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THE MARKET AS A PROPERTY INSTITUTION: RULES FOR THE TRADING OF FINANCIAL ASSETS†

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*Could it be that the market suffers from the defects of communal property rights in organizing and influencing uses of valuable resources?*¹

I. INTRODUCTION

The idea of the "market" is extremely powerful in both economics and social theory.² The "textbook" approach posits that the market adjusts between supply and demand for an asset by setting

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¹ Alchian & Demsetz, *Production, Information Costs, and Economic Organization*, 62 AM. ECON. REV. 777, 795 (1973).

² See Beja & Hakansson, *From Orders to Trades: Some Alternative Market Mechanisms*, in *IMPENDING CHANGES FOR SECURITIES MARKETS: WHAT ROLE FOR THE EXCHANGES?* 144 (E. Bloch & R. Schwartz eds. 1979). "Of all the edifices built by economists, the competitive market model stands as the tallest and the most elegant. It is a monument to efficiency, decentralization, economy of communication and, if you will, trader sovereignty." *Id.*

the clearing price.³ In this process, individual traders free of government regulation voluntarily bid to buy and offer to sell that asset.⁴ There are no externally imposed requirements that require certain bids and offers, or that dictate the means of exchange. The emphasis is on factors that result in an equilibrium price, no matter how fleeting.⁵ While this description is not incorrect, it hides much of the complexity of markets. What Alchian and Demsetz have said about the idea of the firm is equally applicable to the market: "The term . . . [market] as commonly used is so turgid of meaning that we can not hope to explain every entity to which the name is attached in common or even technical literature."⁶

Of all the real world markets, the markets for the secondary trading of financial assets seem most accurately to reflect this ideal description. On first glance and in the popular imagination, these markets in which large sums change hands at breakneck speed are the epitome of the free market: they consist of helter-skelter trading driven only by the avariciousness of the individual participants.⁷

³ See *id.* The following is one textbook definition of "market": "The central institution through which a laissez-faire system answers the basic questions [of allocation and distribution] is the market, a term that is used in economics to signify an institution through which buyers and sellers interact and engage in exchange." K. CASE & R. FAIR, *PRINCIPLES OF ECONOMICS* 43 (1989).

⁴ Markets are usually thought of as the antithesis of government regulation, a misconception I seek to correct. See, e.g., K. CASE & R. FAIR, *supra* note 3, at 42-43.

⁵ Beja & Hakansson, *supra* note 2, at 145.

⁶ Alchian & Demsetz, *supra* note 1, at 785.

⁷ Everyday, over \$640 billion worth of currencies is traded in the foreign exchange markets throughout the world, a volume that is thirty-two times greater than the daily world trade in goods and services. BANK FOR INTERNATIONAL SETTLEMENTS, MONETARY AND ECONOMIC DEPARTMENT, *SURVEY OF FOREIGN EXCHANGE MARKET ACTIVITY 2* (1990) (figures as of April 1989). Of the world trade in currency, 58% is spot market transactions, 40% consists of forward transactions (both exchange traded futures contracts and negotiated forward contracts) and 2% involves option trading. *Id.* at 5. The analogous number for transactions in United States Treasury securities is \$113 billion a day in straight trading and over \$776 billion per day in repurchase agreement contracts. U.S. GENERAL ACCOUNTING OFFICE, U.S. GOVERNMENT SECURITIES: MORE TRANSACTION INFORMATION AND INVESTOR PROTECTION MEASURES ARE NEEDED 2, 15 (Sept. 1990); see also *The techno T-Bond market*, *ECONOMIST*, Mar. 10, 1990, at 82, col. 1. On an average day on the New York Stock Exchange, over 150 million shares of common stock and \$38 million worth of corporate and governmental bonds are exchanged. See *N.Y. Times*, Mar. 18, 1990, § F, at 18 (New York Stock Exchange graph shows average daily volume for week ended March 16, 1990 was 154,646,614 shares); *N.Y. Times*, Mar. 18, 1990, § F, at 21 (volume table based on par value shows average daily volume for week ended March 16, 1990 was \$38,340,600 of bonds). On the markets for financial futures and options, the numbers are no less staggering. The number of Eurodollar futures contracts traded on the Chicago Mercantile Exchange's International Monetary Market on an average day is almost 140,000, with an underlying value of \$140 billion. The volume number for U.S. Treasury bond futures is 336,880, with an underlying value of \$34 billion.

The recent insider trading scandals,⁸ commodity trading indictments,⁹ and journalistic and fictional accounts¹⁰ all contribute to this image of financial markets as arenas of unfettered freedom to pursue pure self-interest.

A simple look beneath the surface of this image, or a quick glance at the primary source of income for thousands of lawyers, dispels that perception. Secondary markets in financial assets, in fact, are highly structured and highly regulated. Individuals do not simply get together and strike a deal in any haphazard fashion. Each market has an established set of procedures that participants follow to engage in trades, and those procedures vary radically from market to market. Moreover, while we let anyone sell cars, clothing and food—the staples of daily life—with only minimal supervision,¹¹ individuals must register and meet strict capital requirements to deal in many types of financial assets. Furthermore, traders must conduct their business only in certain places, the governmentally approved and regulated exchanges or markets. In many cases, the very structure of certain transactions is determined by sets of rules approved by government agencies.

Despite this, most legal commentary on these markets examines boundary issues: should (and how should) investors be protected from the asserted greed and avarice of participants in a free-wheeling market. Articles concerning insider trading,¹² abuses in the trading of commodities¹³ and alleged abuses of "program

The number of German DM futures contracts traded on an average day is close to 50,500, with an underlying value of DM6.3 billion. See N.Y. Times, Mar. 18, 1990, § F, at 28.

⁸ See, e.g., *United States v. Milken*, 759 F. Supp. 109 (S.D.N.Y. 1990); *United States v. Boesky*, 1989 Fed. Sec. L. Rep. (CCH) ¶ 94, 417 (S.D.N.Y. Apr. 26, 1989); *Securities & Exch. Comm'n v. Drexel Burnham Lambert, Inc.*, 1989 U.S. Dist. LEXIS 10383 (S.D.N.Y. June 20, 1989).

⁹ See, e.g., *United States v. Mosky*, 1990 U.S. Dist. Lexis 6162 (N.D. Ill. 1990) (indictment); *United States v. Bailin*, 731 F. Supp. 865 (N.D. Ill. 1990) (indictment).

¹⁰ See, e.g., A. ALLETZHAUSER, *THE HOUSE OF NOMURA* (1990); R. CHERNOW, *THE HOUSE OF MORGAN: AN AMERICAN BANKING DYNASTY AND THE RISE OF MODERN FINANCE* (1990); T. WOLFE, *THE BONFIRE OF THE VANITIES* (1988).

¹¹ Cf. Easterbrook & Fischel, *Mandatory Disclosure and the Protection of Investors*, 70 VA. L. REV. 669, 670 (1984) (in contrast to federal regulation of securities fraud, there is no federal regulation of quality of educational services offered).

¹² See, e.g., H. MANNE, *INSIDER TRADING AND THE STOCK MARKET* (1966); Carlton & Fischel, *The Regulation of Insider Trading*, 35 STAN. L. REV. 857 (1983); Haddock & Macey, *A Coasian Model of Insider Trading*, 80 NW. U.L. REV. 1449 (1987).

¹³ See, e.g., Markham, *Prohibited Floor Trading Activities Under the Commodity Exchange Act*, 58 FORDHAM L. REV. 1 (1989); U.S. GENERAL ACCOUNTING OFFICE, *CHICAGO FUTURES MARKET: INITIAL OBSERVATIONS ON TRADE PRACTICE ABUSES*, REPORT TO THE CHAIRMAN, COMMITTEE ON AGRICULTURE, NUTRITION AND FORESTRY, UNITED STATES SENATE (Mar. 1989); *Hearing on*

trading"¹⁴ debate whether investors need governmental protection from the markets. While fraud at the boundary continues to be an issue,¹⁵ there must be some justification other than investor or participant protection for the massive regulatory enterprise¹⁶ that permeates all aspects of markets for financial assets.¹⁷

This article argues that these markets can be understood as property systems.¹⁸ Property systems are collective devices that reduce the costs of holding and exchanging resources. In the standard view of property systems,¹⁹ property entitlements in resources held

Intermarket Frontrunning and Other Financial Market Manipulations Before the Senate Comm. on Banking, Housing, and Urban Affairs, 100th Cong., 2d Sess. (1988); *Futures Industry Investigation: Hearings Before House Subcomm. on Conservation, Credit, and Rural Development of Comm. on Agriculture*, 101st Cong., 1st Sess. (1989).

¹⁴ See, e.g., *Symposium on the Regulation of Secondary Trading Markets: Program Trading, Volatility, Portfolio Insurance, and the Role of Specialists and Market Makers*, 74 CORNELL L. REV. 799 (1989); *Program Trading: Hearing Before House Subcomm. on Telecomm. & Fin., Comm. on Energy & Commerce*, 100th Cong., 1st Sess. (1987); Schick, *A Review and Analysis of the Changing Financial Environment and the Need for Regulatory Realignment*, 44 BUS. LAW. 43 (1988).

¹⁵ The SEC pursues fraud on individual investors with some persistence, as its penny stock investigations and initiatives indicate. See *Securities Enforcement Remedies and Penny Stock Reform Act of 1990*, Pub. L. No. 101-429, 104 Stat. 931 (1990); *Sales Practice Requirements for Certain Low-Priced Securities*, Exchange Act Release No. 27,160, Fed. Sec. L. Rep. (CCH) ¶ 84,440. Investigations of commodities markets usually focus largely on fraud on customers committed by floor traders acting in collusion. See *supra* note 9.

¹⁶ The most recent legislative effort is the Market Reform Act of 1990, which creates a large trade reporting system, coordinates national efforts for a national clearance and settlement system and provides for SEC monitoring of holding company structures of registered broker-dealers. Pub. L. No. 101-432, 104 Stat. 978 (1990).

¹⁷ Early work by economists on the mandatory disclosure system required by the Securities Act of 1933, 15 U.S.C. §§ 77a-77aaa (1988) [hereinafter "the Securities Act"], concluded that the system did not improve the level of investor welfare. In particular, they discovered no evidence that the Securities Act reduced any significant level of losses caused by fraud. See, e.g., Stigler, *Public Regulation of the Securities Markets*, 37 J. BUS. 117 (1964); Benston, *Required Disclosure and the Stock Market: An Evaluation of the Securities Exchange Act of 1934*, 63 AM. ECON. REV. 132 (1973). Some authors have identified alternative justifications for mandatory disclosure and for rule 10b-5, the federal securities fraud rule. See Easterbrook & Fischel, *supra* note 11, at 696-700, 679-80; Coffee, *Market Failure and the Economic Case for a Mandatory Disclosure System*, 70 VA. L. REV. 717, 723-34 (1984); Gilson & Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549, 635-42 (1984); 17 C.F.R. § 240.10b-5 (1989).

¹⁸ Similarly, Macey and Kanda describe organized stock exchanges as firms producing specific goods—liquidity, monitoring of issuers, off-the-rack corporate governance rules and verification of asset quality—in an increasingly competitive environment. Macey & Kanda, *The Stock Exchange as a Firm: The Emergence of Close Substitutes for the New York and Tokyo Stock Exchanges*, 75 CORNELL L. REV. 1007, 1010-24 (1990).

¹⁹ See, e.g., Anderson & Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J.L. & ECON. 163 (1975); Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347 (1967); Johnsen, *The Formation and Protection of Property Rights Among the Southern Kwakiutl Indians*, 15 J. LEGAL STUD. 41 (1986).

in common are allocated to individuals and protected by society when the benefits of that allocation exceed the costs of negotiating and policing the allocation. This allocation permits the more efficient use and conservation of the resource in question. More significantly, property systems economize on the costs of transacting by creating collective mechanisms either through private contract or, more commonly, through government action. In the same way, markets are collective mechanisms that permit participants to engage in exchanges of assets more efficiently. In some cases, these collective mechanisms may emerge spontaneously; other markets may face obstacles that can only be overcome by the state's coercive power.

Section II discusses the notion of "market" as an institutional structure similar to the property system and the types of obstacles to exchange that any market structure must address. The article sets out the conditions for the emergence of collective mechanisms that permit the market to economize on the costs of transacting. Section III applies this analysis to five types of market structures prevalent in secondary markets for financial assets. The article uses as examples of these market structures the foreign exchange market, the government securities market, the over-the-counter market for equity securities, the Toronto and Tokyo Stock Exchanges, the open outcry markets for futures and options, the NASDAQ and International Stock Exchange computerized markets for equity assets, and the American stock exchanges. Finally, Section IV argues that government regulation of the structure of these markets—as in property systems—is understandable as simply a collective mechanism that reduces costs where the number of market participants is great.

II. FINANCIAL MARKETS AS PROPERTY SYSTEMS

Economic theories of private property have emphasized that security in one's property is the essence of a property system. If people know they are secure in their entitlements to resources, they will have the greatest incentive to invest productively in those entitlements.²⁰ This requires both that the property cannot be taken without their consent and that the bounds of their entitlements are

²⁰ See Holderness, *A Legal Foundation for Exchange*, 14 J. LEGAL STUD. 321, 321–22 (1985); Rose, "Enough, and as Good" of What?, 81 NW. U.L. REV. 417, 419 (1987).

clear.²¹ Such systems give participants the needed incentives to produce new goods and conserve existing resources.

While security does improve the social efficiency of resource use and allocation, equally important is the ability to freely transfer the entitlement to the resource.²² We are all better off if owners of entitlements can transfer those entitlements in a "market" of some type. In addition to providing reliable entitlements, a major (and neglected) function of many rules in property law is to structure a secondary market in assets that permits trading with the lowest transaction costs.²³ Property systems exist largely to facilitate trade in valuable assets, whether land or financial assets. Existing theories of property systems, however, have paid no more attention to how assets are actually exchanged than have the analyses of ideal markets.²⁴

A. *The Demand for Trading of Financial Assets*

In the case of financial assets, transferability is essential. Unlike a tangible asset that can be consumed by the holder, such as land or food, a financial asset is merely a claim on the issuer.²⁵ Thus, its

²¹ These are two crucial assumptions underlying the Coase theorem. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960). The Coase theorem posits that when legal entitlements are clear and secure and when bargaining is costless, bargaining will ensure that the entitlements wind up in the hands of the persons who value them the most, thus maximizing social welfare. The theorem's counterintuitive implication is that in a world of no transactions costs it does not matter to social welfare to whom the law gives the initial entitlement. *But see* Rose, *Crystals and Mud in Property Law*, 40 STAN. L. REV. 577 (1988) (discussing the social function of entitlement determination rules that are unclear).

²² The resource allocation effects of the Coase theorem critically depend on the ability to transfer an entitlement in a world free of transaction costs. Coase, *supra* note 21, at 15.

²³ This aspect of property rules has received less attention. *But see, e.g.*, Baird & Jackson, *Information, Uncertainty, and the Transfer of Property*, 13 J. LEGAL STUD. 299 (1984); Gilson & Kraakman, *supra* note 17, at 643 n.247; T. Hall, *A Reexamination of the Cartel Hypothesis of Real Estate Brokerage Markets and the Multiple Listing Services* (Sept. 1983) (unpublished manuscript on file with author).

²⁴ Some attention has been paid to the structure of organized futures markets. Telser argues that organized futures markets exist because futures contracts, like money, act "as a temporary abode of purchasing power." Telser, *Why There are Organized Futures Markets*, 24 J.L. & ECON. 1, 12 (1981). Williams theorizes that such markets exist because transaction costs in futures are less than the costs of equivalent transactions in the spot market. Williams, *Futures Markets: A Consequence of Risk Aversion or Transactions Costs?*, 95 J. POL. ECON. 1000, 1018 (1987). The futures markets provide a form of cheap intermediation. *Id.* at 1020. These explanations are specific to futures contract trading because they depend on the nature of the future contract; they shed little light on the trading of other financial assets.

²⁵ A financial asset is a legal instrument or contract pursuant to which the holder obtains a right to a specified stream of payments of value from the issuer. J. Donohue & D. Van

value depends on the issuer's future ability and willingness to perform. While investors theoretically could hold assets issued to them to maturity, the rate of return that they would demand is so high that it would seriously reduce the volume of capital that could be raised for productive projects. This is because only a very small number of investors are able to evaluate and bear the risk of default over the entire life of the asset.²⁶

When such an asset is easily transferable, however, the return demanded by an investor is lower.²⁷ Investors know they can shift out of an asset, albeit at a loss, if the risk of issuer default becomes too great. Similarly, and irrespective of the issuer's condition, investors know that they can sell the asset if they decide to alter their portfolios because of changes in their risk preferences, or in the characteristics of other assets in their portfolios. Investors will accept a "liquidity discount" for the ability to transfer an asset freely.²⁸ If assets are freely transferable, the demand for such assets (and the price paid for them) will be higher, other things being equal, than for a less easily transferable asset. To the extent that a market can provide this possibility to investors cost effectively, we are all better off.²⁹ Although the purpose of financial markets is often said to be the efficient allocation of capital, that purpose is only derivative in

Zandt, *Models of Deregulation in International Capital Markets* 3 (Jan. 7, 1990) (unpublished manuscript on file with author). The basis of the payments can be a set percentage of a principal amount ("interest") plus that principal amount (together, "debt") or it can be a specified share of the residual profits of the issuer (a "dividend") plus a share of the proceeds upon dissolution (together, "equity"). This definition includes contracts to purchase such a claim in the future ("forward" or "future") and contracts granting the purchaser the option to buy or sell such a claim in the future ("option").

²⁶ Bank loans, historically, have been financial assets that are held to maturity. Recently, however, the size of the bank loan market has grown, coincident with the emergence of a secondary market in such loans. See London, *Secretive market set to enter the spotlight*, *Fin. Times*, Sept. 26, 1990.

²⁷ Haddock & Macey, *Shirking at the SEC: The Failure of the National Market System*, 1985 U. ILL. L. REV. 315, 317.

²⁸ See J. INGERSOLL, *THEORY OF FINANCIAL DECISIONMAKING* 402 (1987); R. BREALEY & S. MYERS, *PRINCIPLES OF CORPORATE FINANCE* 558 (3d ed. 1988).

²⁹ This, of course, is an overstatement. There are situations in which we would be better off if holders of entitlements cannot transfer them. This is so when transfers result in substantial externalities, informational asymmetries and coordination (or common pool) problems. Calabresi & Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1111 (1972); Epstein, *Why Restrain Alienation?*, 85 COLUM. L. REV. 970, 973-88 (1985); Rose-Ackerman, *Inalienability and the Theory of Property Rights*, 85 COLUM. L. REV. 931, 938-40 (1985). There may also be independent distributional concerns that justify inalienability rules. See Calabresi & Melamed, *supra*, at 1114-15; Radin, *Market-Inalienability*, 100 HARV. L. REV. 1849 (1987); Rose-Ackerman, *supra*, at 961-65.

these markets.³⁰ The immediate purpose of a market is the reduction in the cost of transfers.

B. *The Collective Provision of Transferability*

Markets reduce costs in different ways. Again, an analogy to property systems is useful. While each member of society acting individually could capture and protect resources from physical appropriation by others, property systems are collective efforts that provide such security at less individual cost. Instead of arming oneself, each member of society can call on a third party to protect his or her interest. In the same way, financial markets are institutions that reduce certain costs of transferring financial assets by providing a service collectively, rather than letting participants provide that service individually.³¹

Two parties to a transaction can always organize their transaction to reduce the costs of transacting to the optimum. For example, buyers and sellers of a good may allocate between themselves the costs of assuring the quality of the good by allocating the risk that quality may deviate from some agreed upon level.³² To refer to such arrangements as constituting a "market," however, is to reduce the term to the equivalent of "contract." Instead, markets are a form of "team production" in which two or more individuals, by pooling their efforts, are better off than they would be working individually.³³ Markets are defined by their use of collective mech-

³⁰ By definition, the financial assets traded in these secondary markets have already been issued by the issuer, and the issuer has previously received the funds it will put to productive purposes. When the price of a financial asset dips in the secondary market, the issuer does not suffer and there is no net change in the actual capital being employed in the issuer's enterprise. The secondary market price, however, is important to the issuer because it suggests the price at which the issuer could raise additional capital. Moreover, if potential investors know that they can quickly liquidate a financial asset, they will be more likely to purchase that asset in the future.

³¹ See Steiner, *The Public Sector and the Public Interest*, in STAFF OF SUBCOMM. ON ECONOMY IN GOVERNMENT, JT. ECON. COMM., 91ST CONG., 1ST SESS. 1 THE ANALYSIS AND EVALUATION OF PUBLIC EXPENDITURES: THE PPB SYSTEM 13, 14 (Jt. Comm. Print 1969).

³² Product warranties perform this function, and can be explained as a bilateral economization of the costs of quality assurance. See Priest, *A Theory of the Consumer Product Warranty*, 90 YALE L.J. 1297, 1307-19 (1981) (allocation of insurance and repair responsibility between consumer and manufacturer).

³³ Alchian & Demsetz, *supra* note 1, at 779 ("[t]eam production will be used if it yields an output enough larger than the sum of separable production of Z to cover the costs of organizing and disciplining team members"). Alchian and Demsetz use the concept of team production to distinguish "firms" from "markets." My point is that actual markets are social institutions more similar to the economists' "firm" than the economists' "market." For this discussion, the firm's key characteristic is the collective provision of transaction cost reduction,

anisms in which third parties are enticed, by private incentives or public force,³⁴ to provide services to reduce the transaction costs borne by the parties to the transaction.

Just as private property regimes arise when sufficient demand exists for a collective mechanism to secure entitlements, secondary markets for financial assets emerge when the collective provision of services for transferability are cost effective. For this to occur, the benefits of the system must exceed the costs of establishing and policing the system. In the case of private property systems, such costs include those incurred in obtaining substantial agreement from the members of society to abide by rules requiring the respect of asset ownership, and in the provision of police or other mechanisms to monitor and enforce compliance with the rules. The problem is no different in the establishment and administration of markets. The particular method used by a market to address these obstacles, of course, may generate costs of its own. The important question is not whether there exists a "free market" for a particular asset, but whether the particular market structure "appropriately economize[s]" on the costs of secondary trading.³⁵

Markets differ widely in the way they actually put buyers and sellers together because each type of transfer poses different obstacles to easy trading. The structure of a particular market is determined by how it overcomes, avoids or accepts these obstacles to trading. To take a simple, nonfinancial example, a college student wishing to purchase used furniture and other room furnishings could approach every departing senior to see if they might be willing to sell these assets. A less costly solution, however, has developed. The student knows that he can review a collection of "for sale" advertisements posted on a campus bulletin board by potential sellers. In this example, the market has an institutional structure that is more centralized than one in which each potential buyer individually seeks out each potential seller. Because there is no coercive requirement that buyers and sellers conduct transactions in this way,

a characteristic identified by Ronald Coase in his classic article on the firm. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386, 392 (1937).

³⁴ Gilson and Kraakman use the term "collective" to refer only to governmental provision of the mechanism. Gilson & Kraakman, *supra* note 17, at 605, 638. I will later distinguish between private and public provision of the collective mechanism.

³⁵ See Demsetz, *The Cost of Transacting*, 82 *Q.J. Econ.* 33, 33-34 (1968). "None of this makes unimportant the usual questions concerning the role of government in the resolution of externality and monopoly problems. For there are cases in which the cost of government action is less than the cost of transacting in markets." *Id.*

this practice exists presumably because it is less costly to both buyers and sellers to conduct exchanges through such a bulletin board.³⁶ The bulletin board is a collective device that economizes on the costs of asset transference.

C. *The Costs of Transferability for Financial Assets*

Trading financial assets involves numerous costs, and for a trade to occur the benefits of the trade must exceed the costs of conducting it. One obstacle that a financial asset transaction does not face, however, is the problem of unique assets.³⁷ Real estate is the epitome of a unique asset: buildings and land plots come in all sizes and shapes, and each real estate package has its own configuration of qualities.³⁸ Moreover, these qualities do not lend themselves to measurement on a one- or two-dimensional scale. Therefore, a person wishing to purchase a real estate package must spend considerable time and effort in determining whether a particular package has the qualities that the purchaser desires.³⁹ In contrast, one financial asset is fully substitutable with another of the same type issued by the same issuer.⁴⁰ In order to capture the benefits of transferability, issuers generally issue financial assets of identical characteristics.

There are, however, a whole set of other obstacles, affecting transferrability of financial assets, that a market might seek to reduce. In considering these costs, the relevant event is the transaction itself, rather than the number or price of the financial assets traded

³⁶ Of course, the university may subsidize this collective mechanism by providing the board and cleaning off stale notices periodically. See *infra* notes 245-52 and accompanying text (public versus private provision of collective mechanism).

³⁷ When the assets in a market are unique, there is, in effect, a "thin market." The thin market occurs because of the small number of transactors and transactions for each unique asset. Bargaining costs become important in thin markets because of bilateral monopoly problems. See Haddock, Macey & McChesney, *Property Rights in Assets and Resistance to Tender Offers*, 73 VA. L. REV. 701, 706 (1987).

³⁸ See Gilson & Kraakman, *supra* note 17, at 643 n.247.

³⁹ This assumes that the qualities are readily observable and that such packages are not "experience goods." Nelson, *Information and Consumer Behavior*, 78 J. POL. ECON. 311 (1970). An experience good is a good whose quality is ascertainable only by using it. Obviously, for many of its qualities, a house is the quintessential experience good. The fact, however, that each package has a unique configuration of qualities makes it difficult for a collective mechanism to emerge to economize on quality determination costs. We do not see reports for real estate packages in *Consumer Reports* in the same way we do for other experience goods such as refrigerators and washing machines.

⁴⁰ Cf. Telser & Higinbotham, *Organized Futures Markets: Costs and Benefits*, 85 J. POL. ECON. 969, 971 (1977) (standard contracts are necessary feature of organized futures market).

in the transaction. The costs of a transaction in which 100 shares of stock are transferred vary little from the costs of a transaction in which 10,000 shares are transferred.⁴¹ Regardless of size, each transaction imposes a set of costs that a particular market structure can seek to reduce.

1. Information Search Costs

Lack of information is probably the most significant obstacle to trading. Informational asymmetries between traders of assets are endemic to the real world.⁴² In some cases, the party with the information is more than willing to divulge without charge that information to a potential counterparty, but cannot do so cheaply. In other situations, one party requires a concession to reveal information to a counterparty. Overcoming asymmetries of either type is not costless.⁴³

In order to transact, a purchaser must find a counterparty who holds the desired asset.⁴⁴ While potential counterparties in most cases would not exact a price for divulging their location, they are often geographically disperse and thus costly to locate. In most markets for goods, each individual must expend significant time and resources to discover who holds the desired good. For example, if I wish to purchase a particular type of used car, I must search out sellers by any possible means. Often the time-value of my labor in this search is a significant percentage of the total value of the car I ultimately purchase. If the potential counterparties are widely dispersed, this cost is increased.

Many markets, however, have developed collective devices for reducing counterparty search costs. The basic technique is to reduce the geographical dispersion of possible counterparties. In the above example, the existence of car dealers willing to hold an inventory

⁴¹ The declining commissions charged for larger size trades substantiate this point. H. STOLL, *REGULATION OF SECURITIES MARKETS: AN EXAMINATION OF THE EFFECTS OF INCREASED COMPETITION* 47 (1979) (table 7). That commissions are not identical for all trade sizes reveals some residual marginal costs. For example, security and settlement costs are higher for larger trades. More importantly, fees from large transactions probably still subsidize smaller transactions.

⁴² Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519, 525 (1945).

⁴³ Stigler, *The Economics of Information*, 66 J. POL. ECON. 213 (1961), reprinted in G. STIGLER, *THE ORGANIZATION OF INDUSTRY* 171 (1970).

⁴⁴ A related and significant cost of transfer is title verification: do the counterparties actually own the assets they apparently hold? See Baird & Jackson, *supra* note 23 at 302-05. In the case of financial assets, collective settlement mechanisms reduce this cost.

of used cars reduces the number of places I must look.⁴⁵ Newspapers also help economize on such costs by providing a special section of used car ads, which performs a function similar to the furniture billboard on the college campus. Finally, friends collect and share information that I can use regarding sellers of used cars. Many markets provide a "call auction":⁴⁶ a centralized place and time where buyers and sellers come to trade the asset in question.

Assuming a possible counterparty is found, a prospective buyer must determine whether the asset has the desired qualities.⁴⁷ This determination is difficult because the seller has an incentive not to disclose adverse information about asset quality. Moreover, the search for such information is more or less costly depending on the nature of the asset. While a house can have all sorts of latent defects—for example, the ubiquitous termite problem—and be exposed to nonobvious nuisances, the quality of other assets is more readily observable.⁴⁸ Prospective purchasers can easily observe many of the characteristics of financial assets, such as the principal amount, stated interest rate, voting rights and maturity. Others, such as yield, are easily calculable given knowledge of the asset's market price.

Other significant traits, however, are more difficult to determine. For example, the likelihood of the timely payment of interest and principal or of the level of future dividends is more difficult to assess. Another significant risk in many financial asset trades is that one party has relevant information, which the other party lacks, about the asset issuer. The costs of determining these attributes vary significantly depending on the type of financial asset. Information concerning the quality of different foreign currencies is readily available in daily newspapers. With slightly more effort, and some research, a buyer can form a reasonable conclusion about the likelihood of a private issuer defaulting on a bond. The research costs to determine the quality of common stock and similar equity assets, however, can be substantial.

⁴⁵ See Stigler, *supra* note 43, at 176.

⁴⁶ See Whitcomb, *An International Comparison of Stock Exchange Trading Structures*, in *MARKET MAKING AND THE CHANGING STRUCTURE OF THE SECURITIES INDUSTRIES* 237, 241-42 (1985).

⁴⁷ See Gilson & Kraakman, *supra* note 17, at 594 (costs of acquiring, of processing and of verifying information).

⁴⁸ See Nelson, *supra* note 39, at 312-21 (comparison of experience goods with search goods whose traits can be determined prior to purchase).

Transactors have a variety of individual techniques at their disposal to reduce the costs of determining asset quality.⁴⁹ Many markets, however, provide collective mechanisms to perform this service. Third party certification is the ubiquitous example: the Good Housekeeping seal of approval or the Underwriters Laboratory certification ensure consumers that they are purchasing assets of a certain quality. Performing a similar function for financial assets, credit-rating agencies, such as Standard and Poors and Moody's, grade bonds and other debt instruments. For a fee, market professionals uncover information about private equity securities.⁵⁰ At times, governments provide such collective mechanisms for determining asset quality. For example, the Department of Agriculture certifies meat quality. Another government agency, the Food and Drug Administration, certifies the safety and effectiveness of medicines and food additives. Similarly, in some markets for financial assets, the government mandates disclosure of information about securities. In all these cases, instead of determining asset quality personally, the buyer relies on third party certification to save costs.

Assuming purchasers know the quality of an asset, they will still incur costs in searching for the best price.⁵¹ If search costs for this type of information are too high, it is likely that transactions for identical assets will occur simultaneously at different prices. Even if the mean price of these simultaneous transactions is the market clearing price, there could still be a wide dispersion of the prices at which trades occur.⁵² This might result in local, if temporary, "pockets of glut and shortage existing side by side."⁵³ Although such a state of affairs is not bad per se, individual buyers want to avoid trades at prices exceeding the mean, and thus those buyers have an incentive to engage in costly search behavior.

A potentially desirable solution to this problem would be the centralized publication of offers, bids and transaction price infor-

⁴⁹ See Barzel, *Measurement Cost and the Organization of Markets*, 25 J.L. & ECON. 27, 32-37 (1982) (solution of measurement problem by use of warranties, share contracts, brand names and suppression of information); Priest, *supra* note 32 (standard warranties are efficient cost reduction devices in relationship between consumer and manufacturer).

⁵⁰ Gilson & Kraakman, *supra* note 17, at 595-97.

⁵¹ See K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *THE MICROSTRUCTURE OF SECURITIES MARKETS* 160-61 (1986); Stigler, *supra* note 43, at 174.

⁵² Posner, *Information and Antitrust: Reflections on the Gypsum and Engineers Decisions*, 67 GEO. L.J. 1187, 1188, 1194-95 (1979).

⁵³ *Id.* at 1194.

mation. If the buyer could see every price quotation being offered at one point in time, and the price of every completed transaction up to that point in time, the buyer would be able to select the best price with certainty.⁵⁴ Moreover, if each price offerer could see the prices being offered at the same time, the offerer could quickly adjust his quotation to be more competitive and the range of prices on offers to buy the asset would be reduced. In such a case, a buyer could avoid price search costs because the quoted price is the best one. This represents a collective mechanism. Potentially, some person or organization could collect and disseminate such information to market participants for a fee.

In many markets, including those for financial assets, price search is an important way to save on the costs of asset quality determination.⁵⁵ Price is often a reliable proxy for the quality of the asset.⁵⁶ For example, an old VW Rabbit in good mechanical condition commands a higher price than a car of the same make and age that has suffered a series of mechanical problems. Premiums on particular brands are used as signals of higher quality even by consumers unaware of the brand's reputation.⁵⁷ Relying on the quoted price to reduce quality determination costs, however, is risky unless the buyer has some assurance that the quoted price is near the mean of the distribution of prices for the asset.⁵⁸ The collective

⁵⁴ This is one of the justifications the Supreme Court used in 1918 to reject an antitrust challenge to the Chicago Board of Trade's "call" rule. The rule prohibited members from purchasing or offering to purchase, after the exchange had closed, any wheat, oats, corn or rye that was already enroute to Chicago at a price other than the closing bid price. The Court stated: "[The rule] created a public market for grain 'to arrive.' Before its adoption, bids were made privately. Men had to buy and sell without adequate knowledge of actual market conditions. This was disadvantageous to all concerned, but particularly so to country dealers and farmers." *Board of Trade of Chicago v. United States*, 246 U.S. 231, 240 (1918); see also R. POSNER & F. EASTERBROOK, *ANTITRUST LAW* 175-76 (1981).

⁵⁵ "The 'marvel' of the price system is its efficiency in communicating information in a system in which the knowledge of the relevant facts is dispersed among many people." McAfee & McMillan, *Auctions and Bidding*, 25 J. ECON. LITERATURE 699, 699 (1987) (quoting Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519, 525 (1945)).

⁵⁶ This is based on the idea that a relatively higher price is a signal of quality: signaling "takes place when sellers of truly higher-quality products engage in some activity that would not be rational for those selling lower-quality products." Hirshleifer & Riley, *The Analytics of Uncertainty and Information—An Expository Survey*, 17 J. ECON. LITERATURE 1375, 1406 (1979). Attempts by specific market participants to charge a higher price for lower-quality assets would quickly be adjusted for by the market and be self-defeating.

⁵⁷ While brands help consumers economize on the cost of determining asset quality, Barzel, *supra* note 49, at 35-37, the consumer must still investigate the general quality of the brand. One way to do this is to rely on the brand's price premium to compare the brand's general quality against other brands'.

⁵⁸ See Garbade, Pomrenze & Silber, *On the Information Content of Prices*, 69 AM. ECON.

mechanism of a centralized quotation and trade publication service provides this assurance. It presents to all market participants the actual price distribution and accurately indicates asset quality.

This result accords with the semi-strong version of the efficient market hypothesis: in a competitive market, the equilibrium price should reflect all publicly available information on the quality of the asset.⁵⁹ In a market in which there are frequent trades of large numbers of identical assets, the previous or the currently quoted price is often the most significant information to which a trader has access.⁶⁰ Traders can safely and cheaply form their expectations of the true value of the asset by examining the price.⁶¹ A collective mechanism that centralizes firm bid and offer quotations is, not surprisingly, a feature of a wide range of market structures. Its success in providing this service depends on the percentage of existing prices and transactions that are published. To the extent that any prices and trades are hidden from the mechanism, the collective mechanism's ability to economize declines.

Closely related to price search cost is timing search cost. For example, I may be able to identify an appropriate counterparty who has the entitlement to the asset I seek, but that person may not be ready to offer the asset to me in the current time period.⁶² That is, she is not ready to sell the asset to me now, even if she might do so

Rev. 50, 58 (1979) (when observed price dispersion is more compact, government securities dealers revise estimate of equilibrium price toward mean).

⁵⁹ A major objective of any market is the discovery of the "efficient price," that is, the price at which buyers and sellers hold their optimal portfolio of assets, such portfolio reflecting their beliefs about the risk and return characteristics of each asset in that portfolio. Schreiber & Schwartz, *Efficient Price Discovery in a Securities Market: The Objective of a Trading System*, in *MARKET MAKING AND THE CHANGING STRUCTURE OF THE SECURITIES INDUSTRY* 25 (1985); see Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383 (1970).

⁶⁰ See Garbade, Pomrenze & Silber, *supra* note 58, at 56-58 (mean price contains some but not all asset quality information); Gilson & Kraakman, *supra* note 17, at 572-79 (trading informed by information derived from prices); Hayek, *supra* note 42, at 526-28 (traders learn from prices).

⁶¹ Knowing who is in the market for an asset provides valuable information to other traders. "Trade decoding occurs whenever uninformed traders glean trading information by directly observing the transactions of informed traders . . . [Un]informed traders use the identities of large sellers to deduce whether the latter are likely to possess valuable information." Gilson & Kraakman, *supra* note 17, at 573-74; see also Scholes, *The Market for Securities: Substitution versus Price Pressure and the Effects of Information on Share Prices*, 45 J. Bus. 179, 184 (1972).

⁶² Harold Demsetz describes this as the immediacy problem. Demsetz, *supra* note 35, at 36. Others, using different models, refer to the "liquidity" problem. R. SCHWARTZ & D. WHITCOMB, *TRANSACTION COSTS AND INSTITUTIONAL INVESTOR TRADING STRATEGIES* 45-46 (1988).

at some point in the future.⁶³ Suppose I decide that I would like to buy an Edward Hopper painting (which one is unimportant) for the living room wall in my new addition. I may be able to identify all of the persons who own an asset fitting that description, but it may be that none of them is ready to sell their painting right now. If I wait, I know that such an asset will come on the market sooner or later, but waiting is costly to me: during the wait, I am not able to satisfy my desire for a Hopper. Differing preferences about when to transact cause markets to suffer from asynchronicity.⁶⁴ This means that, at different points in time, there may be a temporary excess of demand or supply for an asset.

A prominent collective mechanism used in most markets to bridge these periods of temporary excess is the dealer (or the "market maker").⁶⁵ The dealer holds an inventory of the asset and stands ready to buy or sell that asset to any comers.⁶⁶ For this service, the dealer charges a fee that is reflected in the "spread":⁶⁷ the difference between the "bid," the price at which the dealer is willing to purchase the asset, and the "offer," the price at which he is willing to sell the asset.⁶⁸ In the above example of the Hopper, I could ap-

⁶³ Of course, a counterparty will have some "price" at which the counterparty will part with the asset. That price, however, for a given counterparty may be at the extreme right tail of the dispersion of offers. For example, a counterparty may be unwilling to breakup a portfolio of assets by selling the one desired by another counterparty. A counterparty's reluctance to sell is sometimes attributed to the "convenience yield": the return from holding an asset not attributable to expected increases in its value. Telser, *Futures Trading and the Storage of Cotton and Wheat*, 66 J. POL. ECON. 233, 235 (1958). The convenience yield may include the costs associated with immediately replacing the asset if it were sold.

⁶⁴ See Cohen, Maier, Schwartz & Whitcomb, *Market Makers and the Market Spread: A Review of Recent Literature*, 14 J. FIN. & QUAN. ANAL. 813, 823 (1979); Demsetz, *supra* note 35, at 35; Grossman & Miller, *Liquidity and Market Structure*, 43 J. FIN. 617, 622 (1988); Stoll, *Alternative Views of Market Making*, in MARKET MAKING AND THE CHANGING STRUCTURE OF THE SECURITIES INDUSTRY 79 (1985).

⁶⁵ Brokers, in contrast, solve the counterparty problem, but not the timing problem. Brokers undertake to search for an appropriate counterparty, but do not underwrite the transaction itself.

⁶⁶ In addition to reducing timing costs, the finance literature identifies two other functions of market makers: they assist in reducing price search costs by contributing to efficient price discovery, and they provide some price stabilization. See R. SCHWARTZ & D. WHITCOMB, *TRANSACTION COSTS AND INSTITUTIONAL INVESTOR TRADING STRATEGIES* 43-44 (1988).

⁶⁷ The spread is not a precise measure of the dealer's revenue because bid and offer prices change over time depending on supply and demand conditions. See Stoll, *The Supply of Dealer Services in Securities Markets*, 33 J. FIN. 1133, 1142-44 (1978). Thus, an asset bought at the bid price at t_1 will be sold from the inventory at the offer price at t_{1+x} , which could be above, below or equal to the bid at t_1 , resulting in the dealer enjoying a gross profit, gross loss or breaking even on that asset. In other words, the dealer's spread does not represent an arbitrage profit. See Grossman & Miller, *supra* note 64, at 628.

⁶⁸ One study suggests that the spread consists of 10% inventory holding costs, 43% risk

proach an art dealer who has an inventory of Hoppers for sale. The dealer has saved me the cost of solving the timing problem myself. Banks, which are essentially dealers in money, perform the same function.⁶⁹

2. Security Costs

Another cost of transacting—well discussed in the literature⁷⁰—is that of security, a cost endemic to all types of exchange. Very few assets are contracted for and exchanged simultaneously. Even if I have agreed to a purchase, I always run the risk that my counterparty will default by not delivering the asset or the payment. Generally, in dispersed and completely unregulated markets, people must develop some sort of bilateral mechanism to provide this security.⁷¹ It can be the taking of a “hostage,” or collateral, that will ensure the counterparty’s performance.⁷²

The law of contract provides a collective mechanism to reduce the costs to transactors of this obstacle to exchange. This mechanism brings the power of the state to bear on those who might otherwise breach their voluntarily assumed obligations to perform. Even with a well-established regime of contract law, however, the possibility of nonperformance still poses a security cost to the market, and parties may still resort to private or bilateral means of reducing that cost. For example, the counterparty can become bankrupt, and even if it is not, enforcing contract rights is not costless; it is simply less costly than most individual steps to ensure counterparty performance.

Some markets provide additional collective mechanisms to reduce security costs. Banks, for example, frequently write letters of credit to protect a seller of goods from a buyer’s default. This is particularly useful in the international sphere, when cross-border enforcement of contract rights is more costly, if not impossible. Issuers of credit cards perform the same function in consumer

from trading with better informed traders and 47% order processing costs. Stoll, *Inferring the Components of the Bid-Ask Spread: Theory and Empirical Tests*, 44 J. FIN. 115, 132 (1989).

⁶⁹ Cf. Williams, *supra* note 24, at 1019–20 (futures markets comparable to financial intermediation provided by banks).

⁷⁰ See, e.g., Telser, *supra* note 24, at 12; Telser & Higinbotham, *supra* note 40, at 970.

⁷¹ See Kronman, *Contract Law and the State of Nature*, 1 J.L. ECON. & ORG. 5, 12–18 (1985); Williamson, *Credible Commitments: Using Hostages to Support Exchange*, 73 AM. ECON. REV. 519, 521–22 (1983).

⁷² See Williamson, *supra* note 71, at 522–26.

transactions by assuring payment to a seller, even though the seller does not know the credit worthiness of the counterparty.

3. Settlement Costs

Even if the counterparty fulfills its obligations, the parties must still bear the simple cost of conducting the exchange. In many contexts, this category of costs is called "closing costs." Real estate closings are good examples. Title insurance must be purchased, deeds drawn up, escrows for taxes created, and parties or their agents must somehow meet to exchange the documents of title for cash. In markets for financial assets, this is the cost of "settlement," where physical securities must be exchanged for cash. For years, transactions in stocks and bonds were settled by hiring messengers to transport certificates from one firm to another. While the costs of such transactions within downtown Manhattan (although not insubstantial) were bearable, transactions between more geographically distant holders of securities raised costs substantially.

While transacting parties might chose to bear these costs themselves, many markets have developed collective mechanisms for reducing settlement costs. In the real estate market, title insurance companies offer real estate closing services that handle many of the mundane tasks of real estate transfers at lower cost than the parties could on their own. Title recording statutes, in addition to verifying ownership, reduce the costs of effectively transferring interests in real estate.⁷³ In the case of financial assets, the use of registered securities and book-entry systems has reduced transaction settlement costs substantially.⁷⁴ Instead of arranging for the physical exchange of cash for certificates representing financial assets, these systems simply record transfers of securities on a central book, debiting and crediting accounts to reflect the cash transfer.⁷⁵

⁷³ See Baird & Jackson, *supra* note 23, at 304-05.

⁷⁴ U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, *ELECTRONIC BULLS AND BEARS: U.S. SECURITIES MARKETS AND INFORMATION TECHNOLOGY* 106-25 (1990). Baird and Jackson suggest that assets such as money are not suitable for a filing system because money is transferred many times, and a possession rule has few disadvantages. Baird & Jackson, *supra* note 23, at 306. Their focus is on the transfer of security interests, rather than on efficient transfer of title itself. In many markets for financial assets, a filing system as a collective mechanism has emerged because of the large number of transfers and the high cost of physical delivery. The law recognizes this in Article 8 of the Uniform Commercial Code. U.C.C. §§ 8-320, 8-401 to 8-407 (system for transfer and pledge of securities).

⁷⁵ The invention of money (whether issued by a private party or the government) is another collective mechanism. This invention was a response to the high settlement costs of barter or of gold exchange.

D. *The Emergence of Collective Mechanisms or Organized Markets*

Even if a collective mechanism that reduces the costs of asset transfer exists, however, it will not be adopted unless there is some way to pay for it. First, the total cost of the mechanism must be less than the total benefit it confers. In the same way that we would not be willing to pay to parcel out property entitlements in only one resource and to establish a police force to protect them, it would not make much sense to use the New York Stock Exchange building only to conduct transactions in the common stock of one company.⁷⁶ Property systems and the collective mechanisms that constitute an organized market entail substantial fixed costs that can only be justified if spread across a wide range of transactions. Second, some way must exist to make the beneficiaries of the mechanism pay their appropriate share of the cost. Even if the total benefit exceeds the total cost, the fact that it is difficult or impossible to charge those who benefit may prevent the mechanism from emerging. In property systems, this latter problem is that of the "commons."⁷⁷

1. Factors Leading to Collective Mechanisms

A collective mechanism will emerge only if the circumstances of the market justify the cost. One factor that affects this calculation is the nature of the assets being traded. For example, the market for used furniture in a college town is more likely to take the form of the previously described bulletin board than that of a central trading floor, such as a vegetable market to which all sellers would bring their wares. This is so because the furniture is fairly heavy, and because any furniture a student would want is probably located within walking distance of the campus. Neither of these is true for fresh vegetables.

Likewise, financial assets differ in the way information about the asset is acquired.⁷⁸ For some financial assets, such information

⁷⁶ On the opening day of the new Budapest Stock Exchange (observed by the author), only one stock, that of the national tourism company, was traded. The Exchange occupied one small windowless room and had six personal computers.

⁷⁷ See *infra* notes 80-95 and accompanying text.

⁷⁸ Gilson and Kraakman analyze this factor by looking at the way that "news," or new information relevant to the security, is initially distributed among traders. Gilson & Kraakman, *supra* note 17, at 567; see also Macey & Miller, *Good Finance, Bad Economics: An Analysis of the Fraud-on-the-Market Theory*, 42 STAN. L. REV. 1059, 1083-85 (1990) (different types of information about assets have different consequences for market efficiency). This article suggests that assets differ in how such initial information is distributed and that this difference has important consequences for market structure.

is easy to acquire at low cost. For example, the quality of government securities is affected largely by information such as government policy action in the debt markets and general economic indicators. Collecting relevant quality information about other assets such as private equity securities, however, is more costly. Other things being equal, collective mechanisms are more likely when such information costs are higher.

The demand for transactions in an asset affects the average cost of the collective mechanism per transaction. Collective mechanisms involve non-de minimis levels of fixed costs. The greater the number of transactions, the lower the proportionate share of the fixed cost that must be borne by each transaction. Continuing the vegetable-furniture comparison, vegetables are goods that are bought (and consumed) quite frequently by a given individual, while furniture purchases are relatively rare. In the former case, the fixed costs of a central market can be spread over a large number of transactions, while in the latter, the infrequency of transactions does not justify the maintenance of a central market. Thus, other things being equal, collective mechanisms will emerge when the demand for transactions is high.

Finally, the number of participants in a market will have a significant impact on the ability of collective mechanisms to economize on transfer costs. For example, holding the number of transactions constant, an increase in the number of participants makes the reduction of all costs of transacting more difficult. Quality determination in the vegetable market would be easier if the number of growers is small because the parties then would be more likely to have transacted with each other in the past and to have built up a relationship of mutual trust or the ability to use "tit-for-tat" strategies. Likewise, in a small group of transactors, the costs of price search, settlement and security would be reduced by the same bilateral mechanisms. With an increasing number of participants, however, such costs for each trader will rise proportionately, and collective mechanisms may be able to provide the same protections at less individual cost. Other things being equal, as the number of market participants increases, collective mechanisms become more likely.

2. Commons Problems in Creating Markets

Even if the above factors suggest that a particular collective mechanism is cost justified, there may still be an obstacle to the

emergence of that mechanism that causes trading to occur at sub-optimal levels. This reflects one of the resilient puzzles of the standard property theory. Even assuming that the creation of a private property system is socially beneficial, it is not clear from the standard view how such a system emerged from the commons.⁷⁹ In that view, private property rights in the specific resource were distributed to individuals at some point because the former communal organization of the resource led to its over-exploitation—the “tragedy of the commons.”⁸⁰ That is, at some point, the social benefits of the creation of a private property system, despite its social costs, outweighed the net social benefits of the communal system. But the very reason the tragedy of the commons existed in the first place was that there was a disjunction between the private and social costs of the system: each person acting in his self-interest had an incentive to take all of a particular resource he could from the commons without considering the social cost of such an act. While the traditional view explains why the system of private property is preferable, it fails to discuss how we came to adopt it.

To understand this, it is useful to think of the classic commons problem as one of the prisoners’ dilemma.⁸¹ Each member of society would have an incentive to defect from an initial agreement to form a private property system because his private expected net gain from defection, the value of the resources he could acquire, is greater regardless of whether others in society defect from or abide by the agreement. All other members of society would reason similarly,⁸² the result being that all would defect from the agreement and thus perpetuate the socially less desirable communal system.

⁷⁹ The same problem plagues the story of the emergence of the state itself in the Hobbesian tradition. That tradition argues that individuals were better off with a sovereign, but does not indicate how the sovereign might emerge. See M. DAVIS, *GAME THEORY* 113–14 (rev. ed. 1983) (Hobbesian account is prisoners’ dilemma).

⁸⁰ Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1243 (1968); see also Demsetz, *supra* note 19, at 354–55.

⁸¹ The prisoners’ dilemma is an important game structure within game theory. In the standard version of it, the prosecutor has arrested two burglary suspects and isolated them in separate rooms. He goes to each and offers the same deal: if you confess and your partner also confesses, you both will receive five years in prison; if you confess and he does not, you will go free and he will get ten years; if you do not confess and he does, you will get twenty years and he will go free; and if you both do not confess, you both will get one year. M. DAVIS, *supra* note 79, at 109. Because the partners in crime cannot reach an agreement with each other, they both will fail to cooperate with each other by deciding to confess.

⁸² Even the presence of a substantial number of socially conscious altruists would not affect the results. Their action would simply encourage those egoists who refused to cooperate.

One answer to the dilemma of the emergence of the private property system is that most resources are not subject to the pure commons problem. That is, the payoff structure is not that of the prisoners' dilemma. Instead, a particular resource might involve a purely cooperative game. The payoff to each person who cooperated with the new private property regime would be greater than any gains to be gotten by refusing to cooperate. Umbeck's analysis of the role of might in the distribution of property rights suggests this situation.⁸³ In the pre-property system state of nature, it is not unreasonable to assume that all persons would have reasonably equivalent private ability to capture a resource by force and protect it from trespass. Given that assumption,⁸⁴ Umbeck demonstrates that individuals would possess equal sized parcels of land of standard productivity.⁸⁵

In that stable situation, a person would have no strong reason to defect from an agreement to establish a private property system. People would abide by the system because the standard size parcel is the maximum payoff they could expect from not agreeing to the system. Even if a person could grab more, acting alone that person could not hold on to more than the standard size.⁸⁶ The person's best strategy is to agree to join a society-wide cartel. Such a cartel will produce a property system at an average cost to an individual that is less than that individual's cost of private protection for the property. The individual gives up nothing, therefore, by agreeing to be subject to collective punishment for violating this social pact.⁸⁷ The problem becomes one of a simple cooperative game.⁸⁸ Under

⁸³ Umbeck, *Might Makes Right: A Theory of the Formation and Initial Distribution of Property Rights*, 19 *ECON. INQ.* 38 (1981).

⁸⁴ Umbeck, *supra* note 83, at 42.

⁸⁵ Umbeck, *supra* note 83, at 43-45.

⁸⁶ An alternative would be for the person to attempt to form a coalition with another to increase the amount of land the person could hold. If there were no economies of scale in the use of force, the person would be no better off. Cf. Umbeck, *supra* note 83, at 45-48 (contracting would result in same distribution of productive land). If there were economies of scale, it is likely that any such coalition would be unstable. The coalition would be subject to competing bids from other individuals who would try to lure the partner away by offering a greater percentage of the land. See M. DAVIS, *supra* note 81, at 184-85; Bittlingmayer, *The Economic Problem of Fixed Costs and What Legal Research Can Contribute*, 14 *L. & Soc. INQ.* 739, 747-50 (1989) (theory of empty core is idea that there is no stable equilibrium in such situations).

⁸⁷ Of course, once the pact is established, individuals have the incentive to avoid paying their allocated share of the costs of the pact. But this is the standard problem that appears in bilateral contracts of enforcement, and is unrelated to whether there is a collective action problem that makes the creation of the pact impossible in the first place.

⁸⁸ Formally, a cooperative game is a non-zero sum game in which the individual payoffs

these conditions, the emergence of a private property system simply involves problems of coordination that entrepreneurs can easily solve by providing a coordination service.

There may still be some resources, however, for which there is no practical limit on the amount an individual may appropriate. The standard examples, about which the "tragedy of the commons" is concerned, are the use of air and water as waste dumping grounds. In such situations, an individual's expected gain from defecting from the property system would exceed the individual's gain from complying. Thus, few people would be willing to sign on to the system at the outset.

The only answer to the prisoner's dilemma problem, in these situations, is to provide for the possibility of information transfers, and retaliation for failures to cooperate. One way to do this is to confront the individual with an existing structure that monitors and punishes defections with substantial certainty. By doing this, the commons problem is converted to the more tractable free rider, or external benefits, problem. Still, such a structure is costly to create. If it has to be created *de novo*, the commons problem will reassert itself.

The simplest explanation for the emergence of such an institutional structure is that a structure already existed, one that was originally created to address other concerns. If some cooperative problem resulted in the creation of a monitoring and enforcement apparatus, that apparatus might be adapted with less additional cost to solve certain aspects of the commons problem.⁸⁹ Alternatively, and more likely as a matter of history, commons problems were resolved by either outsiders or big men within a society, who imposed and enforced an already established institutional structure.⁹⁰

from defection are less than those from cooperation. M. DAVIS, *supra* note 81, at 133-35. While the prisoners' dilemma is also a non-zero sum game, the extra social value created by cooperation is not large enough to offset the individual gain from noncooperative exploitation of the resource. For example, Umbeck reports that gold panners in the California gold rush were able to establish a private property system without the force of the state ensuring cooperation. Umbeck, *supra* note 83, at 54-56.

⁸⁹ There is substantial evidence that the actual "commons," the communal fields outside the villages in sixteenth century England, were actually highly regulated by social custom and its enforcement mechanisms. Overexploitation, therefore, was never a problem. See Cox, *No Tragedy of the Commons*, 7 ENV'T ETHICS 49, 53-59 (1985).

⁹⁰ The actual history of the distribution of "unowned" (e.g., Indian) property supports this. See *Johnson v. M'Intosh*, 21 U.S. 503 (1823). The prevalence of the rule of capture as a method to distribute previously unowned property is also consistent with my story. See *Pierson v. Post*, 3 Cai. R. 175 (1805); Epstein, *Possession as the Root of Title*, 13 GA. L. REV.

In effect, this is a cross-subsidization argument that assumes that such systems of control have substantial fixed costs that can be shared across discrete problems. This is certainly the case with air and water pollution, where existing mechanisms of government monitoring and punishment have been applied to address a problem that individuals acting alone would have been unable to resolve.

In financial markets, most transferability costs pose cooperative problems rather than commons problems. Thus, when the demand for transactions is sufficient and the number of participants low, everyone will find it in their interest to agree to a collective mechanism that both provides a cost reduction service and controls free riding. For this reason, most markets for financial assets have emerged spontaneously without government assistance with the increasing demand for transactions, larger numbers of participants and technology-induced reduction in costs.⁹¹

The one type of cost that does present the commons problem is that of price search. While a properly structured collective mechanism can eliminate some free riding on prices by limiting price dissemination to those who pay for the service, price cost reduction also depends on all parties submitting their trades to the collective process.⁹² This poses a version of the efficient market paradox: if a market is perfectly efficient, no participant has any incentive to search for information.⁹³ In a price search collective mechanism, the price produced would depart from the equilibrium price if participants simply used the price to effect transactions on the side at lower cost, and did not incur the expense of running their prices through the mechanism.⁹⁴ When the number of participants trading in a particular asset is small, this problem may not be substantial. In such a situation, the mechanism may be tied to other cost reduction services that the trader needs for cost-effective trading, and the trader has sufficient private incentive to contribute his prices to

1221, at 1241-43 (1979) (capture rule works satisfactorily and no point in changing rule in mid-stream).

⁹¹ 1 F. HAYEK, *LAW, LEGISLATION AND LIBERTY* 35-39 (1973).

⁹² The New York Stock Exchange and other exchanges have zealously attempted to protect their property interest in the price information created by their collective mechanisms. J. Mulherin, J. Netter & J. Overdahl, *The Organization of Financial Exchanges from a Transaction Cost Perspective* 20-54 (Apr. 26, 1990) (unpublished manuscript on file with author). The commons problem I address here is caused by a failure to contribute to the production of that information, not by free riding on the information.

⁹³ Grossman & Stiglitz, *On the Impossibility of Informationally Efficient Markets*, 70 *AM. ECON. REV.* 393, 404 (1980).

⁹⁴ K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *supra* note 51, at 160-61.

the system. When the group of participants is large and diverse, other techniques may be needed, such as government regulation.⁹⁵

3. Markets and Government Regulation

The problem of the commons is only quantitatively different from the more widespread cooperative problem of creating and maintaining collective mechanisms. Problems that appear to be commons problems are simply situations in which the costs of enforcement of the collective mechanism are extremely high. When the social benefits, however, are high enough, a cost effective enforcement technology will be found. Thus, a system of property rights was created when the benefits of the system were perceived to outweigh the costs of a governmental system of entitlement enforcement. Likewise, the government enforces contracts with its coercive powers because the collective mechanism of contract enforcement is thought to be a more cost-effective way to resolve the security cost problem of transfers than either the private individual practice of hostage taking or private collective systems of agreement enforcement. In this view, government enforcement or regulation is simply one of many possible types of collective mechanisms for reducing the costs of transfer.

Typical arguments about the justified role of government action point to the existence of public goods,⁹⁶ or more generally, externalities or market failures.⁹⁷ What the variation in financial market structures demonstrates, however, is that such problems can be solved by private arrangements.⁹⁸ The commons and the public goods problems are ripe candidates for government action, not because they cannot be solved by private action, but because government action is the more efficient enforcement technology in such circumstances.⁹⁹ Moreover, if the government already exists, the

⁹⁵ Sugden, using an evolutionary approach to game theory, argues that evolutionary stable collective mechanisms that are Pareto superior to individual provision need not be Pareto optimal. Sugden, *Spontaneous Order*, 3 J. ECON. PERSPECTIVES 85, 87 (1989).

⁹⁶ Steiner, *supra* note 31, at 15.

⁹⁷ See Arrow, *The Organization of Economic Activity: Issues Pertinent to the Choice of Market Versus Nonmarket Allocation*, in STAFF OF SUBCOMM. ON ECONOMY IN GOVERNMENT, JT. ECON. COMM., 91ST CONG., 1ST SESS. 1 THE ANALYSIS AND EVALUATION OF PUBLIC EXPENDITURES: THE PPB SYSTEM, 47 (Jt. Comm. Print 1969).

⁹⁸ Cf. Coase, *The Lighthouse in Economics*, 17 J.L. & ECON. 357, 372-74 (1974), reprinted in R. COASE, *THE FIRM, THE MARKET, AND THE LAW* 187, 208-11 (1988) (lighthouse services historically provided privately to some extent).

⁹⁹ Cf. Haddock, Macey & McChesney, *supra* note 37, at 703 (government intervention against externality is justified when "the costs of private internalization exceed the costs of public intervention").

considerable fixed costs incurred in setting up the police force and court system are sunk costs, and the marginal costs of extending its power to the new area may be small. Thus, there is a type of cross-subsidization from crime prevention and national defense work to other regulatory areas.

A simple, and I hope uncontroversial, example of this principle is the prohibition of fraud in contracting.¹⁰⁰ As described above, one of the costs of transacting is the danger that the quality of the asset is not what you think it is. One source of this information is the seller, but if the asset is of abnormally poor quality, the seller has an incentive to deceive the buyer about its quality. Society could simply rely on buyers to take whatever steps they think necessary to assure themselves that the seller's representations are accurate. It may be (and as a society, we have decided that) it is socially less costly to prohibit such seller misrepresentations, and to enforce the prohibition with the external coercive power of the state.

The scope of this prohibition, that is, the definition of what constitutes "fraud," varies in financial markets.¹⁰¹ There must exist, however, some optimal regulatory point between overt misrepresentations and the failure to disclose legitimately acquired information. The test for external coercion (regulation) should not be whether an action is "wrong" or "unfair," but whether public provision of protection is collectively cheaper than leaving individuals to contract privately for such protection. Because secondary trading of assets involves costs in addition to asset quality determination, similar determinations must be made for all aspects of market structure. In fact, fraud is merely a subissue of the more general cost reduction problem of markets.¹⁰² The institutional structures of markets for financial assets reduce the costs of transacting, and the question of government regulation of these structures turns on whether public provision of this service is more "appropriately economiz[ing]"¹⁰³ than private provision.

¹⁰⁰ The property system itself is nothing more than the governmental provision of a collective mechanism that reduces the costs of transacting. We certainly could live in a society in which private means could be used to acquire and protect an acquisition from poachers, but we all believe we are better off with the governmental provision of that service.

¹⁰¹ The judicial elaborations of the scope of fraud under Rule 10b-5, 17 C.F.R. § 240.10b-5 (1989), suggest that the seller's failure to disclose relevant information can be fraudulent as is an affirmative misrepresentation. *See, e.g., S.E.C. v. Texas Gulf Sulphur Co.*, 401 F.2d 833 (2d Cir. 1968), *cert. denied*, 394 U.S. 976 (1969).

¹⁰² *Cf. Coffee, supra* note 17, at 725-37 (public goods problem can justify mandatory disclosure of securities laws).

¹⁰³ Demsetz, *supra* note 35, at 33.

One rough indicator of this in financial markets is the number of participants in the market. A market provides a benefit to its users that entails costs, and unless some institutional mechanism exists to ensure that the beneficiaries bear those costs, the good produced by the market will be underproduced. When, as is the case in some markets, the number of participants is not great, the collective mechanism can be enforced easily among the market participants through private contracting. In other cases, however, the costs of a private collective mechanism may exceed the private expected gain from the use of the collective mechanism. This would be true whenever the mechanism has trouble controlling free riders because of the number of participants and their heterogeneity. In such cases, external coercion may be the best method by which to "economize."

III. MARKETS AND REGULATORY STRUCTURE OF MARKETS FOR FINANCIAL ASSETS

The property theory of markets explains many of the structural features observed in actual markets for trading financial assets. The following subsections examine several of these markets to demonstrate the power of this theory. For ease of exposition, I organize the discussion along a rough continuum from decentralized to more centralized market structures.¹⁰⁴

A. Counterparty Markets

In a counterparty market, buyers and sellers deal directly with each other without the aid of any collective mechanisms. In one sense, a counterparty market is not a market at all, but merely the realm of bilateral contract. Buyers and sellers bear all the costs of

¹⁰⁴ The issue of centralization is key to the fragmentation-consolidation debate over market structure. The fragmentation-consolidation debate turns on whether the economies of scale of centralization are bought at the cost of a loss of competitive pressures that might otherwise drive down costs. See K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *supra* note 51, at 150-69; Cohen, Conroy & Maier, *Order Flow and the Quality of the Market*, in MARKET MAKING AND THE CHANGING STRUCTURE OF THE SECURITIES INDUSTRY 93 (1985); Cohen, Maier, Schwartz & Whitcomb, *An Analysis of the Economic Justification for Consolidation in a Secondary Security Market*, 6 J. BANK. & FIN. 117 (1982); Sametz, *A Modest Proposal Toward a National Market System—From CLUB to CLOB*, in IMPENDING CHANGES FOR SECURITIES MARKETS: WHAT ROLE FOR THE EXCHANGES? 84 (1979); Silber, *Innovation, Competition, and New Contract Design in Futures Markets*, 1 J. FUT. MARKETS 123 (1981); Smidt, *Which Road to an Efficient Stock Market?*, 27 FIN. ANAL. J., Sept.-Oct. 1971, at 20. Here, I attempt to break down the discrete costs that markets may or may not handle through centralization.

search, security and settlement directly, rather than relying on third parties or some market structure.

The largest market of this type is the wholesale market for foreign currency.¹⁰⁵ While there is a separate retail decentralized dealer market for foreign exchange,¹⁰⁶ over seventy-seven percent of all foreign exchange transactions occur in an interbank market.¹⁰⁷ In this market, a small number of individual international banks and other entities maintain trading desks from which they contact traders at other banks directly over telephone lines or computer links.¹⁰⁸ For most trades, other traders cannot observe an exchange, its volume or price. Thus, simultaneous trades can occur at different prices. Although Reuters provides a computer screen quotation system,¹⁰⁹ most trades are conducted by telephone, where one party asks for the other party's prices for a particular currency.¹¹⁰ In some cases, money brokers put two traders together for a fee,¹¹¹ but in most trades no fees are charged and traders make their profits through either astute trading or, more frequently, on general price movements in the underlying currency. Finally, traders settle their

¹⁰⁵ Interest rate swaps, currency swaps, loan participations, Eurodollar deposits and various derivative products are also traded in counterparty markets. The organized futures markets that trade standardized foreign exchange futures and options account for less than 5% of the daily foreign exchange turnover. See BANK FOR INTERNATIONAL SETTLEMENTS, *supra* note 7, at 5.

¹⁰⁶ In this retail market, customers purchase from banks both spot foreign exchange and customized forward contracts to satisfy current and future needs for the currency or to hedge open positions. Corporations and individuals with spot foreign exchange needs generally trade with banks on an ad hoc basis. In such consumer trades, banks provide a service to their customers by either selling or purchasing foreign currency from the banks' inventories. Banks charge a fee for such service, in addition to receiving a mark-up from the interbank bids and offers. This approximates a decentralized dealer market of the type discussed in the next subsection.

¹⁰⁷ BANK FOR INTERNATIONAL SETTLEMENTS, *supra* note 7, at 4.

¹⁰⁸ The actual number of banks and other entities is difficult to determine. The Federal Reserve Bank of New York conducted two market surveys that polled forty-four banks in 1977 and forty-one in 1980. R. KUBARYCH, *FOREIGN EXCHANGE MARKETS IN THE UNITED STATES* 12 & n.8 (rev. ed. 1983). A more recent survey by the Bank for International Settlements suggests that the number of active participants has increased significantly and now includes a number of nonfinancial companies. BANK FOR INTERNATIONAL SETTLEMENTS, *supra* note 7, at 3-4.

¹⁰⁹ Reuter's Monitor Dealing Service, introduced in 1981, has 2,300 subscribers and handles approximately 33% of the foreign exchange volume. The service does not require its subscribers to report on the screen actual trades or prices at which actual trades occur. Cookson, *Dealing Room Systems: 24-hour traders*, Fin. Times, Nov. 9, 1989, spec. § , at IV.

¹¹⁰ R. KUBARYCH, *supra* note 108, at 12-14.

¹¹¹ R. KUBARYCH, *supra* note 108, at 13-15. The Bank for International Settlements estimates that on average 40% of all transactions are brokered, but that the percentage is declining. BANK FOR INTERNATIONAL SETTLEMENTS, *supra* note 7, at 3.

transactions through correspondent accounts, with each other or with common intermediaries, that can be offset to reflect the transactions.¹¹²

There is little government regulation of this trading activity. The regulation that exists takes the form of prudential limits on the foreign currency positions that banks can take, and is intended to protect the financial stability of the trading institution as a regulated bank.¹¹³ This regulation arises from the regulation of banks as deposit-taking institutions. Institutions that do not fall under banking regulation may trade free of such supervision.

Although some collective mechanisms may be emerging in this market, the individual participants usually bear their own costs of transacting because of the small number of participants and the nature of the assets being traded. Because the few participants form a close-knit group, over time a trader is likely to be either a buyer or a seller on an equal number of occasions. Outsiders are unable to effectively break into the trading.¹¹⁴ In addition, the financial assets regularly traded are few in number and highly standardized. Only United States dollars, Deutsche marks, Japanese yen, and British pounds are regularly traded.¹¹⁵ Thus, it is possible for banks to carry each of these assets in their portfolios. Moreover, information about asset quality is publicly provided to anyone willing to open a newspaper or follow a radio report. Unlike assets issued by private firms, price search generates minimal additional quality information about foreign exchange.¹¹⁶

¹¹² The "Fxnet" foreign exchange settlement system, created in 1987 by 12 banks, settles transactions among its members by netting trades between member counterparties throughout the day, and making a computerized net payment at the end of the day. The board of Fxnet has recently opened membership in the system to nonbanks and granted a contract to Quotron International, a Citicorp subsidiary, to expand and develop the system to meet the needs of the entire foreign exchange market. Cane, *Quotron wins forex order*, *Fin. Times*, Aug. 15, 1989, at 24.

¹¹³ Most international banks are subject to general capital requirements and regulatory supervision of their asset positions. See, e.g., BANK FOR INTERNATIONAL SETTLEMENTS, COMMITTEE ON BANKING REGULATIONS AND SUPERVISORY PRACTICES, PROPOSALS FOR INTERNATIONAL CONVERGENCE OF CAPITAL MEASUREMENT AND CAPITAL STANDARDS (Dec. 1987); 12 C.F.R. § 225 App. A-C (1990). Regulators fear that, given the volatility of the prices in this market, open positions in foreign currencies are particularly risky. Through regulatory supervision, banks are generally required to eliminate their open positions on a daily basis.

¹¹⁴ See *supra* note 106 and accompanying text.

¹¹⁵ See BANK FOR INTERNATIONAL SETTLEMENTS, *supra* note 7, at 6, 14-16 (tables C-1 to C-3).

¹¹⁶ The intervention of central banks in the foreign currency markets does move the price, and is the one case in which the price may disclose information not generally available. See *supra* note 61 (price could disclose activities of important market participants).

Because of the small number of participants and currencies in the foreign currency market and the nature of the assets being traded, the costs of transfer are low and individual provision is cost effective. Bank participants have no problem locating counterparties or quickly comparing the prices those counterparties offer. Information about the quality of a United States dollar is easy to obtain, and a collective mechanism for accumulating such information would not be cost effective. Because of the low number of participants and the extremely high number of transactions, timing costs are low; within the interbank group, someone is always willing to deal at a particular point in time. The repeated dealings between the small number of well-known participants means that security costs remain minimal.¹¹⁷ Finally, the use of offsetting accounts reduces the costs of settlement.

B. *Decentralized Dealer Markets*

A wide range of financial assets is traded in decentralized dealer markets. The main feature of a dealer market is the existence of firms or individuals who are willing to hold a supply of assets in inventory and who stand ready to trade those assets with other firms and individuals. Such "dealers" provide a collective mechanism that reduces both timing and counterparty search costs. Dealers make it easier for market participants to find a counterparty and bridge the supply and demand time gap. Dealers bear the cost of searching for the assets and the cost of advertising to inform buyers that they hold such assets. Instead of engaging in costly searches themselves, buyers and sellers of the asset can contact the dealers directly. For these services, dealers charge a mark-up over their cost on the assets they sell out of their inventory.¹¹⁸ While most of the mark-up represents storage charges and reimbursement for the expenses of search and security costs, some part is attributable to the dealer's informational advantage over the customer.

1. Government Securities Market

The secondary market for government securities, both Treasury bills and Treasury notes and bonds, is a type of decentralized

¹¹⁷ The regulation of many participants because of their banking activities affects security costs. While such regulations do not directly ensure performance of a trade, they reduce the chance of default due to insolvency.

¹¹⁸ See *supra* text accompanying notes 65-69.

dealer market.¹¹⁹ The market is bifurcated between a wholesale market and a retail market. In the wholesale market, the Federal Reserve Bank of New York (FRBNY) authorizes a small group of banks and securities houses, called "primary dealers," to trade with the FRBNY in its open market operations.¹²⁰ These primary dealers trade among themselves by means of direct telephone contacts and seven inter-dealer brokers,¹²¹ who provide real-time secondary trading prices on computer screens to the primary dealers.¹²²

In the retail market, one inter-dealer broker facilitates transactions between the primary dealers, other dealers and brokers,¹²³ and a group of largely institutional participants.¹²⁴ Only one broker transmits a limited set of current prices in the wholesale inter-dealer market to nonprimary dealers and other participants.¹²⁵ Retail market participants, therefore, must search for the best price (which includes a dealer mark-up) by canvassing many dealers.¹²⁶ In the retail markets, retail brokers insist on credit reviews of potential customers to reduce default risk.

Treasury securities are issued in "book-entry" form. Instead of transferring physical certificates of ownership, a transfer is simply recorded on the books of a Federal Reserve Bank or the Treasury and the purchaser receives a receipt noting the transfer. Settlement, therefore, involves only the transfer of cash and receipts, and is conducted by use of clearing bank debits and credits on behalf of

¹¹⁹ K. GARBADE, *SECURITIES MARKETS* 430-35 (1982).

¹²⁰ In all, there are 42 primary dealers. They also bid directly at the regular auctions held by the Department of the Treasury for Treasury bonds and Treasury bills. Most of the bids submitted are made to fill orders by clients of the primary dealers who are end investors seeking to add such assets to their portfolio. Such bidding is also open to the public. U.S. GENERAL ACCOUNTING OFFICE, *supra* note 7, at 12, 17-18.

¹²¹ Garbade, Pomrenze & Silber, *supra* note 58, at 55.

¹²² Approximately 58% of all trades in this wholesale market are conducted through inter-dealer brokers. U.S. GENERAL ACCOUNTING OFFICE, *supra* note 7, at 66-67.

¹²³ Dealers and brokers totaled 1,841 as of July 1989, as reflected on the list of registered broker-dealers. *Id.* at 26.

¹²⁴ See Request for Comments on the Oversight of the U.S. Government and Agency Securities Markets, Securities Act Release No. 34-21959, 50 Fed. Reg. 15,904 (Apr. 23, 1985).

¹²⁵ That broker, Cantor Fitzgerald Securities Corporation, sells its prices to Telerate, part of the Dow Jones information services group, which then distributes them. These prices are not firm quotes, and no information is provided on completed transactions. U.S. GENERAL ACCOUNTING OFFICE, *supra* note 7, at 77. There is some evidence of concerted primary dealer opposition to attempts by inter-dealer brokers to publish widely inter-dealer price information. *Id.* at 82; cf. J. Mulherin, J. Netter & J. Overdahl, *supra* note 92, at 20-54 (New York Stock Exchange's and other exchanges' attempts to control dissemination of price information).

¹²⁶ Typically, the mark-up is 1/32% to 2/42% (3 to 13 basis points) for Treasury notes and bonds. U.S. GENERAL ACCOUNTING OFFICE, *supra* note 7, at 54.

customers. The Government Securities Clearing Corporation,¹²⁷ a private venture, is attempting to centralize settlement in the market.¹²⁸

Regulation of the market is limited for the most part to ensuring the financial credit-worthiness of dealers and brokers.¹²⁹ Before authorizing dealers to become primary dealers, the FRBNY requires that those dealers demonstrate their financial ability to bear the risk of the market. This includes meeting specified capital adequacy requirements and submitting daily position and risk information to the FRBNY.¹³⁰ The primary dealers, all other dealers, and brokers are required to register with the Securities and Exchange Commission (SEC) or, if they are a bank, with the appropriate banking authority.¹³¹ Registration entails meeting capital adequacy standards modeled on the FRBNY's requirements. In addition to specifying the applicability of the general anti-fraud provisions of the Securities Exchange Act,¹³² the regulations affect advertising¹³³ and the

¹²⁷ The dealers, brokers and clearing banks in the market own the majority interest in the GSCC, which acts to spread the risk of unsettled trades among all participants. Participating dealers must have a net worth of \$10 million and excess net capital of \$10 million; participating brokers must have liquid capital of \$4.2 million. *Id.* at 71.

¹²⁸ *Id.* at 34 & n.16.

¹²⁹ The Government Securities Act of 1986, 15 U.S.C. § 78o-5 (1988), was largely prompted by the well-publicized failures of several unregulated government securities dealers who dealt exclusively in government securities. See SECURITIES AND EXCHANGE COMMISSION, REGULATION OF THE GOVERNMENT SECURITIES MARKET 9-14 (June 20, 1985), reprinted in *Regulation and Supervision of the Government Securities Market: Hearing before Subcomm. on Domestic Monetary Policy, House Comm. on Banking, Finance and Urban Affairs*, 99th Cong., 1st Sess. 347-52 (Comm. Print 1985) (Drysdale Government Securities, Inc. (1982), Lion Capital Group, Inc. (1984), E.S.M. Government Securities, Inc. (1985) and Bevil Bresler and Schulman Asset Management Corp. (1985)). Prior to the Act, only primary dealers were subject to direct government regulation of their government securities trading through their contractual relationship with the Federal Reserve Bank of New York. Many other market participants, however, were subject to general capital adequacy requirements and other regulations by virtue of their status as securities broker-dealers or banks.

¹³⁰ See *Capital Adequacy Guidelines for Government Security Dealers Proposed by the Federal Reserve Bank of New York: Hearing before Subcomm. on Domestic Monetary Policy, House Comm. on Banking, Finance and Urban Affairs*, 99th Cong., 1st Sess. 290-344 (Comm. Print 1985) (capital requirements); U.S. General Accounting Office, U.S. GOVERNMENT SECURITIES: AN EXAMINATION OF VIEWS EXPRESSED ABOUT ACCESS TO BROKERS' SERVICES 14 (Dec. 1977) (position and risk reporting requirements).

¹³¹ Government Securities Act of 1986, 15 U.S.C. § 78o (1988); see 17 C.F.R. § 240.15Ca1-1 (1989). The cash and securities accounts of customers of most dealers are protected under the Securities Investor Protection Corporation insurance fund against failure of the covered firm. This coverage is required of most dealers who are registered with the SEC. U.S. GENERAL ACCOUNTING OFFICE, *supra* note 7, at 60.

¹³² Securities Exchange Act of 1934, § 10(b), 15 U.S.C. § 78j(b) (1988); 17 C.F.R. § 240.10b-5 (1990).

¹³³ U.S. GENERAL ACCOUNTING OFFICE, *supra* note 7, at 32-33. Regulation of advertising

operation of clearing agencies.¹³⁴ There are no limits on the number of primary dealers or government securities broker-dealers that can be recognized or registered, and no attempt is made to regulate actual trading practices in the market.¹³⁵

The number of participants and the demand for transactions in the retail government securities market explains the development of the collective mechanism of the dealer. The number of retail market participants has remained relatively small and, outside the wholesale market, the demand for transactions is low. While the overall number of transactions is tremendous, most transactions occur on the wholesale market, in which the primary dealers trade with other dealers and the Federal Reserve Bank of New York. The dealers carry sufficient inventories to perform the timing and counterparty search functions for other less active participants.

The small number of active participants, however, reduces the need for a collective settlement mechanism.¹³⁶ In the inter-dealer market, participants trade frequently with each other and can net out their bilateral transactions at the end of the day. In the retail markets, the low number of transactions does not justify such a mechanism. Security with respect to the inter-dealer market is provided collectively by the regulatory registration requirements, and privately in the retail market by customer credit checks. Finally, as with the foreign exchange market, information on asset quality is available to everyone at little cost. The quality of a Treasury security depends on public information about government policy and the

was delegated to the National Association of Securities Dealers (the "NASD"), the self-regulatory organization of the securities industry, which promulgated advertising requirements for government securities that established a pre-publication review of material. NASD Government Securities Rules § 8(b) NASD Manual (CCH) ¶ 2428 (1991).

¹³⁴ The SEC has the authority to register and regulate clearing agencies. 15 U.S.C. § 78q-1 (1988); see 17 C.F.R. §§ 240.17Ab2-1 to 240.17Ad-14 (1990).

¹³⁵ The Government Securities Act of 1986 authorizes regulations only with respect to registration, discipline, inspection and fraud. 15 U.S.C. § 78oA(f)(2) (1988). Although there is some regulation of dealers' sales practices when the dealers are banks or members of the New York Stock Exchange, U.S. GENERAL ACCOUNTING OFFICE, *supra* 7, at 47, the vast majority (over 1370 dealers) are not so regulated. *Id.* at 49. Sales practice rules cover both the suitability of purchasers for the security being sold and the mark-up charged by the dealer. The SEC has taken the position that mark-ups in the government securities business are typically 1/32% to 3-1/2%, lower than those in the equity market. Zero Coupon Securities, Securities Exchange Act Release No. 34-24368, 52 Fed. Reg. 15,575 (Apr. 29, 1987). More importantly, there is no regulation of the actual structure of trading.

¹³⁶ While the retail market is home to over 1,000 dealers, see *supra* note 135, the small number of active primary dealers are the center of the market, see K. GARBADE, *supra* note 119, at 430. Nonprimary dealers must deal frequently with a small group of primary dealers, and reputational information can travel quickly.

basic performance of the economy. Although the use of inter-dealer brokers and their screens provides some collectivization of price search costs for the inter-dealer market, there is little need for a fully collective mechanism for all participants in the broader retail market. In a small market with few participants, reputation plays a crucial role; a party who consistently quotes noncompetitive prices to less informed customers will quickly be viewed as a "sharp" trader who provides questionable price information.

2. NASD Over-the-Counter Market

Although it differs from the Treasury market, the over-the-counter market for small stocks and for off-exchange transactions in exchange stocks (the "third market") run by the National Association of Securities Dealers¹³⁷ (the "NASD") is also a decentralized dealer market. In this market, equity securities that do not meet listing requirements¹³⁸ are inventoried by one or more securities firms, all of whom are members of the NASD.¹³⁹ Frequently, the firm that underwrote the initial public offering of the stock acts as the dealer or market maker. A broker or investor will call the dealer and receive a quotation that includes both the bid and offered price. As in the Treasury bond market, price information for these small stocks is difficult to obtain directly. The NASD requires its members to make the prices of their transactions available to the NASD,¹⁴⁰ but this information is not disseminated immediately to the market. During the course of the trading day, only the dealer firms have much information on the price of the assets. In contrast with the Treasury market, settlement is collectively provided by the National Securities Clearing Corporation ("NSCC").¹⁴¹

¹³⁷ The NASD is the registered self-regulatory national securities association of securities dealers and brokers that sets rules for participation by its members in the securities markets. Although in passing the Maloney Act in 1938, 15 U.S.C. § 78o (1988), Congress contemplated that there would be several registered national securities associations, the NASD has been the only one organized.

¹³⁸ This refers to securities that do not meet the requirements for listing on the NASD's National Market System ("NMS"), Schedule D to NASD By-Laws, pt. III, § 2, NASD Manual (CCH) ¶ 1809 (1991), or the National Association of Securities Dealers Automated Quotation system ("NASDAQ"), *id.* pt. II, § 1, NASD Manual (CCH) ¶ 1803 (1991).

¹³⁹ The number of active participants in the market is much greater: as of October 25, 1990, the NASD had approximately 6,000 member firms with 425,000 registered representatives. Telephone interview with NASD Information Service (Nov. 20, 1990).

¹⁴⁰ Schedule H to NASD By-Laws § 2, NASD Manual (CCH) ¶ 1933 (1991).

¹⁴¹ The NSCC clears and settles trades centrally for all transactions in the over-the-counter market as well as on the organized exchanges. See *Performance of the Equity Market*

Regulation is also more extensive in this market than in the Treasury securities market. As in all United States private equity and debt securities markets, market participants must register with the SEC,¹⁴² be a member of the NASD,¹⁴³ and meet financial health requirements,¹⁴⁴ including membership in the customer insurance scheme of the Securities Investor Protection Corporation (SIPC).¹⁴⁵ Unlike the government securities market, in the over-the-counter market regulation affects the actual structure of trading itself. The NASD's Rules of Fair Practice require dealers to quote firm prices, not mere indications. Dealers may not grant price concessions or discounts to non-NASD members, and charges for services must be reasonable and must not unfairly discriminate between customers. Inventory or dealer transactions must occur at "fair prices," considering such factors as expenses, market conditions and reasonable dealer profits.¹⁴⁶ Generally, this rule places a five percent upper limit on dealer mark-ups.¹⁴⁷

The last rule, the "fair mark-up rule," reflects both the difference in the nature of the assets traded in this market from those in the government securities market and the larger number of partic-

During the October Market Break and Regulatory Overview, in REPORT OF THE PRESIDENTIAL TASK FORCE ON MARKET MECHANISMS VI-15 to VI-16 (1988) [hereinafter BRADY REPORT]; Comment, *International Securities Trading: The United States and Great Britain Develop Clearing and Settlement Procedures for a New Age*, 19 CAL. W. INT'L L.J. 129, 132-33 (1988). The NSCC ensures members' performance of their obligations to settle transactions. Individual members deposit an amount that is determined by their individual historical settlement activity. See BRADY REPORT, *supra*, at VI-16 to VI-17.

¹⁴² Securities Exchange Act of 1934, § 15, 15 U.S.C. § 78o (1988).

¹⁴³ See Securities Exchange Act of 1934, § 15(b)(8), 15 U.S.C. § 78o(b)(8) (1988).

¹⁴⁴ Securities Exchange Act of 1934, § 15(c)(3), 15 U.S.C. § 78o(c)(3) (1988); 17 C.F.R. § 240.15c3-1 (1990) (net capital requirements based on customer accounts); 17 C.F.R. § 240.15c3-3 (1990) (reserve requirements for protection of customer accounts).

¹⁴⁵ The Securities Investor Protection Act of 1970, 15 U.S.C. §§ 78aaa to 78ccc (1988), established the quasi-governmental Securities Investor Protection Corporation to insure customer accounts with broker-dealers up to \$500,000 per customer. See BRADY REPORT, *supra* note 141, at VI-17; R. TEWELES & E. BRADLEY, *THE STOCK MARKET* 317-20 (5th ed. 1987).

¹⁴⁶ NASD Rule of Fair Practice § 4, NASD Manual (CCH) ¶ 2154 (1991).

¹⁴⁷ In the 1940s, the NASD conducted a survey of the mark-up practices of its members. As a result of the survey, the Board of Governors of the NASD announced that a 5% mark-up was adequate to ensure a healthy and viable over-the-counter business. Pursuant to NASD Rules of Fair Practice § 4, the NASD Board of Governors adopted the "NASD Mark-Up Policy," which indicated to members that the NASD believed that a flexible "5% Policy" was a reasonable interpretation of section 4. NASD Mark-Up Policy, NASD Manual (CCH) ¶ 2154 (1991) (adopted Oct. 25, 1943). Although rigid application of the 5% rule against individual dealers is flatly prohibited by the Maloney Act, § 15A(b)(6), 15 U.S.C. § 78oA(b)(6) (1988), it has become the standard in the business. Recent investigations into "penny stock fraud" revolve around the mark-up problem. See *supra* note 15.

ipants. Information about the quality of financial assets issued by private companies is more costly to obtain than similar information about government securities. Thus, buyers and sellers rely more on the asset quality information contained in the price. Nevertheless, when parties do not have access to up-to-date information about prices and transactions, some other search method must be used to assure traders that they are getting the "best available" price. The larger number of dealers, however, makes individual search costs prohibitive, and participants have more difficulty in relying on mechanisms such as reputation. In this market, the fair mark-up rule is a type of collective mechanism, provided by regulation, to reduce the costs of price search that market participants would otherwise bear. The large number of participants in this market also supports collective mechanisms that reduce other transaction costs. Private dealers reduce timing and counterparty search costs, while government regulation of the broker-dealers' financial condition and of central settlement mechanisms reduces both settlement and security costs.

C. *Bulletin Board Markets*

Other types of markets directly address the information or search problems of transacting. Providing all market participants with the prices at which all traders in the market are willing to transact reduces these problems. The bulletin board market is the simplest of these structures. An example is the posting of "for sale" notices on a student center bulletin board, discussed above.¹⁴⁸ In one variation, the "call market," or "batch trading," orders for a particular asset are allowed to accumulate and then the asset is put up for sale at a single time, setting one price.¹⁴⁹ In this market structure, buyers and sellers come to a central location or join a single computer link. The bulletin board contains a single "book" of offered prices, that is, the extant offers and bids for the asset.¹⁵⁰ This market structure also reduces counterparty search costs, albeit in a different way than the dealer market structure. Instead of compensating a dealer for providing this service, bulletin board market participants come, either physically or electronically, to one place to locate counterparties. This generates substantial savings,

¹⁴⁸ See *supra* note 36 and accompanying text.

¹⁴⁹ See Whitcomb, *supra* note 46, at 241.

¹⁵⁰ See Cohen, Maier, Schwartz & Whitcomb, *supra* note 104, at 117, 118 n.1.

even if individuals bear their allocable share of maintaining the bulletin board structure. Moreover, this market eliminates non-productive counterparty searches; each trader knows for certain where to go to locate counterparties.

1. Screen Quotation Systems

The simplest forms of bulletin board markets are the information systems provided by Reuters¹⁵¹ and Telerate¹⁵² in the foreign exchange and Treasury bond markets.¹⁵³ In these, all participants agree to provide to the operator of the information system the participants' quotations for assets. The operator then repackages the information and transmits it electronically to all purchasers of the system. Subscribers to the service can observe all the extant quotations and track the sources of such quotations. Access is restricted to those willing to pay for the system, which defrays its cost and provides a profit to the operator. The operator has an incentive to ensure that subscribers not only take price information, but also contribute information of their own. If an operator fails to compel participants to provide their own price information, the value of the product quickly deteriorates. The system would not reflect the entire market, and those who did provide information would have little incentive to continue to do so.

Such a mechanism requires a substantial number of participants who have a significant level of demand for transactions in the asset. First, the fixed costs of such a system are high and a private provider must be assured of sufficient revenues to make the system viable.¹⁵⁴ Second, users of the system must expect to engage in a sufficient number of transactions to justify the subscription fee. The markets that have fostered the development of such computer screen bulletin board systems exhibit these traits. In the mid-1980s, the number of banks and other institutions interested in trading in foreign currencies began to rise, giving Reuters an opportunity to develop its system. Likewise, Cantor Fitzgerald Securities Corporation, the

¹⁵¹ See *supra* note 109.

¹⁵² See *supra* note 125 and accompanying text.

¹⁵³ Reuters used to provide a bulletin board system to the members of the Association of International Bonds Dealers for the trading of Eurobonds. On that system, dealers would quote nonfirm prices. Users would then telephone or telex the dealers to get firm quotations and to execute trades. *Tying down the Euromarkets*, *ECONOMIST*, Apr. 25, 1987, at 73.

¹⁵⁴ On occasion, providers of this information have attempted to subsidize the service by requiring subscribers to use the provider as a broker to execute trades. My unsystematic observations indicate that such a strategy has not generally succeeded.

only broker serving both retail and inter-dealer markets in government securities, was able to draw on its wider customer base to support the Telerate system. In both cases, users are left to their own devices to reduce the timing, security and settlement costs of trading.

2. Hong Kong, Tokyo and Other Stock Exchanges¹⁵⁵

Several stock exchanges also operate on the bulletin board principle. For example, the Hong Kong Stock Exchange is a trading hall in which rows of seats for members are arranged in front of a long curved chalkboard.¹⁵⁶ Members who want to post an order price for a customer approach the board and enter the order price along with the member's initials.¹⁵⁷ If there are many bids and offers, a queue is developed in which only the two best bids and offers are recorded on the board.¹⁵⁸ The exchange provides only the room, equipment (including, presumably, the chalk) and some surveillance. Members, by exchange rule, must bring all trades to the board,¹⁵⁹ unless the amount of the trade exceeds HK\$1,000,000.¹⁶⁰ The number of memberships on the exchange is fixed, and members of the exchange pay for the costs of the bulletin board through transaction fees. In addition, the exchange provides centralized security and settlement services, but these services are independent of the bulletin board structure itself.

The Tokyo Stock Exchange provides for each stock an order-book clerk, or *saitori*, who matches buy and sell orders. Instead of viewing a range of prices, traders see the single price produced by the clerk.¹⁶¹ For the most actively traded stocks, all floor brokers and traders on the Tokyo Stock Exchange give their orders verbally to these exchange functionaries, who are prohibited from trading

¹⁵⁵ The Sydney, Singapore and Brussels stock exchanges all operate some type of bulletin board system.

¹⁵⁶ K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *supra* note 51, at 21.

¹⁵⁷ In some bulletin board markets, such as the Montreal Stock Exchange and the Toronto Stock Exchange, the exchange provides officials who run the board.

¹⁵⁸ All prices are firm for at least one lot, generally 1,000 shares, and can be good for up to twelve lots.

¹⁵⁹ Cf. NYSE Rule 390, N.Y.S.E. Guide (CCH) ¶ 2390 (1989) (similar rule requiring all members to execute principal trades on exchange); AMSE Rule 5, Am. Stock Ex. Guide (CCH) ¶ 9225 (1989) (same).

¹⁶⁰ K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *supra* note 51, at 21, 28.

¹⁶¹ See R. TEWELES & E. BRADLEY, *supra* note 145, at 214; Macey & Kanda, *supra* note 18, at 1042-46.

for their own account.¹⁶² When there is a match, or when a broker brings a market order, the clerk executes the orders and reports the transaction to another exchange employee. This employee enters the transaction in the Tokyo Stock Exchange's computer.¹⁶³ One floor broker cannot trade directly with another unless the trade occurs within the bid and offer prices being quoted at the time by the order clerk.¹⁶⁴

While the number of private equity and debt securities traded on such markets and the number of participants are large, the average number of transactions in each security is relatively small. The bulletin board is a collective mechanism that allows members to pool the costs of trading across assets to reduce both counterparty search and price discovery costs. As a large department store brings a wide variety of products under one roof, the bulletin board brings together a large number of private equity and debt assets. Unlike the decentralized dealer structure of the department store, and like sales of furniture through the college bulletin board, the market works best if all assets for sale are brought to the board.¹⁶⁵ Participants, therefore, may find it worthwhile to agree *ex ante* to run all their trades through the bulletin board and forego off-market trading.¹⁶⁶ This funnels investor demand for trades into the central market, thus supporting that market by generating transaction fees for the exchange.¹⁶⁷

¹⁶² K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *supra* note 51, at 20.

¹⁶³ Both the Vienna Stock Exchange and the Frankfurt Stock Exchange operated similar systems. *Id.* In Frankfurt, only West German banks are permitted to trade securities for customers. For the most active issues, orders are transmitted to *kursmaklers* (official brokers) who execute trades.

¹⁶⁴ *Id.*

¹⁶⁵ The bulletin board may have aspects of a localized natural monopoly. To the extent that the fixed costs of setting up the board are high and the average costs decline steadily with the demanded number of transactions, a natural monopoly exists. K. CASE & R. FAIR, *supra* note 3, at 323-24. If technology reduced the fixed costs of the system, however, there could be competing bulletin boards serving the same customer base. Alternatively, if the demand for trading increases, then the conditions for a natural monopoly may disappear. In Hong Kong, the Hong Kong Stock Exchange has faced several new competitors in the 1970s, and all seem to coexist. See Gunningham, *Moving the Goalposts: Financial Market Regulation in Hong Kong and the Crash of October 1987*, 15 L. & SOC. INQ. 1, 20 (1990).

¹⁶⁶ A similar rationale could be applied to the 1792 Buttonwood Tree Agreement which established the New York Stock Exchange. Not only did the Agreement fix prices, but more importantly it required members to deal first with each other. F. EAMES, *THE NEW YORK STOCK EXCHANGE* 14 (1968). This tended to ensure a sufficient concentration of price quotations on the bulletin board to induce traders to come to that market. In addition, it prevented free riding brokers. Haddock & Macey, *supra* note 27, at 317.

¹⁶⁷ Some of the fees on the Hong Kong Stock Exchange contribute to the provision of the collective settlement and security system.

The number of participants, however, also poses collective enforcement problems. Because of the nature of the assets traded, asset quality determination costs are high and can be reduced by reliance on the collective price search mechanism. If, however, members with access to the exchange conducted trades off the exchange, the value of the price search and counterparty search services provided to members would be reduced. Moreover, such off-market trading would increase the average cost per transaction of providing the collective mechanism. The Hong Kong Stock Exchange rule requiring members to present and execute trades on the exchange both maintains the total level of transaction fees collected by the exchange and supports the integrity of the collective price search mechanism. In effect, the rule increases the number of transactions and participants at the central market that support the collective mechanism. In a market with a small number of participants, effective methods of retaliation can be used against those who attempt to free ride. In markets with more numerous participants, more formal methods of enforcement might be required.

D. *Competitive Market Maker Markets*

Because of the relatively low demand for transactions on bulletin board markets, individual traders must bear their own timing costs. When the demand for transactions is greater, timing is less of a problem; traders will have to wait shorter periods for appropriate counterparties to appear. There will still be periods, however, when a willing buyer cannot find a willing seller, or vice versa. If there is sufficient demand for transactions, some individuals may find it profitable to act as dealers at the central market. "Market makers" are dealers on a centralized market who bridge the time gap between the appearance of buyers and sellers by carrying assets in their portfolios for sale, or by being short (that is, willing to buy) an asset.¹⁶⁸ In exchange for altering their investment portfolios to less desirable makeups, less active market participants compensate the market makers who trade at less favorable prices. The source

¹⁶⁸ Models of the function of market makers have proliferated. See Hakansson, Beja & Kale, *On the Feasibility of Automated Market Making by a Programmed Specialist*, 40 J. FIN. 1, 8-11 (1985) (demand-smoothing service); Garman, *Market Microstructures*, 3 J. FIN. ECON. 257, 265 (1976) (best estimator of true order generation); Grossman & Miller, *supra* note 64, at 622-26 (provider of immediacy); K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *supra* note 51, at 4 (competitor with market spread set by limit orders).

of this compensation is the informational advantage that the market maker acquires in its position at the center of trading.

1. Open Outcry and Other Physical Pit Systems

Many options markets and almost all futures markets, financial as well as commodity, employ the open outcry structure. In these markets, trades are executed in some type of physical pit in which all traders are in visual and auditory contact with each other. Orders from customers are signaled, physically or electronically, to an individual trader in the pit who then searches for the counterparty willing to offer the best price for the order. Within the pit, certain traders choose to act as market makers; a particular pit will have as many market makers as the demand for timing services permits.

The open outcry system, with its competitive market makers, is the structure of trading on the Chicago Mercantile Exchange (CME), the Chicago Board of Trade (CBOT),¹⁶⁹ the London International Financial Futures Exchange (LIFFE),¹⁷⁰ the Marche à Terme International de France, the London Traded Options Exchange, the New York Futures Exchange and the Swiss Options and Futures Exchange. Each of these markets limits membership, or the right to trade on the exchange, and memberships are traded in a separate secondary market. In the CME and the CBOT pits, traders shout out bids and offers for an asset and accompany the shout with hand signals.¹⁷¹ A bid or offer is good only at the time of the shout. Another trader desiring to "hit" or accept such a bid or offer establishes eye contact and shouts and signals his acceptance. The accepting trader might be standing all the way across the pit. Each party to a completed trade records the specifics of the trade on a card and forwards it to the party's clearing firm for clearance and settlement.

While all traders in the pit should be able to observe any trade taking place, the exchanges facilitate price search by posting some of the trade sizes and prices. Exchange employees in the pit observe as many trades as possible and radio size and price figures to other

¹⁶⁹ The Aurora computerized pit trading system, under development at one time by the CBOT, attempted to replicate on a computer screen the information available in the physical pit. Richardson, *The Twilight of the Gods*, INTERMARKET, Apr. 1989, at 22. The CBOT has since abandoned this effort and agreed to join forces with the CME on its Globex system.

¹⁷⁰ LIFFE operates a screen-based system, the Automated Pit Trading system (the "APT"), that replicates the physical pit. Hargreaves, *Traders Hail Liffe Computer System After Modest Start*, Fin. Times, Dec. 1, 1989, at 31.

¹⁷¹ CHICAGO BOARD OF TRADE, COMMODITY TRADING MANUAL 34 (1985).

employees on catwalks above the pit, who in turn enter them into the exchange's computer system. The system then transmits the information to a series of monitors on the trading floor and the large electronic displays on the walls of the trading floor. The primary responsibility for reporting each trade, however, falls on the traders themselves. The traders must report trades to the pit reporter and submit their order or trading cards to exchange officials at the close of each day.

Traders act as either "brokers," employed by firms to fill customer orders, or "locals" trading for their own account. Local traders compete with one another as market makers in each pit. They invest their own capital to take positions in the asset being traded. The exchanges do not officially designate or register specific traders as market makers. Rather, any member can begin to act as such, if it is cost justified for the member to do so, and provide timing services to other traders. Very often, local traders also act as brokers for orders coming from off the exchange, the so-called "dual capacity."¹⁷² As with any dealer, market making traders earn their profits from their inventory transactions. To do this, they must gain and exploit an informational advantage.¹⁷³ By maintaining a constant presence in the pit, and by constantly observing actual price movements, market making traders can read market information from the prices. This enables them to stay a step ahead of other traders engaged in derivatively informed trading.¹⁷⁴ That is, as prices adjust to new information coming into the market, market

¹⁷² That traders can act both for their own account and as brokers for customers raises possible conflicts of interest. The most serious practice that raises the conflict is "front-running": traders who have large sell orders from customers would want to first sell any of their assets held for their own account before introducing the large order to the market. In that way, traders sell out before the price is depressed by the large sell order. The same result can be accomplished by two or more traders sharing order information. Front-running is expressly prohibited by regulation. Rule 155.2(a)-(b), 17 C.F.R. § 155.2(a)-(b) (1990). The sharing of order information is also prohibited. Rule 155.2(d), 17 C.F.R. § 155.2(d) (1990); Rule 155.3(b), 17 C.F.R. § 155.3(b) (1990). Traders are also banned from engaging in accommodation trades, that is, trades by one trader intended to assist another trader accomplish an illegal objective. See Markham, *supra* note 13, at 17-22. Efforts are being made to eliminate the potential conflicts of interest facilitated by dual capacity. Recently, the CME, in response to public and customer concerns, has approved a ban on dual trading in all contracts that have traded at least 10,000 contracts per day for six months. See Durr, *CME Plans Dual Trading Curbs*, Fin. Times, Mar. 19, 1990, at 25. Since 1987, the CME has had in place a dual trading ban for its Standard & Poor's 500 Stock Index contract. *Id.*

¹⁷³ This is analogous to Manne's suggestion that inside traders' production of information should be rewarded by permitting them to exploit the information. H. MANNE, *supra* note 12, at 138-41.

¹⁷⁴ Gilson & Kraakman, *supra* note 17, at 572.

making traders are able to get into or out of an asset before it reaches its new equilibrium price.¹⁷⁵

Market makers also pick up other information in the pit, such as which other traders and customers are actively buying or selling the asset.¹⁷⁶ Such information might suggest that large quantities of an asset are about to come onto the market. Again, such non-price information gives the constant trader an advantage.¹⁷⁷ Obviously, the availability of such an advantage attracts new entrants to the market. The number of market makers that a centralized competitive market maker system, such as the futures pits, can support depends on the variability of the timing demand for the use of the market, and the predictability of price changes in the market.¹⁷⁸

On the commodity exchanges, the standard institutional structure is one that employs collective mechanisms to reduce both security costs and settlement costs. Unlike most other markets, traders trade with the exchange, or its member clearing houses, as their counterparty for settlement and security purposes. All trades on the CME and the CBOT are viewed legally as trades between clearing firms registered with the exchanges. The exchanges set margin requirements that require traders to post collateral with the clearing houses. This ensures that both the buyer and the seller of an asset will meet their future obligations with respect to that asset.¹⁷⁹ The exchanges also require that all positions be marked to market (that is, valued in the traders' account at fair market value) every day, and that payments be transferred to meet margin requirements. In

¹⁷⁵ It has been demonstrated that even in a semi-strong efficient market, synthesizing news takes some time and the price moves to the new equilibrium price incrementally, rather than by jumping. See Jennings & Barry, *On Information Dissemination and Equilibrium Asset Prices: A Note*, 19 J. FIN. & QUAN. ANAL. 395, 395 (1984). See generally Macey & Miller, *supra* note 78, at 1083 (citing studies). Market makers are an important factor in the equilibrium process. See R. SCHWARTZ & D. WHITCOMB, *supra* note 62, at 43. Gilson & Kraakman suggest that traders in general can benefit from derivatively informed trading. Gilson & Kraakman, *supra* note 17, at 572-79. While this may or may not be true for most traders, market makers are in the best position to exploit such information.

¹⁷⁶ A trader will know that particular traders routinely act as brokers for large customers.

¹⁷⁷ As the recent indictments of participants in the Swiss franc and Japanese yen pits at the CME suggest, this access to non-price information also facilitates fraudulent trading by making derivative front-running and forms of curb trading easier. *United States v. Bailin*, 731 F. Supp. 865 (N.D. Ill. 1990); see U.S. GENERAL ACCOUNTING OFFICE, CHICAGO FUTURES MARKET: INITIAL OBSERVATIONS ON TRADE PRACTICE ABUSES 10 (Mar. 1989) ("characteristics of open-outcry trading may allow floor participants to take advantage of customers").

¹⁷⁸ See Grossman & Miller, *supra* note 64, at 627; Stoll, *supra* note 64, at 86.

¹⁷⁹ See M. MILLER, J. HAWKE, B. MAKIEL & M. SCHOLES, FINDINGS OF THE COMMITTEE OF INQUIRY EXAMINING THE EVENTS SURROUNDING OCTOBER 19, 1987 17 (Spring 1988) (committee appointed by the CME).

operating this system, the exchanges further require traders and clearing firms to meet minimum net capital requirements and exposure limits. In addition, the exchanges maintain a pool to cover any clearing firm defaults, of which there have been none to date, and can assess other clearing members to make up any shortfall. These assessments are backed up by the informal commitments of the exchanges' settlement banks to provide liquidity to the exchanges.¹⁸⁰

Regulation of these markets is twofold. First, regulation bolsters the market's security cost reduction aspects by mandating that exchanges adopt minimum capital and position rules.¹⁸¹ While the United States exchanges do not regulate the market makers separately, any person engaging in the futures business must be registered with the Commodities Futures Trading Commission (the "CFTC").¹⁸² Although such rules have some impact in limiting entry, the exchanges' limits on the number of memberships are more important. Second, the Commodities Exchange Act and the CFTC impose rules that mandate the structure of trading itself. All trading in the specified assets must be conducted in the pits of a registered exchange during designated hours.¹⁸³ Government rules and regulations prohibit "prearranged trading," (trading in which the parties agree to some aspect of a transaction before it is executed in the pit)¹⁸⁴ "curb trading," (trading that occurs after the official close of-pit trading), and "cross trading," (trading in which traders match customer orders without offering them to the pit).¹⁸⁵ A similar rule prohibits "wash trades," (two trades, usually prearranged, that have

¹⁸⁰ BRADY REPORT, *supra* note 141, at VI-28 to VI-29.

¹⁸¹ See, e.g., Commodities Exchange Act of 1936, § 4f, 7 U.S.C. § 6f (1988) (minimum financial requirements); Commodities Exchange Act of 1936, § 8a(7)(D), 7 U.S.C. § 12a(7)(D) (1988) (power of Commission to alter exchange rules on "safeguards with respect to financial responsibility of members"); Financial Reports of Futures Commission Merchants and Introducing Brokers, 17 C.F.R. §§ 1.10 to 1.18 (1990) (minimum financial and reporting requirements); Speculative Position Limits, 17 C.F.R. § 1.61 (1990) (exchange must adopt rules that limit "speculative" positions). American rules also require the absolute segregation of customers' funds from firms' own accounts. Commodities Exchange Act of 1936, § 4d(2), 7 U.S.C. § 6d(2) (1988); 17 C.F.R. § 1.20 (1990). Such rules have the same purpose as the SIPC insurance scheme in the American securities markets.

¹⁸² Commodities Exchange Act of 1936, § 4d, 7 U.S.C. § 6d (1988). The regulations delegate much of the registration work to the National Futures Association, a recognized private traders' association, 17 C.F.R. §§ 3.1 to 3.4, 3.10 to 3.18 (1990).

¹⁸³ Commodities Exchange Act of 1936, § 4(a), 7 U.S.C. § 6(a) (1988).

¹⁸⁴ Trading Standards for Floor Brokers, Rule 155.2(f), 17 C.F.R. § 155.2(f) (1989).

¹⁸⁵ CFTC Regulation 1.38, 17 C.F.R. § 1.38 (1989); see Markham, *supra* note 13, at 36; U.S. GENERAL ACCOUNTING OFFICE, CHICAGO FUTURES MARKET: INITIAL OBSERVATIONS ON TRADE PRACTICE ABUSES 11 (Mar. 1989).

no substance because they are entirely offsetting).¹⁸⁶ In a market in which traders are extremely sensitive to indications of volume and its source, wash trades transmit false information and might be used to move prices. Regulations also require traders to record and report all trades to the exchange.¹⁸⁷

The assets traded on these markets are limited in number, though the number of transactions is extremely high. The assets, particularly financial and commodities futures and options on indexes, are more similar to government securities and foreign exchange than private equity or debt securities. As is the case with those former assets, the information affecting their quality and price is readily available.¹⁸⁸ Moreover, the number of participants has grown enormously over time. These features make the collective reduction of transfer costs feasible. While the creation and maintenance of a small number of physical pits involves enormous fixed costs, the demand for transactions and the number of participants easily covers those costs. The system reduces counterparty and price search costs by providing a central marketplace. The collective devices for the reduction of security and settlement costs employed in less active markets continue to make sense in this market. Finally, the tremendous demand for transactions makes profitable the existence of a set of competitive market makers for each asset, which in turn ensures to other participants the provision of timing services at optimal prices.

2. Screen Trading Systems

Another version of the centralized competitive market maker system is the screen-trading system. While many small scale screen-trading systems simply put buyers and sellers together directly,¹⁸⁹

¹⁸⁶ Commodities Exchange Act of 1936, § 4c, 7 U.S.C. § 6c(a) (1988).

¹⁸⁷ Commodities Exchange Act of 1936, § 4(a)(ii), 7 U.S.C. § 6(a)(3) (1988).

¹⁸⁸ Most relevant information is market information that affects systematic risk of the asset. The only type of "inside" information that a market participant can obtain is advance knowledge of trading by a large participant. "Front-running" is the inside trading on the futures markets. See *supra* note 172.

¹⁸⁹ These include the Small Order Execution System of the NASD, the Computer Assisted Trading systems of the Toronto and Tokyo Stock Exchanges, the National Securities Trading System of the Cincinnati Stock Exchange (located in Jersey City, New Jersey), the Midwest Automated Execution System of the Midwest Stock Exchange and the SEAQ Automated Execution Facility of the International Stock Exchange (formerly, the London Stock Exchange). In each of these systems, orders are matched and executed automatically according to a set of priority rules. See, e.g., COMMODITIES FUTURES TRADING COMMISSION, CHICAGO MERCANTILE EXCHANGE'S PROPOSED GLOBEX TRADING SYSTEM 34-37 (Feb. 2, 1989); M.

others facilitate the presence of competitive market makers as intermediaries who reduce timing costs. Unlike the open outcry system, the screen-trading system does not require the expense and the physical limits on participation of a central physical location; it can accommodate more participants at less cost.

The International Stock Exchange (the "ISE"), formerly known as the London Stock Exchange,¹⁹⁰ and the NASD both operate screen-based systems that are centralized, competitive market maker markets. The ISE has replaced its physical trading floor with the Stock Exchange Automated Quotation system ("SEAQ") for domestic equities and the SEAQ International system for international equity securities. In both systems, individual member firms can register with the ISE¹⁹¹ as Registered Market Makers for any security simply by giving the ISE notice.¹⁹² There is no limit on the number of market makers for each security. Other members of the ISE, and the public, subscribe to SEAQ data feeds that connect them with the SEAQ system. Each market maker transmits its bid and ask quotation for a specified number of lots (1,000 shares) of each security. The SEAQ screen displays these quotations from all market makers in the stock, highlighting the best quotation for each stock in a bright yellow band, together with the day's volume. The screen also displays the price and time at which the last trade occurred. To accept a bid or offer displayed on the screen, a trader must telephone the market maker to place an order. An insurance scheme established by the Financial Services Act of 1986 reduces security costs for participants.¹⁹³ Settlement costs in the London

Dunaevsky, *Globex and Models of Globex Regulation* 7-12 (Dec. 21, 1989) (student paper on file with author). The Globex system being introduced by the CME for futures contracts will operate on the same principle.

¹⁹⁰ Prior to the removal of fixed commissions and other structural reforms in 1986, the London Stock Exchange was a centralized specialist market. See N. POSER, *INTERNATIONAL SECURITIES REGULATION* § 2.1.2, at 18-20 (1991). Exchange rules designated participants as either "jobbers," members who carry inventories of specific assigned stocks, or "brokers," members who take customer orders to jobbers for execution.

¹⁹¹ Rule 356.1, *RULES OF INTERNATIONAL STOCK EXCHANGE* (1988) [hereinafter ISE] (domestic SEAQ); ISE, *supra*, at Rule 334.1 (SEAQ International).

¹⁹² Registered market makers have the advantage of an exemption from the United Kingdom's 1% stamp duty on stock transfers and of the right to borrow stock from other ISE members. *International Stock Exchange: Wakey, wakey*, *ECONOMIST*, May 20, 1989, at 88, 89, col. 1.

¹⁹³ The Investors Compensation Plan covers the first £30,000 of a loss and 90% of the next £20,000. N. POSER, *supra* note 190, § 3.9.4, at 338; Waters, *Stock Exchange alters its rules as dust settles after the Big Bang*, *Fin. Times*, Feb. 2, 1990. Because other exchanges offer more protective schemes, competitive pressures are forcing the ISE to consider a supplemental compensation program.

equity market are still extremely high. Despite the use of the Talisman computerized clearing system,¹⁹⁴ ISE participants still rely on physical delivery of certificates, which may take more than two weeks.¹⁹⁵

The rules of the exchange, like those affecting the open outcry system, structure the trading itself. First, market makers at all times must have placed in SEAQ both firm bid and offer quotations for at least one lot of 1,000.¹⁹⁶ Second, any trade executed by a market maker must be reported immediately by entry into the SEAQ system,¹⁹⁷ which in turn reports the trade on SEAQ screens. Unlike the open outcry systems of the CME and CBOT, prearranged, after hours and other off-exchange trading is not banned. Users of the system, including market makers, can enter into transactions that are not based on quoted prices on the system. In the case of large transactions (over £100,000 in value), members do not have to report the price until twenty-four hours later, although members must report immediately both the deal and its size.¹⁹⁸ Therefore, not all deals must be exposed to the central market.

The NASDAQ system, inaugurated in 1971, was the model for the SEAQ in many significant respects.¹⁹⁹ The NASDAQ system facilitates the trading of any equity security listed with the NASD.²⁰⁰

¹⁹⁴ Regulation E-1, THE REGULATIONS OF THE INTERNATIONAL STOCK EXCHANGE (1988); N. POSER, *supra* note 190, § 2.2.4, at 59.

¹⁹⁵ Freeman, *Taurus system expected to save £255m*, Fin. Times, Mar. 10, 1990, at 24, col. 1; Comment, *International Securities Trading: The United States and Great Britain Develop Clearing and Settlement Procedures for a New Age*, 19 CAL. W. INT'L L.J. 129, 144 (1988). The ISE is developing a paperless clearance and settlement system, called Taurus. N. POSER, *supra* note 190, § 2.2.4, at 60-62; Waller, *Stock Exchange prepares traders for paperless settlement*, Fin. Times, Mar. 10, 1990, at 8. The system is expected to save the domestic securities industry a total of £255 million each year in settlement costs. Freeman, *supra*, at 24, col. 1.

¹⁹⁶ ISE, *supra* note 191, at Rule 357.1; ISE, *supra* note 191, at Rule 336.1. Market makers, however, are not required to deal with other market makers at these quoted prices. ISE, *supra* note 191, at Rule 357.1; see also DIRECTOR GENERAL OF FAIR TRADING, FINANCIAL SERVICES ACT OF 1986: TRADE PUBLICATION AND PRICE TRANSPARENCY ON THE INTERNATIONAL STOCK EXCHANGE 8 (Apr. 1990).

¹⁹⁷ ISE, *supra* note 191, at Rule 371.3. This is not strictly accurate. The SEAQ divides the domestic securities into three sets based upon their relative activity. Alphas are the most actively traded, and all trades in these must be reported immediately by entry into ISE's Topic, a computer information system. For beta stocks, market makers also provide continuous and firm quotations, but trades need not be published immediately. The gammas are the least active: prices quoted for these stocks are indicative only. TOPIC SERVICES, INC., GLOBAL TRADING INFORMATION 7 (1987).

¹⁹⁸ DIRECTOR GENERAL OF FAIR TRADING, *supra* note 196, at 8.

¹⁹⁹ See R. TEWELES & E. BRADLEY, *supra* note 145, at 191-93.

²⁰⁰ To have its securities listed, an issuer must meet the requirements set forth in Part II, § 1, Schedule D to NASD By-Laws, NASD Manual (CCH) ¶ 1803 (1991).

More active NASDAQ-listed securities are also listed on the NASDAQ National Market System (the "NMS").²⁰¹ As with the ISE, the NMS has no central physical trading area. Instead, NASD members subscribe to the NASDAQ screen price quotation system. Members execute trades by telephone calls to the market makers quoting the desired price. Any NASD member may register as a NASDAQ designated market maker,²⁰² and, unlike the ISE, the NASD does not limit membership. As with the decentralized NASD OTC dealer market, the NASD requires its screen quotation system participants to settle trades through the National Securities Clearance Corporation and to meet financial requirements that increase security.

The NASD rules structuring trading are similar to those of the ISE. Market makers must provide continuous bid-ask quotations in their designated stocks.²⁰³ The quotations must be firm offers to buy or sell the security.²⁰⁴ More stringent are the requirements that a market maker's quotations be "reasonably related to the prevailing market,"²⁰⁵ not in excess of the maximum allowable spreads,²⁰⁶ and not "lock" with the quotations of other market makers.²⁰⁷ If the NASD determines that these requirements are not met, it may suspend the market maker's registration in one or all of its stocks.²⁰⁸ The rules also require market makers, and many others, to report, within ninety seconds after its execution, any transaction in a NMS stock effected during trading hours.²⁰⁹

²⁰¹ In 1986, this was 2,695 out of 5,189 NASDAQ listed securities. NASD imposes higher standards for NMS listing. Part III, §§ 1-3, Schedule D to NASD By-Laws, NASD Manual (CCH) ¶ 1803 (1991).

²⁰² The only condition is that members demonstrate that they meet the capital requirements of Exchange Act Rule 15c3-1, 17 C.F.R. § 240.15c3-1 (1989). Registration is extremely simple; the member simply indicates on its NASDAQ terminal that it intends to be a market maker in a specified security.

²⁰³ Schedule D to NASD By-Laws, Part VI, § 2(a), NASD Manual (CCH) ¶ 1819 (1991).

²⁰⁴ Schedule D to NASD By-Laws, Part VI, § 2(b), NASD Manual (CCH) ¶ 1819 (1991).

²⁰⁵ Schedule D to NASD By-Laws, Part VI, § 2(c), NASD Manual (CCH) ¶ 1819 (1991).

²⁰⁶ Schedule D to NASD By-Laws, Part VI, § 2(d), NASD Manual (CCH) ¶ 1819 (1991).

The NASD occasionally publishes the maximum allowable spreads, which are based on the average quoted spreads. The greater the average spread, the greater the maximum allowable spread. For example, at present, if the average spread is 1/4, the maximum is 1-1/2; and if the average is 2, the maximum allowable spread is 3. *Id.*

²⁰⁷ Schedule D to NASD By-Laws, Part VI, § 2(e), NASD Manual (CCH) ¶ 1819 (1991). A quotation locks with another if the bid is equal to or greater than the asked quotation of another market maker or if the asked quotation is equal to or less than the bid quotation of another. *Id.* § 2(e)(i)-(ii), NASD Manual (CCH) ¶ 1819 (1991).

²⁰⁸ Schedule D to NASD By-Laws, Part VI, § 2(c)-(e), NASD Manual (CCH) ¶ 1819 (1991).

²⁰⁹ Schedule D to NASD By-Laws, Part VI, § 2(a)(1), NASD Manual (CCH) ¶ 1867

In contrast to the open outcry markets, the ISE and NASDAQ screen trading systems trade a very large number of assets, but each asset is the subject of fewer transactions. The lower fixed costs of screen technology both increase the possible number of market participants and reduce the expense of maintaining the system. Thus, despite less activity in each asset, the centralized system reduces counterparty search and price search costs.²¹⁰ Consequently, the ISE and NASD members who wish to act as market makers in providing timing cost reduction services can do so more cost effectively, which facilitates the collective mechanism. On both the ISE and the NASDAQ, government regulation simply bolsters the financial and trading rules of the markets.

E. Centralized Specialist Markets

Many of the markets for equity securities operate with a specialist system of one form or another. Specialist markets differ from the competitive market maker systems in that market rules force all information on trading through a single market maker who performs the counterparty search, price search and timing cost reduction functions. That person or company, the "specialist," is given a favored position with respect to such information. The other market participants cannot observe the entire order flow for an asset as they can in the bulletin board or centralized market maker markets. Instead, they must make their decisions based upon a single bid and offer price announced by the specialist.

The New York Stock Exchange (the "NYSE"), the American Stock Exchange (the "AMEX"), and regional American exchanges such as the Midwest Stock Exchange (the "MSE") all designate²¹¹ one of their members as the specialist for each listed security. There are forty-nine specialists on the NYSE, and most specialists cover

(1991). Other NASD members must report all other trades weekly. Schedule D to NASD By-Laws, Part XII, § 2(a)(3), NASD Manual (CCH) ¶ 1867 (1991).

²¹⁰ The ready availability of price quotations on computer screens make the NASD's mark-up rule far less important in the NASDAQ market. See *supra* note 147 and accompanying text for a discussion of NASD's mark-up rule.

²¹¹ On the NYSE, designation occurs pursuant to NYSE Rule 103, N.Y.S.E. Guide (CCH) ¶ 2103 (1989). The Market Performance Committee monitors the performance of specialists on the NYSE. NYSE Rule 103A(a), N.Y.S.E. Guide (CCH) ¶ 2103A(a) (1991). The Committee sets standards for performance and can initiate a Performance Improvement Action if a specialist's performance falls below such standards. NYSE Rule 103A(b), N.Y.S.E. Guide (CCH) ¶ 2103A(b) (1991). There are fourteen posts on the NYSE, each peopled with several specialists who run trading in a specified number of stocks.

several stocks.²¹² To be eligible for such designation, the member must meet capital and other financial requirements.²¹³ Specialists are not exchange employees and, unlike the *saitori* on the Tokyo Stock Exchange, are entitled to trade for their own account. Specialists collect limit orders (orders to buy or sell at a specific price) from floor brokers and traders active in the stock who mill around the specialist's post, and records them in an "order book." Today, for most active issues, this is a computer file. Only the specialists have full knowledge of the contents of the order book, and Section 11(b) of the Securities Exchange Act, as well as exchange rules, expressly forbids specialists from disclosing the contents of the order book to any other person.²¹⁴ Thus, unlike the centralized competitive market maker markets, information about supply and demand on specialist markets is transmitted only through the prices quoted by specialists in response to requests from the floor.

In addition to acting as brokers between orders in their order books, specialists also are market makers²¹⁵ who may buy or sell the stock for their own account.²¹⁶ In this capacity, specialists quote to floor brokers their own bid-ask spread at which they are willing to

²¹² *Automating Financial Markets: The human cost*, ECONOMIST, Mar. 10, 1990, at 20, col. 1. This article attributes the birth of the specialist system to one William Boyd:

Until some time towards the close of the nineteenth century, the NYSE's brokers would scurry around the floor like worker ants, meeting at designated posts where particular shares were traded. There, they would seek a buyer or their seller, and vice versa. That was until William Boyd hurt his leg. A commission broker like the rest of them, Boyd could no longer scurry. He positioned himself by the Western Union post, agreed to look after other brokers' limit orders in that share, and realized he could also make a bit of money trading for himself.

Id. More likely, less fortuitous economic factors lead to the invention of the specialist.

²¹³ NYSE Rule 104.20(1), N.Y.S.E. Guide (CCH) ¶ 2104.20(1) (1991) (be able to assume position of 150 trading units); NYSE Rule 104.20(4), N.Y.S.E. Guide (CCH) ¶ 2104.20(4) (1991) (net liquid assets of the greater of \$1,000,000 or 25% of its position requirements); NYSE Rule 104.30, N.Y.S.E. Guide (CCH) ¶ 2104.30 (1991) (regular reports to Federal Reserve System); AMEX Rule 171, Am. Stock Ex. Guide ¶ 9311 (1991) (maintain in liquid funds \$600,000 or amount sufficient to assume position of 60 trading units in each of assigned securities).

²¹⁴ Securities Exchange Act of 1934, § 11(b), 15 U.S.C. § 78k(b) (1988). This rule is incorporated in the rules of each exchange. *See, e.g.*, NYSE Rule 115, N.Y.S.E. Guide (CCH) ¶ 2115 (1989); AMEX Rule 174, Am. Stock Ex. Guide (CCH) ¶ 9314 (1991).

²¹⁵ The specialists' third function is to act as an impartial auctioneer at the opening of the exchange each day. *See* Macey & Kanda, *supra* note 18, at 1033; BRADY REPORT, *supra* note 141, at VI-5. The specialist reviews the orders that have arrived at the order book since the close of trading the prior day and sets an opening price that attempts to clear the market.

²¹⁶ This ability is important to the profits of specialists. Profits from such proprietary trades in 1986 accounted for 64% of specialists' gross revenues on the NYSE. BRADY REPORT, *supra* note 18, at VI-5.

buy or sell assets. On such sales, the specialists receive no part of the floor broker's commission, but must make their profit on their inventory transactions.²¹⁷ The main advantage enjoyed by specialists is exclusive access to the order book. This is an informationally privileged position vis-a-vis other traders because specialists have direct access to the order flow and can take advantage of market shifts before they are apparent to nonspecialist participants.

Because of this exploitable informational advantage, specialist activity is constrained by a set of practice rules mandated by statute. In general, the specialist must "engage in a course of dealings for his own account to assist in the maintenance, so far as practicable, of a fair and orderly market."²¹⁸ Specialists cannot buy or sell stock for their own account unless such transactions are necessary to maintain the fair and orderly market.²¹⁹ Operationally, these rules have been interpreted to permit, or even require to some extent, specialists to buy or sell for their own account if there are no bids or offers from the floor in the order book.²²⁰ If there are bids or offers, specialists may buy or sell for their own account only at prices more advantageous for the customer than those in the book.²²¹ Such transactions, however, are only permitted if reasonably necessary to meet the vague requirement of maintaining a "fair and orderly market."²²² Any other transactions by specialists for their own account must be "stabilizing."²²³ Finally, specialists may

²¹⁷ The SEC's Institutional Investor Study of 1971 discovered that "many specialists earn[ed] rates of return far in excess of any conceivably competitive level. For example, the average gross *monthly* rate of return before taxes, in active stocks, ranged from 88 to 190 percent, depending on the type of specialist." Smidt, *Which Road to an Efficient Stock Market*, FIN. ANALYSTS J. Sept.-Oct. 1971, at 20, col. 2 & n.7 (citing SECURITIES AND EXCHANGE COMMISSION, INSTITUTIONAL INVESTORS STUDY 1914-28 (1971) (table XII-24)). These returns include floor brokerage fees and short-term capital gains.

²¹⁸ Exchange Act Rule 11b-1(a)(2)(ii), 17 C.F.R. § 240.11b-1(a)(2)(ii) (1990).

²¹⁹ Exchange Act Rule 11b-1(a)(2)(iii), 17 C.F.R. § 240.11b-1(a)(2)(iii) (1990).

²²⁰ See Macey & Kanda, *supra* note 18, at 1030. The specialist is not expected to support a collapsing market. See *id.*; BRADY REPORT, *supra* note 141, at 50.

²²¹ NYSE Rule 104.10(5)(i), N.Y.S.E. Guide (CCH) ¶ 2104.10(5)(i) (1987); AMEX Rule 170(d) and (e), Am. Stock Ex. Guide (CCH) ¶ 9310 (1988); see R. TEWELES & E. BRADLEY, *supra* note 145, at 173.

²²² NYSE Rule 104.10(2)-(3), N.Y.S.E. Guide (CCH) ¶ 2104.10(2)-(3) (1987); AMEX Rule 170.01, Am. Stock Ex. Guide (CCH) ¶ 9310.01 (1988).

²²³ Rule 104.12, N.Y.S.E. Guide (CCH) ¶ 2104.12 (1990). Whether a transaction is stabilizing depends on whether the specialist's total transactions in the designated stock meet the tick test of Rule 112(d)(3), N.Y.S.E. Guide (CCH) ¶ 2112. If the prior reported price for the shares purchased was down, a purchase is considered stabilizing. If the prior price was up, a sale is considered stabilizing. Under Rule 104.12, 75% of all transactions for the specialist's account, unconnected with its "fair and orderly market" obligation, must be stabilizing. See Cohen, Maier, Schwartz & Whitcomb, *supra* note 104, at 129.

not trade ahead of orders in the order book.²²⁴ Specialists must execute market orders and limit orders in the order book at better prices ahead of their own transactions.

The effect of these and other rules is the same as the market exposure rules in the commodity futures exchanges. With one exception, the block trade,²²⁵ no trades can occur between members unless they occur at the post, and in some cases through the specialists. No member other than a specialist, again with a limited exception,²²⁶ is permitted to make a market in any listed stock.²²⁷ Moreover, a member acting on behalf of a client cannot cross or execute the client's order with the order of another client unless the member first exposes the order to the market at the post.²²⁸ In addition, the exchanges prohibit members from engaging in off the exchange transactions for their own account in securities listed on the exchange.²²⁹ Although the SEC has partially invalidated this

²²⁴ This rule is analogous to the rule against front-running in the commodity futures markets. See *supra* note 172.

²²⁵ Block trades, "which may not readily be absorbed by the market," NYSE Rule 127(a), N.Y.S.E. Guide (CCH) ¶ 2127 (1991), can be negotiated "upstairs." A block is a quantity of stock greater than 10,000 shares or with a market value greater than \$200,000 that is to be transferred in a single transaction. NYSE Rule 127.10, N.Y.S.E. Guide (CCH) ¶ 2127.10 (1991). A block positioner who receives a block order must first explore depth of market on the floor by checking with the specialist. NYSE Rule 127(a), N.Y.S.E. Guide (CCH) ¶ 2127 (1991). If such exploration reveals that only a reasonable amount of the block will be lost to floor participants at the agreed price, the positioner must fill such orders from the floor at that price. If, on the other hand, the positioner stands to lose an "excessive" amount of the block, it may elect to announce the agreed price and state that the floor will not have an opportunity to bid on the block. It must then wait a "reasonable" time for the floor participants to trade, after which it must execute the block at the agreed price. If the order was an offer to sell, the positioner then must offer to the floor any stock from the block that it intends to add to its position and, if there is none, must fill all orders from the floor at the agreed price, up to the greater of 1,000 shares or 5% of the block's value. All trades must be reported on the tape system. See generally Burdett & O'Hara, *Building Blocks: An Introduction to Block Trading*, 11 J. BANK. & FIN. 193 (1987).

²²⁶ This is the competitive market maker exception. Under NYSE Rule 107A, N.Y.S.E. Guide ¶ 2107A (1991), a member of the NYSE can register as a competitive market maker and engage in transactions for its own account. Such registration is not limited to any particular stock. If it so registers, it is subject to various obligations to help maintain a fair and orderly market on the exchange. The major disadvantage of both competitive traders and competitive market makers is that they do not have the same access to the order book as does the specialist.

²²⁷ NYSE Rule 90, N.Y.S.E. Guide (CCH) ¶ 2090 (1988).

²²⁸ NYSE Rule 76, N.Y.S.E. Guide (CCH) ¶ 2076 (1990).

²²⁹ NYSE Rule 390, N.Y.S.E. Guide (CCH) ¶ 2390 (1989); AMEX Rule 5, Am. Stock Ex. Guide ¶ 9225 (1989). But see *infra* note 230 (Rule 19c-3). The General Accounting Office recently recommended that the SEC should investigate whether this rule should be modified or removed. GENERAL ACCOUNTING OFFICE, SECURITIES TRADING: SEC ACTION NEEDED TO ADDRESS NATIONAL MARKET SYSTEM ISSUES 32 (Mar. 1990). Academic opinion is divided on

rule, it remains in effect for the most actively traded securities.²³⁰ This forces members to place all their transactions, whether as agents or principals, through the market structure of one of the exchanges. The exchange rules also require all members to transmit bid, offer, size,²³¹ and last-sale price and size information²³² to an exchange employee on the floor.²³³ The consolidation of this price information gives participants the last price, current bid-ask spread and current volume in each stock.²³⁴

As in other markets, the regulations affecting trading in markets, as opposed to the relationship between the markets and investors, are largely bolstering ones. The SEC reviews rules proposed by the exchanges and, for the most part, approves them with little change. Although it has taken weak steps to force market making competition on the exchanges, most regulation accepts the collective mechanisms that have developed over time on the exchanges.²³⁵ The SEC has not directly attacked the specialist system and its grant of informational advantage.

The number of assets traded on the specialist markets is large and, as on the ISE and NASDAQ, there are fewer transactions in

this issue. Compare Haddock & Macey, *supra* note 27, and Smidt, *supra* note 104, with Cohen, Maier, Schwartz & Whitcomb, *supra* note 104, at 129-31. See generally Stoll, Comments: 'An Analysis of the Economic Justification for Consolidation in a Secondary Security Market' by Kalman J. Cohen *et al.*, 6 J. BANK. & FIN. 137 (1982); Parker, *Off-Board Trading Restrictions*, 13 REV. SEC. REG. 919 (1980). A recent empirical study of Rule 19c-3, which partially removed NYSE Rule 390, see *infra* note 230, found that the removal reduced the percentage bid-asked spread, but increased the variance in the returns from trading. Cohen & Conroy, *An Empirical Study of the Effect of Rule 19c-3*, 33 J.L. & ECON. 277, 304-05 (1990).

²³⁰ Rule 19c-3, which became effective on July 18, 1980, abrogates rules such as NYSE Rule 390 for all stocks listed on any exchange for the first time after April 26, 1979. 17 C.F.R. § 240.19c-3 (1990); see Haddock & Macey, *supra* note 27. Rule 19c-1, prohibits an exchange from barring a member from acting, off the exchange, as an agent for a nonmember. 17 C.F.R. § 240.19c-1 (1989). The purpose of this rule was to permit members to execute orders for customers through other exchanges, thereby encouraging the development of the national market system envisioned by the Securities Act Amendments of 1975. Today, the Integrated Trading System ("ITS") routes orders to the exchange offering the best price, although it has not established a common order book. K. COHEN, S. MAIER, R. SCHWARTZ & D. WHITCOMB, *supra* note 51, at 151.

²³¹ NYSE Rule 60(c), N.Y.S.E. Guide ¶ 2060 (1989).

²³² NYSE Rule 128A, N.Y.S.E. Guide ¶ 2128B (1991).

²³³ The SEC, in turn, requires that exchanges disseminate to quotation vendors all bids, offers and sizes. Exchange Act Rule 11Ac1-1, 17 C.F.R. § 240.11Ac1-1 (1989). This requirement is part of Congress' attempt to establish a national market system by consolidating quotation information. Vendors collate the prices from all the exchanges and produce the consolidated quotations. See generally GENERAL ACCOUNTING OFFICE, *supra* note 7; Haddock & Macey, *supra* note 27.

²³⁴ See R. TEWELES & E. BRADLEY, *supra* note 145, at 125.

²³⁵ See *supra* note 230.

each asset than in the futures markets. Moreover, the nature of these equity assets makes the price search reduction mechanism more important. Finally, the number of participants is limited by the requirement of membership on the exchanges. For the reasons stated above, one would expect the substantial provision of collective mechanisms to reduce the costs of counterparty and price search, security and settlement. Under such conditions, however, timing services are less likely to be provided by free competition for any but the most heavily traded stocks.²³⁶ Unlike the NASDAQ market, where entry costs to the market making competition are low, the limited number of memberships on the exchanges decreases the pool of potential market makers. A competitive market maker system is sustainable in a limited membership exchange only when the volume of demand for the service is great. If that volume is low, then only a specialist system can effectively reduce timing costs.

To set up the collective mechanism needed to reduce timing costs, it might be in members' self-interest to designate one of their number as a market maker in a stock, and to compensate that member by giving the member an informational advantage. That advantage would only harm the other members, however, when they trade with the specialist for their own account. When trading for customers, brokering members will still receive their commissions, and the nonmember investors are still subsidizing the system. Even for the nonmember investors, however, it may be advantageous. Because investors desire maximum ability to convert their assets into other forms of wealth, the size of the set of possible alternative holdings is important. A market structure that offered only ten stocks in which an investor could invest (because timing costs in other stocks could not be collectively reduced) would be less

²³⁶ For the most heavily traded stocks on the NYSE, there is effectively a competitive market maker system:

The 'crowd' for those stocks, though substantially smaller than in the T-bond futures market, is large enough to offer a competitive discipline to the Exchange's franchised "specialist," who in these particularly active markets, typically plays more the role of an auctioneer (and a commission collector) than a market maker on personal account.

Grossman & Miller, *supra* note 64, at 620. Floor traders, registered competitive traders, NYSE Rules 111-112, N.Y.S.E. Guide (CCH) ¶¶ 2111-2112, and limit orders, *see* Cohen, Maier, Schwartz & Whitcomb, *Market Makers and the Market Spread: A Review of Recent Literature*, 14 J. FIN. & QUAN. ANAL. 813 (1979), all compete with the specialist in making markets in stocks such as Philip Morris, IBM, General Motors, General Electric and Citicorp. For more lightly traded stocks, however, the specialist appears to be likely to have a monopoly position. Beja & Hakansson, *supra* note 2, at 158 ("In a centralized exchange, a trader designated as a 'market-making specialist' enjoys undeniable monopoly power").

desirable to an investor concerned with portfolio diversification than a market structure that provided 500 stocks. In the financial futures markets, where additional futures products would not add much to portfolio diversification,²³⁷ there is no need for cross-subsidization to support markets for particular assets that attract less volume. To the extent that market participants demand a reasonably diverse set of assets into which to convert, the joint benefit may exceed the cost of maintaining a specialist system.

F. *Changing Factors and Market Structures*

The different market structures analyzed above reflect the collective mechanisms that have developed for the secondary trading of particular assets, given the relative costs and benefits of each mechanism. The demand for transactions, the number of participants in the markets and the nature of the assets determine the structure of these collective mechanisms. As is clear from the above, however, these mechanisms are in flux; in several markets, there are new collective mechanisms vying with the old ones for dominance. In the foreign exchange market, for example, Reuters has introduced a centralized quotation system,²³⁸ and is even attempting to introduce a screen trading system.²³⁹ Likewise, for government securities, one inter-dealer broker is operating a centralized price quotation system.²⁴⁰ Even in the stock markets, competitive market making systems are competing with specialist systems on the New York Stock Exchange and through the third market.²⁴¹

These changes are due to changes in the number of market participants, the demand for transactions, and the nature of the assets. In turn, technological change and international financial deregulation have driven many of the changes in these factors. Technological changes that reduce the costs of participation increase the number of participants in each market.²⁴² In particular,

²³⁷ Stock index futures provide a ready-made portfolio of equity securities. Nonsystematic interest rate risk can be well diversified by use of Treasury-rate, Eurodollar-rate and foreign currency based futures contracts. Finally, by using foreign currency futures contracts, investors can diversify their "political" risks.

²³⁸ See *supra* note 109 and accompanying text.

²³⁹ In the summer of 1989, Reuters introduced a new trade execution system, Dealing 2000. This system will allow foreign currency traders around the world to enter orders, and will match those orders automatically. *Automating Financial Markets: The human factor*, *ECONOMIST*, Mar. 10, 1990, at 20, col. 1. This system is not yet operational.

²⁴⁰ See *supra* note 125 and accompanying text.

²⁴¹ See *supra* note 236.

²⁴² See Macey & Miller, *supra* note 78, at 1086.

advances in telecommunications have broadened potential participation in all financial markets. Moreover, such changes reduce many of the costs of the collective mechanisms. Centralized price quotation systems that previously required a physical presence can now be conducted through telecommunications lines. Finally, changes in information technology can reduce some asset quality determination costs.

International deregulation of financial markets increases the number of participants, as well as the demand for transactions.²⁴³ The type of deregulation that has the greatest effect is that which removes limits on individuals' investment choices. For example, the liberalization of Japanese regulations regarding the operation of their banks and other financial institutions has brought a whole group of new players into the secondary markets. Similar changes have occurred in the rules restricting assets in which Japanese nationals can invest. These changes have freed up substantial capital, which flowed into the American government securities and stock markets in the 1980s.²⁴⁴ As these changes continue, the economizing collective mechanisms will continue to evolve.

IV. PUBLIC VERSUS PRIVATE PROVISION OF COLLECTIVE MECHANISMS

As suggested earlier, government regulation is merely one of several possible devices by which markets provide a collective mechanism to reduce the costs of transferability. The use of government regulation should depend on its comparative advantage over other devices. As the preceding review of market structures indicates, government regulation appears in situations in which the number of participants is large and diverse. Moreover, where it does exist, it functions to bolster existing market rules. Government regulation may increase the severity of sanctions for rule violations and may bring the additional resources of the government enforcement mechanisms to bear on the violators. Major roles of government regulation include ensuring the financial health of market participants and supporting the markets' private rules that require their participants to contribute to price search costs. Many of the other collective mechanisms that reduce the costs of transferability are provided privately.

²⁴³ See generally S. KHOURY, *THE DEREGULATION OF THE WORLD FINANCIAL MARKETS* (1990).

²⁴⁴ See *id.* at 108-10.

This analysis is consistent with the comparative cost argument. Whether a collective mechanism that reduces transfer costs will emerge depends on the cost of providing that mechanism and the demand for it. Many of the mechanisms are structured such that the market is able to charge those who benefit from the services for their allocable share of the costs of the mechanisms. An information service that collects, collates and transmits quotation and price information to market users is able to limit access to the services to those who pay for it. For example, most of the markets have developed ways, albeit different, for reducing settlement and timing costs. Moreover, the NYSE, the Tokyo Stock Exchange, the ISE, and the NASDAQ systems collect fees from participants and privately provide the centralized mechanism that reduces counterparty search and price dissemination costs.²⁴⁵

Such private rules and their enforcement, however, may be quite costly; it may not be so simple to force the beneficiaries of the collective mechanism to pay their share. First, where the participants in a market are numerous and diverse, private rules may be difficult to enforce privately. The NYSE, the ISE, and the NASD all have large and diverse memberships that often have conflicting interests. Each market's centralized price search mechanism, for example, not only reduces price and counterparty search costs, but also provides participants with equilibrium prices that summarize asset quality information. Even if the collective mechanism can exclude firms from access to those prices unless they pay a fee, the mechanism also depends on members' contributions to the information pooling. If only a portion of the members transact within the market structure, the collective reduction of transacting costs may be less than optimal.²⁴⁶ Those members transacting outside the market structure would not be making their allocable contribution to the cost of the

²⁴⁵ The NYSE has fought hard to establish its property right in the price information generated by trades on the exchange. See J. Mulherin, J. Netter & J. Overdahl, *supra* note 92, at 20-54.

²⁴⁶ In such situations, individual participants have strong incentives to take advantage of the consolidated price and asset quality information without exposing their transactions to the market. Assuming they can solve the timing and counterparty problems, participants can trade directly with each other without going through the central market structure, and large houses may even be able to cross trades in-house. See Cohen, Maier, Schwartz & Whitcomb, *supra* note 104, at 124. If the number of defectors is small enough, the quality of the centralized price information will not be materially diminished, but no individual trader would have an incentive to continue to contribute to the central price. Cf. Grossman & Stiglitz, *supra* note 93, at 404 (efficient market paradox: if prices are efficient, no one person has incentive to gather information).

market. Moreover, detection of such off-exchange trading is quite difficult. For this reason, government regulation that increases both the possible sanctions for violations of private rules of the exchange²⁴⁷ and the probability of the sanctions being imposed²⁴⁸ may increase the likelihood of compliance.

Even putting this special problem aside, private markets, in order to enforce their rules effectively and preserve the benefits of the collective mechanism, would have to develop enforcement institutions that would rival similar governmental units. If public enforcement of these rules would be less costly than setting up private mechanisms, it would likely replace or supplement private enforcement. It may be that if the rules of market organizations were enforced by federal regulators, who have civil and criminal sanctions at their disposal, the social as well as the private costs of these market structures could be reduced.

This argument is consistent with the economic theory of regulation,²⁴⁹ and inconsistent with the older view that regulation is necessary to correct the "unfortunate allocative consequences of [some] market failure."²⁵⁰ Organized groups of market participants who wish to take advantage of the government's ability to provide enforcement of market rules may demand and obtain regulation of financial markets. In all cases, such regulation constitutes a wealth transfer from one group to another.²⁵¹ Absent a discriminating

²⁴⁷ Violation of exchange rules subjects the violator to suspension from exchange membership. Because of government regulation, such violations can also expose the violator to suspension as a broker-dealer, and consequently from the securities business completely. See Securities Exchange Act of 1934, § 15(b)(4), 15 U.S.C. § 78o(b)(4) (1988).

²⁴⁸ The SEC's Division of Market Regulation helps uncover trading rule violations. J. COX, R. HILLMAN & D. LANGEVOORT, *SECURITIES REGULATION: CASES AND MATERIALS* 21 (1991). Although it usually acts on individual complaints, the Division has access to exchange trading information from which it could ascertain some types of violations. "[T]he '34 Act has always provided for a certain degree of SEC oversight of [self-regulatory organization] oversight." *Id.* at 1192. Likewise, the presence of the CFTC increases the likelihood of detection of trading rule violations in the futures markets. Although it has limited resources, the CFTC monitors trade practices at the commodities exchanges and is seeking to upgrade the audit on paper trails for transactions. U.S. GENERAL ACCOUNTING OFFICE, *FUTURES MARKETS: STRENGTHENING TRADE PRACTICE OVERSIGHT* 21-23, 39-44 (Sept. 1989).

²⁴⁹ Haddock & Macey, *Regulation on Demand: A Private Interest Model, With An Application to Insider Trading Regulation*, 30 J.L. & ECON. 311, 313 (1987) (insider trading regulations benefit market professionals); see also Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971); Peltzman, *Toward a More General Theory of Regulation*, 19 J.L. & ECON. 211 (1976).

²⁵⁰ Peltzman, *supra* note 249, at 213 (presumption that "what is basically at stake in regulatory processes is a transfer of wealth").

²⁵¹ See Gilson & Kraakman, *supra* note 17, at 635-42 (mandatory disclosure regulation

users' fee, government regulation, paid for by the public at large, increases the wealth of those market participants who enjoy the cost reductions brought about by the collective mechanism.²⁵² Despite this wealth transfer, however, it still may be that one effect of such regulatory action is to reduce the total social cost of transactions. The difficult policy question is whether a particular regulation is desirable in this sense.

V. CONCLUSION

Markets for the secondary trading of financial assets, like all markets, are social institutions that exist because they organize behavior to benefit the users of the market. In order to be beneficial, these markets must reduce the costs of transacting below what users would incur without them. The important issue is not whether some idealized notion of a "free market" is superior to some idealized notion of "regulation." It is whether a particular market structure "economizes" most thoroughly given the nature of the assets, the demand for transacting and the available cost-reducing technology. In this calculus, when market structures are faced with difficult commons problems, it may be that government regulation is the best "economizing" technology.

is "a form of relief legislation for professional traders"); Haddock & Macey, *supra* note 249, at 328-32 (insider trading regulations benefit market professionals).

²⁵² Gilson and Kraakman's discussion of derivative trading and insider trading regulation illustrates this point. Gilson & Kraakman, *supra* note 17, at 629-34.