Market Regulation: Recent History and New Developments

Outline

- SEC Regulation NMS ("Reg NMS") was adopted in 2005.
  - It provides the defining framework for the structure of US equities trading.
  - Many of its features have been copied and adapted in non-US, non-equity markets.
  - Text of the rule: Part I, Introduction
- Background
- Provisions
- Evolution

Background

- The earliest and most important securities regulations focused on accounting and disclosure.
  - 1910's-1930's. State regulation ("Blue Sky Laws")
  - 1933 and 1934 Federal Securities Acts
- Markets and the trading process were less regulated.
  - Before the SEC was created (in 1933), most trading governed by rules and practices of the individual exchanges.
  - The SEC was given oversight over the exchanges
    - But it designated them as self-regulatory organizations (SROs) and pretty much left them alone unless something went wrong.
  - With increased use of technology, the SEC's market regulation became stronger.

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- 1973: NASDAQ starts
  - National Association of Securities Dealers Automated Quotation system.
  - A network of electronic terminals.
  - Collected and displayed the bids and offers of over-the-counter stocks; later extended to report trades.
  - Demonstrated the power of technology.

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- Congress passes the 1975 Securities Act
  - Abolished fixed commissions
    - At its founding in 1792, the New York Stock Exchange fixed the commissions that its members would charge.
    - When Congress acted, retail commissions dropped by half, volume increased.
    - Trading volume increased.
  - Directed the SEC to set up a National Market System
    - Envisioned an electronic unification of equity trading.
    - Existing markets (New York and American Stock Exchanges, NASDAQ) resisted, but eventually built a slow linkage systm.

- While the big US exchanges resisted the trend, other markets were going electronic.
- The earliest electronic markets were non-US exchanges
  - Paris Bourse
  - Toronto Stock Exchange
- … and (in the US) new systems not part of existing exchanges.
  - Instinet (open to institutional traders and dealers)
  - Island (retail)
  - Archipelago (retail)
- Instinet, Island and Archipelago were organized as open electronic limit order books (what we have today)

Regulation of the new electronic markets

- They did not want to be designated as "Exchanges"
  - Too many rules and required filings.
- There was no alternative designation, so they existed with no regulatory status.
- Allowed to operated under the SEC's grant of "no action letters"
- In 1998, the SEC created a classification of Alternative Trading Systems ("Reg ATS", now Rule 301).
  - Most dark pools are currently registered as ATSs

ATSs and ECNs

- An electronic communications network (ECN) is a market center (trading venue) that publishes visible bid and ask quotes.
  - Dark pools are ATSs, but they are not ECNs.

Consolidation and Fragmentation

- Newer ECNs and ATSs began to erode the dominance of the NYSE and NASDAQ
- Were markets still a natural monopoly?
- In 2000 the SEC issued a Concept Release that distinguished
  - *Market center competition*
    - "[Competition] among market centers encourages ongoing innovation and the use of new technology."
    - favors fragmentation (a world of many competing exchanges, ATSs, etc.)
  - *Order competition*
    - Competition among individual orders at a given point in time.
    - favors consolidation: pulling all orders into the same place so that they can directly compete against each other.

SEC Regulation NMS (2004-2006) tried to strike a balance

- An attempt to realize the National Market System envisioned in the 1975 Act.
- Intent was to have competing market centers, linked and governed by rules that fostered "virtual consolidation".
- Components
  - Order protection rule
  - Access rule
  - Sub-penny rule
  - Market data rule
  - A rule to renumber these and all pre-existing rules.

The Reg NMS *Order Protection Rule*

- Recall: trade-through
  - In a floor market, Amy is bidding $10, Brian is bidding $11
  - Cathy sells to Amy at $10.
  - Cathy (or her customer) gets an inferior price; Brian (and others) are discouraged from bidding aggressively.
  - Floor markets prohibit trade-throughs
- By 2000, a stock like MSFT would have had multiple limit order books in different markets.
  - Trade-throughs were thought to be occurring.
- The order protection rule in Reg NMS does not strictly prohibit all trade-throughs, but it does discourage many or most of them.
  - It defines a set of orders that are protected.
  - It requires procedures for avoiding trades through the protected orders.

The basic principles of the order protection rule

- For a limit order (bid or offer) to be protected it must be
  - Visible.
  - Accessible for automated execution.
  - At the top of its market's book.
- Before a market executes an order, it must check other markets' protected bids and offers.
- If the execution would cause a trade-through, they can't execute.
- Generally they must route the order to a market displaying the best price.

The bid book on markets A and B

Market A			Price	Market B		
Trader	Time	Shares		Shares	Time	Trader
Ava	10:21	100	20.12			
Brian	10:20	200	20.10	200	10:19	Dana
			20.08	100	10:01	Edward
			20.06	300	10:02	Frederick
Cora	10:19	400	20.04			
Gerry	9:30	1,000	20.02	2,000	9:32	Hildy

- What's protected?
- "Sell 300, limit 20.02" to Market A."

100 sh → Ava
200 sh → Brian

- Jamie sends "Sell 1,000, limit 20.02" to Market A.

Mkt A sends 200 sh to B. (Dana)

*NOT Protected

Market A			Price	Market B		
Trader	Time	Shares		Shares	Time	Trader
Ava	10:21	100	20.12			
Brian	10:20	200	20.10	200	10:20	Dana
			20.08	100	10:01	Edward*
			20.06	300	10:02	Frederick*
Cora	10:19	400	20.04			
Gerry	9:30	1,000	20.02	2,000	9:32	Hildy

400 → Cora
100 → Gerry

100 → Ava
200 → Brian
[400 → Cora
300 → Gerry] trade through Dana's bid.

- Jamie sends "Sell 1,000, limit 20.02" to Market B.

Market A			Price	Market B		
Trader	Time	Shares		Shares	Time	Trader
Ava	10:21	100	20.12			
Brian	10:20	200	20.10	200	10:20	Dana
			20.08	100	10:01	Edward
			20.06	300	10:02	Frederick
Cora	10:19	400	20.04			
Gerry	9:30	1,000	20.02	2,000	9:32	Hildy

Send 100 sh → Ava (Mkt A)
200 → Dana, 100 → Ed, 300 → Fred
300 → Hildy

Exceptions: latencies

- The quote might have changed so recently that an executing market is unaware of a better quote.

Time	
10:00:00.000	Market A bids $20.01
10:00:00.900	Market A bids $20.02
10:00:01.000	Market B executes a trade at $20.01

- There is a one-second grace period, during which Market B can be presumed "unaware" of Market A's bid.
- Market B *could not* execute the trade at 10:00.02.100
- Market B can't program its systems to take advantage of this latency.

Exceptions: system failures

- If Market B can't get a response from Market A, it doesn't have to honor Market A's quotes.

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The problem of delay; sweep orders

- A market center must check other centers' quotes.
  - While this is going on, prices can change.
- Alternatively, a trader can indicate to the receiving market center that she (the trader) is assuming the responsibility for avoiding trade-throughs.
  - The market center will execute the order without checking.
  - To do this, the order must be marked *intermarket sweep order* (ISO)

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Definition (from the Reg NMS text)

- An intermarket sweep order is … a limit order that meets the following requirements:
  - (1) The limit order is identified as an intermarket sweep order when routed to a trading center; and
  - (2) Simultaneously … one or more additional limit orders, as necessary, are routed to execute against the full displayed size of any protected bid, in the case of a limit order to sell, or the full displayed size of any protected offer, in the case of a limit order to buy, for the NMS stock with a price that is *superior to the limit price* of the limit order identified as an intermarket sweep order.

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Protected bids and offers

- A bid or offer is protected if it is at the *top of the market center's book*.
  - A buy order priced at the market center's best bid or a sell order priced at the market center's best offer (not necessarily the National BBO).
- An order must be *visible* to be protected.
- The components of the sweep order must be sufficient to take out all protected bids or offers priced above the sweep order's limit price.

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Analyzing sweep orders

- Identify all the potentially protected bids and offers.
  - "Protected": at the *top* of a market's *visible* book
- For a contemplated multi-market order, look at the limit price (if more than one, most aggressive limit price: lowest sell limit, highest buy limit)
- Check all protected bids and offers *priced better than* the limit price.
- These quantities must be routed (sent) to the markets with the protected quotes by the trader entering the sweep order.

Some permissible sweep orders

Price	Exchange A Shares	Exchange B Shares	Exchange C Shares
20.05	***100***	***200***	
20.04	200	500	***200***
20.03	300	600	300
20.03	800	700	200

- Sell 1,000 limit 20.05 → A
- Sell 1,000 limit 20.04 → A, Sell 200 limit 20.04 → B
- Sell 1,000 limit 20.04 → A, sell 200 limit 20.04 →B, sell 1,000 limit 20.04 → C

Note: the next 3 slides are annotated versions of the last slide.

Some permissible sweep orders

Price	Exchange A Shares	Exchange B Shares	Exchange C Shares
20.05	~~*100*~~	***200***	
20.04	200	500	***200***
20.03	300	600	300
20.03	800	700	200

900 added to A's sell book
A's offer is 20.05

No other mkts bidding > 20.05

- Sell 1,000 limit 20.05, *sweep* → A
- 100 shares would execute on A.
- Notes:
  - By marking the order as an (intermarket) sweep order, the sender of the order is telling A to handle the order without checking for possible trade-throughs (as normally required by the regulation)
  - The remaining 900 shares might be cancelled (if marked IOC) or added to A's book.
  - If the 900 shares are added to A's book on the sell side, it would become A's new best offer, at 20.05. If B is still *bidding* 20.05, A's offer of 20.05 would lock the market.

Some permissible sweep orders

Price	Exchange A Shares	Exchange B Shares	Exchange C Shares
20.05	***100***	***200***	
20.04	200	500	***200***
20.03	300	600	300
20.03	800	700	200

- Sell 1,000 limit 20.04, *sweep* → A, Sell 200 limit 20.04, *sweep* → B
- On A: 100 execute at 20.05; 200 execute at 20.04. (The unexecuted 700 might be cancelled or added to the book.)
- On B: 200 would execute at 20.05

Some permissible sweep orders

Price	Exchange A Shares	Exchange B Shares	Exchange C Shares
20.05	***100***	***200***	
20.04	200	500	***200***
20.03	300	600	300
20.03	800	700	200

- Sell 1,000 limit 20.04, *sweep* → A, sell 200 limit 20.04, *sweep* →B, sell 1,000 limit 20.04, *sweep* → C
- On A: 100 execute at 20.05; 200 at 20.04; remainder cancelled or added to A's book.
- On B: 200 at 20.05
- On C: 200 at 20.04; remainder cancelled or added to C's book.

And some impermissible sweep orders

Price	Exchange A Shares	Exchange B Shares	Exchange C Shares
20.05	***100***	***200***	
20.04	200	500	***200***
20.03	300 ?	600 ?	300
20.03	800	700	200

Here's what you must execute

Here's what you must send.

- Sell 1,000 limit 20.04 → A
  - Would trade through B's 200-share bid.
- Sell 50 limit 20.04 → A, Sell 200 limit 20.04 → B
  - *Might* trade through A's remaining 50 shares @ 20.05 (if part of B's 200 shares were cancelled or previously executed).
- Sell 100 limit 20.03 → A, sell 200 limit 20.03 →B
  - Might trade through C's 200 share bid.

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Discussion: was the trade-through rule needed?

- "Brokers are subject to a duty of 'best execution'."
  - Since a trade-through hurts a broker's customer, monitoring and preventing one should be part of a *broker's* obligation, not the *market's* obligation.
- Counter
  - Customers lack the means to verify that their brokers are following best execution practices.
  - The Commission's studies suggested that 1 out 40 (about 2.5%) executions involved a trade-through.

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Discussion: which quotes to protect?

- Visible (not controversial)
- Accessible for automated execution.
  - Prior to Reg NMS, the manual floor markets insisted that their quotes had to be protected.
  - All orders that would trade through their quotes had to be sent to them (and they had up to two minutes to respond).
  - *The "auto-ex" requirement marked the end of floor markets.*

- At the top of its market's book.
  - Orders that are not at the top of a market's book are not protected.
    - There is, in general, no respect for time priority.
  - Should the entire book be protected?
- At the time Reg NMS was debated, it was thought that protecting entire books would generate too much network traffic.
- *Is this still true?*

The Reg NMS *Access Rule*

- Markets can't discriminate in favor of their own customers.
- Execution fees capped at $0.003 per share.
- Since the rule took effect …
  - Maker/taker fees have grown much more complex.
  - They distort prices.
  - Routing fees aren't capped.

The Reg NMS *Market Data Rule*

- The sale of market data in real time is the largest source of revenue for a market.
- Bids, offers and trades are consolidated (combined from individual markets) before the data are sold.
- How to divide the revenues?
- The market data rule gives guidelines.

The Reg NMS *Subpenny Rule*

- A market can't display quotes in increments smaller than one cent.
  - A market can't accept orders priced in subpenny increments.
- Reaction
  - Markets have used maker/taker and taker/maker fees to circumvent the rule.

The tick size

- A "tick" is a market's minimum price increment.
- Until the 1990's, bids, asks, and trade prices in US equity markets were in eighths of a dollar $\left(\frac{\$1}{8} = \$0.125\right)$.
- Common Cents Pricing Act of 1997 (US Congress)
  - "A bill to … eliminate legal impediments to quotation in decimals for securities transactions in order to protect investors and to promote efficiency, competition, and capital formation."
  - "Within one year after the date of enactment of this paragraph, the [SEC] shall, by rule prescribed pursuant to paragraph (1), require quotations in dollars and cents for transactions in equity securities …"
  - Note: "Common Sense" (Thomas Paine, 1776) was an influential pamphlet from the US revolutionary era.

Excerpts from Representative Oxley's opening remarks:

- Mr. Speaker, I am pleased to introduce today … a bill to modernize the way stock prices are quoted in today's securities markets. The Act will eliminate regulatory obstacles that stand in the way of competitive forces.
- The rules of [Exchanges] … effectively mandate a minimum spread between a stock's buy and sell price of [12 ½ cents]. That means that floor traders capture a minimum of 12 ½ cents from investors on every trade. [Exchange] rules make it impossible for competition to further narrow the spread for the average investor. Large institutions can get better deals on their trades by negotiating prices on block trades--but regular investors have to pay full freight.
- *The new $0.01 tick was supposed to be good for retail investors, but bad for floor traders.*

The transition

- On June 24, 1997 the tick size was halved to $1/16 ($0.0625)
  - Quickly: 11/16 or 5/8, which is larger?
- In 2001, the all stocks began quoting in $0.01 increments.
- The bid-ask spreads of most actively traded securities dropped from 1/8 to 1/16, and then to $0.01.
- Most measured costs of trading also declined.

Small Cap Liquidity Reform Act of 2014

- Sponsored by Sean Duffy (R, Wisconsin), passed Feb 11, 2014
- Amends the Securities Exchange Act of 1934 to establish a pilot liquidity program for equity securities of emerging growth companies (EGCs) with total annual gross revenues of less than $750 million, under which those securities shall be quoted using … a minimum increment of $0.05 or $0.10 …
- *1/8 to 1/16 to $0.01 … to $0.05 or $0.10?*

Rationale for the bill.

- With a small tick size, market-makers can’t earn a fair return on their capital.
- If MMs can make more money on secondary trading, they will sponsor more initial public offerings.
- More public offerings implies more jobs.

What is the right tick size?

- "The tick size is the price of time priority."
  - If the bid is $10.00 for 20,000 shares, then a new order "buy limit $10.00" goes to the end of the queue.
  - But "buy limit $10.01" (one tick better) goes to the head of the queue.
- "A large tick favors market makers because it sets the minimum bid-ask spread."
  - Below $0.01, we can't compete on price.
- Does the $0.01 minimum tick excessively penalize market makers?

Pilot: an experimental or test study.

- Most financial regulations apply uniformly to all participants.
- This makes it difficult to figure out whether a new rule is effective.
- Suppose that on July 1 there is a new rule: "All bids must be displayed in green; all offers must be displayed in purple."
  - We observe that average spreads drop.
  - But did the new rule cause the drop?
  - To determine causality, we need to run a controlled experiment.
- The Reform Act directs the SEC to run an experiment.
- This is new and unprecedented.

The plan

- Pilot securities are stocks with a market cap $\leq \$5B$, closing price of at least $2, average daily volume under one million shares.
- Stocks randomly assigned to one of three test groups or a control sample.
  - Group 1: These stocks will quote in $0.05 increments, but can trade in any increment.
  - Group 2: These stocks will quote *and* trade in $0.05 increments
  - Group 3: These stocks will quote *and* trade in $0.05 increments. They will also be subject to a "trade at" rule.

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"Trade At"

- Price matching
  - The NBO is $11. Dealer Z receives a customer market buy order.
  - He sells to the customer at $11, matching the NBO.
- Problems
  - The customer buy order is internalized.
    - It never gets the chance to interact with a broader set of sell orders (and possibly getting a better price).
  - The traders posting visible orders at $11 get discouraged. They are setting the best offer, but they aren't being rewarded by an execution.

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Recall the CME and NYSE floor trading rules

- Before a member could trade against a customer order or cross two customer orders, he was required to establish a market by posting a quote before he traded.
- Example
  - The BBO is $20.00 bid, offered at $20.10. Member *M* has a customer order to buy. *M* would like to sell to the customer at $20.05.
  - He must first make a market ("Bidding 20.04, Offering at 20.05")
  - He must allow other brokers to participate at these prices.
  - Only then can he execute the trade at 20.05.
  - "He must *make* a price before he can *trade at* that price."

The pilot trade-at prohibition

- Market (or dealer) *Z* cannot execute a trade by price matching (that is, at a price displayed on another market).
- Market *Z* must be displaying the price before it can execute at that price.
- Market *Z* can only execute up to its displayed size.

Examples

- The NBO is \$10.00. Market *Z* is offering at 10.10.
  - Market *Z* is prohibited from executing a trade at \$10.00
- The NBO is \$10.00 Market *Z* is offering 100 shares at \$10.00
  - Market *Z* is prohibited from executing a trade at \$10.00 larger than 100 shares.
- There are exceptions.

What will happen?

- A representative from NASDAQ is appearing at a Stern Conference on Friday to comment on preliminary results.