

Zicklin School of Business Financial Markets Series

Robert A. Schwartz  
John Aidan Byrne  
Eileen Stempel *Editors*

# 40 Years of Experience with the National Market System (NMS)

Who Are the Winners and What Have We  
Learned?

 Springer

# **Zicklin School of Business Financial Markets Series**

## **Series Editor**

Robert A. Schwartz  
Zicklin School of Business  
Baruch College/CUNY  
New York, NY, USA

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Robert A. Schwartz  
Zicklin School of Business  
Baruch College-CUNY  
New York, NY, USA

John Aidan Byrne  
Rockaway, NJ, USA

Eileen Stempel  
Zicklin School of Business  
Baruch College  
New York, NY, USA

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# **Preface: 40 Years of Experience with NMS: Who Are the Winners and What Have We Learned?**

Robert A. Schwartz  
Zicklin School of Business  
Baruch College-CUNY  
New York, NY, USA

In 1975, exactly forty years ago, the US Securities Acts Amendments were enacted by Congress. As you know, the new law, amongst other measures, precluded a return to fixed commissions. But most significantly for us, the development of a National Market System (NMS) was officially mandated.<sup>1</sup>

At the time, nobody, not even Congress, knew anything much about an NMS. Yet that did not slow them down in their mission to implement an NMS.

While the conference title appears to have a slant towards regulation, I anticipate that our discussions today will be a good deal broader. I certainly hope so. I have talked to the moderators and speakers about broadening the discussion. Nevertheless, the conference title is, perfectly suitable for our gathering today on market structure.

We all know that, since 1975, there have been technology changes that are huge and pervasive in scope. The competitive map has been redrawn. So, today, let's not focus just on regulation. Let's also pull technology and competition into our discussion.

The conference subtitle is, "Who are the winners and what have we learned?" The winners? Look at the landscape, and at the firms still standing. New firms arise and older firms disappear, driven out in part by the regulatory changes. There is market turbulence and other turbulence, and some change is naturally inevitable. But this change appears to be more pronounced when the regulatory environment itself changes.

Let me call your attention to one set of winners you might not immediately think of. It's us academicians! We've won because the issues are so intricate, complex, subtle, and seemingly without end. That means our microstructure research can continue on and on without interruption.

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<sup>1</sup>Federal legislation launched on June 4, 1975, to amend the Securities Exchange Act of 1934. The 1975 amendments instructed the Securities Exchange Commission to cooperate with the industry creating a National Market System along with an ambitious system for the clearance and settlement of securities transactions nationwide. The amendments also provided for the prohibition of fixed-commission rates, promulgated earlier by the SEC in its Rule 19b-3.

What have we learned? I have my thoughts, my proposals, and my suggestions. I will not go into them right now. But, from a personal point of view, I want to point out something I have learned. I've learned how complicated the issues are. There are no magic answers, no silver bullets and, of course, the questions never end. When it's complicated as it is, it says something for letting nature take its course in a competitive environment.

The opinion is widely held today that our market quality is far better than it was 40 years ago. Yes, there are tighter spreads. The evidence is that market impact costs have come down. Those are tricky things to measure, but the evidence is certainly saying that. Clearly, commissions are lower too.

At the same time, the feeling is widespread that something isn't working so well. On both sides of the Atlantic, there's a great deal of regulatory attention being given to market structure issues. Of course, of particular concern are the flash crashes, but it's not just flash crashes.

How do you know if a boat is really seaworthy? Don't assess it on a calm day. If you really want to know, see how it rides when the weather turns foul. If we are to properly assess market quality, assess it during stressful times. The market is very accommodating about this—it gives us a lot of stressful times.

Sila Alan and I published a study on this in a 2013 paper in the *Journal of Portfolio Management*, "Price Discovery, the Economic Function of a Stock Exchange."<sup>2</sup> Our paper can be traced back to comments made at an earlier conference in our Zicklin School series. We found evidence of extraordinarily high intraday volatility for some individual stocks on some individual days. That evidence demands attention.

Let me remind you that so many assessments of market quality have to do with spreads, market impact or whatever, and are made on the basis of averages. My warning: beware of averages.

There's a story told about a physicist, a chemist, and a statistician who went bear hunting in Maine. They went into the woods and spotted a bear in the distance. The physicist shoots first and misses, 5 feet to the left. The chemist goes next, shoots, and misses, 5 feet to the right. The statistician says, don't worry guys, on average, you killed the bear!

Highly computerized markets are great.

Here is one other thing about electronic trading. The computer doesn't think, in reality it responds to instructions. If an unusual situation comes along, a computer does not know how to handle it. I've worked with enough of the markets. I know this is a terrible concern.

The computer deals with a bunch of "if statements", *If* this, then that; *if* this, then that. These *if* statements, don't think behind the meaning of what's being said. This reminds me of the fellow who is working in his office late in the afternoon. He gets a call from his wife. "Honey", she says "On the way home, would you please stop

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<sup>2</sup>"Price Discovery: The Economic Function of Stock Exchange," by Nazli Sila Alan and Robert A. Schwartz was published in *The Journal of Portfolio Management* Fall 2013, 40 (1) 124–132; <https://doi.org/10.3905/jpm.2013.40.1.124>

at the grocery and get me a quart of milk?" The husband responds: "Sure, dear, I'll be pleased to." The wife then adds: "A quart of milk, please. And if they have avocados get me four." The husband confirms: "Sure, honey, I'll be pleased to." He shows up a short while later, walks in the front door, and his wife loudly exclaims, "My, God, what are you doing with four quarts of milk." He replies: "Because they had the avocados" (laughter)! *If* statements, guys, *if* statements. Some people here today laughed. Some didn't. If you didn't understand this joke, I have to explain it! This is a cross between a joke and an IQ test (laughter).

I want to call your attention to liquidity. It isn't just trading costs that are at stake. It is also liquidity. What is liquidity? How do you define it? How do you measure it? How might it best be provided? And do we even want it? Why do I add this? How many of you read Martin Wolf's column in the *Financial Times*, October 6<sup>th</sup>? Did any of you read it?<sup>3</sup> Just a couple? It's a really interesting article; it's a sparky article. After I read the piece, my first reaction was, Oh, my goodness gracious, how could he be correct?

I'll zip through a couple of quotes from the piece. "Market liquidity is likely to disappear when one needs it most, building our hopes on its durability is risky." Correct, I agree. "Market liquidity is a fickle friend;" Correct, I agree. "We should contest the conventional wisdom of the benefits of market liquidity." The benefits, hmm? That's when I slowed down. This is the last quote I'll give you from the same piece: "The economy should not be based on confidence in something likely to vanish." Fine, I can accept that.

I believe that there is truth to what he's saying about fragility and fickleness. But I would take the conclusion in a different direction. I would say you should emphasize the need to find a superior, more reliable source of liquidity. That's where I pull in the listed companies. I hope that in our discussions today we get into some of this stuff.

It is now a pleasure on my part to introduce Tom Gira from FINRA, the Financial Industry Regulatory Authority. This is your third appearance here, Tom. I am very excited to have you back again.<sup>4</sup>

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<sup>3</sup>Beware of the Liquidity Delusion. Martin Wolf, *Financial Times*, October 6, 2015. <https://www.ft.com/content/c8c2cc44-68fa-11e5-a57f-21b88f7d973f>

<sup>4</sup>With great sadness, FINRA announced the passing of Tom (Thomas) Gira, executive vice president, Market Regulation and Transparency Services, on Saturday, June 20, 2020. He was 58.

# List of Participants

Name	Company	Title
John Adam	Portware	Global Head of Product Management
Nazli Sila Alan	Fairfield University	Assistant Professor of Finance
Amber Anand	Syracuse University	Associate Professor
Gregg Berman	Ernst & Young	Principal, Financial Services
William Brodsky	CBOE	Chairman of the Board
Andy Brooks	T.Rowe Price	Vice President
Enrico Cacciatore	Voya Investment Management	Senior Quantitative Trader
Arthur Cashin	UBS	Managing Director
Stephen Cavoli	Virtu Financial	Global Head, Virtu Execution Services
Bryan Christian	BATS	Senior Vice President
Curt Engler	JP Morgan Asset Management	Head of Equity Trading, Americas
Anthony Fortunato	Instinet	Managing Director
Joe Gawronski	Rosenblatt Securities	President & COO
Thomas Gira	FINRA	Executive Vice President of Market Regulation
Bill Harts	Modern Markets Initiative	CEO
Alan Hill	Jones Trading	CEO
Pete Jenkins	CODA Markets (formerly PDQ ATS)	Managing Director
Richard Lindsey	Janus Capital Group	Chief Investment Strategist
Frank Loughlin	Alliance Bernstein	Global Co-Head of Equity Trading
Tim Mahoney	BIDS	CEO
Nina Mehta	Journalist and Author	
Bob Pisani	CNBC	Correspondent
Robert Schwartz	Zicklin School of Business, Baruch College	Speiser Professor of Finance
Gary Stone	Bloomberg Trading Solutions	Chief Strategy Officer

Name	Company	Title
Nandini Sukumar	World Federation of Exchanges	CEO
Adam Sussman	Liquidnet	Head of Market Structure & Liquidity Partnerships
Larry Tabb	Tabb Group	CEO
Dave Weisberger	Markit	Managing Director
Greg Wood	Deutsche Bank Securities	Director
John Zecca	Nasdaq	Senior Vice President

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Jones Trading  
Modern Markets Initiative  
Nasdaq  
PDQ ATS Inc.  
Portware  
TABB Group

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# Chapter 1

## Thoughts and Perspectives on 40th Anniversary of the National Market System (NMS)



Thomas Gira

I want to start by thanking Bob Schwartz for inviting me to speak this morning, and for his tireless efforts to foster a greater understanding of trading and market structure. As always, Bob today has laid out a very provocative and thoughtful theme, “40 Years of Experience with NMS: Who Are the Winners and What Have We Learned?” It looks like we can expect a great conference with all the excellent panels.

Before the panels begin, I would like to share my views on the National Market System, or NMS.<sup>1</sup> Many of us in this business a long time will appreciate how the ‘75 Act Amendments to the Securities Exchange Act of 1934, and the rules by the SEC to create the National Market System, set the stage for the last 40 years of innovation in the markets.<sup>2</sup> The pace of change since 1975 has accelerated through the decades, leading to what are the most efficient markets in the world.

While the changes have not always been welcome, and indeed, they’ve been very contentious and painful for some, they have nevertheless brought a variety of positive effects for investors and issuers and have triggered a technological revolution to this day.

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<sup>1</sup> Federal legislation launched on June 4, 1975, to amend the [Securities Exchange Act of 1934](#). The 1975 amendments instructed the [Securities and Exchange Commission](#) to cooperate with the industry in creating a [National Market System](#) along with an ambitious system for the clearance and settlement of securities transactions nationwide. The amendments also provided for the prohibition of fixed-commission rates, promulgated earlier by the SEC in its Rule 19b-3.

<sup>2</sup> Ibid.

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T. Gira (✉)  
FINRA, New York, NY, USA

To put that in perspective, FINRA collects on average 40 billion events a day.<sup>3</sup> On August 24 alone, we successfully collected 75 billion events.<sup>4</sup> To further put that in perspective, on just one day, FINRA handled more events than MasterCard processed in a year, and Visa processed in a month. That will give you a sense of the enormous size of the market, and of all the events generated in our markets today.

Because the National Market System facilitated the infusion of technology, the industry is now starting to discuss execution speeds in picoseconds, or a one-trillionth of a second. The industry also is now starting to talk about reducing latency further, by swapping out the dated fiber optic cables with microwave dishes that were so famously described in *Flash Boys*.<sup>5</sup> These can convey data in almost half the time, allowing high-frequency traders a way to squeeze profit from miniscule price discrepancies in assets traded around the world.

Lastly, exchange data centers are now an amalgamation of exchange trading engines and computers of broker-dealers, to reduce latency as much as possible. All these changes are grounded in the wide latitude the SEC gave to markets and market participants to determine the best structure to achieve the objectives of the National Market System.

So, in addition to Bob's questions, I would like to pose two additional questions: Did the SEC give the markets too much discretion; and, if so, is the result a market that is now out of control? It is important to note that these are not simply academic questions. The fairness and efficiency of our financial markets have an impact on investor confidence and on capital formation. Our markets are a key component of America's competitive strength within the global economy. So, it's critical that we get these answers right.

For a little more perspective on the impact of the National Market System, I would like to take you on a trip down memory lane. Before 1975, there were off-board trading restrictions that limited where investors could purchase or sell securities. Also, competition among exchanges was limited, and there were no consolidated data feeds for quotes. Options listings were allocated in lotteries much like the NFL draft; and the norm was fixed commissions with excessively high trading costs. That meant that retail investor participation in the market was a fraction of what we see today.<sup>6</sup>

The Securities Act Amendments of 1975, which mandated the creation of a National Market System, spurred far-reaching change in the equity markets. The five objectives for the National Market System are: (1) the efficient execution of transactions; (2) fair competition between markets; (3) the availability of quotation and transaction information; (4) the best possible execution of orders; and (5) where

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<sup>3</sup>Event gathering and processing refers to the collection and management of the data associated with customer orders and other commercial transactions. FINRA, or the Financial Industry Regulatory Authority. About FINRA: <https://www.finra.org/about>

<sup>4</sup>After historic 1,000-point plunge, Dow dives 588 points at close. Matt Egan. CNN., August 25, 2015 <https://money.cnn.com/2015/08/24/investing/stocks-markets-selloff-china-crash-dow/>

<sup>5</sup>See, *Flash Boys: A Wall Street Revolt*. Michael Lewis (2015, WW Norton & Company, LLC).

<sup>6</sup>See, *The History of Options Trading*. Source: [optionstrading.org](http://optionstrading.org).

consistent with other goals, the execution of orders without the participation of a dealer.<sup>7</sup>

With these objectives in the forefront and equipped with a flurry of proposals and approvals starting in the mid-1970s, the SEC created securities information processors, or SIPs. The SIPs were created for the consolidation of quotes and trades for equities and options.<sup>8</sup> The Intermarket Trading System, or ITS, was also implemented.<sup>9</sup> It was a rudimentary linkage among the stock exchanges that was, nevertheless, an enormous change at the time, one that allowed non-members access to liquidity on an exchange. It was designed to ensure that customers got the best prices possible.

Off-board trading restrictions were eventually lifted, and the options listing lottery was abolished for a system that rewarded market share based on market quality, not on exclusive assignment.

Later in the 1990s, the SEC adopted the order handling rules.<sup>10</sup> These rules required market makers to publish customer limit orders in their quotes, and abolish the two-tiered market structure where a market maker could simultaneously display a public quote and a superior non-public quote on a private electronic trading system.

Next, the shift to decimalization in 2002 led to a sea change in the over the counter market—with spreads dramatically narrowing, and firms acting as their clients' agents rather than trading with them as market makers.<sup>11</sup>

The implementation in 2007 of Regulation NMS, ushered in another period of incredibly rapid change, and provided a catalyst that led to enhanced technology and competition.<sup>12</sup> Perhaps the greatest changes were the more fulsome automation of the NYSE and the moving away from the floor-based specialist model. Also notable are the joys of access fees, maker taker and taker maker, other pricing

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<sup>7</sup>Federal legislation launched on June 4, 1975, to amend the [Securities Exchange Act of 1934](#). The 1975 amendments instructed the [Securities and Exchange Commission](#) to cooperate with the industry in creating a [National Market System](#) along with an ambitious system for the clearance and settlement of securities transactions nationwide. The amendments also provided for the prohibition of fixed-commission rates, promulgated earlier by the SEC in its Rule 19b-3.

<sup>8</sup>Security Information Processors (SIPs) were established to link US markets by processing and consolidating quotes and trades from trading venues into a single and accessible data feed.

<sup>9</sup>Network linking the [trading floors](#) of US stock exchanges to permit trading among them in [stocks listed](#) on either the [NYSE](#) or [AMEX](#) (now part of the NYSE), and one or more [regional exchanges](#).

<sup>10</sup>SEC's Order Handling Rules and Beyond [https://link.springer.com/chapter/10.1007/978-3-319-54588-2\\_1](https://link.springer.com/chapter/10.1007/978-3-319-54588-2_1)

<sup>11</sup>"A system in which the price of a security is quoted using a decimal format rather than fractions. For example, a decimal trading quote would be \$56.25; using fractions, the same quote would appear as \$56¼. The US Securities and Exchange Commission ordered all stock markets within the US to convert to decimals by April 9, 2001. Prior to 2001, markets in the US utilized fractions in price quotes. Since decimalization, all quotes appear in the decimal trading format." Source: Investopedia Read more: Decimal Trading <https://www.investopedia.com/terms/d/decimal-trading.asp#ixzz56MmIr0Vz>

<sup>12</sup>Reg NMS (Regulation National Market System) was adopted by the Securities and Exchange Commission in 2005, and introduced two years later to further advance the ideals of a national market system. The regulation includes the order protection, or trade-through rule; access rule (fair access) to market data including quotations; rules on sub-penny trading and on market data.

models, and the advent of dark pools created to facilitate the execution of block orders in a market with shrinking quote sizes. With this come the potential for greater order leakage.<sup>13</sup>

We have also seen a dramatic shift in where trades are executed, and how trading volume is spread across the venues. The NYSE and NASDAQ once had an overwhelmingly dominant share of the market for their issues.<sup>14</sup> But a substantial portion of that volume has shifted to other upstart venues, including the BATS family of markets, and the revamped Pacific Stock Exchange, now known as NYSE Arca, as well as the 40-odd ATs that are operating today.<sup>15</sup>

Who are the winners of the regulatory changes over the last four decades? Clearly, investors. And because of that, issuers too. Investors now benefit from lower trading costs through tighter spreads, instantaneous executions, a wider variety of order types to achieve their investment objectives, and the availability of multiple innovative trading platforms.

However, with our National Market System, it is never that straightforward, nor is it clear-cut. While our investors have benefitted, the regulations have also created a much more complex, fragmented market, and liquidity is disbursed over many trading venues. Ironically, as the SEC has continued to seek to improve the National Market System, where their centerpiece is transparent markets, a significant byproduct of these efforts has been the proliferation of dark pools, where the lack of transparency seems antithetical to the objectives of the NMS system.<sup>16</sup>

In addition, we also are becoming much more of an order-driven market, with the registered market makers playing a much less prominent role in the provision of liquidity.<sup>17</sup>

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<sup>13</sup>In a competitive program to encourage trading on exchanges, maker-taker fees, for instance, offer a transaction rebate to trading participants who provide liquidity, charging customers who take liquidity. New York Stock Exchange Systems and Trading Procedures Joel Hasbrouck. George Sofianos. Deborah Sosebee. NYSE Working Paper #93-01 <http://people.stern.nyu.edu/jhasbrou/Research/Working%20Papers/NYSE.PDF>. The SEC's Order Handling Rules of 1997 and Beyond: *Perspective and Outcomes of the Landmark Regulation*. Richard Lindsey, John Aidan Byrne and Robert A. Schwartz. The Journal of Portfolio Management Spring 2016, 42 (3) 56–64; <https://jpm.ijournals.com/content/42/3/56>

<sup>14</sup>At the time of writing, the dominant market share of both exchange operators had declined sharply to some 19 percent for the New York Stock Exchange and to 16.62 percent for NASDAQ.

<sup>15</sup>By one early count, prior to this conference, a total of 91 ATs were registered with the Securities and Exchange Commission by late 2013, according to a story published by Reuters.

<sup>16</sup>The National Market System (NMS) addresses this transparency in the following ways:

Promotes free market transparency by regulating how all major exchanges disclose and execute trades; facilitates the fair distribution of information, the NMS requires that exchanges make bids and offers available and visible to both individual and institutional investors. In 2005, the SEC issued Regulation National Market System (Reg NMS) to strengthen the NMS and account for changing technology. (Source: Investopedia)

<sup>17</sup>An order-driven market is one where pricing primarily comes from orders placed by investors and other market participants. In contrast, a quote-driven market is one where pricing primarily comes from market making entities obligated to maintain two-sided quotes.

This brings me back to the question I previously posed: Did the SEC give too much latitude to the markets as the NMS system developed? Were the guardrails for innovation established by NMS set too far apart? I think the answer is absolutely not, but there are many who think otherwise. Some believe high-frequency trading should be banned, or at least seriously curbed. There are those who believe the speed at which trades occur and quotes are updated, is a root cause of dramatic fluctuations in the market.

There are some who believe firmly in human intervention. But history tells us that trying to stop technology is a fool's errand, particularly market technology. Looking at all the changes the markets have experienced in the last 10 years, it is clear that we likely do not know what's around the corner from a technology perspective. But it would be dangerous to rein in the market and not make use of the available and evolving technology.

One thing we have learned about the NMS system over the years is that it is an evolutionary process, not a utopian destination point. I think there are also several other lessons learned about the NMS system that we should keep in mind as markets evolve.

First, NMS regulations in the past have tended to apply a one-size-fits all approach, where a particular rule applies to all NMS issues. Given the differences in market characteristics across issues in terms of volume, liquidity, and other attributes, it is not entirely clear that it is best to apply one set of rules designed for highly capitalized, actively traded issues to all issues. I think that it's a very positive development the SEC is conducting the tick size pilot, and potentially looking for a more nuanced and stratified approach to regulation.<sup>18</sup> The data this pilot provides will deepen our understanding of how tick sizes affect market quality, and help us consider new regulatory initiatives that can improve trading in all small-cap securities.

Second, by applying more data analytics to the rule making process, and conducting more robust cost-benefit analyses, we need to continue to focus on maximizing the intended consequences of regulation and minimizing the unintended consequences.

I'm not so sure that the SEC fully anticipated all the issues that have flowed from access fees.<sup>19</sup> It was very encouraging to hear there was consensus to develop a pilot to evaluate trading without maker-taker inducements, among SEC staff, and market participants, and at the SEC's recent Equity Market Structure Advisory Committee.

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<sup>18</sup>The pilot was approved by the Securities and Exchange Commission. See, SEC Approves Pilot Program to Assess Tick Size Impact for Smaller Companies. Press Release. Securities and Exchange Commission. May 6, 2015. <https://www.sec.gov/news/pressrelease/2015-82.html>. See also, SEC Approves Pilot Program to Assess Tick Size Impact for Smaller Companies. Center for Financial Stability, May 7, 2015. <http://centerforfinancialstability.org/wp/?p=5987>.

<sup>19</sup>See, Capital Markets Outlook 2015: The SEC is conducting a broad review of US equity market structure, but the most important proposals are the tick-size pilot, maker-taker rebates, dark pools, and order routing transparency. *Wall Street and Technology*. Ivy Schmerken. January 7, 2015. <http://www.wallstreetandtech.com/trading-technology/the-clock-for-market-structure-change-is-ticking/d/d-id/1318135>.