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IEX Market Microstructure Analysis
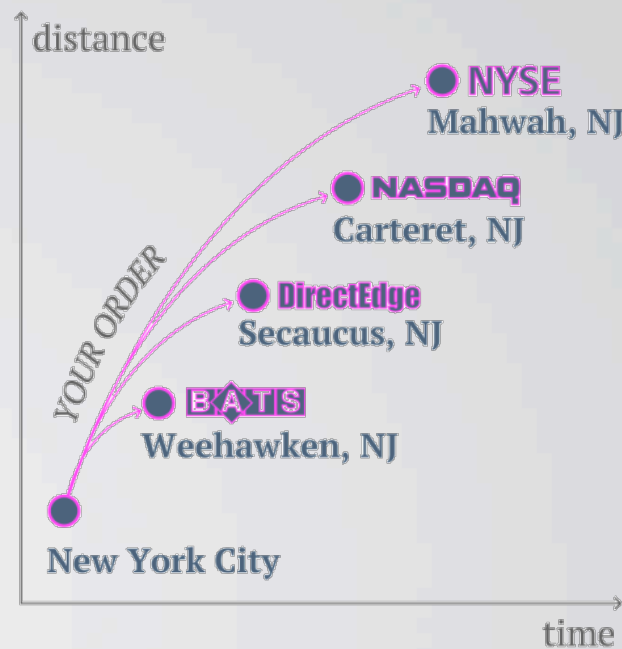
JIEYUN WANG   MIAOSHI LI   YAQI WU   HENG LU   SITENG JIN

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Background - HFT

How high-frequency trading can cut orders off

Orders placed in New York take time to get to all the major exchanges.

Fast high-frequency trading services see the order at the BATS exchange and intercept it at more distant ones.

distance

NYSE
Mahwah, NJ

NASDAQ
Carteret, NJ

DirectEdge
Secaucus, NJ

BATS
Weehawken, NJ

YOUR ORDER

New York City

time

HIGH-FREQUENCY TRADES

NYSE
Mahwah, NJ

NASDAQ
Carteret, NJ

DirectEdge
Secaucus, NJ

BATS
Weehawken, NJ

New York City
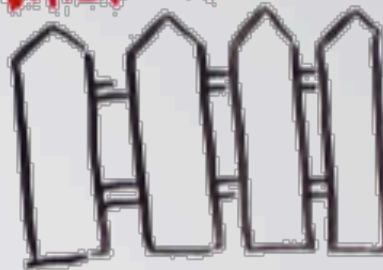
Background - IEX

Background - IEX

- 350 microseconds of latency
- No co-location
- No special access to data
- No kickbacks or rebates
- Only four types of orders
- No proprietary trading affiliates
- Investor-owned only

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Introduction

- The project is advised by an SEC staff member Paca Nguyen

- Goals:
  - Expose MSFE students to financial data and market microstructure
  - Evaluate the changes of market characteristics for a sample set of stocks pre & post the opening of IEX

Project Scope

Symbol	Name
AAPL	Apple Inc.
XOM	Exxon Mobil Corp.
GOOG	Google Inc.
MSFT	Microsoft Corp.
JNJ	Johnson & Johnson
WFC	Wells Fargo
GE	General Electric
WMT	Wal-Mart Stores
CVX	Chevron Corp.
JPM	JPMorgan Chase & Co.

- Daily Trade files and NBBO Files from September 9, to December 6,2013
- Focus on the performance of 10 stocks of highest market capitalization from S&P 500
- Data Source:
  - Daily Trade File: 2G
  - Daily NBBO File: 15G

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Data Processing (SQL)
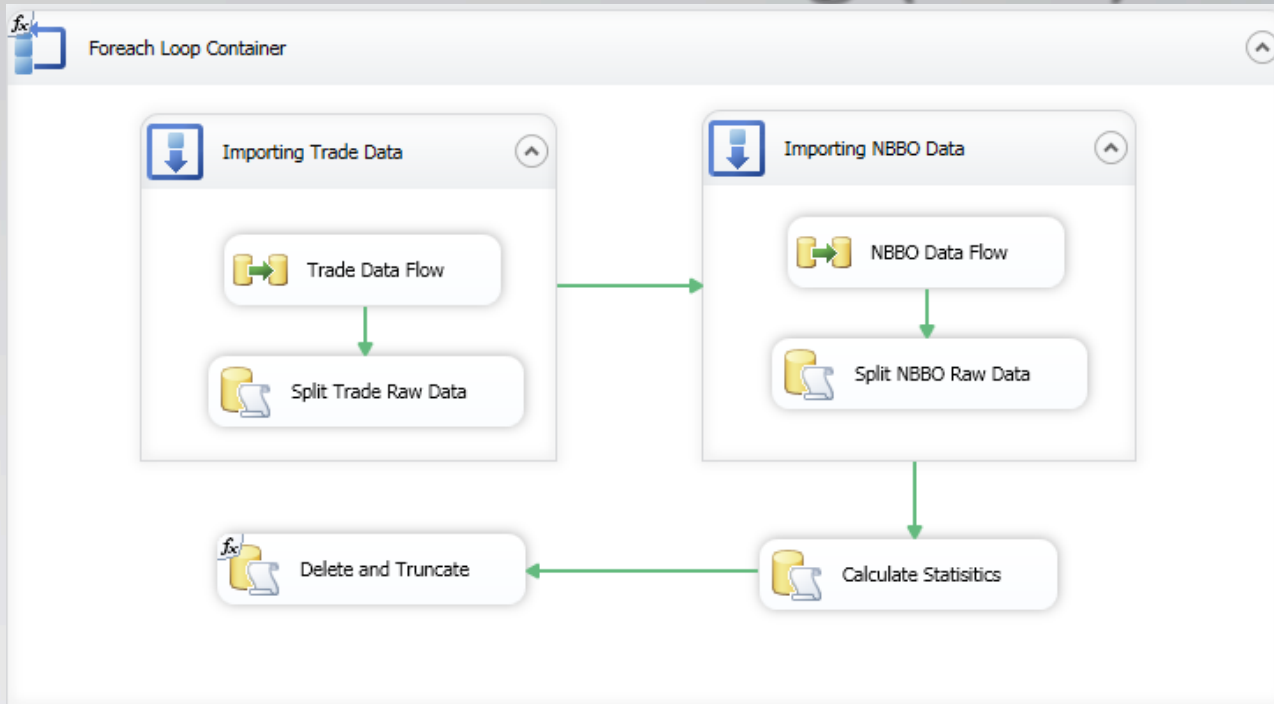
- Importing Trade Data

100443217	P	AAPL	@F	000000200	00001025200	000	000000000187257	N

- Calculate Statistics
  - 5 minutes interval
  - Trading hours: 9:30 to 16:00

SaftSeglmeVlumber

Statistical Analysis
Two-side T-test

	95% Interval		P-value	T-value
Time Weighted Spread	-0.00046134	0.00002971	0.0838	-1.7595
Volume Weighted Spread	-0.01292548	-0.00335375	0.0012	-3.4044
Effective Spread	-0.05012414	0.00935582	0.1753	-1.372
Average Price	-48.92445	-10.0893	0.0036	-3.0525
Price Range	-0.05083274	0.00844901	0.1578	-1.4311
Price Movement	-0.00018626	0.00021043	0.9021	0.124
Trade Volume	-7811.976	29376.733	0.2505	1.1607
Dollar Volume	-1900935	2790550	0.7056	0.3796
Cross Trade Count	-2.291	124.7973	0.0586	1.9295

Statistical Analysis
Regression Model

Volume Weighted Spread

	Interception	VIX	SP_Return	SP_Volume	Mon	Tue	Wed	Thu	IEX
Coefficient	0.00874	(0.00012)	(0.00001)	(0.00028)	(0.00051)	(0.00021)	(0.00030)	(0.00013)	0.00012
t-value	65.53	-1.69	-0.13	-4.58	-2.86	-1.13	-1.78	-0.70	0.83

- Dependent variable: volume-weighted spread
- Independent variables:
  - VIX: centralized VIX index
  - SP_Return: daily return of S&P 500 index
  - SP_Volume: volume of the S&P 500 index
  - Mon: dummy variable indicating whether it is Monday
    - 1 is Monday, 0 otherwise
  - IEX: dummy variable indicating whether it is before or after IEX establishment
    - Before IEX is represented by 0, and after by 1
    - The establish day October 25, 2013 is set as 1

Statistical Analysis
Regression Model
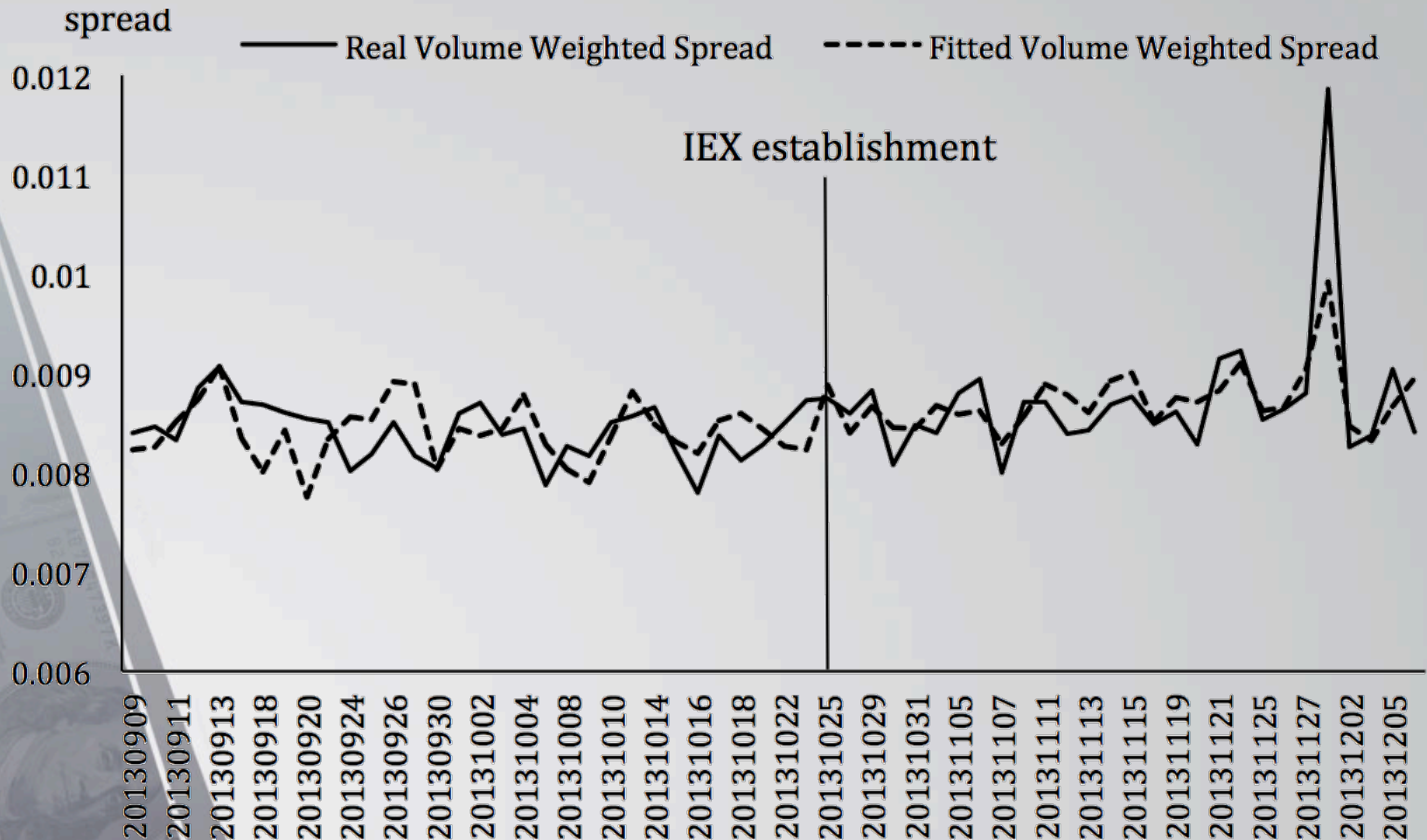
Conclusion

- No significance on transaction cost (Spread) and volatility (Price Range)
  - time limitation to process more data
  - Market Share : 0.02% at the time
  - As of Dec 1st 2014, IEX accounts for 0.968% of the whole market share
- We still believe that IEX is a great revolution in the market

Conclusion

IEX Monthly Growth