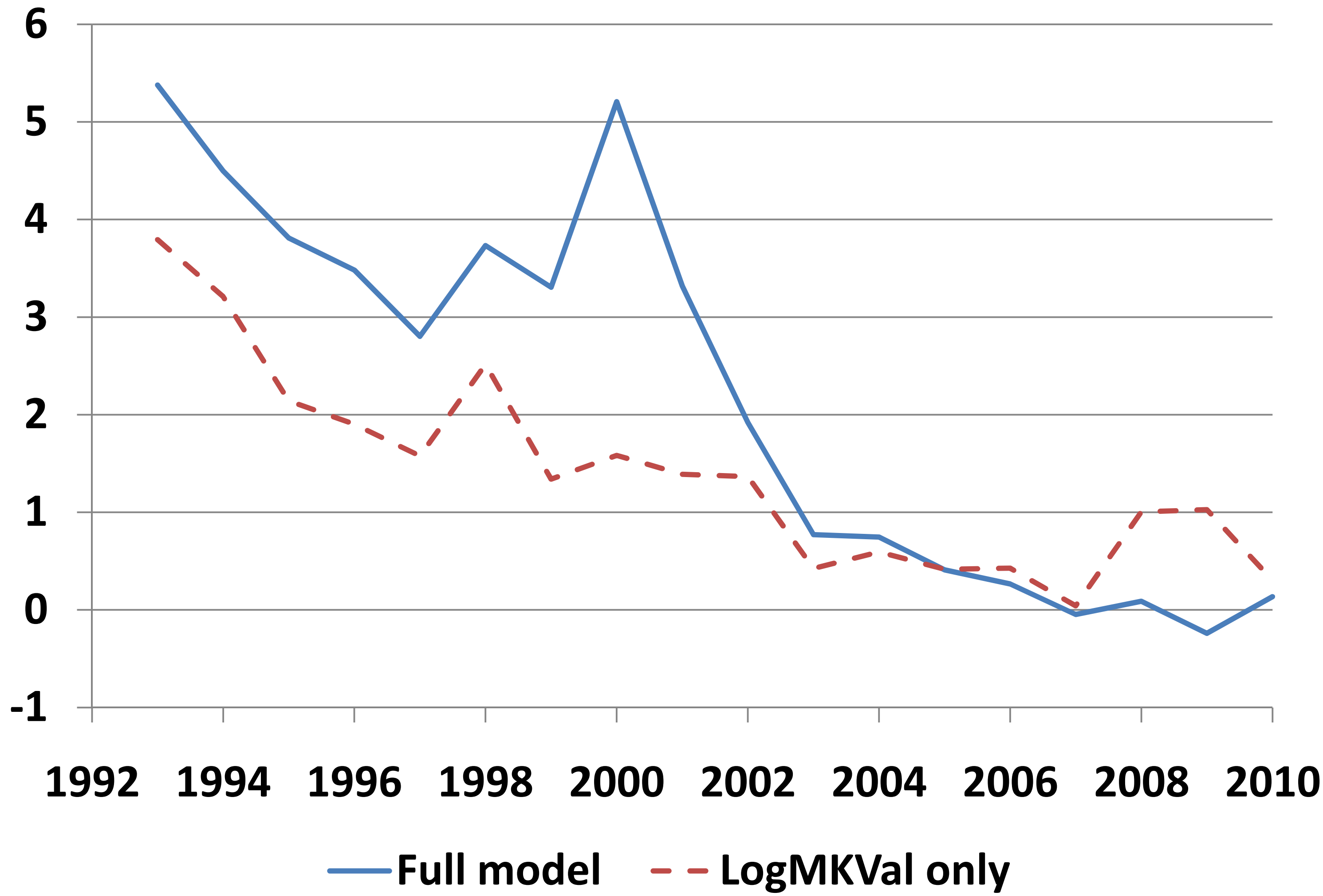
Results

All causal effects are reported as Nasdaq compared to Listed

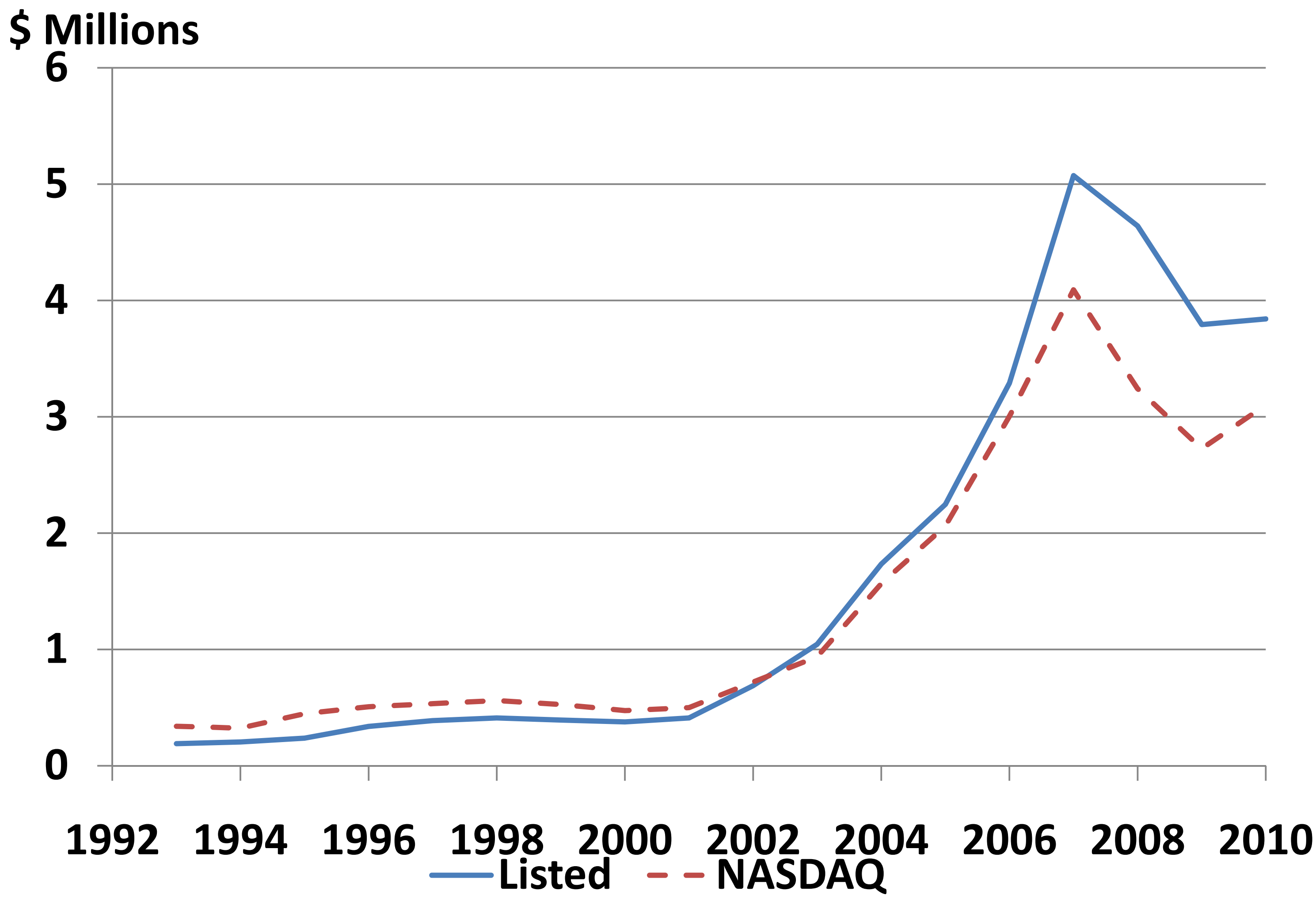
Median $ Volume Causal Effect



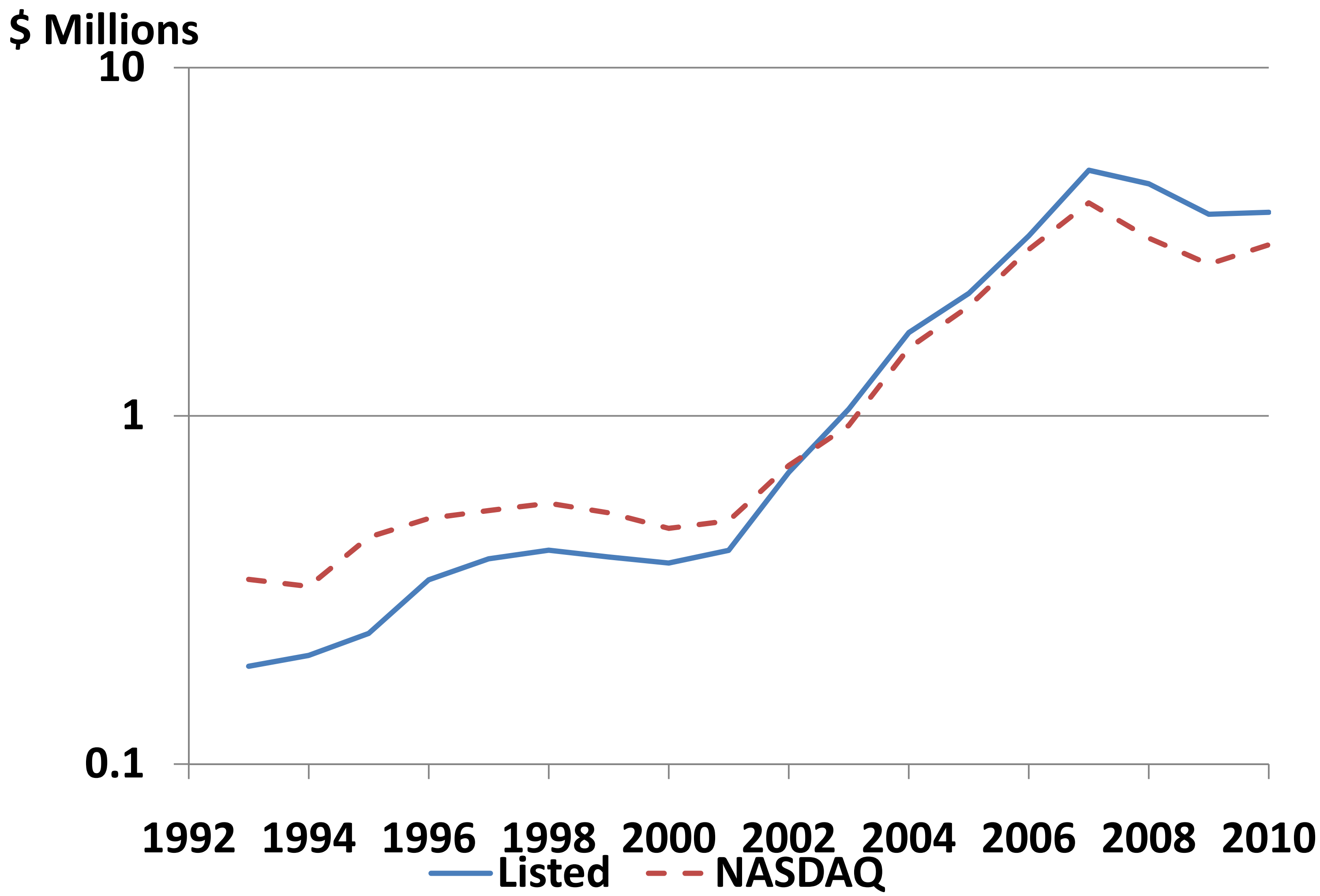
Median Transitory Volatility C.E.



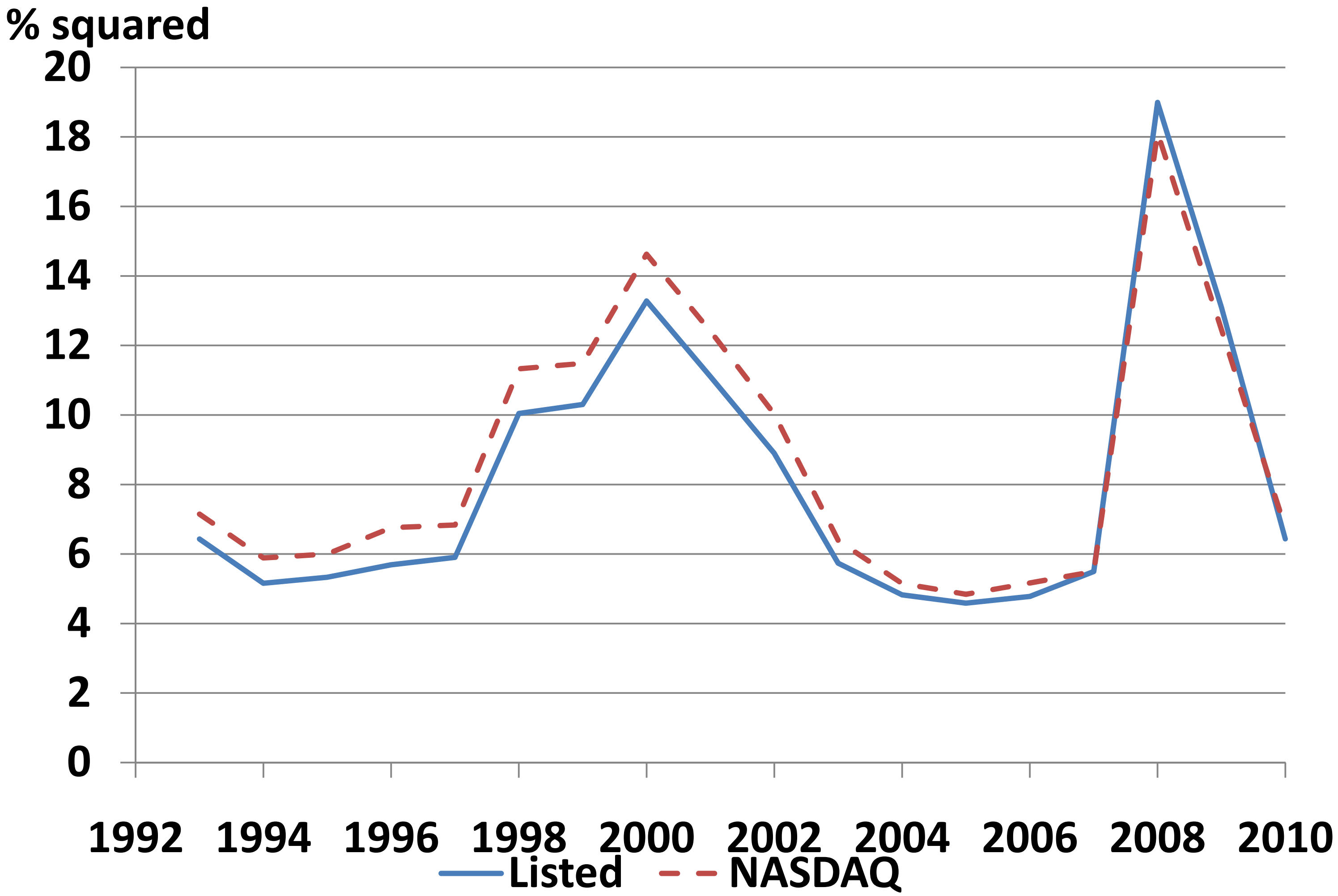
Median Daily Dollar Volumes



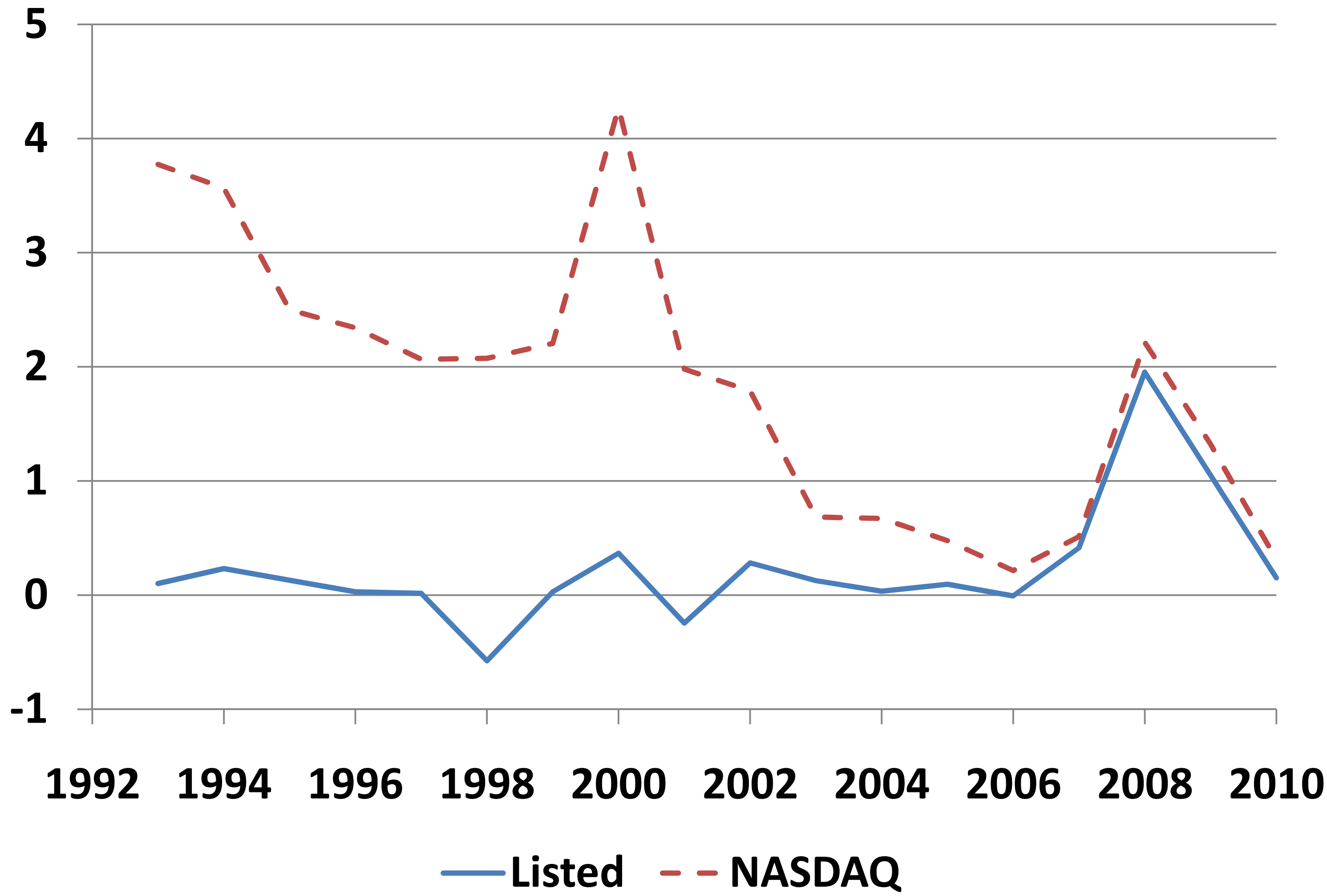
Median Daily Dollar Volumes



Median Daily Return Volatilities



Median Transitory Volatilities



Conclusion

- SEC efforts to improve the competition among exchange service providers for trader order flow has fragmented trading and homogenized market structures across stocks.
- These decisions effectively eliminated the ability of corporations to specify market structures for the trading of their stocks.

A Policy Proposal

- Regulators should allow corporations or their shareholders to choose market structure for the trading of their stocks.
- These structures may require complete consolidation, but need not.
- Any exchange monopolies thus created should be contested every 2-5 years.
- Supermajority votes would be necessary to implement big changes.