Securities Trading: Principles and Procedures
Chapter 18

The National Market System and Regulation National Market System ("Reg NMS")

Reg NMS is connected to other topics

- Order protection rule ("no trade-throughs")
- Access fees
- Sub-penny pricing (tick size)
- Why did Reg NMS tie all these things together?

Outline

- SEC Regulation NMS ("Reg NMS", 2005).
  - US regulatory framework for electronic stock markets.
  - Influential for other markets, other countries.
- Background
- Specifics
- Current moves to repeal/modify.
- Readings (NYU Classes → Resources → Readings → Reg NMS Readings)
  - Introduction to Rule NMS
  - Memo from SEC's Equity Market Structure Advisory Committee (EMSAC)

 3

Background: the transition from floors to electronic markets

- 1971. NASDAQ starts operations
  - "National Association of Securities Dealers Automated Quotation" system.
  - A network of electronic terminals.
  - Demonstrates that stocks could be traded electronically.

 4

The Securities Act Amendments of 1975 ("the 1975 Act")

- Up to 1975, the NYSE and NASDAQ controlled almost all trading in their listed stocks.
- The 1975 Act …
  - Weakened these monopolies.
  - Proposed a network of "national securities exchanges."
- Not specific about network design/function
- Gave momentum to development of electronic markets and the systems to link them.

Competition in electronic markets heats up

- Instinet started in 1969 as a trading system for institutions.
  - By the 1980s: a modern electronic limit order book.
- Other US trading systems from around the same time: Autex, Quotron, …
- Some non-US exchanges went electronic: Paris Bourse, Toronto Stock Exchange, …
- Most early US electronic markets aimed at institutional traders and dealers, *not retail traders*.

- 1990s: Island, Archipelago
  - Open to anyone, including (especially) retail traders.
  - Became larger than Instinet.
- Instinet, Island and Archipelago were all organized as open electronic limit order books.
  - These markets were called electronic communications networks (ECNs)

Regulation of the electronic markets

- They did not want to be labeled “Exchanges”
  - SEC rules: an exchange is member-owned.
  - Subject to many regulations, required filings.
- If they weren’t exchanges, what were they?
- The SEC gave them “no action letters”
  - No action letter: a temporary approval.
- In 1998, the SEC created a classification of Alternative Trading Systems (“Reg ATS”, now Rule 301).

Reg ATS / Rule 301

- A market that registers as an ATS has a sliding scale of requirements based on trading volume.
- A small ATS must only:
  1. file a notice of operation and quarterly reports;
  2. keep an audit trail of transactions
  3. refrain from calling itself an “exchange,” “stock market,” or similar.
- Most dark pools are registered as ATSs.

Terminology: ATSs and ECNs

- An Alternative Trading System (ATS) is a place where trades can be executed.
- An electronic communications network (ECN) is a market center (trading venue) that has *visible* bid and ask quotes.
- Dark pools are ATSs, but they are not ECNs.

Linking the exchanges, ECNs, and ATSs

- Everyone had to report trades.
- Exchanges generally displayed their quotes (bids and asks) publicly.
  - But many ECNs displayed their quotes selectively.
- Exchanges, ECNs and ATSs could restrict access.

The intermarket trading system (ITS)

- Linked NYSE, American Stock Exchange, and the regional exchanges (Boston, Philadelphia, Cincinnati, and others)
- Access
  - Example: Boston could send a marketable order to NYSE.
  - Process was slow; rarely used.
- Provided a method for protesting trade-throughs.
  - These protests were rarely successful, so rarely used.

Consolidation and Fragmentation

- Thru the 1990s, the ECNs and ATSs compete with NYSE, NASDAQ.
- The market becomes fragmented (with trading spread over many venues).
  - Is this a good thing?
- In 2000 the SEC issued a Concept Release (a statement of principles) that distinguished two kinds of competition:
  - Market center competition
  - Order competition

- Market center competition
  - "[Competition] among market centers encourages ongoing innovation and the use of new technology."
  - Favors a fragmented market with many competing exchanges, ATSs, ECNs
- Order competition
  - "Integrated competition among orders promotes more efficient pricing of … stocks for all types of orders, large and small."
  - Competition among orders is helped by having all orders in one place at one time.
  - Favors consolidation.

SEC Reg NMS (2004-2006) tries to strike a balance

- Proposed a network of competing, but linked, market centers …
  - The goal: *virtual* consolidation.
- Components of Reg NMS
  - Order protection rule (Rule 611)
  - Access rule
  - Sub-penny rule
  - Market data rule
  - A rule to renumber these and all pre-existing rules.

 17

The order protection ("no trade-through") rule (611)

- What is a trade-through?
  - In a floor market, if A is bidding \$100, and B sells to C at \$99, then B has traded through A's bid.
- Fair and orderly markets shouldn't have trade-throughs.
- Trade-throughs discourage aggressive bids and offers.
- The order protection rule does not absolutely prohibit trade-throughs.
  - We still have trade-throughs, but fewer of them.

 18

Where is the order protection rule fuzzy?

- The rule does not apply to all orders in the market.
  - It only applies to "protected" orders.
  - Many transactions that look like trade-throughs are not considered trade-throughs by the rule.
- The rule does not explicitly prohibit trade-throughs.
  - Markets shall "establish, maintain, and enforce written policies and procedures reasonably designed to prevent" trade-throughs.
  - You have to try to avoid trade-throughs (but you might fail).

What is protected?

- For a limit order to be protected it must be
  - Visible.
  - Accessible for automated execution.
  - At the top of its market's book.
- So …
  - Hidden orders
  - Bids and offers made orally.
  - Orders priced below the market's best bid or above the market's best offer
- … are not protected.

What does it mean to have a “policy” to prevent trade-throughs?

- Before market *A* executes an order, it must check other markets’ protected quotes.
  - If it appears the execution would cause a trade-through, A should not execute the order.
  - Or, if *A* wants to go ahead and execute the order, it should route (send) a portion of the order to the other markets with protected quotes.

Exceptions: latencies

- One exchange might not yet be aware of another exchange’s 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 might be unaware of Market A’s bid.
- Market B *could not* execute the trade at 10:00:02.000 (> one second).
- 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, Market B can invoke the "self-help" provision of Reg NMS.
  - When "self-help" is in force, Market B doesn't have to honor Market A's quotes.
- Example (Notices on BATS web site):

BATS EDGA Exchange has declared self-help against New York Stock Exchange
July 08, 2015 10:52:54

BATS EDGA Exchange has declared self-help against New York Stock Exchange per Rule 611 of Regulation NMS. Routing to New York Stock Exchange has been suspended as of 10:51:54 ET.

All BATS EDGA Exchange systems are operating normally.

BATS EDGA Exchange has revoked self-help against New York Stock Exchange
July 08, 2015 15:13:06

BATS EDGA Exchange has revoked self-help against New York Stock Exchange per Rule 611 of Regulation NMS. Routing to New York Stock Exchange has been resumed as of 15:13:01 ET.

The problem of delay: intermarket sweep orders

- Before executing an order, a market center must check other centers' quotes.
  - During this check, prices can change.
- An intermarket sweep order (ISO) is a limit order that is sent to multiple exchanges simultaneously, and marked "ISO"
- When an exchange receives an ISO, it does not check other markets.
  - The "ISO" qualifier tells the exchange that the trader who entered the order is assuming the responsibility for avoiding trade-throughs.
  - The trader is doing everything that the exchange would normally do.

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.

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 more aggressively than the sweep order's limit price.

Analyzing sweep orders

- Identify all the potentially protected bids and offers.
  - "Protected": at the *top* of a market's *visible* book
- Look at the limit price of the sweep order.
- Check all protected bids and offers *priced better than* the limit price.
- The trader must route orders to satisfy these protected quantities.

 27

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

1. Sell 1,000 limit 20.05 → A
2. Sell 1,000 limit 20.04 → A, Sell 200 limit 20.04 → B
3. Sell 1,000 limit 20.04 → A, sell 200 limit 20.04 →B, sell 1,000 limit 20.04 → C

 28

Permissible sweep order #1

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, *ISO* → A: 100 shares would execute on A.
- Notes:
  - By marking the order ISO, the sender is telling A: "Don't check for possible trade-throughs."
  - 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.

 29

Permissible sweep order #2

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, *ISO* → A, Sell 200 limit 20.04, *ISO* → B
- On A: 100 execute at 20.05; 200 @ 20.04.
  - The remaining 700 might be cancelled or added to the book.
- On B: 200 @ 20.05

 30

Permissible sweep order #3

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, *ISO* → A,
- Sell 200 limit 20.04, *ISO* →B,
- Sell 1,000 limit 20.04, *ISO* → C
- On A: 100 execute at 20.05; 200 @ 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.

Impermissible sweep order #1

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 → *A ISO*
  - When *A* receives this order, it won't check other exchanges' quotes (that's what "sweep" conveys).
  - When *A* executes the order, we'll have executions at 20.05 and 20.04.
  - The execution at 20.04 will have traded through *B*'s 200-share bid.
  - Exchange *A* to customer: "You told me not to check! And I see that you've traded through another bid. If you didn't at least try to send 200 to B, you've violated the law."

Impermissible sweep order #2

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 50 limit 20.04 → *A ISO*,
- Sell 200 limit 20.04 → *B ISO*
- Exchange *A* executes 50 @ 20.05; 50 are left at 20.05
- Suppose that 190 of *B*'s shares at 20.05 are cancelled before the order arrives.
- *B* won't check other exchanges ("sweep"). It will execute 10 shares @ 20.05 and 190 at 20.04.
- The trade at 20.04 trades through *A*'s 50 shares@ 20.05.
- Exchange *B* to customer: "You told me not to check. And I see that you've traded through *A*'s bid. If you didn't at least try to take out all of *A*'s 100-share bid at 20.05, you've violate the law."

Impermissible sweep order #3

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 100 limit 20.03 → *A ISO*,
- Sell 200 limit 20.03 →*B ISO*
- Suppose that all of *B*'s 200 sh at 20.05 and 500 sh at 20.04 are cancelled before the order arrives. The best bid at *B* is now 20.03.
- The sweep order sent to *B* executes at 20.03.
- Exchange *B* to customer: "You told me not to check. And I see that you've traded through *C*'s bid. If you didn't at least try to sell 200 shares at *C*, you violated the law."

2005 debate: Do we really need a trade-through rule?

- "No. Brokers are already 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.
- "Yes. Customers can't check on their brokers."
  - SEC studies suggested that 1 out 40 (about 2.5%) executions involved a trade-through.

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 no time priority across markets.
  - Should the entire book be protected?

Then and Now

- Then
  - The Order Protection Rule was adopted in 2006 by a Commission vote of 3-2.
  - Voting against: Commissioners Paul Atkins and Cynthia Glassman.
- Now
  - Many traders want the rule modified or repealed.
  - The SEC has begun discussions.

SEC Equity Market Structure Advisory Committee (EMSAC) Memo (April, 2017)

- Arguments against the rule
  - Small (“de minimis”) reductions in trade-through rates.
  - High compliance costs for brokers.
  - No increase in displayed limit orders.
- Arguments in favor
  - Without the protection, individual investors couldn’t verify that they were getting the best available prices on their market orders.
  - … or that their limit orders weren’t being traded through.

 39

- EMSAC recommendations
  - Perform a pilot study: a short-term removal of the trade-through rule …
  - with the understanding that if there is no net benefit, the rule will be reimposed.

 40

Other parts of Reg NMS, in brief

- Access Rule
  - Some ATSs can refuse access to certain customers.
  - Exchanges can't discriminate. They must offer equal access to all customers.
  - Access fees are capped at \$0.003 per share (see "Pricing")
- Subpenny Rule
  - A market can't display quotes in increments smaller than \$0.01 ("subpenny") increments
  - A market can't accept orders priced in subpenny increments.

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
  - "A bill to amend the Securities Exchange Act of 1934 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.

 45

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.

 46

Small Cap Liquidity Reform Act of 2013

- Sponsored by Sean Duffy (R, Wisconsin)
- Directed the SEC 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 …

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.

Pilot: a controlled experiment

- 2,600 small publicly traded companies.
- 1,400 companies reserved as a control group
  - $0.01 quotes; sub-pennies okay for trades.
- 400 companies in each test group
  - Group 1: $0.05 quotes; subpennies okay for trades.
  - Group 2: $0.05 quotes; $0.05 trades (but midpoints also okay)
  - Group 3: Same as group 2 + a trade-at restriction.

 49

"Trade-at"

- The NBB is $10.00, and Exchange A is bidding $9.90.
- Exchange A does a trade at $9.90 → trade-through violation.
- Exchange A does a trade that matches the NBB ($10.00)
  - This is a dark trade, but not a trade-through
- The trade-at restriction in group 3
  - A can't price-match a protected bid or offer.
  - A would have to execute above $10.00
  - There are exceptions.

 50

Preliminary results

- The pilot runs October 2016 through September 2018.
- Preliminary results
- Higher trading costs for small marketable orders (retail).
  - Counterparty limit orders earn higher profits.
- Effect on larger institutional orders not clear.
  - Midpoint exceptions in groups 2 and 3 causes orders to move to dark markets.

Current events

- High-frequency trading
- Bitcoin markets
- Standards of behavior when giving financial advice:
  - agency, fiduciary, prudent-man, suitability.