MEMORANDUM

To: File Nos. S7-08-09 and S7-21-09

From: Smeeta Ramarathnam
Office of Commissioner Aguilar

Date: October 22, 2009

Re: Meeting with Representatives from Goldman Sachs

On September 24, 2009, Smeeta Ramarathnam and Zak May, Counsels to Commissioner Aguilar, met with the following representatives from Goldman Sachs: Paul Russo, Managing Director, Equities Division; William Conley, Managing Director, Global Securities Lending, and C. Annette Kelton, Managing Director, Associate General Counsel to discuss issues involving market structure including short selling, dark pools and Reg ATS, high frequency trading and exchange co-location, sponsored access, flash trading and IOIs. The representatives provided the attached materials entitled, "Market Structure Overview."

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Market Structure Overview

Goldman Sachs
September, 2009

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Summary

- **The US equities market is increasingly efficient and is broadly regarded as the best in the world.**
  - Spreads are reduced, execution costs are down, and liquidity is up
- **The investing community (especially retail) has benefitted from the evolving market structure and industry competition.**
- **Themes in the current market structure debate:**

1. ***Short Selling, Pre-borrow, & Hard Locates***
   - Rule 204 of Regulation SHO has been effective at reducing fails in the marketplace.
   - The necessity of additional measures to eliminate fails or "naked" short selling are not supported by empirical evidence.
   - 99.9% of locates do not fail.
   - Pre-borrow requirements would dramatically harm liquidity and market efficiency.
2. ***"Dark Pools" & Reg ATS:***
   - Non-displayed liquidity has always existed.
   - "Dark Pools" are a technological evolution of classic market structure that have brought benefits to institutional and retail trading alike.
   - "Trade-At Protection," or a reduction to the Reg ATS Fair Access threshold, would not be in the best interest of investors.
3. ***High-Frequency Trading & Exchange Co-location***
   - Additional trading obligations should be attached to the privilege of co-location and special rebates offered by exchanges.
4. ***Sponsored Access / DMA***
   - "Naked" sponsored access introduces the potential for significant systemic risk due to the lack of appropriate risk controls.
5. ***Flash Trading & IOIs***
   - Goldman Sachs believes that actionable IOIs and so called "flash orders" from exchanges should be treated as quotes and subject to the applicable rules and regulations.

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Market Structure Overview
(Appendix A)

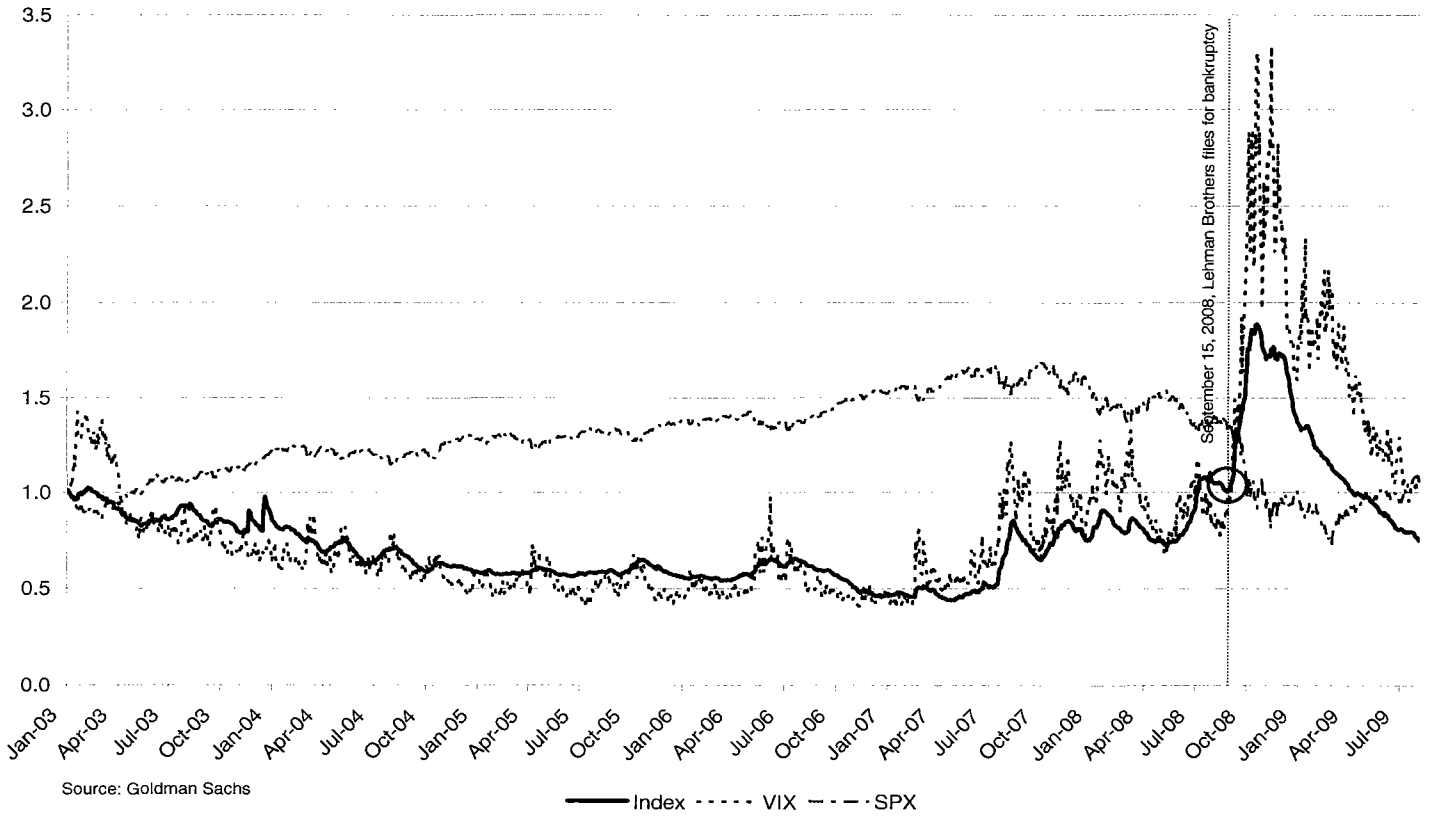
- **Technological innovations have enabled profound change in market structure**
  - Proliferation of faster and less expensive hardware has leveled the playing field, enhanced competition and increased liquidity
  - Allowed for the creation of new quantitative trading strategies – enhancing market efficiency
  - Has reduced response times from seconds, to milliseconds, to microseconds over the course of only a few years (exponential change)
- **Changes in the exchange landscape**
  - Technology advancements have lowered barriers to entry, allowing for more competition
  - Post "de-mutualization", relationships between exchanges and brokers have changed in nature, "the world is flattening".
  - A highly competitive environment has resulted in a large reduction in exchange fees, savings that have been passed on to the end customers
- **"High frequency" strategies have replaced the liquidity traditionally supplied by "specialists" and "market makers"**
  - Co-location, Sponsored Access, direct exchange data feeds and in many cases there are no specific obligations for these privileges
- **Several seminal regulatory changes have dramatically altered the landscape:**
  - Reg ATS, Reg NMS, Reg SHO
  - Decimalization has had a dramatic impact on displayed liquidity
    - "Penny jumping" has made limit order display for large sizes difficult, has forced the adoption of algorithmic trading techniques which break up orders into much smaller sizes.
  - The increased use of algorithmic trading has resulted in **"virtual blocks"**
    - Our empirical evidence confirms that the ability for sizable orders to access non-displayed ("dark") liquidity has benefited the trading performance of such sizable orders
- **Automation of manual procedures has driven efficiency gains**
  - Shift to algorithmic trading for execution of agency orders
  - Use of the ATS construct within the broker-dealer has allowed for the automation of internal crossing opportunities before going to the marketplace, previously a manual function
- **A very robust private network has developed, greatly increasing connectivity and access to liquidity**
  - As part of the Reg NMS intermarket sweep, exchanges are also now connected to both displayed and non-displayed liquidity pools

While all of this change has not been without its challenges, it has been accompanied by a decline in both implicit and explicit trading costs, benefiting primarily retail and also institutional investors

Are the US Equities markets more efficient..... the trend seems to be in the right direction

- Goldman Sachs constructed an index that corresponds to market **in**efficiency across the Russell 3000 universe of stocks using two factors: quoted depth and bid-ask spreads
- The chart to the right shows the market inefficiency index, the S&P 500 index, and the implied volatility index (VIX) over the period Jan 2003 to August 2009.
- The chart demonstrates that market inefficiency and VIX are positively correlated.

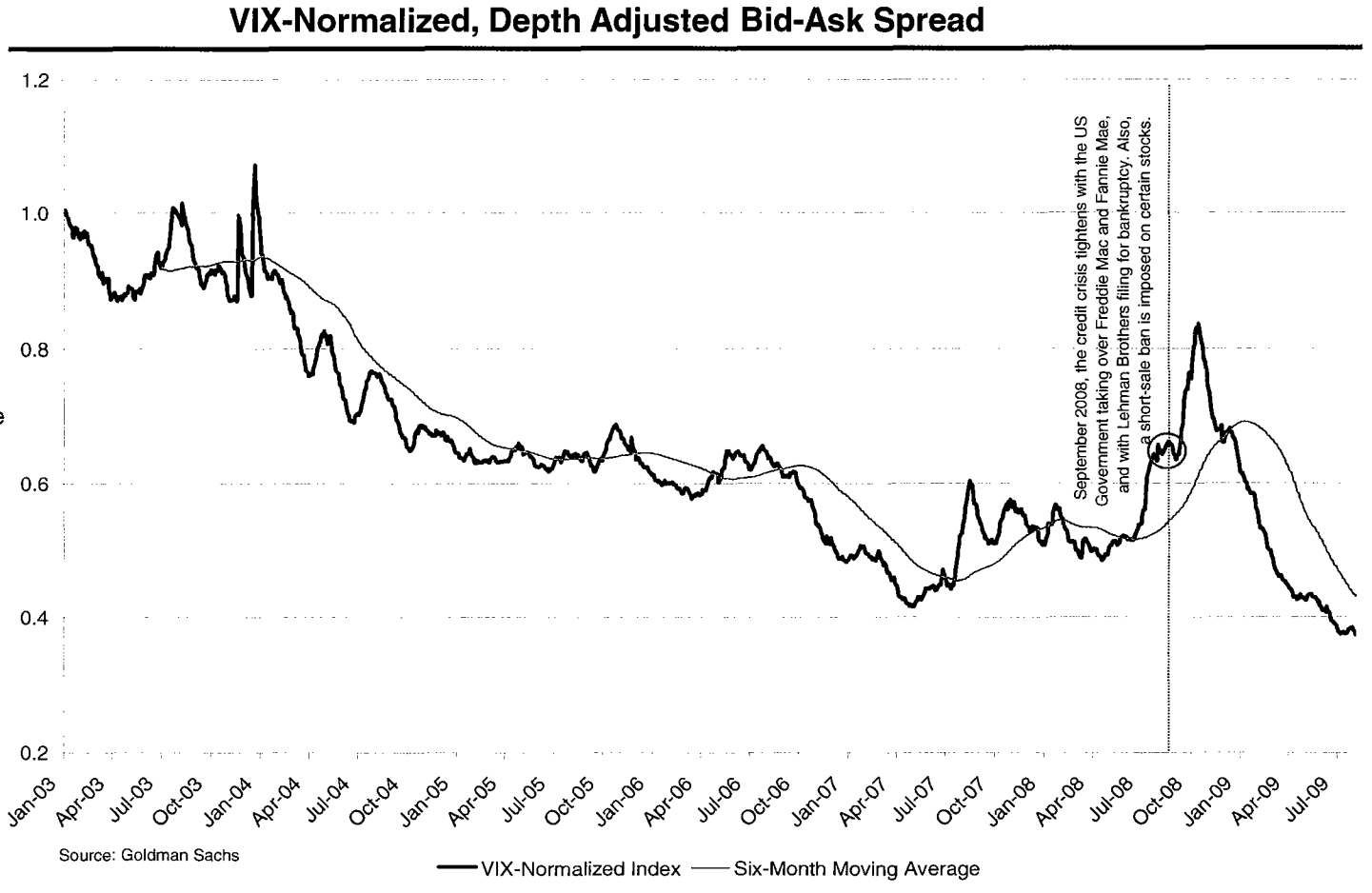
Depth Adjusted Bid-Ask Spread, Normalized to January 9, 2003



Source: Goldman Sachs, ***(Appendix A)***

Are the US Equities markets more efficient..... the trend seems to be in the right direction

- In order to separate the contribution of the VIX versus those of other factors, we analyze the correlation between changes in the market inefficiency index and changes in the VIX.
- The chart to the right shows the portion of market inefficiency that is unexplained by changes in the VIX. That is, it shows the evolution of depth-adjusted bid-ask index if volatility is held constant.
- After adjusting for the VIX, we observe that market inefficiency steadily **decreases** over time.
- This can be attributed to several reasons, such as technological advancements, market structure evolution, increased competition, and financial innovations.



Source: Goldman Sachs, ***(Appendix A)***

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A highly competitive industry where participants are pushing into each other's traditional space...

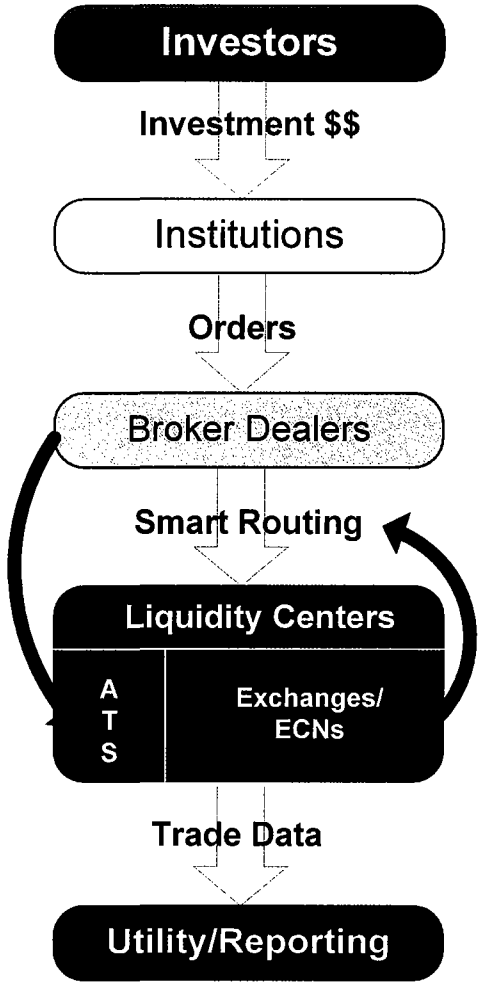
(Appendix A)

- **The Industry is healthy...**
  - 8 Public Exchanges / ECNs with significant market share
  - 20+ ATSs
  - Dozens of agency-execution brokers
  - Robust vendor population (market data, trading analytics, etc)
  - Record volumes

- **Participants often are located in multiple spaces throughout market structure**
  - Ex- Goldman Sachs is an institution, a broker, and a liquidity center.
  - There has been bleeding of roles- exchanges and brokers have pushed into each other's traditional space.
    - Many of the topics in current public dialogue are primarily competitive issues, rather than matters of market integrity

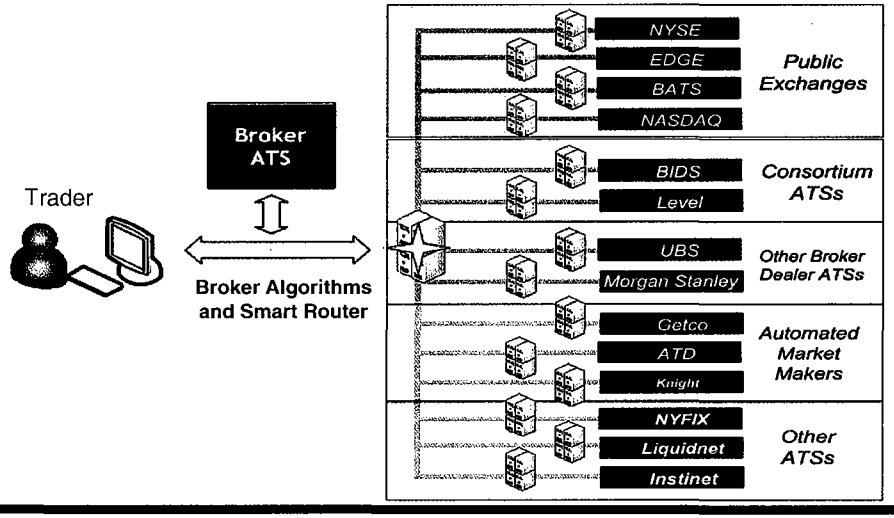
- **No dominance by any one player**
  - Investors have more options/access than ever before
    - Brokers compete for customer order flow through innovative tools and aggressive pricing
      - ➢ No broker has more than 8-10% market share
    - Exchanges compete for order flow by reducing execution fees
      - ➢ Gradual move from duopoly towards balanced market shares across many venues

- **Fierce competition has fostered innovation**
  - Technology advances and "processing power" have grown exponentially.
  - Ultimately resulting in more powerful data, decision tools, and lower costs for the end customer.



Has the Evolution of this Market Structure Brought Benefits to the Investing Community?

Then		Now
■ Market participants "liquidity" (willingness to buy/sell securities) goes largely undiscovered due to an inefficient and cumbersome process	→	■ Once inaccessible liquidity can now be connected to and simultaneously accessed with the push of a button.
■ Broker-dealer liquidity is largely unattainable	→	■ Broker-dealer buy/sell interest has been turned electronic in ATSs
■ Relationships provide traders with access to liquidity	→	■ Electronic trading venues provide participants equal access to liquidity
■ Market Makers are directed captive retail orders	→	■ Market Makers must compete for retail orders, resulting in increased willingness to trade, superior execution prices, and faster trading
■ There is minimal competition between trading venues. Investors compete to find liquidity and exchanges have	→	■ Trading venues compete for investors order activity and aggressively reduce their pricing



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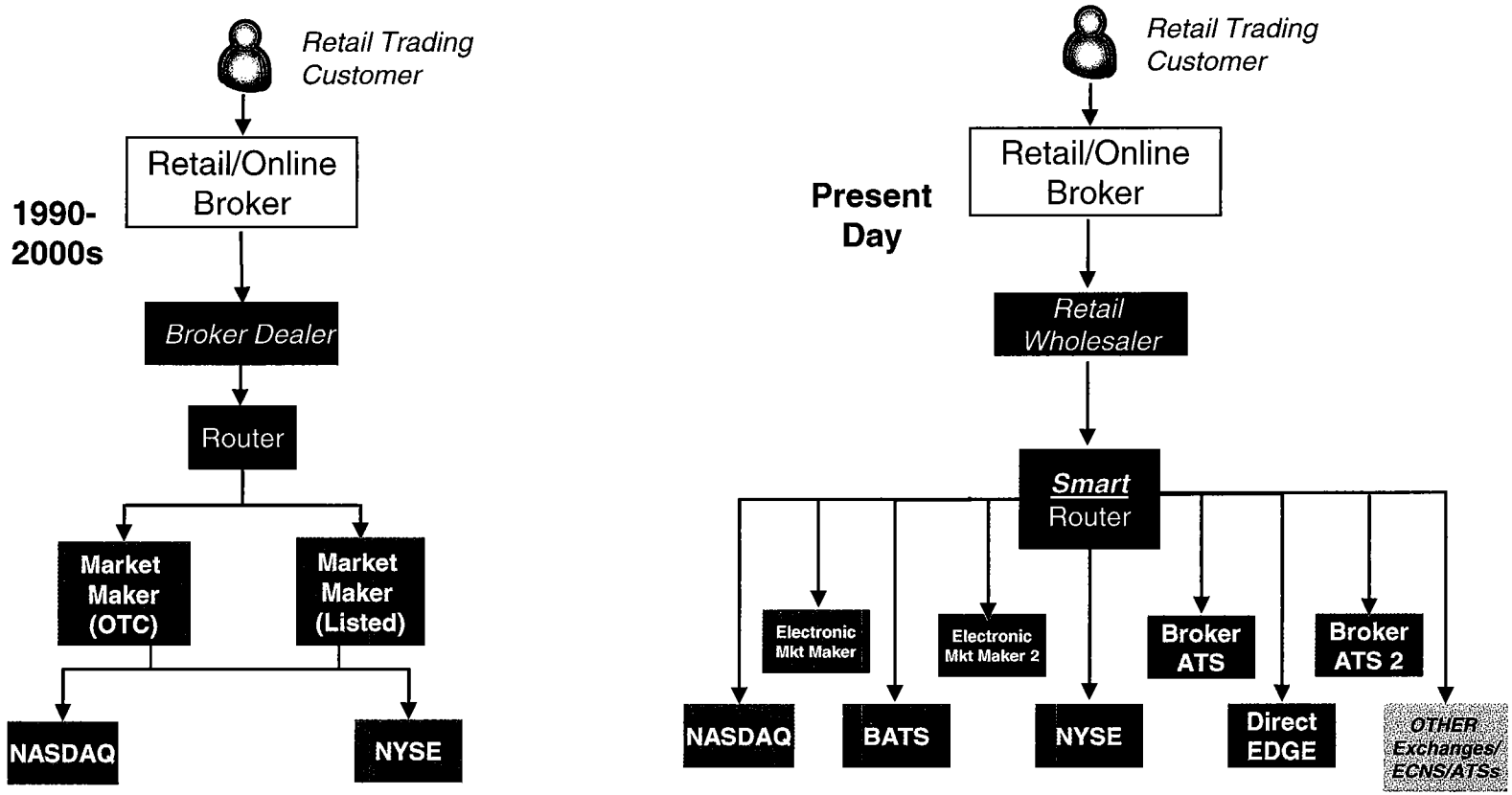
As a Result of this Intensely Competitive Market Structure, The Retail Trading Community is More Empowered than Ever Before

- Increased competition has lead to industry wide price compression among trading destinations. These economics ultimately make it to the retail trading customer in the form of reduced execution costs (ex $5 trades with Online Broker XYZ)
- Fragmented market share pushes venues to achieve superior execution (speed, price) on behalf of retail customers
- Electronic market-making and Broker ATSs replace manual execution services- improving efficiency, lowering costs, and reducing information leakage



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Part II: Themes in the Current Market Structure Debate

1. *Short Selling, Pre-borrow, & Hard Locates*
2. *"Dark Pools" & Reg ATS*
3. *High-Frequency Trading & Exchange Co-location*
4. *Sponsored Access / DMA*
5. *Flash Trading & IOIs*

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Short Selling and Fails to Deliver

(Appendices C,D)

I. Review of Short Activity
- Heavy covering during short sale ban and market decline during fall of 2008
- Short activity rose sharply after the March 2009 market low while market was rising

II. Rule 204 of Regulation SHO has been effective
- Reduction in CNS fails to deliver
- GAO Report shows 99.9% of trades settle on time

III. Additional measures to eliminate fails or "naked" short selling are not necessary
- Pre-borrow suggestions have significant costs
- Hard locate proposals require significant and complex infrastructure development
- Pre-borrow and hard locates are not a guarantee of delivery

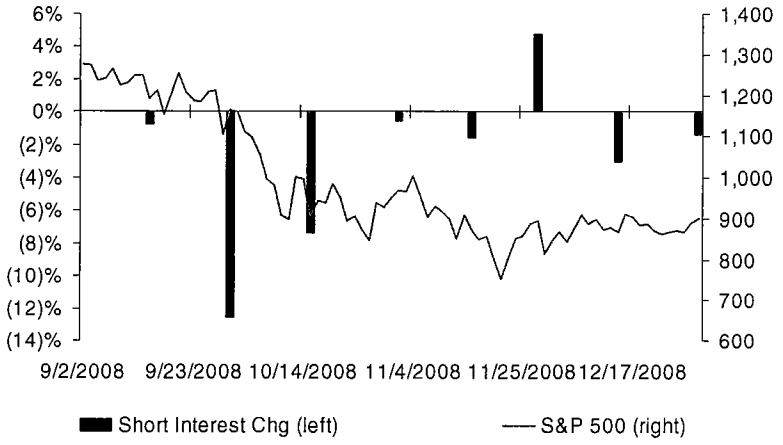
IV. Prime Brokerage No-Action Letter
- Industry sponsored solution
- Requires prime brokers to monitor customer order marking and report back to executing brokers

I. Review of Short Activity

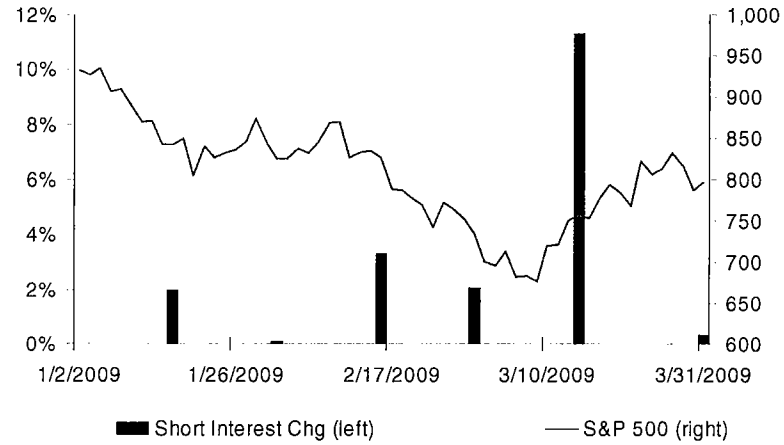
Short Interest Fell Sharply

- During the Short Sale Ban (Sept 18 - Oct 8, 2008), public short interest declined 19% while the market declined 15%. [1]
- Public short interest accelerated as the market began to rally in March 2009

2008
September to December



2009
January to March



Source: Values calculated from Bloomberg Data
[1] Bloomberg Data: NYSE Short Interest on Sept 15, 2008 (14.7BN shares) compared to Oct 15, 2008 (11.9BN shares)]

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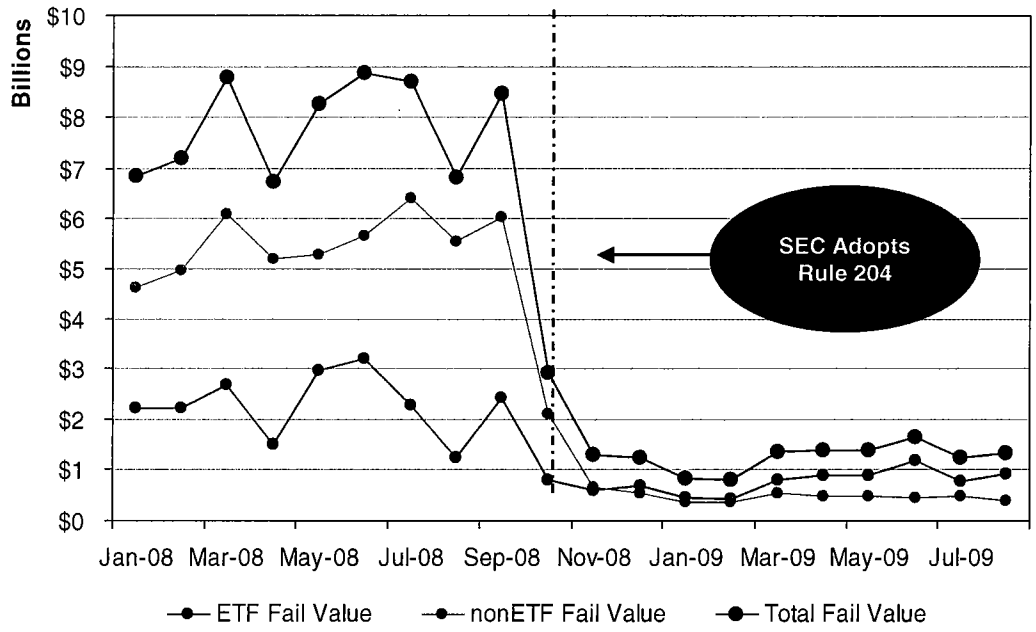
II. Rule 204 of Regulation SHO has been effective

Reduction in CNS Fails

Since Implementation:

- **89% reduction in CNS fails for non-ETF's**
  - Before 204 = $5.5BN
  - After 204 = $633MM
  - ***Reduction of $4.9BN***
- **67% reduction in CNS fails for ETFs**
  - Before 204 = $2.3BN
  - After 204 = $772MM
  - ***Reduction of $1.5BN***
- **82% reduction in CNS fails for ALL stocks**
  - Before 204 = $7.9BN
  - After 204 = $1.4BN
  - ***Reduction of $6.4BN***



Source: http://www.sec.gov/foia/docs/failsdata.htm

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III. Additional measures to eliminate fails or "naked" short selling are not necessary

- Pre-Borrow and Hard Locates do not guarantee delivery
  - Under the MSLA, lender's reserve the right to recall securities
- Only a small percentage of locates actually result in the need to borrow
  - 99.9% of locates do **not** fail
  - We estimate that less than 5% of all locates result in securities borrow transactions.
- Pre-borrow requirements would dramatically harm liquidity and market efficiency
- July 2008 Emergency Order mandating pre-borrower significantly increased transaction costs
  - GAO report estimates balance sheet impact of up to $2 billion/day for those 19 financial securities only. [1]
  - Clearance brokers do not have access to short sale proceeds, therefore need to fund pre-borrows at unsecured rates
  - In the Securities Lending Market, the weighted average lending fee on the 19 Financial securities increased 238% (from 39.4 bps to 133.2 bps) [2]
  - In the Cash Trading Market, post the July 2008 Emergency Order, the Bid/Ask spread for the 19 Financial securities increased 20% on average (from 5 bps to 6 bps) [3]
- Hard locate requirements will not eliminate "Naked Short Selling"
  - "Naked" short sellers do not comply with locate requirements, nor make delivery on sales
  - Short sales marked as long sales will not be discovered

[1] GAO Report; SEC Office of Economic Analysis (available at: http://www.sec.gov/comments/s-730-08/s73008-37.pdf)
[2] Goldman Sachs Securities Lending
[3] Calculated from Reuters data

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IV. Prime Brokerage No-Action Letter

Industry sponsored solution

- Pending No-Action Letter – August, 2009
  - Replacement of 1994 letter, with changes to reflect Regulation SHO
- Requires that Prime Brokers monitor customer order marking
  - Prime Broker compares order marking between customer and executing broker
    - Un-reconciled discrepancies must be reported to executing broker
  - Short Sale Locate Compliance
    - If Prime Broker does not have record of locate, must contact customer to identify the source
    - If locate source does not confirm the locate, prime broker must notify executing broker
    - If locate source confirms locate but fails to deliver, prime broker must notify executing broker
  - Long Sale Compliance
    - Prime broker must validate position in customers account
    - If position not held at prime broker, must contact customer to identify location
    - If position is not held long, prime broker must notify executing broker
- Executing brokers that receive these notices must consider this information in determining in subsequent transactions whether it is reasonable to rely on future representations by such customer

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What are "Dark Pools"?
(Appendix B)

What is a "Dark Pool"

- The term "dark pool" is used to refer to a wide variety of either trading centers or services offered by *ATSs* (alternative trading systems), *ECNs* (electronic communications networks), and broker-dealers. Depending on the context, the term has been used, for example, to refer to the following types of trading centers or services:
  - (a) an ATS that does not display quotes publicly;
  - (b) *internalization* practices of a broker-dealer;
  - (c) services at an exchange or ECN that allow for some or all of the quantity of an order to not be displayed publicly; and/or
  - (d) a trading center whose reported volume is not separately identified when it is reported to the *Consolidated Tape (or Ticker)*.
- Most commonly, the term "dark pool" refers to an Alternative Trading Systems (ATS).

What is an ATS?

- An ATS is an SEC-approved, non-exchange, trading venue.
  - Typically, ATSs do not publish real-time bid/ask information; derive their pricing from the publicly available National Best Bid Offer (NBBO), and are thus referred to as "dark." All trading activity in ATSs must occur at, or inside, the NBBO.
  - Within the US many large broker-dealers, including Goldman Sachs, have registered their own ATS with the SEC.
- ATSs are highly regulated entities. They are, by nature, affiliated with registered broker-dealers and, accordingly, their activities are governed by the provisions of the Securities Exchange Act of 1934. Additionally, ATS are registered with the SEC and their operations are subject to the provisions of SEC Reg ATS and Reg NMS.

Who uses ATS "dark pools" and why?

- Institutional traders, hedge funds, asset managers, and broker-dealers all have the choice to access "dark pool" ATSs.
- Trading in an ATS offers opportunities for improved trading performance, reduced market impact, lower transaction fees, and less opportunity for information leakage. Most importantly, participation is entirely optional

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"Dark Pools" : Common Myths
(Appendix B)

- ***Myth 1: Broker ATS "dark pools" create a two-tiered market structure which disadvantages retail investors***
- **Reality**:
  - There is not a "two-tier market" with respect to liquidity access. The retail trading community is more empowered than ever before
    - Retail access through "wholesalers" and exchange routing products
    - Retail smart routers which intelligently incorporate dark pools for increased liquidity access at favorable economics
    - Increased competition from dark pools **pushes all execution venues to compete for retail order flow with superior execution** (speed, price)
  - **Increased competition has lead to industry wide price compression among trading destinations**. These economics ultimately make it to the retail trading customer in the form of reduced execution costs
    - Ex- $5 trades with Online Broker XYZ
  - While market structure evolution has not been without its challenges, they have been accompanied by a secular decline in both implicit and explicit trading costs, **benefiting primarily retail investors**

- ***Myth 2: "Dark" (or non-displayed) trading activity is a a recent market phenomenon***
- **Reality (Appendix D): Non-displayed stock trading is not new.** However, the way it occurs has rapidly evolved with technology
  - NYSE Floor brokers – historically the largest form of "human reserve orders"
  - Orders resting on trading desks
  - Unexecuted part of orders resting either with brokers or in hands of investment managers
  - Today, faster and cheaper technology, together with greater connectivity among market participants, exchanges, and ATSs has made the search for liquidity, across many various sources, a smooth, high-speed, process

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"Dark Pools": Common Myths (continued)
(Appendix B)

- ***Myth 3: Non-displayed liquidity undermines the quality and quantity of publicly disseminated trade information***
- **Reality**:
  - Trade Reporting Facility (TRF) volumes have hovered in the 20% range (adjusted for transitional players) for the last few decades
    - In 1993 NYSE estimated that dark liquidity (excluding activities on the floor) accounted for 20% of US equity volume
  - Too much emphasis has been placed on the impact of displayed vs. non-displayed venues
    - A survey of exchanges, leads us to believe that approximately **60%** of shares ordered in "displayed" markets make use of reserve functionality.
      - ➢ As way of example, greater than 80% of GS orders to exchanges utilize display/reserve logic of some sort
    - "Displayed" markets have themselves introduced completely-hidden and midpoint-peg order types
    - As a result, the distinction between "displayed" and "non-displayed" marketplaces is a spectrum rather than a discrete, binary one
  - Non-displayed orders and related trading activity **are** part of the price discovery process. Market participants leverage automated trading tools which shift between passive (non-displayed) trading and aggressive (displayed) market interaction.

Myth 4: Dark Pool ATSs make up a large portion of US trading activity

Reality: Less than 10% of market volume transacts in ATSs which are "non-displayed"

VENUE	JULY 08	LAST 3 MOS	JUNE 09	JULY 09	%CHG (M/M)	%CHG (Y/Y)	% CONS VOLUME
BARCLAYS LX	51.0	23.1	19.6	29.7	51.53%	-41.76%	0.34%
BIDS TRADING	12.4	11.0	10.0	12.3	23.00%	-0.81%	0.14%
BNY CONVERGEX VORTEX	4.4	6.6	7.3	5.5	-24.83%	23.86%	0.06%
CITI MATCH	50.5	34.6	33.5	33.5	0.00%	-33.66%	0.38%
CREDIT SUISSE CROSSFINDER	71.0	140.4	137.2	136.0	-0.87%	91.55%	1.55%
GETCO EXECUTION SERVICES	47.1	109.7	102.5	94.6	-7.71%	100.85%	1.08%
GOLDMAN SACHS SIGMA X	142.0	117.0	115.0	113.0	-1.74%	-20.42%	1.29%
INSTINET CBX	21.9	20.4	18.0	20.4	13.06%	-7.08%	0.23%
ITG POSIT	~28.0	~21.5	~20.6	~21.2	2.67%	-24.46%	0.24%
KNIGHT LINK	103.0	111.7	101.0	95.0	-5.94%	-7.77%	1.08%
LEVEL	44.1	51.1	48.6	50.9	4.73%	15.42%	0.58%
LIQUIDNET	41.4	27.8	24.6	28.9	17.28%	-30.31%	0.33%
MORGAN STANLEY MS POOL	22.5	48.5	51.5	44.0	-14.56%	95.56%	0.50%
NYFIX MILLENNIUM	27.7	15.8	15.6	15.1	-3.22%	-45.67%	0.17%
PIPELINE TRADING	~14.6	~9.5	~8.6	~8.0	-6.98%	-45.21%	0.09%
UBS PIN	25.0	~41.4	~40.7	~39.4	-3.32%	57.40%	0.45%
TOTAL	706.6	790.0	754.2	747.2	-0.93%	5.75%	8.52%
CONSOLIDATED U.S. EQUITY VOLUME	9631	9890	9640	8767	-9.06%	-8.97%	NA
% TOTAL VOLUME IN DARK POOLS	7.34%	7.99	7.82 %	8.52%	A	NA	NA

Source: Rosenblatt Securities, company data; All volumes are average per day, in millions, single-counted and matched only (excluding shares executed at partner pools or displayed markets).
~ Denotes Rosenblatt Estimate

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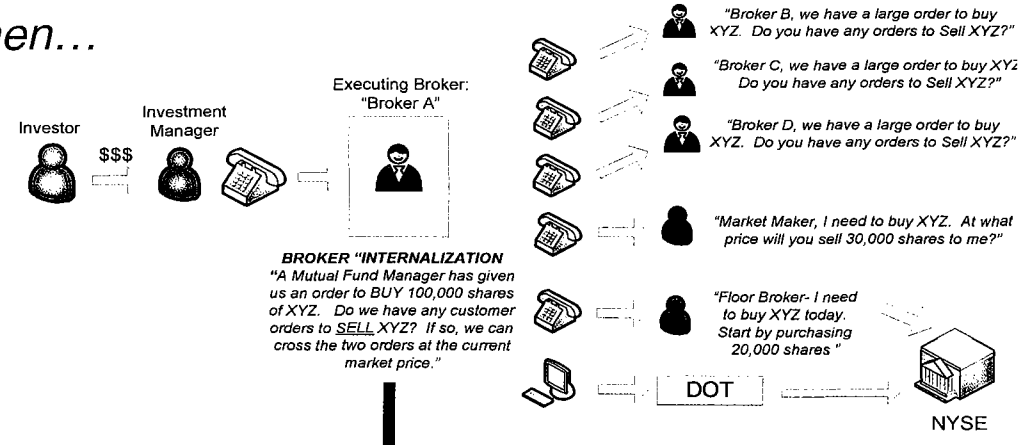
Myth 5: Reg ATS has resulted in a market which is "too fragmented"

Reality: Technology Has Automated Traditional, Manual, Trading Procedures into More Effective Workflows, w/ Access to Greater Overall Liquidity. ***(Appendix B)***

Price discovery is not broken, but has evolved into a high-speed process facilitated by smart routers and algorithms

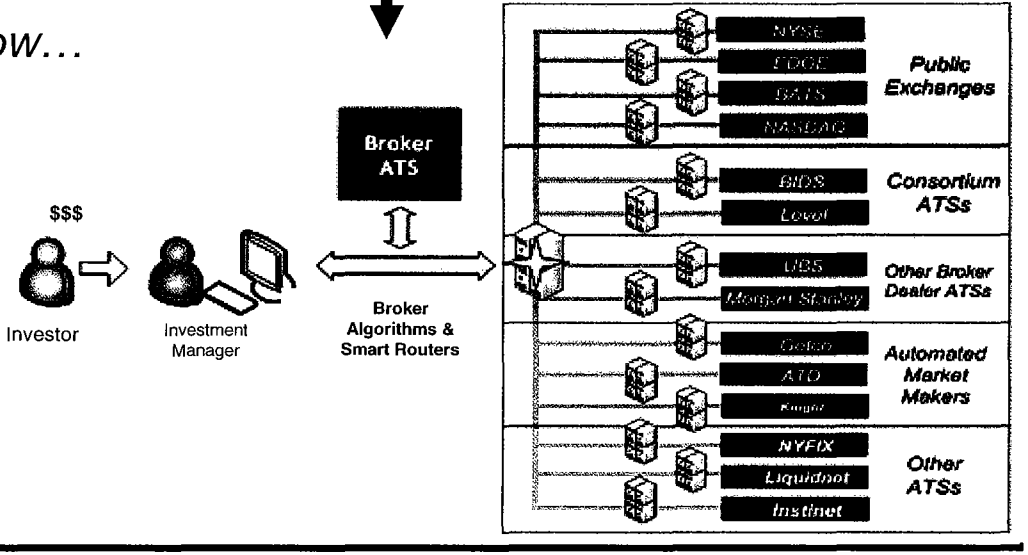
Then…

- Highly inefficient, manual, and time consuming process to execute a sizable order
- Many market participants acquire knowledge of the order with no obligation to trade.
- In the absence of finding a match upstairs, there are limited exchanges to which to send the order. There is no competition for executing the trade quickly and/or at a favorable execution price



Now…

- Although liquidity is fragmented across many destinations, it is accessed in a high-speed, fluid, and optimized manner
- The executing broker's ATS automates the previously manual function of customer order flow internalization
- Sophisticated algorithm and smart router logics provide greater anonymity and enhance execution quality
- The end user is empowered. Exchanges and other liquidity centers vie for customer orders by offering lower latency and improved execution prices



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"Dark Pool" / Reg ATS Regulation

- **Post-Trade Transparency**
  - GS supports aggregate volume attribution to Broker ATSs
  - Standardized periodic reporting and/or real-time
- **Consideration for NBBO "Trade-At" Protection**
  - NBBO trade-at protection would effectively create a virtual "CLOB" (Central Limit Order Book) which the SEC has previously concluded **would be anti-competitive.**
  - **Increases costs** by forcing industry participants to access same price away and pay a higher access fee.
  - **Inhibits innovation** by dis-incentivizing business models that provide potential for liquidity (size) and price improvement.
- **Reg ATS 5% Fair Access and Display Requirements**
  - Clarification around the rules and procedures in response to breaching the 5% threshold is needed
    - Automatic quoting obligation?
    - Symbol-specific?
- **Consideration of lowering the 5% Fair Access threshold**
  - **Scenarios that allow complete open access threaten liquidity pool quality control**
    - Caps-out the consumer benefits of non-displayed execution currently available to retail and institutional trading alike
      - ➢ **Trade execution quality suffers** – retail and institutional activity becomes increasingly exposed to predatory market participants.
    - Spurs a new wave of fragmentation as consumers and brokers aim to backfill lost non-displayed trading opportunities in venues where Fair Access has not yet been breached and participant population is still controlled.

While small changes and clarifications could improve REG ATS, we believe "Trade-At" protection, or a reduction to the Fair Access threshold, would not be in the best interest of investors.

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What is High-Frequency Trading?

- **Overview**
  - In general, it is accepted that HFT refers to trading strategies that have a holding period that range from minutes to a fraction of a second.
  - "High frequency" strategies have to a large degree replaced the traditional roles of "specialist" and "market maker" in providing liquidity to the marketplace.
- **Co-location**
  - In order to reduce latency, HFT market participants physically place their equipment at the exchange or ATS' data centers. One of the primary advantages of co-location is the ability to establish queue position, which allows execution priority at desired price points.
- **Goldman Sachs believes that those who participate in HFT with certain benefits, such as co-location, should assume additional obligations and be subject to appropriate regulatory oversight.**
  - Some of the obligations we believe are necessary include:
    - Implementation of a price improvement quota and best bid-ask quota
    - Systematic monitoring of trade cancelations to execution ratio and liquidity posting to taking ratio
    - Ensuring that exchanges have broad powers to regulate HFT, including remedies for failures to comply with the previously stated obligations

What is Sponsored Access?

Definition *(source: SIFMA):* **Sponsored Access** is the practice of a non-member using the exchange membership of a broker-dealer. This is typically done by co-locating the hardware and software and bypassing the broker-dealer's order management infrastructure.

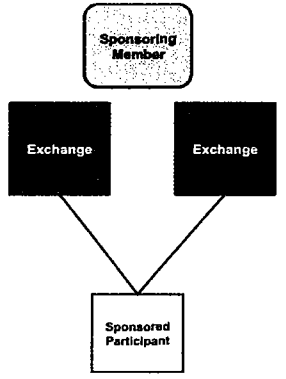
Two Types of Sponsored Access:

1. **Naked Sponsored Access (Direct Market Connections)**
   - Provides the Sponsoring Participant with the ability to transact directly with the exchanges using a Market Participant Identifier (MPID) associated with the Sponsoring Member. The Sponsoring Member does not have the ability to ensure that the order flow complies with applicable risk thresholds and regulatory checks.

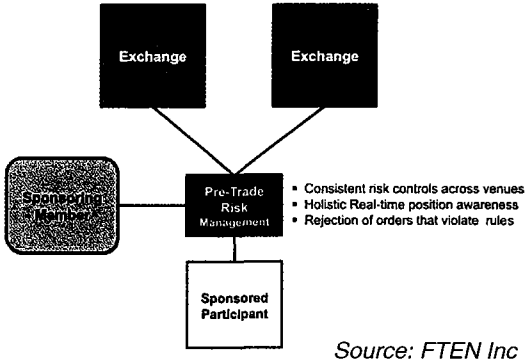
2. **Sponsoring Member / 3rd Party Systems**
   - The Sponsored Participant uses a 3rd party system that enables the Participant to transact directly with an exchange using the Sponsoring Member's MPID. The implementation of controls via the 3rd Party System provides the Sponsoring Member the ability to ensure the Sponsored Participant's order flow complies with applicable risk thresholds and regulatory checks.

Goldman Sachs believes that Naked Sponsored Access introduces the potential for significant systemic risks due to the lack of appropriate pre/intra/post trade controls.

1. Naked Sponsored Access



2. Sponsoring Member / 3rd Party Systems



Source: FTEN Inc

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"Flash" Trading & IOIs

- **"Flash" Trading**
  - Goldman Sachs does not utilize flash trading offerings unless instructed to do so by the customer
  - Best-ex consists of multiple "factors," including
    - Speed and price certainty
    - Opportunity for size and price improvement
    - Clients will determine which of these factors is most important and accordingly the ability to opt-in, or opt-out, of these features is most important
  - Benefits to retail investors
    - These programs are associated with lower fees, which help wholesalers keep costs low, which in turn pass back to retail broker-dealers in the form of higher payment for order flow
- **IOIs**
  - Many different flavors
    - Used historically in the process of searching for natural liquidity
    - Used in the process of inter-market routing
    - Used in the context of ATSs to attract contra-side order
- Potential Issue – depreciation of SIP data usefulness

Goldman Sachs believes that actionable IOIs and so called "flash orders" from exchanges should be treated as quotes and subject to the applicable rules and regulations. To the extent that non-quote order information is not fully displayed, it should have a corresponding obligation.

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Appendices: Table of Contents

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Appendix A: US Equity Market Structure Overview

- History
- Increasing Efficiency
- Competitive Landscape
- Market Data and Trading Trends

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History Part I:
Regulation & Liquidity Fragmentation

- Pre-1997
  - NASDAQ creates the first ECN (1971)
  - Posit & Instinet gain traction as non-exchange and "dark" trading pools (Mid 80s)
  - First Version of REDI given to clients ('92)
  - FIX Protocol launches ('92)
- 1997
  - Order Handling and Display (Manning) rules are introduced
- 1998
  - **SEC Implements Reg ATS** – formalizing ECN regulatory reporting requirements
  - REDIBook ECN formation
  - ECNs introduce (and the market quickly adopts) reserve (or "iceberg") functionality- allowing customers to display as little as 100 shares of an order of indefinite size on public markets
- 2000
  - **Equities begin trading in decimals- fracturing the liquidity displayed in public markets from fewer levels with high concentrations of buying/selling interest, to many levels with more diluted interest**
- 2001
  - **Consequently, broker-dealers introduce both algorithms and smart routers to help customers navigate the evolved equities markets**
  - New block-trading ATSs gain traction (e.g., Liquidnet)

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History Part II:

Consolidation, Followed by Renewed Competition

- 2002
  - A phase of consolidation begins, starting with the ECNs...
    - GS sells REDIBook ECN to ARCA and the two platforms merge as "ARCA"
    - Instinet and Island merge to form "INET"
- 2005
  - Reg NMS is approved
    - Levels the playing field among trading venues in the US, providing trade through protection for the best-priced displayed bids/offers
  - **Consolidation continues with Exchange-ECN mergers. A virtual duopoly begins to take shape:**
    - NASDAQ and INET announce merger
    - NYSE and ARCA announce merger
  - **GS files for an ATS and introduces SIGMA X. Several other broker dealers register their own ATSs**
- 2006
  - Reg NMS begins with the sub-penny rule
  - Upstart ECN BATS inverts pricing- offering higher rebates to liquidity providers than the fee applied to liquidity takers. The strategy attracts liquidity away from NYSE and NASDAQ who currently account for more than 80% of equity trading volume.
  - Exchanges and ECNS begin to offer "dark" order types allowing customers to place public market orders that rest on their book, but display no shares at all

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History Part II:

Consolidation, Followed by Renewed Competition (continued)

- 2007
  - Full implementation of Reg NMS
  - ECNs, DirectEdge and BATS, as well as broker ATSs, gain traction. **Consequently, a period of aggressive pricing competition begins between trading venues**
- 2008
  - Exchanges begin to utilize Broker ATS pools to lower their own cost of intra-market REG NMS routing. NYSE announces access to 29 ATSs

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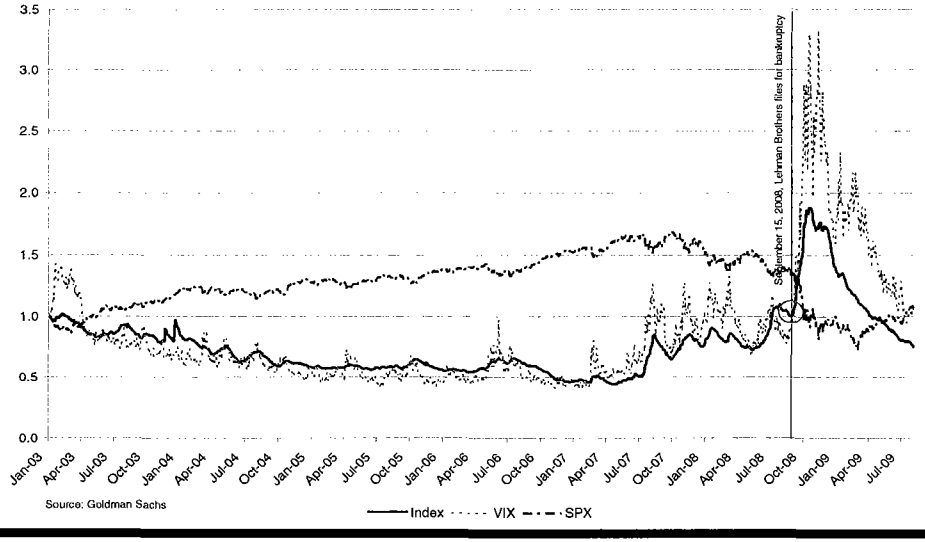
Market Efficiency Approach & Background

- The efficiency of the equities market can be measured using numerous factors. In this study, we construct an index that corresponds to market efficiency across the Russell 3000 universe of stocks using two factors, namely quoted depth and bid-ask spreads. The index combines bid-ask spread and the inverse of the quoted depth, hence the name depth-adjusted bid-ask index. More specifically, we adopt the following process for constructing the Index.
  - Starting January 9, 2003, we pull the constituents of the Russell 3000 on each trading day.
  - For each constituent, we retrieve the quoted depth and spread which we define as follows.
    - The spread for each stock is the time-weighted average spread in basis points.
    - The depth for each stock is the time-weighted average of the bid and ask size in split adjusted shares.
  - For each day of interest, we calculate the index-weighted average of depth and spread across the
- Russell 3000 index. Specifically, we
  - Invert the depth series and normalize it so that the value for the first data point is 1.00,
  - Normalize the spread series so that the value of the first data point is 1.00, and average the resulting series to construct the depth-adjusted bid-ask index. Note that lower values for this Index reflect increased market efficiency.
- The chart below shows the depth-adjusted bid-ask index, the implied volatility index (VIX), and the S&P 500 index (SPX) over the period January 9, 2003 to August 11, 2009. The chart demonstrates that the Index and VIX are positively correlated.

Depth Adjusted Bid-Ask Index Normalized to 1.0 on January 9, 2003



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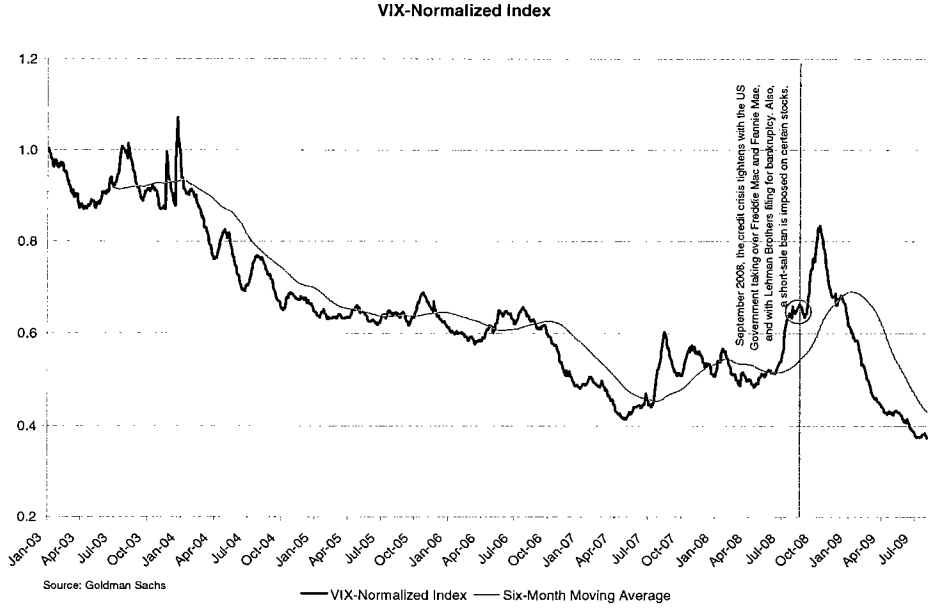
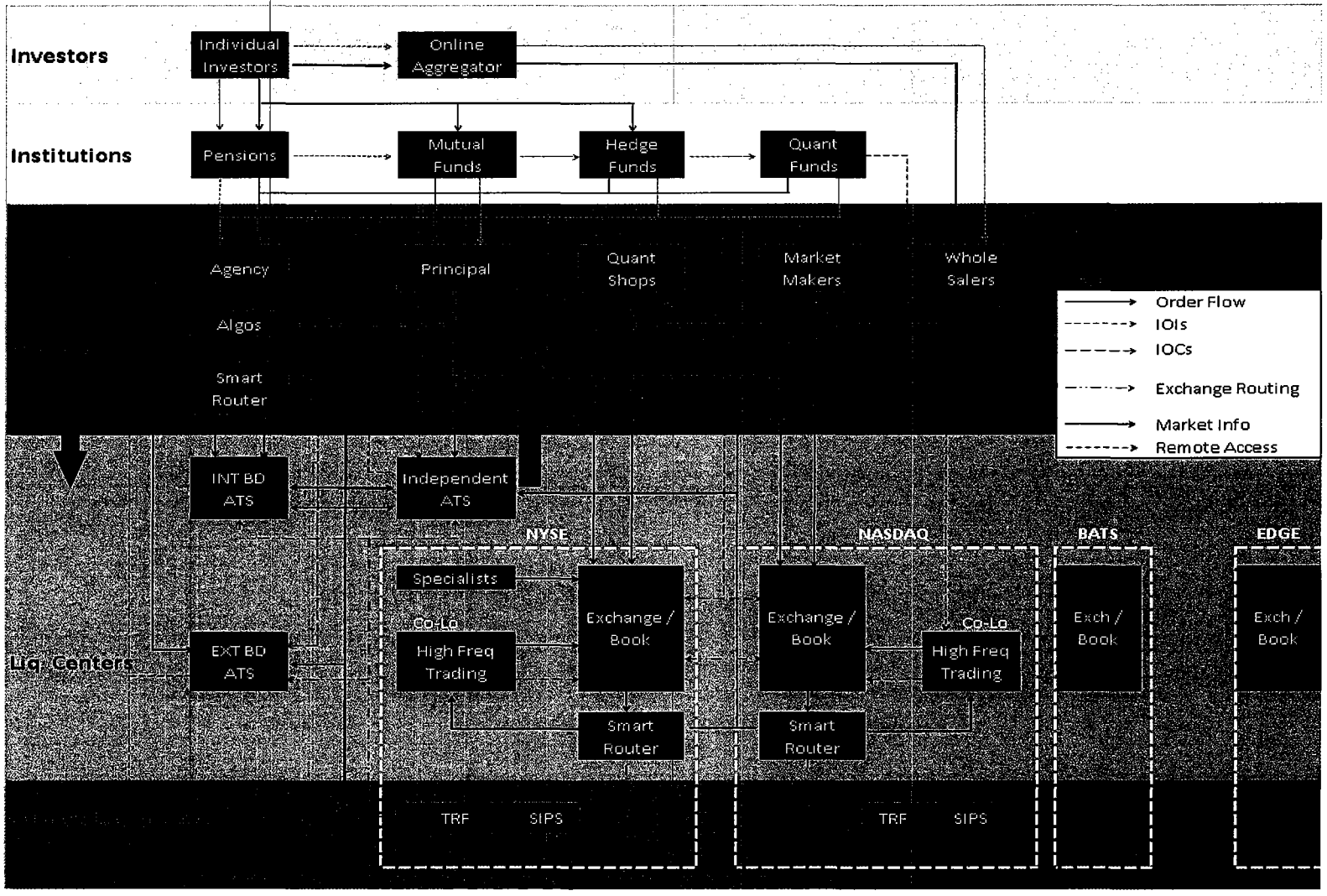
Market Efficiency Approach & Background (continued)

- In order to separate the contribution of the VIX versus those of other factors, we construct a VIX-normalized depth-adjusted bid-ask index (VIX-Normalized Index) **by regressing returns of the Index against returns of the VIX. We then calculate the residuals with respect to the VIX and compound them to create the VIX-Normalized Index**.
- The chart below shows the portion of the Index value that is unexplained by changes in the VIX. That is, it shows the evolution of the depth-adjusted bid-ask index if the VIX is held constant. We note that the VIX-Normalized Index decreases steadily over time. This can be attributed to several reasons, including technological advancements, market structure evolution, increased competition, and financial innovations.
- The VIX-Normalized Index peaked in October 2008, which coincided with the tightening of credit, and the implementation and subsequent removal of the short-sale ban. It declined sharply since. From July 1, 2008, to July 1, 2009, the VIX-Normalized Index decreased by 29%, dropping from 0.54 to 0.38. This was accompanied by substantial growth in high-frequency trading volume as suggested by Tabb Group.



Equities market structure is highly competitive where participants are pushing into each other's traditional space…



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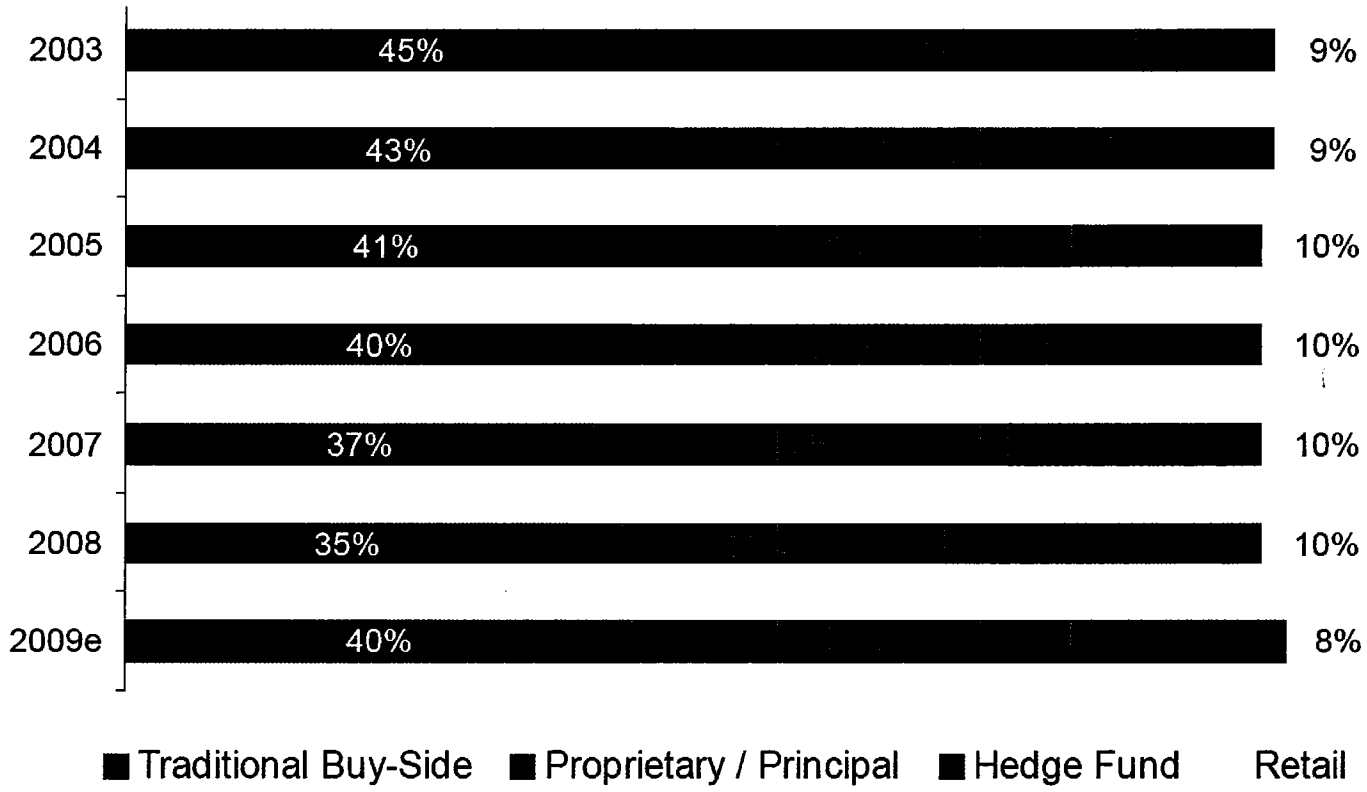
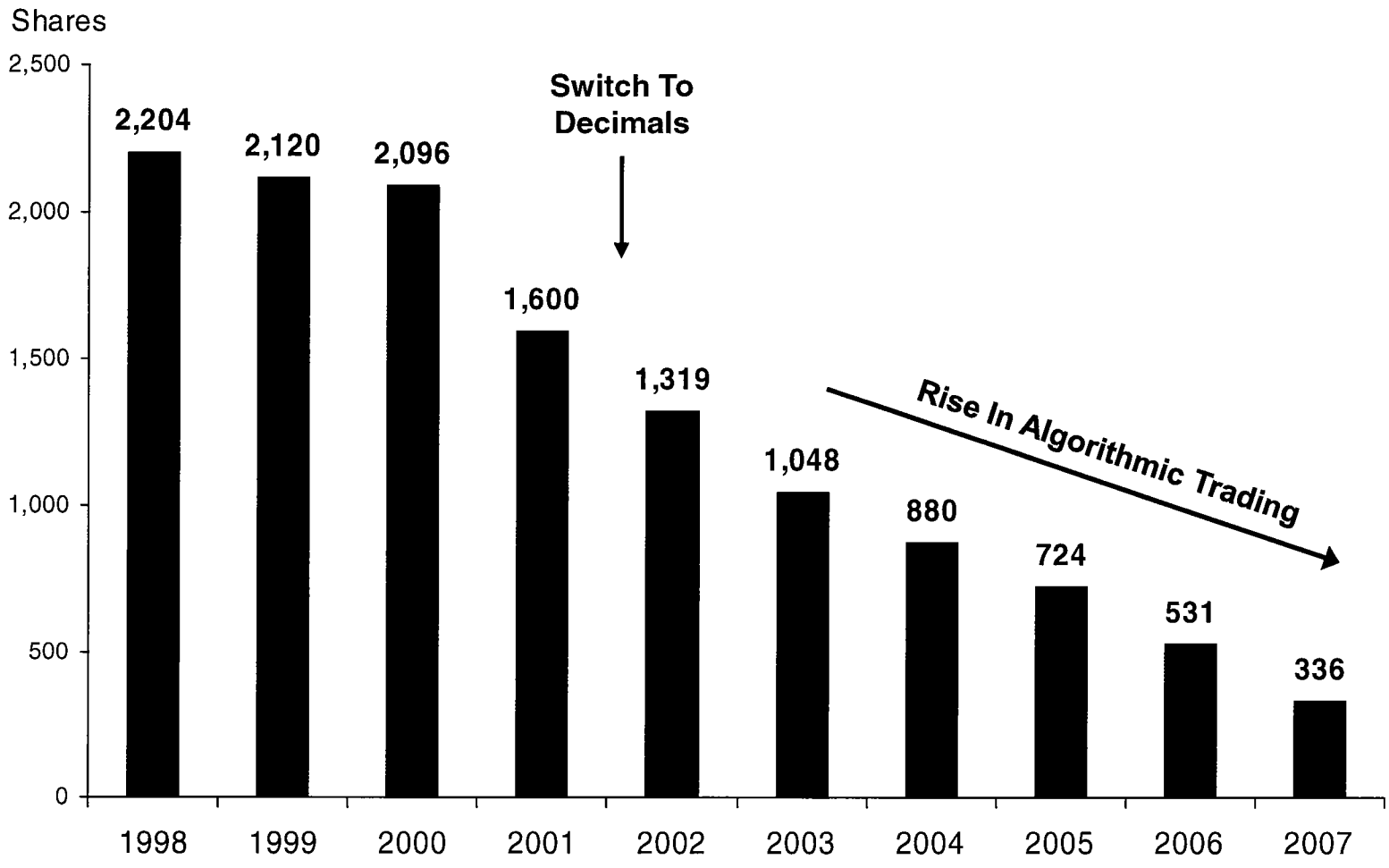
Retail Order Flow Accounts for a Small Percentage of US Equity Trading

Estimated Industry Share Volume



Source: Tabb Group, Feb '09

The Decline In Trade Size on the NYSE



Source: "Street Smarts", George Sofianos Goldman Sachs Equity Execution Strategies, July 2007

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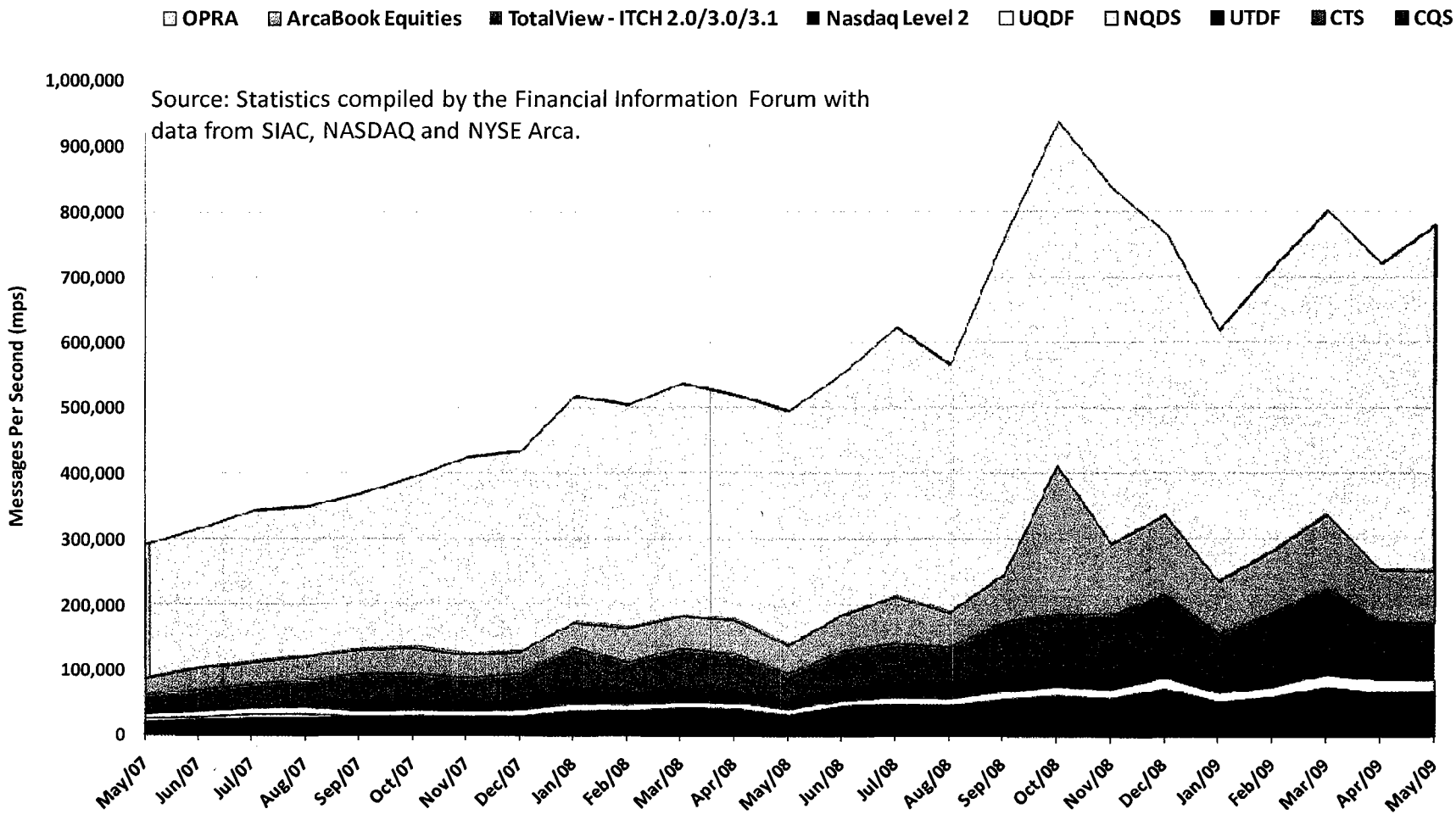
Order Activity in US Equities Has Rapidly Accelerated with Technology Improvements

Source: Financial Information Forum, May '09



Note: TotalView data is based on: TotalView ITCH 2.0 shown for May 2007 ; TotalViewITCH 3.0 Shown from June 2007 to March 2009. TotalView ITCH 3.1 shown from April 2009 onwards. TotalView ITCH 2.0 has been discontinued in 2009. TotalView Legacy has been discontinued since June 2007.

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Appendix B:

Non-Displayed Liquidity (aka "Dark Pools")

- Types of Non-Displayed Liquidity (p13-17)
- The SIGMA X Benefit (p18-19)
- How Goldman Sachs Accesses Liquidity Broadly (p20)

Four Types of Liquidity

Displayed

- Displayed orders on the ELBs of exchanges and ECNS
- Dealer quotes

Non-displayed at Market Venue

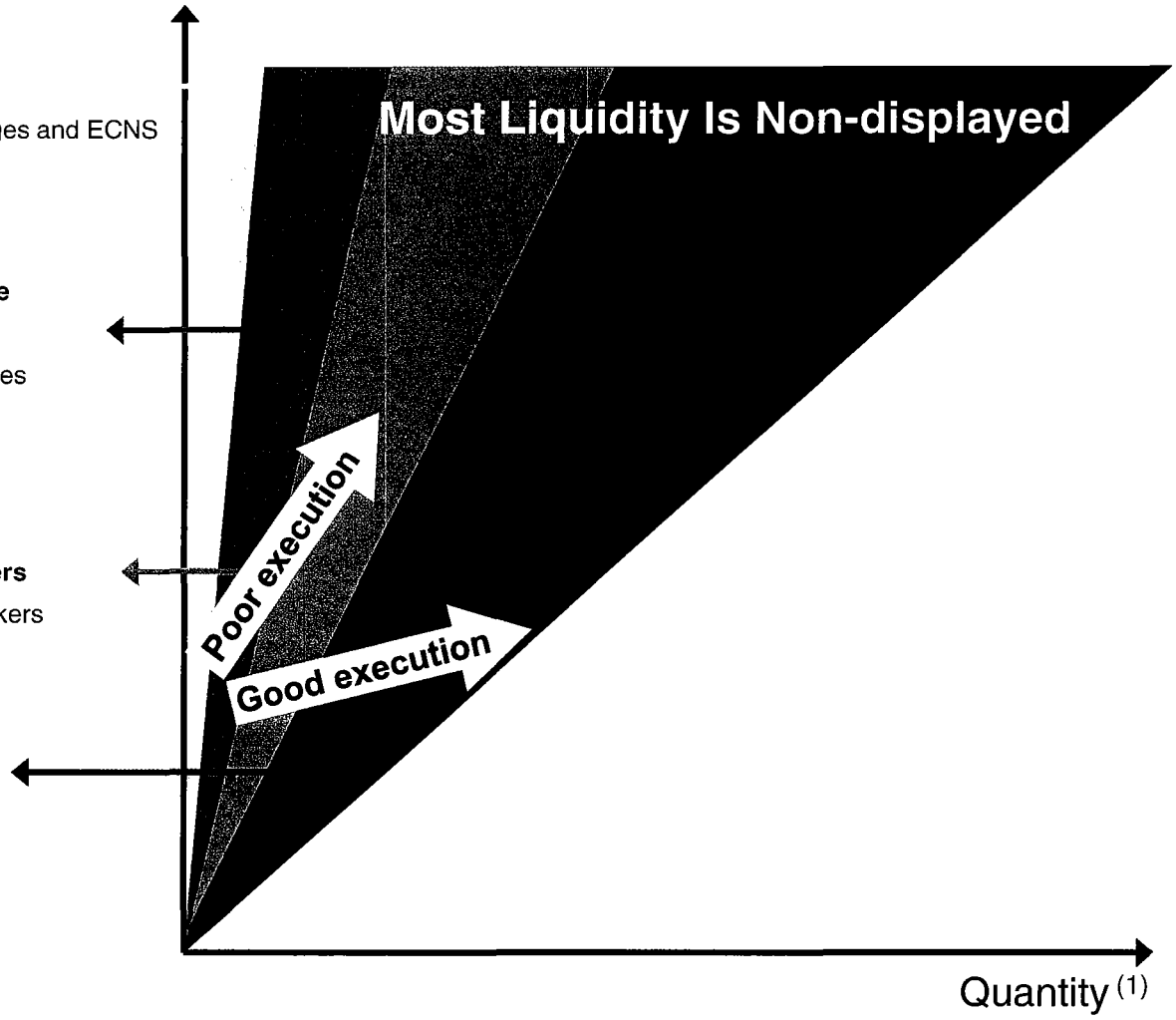
- Floor brokers
- Reserve orders on Exchanges
- Discretion orders on ECNs
- Broker Dealer ATSs

Non-displayed at Broker-Dealers

- Client orders worked by brokers
- Dealer capital

Non-displayed at Investors

- Orders at buy-side desks
- Latent liquidity

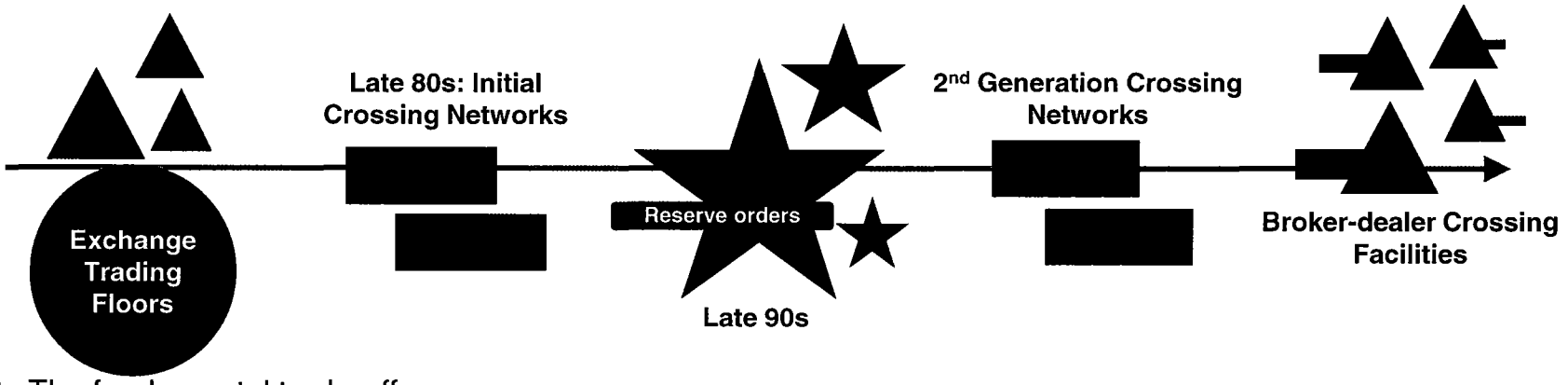


Source: George Sofianos Goldman Sachs Equity Execution Strategies, July 2008.

Non-displayed Liquidity in Not New

- Non-displayed Liquidity
  - "Dark Pools"
  - "Hidden Liquidity"
- Non-displayed liquidity has always been with us
  - Until a couple of years ago, the NYSE trading floor was the biggest pool of non-displayed liquidity: orders represented by floor brokers
- And will always be with us
- But its nature is changing…

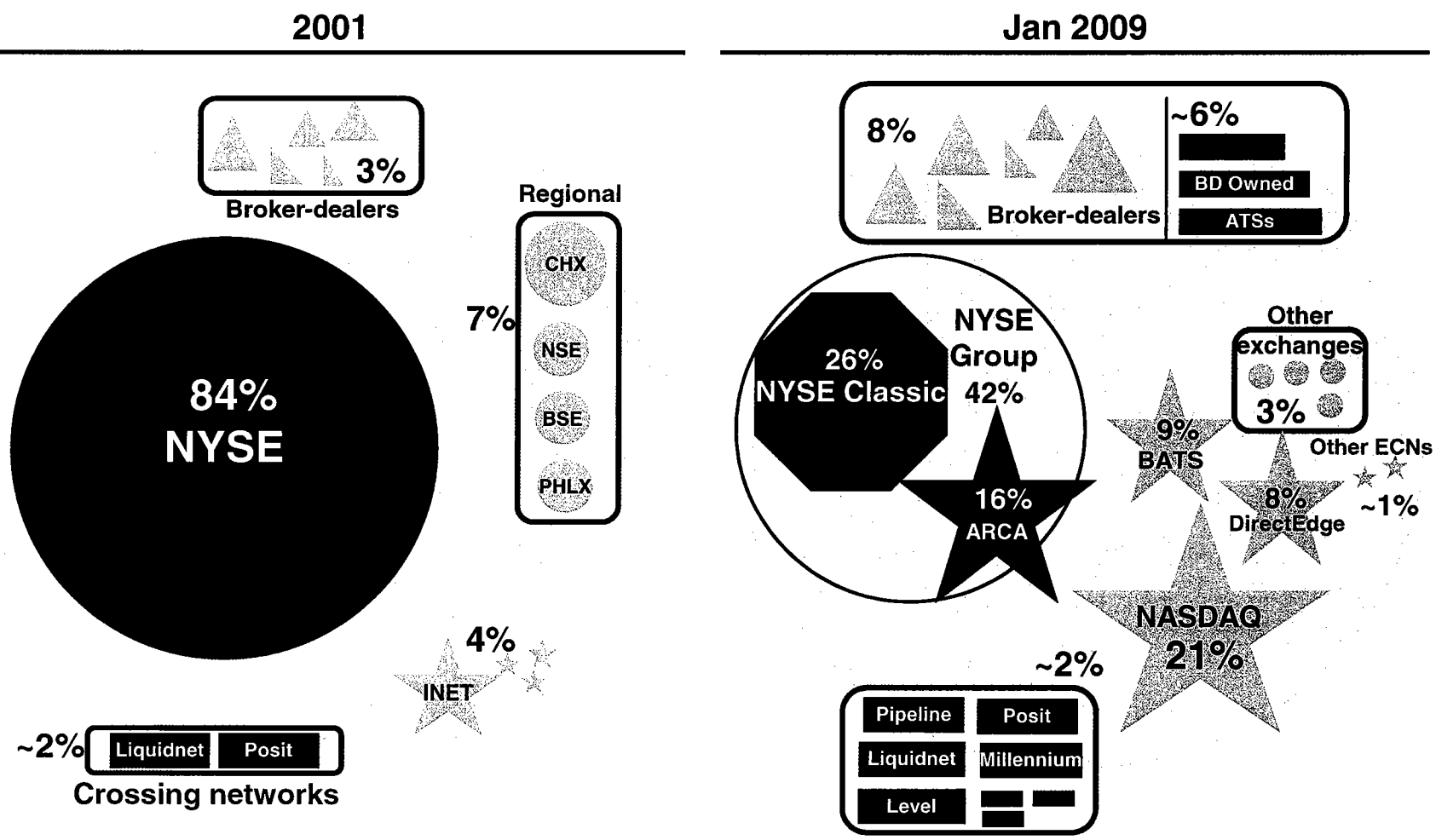
The Milestones



- The fundamental trade-off
  - Non-displayed liquidity reduces information leakage and risk of being front-run
  - But by not displaying cannot pro-actively attract counterparties

Source: George Sofianos Goldman Sachs Equity Execution Strategies, July 2008.

Distribution of Trading Volume in NYSE Listed Securities

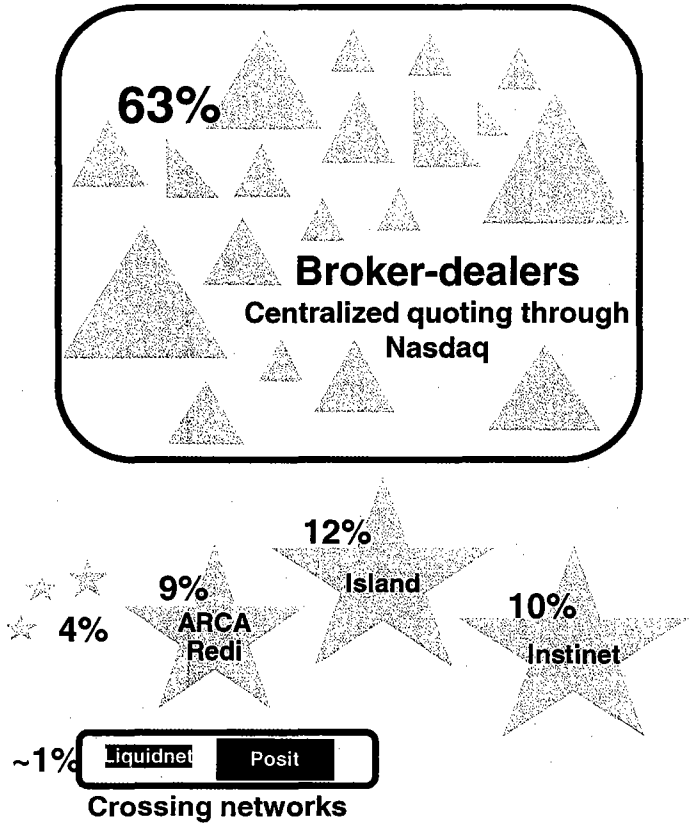


=> Trading of NYSE Listed Securities has become more fragmented.

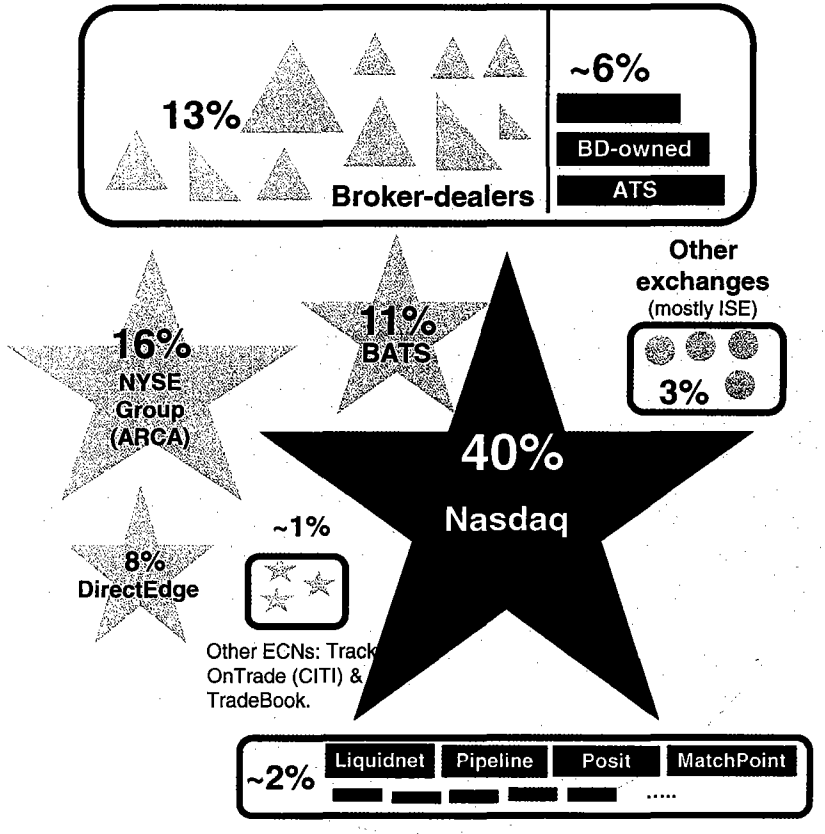
Source: George Sofianos Goldman Sachs Equity Execution Strategies, July 2008. Data utilized is from official exchange data and Rosenblatt "Trading Talk" for ATSs

Distribution of Trading Volume in NASDAQ Securities

2001



Jan 2009



=> NASDAQ has always been fragmented

Source: George Sofianos Goldman Sachs Equity Execution Strategies, July 2008. Data utilized is from official exchange data and Rosenblatt "Trading Talk" for ATSs

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Exchange Usage of Completely Hidden Order Types

Hidden orders on exchanges and ECNs accounted for 3.8% of U.S. volume in May.

VENUE	HIDDEN ADV[a]	% VENUE VOLUME	% CONSOLIDATED VOLUME
NASDAQ	221.3	9.9%	1.96%
BATS	80.2	6.1%	0.71%
DIRECT EDGE	67.6	4.8%	0.60%
NYSE ARCA	63.6	3.5%	0.56%
TOTAL	432.8	6.4%	3.84%

[a] *In millions of shares. Does not include reserve orders, which are partially displayed; Source: Rosenblatt Securities; Company data*

- ECN and exchange offered "completely-hidden" order types now account for 400+mm shares of daily trading volume
- Note: this figure does **not** include non-displayed "reserve" ordered shares, which we believe account for the majority of all exchange ordered shares

Source: Rosenblatt "Trading Talk" May 2009

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Quantifying the SIGMA X Benefit to Algorithmic Orders

- To help quantify the SIGMA X crossing benefit to **algorithmic orders** the GS Execution Execution Strategies team undertook the following study
- Overview
  - To quantify the SIGMA X crossing benefit, the team used a sample of client VWAP algorithm orders executed by GSEC between August and December 2007
  - Some orders had zero SIGMA X crossing, some executed 100% within SIGMA X, and some executed partially within SIGMA X
  - Multivariate regressions were used to control for the various factors that influence execution shortfall
- Findings
  - **For the average VWAP order in the study, SIGMA X crossing reduced execution shortfall (relative to arrival price) by 12 percent, from 26.8 to 23.6 bps**
  - Reduction in shortfall was caused by SIGMA X
    - Is larger for orders in mid and small cap stocks (which are typically more "difficult" to trade than large-cap)
    - Increases with execution horizon and order size
    - Is most likely caused by reduced information leakage

Source: "Street Smarts", George Sofianos Goldman Sachs Equity Execution Strategies, Apr 2008

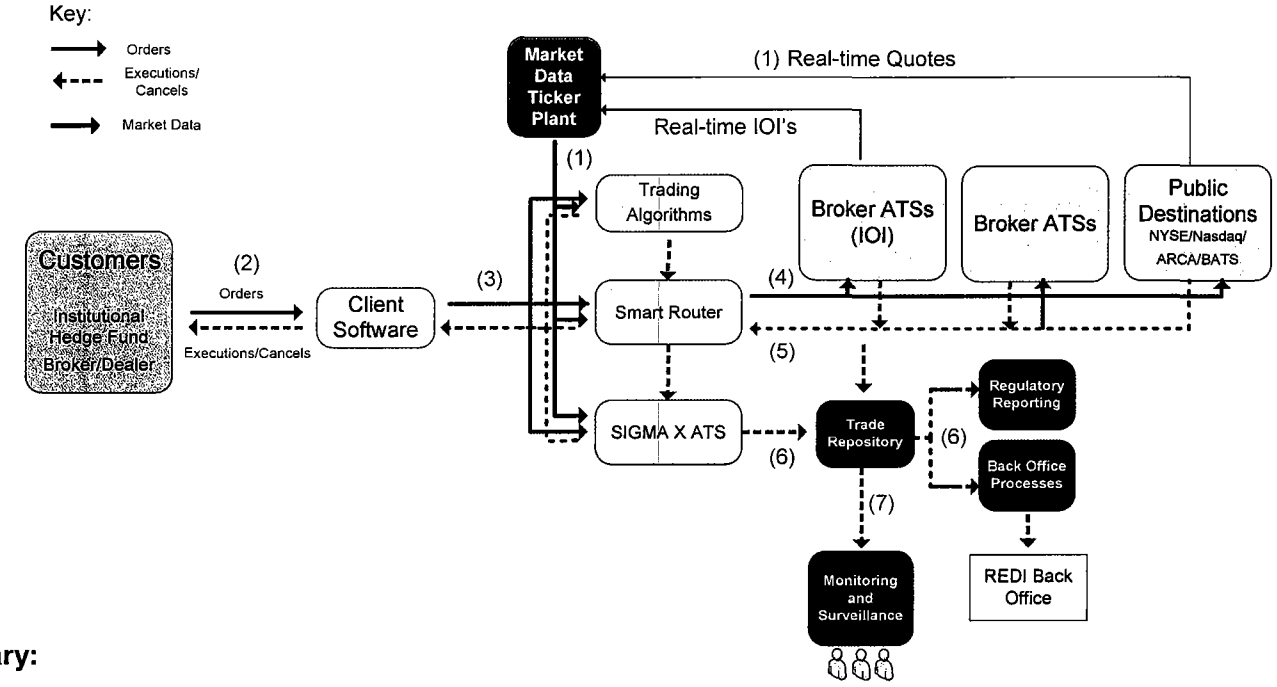
Goldman Sachs

Quantifying the SIGMA X Benefit to DMA Orders

- To help quantify the SIGMA X crossing benefit to **DMA smart routed orders** the GS Execution Strategies team undertook the following study
- Overview
  - To quantify the SIGMA X crossing benefit, the team used a sample of DMA smart routed orders that first were routed to SIGMA X prior to the public markets. The sample period consisted of orders from May 2008
  - Some orders had zero SIGMA X crossing, some executed 100% within SIGMA X, and some executed partially within SIGMA X
  - Multivariate regressions were used to control for the various factors that influence execution shortfall
- Findings
  - For order sizes greater than quoted depth, SIGMA X crossing reduces execution shortfall and the SIGMA X crossing benefit increases as order size relative to quoted depth increases
  - **On marketable smart router orders three times quoted depth, SIGMA X crossing reduced execution shortfall by 25 percent (from 5.3 to 4.0 bps)**
  - **On marketable smart router orders ten times quoted depth, SIGMA X crossing reduces execution shortfall by 47 percent (from 7.5 to 4.0 bps)**
    - The implication for traders is that when executing marketable orders, it may be worthwhile to check for liquidity in SIGMA X before going to the public market

Source: "Street Smarts", George Sofianos Goldman Sachs Equity Execution Strategies, July 2008

How Goldman Sachs Accesses Liquidity Broadly



Flow Summary:

- Real-time market data feeds into the SIGMA X ATS from the exchanges.
- GSET customer base, comprised of institutional, hedge fund, and other broker/dealers, can use a GUI front-end or FIX (financial information protocol) to send orders.
- Customers can then use a trading algorithm, our smart router, or access the SIGMA X ATS directly.
- Trading algorithms and smart routed orders will send orders to other dark pools and public destinations.
- Orders are then executed, partially executed, or canceled back to the client via the same arrival method.
- Real time order transactions are sent to a trade reporting facility (ACT) and to our back office trade repository.
- GSET also actively monitors SIGMA X ATS trades and executions on a real-time and end of day basis.

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Appendix C:

- **Discussion on Adapting a Tick Test for Today's Market**

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Different "Tick Tests" On Different Venues

- **Exchange Listed Securities Tick Test - SEC Rule 10a-1 approved in 1938**
  - Covered exchange "listed" securities on trades reported to the tape
  - Trade must be effected above last sale or at last sale if last sale was a "plus-tick"
  - Last Sale price permitted to be calculated off of consolidated tape or on an exchange's own data
- **NASDAQ Market Bid Test - NASD Rule 3350 approved in 1994**
  - Covered NASDAQ National Market securities reported to ACT (NASD's TRF)
  - Trade must be effected above last bid or at last bid if last bid was a "plus bid"
  - Bid price permitted to be calculated separately by each trading center or market maker
- **Other, No Test - no restrictions on short sale trading**
  - Did not cover NASDAQ securities traded on exchanges on a UTP basis
  - Did not cover NASDAQ Small Cap securities
  - Did not cover Bulletin Board or Pink Sheet securities

Historically, there was no uniform tick test rule. We must decide how to adapt the "old rules" to today's market.

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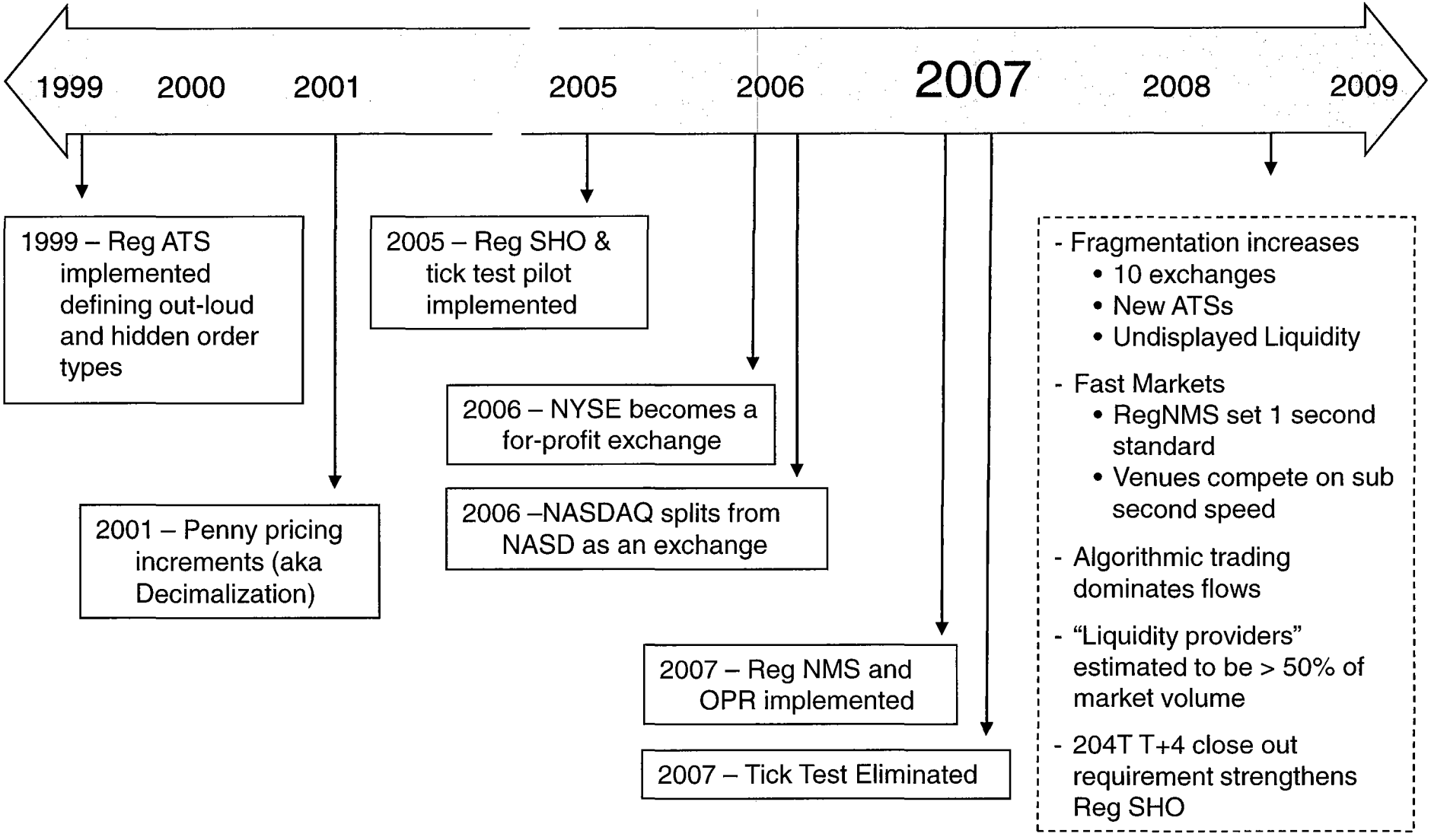
The Old Rules Required Many Exceptions

From the inception of Rule 10a-1 in 1938 through elimination of the old rules in 2007, numerous exemptions and exceptions were needed:

- 1938 – 39: Several exceptions were codified as part of Rule 10a-1 since its inception, including long seller's delay in delivery (e)(1), execution of an erroneously marked order(e)(2), odd lot transactions (e)(3) and (e)(4), the original equalizing exception (e)(6), bona fide domestic arbitrage (e)(7), international arbitrage (e)(8)
- 1974: Subsection (e)(10) adopted to exempt short sales by underwriters or syndicate members participating in a distribution in connection with an overallotment, and any lay-off sales by such a person in connection with a distribution of securities through rights or a standby underwriting commitment.
- 1980: Subsection (e)(5) and (e) (11) were adopted to update the equalizing exception - allowing certain market makers to equalize price notwithstanding the tick test for purposes of compliance with trade through rules and quoting obligations.
- 1984: Subsection (e)(13) was adopted to permit block positioners to offset part of the net short position.
- 1986: Merrill Lynch exemptive relief to allow for offset of net short positions for liquidation of index arbitrage positions.
- 1991 – 1999: Series of No Action Letters granting relief for electronic trading systems that match and execute trades at independently derived prices during random times within specific time intervals.
- 1993- 2001: SEC grants various fund sponsors exemptive relief for transactions in exchange traded funds (ETFs)
- 1994: NASD bid test is adopted in lieu of Rule 10a-1 and exemptive relief is granted for trades executed by qualified market makers in connection with bona fide market making
- 2000 – 2001: Series of No Action Letters granting relief for certain transactions executed on a volume-weighted average price ("VWAP") basis
- 2005: Exemptive relief granted to allow broker-dealers to fill customer orders, without the restrictions of the tick test for certain Riskless Principal transactions.
- 2006: Relief granted to allow the NASD to exempt securities included in the Nasdaq-100 Index.

If we reinstitute the old rules, many of the exemptions and exceptions will need to be restored and new ones may need to be added. Therefore, our goal should be to adopt a rule that is both protective and pragmatic for today's marketplace.

Market Structure Changes Timeline



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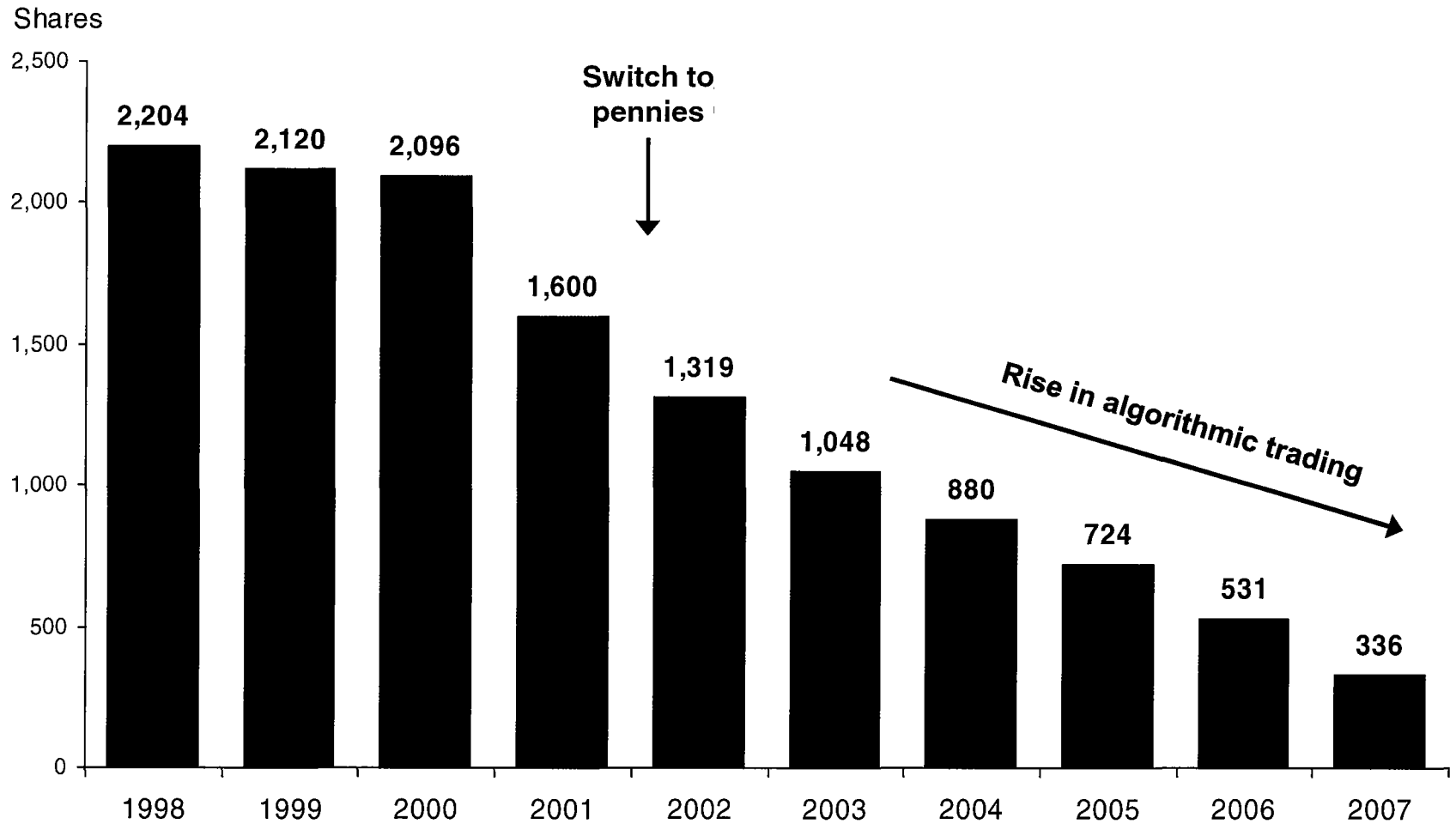
The decline in trade size on the NYSE



Source: ratio of consolidated. volume to trades (prints) – NYSE websites. Ratios prior to Jan '01 are adjusted for the change in NYSE reporting of total trades.

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Adapting Old Rules To Today's Market

The markets desire a new and more effective rule to combat potential manipulative short selling, increase market confidence and ensure that the U.S. capital markets are globally competitive - a solution for the 21st century in a post Regulation NMS world.[1,2]

In order to be most effective, we believe that any new pricing restriction rule should serve two basic fundamental goals:

- The rule must be designed to filter false positives, meaning that it is triggered at times when the market is most vulnerable to potential manipulative short selling - but not when normal market conditions prevail.
- The rule must be effective and updated for the current market structure, simple to enforce, and quick to implement.

[1] Post implementation of Regulation NMS, markets have become "fast" and market participants are required to maintain best bid or offer ("BBO") data to comply with trade through restrictions and best execution obligations. This BBO data can be leveraged to quickly implement a bid test requirement.

[2] We do not think a last tick test is implementable in a post Regulation NMS world across multiple venues. However a bid test is possible if we leverage the Regulation NMS data already required.

Proposal for Enhanced Tick Test ("Modified Uptick Rule")

Stock
Live Public Venue Test

↓

Objective % Move Circuit Breaker Test

BBO Offer
Previous Day Close

> 5 - 15%
(based on share price)

- Stocks which have hit the trigger to be published by exchanges
- The recommended range is 5 - 15% and should vary with stock price
- The percentage move could be calculated from current day open to avoid triggering based on pre-open news
- Prevents unintended loss of liquidity provider function in normal markets

If test is TRUE, then...

↓

Pricing Restriction Triggered
(three possibilities - ranked from most to least protective)

a) Ban on Short Selling
b) Ban on Hitting Bids ("Modified Uptick Rule")
c) Plus Bid Test

- Choice of restriction depending on behavior the SEC is attempting to deter
- "Cool-down" period can last from an hour to multiple days depending on the restriction
- Restrictions could be effective intraday or next day. Halting stocks may be necessary if intraday restrictions apply
- The data is calculated from existing "Protected Bid/Offer," as defined by Regulation NMS
- Exemptions will be needed for participants who are engaged in market making, upstairs customer facilitation and delta neutral hedging strategies

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Simplified Categories of Market Exemptions to Preserve Liquidity

Market Participant/Activity	What are the Qualifying Criteria?	For Use By	Rationale
Market Makers: **a) Exchange-based Market Makers** **b) OTC Market Makers**	a) Liquidity providers w/ express market obligations by virtue of registration, e.g., affirmative obligation b) Registered broker-dealers that provide two-way markets and source liquidity in derivatives products to their client base	a) NYSE Specialists, primary market makers incl. registered MMs, DPM and LMMs (Listed Options), and secondary liquidity providers e.g., NYSE SLPs b) OTC Derivatives dealers, including options, structured products, equity swaps and convertibles	a) Restrictions on hedging will impede provision of liquidity b) Inability to hedge will trigger ISDA provisions, cause unwinds w/increased volatility and cost to clients; dealers will be reluctant to establish new positions diminishing liquidity
Upstairs Customer Facilitation	Broker-dealers that provide two-way markets and liquidity in stock, ETFs, baskets and programs to their customers	Traditional block desks and other customer facilitation such as ETF, program trading and exchange-listed derivatives facilitation	Restrictions will impair dealers' provision of liquidity to their customer base – reducing an additional source of liquidity
Delta Neutral Hedging Strategies	Any market participant hedging equity exposure, as measured by a recognized industry model like Black-Scholes.	Registered broker-dealers, investment advisers or other participants, who submit to SEC inspection through certification/ filings	Inability to hedge will destroy investment strategies that are beneficial to the market such as convertible arbitrage, which will harm companies' ability to raise capital through the issuance of convertibles

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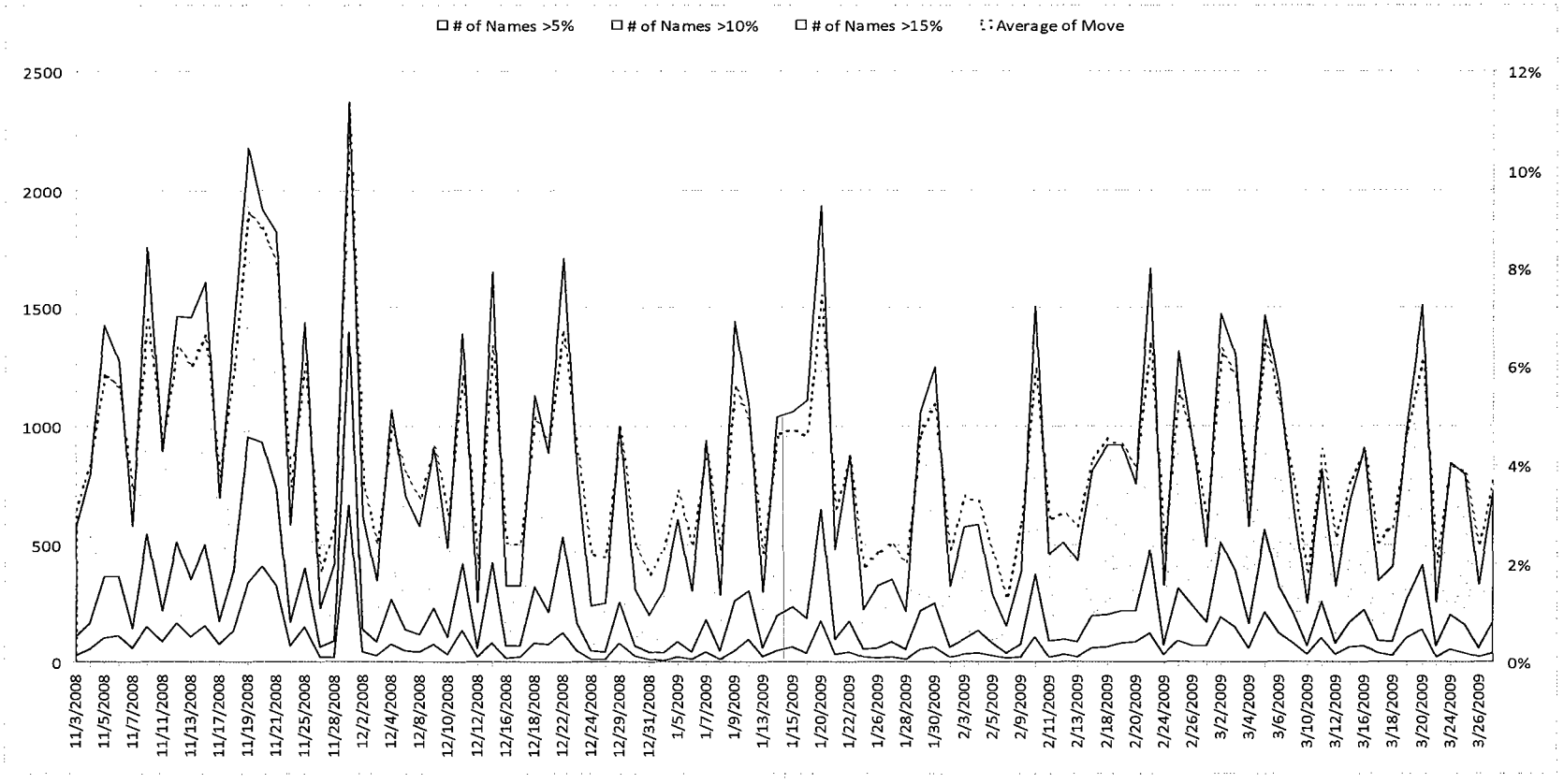
What's Changed in the Markets?

Old Environment	Current	Implications for Old Tick Test Rule
Minimum Price Increment = 5¢	Minimum Price Increment = 1¢ (a.k.a. Decimalization)	Increased "Quote Flickering". Up-Tick or Up-Bid is not as economically meaningful. Easier to game by creating artificial Up-Tick or Up-Bid.
Multiple tick or bid test rules to comply with, depending on which security and where it was traded. NASDAQ Securities traded OTC as part of NASD	NASDAQ became an exchange and it's securities are now considered "Listed", but still traded under old NASD bid test rule.	Multiple rules on different set of securities is problematic.
Old Trade-Through Rule	Unified set of short sale regulation for all markets due to Reg SHO and Reg NMS, including the new Order Protection Rule (OPR).	Reg NMS dictates that each market center must check its trades versus the best bid/offer that they "see", so there is no one place to determine an up or down bid/tick.
80-90% of "listed" volume on NYSE	10 Exchanges and no one has more than 40% of the volume. Smart Order Routers split order to multiple venues.	Ability exists to "create" an uptick on multiple venues. Sequencing and Ordering is problematic as each venue has different "view" of the market data.
Exchange Quotes sent out on one universal price feed. There is a Single TRF(ACT) for off-exchange volume reporting.	Each major exchange has its own data feed. We now have Multiple TRFs.	Each market participant will calculate the up-tick or up-bid in a different way using different data feeds. Sequencing and Ordering the prints will be problematic across venues.
Mutualized Exchanges with Market Data Revenue going towards supporting regulation cost.	For-Profit Exchanges with Market Data Revenue a key driver of profits.	Many different forms of exchanges "selling" market data (e.g. top-of-book vs. depth-of-book, full feed vs. "skipped" or aggregated ticks).
Mostly human trading decisions	Mostly electronic and Algorithmic trading decisions with high frequency trading "co-located" in Exchange data centers.	Speed advantage enables "flashing" of an up-bid. Trading occurs on market data that is seconds ahead of "official" published NBBO.
Order "turn-around" time measured in multiple seconds	Order "turn-around" time measured in micro seconds (pico?)	Flickering Quotes and timing mismatches will make surveillance and monitoring difficult if not impossible
Most Bids/Offers are "out-loud" and displayed in market data systems.	"Hidden" order types abound and most liquidity is not quoted "out-loud".	Trading inside the bid/offer now occurs frequently and often at sub-penny prices.
Handful of ETFs on broad stock indices	Over 800 ETFs accounting for over 20% of the trading volume. Some ETFs don't even have stock underliers.	Will need to update the definitions for exempt activity.
Varying definitions of exempt activity	We now have ATSs, SLPs, DMMs, Positioners/Facilitators	Will need to update the definitions for exempt activity.

Goldman Sachs

Symbols per day 5%, 10%, and 15% below the open Based on Russell 3000 Tickers



Average Number per Day % Down vs. Open

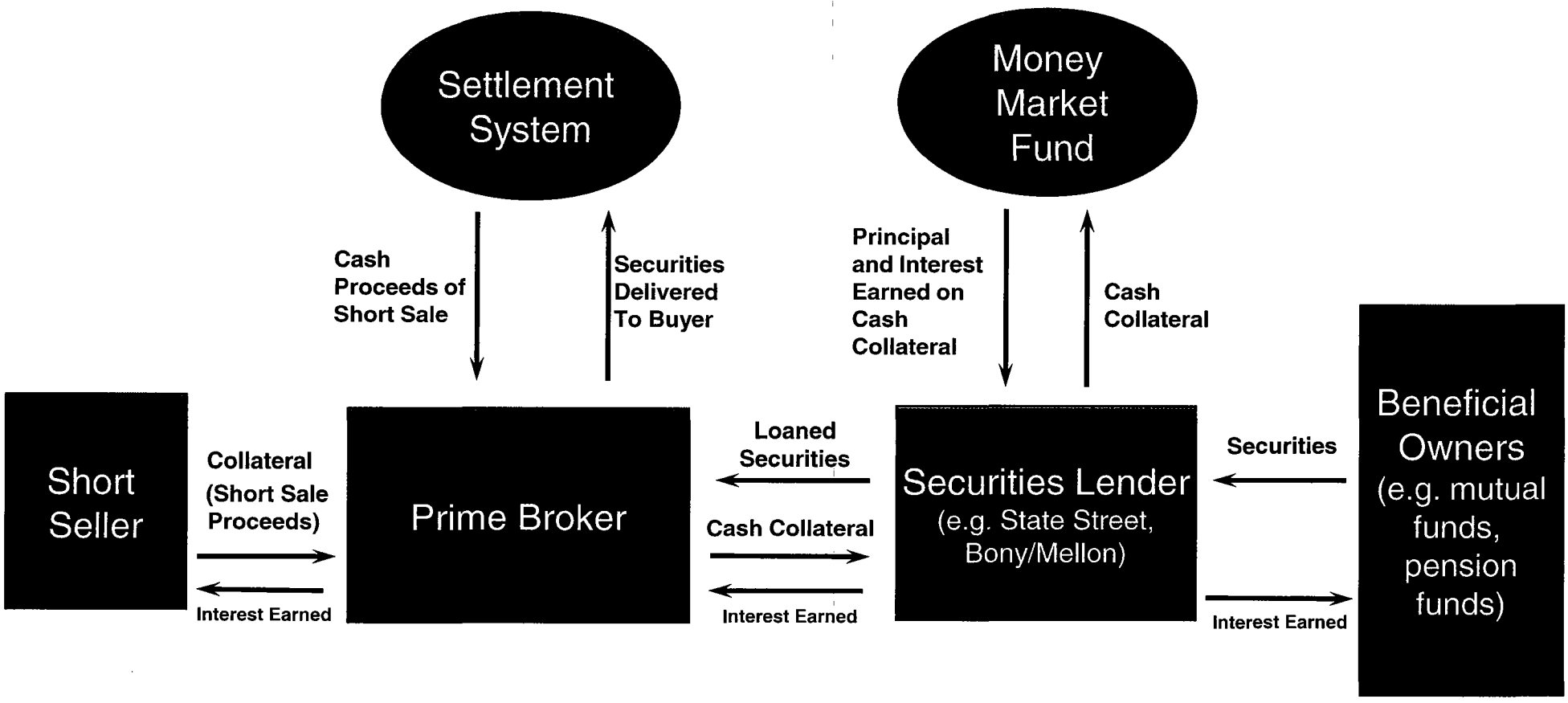
	Count	5%	10%	15%
Symbols >= $10	1799	346	54	11
Symbols < 10	1089	499	180	67
All Symbols	2888	845	234	78

Goldman Sachs

Appendix D: Securities Lending

- Securities Lending Transactions (p32)
- The Locate Process (p33)

Securities Lending Transaction



GS Market Structure- Locate Process