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Entropy and the National Market System

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ENTROPY[1] AND THE NATIONAL MARKET SYSTEM[2]

Junius W. Peake[*]

I was invited to the *Brooklyn Journal of Corporate, Financial & Commercial Law* symposium to discuss my predictions for and thoughts on some of the problems facing and changes occurring in the current national market system. My thoughts are presented from a unique perspective. I have been an executive in the securities industry, and governor and vice-chairman of a self-regulatory organization. I founded the first electronic futures market and have been a consultant to government agencies, markets and market participants. Most recently I was an academic for 14 years. I am now retired.

During almost all that time, I followed the torturous path of the development of the national market system. I have written and spoken about it for more than thirty years. As a result, this essay reflects my thoughts on the past, present, and future state of the national market system.

I. A BIT OF HISTORY

My first exposure to market structure came when, in 1965, I was placed in charge of the operations of the brokerage firm Shields & Company. Although my area of responsibility did not include floor or over-the-counter trading, it encompassed the operational results of those activities. In those days, operational systems were almost entirely manual. Automation consisted of tabulating machines, key punches and Addressograph plates. The mechanics of floor and over-the-counter trading were accomplished by scribbles, shouts and telephone calls.

Needless to say, these archaic technologies contributed to what would be called the "back office crisis," which continued until the mid-1970s. Errors were rampant; correcting them was time-consuming and costly. DKs, or Don't Knows—which stood for transactions on exchange floors that were not confirmed by both parties—were legion and many firms lost bookkeeping control. Securities were not delivered in a timely fashion, and the number of "fails," which were transactions that did not close within normal settlement times, escalated to numbers that placed more than a few firms into financial jeopardy or bankruptcy.

With much time and effort, the operational side of the business was finally addressed with considerable success. Consensus was achieved when

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1. Entropy: "In software, it is the disorder and jumble of its logic, which occurs after the program has been modified over and over." Entropy Definition, http://www.pcmag.com/encyclopedia_term/0,2542,t=entropy&i=42666,00.asp (last visited Mar. 31, 2007).

2. Please note that portions of this paper incorporate or have been adapted from my previous writings.

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both the banking and brokerage industries finally realized that the clearance and settlement part of the business was almost entirely on the expense side of the ledger, and that cooperation and consolidation of these functions would result in enormous cost savings and greater efficiency for all participants, including the customers.

Major milestones in resolving these operational problems came about through the establishment of the Committee on Uniform Securities Identification Procedures (CUSIP) number for identifying publicly-traded securities, the implementation of what was known as a continuous net settlement system for clearing houses, and the metamorphosis of those entities into a national clearing, settlement and depository system.

The modernization of these back office functions came about from 1966–1973, starting with CUSIP. During the same time period, lots of discussions about problems with the trading side of the business were held and Congress started to examine the problems of the securities industry with the view toward determining whether legislation was needed.

Congress—and others such as myself—began to explore whether trading systems are just as much cost centers as the clearing and settlement activities. Who does and should pay their costs? The same universe is involved in both: investors and issuers. I attended a conference at New York University in 1979 when the executive vice president of the New York Stock Exchange (NYSE) stated that automating the NYSE would cost as much as $20–$30 million.[3] He rhetorically asked where the industry would ever find that much money. In contrast, twenty-five years later, when the Securities and Exchange Commission (SEC) issued the proposed Regulation NMS[4] in 2004, the Commission stated:

> The Commission staff estimates that there would be an initial one-time burden of 200 burden hours per SRO or 1,800 hours, and 150 burden hours per non-SRO order execution facility or 1,015,200 hours, for a total of 1,017,000 burden hours to establish policies and procedures designed to prevent the execution of a trade-through for an estimated one-time initial cost of $145,469,475. The Commission estimates a capital cost of approximately $101,655,000 for both SROs and non-SROs resulting from outsourced legal work.[5]

Those figures, of course, do not include the enormous costs of hardware and programming the millions of lines of code that will be needed to

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3. Morris Mendelson, Junius W. Peake, & R.T. Williams, Jr., *Toward a Modern Exchange: The Peake-Mendelson-Williams Proposal for an Electronically Assisted Auction Market*, *in* IMPENDING CHANGES FOR SECURITIES MARKETS: WHAT ROLE FOR THE EXCHANGES? 53, 67 (Ernest Bloch & Robert A. Schwartz eds., 1979).

4. "NMS" refers to the National Market System.

5. "SRO" refers to self-regulatory organization. *See* Regulation NMS, Exchange Act Release No. 49,325, 69 Fed. Reg. 11,126 (Feb. 26, 2004) (codified at 17 CFR pts. 200, 230, 240, 242, and 249) (citations omitted).

implement Regulation NMS. Nor do they reflect the true price tag being paid by investors and issuers through their brokers and market centers.

In 1971, both the House and Senate held investigative hearings; in 1973, legislative hearings were held that culminated in the May Day enactment of the Securities Acts Amendments of 1975, which were intended to foster competition among the securities markets. I testified at a number of House and Senate hearings leading up to the Amendments.

In 1975, section 11A of the Securities Exchange Act of 1934 became law. Congress ordered the Commission to:

> [U]se its authority under this title to facilitate the establishment of a national market system for securities (which may include subsystems for particular types of securities with unique trading characteristics) in accordance with the findings and to carry out the objectives set forth in paragraph (1) of this subsection.[6]

Many believed that accomplishing the mandate entrusted to the Commission would be straightforward and rapid. Although we are now starting the fourth decade since that fateful May Day legislation, Regulation NMS, the latest iteration of the SEC's instructions to facilitate this task, was not started until March 2007.[7]

A. A PROPOSED SOLUTION

When Professor Morris Mendelson of the Wharton School, R.T. Williams, Jr., my fellow consultant, and I submitted to the Commission's National Market Advisory Board our National Book System (NBS) proposal for the development of the NMS in 1976, we wrote:

> While it may appear that some of the elements of our proposed National Book System differ substantially from the present mechanism, the fact remains that our system will cost less to design, build, operate and regulate than any interim system. It will also be simpler to construct and will restore a centralized trading facility. Any attempt made to obtain a system such as we present, in stages, must result in a sequence of fully developed systems, each operating only long enough to permit the next stage to be constructed before being discarded.[8]

Specifically, our NBS proposal recommended several important features, including: screen-based electronic auction trading; consolidation of market makers' bids and offers with customers' bids and offers into a "book" of all orders for each security; an instantly accessible display of the aggregate quantities of all bids and offers at each price; anonymity for all

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6. Exchange Act § 11A(a)(2), 15 U.S.C. § 78k-1(a)(2) (2000).

7. Gaston F. Ceron, *New Trading Rules to Launch*, WALL ST. J., Mar. 5, 2007, at C3.

8. Letter from Junius W. Peake, Morris Mendelson & R.T. Williams, Jr., to George A. Fitzsimmons, Sec'y, SEC, Reference: File No. 57-619 (Apr. 24, 2000), *available at* http://www.sec.gov/rules/sro/ny9948/peake1.htm [hereinafter April 24, 2000 Letter].

orders entered; minimum price increments in decimals; price-time priority for execution of all entered bids and offers; multilateral price negotiation; and equal and instant information and global access by all qualified participants, including investors, dealers, market makers and specialists.[9]

The Commission did address these issues. It started out by proposing an automated central limit order book (CLOB). On December 19, 1975, the Commission issued Exchange Act Release No. 11,942, which stated unambiguously the reasons why it was necessary.

> Development of a central electronic repository for limited price orders would be of special significance to ensure integration of the markets and preservation of an opportunity for public orders to meet without the participation of a dealer. Such a step will certainly enhance competitive opportunities in market makings. For all these reasons, the Commission will utilize its new powers under the Act promptly to ensure implementation of a national mechanism for multi-market protection of limit orders. Nevertheless, it must be emphasized that it would be inappropriate to withhold from the markets the benefits to be derived from increased market maker competition indefinitely. Development of a national limit order mechanism is a further step in creating a national market system and must be expedited.[10]

And in 1976, SEC Exchange Act Release No. 12,159 further elaborated on the need for automation.

> The Commission believes that there is a need for further modernization and improvement of our securities markets, not only for the purpose of utilizing new data processing and communication techniques, but also to insure economically efficient execution of securities transactions and fair competition among brokers and dealers and among various securities markets which either directly compete with each other or have the potential for such competition. Existing exchange mechanisms for the storage and execution of limited price orders appear to be in need of modification to meet the requirements of member firms and investors for expeditious handling of order flow in the context of a national market system, as well as to cope with an increasing volume of securities transactions (such as that experienced in recent weeks). Further, existing limit order mechanisms are unable to provide nationwide limit order protection and thus cannot always provide the degree of protection for limit orders which hopefully could be furnished by a composite book. Finally, a composite book appears to be well suited to assuring an opportunity for public orders to meet without the participation of a dealer.[11]

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9. Mendelson, Peake, & Williams, *supra* note 3, at 53, 67.
10. Exchange Act Release No. 11,942, 41 Fed. Reg. 4507 (Jan. 30, 1976).
11. Exchange Act Release No. 12,159, 9 SEC Docket 76, at *1 (Mar. 2, 1976).

The Commission further responded in SEC Exchange Act Release No. 14,416, dated January 26, 1978, which explained the goals of the SEC.

> The concept of a national market system was first articulated in the Commission's letter of transmittal accompanying its Institutional Investor Study, submitted to Congress on March 10, 1971. There the Commission stated that:
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> > [a] major goal and ideal of the securities market and the securities industry has been the creation of a strong central market system for securities of national importance, in which all buying and selling interest in these securities could participate and be represented under a competitive regime.[12]

Again, quoting from the 1978 Release:

> In addition to elaborating on the principles set forth in the Future Structure Statement, the Commission's Policy Statement articulated two new proposals to govern trading within a national market system: an auction trading rule, which would provide price priority protection for all public orders entered in a proposed central electronic repository, and a public preference rule, which would accord preferential treatment to public orders entered in the central electronic repository by preventing securities professionals acting as principal from competing for execution with such orders unless such professionals bettered public bids or offers entered in that system.[13]

In reporting the legislative history of the 1975 Amendments, the same Release stated:

> [T]he Senate Committee on Banking, Housing and Urban Affairs (the "Senate Committee") stated that
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> > [t]he rapid attainment of a national market system . . . is important . . . to assure that the country maintains a strong, effective and efficient capital raising and capital allocating system in the years ahead.[14]

And again:

> The Senate Committee noted, however, that auction trading principles could not be perfected under existing circumstances because of fragmentation of the markets, particularly "the lack of a mechanism by which all buying and selling interest in a given security can be centralized and thus assure public investors best execution." Thus, the concept of implementing a nationwide system according price and time priority to all

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12. Exchange Act Release No. 14,416, 43 Fed. Reg. 4354, 4354 (Feb. 1, 1978) (quoting INSTITUTIONAL INVESTOR STUDY REPORT, H.R. DOC. NO. 92-64, pt. 1, at xxiv (1971)).

13. *Id*. at 4355.

14. *Id*. (quoting SENATE COMMITTEE ON BANKING, HOUSING AND URBAN AFFAIRS, REPORT TO ACCOMPANY S. 249, S. REP. NO. 94-75, at 3 (1975)).

> limit orders of public investors over all professional orders, regardless of where such limit orders originate or in what market center professional orders may be executed, received considerable support from the draftsmen of the 1975 Amendments.[15]

Discussing progress to date, the Release continued:

> The major problems to which the idea of a national market system is addressed are those arising from "market fragmentation," or the existence of multiple, geographically separated forums in which trading in the same security occurs, and from the institutionalization of the markets.[16]

The Release then specifically discussed "THE COMMISSION'S FUTURE PLANS FOR FACILITATING ESTABLISHMENT OF A NATIONAL MARKET SYSTEM."[17] In those plans, these prophetic words appeared:

> The adverse consequences of failing to achieve more rapid progress toward a national market system have become particularly apparent in the context of the Commission's pending proceeding concerning removal of exchange off-board trading restrictions. During the course of that proceeding, many elements of the securities industry, members of Congress and representatives of American business have urged the Commission to assume a leadership role in developing a national market system in order to overcome the impediments to development of that system inherent in the diversity of the securities industry, so that the benefits to the markets, the professional trading community and the public which the Congress and the Commission have long believed would inure from that system might finally be secured. Commentators in that proceeding, for example, were virtually unanimous in the view that the risks which many believe would attend removal of the remaining off-board trading restrictions could be minimized by assuring more effective integration of the markets for securities presently covered by those restrictions by means of national market system mechanisms.[18]

In regard to nationwide limit order protection, the Commission stated:

> The Commission continues to believe that one of the basic principles upon which a national market system must be based is the assurance that all agency orders in qualified securities, regardless of location, receive the benefits of auction-type trading protections. To this end, the Commission believes the several self-regulatory organizations should take joint action promptly to develop and implement a central limit order file (the "Central

15. *Id*. at 4356.
16. *Id*.
17. *Id*. (capitalization in original).
18. Exchange Act Release No. 14,416, 43 Fed. Reg. 4354, 4357–58 (Feb. 1, 1978).

> File") for public agency orders to buy and sell qualified securities in specified amounts at specified prices ("public limit orders").[19]

The Commission concluded by saying:

> The Commission urges the self-regulatory organizations to prepare and submit to the Commission, preferably jointly, a plan or plans no later than September 30, 1978, contemplating the design, construction and operation of a Central File. However, *should voluntary cooperation among such organizations to that end prove difficult, or involve undue delay, the Commission intends to commence rulemaking to consider the manner and timing of compulsory development of a Central File (including the question of whether that task should be assigned principally to a single self-regulatory organization).*[20]

But, in 1979, thanks to intensive lobbying efforts by the NYSE and other exchanges and market makers to preserve the status quo, the SEC suddenly reversed course and permitted a trio of unconnected systems to be, as the Commission put it, the "cornerstones" of the national market system. That reversal sealed the unconscionable delay of a national market system, at least for the rest of the 20th Century. In their April 1979 Exchange Act Release No. 15,770, the SEC stated:

> Most other self-regulatory organizations opposed creation of a Central File as described in the January Statement. These commentators argued that the kind of priority proposed to be afforded public limit orders entered into the Central File would have significant and deleterious effects on the exchange trading process. In essence, these commentators asserted that such a preference for public limit orders would provide a major trading advantage to those orders, thereby creating a disincentive to the commitment of market making capital by dealers, and would eventually lead to the elimination of exchange trading floors by inexorably forcing all trading into a fully automated trading system. In addition, several self-regulatory organizations suggested that, in lieu of the immediate implementation of a Central File, the Commission should permit the participants in the Intermarket Trading System ("ITS") sufficient time to attempt to provide limit order protection on an inter-market basis using the ITS. Specifically, the New York Stock Exchange, Inc. ("NYSE") and the MSE submitted proposals which envisioned the electronic dissemination and display of limit order information from each market center and use of the ITS to assure inter-market price protection of displayed limit orders in any market.[21]

The CLOB was to be a straightforward electronic file of all entered bids and offers for each security. All bids and offers would be queued in price-

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19. *Id.* at 4359.

20. *Id.* at 4359 (emphasis added).

21. Exchange Act Release No. 15,770, 44 Fed. Reg. 26,692, 26,694 (Apr. 26, 1979) (emphasis added).

time priority, and executions would occur on a first-come, first-served basis. Designing and building such a computer system would be relatively simple in terms of programming.

Not surprisingly, led by the NYSE, the broker-dealer establishment attacked such a system as being nothing but a "black box" solution. And they asked where a computer would obtain the capital to trade. They said such a system (a) would not work, and (b) would destroy the finest capital market mechanism in the world. Instead, they promoted separate order entry, order displays, and reporting systems that would negate an integrated electronic one. The Intermarket Trading System was one cornerstone of their proposal. Interestingly enough, then President of Merrill Lynch, William Schreyer, testified under oath before two House Subcommittees in 1979 that "[i]t is as far from the concept of an automated, efficient marketplace as a tom-tom is from a communications satellite."[22]

The other elements of the NYSE's version of the national market system included a separate Consolidated Quotations System (CQS), and a separate Consolidated Tape System (CTS).

I have analogized these disparate systems with a comparable Automated Teller System. Under such a system it would be necessary to go to one ATM to enter the transaction amount, another ATM to obtain the results of the transaction, and a third ATM to obtain a report of the transaction. I believe very few—if any—would prefer such a system to the actual automated teller systems available today. The present-day ATM differs from its analogous market system because competition and private enterprise, rather than mandated regulations, fostered the development of the ATM system.

II. PRESENT ISSUES: THE ORIGINAL SOLUTION IS STILL RELEVANT TODAY

Presently, there are four interesting issues in the state of the national market system: (1) balancing the demands for competition and consolidation against the dangers of fragmentation, (2) whether trading markets will be electronic or manual, (3) to what extent (if any) retail and institutional interests will be reconciled, and (4) how to enforce best execution as a legal standard.

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22. *Progress Toward the Development of a National Market System: Joint hearings before the Subcomm. on Oversight and Investigations and the Subcomm. on Consumer Protection and Finance of the Comm. on Interstate and Foreign Commerce,* 96th Cong. 70 (1979), *quoted in* Letter from Junius W. Peake, to Jonathan G. Katz, Sec'y, SEC, Regarding File No. 4-206, Exchange Act Release No. 40,204 (Aug. 21, 1998), *available at* http://www.sec.gov/rules/proposed/4208/peake1.htm.

A. BALANCING THE DEMANDS FOR COMPETITION AND CONSOLIDATION AGAINST THE DANGERS OF FRAGMENTATION

Today, it is important to balance the demands for competition and consolidation against the dangers of fragmentation. I think that all economists know that a securities market is a natural monopoly unless prevented from becoming one by technological limitations, regulation or unfair competition. The best and most open prices are attained when *all* potential buyers and sellers can have the opportunity to have their orders interact.

Competition should focus on price—not place. When securities markets were manual because of the technological inability to centralize them, exchanges and broker-dealers would trade the same securities at the same time in different locations and at different prices forming "pools" of orders. This enabled intermarket arbitrage—the buying or selling of a security at one location and immediately selling or buying it back at a guaranteed profit at another location—and was *prima facie* evidence that the system was inefficient.

Today, the buzzword is "liquidity pools," with the newest one being "dark liquidity pools," primarily comprised of hedge funds. But what is needed is an "ocean" of liquidity formed by integrating all the pools into a format wherein each and every bid in a security has the opportunity to interact with each and every offer in that security.

The main argument against letting the new securities market become a natural monopoly has been—and still is—that competition will be stifled and the market mechanisms will suffer. I disagree. Just as clearing and depository have been centralized, market structure centralization would improve services and reduce costs, provided it is properly structured and governed.

B. ELECTRONIC VS. MANUAL TRADING MARKETS

Going forward, it is important to assess whether the trading markets will be electronic or manual. This is a no-brainer. The recently announced proposed merger of Chicago's derivative exchanges punctuates the answer forcefully. As one of the founders of the world's first electronic futures exchange, I am thrilled—but not surprised—that automation has won the day.

While the NYSE is continuing to push its Hybrid market structure, it is only the Commission's acquiescence to the NYSE's anticompetitive floor trading rule proposals that have allowed it to come this far. So, why does the Commission approve the anticompetitive rule changes proposed by the NYSE? I sent a comment to the Commission on Releases SR-NYSE-2006-65 (November, 2006) and SR-NYSE-2006-36 (October, 2006):

> I would like to make but one point about the NYSE's proposals in their Hybrid Market. There never is—and cannot ever be—any discretion in an order entered electronically. All of the preconditions under which the order will be executed, cancelled or changed ***must*** be determined and entered ***before*** its arrival at the execution engine (the processor). It makes no difference if it is called a floor broker's so-called "discretionary" order or a specialist's algorithmic order. The terms which will decide any action on these orders have been predetermined. Since this is a fact, and since investors and ***all*** other market participants have the theoretical or practical capacity to place complex conditions on orders entered electronically, there is absolutely ***no*** regulatory reason to prevent them from having exactly the same ability to enter so-called "discretionary" orders or algorithmic orders. As a result of the Commission's apparent willingness to permit the NYSE to have such unfair competitive advantages for their floor brokers and specialists, I assume that all broker/dealers and investors will be able to enter so-called discretionary orders and use algorithmic orders on all market centers except the NYSE. . . . I cannot believe the Commission's intent is to approve proposed rules of the NYSE that would create unfair competition among brokers and dealers, among exchange markets and markets other than exchange markets, as well as denying investors' orders to be executed without the participation of a dealer (floor brokers are also registered as broker-dealers).[23]

While the actual execution of all orders will be done electronically, pre-trade strategy will continue by personal judgment (manually) assisted by technology.

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23. Junius W. Peake, Comment on Releases SR-NYSE-2006-65 and SR-NYSE-2006-36, http://www.sec.gov/comments/sr-nyse-2006-65/nyse200665-1.pdf (last visited Mar. 28, 2007) (emphasis in original). Section 11A(a)(1)(C) of the 1934 Securities Exchange Act, 15 U.S.C. § 78k-1 (2000), states:

> It is in the public interest and appropriate for the protection of investors and the maintenance of fair and orderly markets to assure—
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> i. economically efficient execution of securities transactions;
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> ii. fair competition among brokers and dealers, among exchange markets, and between exchange markets and markets other than exchange markets;
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> iii. the availability to brokers, dealers, and investors of information with respect to quotations for and transactions in securities;
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> iv. the practicability of brokers executing investors' orders in the best market; and
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> v. an opportunity, consistent with the provisions of clauses (i) and (iv) of this subparagraph, for investors' orders to be executed without the participation of a dealer.

C. RECONCILING RETAIL AND INSTITUTIONAL INTERESTS

As markets evolve, it is yet to be determined to what extent (if any), and how, retail and institutional interests should be reconciled. The interests of retail and institutional investors are congruent. Although reconciliation is not required, both groups want to pay the very least net cost for their purchases and to receive the largest net proceeds for their sales. A properly-designed market system should be able to accommodate both interests. Automation has made multiple execution reports a trivial matter. Innovation and competition will get the job done.

D. ENFORCING BEST EXECUTION AS A LEGAL STANDARD

It is also necessary to develop a solution for the problem of how to enforce best execution as a legal standard. In order to do that "best execution" must be properly defined. A simple definition is the easiest to enforce. Today's definition is far too complicated and focuses in the wrong direction—on orders, rather than executions. In 2002, I counted 533 references by the SEC to the term "best execution" since the Commission started issuing '34 Act Releases. The first was in 1938; the next was in 1963. Three hundred fifty-five of the references were issued from 1992 to 2002.[24]

Early on, best execution referred to transactions rather than orders. In the 1963 Special Study of the Securities Industry, the Commission wrote:

> The Report concludes that the factors contributing to or detracting from the public's ready access to all markets and its assurance of obtaining the best execution of *any particular transaction* require the continuous attention of the Commission and the Policy and Planning Unit.[25]

In the same report, the Commission further noted:

> [W]hile the NASD has recognized the principle of best execution, it has not prescribed specific guidelines or standards with respect to it. *The Report recommends that rules and standards be adopted by the Commission and/or the NASD requiring broker-dealers executing retail transactions, whether as principal or as agent,* to make a reasonable effort to ascertain the best interdealer quotations and "to provide an execution as favorable as may reasonably be obtained in light of the kind and amount of securities involved and other pertinent circumstances."[26]

More recently, the subject of what should receive best execution has metamorphosed from transactions to orders. There can be a considerable difference between the two: execution always equals transaction, but order

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24. A LexisNexis search in the source SEC Decisions, Orders & Releases for "best execution," until April 21, 2002 returns 355 releases.

25. Special Market Study, Release No. 32 (July 17, 1963) (emphasis added).

26. Special Market Study, Release No. 31 (July 17, 1963) (emphasis added).

may, or may not, equal transaction. In 1968, the Commission addressed the difference: "One of the basic duties of a fiduciary is the duty to execute securities transactions for clients in such a manner that the client's total cost or proceeds in each transaction is the most favorable under the circumstances . . . ."[27]

As previously noted, in securities markets, investors and other traders each want only one thing. Buyers want to pay the smallest total amount for each execution. Sellers want to receive the greatest proceeds for each execution. When an order is executed in more than a single transaction, the investor would like to receive the highest aggregated proceeds for the entire sale, or the lowest total cost for the entire purchases. The Commission has the ability to define precisely the term "best execution" for each transaction in a national market system, but always uses broad generalities to attempt to define best execution for orders requiring multiple transactions. Orders determined to require more than a single transaction have but one thing in common: They need the professional skill and judgment of the person or persons responsible for fulfilling the order. Experts may execute large orders differently, depending on their differing judgments, just as competent and skilled attorneys will handle the same case differently. Attempts to measure best execution of complicated orders will always be subjective.

Complicated orders—especially large orders for hundreds of thousands or millions of shares entered by institutional investors—may require multiple trade executions, sometimes taking one or more days. This may be required to accrue the lowest overall cost or the highest proceeds. But if each and every trade execution, at the time it is made, is made at the highest bid (for a purchase) or the lowest offer (for a sale), the total cost or proceeds of the entire order will assure best order execution, provided reasonable judgment and care is taken with the order.

The term price improvement is fraudulent. In every market, for a trade to take place, a bid must be hit or an offer taken. The Commission itself defines "best bid" and "best offer" as follows: "Best bid and best offer mean the highest priced bid and the lowest priced offer."[28] At the moment of execution, the spread must be zero. There can be no price improvement, since a bid must be hit or an offer taken.

The issue becomes: Who gets to see and trade with the best bid or offer? Price improvement is only possible if the market system hides either the bid or the offer (or both) from some market participants. If the best bid and offer is neither disclosed nor executable by all market participants, it becomes a "Tantalus system." Tantalus was condemned to hang from the

27. In the Matter of Kidder, Peabody & Co., Inc., Edward B. Goodnow, Investment Advisors Act Release No. 232, Exchange Act Release No. 8426, 43 S.E.C. 911, 915 (Oct. 16, 1968).

28. 17 C.F.R. § 242.600(b)(7) (2007).

bough of a fruit tree over a pool of water. When he bent to drink, the water would recede; when he reached for a fruit, the wind would blow it from his reach. A further account of his punishment tells of a great stone hanging over his head threatening to fall.[29] Like Tantalus, some best bids and/or offers are always kept out of reach of certain market participants.

Designing state-of-the-art trading systems is a task best left to the free market, not Commission lawyers who tend to create Alice in Wonderland solutions. It has been more than three decades since the Congress mandated that the Commission facilitate the development of a national market system for securities.[30]

The following is what the Commission itself said about proposed Rule (11Ac1-5): "While broker-dealers currently may be able to obtain order execution information from some market centers, that information may be of limited use and may not allow broker-dealers to compare execution quality among the different market centers."[31] The problem with the Commission's best execution definition is that the best published quote is seldom made up of ***all*** the bids and offers available at a moment in time. There are often better bids and offers, but there is no practical or economical way for all orders to interact with them.

The only way for the best execution of each transaction to be guaranteed is for all bids and offers in any particular security to be able to interact, preferably on a price-time priority basis. Best execution of a multiple transaction order will still require skill and judgment, as it should. But the cost of such a system would probably be at least one order of magnitude less than the present multiple, cobbled-together systems that have been ordered by the Commission since 1975.

Below, in a brief excerpt from the Commission's staff, is an attempt to explain the complexities of the reporting requirements that make up the raw data to measure best execution:

> **Division of Market Regulation: Staff Legal Bulletin No. 12R** (*Revised*)
> "Frequently Asked Questions About Rule 11Ac1-5"
> **Action**: Publication of Division of Market Regulation Staff Legal Bulletin
> **Date**: June 22, 2001 (revised). . .
>
> The Commission adopted the Rule in November 2000. It generally requires a "market center" (as defined in the Rule) that trades national market system securities to make available to the public monthly electronic reports that include uniform statistical measures of execution quality . . . .

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29. Tantalus, Infoplease, http://www.infoplease.com/ce6/ent/A0847814.html (last visited Mar. 28, 2007).

30. *See* Exchange Act §11A(a)(2), 15 U.S.C. §78k-1(a)(2) (2000).

31. Disclosure of Order Execution and Routing Practices, Exchange Act Release No. 43,590, 65 Fed. Reg. 75,414, 75,432 (Dec. 1, 2000).

Question 1: Format of Monthly Reports and Procedures for Making Reports Publicly Available
Question 2: Vendor or SRO Assistance in Making Reports Available
Question 3: Definition of Market Center - Multiple Trading Venues
Question 4: Integrated Broker-Dealer Firms - Orders Received as Market Center and Orders Received Solely as Agent for Routing
Question 5: Definition of Covered Order - Special Handling Exclusions
Question 6: Exemption for Manually-Received Orders
Question 7: Locked and Crossed Quotes
Question 8: Trading Halts
Question 9: Activity Within the Intermarket Trading System ("ITS")
Question 10: Activity within SuperSOES and SelectNet (modified)
Question 11: Partial Executions and/or Partial Cancellations
Question 12: Orders Left Unexecuted and Uncancelled at End of Regular Trading Hours
Question 13: Establishing Time of Order Receipt
Question 14: Orders Received in Same Second as a Quote Change
Question 15: Time of Execution for "Stopped" or "Guaranteed" Orders
Question 16: Adjusted or Voided Order Executions
Question 17: Calendar Month Reporting
Question 18: Phase-In of Reporting
Question 19: Exemption for Orders Received Prior to Dissemination of Quotations by Primary Listing SRO (new)
Question 20: Filtering Potential Errors in Consolidated Best Bid and Offer (new)
Question 21: Time of Consolidated Best Bid and Offer (new)
Question 22: Rounding of Statistics (new)
Question 23: Modified Orders (new)
Question 24: Riskless Principal Orders (new)
Question 25: Exemption for Inactively Traded Securities (new)
Question 26: Exemption for Small Market Centers (new)
Question 27: Exemption for Block Orders (new)[32]

In order to determine how accurate the results of analyzing this type of data have been until now, all we have to do is to read the lead story in the October 16, 2006 issue of *Global Investment Technology*, entitled, *Transaction Costs: Buy-Side Firms Want Transaction Cost Analysis Offerings to Incorporate Risk in Real Time*. The article states in part:

> [Transaction Cost Analysis] pioneers who analyzed transaction data and reported on it quarterly are finding periodic reports outmoded. . . . The biggest impediment to effective TCA is always the data itself, according to Ian Domowitz, Chief Executive Officer of ITG Solutions Network, a

32. SEC, Division of Market Regulation: Staff Legal Bulletin No. 12R (Revised): Frequently Asked Questions About Rule 11Ac1-5 (June 22, 2001), *available at* http://www.sec.gov/interps/legal/slbim12a.htm.

> division of ITG Inc., an agency brokerage and trading technologies provider whose offerings include TCA solutions. "The nature of change in the market structure both validates and renews [the] emphasis on best execution within which regulators can actually regulate[.]" . . . Investors still look at individual orders, Domowitz explains. But the orders are being broken down into small trades and spread out over time, so analysis of the order can be quite difficult.[33]

In conclusion, the clean, straightforward electronic trading system that could have been built in the 1976–1979 period (and can still be built) has now become a Rube Goldberg-type Gordian knot created by the Commission.[34] Reading and trying to understand all the complex rule proposals for the NYSE's Hybrid system is an absolute cure for insomnia. In my judgment, it is now time for the Commission to engage a staff that is intimately familiar with both trading and the appropriate use of electronics, and create the national market system the Congress wanted. Using the definition of "entropy" I have selected, the Commission surely has jumbled and disordered its logic, which occurred after the program was modified over and over in three decades. There is still time to do what the Congress ordered.

III. CONCLUDING REMARKS: ONGOING CONCERNS

There are a few additional issues that I would like to address in this commentary. I have long been concerned about the continued approval, albeit with changes, of section 28e. I see no reason mutual fund or other investors should pay excessive execution costs that are charged to the benefit of managers. I am also concerned about the dangers of naked short selling, especially immediately after an original offering. Total trading volumes the day following effective registration can sometimes exceed the total available float of the new issue. I am also worried about the enormous impact of hedge funds on our capital markets. I would hope the Commission would continue to examine their potential to damage the integrity of our markets. Finally, I hope and trust that if the Congress eliminates the one cent coin from circulation, that it continues one cent increments as the minimum price differential in trading equities and options.

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33. *Transaction Costs: Buy-Side Firms Want Transaction Cost Analysis Offerings to Incorporate Risk in Real Time*, GLOBAL INV. TECH., Oct. 16, 2006, at 1.

34. Rube Goldberg is an American cartoonist and sculptor "known for his drawings of ludicrously intricate machinery meant to perform simple operations." Rube Goldberg, Infoplease, http://www.infoplease.com/ce6/people/A0821154.html (last visited Apr. 5, 2007). Gordius was an "ancient king of Phyrgia, who tied a knot (the Gordian knot) that, according to prophecy, was to be undone only by the person who was to rule Asia, and that was cut, rather than untied, by Alexander the Great." Gordian, Infoplease, http://www.infoplease.com/ipd/A0460642.html (last visited Apr. 5, 2007). To "cut the Gordian knot" means "to act quickly and decisively in a difficult situation" or to "solve a problem boldly." *Id.*