

# Financial Innovation and the Organisation of Stock Market Trading \*

## Introduction

The recent stock market crash has brought renewed criticism of the New York Stock Exchange (NYSE) "specialist" system of price formation and recommendations to introduce a system similar to London's "International Stock Market" (ISM) computer supported, screen based, automatic execution dealer market which has eliminated stock jobbers and moved almost all trading off the exchange floor. Economists have never been overly interested in either the institutions comprising markets or the process of price formation in them, having instead chosen to study the possibility of the existence of "equilibrium" prices under competitive conditions. Nevertheless, it has become commonplace for economists to refer to the stock market as a real world example of a perfectly competitive market, and most proposals for reform of the specialist system are based on the assumption of competitive conditions.

Yet, it is clear that the New York Exchange is no longer (if ever it was) a competitive market in the sense of engaging a sufficiently large number of buyers and sellers so that no individual transaction has a permanent impact on the determination of prices. This paper suggests that it is the recent changes in competitive market structure which have increased the volatility of prices and made it difficult, if not impossible, for the specialist to satisfy the tasks assigned to him in forming market prices. Proposals for change in the organisation of market trading should thus be judged relative to the prevailing imperfectly competitive conditions, rather than the ideal perfect market.

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### Private markets, public markets and information

The broad flow of historical changes in the organisation of markets surveyed by Braudel (1979) suggests a process in which the institutions which regulate price formation alternate over time in cycles of "public" and "private" markets (*cf.* Kregel, 1985). In a public market all traders are subject to formal regulations which insure that trading intentions are fully known to other traders; private markets evolve when it becomes more profitable for traders to operate outside the formal regulations of the public market. Such private markets are dominated by intermediaries who have an interest in restricting information concerning their trading intentions and market conditions. Prices thus come to be determined more by traders' expectations of future prices and supplies than by objective market conditions as represented by market supplies and buying orders. These private benefits to traders soon create public costs to producers and consumers which eventually generate impetus for a process of re-regulation in which the market again becomes centralised, but at a lower level of aggregation, and institutions are created which render trading more public and the actions of traders more transparent. In this context, the adoption of a screen-based dealer system might be interpreted as an expression of a movement towards a more decentralised "private", and thus less perfectly competitive, market form which should eventually give rise to new institutional regulations to render trading more public and transparent.

In such an approach to the evolution of market institutions the merits of the "specialist" as opposed to a "dealer" system can be assessed only by considering a prior question concerning the past evolution of the organisation of stock market trading: Why have Anglo-Saxon financial markets tended to evolve the continuous trading two-sided "Open outcry" auction system of price formation, while most continental European exchanges continue to employ the restricted "Call" of the exchange list of approved stocks? The question is also of interest because generic references to the "stock market" as the exemplary perfect market do not appear to distinguish between these two simultaneously existing types of stock market organisation; yet, only the continental call system corresponds closely to the idealised competitive market outlined by Walras and accepted by most economists as the model of perfect competition. Indeed, many economists look on Walrasian markets as rarefied abstractions from the real world without realising that close approximations to such markets do exist in most

continental stock markets and that the *tâtonnement* method of price determination is still employed in almost identical form to that described by Walras in the daily London gold fixings.<sup>1</sup>

In a characterisation of the continental "call" system, brokers gather their clients' buy and sell orders which they make known when the price of the appropriate stock is fixed at the daily call of the exchange list at the Bourse to which they have the monopoly of access.<sup>2</sup> The price which balances the buy and sell orders announced by brokers on behalf of their clients is the official or market price. As in the Walrasian system, it is the role of an "auctioneer" to call out the prices and fix one which balances supply and demand for each stock on the official list. Since all relevant information in the form of clients' orders at various prices is present at the Call there is perfect information concerning all buy and sell combinations. But, this transparency of trading information requires that the market be regulated so as to restrict trading to a single location, the exchange floor, and to a single point in time, the Call of the official exchange list, with access to trading limited to brokers who are the sole participants in the auction process that determines prices. The market is perfectly competitive only because it is highly regulated.

It is interesting to note that trading on the NYSE was also organised on the "continental" call system until around 1871 (*cf.* Leffler, pp. 86 ff.). New communications technology, in the form of the stock ticker, arrived in 1867; telephones linked brokers' offices to the exchange floor in 1878. But, much as today, it appears that it was the increase in size of the market, more than the change in technology, that motivated the change in the organisation of trading. On the one hand, the boom in railroads and expansion to the West led to a large increase in the number of shares listed. In 1870 there was a "Regular List" of 278 securities and a "Free List" of unlimited size. The regular list was "called" first. On the other hand, exchange membership nearly doubled from 533 to over 1,060 in 1869. After the Panic of 1873 (which closed the Exchange for 12 days!) activity recovered and the number of shares traded doubled by the end of the decade and doubled again by the end of the century.

The shift to the auction system in 1871 would seem to have been the result of the list having become too long and the crowd too large.<sup>3</sup>

<sup>1</sup> Keynes suggests that Walras' *tâtonnement* was designed after the method of price determination on the Paris Bourse.

<sup>2</sup> The *Agents de change* in the Paris Bourse were not dealers and were forbidden from trading for their own account because of their royal monopoly on exchange trading.

<sup>3</sup> ...and rowdy — discipline was maintained by a system of fines: \$10 for standing on a chair, \$50 for knocking off a man's hat, \$10 for throwing a paper dart — telephones and tubes were not yet in use. See LEFFLER, p. 87.

The change in organisation took the form of a "decentralisation" of trading with the "Regular List" broken down into a number of smaller "lists", traded at separate locations called "posts". This decentralisation caused a sufficient reduction in the size of the lists that brokers found that a single formal Call of the list of the stocks traded at each post was no longer necessary; all stocks were thus traded continuously and nearly simultaneously, rather than serially as in the Call.

#### From the Call system to the specialist system

Tradition has it that the "specialist" was introduced into this decentralised, simultaneous and continuous auction system when a temporarily immobilised broker decided to continue business from a chair by the Western Union post. He soon started to collect commissions to act on behalf of other brokers who had more important trades to complete at other posts. Whether or not the story is true, specialisation of brokers in trading the stocks of a particular post would have developed in any case.

Under the Call system all stocks were called and trades executed in the same physical and temporal space. This allowed all brokers to be physically present for all trades in all stocks on the List. Under the new decentralised system, trading in different stocks was done at posts which were separated spatially; brokers' trades were thus also separated temporally. Since there was not enough floor space on the Exchange for every firm to have a broker at each post and since it was impossible for brokers to be at every post at once, spatial and temporal specialisation became necessary to the efficient completion of clients' orders. Thus a large number of "specialists", with responsibility for the trading and pricing of the stocks at a single post (and eventually for only one of the stocks at the post) in the continuous decentralised market, replaced the single "auctioneer" of the unified call market.

The success of this new organisation of trading depended on the institution of a system to distribute the trading and price information which was automatic under the single auctioneer Call system. This was achieved by the stock ticker, which allowed brokers to gather trading and price information from all Exchange posts without having to be physically present to witness or participate in trading at any of them. It also required the telephone and tube system to allow client orders

received in the broker's offices to reach the specialist posts without the broker's physical presence at all of them.

Thus the sharp increase in the size of the market, which made the List too long to be called in a period of time which could be considered as "instantaneous", so that all stocks were traded under the same information conditions, and the increase in the number of brokers which made it difficult for all to assist and trade at a single call, led to a decentralisation of the market. The single auctioneer, responsible for the trading and pricing of all stocks, was replaced by a market maker for each single stock, the specialist. In the terminology mentioned above, this was a move towards a more decentralised and less "public" form of market organisation to the extent that market information became concentrated in the hands of the specialists. It was only possible to keep information publicly dispersed by means of the communications revolution which produced the ticker and floor phones. Indeed, the most highly regulated aspects of the NYSE trading system concern the operations of the specialist and the formal dispersion of trading information.

#### Price continuity in continuous markets

The shift from a Call to a continuous trading auction system created another problem beside the availability of information: price continuity. In the once a day "Call" system, all available information is rendered fully visible as brokers respond to various prices with their clients' orders; no trades are struck except at the "fixed" market price which balances buy and sell orders (what economists call "equilibrium" of supply and demand). In the ideal form of competition no individual buyer or seller can influence this price; all orders are expressed at the Call, which is the only relevant time unit. Any other trading (before, during or after the Call of the List) is made with reference to the official fix.

In the continuous market, however, all the bids and offers for a single stock coming to the market through brokers will not be temporally concentrated at a single point in time, but distributed randomly throughout the trading "day" (which is still regulated to a fixed period). Instead of a Walrasian *tâtonnement*, this is more like Marshall's process of the "higgling and bargaining" (1920, Book V, Chapter II.2.) in which bids and offers occur randomly over the market

day. Only a certain number of them will result in completion, and none of them need be at the "equilibrium" price that would have emerged from the simultaneous confrontation of all bids and offers at a Call (although Marshall contends that the market will "probably" settle on this price). In addition, this process will be spatially separated for stocks traded at different posts.

The problem of price continuity concerns how the market handles the determination of a stock's price when there are gaps or mismatches between buy and sell orders at any particular point in time during the trading day, even though they may be balanced over the course of the day. In other words the problem is how to make the average of the prices of the actually executed continuous trades correspond as closely as possible to the "equilibrium price" (which now loses its market referent and becomes a notional concept) that would have been established if all bids and offers had been presented simultaneously.

In the ideal operation of the continuous market this smoothing function is undertaken by "floor traders" engaging in speculative dealing for their own account, that is, in a system where trades are no longer temporally compacted at the Call, floor traders perform a similar function by engaging in temporal arbitrage. They are willing to provide the other side of mismatched orders at what they believe the "market price" to be, in the expectation of being able to unwind these positions later in the day as the randomly absent brokers (attending to deals at other posts) appear at the post to complete orders at prices closer to the expected equilibrium or "market" price. Competition among floor brokers thus keeps prices throughout the trading day close<sup>4</sup> to the expected equilibrium. Since floor traders do not in general do commission business, they must earn their keep by the size of the turn and the number of (profitable) trades. The size of the turn is a question of the number of traders on the Floor and profitability depends on ability to forecast the "market" price, while turnover depends on how quickly trades can be executed. Floor brokers could not survive in a call system in which trade took place only once a day, nor in a market with unlimited access to the trading floor. Floor traders, and their price expectations, thus come to play a crucial role in the determination of market prices and public expectations, for it is now closing prices which are used as reference prices by the public rather than the fix as in the Call system.

<sup>4</sup> Within an eighth of a point which is the limit used to judge the continuity of the price of a specialist's stock.

Price continuity in a continuous simultaneous auction market thus requires the activity of floor brokers willing to take temporal speculative positions. It is this role of temporal speculation to ensure price continuity and market depth which eventually became the formal responsibility of the specialist, expressed in the charge to maintain a "fair and orderly market". With the gradual disappearance of independent floor brokers, single specialists became responsible for preserving continuity and depth in the market by taking position on his own account. The specialist thus became both broker and dealer.

In order to fulfill this function of making continuous prices correspond roughly to Call prices on a non-speculative basis the specialist should possess virtually all the information concerning his stock that would have been available under the full information conditions of the Call system. Clearly he cannot have this information, but he is allowed more information than other brokers because of his monopoly over the specialist's book of market and limit orders for his stock. He cannot know all the current and future trades, but he does know the current trading in the crowd around the post and those that have been announced in advance by means of limit and stop orders and commission orders which are communicated privately to him. He thus provides a continuous "fixing" of the market price and thus furnishes the official exchange quotes for his stock. The specialist can only function as the price setter and market maker if he is better able discern the "equilibrium" price, which requires that his information position be superior to that of other brokers in the crowd. It is this condition which is no longer being satisfied on the NYSE.<sup>5</sup>

<sup>5</sup> There is an inherent contradiction in presuming first, that a single specialist can fully substitute for the actions of a large number of speculating floor traders, and second that specialists should undertake dealing on the basis of information contained in the book to provide continuity independently of private benefit when the floor traders acted for private profit on the basis of expectations of equilibrium prices formed on the basis of public information gathered in the market place. The specialist is in fact being asked to play the role of the Walrasian auctioneer for a single stock according to the continuous trading Marshallian rules of the game. In this way confusion is created between the actual obligations of the specialist to reduce the variability of continuously determined auction prices around the notional (Call determined) "equilibrium" prices and the presumed, but impossible, task of reducing variability of the equilibrium price itself. This contradiction may be seen in the trading tick rules which forbid the specialist to buy into a rising market or sell into a falling market. These rules seem to have been counterproductive during the October break for they sanctioned specialist sales whenever there was a price recovery. In that case buying into a rising market might have been considered as stabilising recovery of equilibrium prices.

### Property owning democracy becomes "money manager" capitalism

As noted above, the economist's traditional definition of competition refers to the number of buyers and sellers being sufficiently large so that none can influence price. It is obvious that this is a condition which is never formally satisfied on the Exchange floor because the number of brokers is strictly limited. It is presumed to be satisfied by the fact that brokers act as agent for an infinitely large number of buyers and sellers. An increased public dispersion of share ownership is thus thought to increase competition in financial markets. Ownership was not widespread before World War I, but increased by a factor of ten during the stock market boom of the late 20s. Interrupted by the Crash and Great Slump, the trend resumed after W.W. II, but in ways which had been little anticipated. Although share ownership became more widespread, it was through what might be called indirect, rather than direct ownership, which produced "the rise of the 'institutional investor'", which "more than any other post-war development, has come to characterize today's investment market — they are now the pre-eminent factor in our securities market". This has produced "the institutionalization of the people's savings in insurance companies, in pension and welfare funds, in investment trusts (both open and closed end), and the substantial wealth in trust accounts" (Schiff, 1955, p. 58). Thus while the dispersion of share ownership increased, already in the 1950s the actual decisions over the purchase and sale of stocks were being concentrated in the hands of a much smaller number of portfolio managers.

In the late 1960s the Stock Market entered the era of the large scale institutional money managers, an era of "Money Manager Capitalism" to borrow Minsky's (1988) apt characterisation, which was to usher in a number of crucial changes in market organisation. The Big Bang of May 1975 was one of them, shifting the commission structure from one tailored to small retail clients to one tailored to institutions and fund managers moving large blocks of shares. While these changes facilitated block trading by reducing commission costs,<sup>6</sup> there was another aspect of block trading which increased the costs of managing large portfolios: the large institutions' block trades could not be executed without

<sup>6</sup> Commissions per share charged for large transactions fell from 26 cents in April 1975 to 7.5 cents in 1986, while commissions to private retail customers rose from 30 cents to 60 cents. Cf. Brady Report, pp. II-15.

exerting direct influence on prevailing market prices. The depth of the market was not sufficient to absorb the institutions' large trades without producing price discontinuities which specialists were not able, nor expected, to absorb in their official function of preserving market price continuity with depth on both sides of the market.

### Block trading and the specialist

The problems that institutional block trading created for the specialists were officially resolved by exempting large block trades from certain floor trading regulations, effectively moving them off the floor, outside the direct responsibility of the specialist. In this so-called "upstairs trading", large institutional and fund money managers arranged the transfer of large blocks of stock amongst themselves or through the block trading desks of the national retail brokers and the "special bracket" Wall Street investment banks at prices which were not necessarily linked to official NYSE specialist quotes, but to traders' future expectations of either the impact of the block on market prices or the expected future prices at which the block could be moved in smaller lumps. Further, upstairs traders were not required to inform the specialist of blocks being negotiated, nor were they required to execute all block trades on the Floor (or even on the NYSE), although the National Association of Securities Dealers requires that the trades be reported to the public.<sup>7</sup>

In 1975 block trades involving 10,000 or more shares accounted for only 16.6% of NYSE trading volume. By 1985 it exceeded 50%. The number of transactions doubled between 1985 and 1987 to reach 920,000 trades and 24.5 billion shares (cf. Kaufman and NYSE Factbook). Salomon Brothers' estimates for the first half of 1988 are above 55% (reported in *The Economist*, 1988, p. 100). Although the common practice is to execute block trades on the Floor, it is still the case that institutional trading in large blocks means that over half of all trades on the NYSE are not negotiated at the specialist's post.

<sup>7</sup> When they are brought to the attention of the specialist he is required to act as if he were ignorant of their existence and when they are brought to the floor to be crossed, regulations limit trading with the specialist's book and with the crowd. Rule 127 sets these conditions; if the trader does not take position in the block it is in general possible to exclude floor trade.

This off-market "upstairs" trading activity drastically reduces the information available to floor traders in general and in particular to the specialist; it also reduces the value of the NYSE quote given by the specialist as an indication of the position of the market. In fact, the "upstairs traders" have effectively displaced the specialists as the market makers for the high capitalisation stocks which compose the major market indices, independently of any Exchange regulations over the technical procedures to be used for setting prices and for their own capitalisation such as apply to specialists.<sup>8</sup>

The advent of block trading has also produced concentration in brokerage firms that parallels that of the concentration of share ownership through institutions and the concentration of purchase and sales decisions in the hands of the institutional portfolio managers, with the top 25 brokerage firms accounting for nearly 80% of both revenues and capital among members of the Securities Industry Association in 1985. The effects of the October crash have only accentuated this trend. The result is that the most commonly cited real world example of perfect competition is a market in which over half of the market trades are at prices determined by a handful of large brokers, banks and institutions outside the official market mechanisms of the Exchange floor. Despite the increasingly widespread ownership of stocks, the majority of trades normally do exert direct influence on price.

For the specialist operating at the floor post the special arrangements for block trades have advantages and drawbacks. The advantage is that they exempt the specialist from acting in cases where he does not have the capability to preserve price continuity and depth. Clearly it would be impossible to declare imbalance in the market and suspend trading each time a block came up which could not be cleared at a price sufficiently near market without specialist intervention in excess of his ability to take position. This would have meant a sharp reduction in the liquidity of the market and forced rapid change in trading organisation. The required liquidity was created in the "upstairs" block trading desks. These trades were thus moved outside of the specialist's control and out of the "market". Better upstairs than on the curb.

On the other hand, the benefit to the specialist of not having to make a market by trading on his own account in conditions which might

<sup>8</sup> Exchange Rule 97 requires members who act as "block positioners" to have a \$1,000,000 capital base, but does not mandate assistance in maintaining a fair and orderly market.

exceed his capital base and thus lead to insolvency was offset by a serious erosion of his monopoly on information. Since the specialist no longer necessarily controlled and observed a majority of the trading in his stock he no longer had an advantaged position on information concerning market conditions and thus on market price.

While the block trading rules seemend to resolve the contradiction between the capital base of specialists and the necessity to provide depth for block trading and to make further organisational change unnecessary, there was one important response to the growing predominance of large block trades. The NYSE attempted to reduce the costs of small trades by introducing new communications technology. Thus, the introduction of automated trading had nothing to do with large block trades, but rather with reducing the number of times human hands had to handle small (which is defined by the NYSE by reference to the average transaction size, currently around 2,000 shares) trades.

The Designated Order Turnaround (DOT) system and the "electronic display book" for specialists were both introduced to provide automatic transmission of small orders from client and/or broker to the specialist post (*cf.* S.E.C., pp. 7-15 ff. and Brady, pp. VI-11 ff.). But, in contrast to what many writers seem to imply, the actual execution of trades communicated via DOT remain within the control of the specialist.<sup>9</sup> The idea behind this move to automation was to free floor brokers to pursue more lucrative, larger trades which required more personal attention. Effectively this meant that the specialist was reduced to being the small trade market maker, with the majority of the trading and negotiation taking place outside of his direct control and knowledge.

While moving block trading "upstairs" limited the transactions costs of large block trades (relative to what would have been the case had they been offered on the Floor) due to their negative impact

<sup>9</sup> The only automatic execution permitted on the NYSE, under the Immediate Reporting Service, is limited to just 50 stocks, none of which is assigned to a specialist using an electronic display book and is limited to a maximum trade of 2,099 shares (SEC, p. 7-18, n. 58). Under the Request Status Reporting system orders of the same size are guaranteed execution at a reference price (the price ruling when the order reaches the post) within three minutes of being received by the specialist. The majority of such orders are executed by the specialist before the limit. The October break exposed a problem with the transmission capacity of the system; overloading made it impossible for traders to know if their orders had ever reached the floor; the majority did not. The DOT system was thus suspended because of technical malfunction, not to stop computer based trading. The Opening Automated Report Service (OARS) of DOT allows pre-market orders of up to 5,099 shares for automatic execution at the opening price, while DOT accepts post-opening orders of up to 30,099 shares without any execution guarantee and limit orders of 99,099 shares.

on execution price, these costs were still substantial and institutions looked for ways to reduce or eliminate them. The answer was found in the use of stock options and stock index futures markets introduced in the early 1980s. These derivative markets have been widely analysed in terms of their impact on risk diversification and market instability. But it is more likely that they owe their very rapid success to the fact that they offered sharp reductions in the transactions costs of portfolio adjustments for large trades block traders — because of their lower commission costs and margins, but more importantly because large trades in futures markets have a smaller impact on prices and were thought to have no impact on cash prices.

For cash transactions, the minimum tick representing the specialists turn is an eighth of a point or 12.5 cents, while in futures contracts it is 1/20th of a point. The commissions are also lower. As a measure of the cost involved with price change, it is estimated that a \$20 million trade will move prices in the cash market by .27%. Thus in addition to commissions, *etc.* the cost of a block trade will include its negative impact on price. Adjusting a portfolio by a similar amount in the futures market moves the relevant stock futures price by only .04% and has no direct impact on stock price. In dollar terms, a \$120 million trade will have a transaction cost of \$520,000 due to its impact on market price while the cost in the futures market would be only \$20,000 (*cf.* S.E.C., pp. 3-5, n. 26). This reduction in cost (some of which is due to the lower margin requirements on futures and cash settlement basis of the contracts) make futures an appealing cost reduction alternative to operating in the cash market.

But the very act of substituting trading in futures for block trades on the cash market creates discrepancies between the derivative prices and the underlying physical cash prices. In short, while shifting from the cash to the futures market reduces the transactions cost due to the negative impact on price, it does not eliminate the impact of block trades on cash prices because a large block sale which is substituted by the sale of an equivalent number of index futures contracts will drive the futures price below the underlying cash price of the index stocks, creating a potential for arbitrage through purchase of futures and the sale of the underlying stocks on the Exchange. Shifting the price impact onto the futures markets thus simply creates arbitrage opportunities which sends the price impact back to the Exchange floor, if in diminished magnitude.

These arbitrage opportunities, which occur on much smaller price moves, required another technological innovation. First, computing power was necessary for rapid arbitrage calculations and, once identified, the orders had to be transmitted rapidly to the specialist. This provided the second reason for the use of communications technology on the trading floor — to speed the transmission of orders to the printers at the specialist post via DOT to short circuit both the physical brokers and the associated paper work. The specialist comes back into the story because the timing required for arbitrage precludes the possibility of going through block trading desks or other negotiated means.

### Block trading and programme trades

The growth of large institutional portfolios not only increased block trading, it also required new techniques for the design and trading of portfolios. Simple portfolio diversification gave way to application of the capital asset pricing model and the introduction of designed portfolio and programme trading, *i.e.* decisions to trade involving groups of large blocks of stocks with desired characteristics, or even the entire portfolio, rather than trades of single stocks within a portfolio. Again, computing power was crucial to both the design of the specific stocks in the portfolio packages, and the automatic transmission of the packages or baskets of buy or sell orders for the blocks of stocks involved which had to be transmitted to a number of posts simultaneously.

Thus, not only did the size of the average trade change from a round lot to a block, the average trading decision changed from substitution of a single stock in a portfolio to a package of stocks in a programme trade. Derivative markets also provided distinct advantages, for the multiple trades on the cash market required to trade an entire portfolio could be substituted with a single futures transaction in an index which approximated the portfolio composition. Upstairs trading in portfolio packages also developed in a "bespoke" market with brokers acting as agent or principal, quoting a price for the entire portfolio, which would then be sold through the market, or held for their own account. In the latter case where dealers acted as principal the transaction need never reach the Exchange floor, or the

specialist post. Since these programme trades have the same impact on the prices of the individual stocks that make up the portfolio as single share block trades, the use of index futures as substitutes created the same arbitrage feedbacks onto the cash market, and the price impact eventually returned to the specialist.

The development of this arbitrage process linking programme trading and index futures depended on another technological innovation introduced by the NYSE to permit transmission of multiple orders composed of "lists" of the stocks making up the portfolios traded or the major market indices through the LIST function of DOT. The use of LIST, when the multiple orders were the actual stocks underlying the stock index futures, was thus a crucial contribution to the growth of arbitrage in index futures relative to stock options. It was in this way that the impact of large managed portfolios using programme and block trades on the depth and continuity of market prices which had been shifted away from the specialist onto the upstairs traders found its way back to the Exchange floor, and once again became the responsibility of the specialist. This meant that the specialist was again being asked to provide continuity of prices and market depth in the face of changes in the notional equilibrium price due to the large block trades, but in conditions which so reduced his information concerning the position of his stock that he became increasingly unwilling and/or unable to do so. As a completion of this vicious circle, the increase in price volatility which was produced by the increase in block trading and the inability of the specialist to provide market depth thus provided the justification for the increased use of the derivative markets to reduce the risk of increased price volatility.

This increase in volatility also provided the means and the justification for a second type of computer based trading based on the use of technical models which provided another endogenous source of volatility which made the use of such models self justifying (*cf.* Goldberg and Schulmeister, 1988) and further intensified volatility.

The most important aspect of this circle is the sharp reduction in relevant trading information available to the specialist, for the price changes which initiate arbitrage and technical trading do not originate in the retail market in his stock, but in upstairs trading and the conditions in the derivative markets and the parameters of the computer models employed. Indeed, premiums and discounts in derivative markets become as important as floor bargains to specialists as indications of market conditions which specialists are supposed to be overseeing.

An associated aspect of the use of asset pricing in composing portfolios which is relevant to the change in information flows in the market is that it increases mimetism. Although specific market information available to the specialist declines, the information concerning the performance results of the institutional money managers increases and may be easily compared and rated. Performance comparison tends to reduce managers' time horizon as well as shifting objectives from absolute performance to relative performance, leading to the much lamented maximisation of total short-run return. Performance comparison takes place not only with respect to other managers, but also relative to the "market", but in a market in which a larger and larger number of trades are occurring at prices which are "non-market" prices determined off the floor. But, comparison with the "market" means that a money manager has to beat the market average composed of official NYSE prices which differ from those at which he has been able to trade his large blocks of shares. This makes beating the market that much more difficult and if profit per trade is thus lowered, it can be offset only by trading in the products of the derivative markets.

In order to be sure to match the market a portfolio cannot diverge too far from the average "market portfolio", thus there will be a concentration on large capitalisation index stocks and issues which follow general market trends. Thus, beating the market requires, aside from luck or perfect foresight, reducing transactions costs, and gaining leverage on profitable market movements. All of these goals are best achieved in futures and options markets. The market can be tracked by sticking to index stocks, which also allows index futures arbitrage (on both the long and the short side), a floor can be created at market average by using some type of portfolio insurance and returns can be increased by locking in profits from arbitraging on differences between futures and physicals costs of buying the market portfolio. Finally, futures trading allows the use of increased leverage provided by lower margin requirements and decreasing turnover costs, not to mention the lower commissions and turn.

The net result of the attempt to use futures markets to eliminate the effect of programme and block trades on cash markets is then to create a greater number of lines of reverse linkage returning the impact from the derivative to the physical markets, sometimes in increased magnitude. This suggests another aspect of the circular process leading to increased volatility. The growth of private savings committed to large managed institutional funds leads both to money managers seeking greater



stability in the performance of the funds they manage, as well as to the use of larger blocks in programmed portfolio trading which increases the volatility of market prices. To achieve greater stability in the presence of increased volatility, the block trades are substituted by trading in derivative markets which via arbitrage redirects the impact back to the cash markets. To offset this variability portfolio insurance and other measures are introduced, which simply provide an additional linkage from the derivative back to the cash markets, making the use of even more sophisticated strategies to preserve stability necessary.

A number of analysts have suggested that the only impact of futures and options trading has been to make the impact of changes in market opinion concerning changes in underlying fundamentals more immediate and more direct. The increased volatility is supposed to be the simple result of the more rapid direct expression of changes in investors' expectations of future market prices. In this sense the market is presumed to have become an even more efficient expression of underlying economic conditions.<sup>10</sup> This is undoubtedly true, but the impact on market prices caused by the introduction of futures is certainly no more direct and certainly less rapid than it would have been had all large blocks been traded directly on the floor of the exchange or through the specialist.

### Money manager capitalism and the specialist

This leads to the conclusion that one of the main causes of the increase in volatility that has been verified in the market (*cf.* Brady, Study II) is the fact that although share ownership has become more competitive in the sense that there is an ever more widespread distribution of share ownership, paradoxically this has led to a sharp decrease in the number of *de facto* traders so that there has been a sharp increase in the concentration of share ownership and a reduction in market competition.

It is this increased volatility caused by the reduction in the number of traders relative to the number of share owners and the resulting

<sup>10</sup> There is no reason why an oligopolistic market should be more volatile than a competitive market under uniform expectations; however, with heterogeneous expectations of the impact of changes in information, a larger number of traders provides more diversity of opinion and thus more price stability.

increase in the size of large trades that has been confused with a deterioration in the operation of the specialist system. With off-floor block trading and the widespread use of futures trading for short-term portfolio adjustment and leverage, the specialist now seldom has any good idea of when pressure is likely to build up in his stock for it is not the result of market or limit orders on his book, but comes indirectly via the derivative markets filtered through the arbitrage and insurance programmes used by the institutions.

Portfolio insurance is a good example of this process. Portfolio insurance has been described as a synthetic stop-loss order or put option on an entire portfolio. As a stop loss or limit order it would normally appear on the specialist's book and he would be aware of it in advance. When it is embodied in software in the money manager's computer the specialist has no idea when it is coming, nor of its size; he is thus deprived of the information he requires to properly provide market continuity and depth.

Thus, the idea that the "futures markets lead the cash markets" in the formation of prices may be correct in practice but it does not imply that the futures markets are more efficient than cash markets, simply that the cash market is no longer sufficiently liquid to handle the block and portfolio trades without disturbing price continuity. It is precisely this fact which has changed specialist behaviour and increased volatility — the specialist must now read the tea leaves of the premium or discount of the futures market in his stock or of the index of which it is a part, and then guess what trading programmes are being employed by the holders of large blocks of his stock. As well as interpreting the tenor of the market and the state of the news the specialist also has to follow futures markets and know the distribution of ownership of his stock among the institutions and their types of arbitrage and insurance trading. The book no longer gives the monopoly of information required to produce a semblance of continuity, and as a result the specialist is much less certain of the action he should take and certainly much less willing to take risk capital to take position in order to provide market depth.

### Implications for change in organisation

The first implication of the changed market structure is that the Exchange regulations which have allowed block trades to be taken off

the exchange floor appear to have been self defeating; they have generated a process by which it has become even more difficult for the specialist to operate because they have shifted price formation off the trading floor and then onto the derivative markets, from which it returns in a form which is not unique to the specialist and difficult to interpret in formulating price expectations. The prices which he quotes are no longer representative market prices.

Recalling that the specialist incorporated the floor brokers' speculative activity to provide market liquidity and price continuity, it is clear that this role has been taken over by the "upstairs traders" and the futures markets. When the former stop taking position or the latter are not accessible the institutions can no longer adjust portfolios and the pressure of block trading comes directly onto the specialist. The market break was then to a large degree not a breakdown of the specialist system, but a breakdown of the system of safeguards which had been set up to protect the specialist from block trades.

There are then two possible responses. The first would be to reinforce the system of safeguards. This would imply a move towards a more private market form, increased upstairs trading, more sophisticated use of programme trading and derivative markets, all of which would create a further deterioration in specialists' information and increase volatility.

The alternative would be to attempt to return to a more public form of market, bringing block trades back to the floor. There are a number of ways this might be done. The first is to formalise the role of upstairs traders and "block positioners" as wholesale specialists with similar affirmative obligations for depth and continuity of block trades. This would effectively sanction a two-tier, wholesale-retail, market, with the associated price differences, which was initiated with the Big Bang. A link would have to be created between the specialist-retail, and block specialist-wholesale, market similar to the link between odd and round lot prices.

The second possibility would be to return to a daily or twice daily call system with an auctioneer to fix prices given the reported bids and offers for trades in large blocks of single stocks. The simplest possibility would probably be to introduce a procedure similar to the semi-automated OARS system currently used by specialists to determine opening market prices,<sup>77</sup> leaving the smaller retail trading to be

<sup>77</sup> It is interesting to note that to diminish the volatility caused by the triple witching hour, the expiration of stock index futures, index options and stock options on the same day, the NYSE shifted settlement from the close of trading to the opening where all the orders could be visibly dealt with by the specialist in determining the opening market price with the aid of OARS.

executed automatically at these prices by IRS via DOT. This would also resolve the problem of the off market trading of unique designed portfolios for their single stock components could be sent automatically at the call.

In the absence of any change the most likely response to the market break is increased vertical integration of the large retail brokers. Just as large financial firms such as Merrill Lynch and Shearson/American Express have found such expansion advantageous (both in terms of service and in terms of replacing declining retail commission business with fee income) to their underwriting and merchant banking activities, it becomes much easier to take position in block trading and merchant banking deals if the acquired shares can be off loaded to in-house funds or to retail clients through a large network of "financial advisors". These firms effectively can guarantee their own private internal markets for blocks that make up portfolio baskets if they cannot intermediate and do not want to take position. The result is an even larger step away from "public" markets, toward the "private" markets in which both trading and price information is less and less easily available to the general public and the market quote has less and less meaning as an indication of the equilibrium price.

The only possibility that might break this tendency towards increased concentration is the internationalisation of stock trading. Indeed, the same large retail brokers and wholesale houses who have been moving towards vertical integration have been active in internationalising their activities. This has involved, on the one hand, increased dealing in foreign stocks via American depository receipts (ADR). The international depository receipt (IDR) is now in its infancy, but would provide the possibility of creating an international retail market which might provide sufficient depth for large blocks.

It seems that the only way a screen based dealer market might work is if the trading in high capitalisation index stocks became truly international so that the number of dealers in the market was sufficiently large to allow institutions to sell large blocks simultaneously to a number of dealers without a negative impact on execution prices.

But, there are two other factors which render this increased international competition unlikely. The first is the already mentioned internationalisation of the large, vertically integrating, Wall Street firms. The second is that even if these firms do not succeed in dominating the international market, should it become reality, professional estimates predict that it will be dominated by no more than 15-25 mega

international investment intermediaries (which might well be international commercial banks, but that is another question). Thus, even if the stock market does become international, it is unlikely that it will resemble the perfectly competitive ideal presumed by those who suggest that the difficulties of the specialist system may be resolved by the simple introduction of an ISM dealer based screen system. The challenge is to try and produce new institutions and regulations that make a structurally concentrated market as public as possible.

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