
ARTICLES

MAKING MARKETS: NETWORK EFFECTS AND THE ROLE OF LAW IN THE CREATION OF STRONG SECURITIES MARKETS

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As Russia and other formerly socialist states construct market economies, the appearance of strong securities markets remains an unfulfilled expectation. Notwithstanding broad privatization of state-owned enterprises and the elimination of industrial subsidies—essential precursors to demand for capital-raising securities markets—stock markets in Central and Eastern Europe remain illiquid, inefficient, and unreliable.

Strong securities markets do not, it seems, neatly follow from the welfare-maximizing behavior of individuals and institutions. Nor can the appearance of securities markets be effectively dictated by government decree. Post-communist securities market transition therefore presents a puzzle: Do markets emerge, or must they be created?

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Joining the debate over whether “law matters” in the creation of securities markets, this Article draws on recent finance and microeconomic analysis of network effects to propose an alternative theory of *why* law might matter in the creation of securities markets, and to challenge traditionally limited views of *how* it matters. After articulating the proposed network model of securities markets, this Article outlines the model’s implications for securities market transition. Specifically, it highlights two categories of network inefficiencies that may help explain the persistent weaknesses of securities markets in Russia and other transitional states. The model suggests such inefficiencies may also arise in the modernization of established securities markets, however, implying lessons for the United States and other developed economies as well.

Where network effects undermine the spontaneous emergence of strong markets, this Article proposes a limited coordination of market expectations—as distinct from law’s demarcation of property rights and enforcement of contracts, as conventionally acknowledged, and its protection of minority investors, as recently emphasized by “law matters” corporate and securities law scholars—as a central role for law in the very creation and design of strong securities markets.

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INTRODUCTION

[M]arkets are not a fixture of the economy, but are the results of decisions made by private economic agents and government agencies.¹

[W]e should not expect exchanges to be loosely run organizations that arise as if by magic.²

Faced with the persistent absence of strong securities markets across the globe, from the transitional economies of Central and Eastern Europe, to the developed economies of Germany and Japan, students of securities markets have turned to first questions: Does law matter in the creation of strong securities markets? Do markets emerge, or are they made?³

Corporate and securities law scholars have identified, at most, an indirect role for law in the market transition process. Rather than creating and shaping markets, this view suggests, law's role is limited to creating a framework within which securities markets will spontaneously emerge. Specifically, law and economics have suggested two key contributions of law to such a framework. Most significantly, law's articulation of clear property rights and provision of reliable contract enforcement have been

1. Walter P. Heller, *Equilibrium Market Formation Causes Missing Markets*, in *MARKETS, INFORMATION, AND UNCERTAINTY: ESSAYS IN ECONOMIC THEORY IN HONOR OF KENNETH J. ARROW* 235, 235 (Graciela Chichilnisky ed., 1999) [hereinafter *MARKETS, INFORMATION, AND UNCERTAINTY*] (citing Kenneth J. Arrow, *The Organization of Economic Activity: Issues Pertinent to the Choice of Market vs. Non-Market Allocation*, in *THE ANALYSIS OF PUBLIC EXPENDITURE: THE PPB SYSTEM* 47 (1969)).

2. J. Harold Mulherin, Jeffrey M. Netter & James A. Overdahl, *Prices Are Property: The Organization of Financial Exchanges From A Transaction Cost Perspective*, 34 *J.L. & ECON.* 591, 593 (1991).

3. See, e.g., Bernard S. Black, *Is Corporate Law Trivial?: A Political and Economic Analysis*, 84 *NW. U.L. REV.* 542 (1990); Brian R. Cheffins, *Does Law Matter? The Separation of Ownership and Control in the United Kingdom*, 30 *J. LEG. STUD.* 459 (2001); John C. Coffee, Jr., *The Future as History: The Prospects for Global Convergence in Corporate Governance and Its Implications*, 93 *NW. U.L. REV.* 641, 643-44 (1999) [hereinafter Coffee, *Future as History*] ("Such data understandably fascinates legal scholars because it suggests a conclusion that financial economists tend to slight: namely, law matters."); John C. Coffee, Jr., *The Rise of Dispersed Ownership: The Roles of Law and the State in the Separation of Ownership and Control*, 111 *YALE L.J.* 1, 59 (2001) [hereinafter Coffee, *Rise of Dispersed Ownership*].

identified as essential precursors to the emergence of strong markets.⁴ More recently, corporate law scholars have posited that law's protection of minority investors might also matter, given the dependence of public securities markets on investors' willingness to surrender control of their assets.⁵

The present analysis does not question the importance of each of these elements in the legal framework for the appearance of strong securities markets. Instead, drawing on recent finance analysis of securities market structure⁶ and on microeconomic analysis of so-called network effects, it suggests a more direct role for law in the creation of securities markets.

This additional role for law arises from a reconceptualization of the basic economics of equity securities markets. Starting from securities markets' core financial functions—the provision of liquidity and efficient price discovery—I highlight the presence of network economies, and consequent network effects, in securities market trade. Securities markets, I suggest, exhibit increasing returns to scale, on the demand side. As with more traditional network goods, the utility of markets and the securities traded on them grows with additional participation and use.⁷ The network

4. See R.H. COASE, *ESSAYS ON ECONOMICS AND ECONOMISTS* 11 (1994) (noting importance of “an appropriate system of property rights (and that . . . rights are enforced)”); R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 19, 32–33, 43–44 (1960) (suggesting need to analyze and define rights in property). See also Frank B. Cross, *Law and Economic Growth*, 80 TEX. L. REV. 1737, 1741, 1743–53 (2002); David E. Van Zandt, *The Market As a Property Institution: Rules for the Trading of Financial Assets*, 32 B.C. L. REV. 967, 991 (1991).

5. See Bernard S. Black, *The Legal and Institutional Preconditions for Strong Securities Markets*, 48 UCLA L. REV. 781, 783 (2001) (describing law's provision of confidence to minority investors that they will not be cheated as “essential prerequisite[]” to strong public securities markets); Coffee, *Future as History*, *supra* note 3, at 644 (“Absent such protections, most investors will be reluctant to make equity investments . . .”). See also ADOLF A. BERLE & GARDINER C. MEANS, *THE MODERN CORPORATION AND PRIVATE PROPERTY* 5–6 (1932) (identifying “separation of ownership and control” as central feature of the modern corporation). Like the earlier identification of law's role in defining property interests and enforcing contracts, which arose out of the insights of the New Institutional Economics, the recent emphasis on legal protections of minority investors also draws on the work of economists. Specifically, it cites a growing body of finance literature finding an empirical correlation between the strength of securities markets and their protection of minority shareholders. See, e.g., Rafael La Porta, Florencio Lopez-De-Silanes, Andrei Shleifer & Robert W. Vishny, *Legal Determinants of External Finance*, 52 J. FIN. 1131, 1149 (1997).

6. To date, this work has received relatively little attention in the legal literature. See Frank Partnoy, *Why Markets Crash and What Law Can Do About It*, 61 U. PITT. L. REV. 741, 744 (2000) (“Finance and law often are ships passing in the night.”). Highlighting the need for legal scholars to give greater attention to the finance literature, Frank Partnoy recently proposed “to introduce two major branches of scholarship—one in finance, one in law—to each other.” See *id.* Introductions having been made, the present analysis might be read as an attempt to help them get to know each other.

7. See Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479, 481 (1998) (describing network markets as those “in which the value that consumers place on a good increases as others use the good”); Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestiture in Network Industries*, 68 U. CHI. L. REV. 1, 5 (2001) (“A network

model of equity securities markets that follows from this analysis—not previously evaluated in the legal literature, and only recently given attention even among finance scholars—has significant implications for law’s role in securities market transition. Specifically, it predicts the existence of multiple, network-related barriers to the spontaneous emergence of strong securities markets.⁸

If network effects thereby suggest *why* law might matter in the creation of strong securities markets, what are their implications for *how* law might matter? Put differently, if network effects are the ‘problem’ of securities market creation—or at least part of the problem—then what might be law’s role in its resolution? In securities market transition, I conclude, law’s essential function is to coordinate expectations across an array of securities market participants, from market sponsors to market professionals, and from issuers to investors.

Such a coordinative function can be distinguished from law’s facilitation of cooperation, which legal analysis has traditionally viewed as law’s primary, if not exclusive, function. In the latter case, law seeks to restrain divergent interests, in the service of a common good.⁹ In the creation of networked securities markets, on the other hand, parties’ interests are not primarily divergent, leading law to play a different role. Coordination becomes law’s key function, and expression replaces sanction as its primary tool. As a consequence, the potential private role in regulation also grows in range and significance.¹⁰

externality, or ‘network effect,’ exists when the value of a product or service increases with the breadth

8. The alteration of expected welfare outcomes by network effects has been a subject of growing interest among legal scholars. Even in securities law, there has been some reference to network effects, though primarily with regard to disclosure requirements, accounting rules, and other securities law mandates, in which network efficiencies have been argued to arise from a wider use of compatible standards. See, e.g., Coffee, *Future as History*, *supra* note 3, at 692–97 (suggesting desirability of mandatory rules for foreign issuers, based on network externalities). There has been no extended analysis of the place of network effects in the basic finance, structure, and regulation of securities markets, however, nor any evaluation of their implications for the role of law in securities market transition.

9. See Richard H. McAdams, *A Focal Point Theory of Expressive Law*, 86 VA. L. REV. 1649, 1651 (2000).

10. Study of this regulatory pattern in securities law is particularly appropriate, given a tendency in this direction, even in ordinary, nontransitional securities law. Securities regulators have thus made broad use of self-regulatory mechanisms, see Mark Borrelli, *Market Making in the Electronic Age*, 32 LOY. U. CHI. L.J. 815, 827 (2001) (“In regulating the securities industry, the SEC relies heavily on a well-entrenched self-regulatory system . . .”), creating a grand experiment that is fertile ground for a broader understanding of law and its function. See *infra* Part III.D (discussing quasi-public character of National Association of Securities Dealers and Financial Accounting Standards Board).

An emphasis on securities law is also appealing, given the seeming correlation of strong securities markets with economic growth, a central concern of the transitional states on which I focus.

As evident in the concrete applications noted below, the proposed network analysis of securities markets and law's part in their creation has its most immediate application in the still incomplete economic transformation of Central and Eastern Europe. In Russia, notwithstanding a decade of effort and expectation, strong securities markets have yet to emerge.¹¹ Law's failure to define property rights and protect minority shareholders have undoubtedly contributed to this lack of success.¹² The absence of strong securities markets in Russia stems in part, however, from a failure to incorporate law into the resolution of fundamental—and network-related—questions of capital market design, including the basic choice of securities markets over banks as the dominant source of corporate finance, and the ensuing selection of a particular securities trading model.¹³ Given the centrality of network effects to these questions, their resolution—or at least their efficient resolution—may simply be impossible without law.

These questions are not unique to Russia and its fellow travelers, however, but arise in developed markets as well.¹⁴ Securities market

See Coffee, *Rise of Dispersed Ownership*, *supra* note 3, at 5 (noting that a “growing body of research suggests that an active securities market is an engine for economic growth”); La Porta, *supra* note 5. *See also* ROBERT B. AHDIEH, *RUSSIA'S CONSTITUTIONAL REVOLUTION: LEGAL CONSCIOUSNESS AND THE TRANSITION TO DEMOCRACY 1985–1996* 182 (1997) (highlighting importance of strong capital markets to success of transition process).

11. *See* Bernard S. Black, Reinier Kraakman & Anna Tarassova, *Russian Privatization and Corporate Governance: What Went Wrong?*, 52 *STAN. L. REV.* 1731, 1734–35 (2000) (analyzing failure of market reform in Russia and discussing reasons for that failure); Celia R. Taylor, *Capital Market Development in the Emerging Markets: Time to Teach an Old Dog Some New Tricks*, 45 *AM. J. COMP. L.* 71 (1997).

12. Along with other problems—legal and otherwise—that stand in the way of successful market transition. One might highlight, for example, the ‘lemons’ problem of potential Russian market makers. How can the latter adequately assure potential investors, trading partners, and others of their own honesty and the market's reliability? Law—in the form of clearly delineated property rights, and consistent contract enforcement—may be one answer. *See* Van Zandt, *supra* note 4, at 971 (discussing need for people to feel secure in their entitlements if they are to invest in those entitlements). Yet listing standards, bonding mechanisms, and other private measures may also suffice. *See* Coffee, *Rise of Dispersed Ownership*, *supra* note 3, at 37–39.

13. These questions, along with the choice of a primarily domestic or foreign listing model for corporate entities in the relevant market (for example, listing via American Depository Receipts and analogous instruments, or on domestic exchanges), and the ultimate need to develop an effective linkage system to ensure efficient trading among disparate exchanges and other trading systems, will be used in the ensuing analysis to highlight network effects' concrete implications for securities market transition.

14. Securities market transition occurs in developed economies, but simply comes in the form of market restructuring, rather than market creation. By way of example, one might highlight the National Market System regulatory effort in the United States. *See* Jonathan R. Macey & David D. Haddock, *Shirking at the SEC: The Failure of the National Market System*, 1985 *U. ILL. L. REV.* 315. I more fully evaluate the National Market System endeavor, within a network effects paradigm, in a forthcoming work.

transition in Russia may therefore serve as a laboratory of sorts, in which the evolution of securities markets, ordinarily an extended process, stretched out over decades, if not centuries, can be observed in real time. An understanding of securities market creation, like the “first three minutes” in the life of the universe,¹⁵ may therefore help elucidate the nature and evolution of securities markets generally, whether in Moscow, New York, or Abidjan.

Part I articulates the core premise, and resulting model: that the basic functions of securities markets, providing liquidity and efficient price discovery, are best understood as a form of network effect. It further highlights the relative breadth and depth of securities market networks.

In Part II, I set the proposed network model of securities markets in motion, assessing the implications of potential network inefficiencies for the emergence of strong securities markets. Specifically, I suggest that network-related market failures may prevent strong securities markets from efficiently emerging and evolving—highlighting *why* law might matter, in at least some transitions.

In Part III, finally, I turn to the question of *how* law might therefore matter in securities market transition, suggesting that an appreciation of the network character of securities markets, and of the resulting barriers to their efficient emergence, serves to clarify the specific function of law in market transition. If network effects are central to why law matters, I argue, they point to law’s coordination of market expectations an unusual, but still limited, function, and one more in the nature of process, than legislation—as the specific role of law that matters. Part III concludes with some preliminary thoughts on the specific regulatory forms and mechanisms that might be best suited to law’s coordinative function in market transition.

I. TOWARD A NETWORK MODEL OF STRONG SECURITIES MARKETS

*[C]ompetition with other exchanges will lead to prices which induce the socially optimal purchases by customers. This is just another application of the Fundamental Theorem of Welfare Economics. The only difficulty with this application arises when there are externalities across exchanges.*¹⁶

15. See STEVEN WEINBERG, *THE FIRST THREE MINUTES: A MODERN VIEW OF THE ORIGIN OF THE UNIVERSE* (1988) (suggesting that first three minutes prepared universe with all the necessary materials to start life).

16. Daniel R. Fischel & Sanford J. Grossman, *Customer Protection in Futures and Securities Markets*, 4 J. FUTURES MKTS. 273, 292 (1984).

the
law of one price—today more accurately identifies the relevant ‘market’ in any given security. *See* William J. Carney, *Jurisdictional Choice in Securities Regulation*, 41 VA. J. INT’L L. 718, 730 (2001). *See also* GEORGE J. STIGLER, *THE THEORY OF PRICE* 85 (3d ed. 1966) (defining “market” as “the area within which the price of a commodity tends to uniformity”); Mark Klock, *The SEC’s New Regulation*

investors and corporate enterprises, and the facilitation of efficient price discovery.²¹ Other functions, most significantly the efficient allocation of scarce capital, are best understood as arising from this pair.

In securities markets, liquidity measures immediacy, that is, the ability to timely execute a buy or sell order,²² and price resiliency, investors' ability to trade without moving the price of a security against themselves.²³ Through these twin elements, liquidity allows investors to dispose of their holdings with minimal search or other transactions costs.²⁴ Such minimization of trading friction is essential to the character of equity securities, much of the value of which, as described below, is tied to ease of resale.²⁵ Liquidity also benefits corporate issuers, meanwhile, by enhancing share value and providing a ready market for additional shares.²⁶

Tied to their provision of liquidity, securities markets also serve critical information functions.²⁷ Specifically, they facilitate efficient price

ATS: Placing the Myth of Market Fragmentation Ahead of Economic Analysis, 51 FLA. L. REV. 756, 793 (1999). "Even though individual trades may be executed in different market centers, dealers have homogenous beliefs and therefore quote identical prices. We refer to this system as a *consolidated market*." See Ananth Madhavan, *Consolidation, Fragmentation, and the Disclosure of Trading Information*, 8 REV. FIN. STUD. 579, 582–83 (1995) (emphasis in original).

21. See Norman S. Poser, *The Stock Exchanges of the United States and Europe: Automation, Globalization, and Consolidation*, 22 U. PA. J. INT'L ECON. L. 497, 501 (2001) (stating that stock exchange functions are "providing liquidity and setting securities prices"). See also WILLIAM A. KLEIN & JOHN C. COFFEE, JR., *BUSINESS ORGANIZATION AND FINANCE: LEGAL AND ECONOMIC PRINCIPLES* 382 (7th ed. 2000).

22. See Paul D. Cohen, *Securities Trading Via the Internet*, 4 STAN. J.L. BUS. & FIN. 1, 12 (1999). See also Klock, *supra* note 20, at 786.

23. "The second characteristic of liquidity, emphasized more strongly in recent times, is degree of freedom from the risk of fluctuation in capital value." THE MIT DICTIONARY OF MODERN ECONOMICS 248 (David W. Pearce ed., 4th ed. 1992). See generally EITAN A. AVNEYON, *DICTIONARY OF FINANCE* 282 (1988) (defining liquidity); Poser, *supra* note 21, at 512 (discussing liquidity in financial markets).

24. See Yakov Amihud & Haim Mendelson, *Liquidity, Volatility, and Exchange Automation*, 3 J. ACCT. AUDITING & FIN. 369, 369 (1988) ("Liquidity is what markets are all about."); Nicholas Economides, *How to Enhance Market Liquidity*, in GLOBAL EQUITY MARKETS: TECHNOLOGICAL, COMPETITIVE, AND REGULATORY CHALLENGES 90, 91 (Robert A. Schwartz ed., 1995) [hereinafter GLOBAL EQUITY MARKETS] (describing role of liquidity in financial exchange markets). See also Ananth Madhavan, *Trading Mechanisms in Securities Markets*, 47 J. FIN. 607, 608 (1992) ("The crucial function of a trading mechanism is to transform the latent demands of investors into realized transactions.").

25. See *infra* notes 59–73 and accompanying text; Van Zandt, *supra* note 4, at 972–73.

26. See Merritt B. Fox & Michael A. Heller, *Corporate Governance Lessons From Russian Enterprise Fiascoes*, 75 N.Y.U. L. REV. 1720, 1760–61 (2000) (noting that public ownership produces lower cost of capital because firm's more liquid shares can be sold at higher price).

27. See Stephen J. Choi, *Regulating Investors Not Issuers: A Market Based Proposal*, 88 CAL. L. REV. 279, 320 (2000) (arguing that information, such as transaction price and volume information, gives market signals on how investors value securities). See also Joel Hasbrouck, *One Security, Many Markets: Determining the Contributions to Price Discovery*, 50 J. FIN. 1175, 1175 (1995)

discovery in both economic and financial terms.²⁸ In economic terms, they determine market-clearing prices based on the cumulative supply and demand collected by the market.²⁹ In finance terms, they allow for the efficient incorporation of information into price.³⁰

Although not ordinarily characterized as such in the legal literature, and only recently evaluated in these terms even by finance scholars, the twin functions of liquidity and price discovery are arguably best understood in network terms.³¹ This characterization becomes readily apparent in the mechanisms through which liquidity and price discovery are actually achieved.

(“[Fragmentation] is of concern to financial economists and regulators because price information and price discovery (the impounding of new information into the security price), arguably the most important products of a security market, have many attributes of a public good.”); Stephen Craig Pirrong, *The Efficient Scope of Private Transactions-Cost-Reducing Institutions: The Successes and Failures of Commodity Exchanges*, 24 J. LEGAL STUD. 229, 241–42 (1995).

Arguably, securities markets’ price discovery function may be even more significant than its provision of liquidity. Amir Licht argues as much, pointing out that liquidity is provided by market participants themselves, while price discovery is a unique product of the market. See Licht, *infra* note 28, at 621 n.158.

28. See Amir Licht, *The 16th Sokol Colloquium: The Privatization of Securities Laws: Stock Exchange Mobility, Unilateral Recognition, and the Privatization of Securities Regulation*, 41 VA. J. INT’L L. 583, 621 (2001) (“The integrity of the price discovery process is crucial to the success of a stock exchange that operates in a competitive environment.”). See also Mulherin, *supra* note 2, at 594.

29. See Madhavan, *supra* note 24, at 608 (“The crucial function of a trading mechanism is to transform the latent demands of investors into realized transactions. The key to this transformation is price discovery, the process of finding market clearing prices.”) (emphasis added). The more “buy and sell orders come together in a single market,” the more completely the market reflects the full extent of supply and demand, and not some localized or limited segment of it. See Paul D. Cohen, *Securities Trading Via the Internet*, 4 STAN. J.L. BUS. & FIN. 1, 25 (1999). In turn, the more accurate pricing will be, with sale price more closely approximating equilibrium value. See *id.*

30. See Madhavan, *supra* note 24, at 607. But see Lynn A. Stout, *The Unimportance of Being Efficient: An Economic Analysis of Stock Market Pricing and Securities Regulation*, 87 MICH. L. REV. 613 (1988) (challenging assumption of efficient markets). Efficient pricing allows stock markets to serve other essential functions, including the efficient allocation of limited capital—one of the fundamental benefits of public securities markets. See Poser, *supra* note 21, at 512. See also Van Zandt, *supra* note 4, at 980–81. A related element of securities markets’ price discovery function is their tendency to reduce price variability, and hence market uncertainty. See Caroline Bradley, *Disorderly Conduct: Day Traders and the Ideology of “Fair and Orderly Markets,”* 26 J. CORP. L. 63, 80 (2000) (noting securities exchanges’ goal to reduce price volatility). See also Nicholas Economides, *Network Economics with Application to Finance*, 2 FIN. MARKETS, INST. & INSTR., Dec. 1993, at 89, 91 (reasoning that network externalities produce “reduction in realized market uncertainty”).

31. See Carmine Di Noia, *Competition and Integration Among Stock Exchanges in Europe: Network Effects, Implicit Mergers and Remote Access*, 7 EUR. FIN. MGMT. 39, 41 (2001) (“Exchanges can be considered as networks in which the greater the number of customers, the higher the utility for everyone.” *Id.*

At some level, each follows from an increase in the number of market participants trading in the relevant stock.³² As more sellers and potential purchasers appear, more bid and ask orders follow, closing the bid-ask spread, and providing more ready convertibility of the stock to cash, i.e., liquidity.³³ “[T]he fact that some orders are sent to a particular trading system makes it more likely that other orders sent to the same trading system will be executed; in short, liquidity attracts liquidity.”³⁴

Increased orders likewise produce rough improvements in price accuracy and stability.³⁵ Additional bids and offers both enhance the supply and demand captured by the market and introduce more complete information, increasing the proximity of market price to equilibrium value. This, in turn, can also be expected to improve price stability.³⁶

32. “More liquidity exists in the market as the number of each type of participant increases.” Alberto Cybo-Ottone, Carmine Di Noia & Maurizio Murgia, *Recent Developments in the Structure of Securities Markets*, in BROOKINGS-WHARTON PAPERS ON FINANCIAL SERVICES 223, 245 (Robert E. Litan & Anthony M. Santomero eds., 2000). See Nicholas Economides & Aloysius Siow, *The Division of Markets Is Limited by the Extent of Liquidity (Spatial Competition with Externalities)*, 78 AM. ECON. REV. 108, 109 (1988) (“Liquidity at a market can only be increased by increasing the number of traders at that market.”). Although somewhat oversimplified, because the number of traders primarily serves as a proxy for the volume of trade, the true variable of interest, this notion essentially holds true.

33. See Cybo-Ottone et al., *supra* note 32, at 247 (“One indicator of network scope is the number of participants.”); Ian Domowitz, *Electronic Derivatives Exchanges: Implicit Mergers, Network Externalities, and Standardization*, 35 Q. REV. ECON. & FIN. 163, 168 (1995) (“[T]he driving force behind exchange structure is the liquidity effect. This, in turn, is driven by the size and scope of the network of traders making the adoption decision.”). See also Nicholas Economides, *Liquidity and Markets*, in 2 THE NEW PALGRAVE DICTIONARY ON MONEY AND FINANCE 594 (Peter Newman et al. eds., 1992); Nicholas Economides, *The Impact of the Internet on Financial Markets*, 1 J. FIN. TRANS., Apr. 2001, at 8, 10 (noting liquidity, and hence efficiency, gains from additional traders) [hereinafter Economides, *Impact of the Internet*].

34. Di Noia, *supra* note 31, at 55. See also Stephen Craig Pirrong, *The Self-Regulation of Commodity Exchanges: The Case of Market Manipulation*, 38 J.L. & ECON. 141, 155 n.24 (1995) (“Liquidity effects make this simultaneous choice of market a game of coordination, and inefficient equilibria usually exist in these games.”).

35. “Regarding stock exchanges, they can be seen as networks where the more traders (drawn from the same distribution of uncertain endowments) enter the market, the more market uncertainty (measured by the variance of market prices) is diminished.” Di Noia, *supra* note 31, at 52. See Nicholas Economides, *The Economics of Networks*, 14 INT’L J. INDUS. ORG. 673, 679 (1996) (“Higher participation of traders on both sides of the market . . . decreases the variance of the expected market price and increases the expected utility of risk-averse traders.”).

36. To be clear, this is not a “greater fool” approach, see Joseph Bankman & Marcus Cole, *The Venture Capital Investment Bust: Did Agency Costs Play a Role? Was it Something Lawyers Helped Structure?*, 77 CHI.-KENT L. REV. 211, 220 (2001) (defining “greater fool” notion of investing), or Malkiel’s “castles-in-the-air” concept, see BURTON G. MALKIEL, *A RANDOM WALK DOWN WALL STREET* 128–29 (1991). The presence of more traders does not mean that someone will come along who values the stock more than you, and you will thereby profit. Rather, the argument is a more limited one. Regardless of whether the newcomer is a fool or genius, he or she will increase market liquidity, which enhances the value of your holding. If all are geniuses, it may well be that the price of your stock holding will fall. Even in that case, however, the *liquidity value* of the stock has increased.

The network implications of this pattern are relatively apparent, if little noted. Network effects are positive consumption externalities;³⁷ they arise where the utility of a good to one user increases as other users acquire or utilize it.³⁸

Equities markets operate in just this network manner, in their liquidity and price discovery functions. As additional traders come to market, the extent of liquidity and price discovery available to existing traders progressively grows.³⁹ Equities markets are thus a classic network, in which the value of the good—a given stock, the market in that stock, and, as we shall see, the market generally—increases with each incremental expansion in the size of its network (i.e., the network of traders).⁴⁰ In more

37. I use the term network effects, rather than network externalities, as the latter assumes a market failure, which may or may not be true as to any given network effect. See S.J. Liebowitz & Stephen E. Margolis, *Network Externalities: An Uncommon Tragedy*, J. ECON. PERSP., Spr. 1994, at 133, 135. See also Lemley & McGowan, *supra* note 7, at 482 n.5.

38. See *supra* note 7. See also Gideon Parchomovsky, *Publish or Perish*, 98 MICH. L. REV. 926, 945 (2000); Larry E. Ribstein & Bruce H. Kobayashi, *Choice of Form and Network Externalities*, 43 WM & MARY L. REV. 79, 110 (2001). The owner of the paradigmatic network good, the telephone, derives no utility from it, unless others own units as well, see Michael Klausner, *Corporations, Corporate Law, and Networks of Contracts*, 81 VA. L. REV. 757, 772 (1995); Lemley & McGowan, *supra* note 7, at 488 (noting that “owning the only telephone or fax machine in the world would be of little benefit because it could not be used to communicate with anyone”); further, their utility continues to grow with each additional telephone purchase, see Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985); Lemley & McGowan, *supra* note 7, at 488–89 (“The value of the telephone or fax machine one has already purchased increases with each additional purchaser, so long as all machines operate on the same standards and the network infrastructure is capable of processing all member communications.”). The owner of a tea kettle, conversely, may find great benefit in its water capacity, built-in whistle, and other inherent qualities, but has relatively little interest in the number of other tea drinkers. The utility derived from a telephone thus arises from the size of its network of users, see Di Noia, *supra* note 31, at 52 (“Positive network externalities (the benefit to an individual increases in the number of others on the system) arise when a good is more valuable to a user the more users adopt the same good or a compatible one.”); Katz & Shapiro, *supra*, at 424 (“[T]he utility that a given user derives from the good depends upon the number of other users who are in the same ‘network.’”), while that of a tea kettle turns on its inherent value.

39. See Brett Frischmann, *Privatization and Commercialization of the Internet Infrastructure: Rethinking Market Intervention into Government and Government Intervention into the Market*, 2 COLUM. SCI. & TECH. L. REV. 1, 34–35 (2001) (noting that value of internet increases with interconnection of more users); William J. Kolasky, *Network Effects: A Contrarian View*, 7 GEO. MASON L. REV. 577, 579 (1999) (noting that value to each customer increases as more friends and family join network). In this regard, some analogy might be made to the more tangible case of eBay, the internet auction site. Consistent with the pattern described, additional participants in eBay, whether sellers or buyers, have progressively helped to enhance its value, leading to its ultimate dominance of the market.

40. See Domowitz, *supra* note 33, at 164–65 (“Second, the benefit to an individual increases in the number of others on the system. This is sometimes called the ‘network externality,’ because each new user confers a benefit on all other users. In trading terms, we might call it a liquidity effect”); Amir Licht, *Stock Exchange Mobility, Unilateral Recognition, and the Privatization of Securities*

familiar terms, networked securities markets exhibit decreasing, rather than increasing, transactions costs with additional traders.

Within this paradigm, what is the relevant benefit to existing traders, i.e., the network effect? It is seemingly the very liquidity and price accuracy/stability that the market is designed to achieve. Network economies can therefore be understood as the foundation of organized markets' role as sources of liquidity and price discovery. For the same reason, the proposed model of securities markets as a network industry distinguishes them from most network goods, such as telephones and personal computers, in which the network effect is a secondary consequence, to be managed or controlled. Here, by contrast, the network effect is the precise result desired.⁴¹ Rather than secondary effects, network economies stand at the heart of why organized markets exist and function as they do.⁴²

Regulation, 41 VA. J. INT'L L. 583, 621 n.158 (2001). It bears emphasizing that the network function in securities markets is not of the same linearity as the network effects in telephone or computer operating systems. Thus, as the number of traders and volume of trade progress beyond a certain point, greater anonymity and increase prospects of both rational and irrational herd behavior create at least the possibility that market quality may decline. Of course, even traditional network technologies have the potential for such decreasing returns, if not diseconomies of scale, at some point sufficiently far along the demand curve. With conventional goods, however, these patterns can be expected to arise at higher levels of demand and to be more susceptible to technological remedy than would be similar patterns in securities trading.

41. By this, I do not mean to suggest that network value constitutes a greater proportion of the value of equity securities than of the several technologies noted. *Cf. infra* notes 52, 67. Rather, it is the centrality of the network effects of liquidity and price discovery to the basic function of organized markets that I aim to highlight.

42. While the present analysis emphasizes additional traders as the network mechanism in securities markets, the arrival of additional issuers is to similar effect: Not only do additional *traders* enhance market efficiency, but likewise additional *listings*. Cybo-Ottone and his co-authors thus start with issuers/listings. *See* Cybo-Ottone et al., *supra* note 32, at 248–49 (suggesting that strong network effects arise more from increased listings than from increased traders); *id.* at 256 (“Order flow seems to attract order flow, but more at the level of an individual stock than globally, which is why listing supremacy remains relevant.”). *See also* Di Noia, *supra* note 31, at 41 (framing listing evaluation: “All else being equal, firms want to be listed where other firms are listed . . .”). Notably, this emphasis causes Cybo-Ottone and his co-authors to ground some part of the increased network returns in reputational improvements. *See* Cybo-Ottone et al., *supra* note 32, at 248–49 (highlighting relationship of network growth patterns in foreign listings on New York Stock Exchange and reputational implications of participating on largest trading network). Di Noia, meanwhile, explicitly separates out a trader and an issuer analysis of network effects, characterizing the listing network as producing a direct-network effect and increased traders as producing a cross-network effect. *See* Di Noia, *supra* note 31, at 53 (defining “cross-network externality” as circumstance in which “[u]tility derives from an increase in the computation of a *different* good belonging, in a sense, to the same network”) (emphasis in original). She also seems to recognize the potentially greater importance of the trader network, however. *See id.* Moreover, it is not entirely clear that Di Noia’s distinction is consistent. Although she highlights the listing analysis, her assessment is largely grounded in the number of traders. *See id.* Finally, an

How broad are the implications of network effects in securities markets, however? While the utility gains of improved liquidity and price discovery are directed, in the first and highest order, to the market in an individual equity issue (i.e., additional traders in Microsoft stock most directly enhance the liquidity and price quality of Microsoft stock), such gains are ultimately dispersed more broadly.⁴³ To varying degrees, new traders in a given stock also enhance the utility of market participants trading in entirely different stock.⁴⁴ This arises from the implications of modern finance theory for the cross-pollination of liquidity and price discovery effects among multiple traders in multiple stocks.

By way of an intuitive example, shareholders in FFLC Bancorp, one of the smallest companies listed on NASDAQ,⁴⁵ likely derive utility from the presence of Microsoft, Intel, and Cisco—three of the largest companies on the market.⁴⁶ This suggests that the liquidity of FFLC Bancorp is shaped not only by the liquidity of the market in that stock, but by the liquidity of the entire market on which the stock trades.⁴⁷ Modern finance

entirely different analysis would be one focused on “the number of locations from which the market
See Domowitz, *supra* note 33, at 164.

43. See Economides, *supra* note 30, at 90–91 (“Under uncertainty, the expansion of counter-matching offers (created by the expansion of the network) can be beneficial to market participants even when the counter-matching offers (or the traders who make them) are drawn from the same distribution.”).

44. See Cybo-Ottone et al., *supra* note 32, at 245 (“Intermediaries want to be present at the exchanges where more firms and intermediaries are present, as it is more attractive to their final customers (investors) and to their own portfolios and risk management.”).

45. See NASDAQ, <http://quotes.nasdaq.com> (accessed Dec. 6, 2002) (listing market capitalization of \$104,503,780).

46. See Di Noia, *supra* note 31, at 42.

It is plausible that, *ceteris paribus*, when firms decide to be listed on an exchange, they choose the one with more intermediaries and firms due to the greater liquidity on the market.

The same strategy is followed by the intermediaries that want to become members of that exchange (unless regulations prohibit this choice).

Id. Again, one might think of eBay, which draws together buyers and sellers of a wide array of products (from tea kettles to telephones), who nonetheless benefit from each other’s presence—a network gain. See Richard Warner, *Border Disputes: Trespass to Chattels on the Internet*, 47 VILL. L. REV. 117, 132–35 (2002) (discussing positive network effect created by self-perpetuating expectation on eBay: “Buyers and sellers use eBay because they expect other buyers and sellers to use it.”).

47. The extension of liquidity and price discovery effects across multiple stock is suggested by the very reference to the liquidity of a *market*, as opposed to the individual stocks listed on that market. See Cybo-Ottone et al., *supra* note 32, at 247 (stating that “liquidity is often measured by the number of listed companies”). See, e.g., Joseph A. Grundfest, *The Ambiguous Boundaries Between Public and Private Securities Markets*, 51 CASEW. RES. 483, 486 (2001) (describing NYSE as liquid market). To similar effect are references to the volume of trade of an entire market, versus that of a specific stock. See Cybo-Ottone et al., *supra* note 32, at 246 (“For trading, it is common to look at exchange liquidity in terms of the volume traded.”). See, e.g., Daniel M. Gallagher, *Move Over Tickertape, Here Comes the Cyber-Exchange: The Rise of Internet-Based Securities Trading Systems*, 47 CATH. U. L. REV.

confirms this intuition and its implications for the reach of network effects beyond individual securities to the market as a whole. Thus, finance models of pricing, diversification, and risk suggest a broad reach of network effects through the equity securities markets.

These implications arise from the comparability, substitutability, and complementary nature of equity securities.⁴⁸ In light of these characteristics, the potential purchaser of any given stock is also a potential purchaser of other stocks, based on various factors of diversification and effective management of systematic and nonsystematic risk. The positive welfare implications of additional traders in Microsoft, Intel, or Cisco for the market in FFLC Bancorp therefore arise from the fact that they are also potential traders in FFLC Bancorp.⁴⁹

1009, 1019 (1998) (“The New York Stock Exchange (NYSE) has the highest share volume and dollar value of trades among the exchanges.”).

48. See Jay W. Eisenhofer & John L. Reed, *Valuation Litigation*, 22 DEL. J. CORP. L. 37, 116 (1997) (describing comparable company approach to company valuation, including need to identify comparable publicly-traded companies); Ehud Kamar, *A Regulatory Competition Theory of Indeterminacy in Corporate Law*, 98 COLUM. L. REV. 1908, 1930 n.83 (noting comparability of equity securities); Lynn A. Stout, *Corporate Finance: How Efficient Markets Undervalue Stocks: CAPM and ECMH Under Conditions of Uncertainty & Disagreement*, 19 CARDOZO L. REV. 475, 484 (1997) (describing conventional theory’s implication that no equity share is a bargain relative to any other firm’s shares, making all stocks perfect substitutes).

49. Modern Portfolio Theory (“MPT”) and the Capital Asset Pricing Model (“CAPM”), in tandem with the Efficient Capital Markets Hypothesis (“ECMH”), teach that equity shares are essentially substitutes, which should be collected together in a risk-diversified portfolio. Given as such, traders cannot be thought of as being in the market for a particular stock, but rather for any stock with a certain level of risk, as prescribed by their risk tolerance and the present composition of their investment portfolio. On account of the dictates of diversification, meanwhile, such a portfolio must include an array of complementary securities, and not any single equity or even small group of stocks. Finally, given the ECMH’s lessons for stock comparability and the CAPM’s identification of relative risk as the appropriate measure of comparison, the enhancement of available price information on any given stock, through the mechanism of additional traders, must necessarily improve the quality of price information on other stock as well. (Additional traders, of course, not only expand the data set available in price discovery, but also enhance the skill set applied to that process.)

One caveat should be noted. As fully developed, MPT suggests a broader comparability, substitutability, and complementarity than the proposed network analysis of singular securities markets would seem to allow. Rather than limited to the equities traded on any single exchange, MPT finds these characteristics applicable among equity securities traded on independent markets, and even among equity securities and entirely different financial instruments. Can MPT be incorporated into the present analysis, then, to suggest that network effects extend across the financial markets, without regard to the boundaries of distinct financial instruments, trading markets, or even nations? Besides the fact that any such network effects will necessarily be weaker in degree than network effects among the equity securities traded on a single market, they are also meaningfully different in kind. Unlike network effects within a single, interconnected market, any externalities between markets are Pigovian in nature, operating by way of the price function (i.e., pecuniary externalities). As such, they are effectively internalized. See Hugh Macaulay, *Externalities*, THE MCGRAW-HILL ENCYCLOPEDIA OF ECONOMICS 379–81 (Douglas Greenwald ed., 1982).

Network effects in equity securities markets are also likely to be of some strength, given the separation of ownership and control in the modern public corporation,⁵⁰ and the consequently higher proportion of network to inherent value in equity securities.⁵¹ All goods have some mix of inherent and network value.⁵² Even the paradigmatic network technologies noted

50. See BERLE & MEANS, *supra* note 5, at 5–6.

51. Network strength is an important consideration, as network effects will only have meaningful welfare implications in a given industry if they are strong enough to shape its structure and performance. See David S. Evans & Richard Schmalensee, *A Guide to the Antitrust Economics of Networks*, 10 ANTITRUST 36, 36 (1996) (explaining that soft drinks are not a network industry, notwithstanding the presence of network effects, because the industry is not significantly shaped by those network effects).

52. See Klausner, *supra* note 38, at 763 (“In short, widespread use of a PC has a value to a user independent of the inherent value of the product.”). What I term “inherent value” and “network value” utarky value” and the “synchronization value” of a good or service. See S.J. Liebowitz & Stephen E. Margolis, *Network Effects and Externalities*, in 2 THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW 671 (Peter Newman ed., 1998) [hereinafter DICTIONARY OF ECONOMICS AND THE LAW].

It bears emphasizing that the term “inherent value,” as used in the network effects literature, is designed simply to distinguish that part of an asset’s value that is impervious to a rise or fall in the number of other users of the asset (inherent value), and that part of its value that is sensitive to the former (network value). Thus, the network effects analysis of inherent versus network value, even as applied to equity shares herein, is separate and apart from a finance assessment of equity valuation, or asset valuation generally. The value of an equity security is equivalent to the future income stream that the stock will generate, discounted to the present. See Jonathan Macey & Hideki 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, 1012 (1990). More specifically, of course, it is “a function of the dividends (including any final, liquidating dividend paid when the corporation’s existence ends) that the corporation can be expected to pay out over its life.” KLEIN & COFFEE, *supra* note 21, at 274. Rather than disputing this conventional definition, a network analysis adds to it. It suggests that the future income stream of a particular security may be shaped in part by features impervious to the size of that security’s ‘network,’ but also, in part, by features sensitive to network size. See Marcel Kahan & Michael Klausner, *Standardization and Innovation in Corporate Contracting (Or “The Economics of Boilerplate”)*, 83 VA. L. REV. 713, 726 n.32 (1997); Kamar, *supra* note 48, at 1930 (discussing network and other elements in value of Delaware law). Even a non-salable, and hence completely illiquid, security has a value larger than zero. That value is less, however, than it would be were the security liquid. It is this additional value added of liquidity, for example, that network analysis would characterize as network value. Cf. KLEIN & COFFEE, *supra* note 21, at 308 (analogously dividing value of corporate bond into two components of annuity and lump-sum terminal payment).

Of course, even this might be read to suggest some dispute with conventional finance theory, insofar as the latter relies on the identity of present dividend payments and a terminal ‘dividend’ payout arising from sale of a stock (even as adjusted to present value). See *id.* at 273–74. The present analysis, thus, would characterize present dividend payments as part of a security’s inherent value, but any terminal payment as network value, because the latter depends on liquidity/salability on the terminal date. The Miller-Modigliani Theorem’s implication that dividend payments can be self-constructed, through any shareholder’s sale of a discrete share amount, see Merton Miller & Franco Modigliani, *Dividend Policy, Growth, and the Valuation of Shares*, 34 J. BUS. 411, 414 (1961), itself assumes liquidity or, alternatively, the minimal level of risk necessary to utilize the shares as security for an equivalent cash flow. Where liquidity or network value is limited, then, the value of present dividend distributions will necessarily differ from that of discounted future dividends.

above have some inherent value,⁵³ independent of the size of their network, or even the existence of one.⁵⁴ A computer is a useful word processing device, even if one never goes on the Internet, exchanges software and/or data with other users, or purchases software beyond what is pre-installed.⁵⁵ Even a telephone has some inherent value.⁵⁶ An attractively designed unit might have aesthetic value, and even an unattractive model might prove valuable as a projectile in a particularly contentious argument.⁵⁷ It is particularly in those cases where the proportion of network to inherent value is high, however, that network effects can be expected to be strong and of greater welfare and legal consequence.⁵⁸

Stockowners, like telephone and computer users, are very much interested in the network of other ‘users’ of the relevant good.⁵⁹ In this

53. See Klausner, *supra* note 38, at 772; Lemley & McGowan, *supra* note 7, at 586.

54. See Lemley & McGowan, *supra* note 7, at 491 (“Unlike telephones and fax machines, an operating system or application program will allow even a single user to perform a variety of tasks regardless whether even a single other consumer owns the software.”).

55. Cf. David Dunn, *Getting Organized with Your Word Processor*, 82 LL. BAR J. 571, 571 (1994) (describing utility of computer word processing for personal information management).

56. Cf. David McGowan, *Networks and Intention in Antitrust and Intellectual Property*, 24 J. CORP. L. 485, 501 (1999) (“The inherent value of a telephone is trivially small . . .”).

57. Conversely, all goods enjoy some network value. Recall our tea kettle. While inherent value clearly predominates, if our tea kettle was architect Michael Graves’ incredibly popular ‘Whistling Bird,’ it likely would have some network value as well. As my kettle becomes increasingly popular, its ‘fad’ value to me grows, even if it still takes just as long to boil. The benefits of having what is ‘in’ thus constitute a form of network effect. See Katz & Shapiro, *supra* note 38, at 424 n.1 (characterizing “purely psychological, bandwagon effects” as “subtle” sources of consumption externalities). Cf. Harvey Leibenstein, *Bandwagon, Snob & Veblen Effects in the Theory of Consumer’s Demand*, 64 QJ. ECON. 183, 190 (1950) (describing “bandwagon effects” as “the case where an individual will demand more (less) of a commodity at a given price because some or all other individuals in the market also demanded more (less) of the commodity”). Lemley, though, highlights the difference between the payoff interaction of network effects, involving “positive utility payoffs,” and the herd behavior of fads, suggesting that the latter can easily be broken. See Lemley & McGowan, *supra* note 7, at 598. Besides their instability, bandwagon effects may also produce negative externalities, once the extent of popularity overwhelms the capacity for sales and service. Notwithstanding initial positive returns to scale, therefore, fads may produce diminishing returns beyond a certain scale.

58. Lemley and McGowan reason:

The essential criterion for locating a good along . . . [the continuum from actual networks, to virtual networks, to positive feedback phenomena] is the degree to which the good provides inherent value to a consumer apart from any network characteristics. The greater the inherent value of the good relative to any value added by additional customers, the less significant the network effect.

Lemley & McGowan, *supra* note 7, at 488, 498 (“The ratio of inherent value to network value is of similar importance.”). See also Russell Korobkin, *Inertia and Preference in Contract Negotiation: The Psychological Power of Default Rules and Form Terms*, 51 VAND. L. REV. 1583, 1593–95 (1998); Thomas B. Nachbar, *Paradox and Structure: Relying on Government Regulation to Preserve the Internet’s Unregulated Structure*, 85 MINN. L. REV. 215, 272 (2000).

59. See Marcel Kahan, *Securities Laws and the Social Costs of “Inaccurate” Stock Prices*, 1992 DUKE L.J. 977, 1019 (arguing that investors place higher value on more liquid stocks). See also Amir

vein, an equity share might be better understood as a standardized unit of trade than as a proportionate interest in the underlying corporation.⁶⁰

This relative emphasis on liquidity value, or network value,⁶¹ in equity valuation arises from the nature of the firm. The modern public corporation is characterized by a substantial dispersion of shareholding.⁶² While actual share ownership varies widely among the corporation's multiplicity of shareholders, no individual or even small group of shareholders ordinarily holds sufficient shares to exercise authority over management of the firm.⁶³ Instead, control resides with its professional managers, producing the "separation of ownership and control" that is characteristic of the modern corporation.⁶⁴

Given such separation, it should come as no surprise that the ability to trade an equity share (i.e., its network value), rather than 'consume' or control it in some fashion (i.e., its inherent value), constitutes a significant

N. Licht, *Genie in a Bottle? Assessing Managerial Opportunism in International Securities Transactions* 2000 COLUM. BUS. L. REV. 51, 73 (stating that improved liquidity of stock increases share value). Cf. Amihud & Mendelson, *supra* note 24, at 371–72 (stating that liquidity, shaped by market conditions and trading regulations, influences an equity's underlying value).

60. See RICHARD A. BREALEY & STEWART C. MYERS, *PRINCIPLES OF CORPORATE FINANCE* 62 (6th ed. 2000) (noting that fractional interest of single share of General Electric stock is .00000003 percent of the company). Describing the function of organized markets, Telser and Higinbotham describe a world in which "standard contracts . . . circulate among the traders at market determined prices, and the participants may never wish to convert their standard contracts into the physical good." Lester G. Telser & Harlow N. Higinbotham, *Organized Futures Markets: Costs and Benefits*, 85 J. POL. ECON. 969, 971 (1977). See Van Zandt, *supra* note 4, at 972–73 ("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."). This vision particularly characterizes the trade in "shares of stock," they suggest, "since rarely do the shareholders wish to liquidate the corporation." Telser & Higinbotham, *supra*, at 971.

61. Although closely correlated, it bears noting that liquidity and network value are not identical in equity securities markets. Most significantly, network value also encompasses the utility enhancements of price discovery and stability. As referenced above and in the ensuing analysis, therefore, liquidity is used simply as a tangible proxy for network value.

62. See John C. Coates IV, *Measuring the Domain of Mediating Hierarchy: How Contestable Are U.S. Public Corporations?*, 24 J. CORP. L. 837, 848 (1999) (noting persistent dispersion of ownership in public companies, with fewer than 20% having 35+% shareholder).

63. See George W. Dent, Jr., *Toward Unifying Ownership and Control in the Public Corporation*, 1989 WIS. L. REV. 881, 882 (1989) (noting that shareholders are too scattered to effectively exercise control). Institutional investors are the only significant potential exception. Even their capacity for control is relatively limited, however, both in practice and by legal design. See Rado Bohinc & Stephen M. Bainbridge, *Corporate Governance in Post-Privatized Slovenia*, 49 AM. J. COMP. L. 49, 50, 62–63 (2001) (describing entrenchment of separation of ownership and control in corporate law norms: "In general, shareholders of public U.S. corporations have neither the legal right, the practical ability, nor the desire to exercise the kind of control necessary for meaningful monitoring of the corporation's agents.").

64. See BERLE & MEANS, *supra* note 5, at 5–6. But see Coates, *supra* note 62, at 848 (noting prospect of shareholder control).

the present value of the future income stream they will produce—is invariably more or less than that of shares in a public corporation. The value of a share in a close corporation may be substantially greater or smaller than any given public corporation. The relative proportion of liquidity to consumption value, however, will be less.

68. See Mukesh Bajaj, David J. Denis, Stephen P. Ferris & Atulya Sarin, *Firm Value and Marketability Discounts*, 27 J. CORP. L. 89, 90 (2001) (describing how nonmarketable securities are valued through incorporation of discount); Eisenhofer & Reed, *supra* note 48, at 128 (describing need for marketability discounts for nonmarketable securities). Restricted securities cannot be sold or otherwise traded, but such formal barriers are not the primary concern herein. Rather, whenever a market is absent, liquidity is lacking. Even if one can dispose of a security in a one-on-one transaction, this constitutes only one half of the meaning of liquidity as price resiliency cannot exist in such a transaction. One-on-one transactions thus do not constitute a market at all, let alone a liquid one. See Economides, *supra* note 24, at 91 (“Liquidity plays a crucial role in financial exchange markets. Without the availability of counteroffers, markets cease to exist, and they are replaced by individualized bilateral contracts. Thus, some liquidity is necessary even for the *existence* of a financial exchange market.”) (emphasis in original).

69. The implications of time should also be noted. The proportion of liquidity or network value in an equity security (and hence the welfare and legal implications of any network effects that may exist), declines as the relevant transaction date moves farther into the future, and the present value of that transaction accordingly declines (while the most likely such transaction might be trade or sale, other events, including the use of the asset as a security, as by mortgaging my home, may have similar implications). Cf. KLEIN & COFFEE, *supra* note 21, at 234 (noting increased impact of interest rate adjustments, depending on length of time to maturity). Thus, as one is more of an investor, and less of a trader, the proportion of network to inherent value in one’s portfolio falls. Famed investor Warren Buffett, adopting a buy-and-hold strategy, derives proportionately less value from the liquidity of his

Ultimately, however, these exceptions prove the rule. For most equity securities, the network value of liquidity is a significant component of composite value.⁷⁰ Dispersed ownership remains the norm, and recurring dividends account for a limited portion of the expected return on most equities.⁷¹ Meanwhile, the buy-and-hold lessons of modern finance have generally not trickled down: Most investors continue to trade relatively actively.⁷² Given as much, strong network effects—and consequently broader welfare and legal implications—can be predicted in equity securities markets.⁷³

II. WHY LAW MATTERS: THE NETWORK BARRIER TO MARKET TRANSITION

What does the proposed network model of securities markets teach as to why law might matter in Russia's creation of new markets? In the face of this model, can an assumption of securities markets' spontaneous emergence be sustained? In this Section, I will argue that network economies in securities markets produce a series of dynamic effects, which

portfolio, and more from its inherent value. See Lawrence A. Cunningham, *The Essays of Warren Buffett: Lessons for Corporate America*, 19 CARDOZO L. REV. 5, 89 (1997) (describing Buffett's investment strategy); Deborah A. DeMott, *Agency Principles and Large Block Shareholders*, 19 CARDOZO L. REV. 321 (1997) (noting that Berkshire Hathaway is a holding company that invests in large blocks of public companies). Such a strategy, it therefore bears noting, will necessarily diminish the welfare implications of network effects in securities markets.

Even for Buffett, however, network value remains significant. A large part of his gains remain unrealized until he is actually able to trade his holdings—into a liquid market. If he cannot do so efficiently—if liquidity is lacking—his shares necessarily give up some part of their value. (Besides the caveat of dividends, noted above, this statement is cabined by the fact that even an illiquid equity may be valuable as collateral or other form of security. It is further limited by the possibility that Buffett also bought in an illiquid market, and hence received an up-front (il)liquidity discount.) Yet Buffett might still do well if the inherent value of his portfolio were sufficiently high to compensate for its illiquidity. In particular, a collection of equities that pays out regular and substantial dividends might retain substantial value even absent liquidity. In that case, the inherent value of holding the stock is greater and may compensate for any diminished network value.

70. This may actually be true of most financial exchange instruments, though clearly not every one. Where it is not true, of course, network effects will be correspondingly weaker.

71. See *supra* note 69.

72. See *id.*

73. See Lemley & McGowan, *supra* note 7, at 592. Lemley and McGowan argue that: Network theory implies that strong network markets will tend to 'tip' to a standard technology because a large portion of the value of goods in such markets is, by definition, to communicate with others who own the standard as well or to interoperate with goods compatible with the standard. The relatively high network value and low inherent value of such goods implies that, once consumers perceive that a de facto standard has been established, tipping will occur very quickly.

Mark A. Lemley & David McGowan, *Could Java Change Everything? The Competitive Propriety of a Proprietary Standard*, 1998 ANTITRUST BULL. 715, 721. See also Economides, *Impact of the Internet*, *supra* note 33, at 10 (noting "strong network effects" in "financial exchange markets").

can be loosely categorized under the twin headings of ‘size effects’ and effects.⁷⁴ As I will suggest with particular reference to the several market formation choices noted at the outset,⁷⁵ these phenomena—and the sometimes severe, sometimes mild, market failures that follow from them—may stymie efficient transition in network industries, including equities markets.⁷⁶

A. SIZE EFFECTS

A preliminary set of network-related obstacles to the efficient emergence of securities markets turns on positive externalities in network economies. These inefficiencies, which I characterize as size effects, include the possibilities of market underutilization, market misidentification, and technological failure.

Network effects have been characterized as “positive externalities on
⁷⁷ Less commonly highlighted than negative externalities, which arise when costs go uninternalized by a producer,⁷⁸

74. See Gregory J. Werden, *Network Effects and Conditions of Entry: Lessons from the Microsoft Case*, 69 ANTITRUST L.J. 87, 89–92 (2001) (discussing two efficiency concerns relating to network industries—size and tipping).

75. See *supra* note 13 and accompanying text.

76. The term “market failure,” and particularly the notion of network inefficiency, have a very specific connotation as used herein. The relevant market failure and inefficiency in network industries need not mean that markets are less efficient because network effects are present. To the contrary, they may be far more efficient. In the circumstances below, however, they may be less efficient than they otherwise might be. Network inefficiency as used herein might therefore be better characterized as network *sub*-efficiency.

77. See Stefan Voigt & Hella Engerer, *Institutions and Transformation—Possible Policy Implications of the New Institutional Economics*, in FRONTIERS IN ECONOMICS 131, 139 (Klaus F. Zimmermann ed., 2002). See also Kolasky, *supra* note 39, at 579–80 (explaining that network effects are often referred to as “positive network externalities” because each additional user adds value to the network). Some legal analysis actually evaluates what economics would characterize as network effects under the heading of “positive externalities.” See, e.g., Jeffrey N. Gordon, *The Mandatory Structure of Corporate Law*, 89 COLUM. L. REV. 1549, 1567–69 (1989) (highlighting positive externalities of standardization as grounds for federalizing corporate governance terms). Network effects and positive externalities are not synonymous, however, notwithstanding such parallels. Most positive externalities are not network effects. See Lemley & McGowan, *supra* note 7, at 594–95 (discussing difference between network effects and economies of scale). On the other hand, all network effects have some positive third-party utility implications.

78. The classic externality is the steel mill that drops soot on the neighboring laundromat. See HAROLD DEMSETZ, OWNERSHIP, CONTROL, AND THE FIRM 13 (1988). As originally analyzed by Marshall and Pigou, externalities were of relatively little consequence, as they focused on pecuniary externalities, which operated through the price mechanism. This can be contrasted with so-called technological externalities, which are commonly intended by the term externality today. See Macaulay, *supra* note 49, at 379–81. Notably, however, even pecuniary externalities may have welfare consequences, when prices play a role besides equalizing supply and demand. See J.J. Laffont, *Externalities*, in 2 THE NEW PALGRAVE—A DICTIONARY OF ECONOMICS 264 (John Eatwell, Murray

positive externalities arise when benefits remain uninternalized.⁷⁹ The paradigmatic example of such positive externalities, though an empirically flawed one, is beekeeping, which serves to pollinate the flowers and crops of neighboring residents and farmers.⁸⁰ Here, “social marginal benefits exceed private marginal benefits,”⁸¹ and beekeeping may be inefficiently underpursued.⁸²

Network economies, whether in telephones, personal computer operating systems, or stock markets, produce just such third party benefits.⁸³ Thus, whether I purchase an Apple computer or Apple stock, I enhance the utility of other members of the relevant network—increasing software availability for computer users and liquidity for stockholders.⁸⁴

Milgate & Peter Newman eds., 1987) [hereinafter *DICTIONARY OF ECONOMICS*]. In securities markets, of course, they convey information.

79. See B. Peter Pashigian & Eric D. Gould, *Internalizing Externalities: The Pricing of Space in Shopping Malls*, 41 J.L. & ECON. 115 (1998) (analyzing positive externalities arising from anchor stores in malls); Jeffrey Standen, *The Exclusionary Rule and Damages: An Economic Comparison of Private Remedies for Unconstitutional Police Conduct*, 2000 B.Y.U. L. REV. 1443, 1459–62 (2000) (discussing the exclusionary rule as a source of positive externalities). Most applicably in the present context, see John C. Coffee, Jr., *Market Failure and the Economic Case for a Mandatory Disclosure System*, 70 VA. L. REV. 717, 725 (1984) (discussing positive externalities arising from harmonization of disclosure standards). See also Lucian A. Bebchuk, *Federalism and the Corporation: The Desirable Limits on State Competition in Corporate Law*, 105 HARV. L. REV. 1437, 1485–86 (1992) (discussing the ways in which state charter competition leads to socially undesirable externalities).

80. See Steven N.S. Cheung, *The Fable of the Bees: An Economic Investigation*, 16 J.L. & ECON. 11, 19–22 (1973) (describing and refuting potential positive externalities of beekeeping); Kenneth G. Dau-Schmidt, *An Economic Analysis of the Criminal Law as a Preference-Shaping Policy*, 1990 DUKE L.J. 1, 8 n.38 (discussing symbiotic relationship between apple grower and neighboring beekeeper).

81. See Economides, *supra* note 30, at 89 (“The benefits of the addition of an extra node (or an extra customer) exceed the private benefits accruing to the particular node (or customer).”); Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, J. ECON. PERSP., Spr. 1994, at 93, 96; Standen, *supra* note 79, at 1447–48 (positive externalities arise where “the utility from the good is distributed to a diffused group and not captured by one person”).

82. See Standen, *supra* note 79, at 1447–48 (noting potential for under-production of desired good, with positive externalities). See also DEMSETZ, *supra* note 78, at 35.

83. Cf. Frank H. Easterbrook & Daniel R. Fischel, *Mandatory Disclosure and the Protection of Investors*, 70 VA. L. REV. 669, 697, 700–01 (1984) (articulating “third party effects” rationale for mandatory securities disclosure).

84. Economides offers a possible explanation for the perceived public character of certain networks:

Financial markets also exhibit positive size externalities in the sense that the increasing size (or thickness) of an exchange market increases the expected utility of all participants. Higher participation of traders on both sides of the market (drawn from the same distribution) decreases the variance of the expected market price and increases the expected utility of risk-averse traders. Ceteris paribus, higher liquidity increases traders’ utility. Thus, financial exchange markets also exhibit network externalities.

Economides, *supra* note 35, at 679–80. This may help explain the perceived public character of certain networks. See Graciela Chichilnisky, *Introduction*, in *MARKETS, INFORMATION, AND UNCERTAINTY*, *supra* note 1, at 16. Examples include the telephone network, the internet, and even the Windows desktop. See also Standen, *supra* note 79, at 1448 (“A positive externality is thus tantamount to a

Such external benefits, however, do not alone produce network externalities.⁸⁵ Rather, externalities arise only where the relevant producer/actor is unable to internalize fully the gains of their trade.⁸⁶

In securities markets, such internalization of the network gains that accrue from the appearance of additional traders (as well as issuers)⁸⁷ would appear to be difficult, and externalities therefore likely. The challenge of quantifying, or even identifying, network gains from improved price discovery is illustrative. Closer price approximation of equilibrium value clearly benefits those who trade in a stock. Yet improved price information will also cause some traders to efficiently decline to purchase the stock. The beneficiaries of greater network size and consequently improved price discovery therefore include not only those who elect to purchase an efficiently priced security, but anyone who *considers* doing so.⁸⁸ Nor can mechanisms of ownership be relied upon as a remedy. As

public good.”). Most significantly for our purposes, stock markets have long been viewed as quasi-public institutions. See James L. Chochrane, Brian McNamara, James E. Shapiro & Michael J. Simon, *The Structure and Regulation of the New York Stock Exchange*, 18 J. CORP. L. 57, 58 (1993) (describing NYSE as structured for public customers).

The efficiency of the market is necessary to increase savings, to protect them and, finally, to expand production and employment. Thus, ‘social’ market utility cannot be measured only by the profits of the stock exchange company because there is not necessarily a direct correspondence between cost and (social) revenues, given the ‘social’ service of the market.

Di Noia, *supra* note 31, at 48.

85. See Roberta Romano, *The Need for Competition in International Securities Regulation*, 2 THEORETICAL INQUIRES L. 387, 514–15 (2001) (stating that network effects are not necessarily an externality, but a factor in preventing inefficient networks from being replaced by efficient networks). Thus, although the reference to “network externalities” has become standard, along with the analogous “network effects,” proper usage is to “network effects.” See Katz & Shapiro, *supra* note 81, at 96. See also DICTIONARY OF MODERN ECONOMICS, *supra* note 23, at 146 (discussing use of term “externalities” in economics); Laffont, *supra* note 78, at 264; Liebowitz & Margolis, *supra* note 52, at 671.

86. See Niva Elkin-Koren & Eli M. Salzberger, *Law and Economics in Cyberspace*, 19 NT’L REV. L. & ECON. 553, 563 (1999).

87. See *supra* note 42.

88. Cf. William J. Carney, *Fundamental Corporate Changes, Minority Shareholders, and Business Purposes*, 1980 AM. BAR FOUND. RES. J. 69, 75 (noting that “stock prices send signals about management’s performance to prospective bidders for control as well as to large shareholders who might launch proxy fights”). The difficulties of identifying and quantifying network gains, for purposes of internalization, are further compounded by public goods-style inefficiencies. Existing traders and issuers can be expected to understate any benefit they derive from the public good of a larger network. Given the cross-pollination effects noted above, moreover, improved valuation of any given stock enhances the valuation of other securities, including most immediately those with similar levels of risk. As such, purchasers (and potential purchasers) of a broad array of securities benefit from the arrival of each additional trader and issuer, and the resulting network efficiencies. Efficient internalization of such far-reaching externalities would seem unlikely.

This is not to suggest that compensation of new traders, and hence internalization of network gains, is never possible. Even when it is, however, there are substantial transactions costs to be accounted for. Thus, the internalization costs of positive externalities track those of (more familiar)

explained below, several factors in the nature of securities markets, and especially those in transition, limit the efficacy of property rights, and interests, as a mechanism of efficient internalization.⁸⁹

If network externalities therefore exist in securities markets, what potential inefficiencies may follow from them and suggest some role for law? At least three can be cited: market underutilization, market misidentification, and technological failure.

Most apparent are issues of network underutilization. Network externalities in telephony, which prevent consumers' internalization of the social benefit of their telephone purchases, can be expected to produce a less than optimal number of telephone users.⁹⁰ In securities markets, similarly, fewer traders will come to market than would be socially optimal, as long as the private gain from market participation lags the social gain.⁹¹ Yet successful securities market creation likely requires some critical mass of support and engagement. In developing country transition, if market participation is insufficient, it may be impossible for vigorous securities markets to develop, let alone provide efficient liquidity and price discovery. Securities markets may be weak or may not even appear.⁹²

negative externalities, in which costs are imposed on a disperse group. See Israel Gilead, *Tort Law and Internalization: The Gap Between Private Loss and Social Cost*, 17 INT'L REV. L. & ECON. 589, 602 (1997) (describing difficulty of internalizing positive externalities). Even with environmental regulations, internalization is not impossible; it simply involves massive transactions costs. See Charles J. Walsh & Philip A. Bramson, *ECRA: Triggering the Internalization of the Social Costs of Hazardous Wastes*, 1990 COLUM. BUS. L. REV. 415, 417-20. See also Coase, *supra* note 4, at 19-28 (suggesting that lack of clear entitlements enhance this basic difficulty). Ultimately, whether internalization is ever possible is not the relevant question. The essential point is that where it is not possible, as it likely is not with at least some network externalities in securities markets, market failure may occur. Hence the essential need for empirical evaluation of whether network effects exist in any given case, and how strong they are. See Liebowitz & Margolis, *supra* note 37, at 146.

89. See *infra* notes 264-272 and accompanying text.

90. See Katz & Shapiro, *supra* note 81, at 96 ("the equilibrium network size is smaller than the socially optimal network size, and the perfectly competitive equilibrium is not efficient"). See also *id.* at 100 ("hardware/software networks . . . are susceptible to under-utilization"); Liebowitz & Margolis, *supra* note 52, at 672. As described below, this result may not always be avoided through direct or indirect subsidies paid by network owners or members. See *infra* Part III.C.

91. See Lemley & McGowan, *supra* note 7, at 497 (discussing risk of suboptimal network size arising from inability of users to compensate prospective users for incremental value they add to network). A distinct, but related issue is monopoly pricing in network markets. With network effects, if one network/standard prevails, as would be expected, the resulting monopolist is likely to price access higher than the efficient price that would draw the maximum number of consumers. Such pricing, though not a positive externality, is similar in effect, in that it produces a sub-optimally sized network, accentuating the dead-weight social loss. See Lemley & McGowan, *supra* note 7, at 515-16.

92. See *id.*

Network effects thus may stymie securities market development from the very outset. The initial challenge in Russia and other emerging markets is to determine the place of public securities markets in their economic structure.⁹³ At this preliminary stage, market underutilization may produce an inefficient preference for bank financing arrangements, as it actually has in Russia.⁹⁴ To similar effect, early underutilization may predetermine reliance on offshore equities markets, even in those nations that favor equities markets.⁹⁵

Beyond these initial hurdles, network underutilization can also be expected to influence the choice of an order- or quote-driven system of trade,⁹⁶ and the identification of a cross-market linkage system. In the former case, for example, network-related underutilization may favor the trading model that can best operate with inefficiently diminished trading volumes, regardless of its efficiency otherwise.

93. Specifically, countries must elect to rely on stock markets or bank financing as the primary source of capital for growing companies. See Black, *supra* note 5, at 831 (describing alternative corporate finance arrangements).

94. For the most part, Russian enterprise has looked not to public securities markets but to commercial banking structures for capital financing. See Patricia A. McCoy, *Levers of Law Reform: Public Goods & Russian Banking*, 30 CORNELL INT'L L.J. 45, 79–82 (1997). Given the transitional needs of Russia's corporations and the further need to nurture small enterprises, however, bank financing may be an imperfect alternative. Banks' conservative lending practices and intrusive exercise of control over dependent firms may not induce necessary industrial growth and development. See Jonathan R. Macey & Geoffrey P. Miller, *Corporate Governance and Commercial Banking: A Comparative Examination of Germany, Japan, and the United States*, 48 STAN. L. REV. 73, 96–97 (1995) (challenging efficiency of German and Japanese bank-dominated system). See also J. Robert Brown, Jr., *Of Brokers, Banks and the Case for Regulatory Intervention in the Russian Securities Markets*, 32 STAN. J. INT'L L. 185, 220 (1996) (noting the failings of German and Japanese bank-dominated financing systems and the implications of such a model for Russia). Of course, this view is not uncontested. See, e.g., Mark J. Roe, *Some Differences in Corporate Structure in Germany, Japan, & the United States*, 102 YALE L.J. 1927 (1993). Given the early state of Russian market development, bank financing may enjoy certain advantages. For present purposes, however, it is sufficient to rely on recent empirical evidence correlating capital market development with economic growth rates, see *supra* note 10, to conclude that strong securities markets, whether substitutes or supplements, would further Russia's economic development.

95. Compare Ross P. Buckley, *A Tale of Two Crises: The Search for the Enduring Reforms of the International Financial System*, 6 UCLA J. INT'L L. & FOREIGN AFF. 1, 40 (2001) (describing benefits of local capital markets), with John C. Coffee, Jr., *Racing Toward the Top?: The Impact of Cross-Listings and Stock Market Competition on International Corporate Governance*, 102 COLUM. L. REV. 1757, 1802–03 (2002) (highlighting weaknesses and questionable long-term prospects of transitional stock markets). See also Andrew T. Guzman, *Capital Market Regulation in Developing Countries: A Proposal*, 39 VA. J. INT'L L. 607, 609–11 (1999).

96. See Roberta S. Karmel, *Turning Seats into Shares: Causes & Implications of Demutualization of Stock and Futures Exchanges*, 53 HASTINGS L.J. 367, 371 (2002). See also Reena Aggarwal & James J. Angel, *The Rise and Fall of the Amex Emerging Company Marketplace*, 52 J. FIN. ECON. 257, 271–72 (1999).

Notably, a pattern of network underutilization accurately captures Russia's perennially fragmented and undersized securities markets, which have generally fallen far short of Russia's capital needs.⁹⁷ Even at its peak, capitalization of the major Russian securities market amounted to only \$130 billion.⁹⁸ While they have persisted, Russian securities markets have remained tiny.⁹⁹ Instead, corporate financing has been provided through the inefficient universal banking arrangements of Russia's Financial-Industrial Groups ("FIG").¹⁰⁰

The second potential consequence of network externalities in securities markets is that traders and issuers may end up on the wrong market. In essence, because of the failure to fully compensate new traders for the social utility they create, traders may not be efficiently induced to join the market that will produce the highest social gain. Instead, another potential market, though producing diminished public utility, may provide greater individual utility, whether in the form of side payments or otherwise. In this scenario, traders, and issuers as well, may wind up on pareto suboptimal markets.

In Russia, during the explosive establishment of equities exchanges in the early 1990s¹⁰¹—most of miniscule proportions¹⁰² and trading only in

97. See Andrei A. Baev, *Implications of Emerging Legal Structures for Capital Markets in Russia*, 2 STAN. J.L. BUS. & FIN. 211, 216–17 (1996) (discussing problems in Russia's emerging capital markets); Brown, *supra* note 94, at 185 (stating that "[a] plethora of banks, brokers, and stock exchanges sprang to life, most of which were undercapitalized, disorganized, and poorly policed" immediately after privatization occurred in Russia). Cf. Frances H. Foster, *Restitution of Expropriated Property: Post-Soviet Lessons for Cuba*, 34 COLUM. J. TRANSNAT'L L. 621, 648 (1996) (noting Baltic states' scarce capital reserves and limited access to world markets).

98. See Fox & Heller, *supra* note 26, at 1721 (noting that peak capitalization of Russian markets before 1998 collapse amounted to only \$130 billion for 200 largest companies—less than that of Intel at the time).

99. See TIMOTHY J. YEAGER, INSTITUTIONS, TRANSITION ECONOMIES, AND ECONOMIC DEVELOPMENT 83 (1999) ("Thus far stock markets in transition economies are small and illiquid. The Czech Republic has the largest exchange relative to the size of its economy, but the turnover tends to be low.").

100. See Voigt & Engerer, *supra* note 77, at 164 (characterizing FIGs as formal networks); McCoy, *supra* note 94, at 79–82 (noting that corporate financing has been largely supplied by Russian banking industry).

101. See Brown, *supra* note 94, at 185; Karen Halverson, *Resolving Economic Disputes in Russia's Market Economy*, 18 MICH. J. INT'L L. 59, 87 n.135 (1996) (noting that there were as many as 1,000 exchanges before contraction and specialization) (citing *Russia: Milestones on the Capitalist Road*, EUROMONEY, July 19, 1994, at 34).

102. See J. Robert Brown, Jr., *Order from Disorder: The Development of the Russian Securities Markets*, 15 U. PA. J. INT'L BUS. L. 509, 536 (1995) (noting lack of appreciable trading on exchanges).

privatization vouchers¹⁰³—some hint of this pattern could be observed. A handful of private exchanges, owned by well-financed entrepreneurs, offered cash and other incentives to attract listings, traders, and investors. As suggested by their rapid rise and fall,¹⁰⁴ however, there is little reason to believe that these markets were socially optimal choices, or even minimally efficient.¹⁰⁵

More generally, the network-related risk of wrong markets has the potential to lead Russia and other transitional markets to an erroneous choice of market type, selecting either an order- or quote-driven, and a floor-based or electronic trading mechanism, where the alternative might be preferable.¹⁰⁶ The early tendency toward fragmented floor-based trading in Russia may be suggestive in this regard.¹⁰⁷

A final by-product of network externalities in securities markets and attendant size effects is technologically deficient markets. Thus, inadequate market participation may reduce technological sophistication, essentially placing the most efficient technologies out of reach. Again, Russian markets are suggestive with reference to the choice of floor-based versus electronic trading, and the effective linkage of independent trading sites. Until regulators' imprimatur of the electronic trading mechanism of the Russian Trading System ("RTS"), as described below, Russia's equities exchanges proved unwilling to invest any significant funds in necessary, but costly, computerized trading and linkage technology. Rather, they chose to operate as fragmented appendages of existing commodities exchanges.¹⁰⁸ Even the RTS was technologically limited in the period immediately following its creation. It was only with the provision of U.S.

103. See Anthony V. Raftopol, *Russian Roulette: A Theoretical Analysis of Voucher Privatization in Russia*, 11 B.U. INT'L L.J. 435, 455–56 (1993) (describing trade of privatization vouchers on Russian markets beginning in November 1992).

104. See Halverson, *supra* note 101, at 87 n.135 (describing contraction in number of exchanges).

105. Cf. Brown, *supra* note 102, at 549 (noting that loose licensing requirements led to as many as 120 national stock exchanges).

106. See Aggarwal & Angel, *supra* note 96, at 272 (suggesting smaller firms would prefer a dealer market); Craig Pirrong, *Market Liquidity and Depth on Computerized and Open Outcry Trading Systems: A Comparison of DTB and LIFFE Bund Contracts*, 16 J. FUTURES Mkts. 519, 531–41 (1996) (finding greater liquidity and depth on computerized trading system, even with less trading volume).

107. Russia's still strong tendency toward bank financing, over public securities markets, might also be understood as a 'wrong market' issue of sorts. See *supra* note 100.

108. See Halverson, *supra* note 101, at 87–88 (describing development of Russia's exchanges, beginning in 1990 with the Moscow Commodities Exchange). Cf. Brown, *supra* note 102, at 535–36 (noting that most trades were not made in centralized markets but in over-the-counter markets). Such arrangements might not, in any given situation, be inefficient. In this case, however, they were part of a pattern of unwillingness to invest in structural improvements.

technical assistance funds that RTS trading screens came to be widely disseminated, and the system made operational.¹⁰⁹

Even more important than their consequences for such initial technology choice, network externalities may limit the willingness of network owners to maintain, let alone upgrade, market infrastructure, as some have observed in the United States.¹¹⁰ This is most immediately a question of adequate size. Again, a certain critical mass may be necessary to finance maintenance and improvement of market technologies. In addition, however, if multiple owners exercise dominion over segments of the entire network (or market), each owner's inability to reap the full social gain of their innovations will limit their willingness to finance them, and they will be underproduced.¹¹¹ Consequently, centralized ownership or control, or at least centralized coordination, may be necessary.¹¹²

Both the size and ownership dimensions of such network-driven resistance to infrastructure maintenance and development can also be expected to shape the emergence of a network-efficient linkage among trading sites. Given the substantial costs of such technology, relatively high, if not universal, participation is likely to be essential to its emergence. By the same token, substantial positive externalities running to co-owners of the components of any network linkage will likely overwhelm any incentive that might otherwise favor investment in such linkages.¹¹³

109. Cf. Mikhail Ratinov, *Investing in Russian Securities: Analysis of Capital Market Development*, 21 *FORDHAM INT'L L.J.* 1772, 1790 (1998) (describing sluggish development of Russian market, despite inflow of technical assistance funds).

110. See Morris Mendelson & Junius W. Peake, *Intermediaries or Investors: Whose Market is it Anyway?*, 19 *J. CORP. L.* 443, 447 (1994). Cf. Gerald T. Nowak, Note, *A Failure of Communication: An Argument for the Closing of the NYSE Floor*, 26 *MICH. J.L. REFORM* 485, 524 n.192 (1993) (noting that NYSE might become a museum of bygone technology, while other exchanges, such as Tokyo, London, and Toronto, dominate international securities trading). The transitional inefficiencies attendant to network externalities are not, as this example makes clear, unique to emerging markets. They may similarly interfere with securities market innovation in developed economies. Cf. Klausner, *supra* note 38, at 850 n.283 (noting that Delaware, with its strong lead in corporate chartering, "has often responded to other states' innovations, [but] has generally not been an innovator"). The ill consequences of network externalities in established securities markets may, in fact, be greater than in emerging markets. New market mechanisms may require even greater market support and engagement in established markets if they are to effectively compete with long-standing arrangements, which, however inefficient they may be, are familiar and reliable.

111. See Frischmann, *supra* note 39, at 34 (discussing reluctance of private investors to sink high fixed costs unless beneficiaries contribute to cost recovery).

112. See Lemley & McGowan, *supra* note 7, at 560 (noting potential need for centralized ownership or coordination).

113. The impact of network externalities in any given case may well be small. Cumulatively, however, the inefficiencies that result have the potential to substantially reduce net social welfare, see

B. TIPPING EFFECTS

A further set of network implications for securities market transition can be grouped under the heading of “tipping effects.”¹¹⁴ Arising from the winner-take-all character of network competition,¹¹⁵ the latter are likely to be of greater ultimate consequence for market creation than the size effects described above.¹¹⁶ Tipping thus creates the peculiar paradox of network industries, in which standardization is at once efficient, but resisted.¹¹⁷

Because of the countervailing implications of market tipping in network industries, strong markets may fail to emerge, at least in a timely fashion, absent some function of law.¹¹⁸ From the outset, thus, domestic

Katz & Shapiro, *supra* note 81, at 96, and to delay or prevent efficient market creation and restructuring.

114. See Lemley & McGowan, *supra* note 7, at 496–97. Besen and Farrell characterize network markets as “tippy,” such that “the coexistence of incompatible products may be unstable, with a single winning standard dominating the market.” Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, J. ECON. PERSP., Spr. 1994, at 117, 118. See also Katz & Shapiro, *supra* note 81, at 105–06 (“Because of the strong positive-feedback elements, systems markets are especially prone to ‘tipping,’ which is the tendency of one system to pull away from its rivals in popularity once it has gained an initial edge.”). Economides refers to this as the self-reinforcing nature of networks. See, e.g., Economides, *supra* note 30, at 92.

115. See Shelanski & Sidak, *supra* note 7, at 5. See also Di Noia, *supra* note 31, at 42 (“When exchanges are not interconnected (the incompatible case), only pure-corner solutions in equilibrium may arise, with only one exchange surviving.”); Economides, *The Impact of the Internet*, *supra* note 33, at 10.

116. See Liebowitz & Margolis, *supra* note 52, at 672 (“Concern about marginal adjustment of the level of network activity has not been the primary focus of network externality modeling; it has focused, instead, primarily on selection among competing networks.”). Liebowitz and Margolis, however, argue that size effects are the only important network effects. See *id.*

117. See Lemley & McGowan, *supra* note 7, at 506, 510 (highlighting benefits of standardization in network industry). But see Domowitz, *supra* note 33, at 164 (“The result is that the market as a whole is biased against standardization in the presence of competing exchange services technologies.”). As described above, network effects in securities markets arise from the efficiency gains produced by new participants, and the corresponding inefficiency attendant to fragmented markets. Again, telephone networks are instructive: All users should likely be on a single network; at a minimum, they should converge to a limited number of large networks. Network effects hence encourage interoperability, whether by means of standardization or compatibility. See Katz & Shapiro, *supra* note 81, at 105 (“In markets with network effects, there is [a] natural tendency toward de facto standardization, which means everyone using the same system.”).

118. See Katz & Shapiro, *supra* note 81, at 94 (discussing importance of coordination in network industries). Debt securities are less commonly traded than equities, provide a consistent and reliable cash flow, and have a maturity date on which they are subject to redemption. Given these features, they can be expected to enjoy more limited liquidity value, see John C. Coffee, Jr. & William A. Klein, *Bondholder Coercion: The Problem of Constrained Choice in Debt Tender Offers and Recapitalizations*, 58 U. CHI. L. REV. 1207, 1217 (1991), and greater consumption value—in network terms, the ratio of network to inherent value of bonds is likely to be lower than that of stocks. Consequently, network effects in bonds are likely to be weaker, reducing resistance to entry and permitting debt markets to emerge more readily. Evidence to this effect may be suggested by the

public securities markets may prove unable to establish themselves, given strong banks on the one hand, and attractive offshore capital markets on the other.¹¹⁹ Tipping effects are likely to have even clearer implications, however, for the intertwined choices of a quote- or order-driven trading model and a floor-based or electronic trading system.¹²⁰ Most dramatic, finally, may be the tipping effect implications for emerging markets' choice of a particular (and singular) trading linkage system. Captured by economists as issues of "expectations, coordination, and compatibility,"¹²¹ tipping effects' implications for these several choices are central to network effects' legal implications for securities market transition.

1. Tipping as a Barrier to Entry in Market Transition

One can begin to appreciate the phenomenon of market tipping by considering how a trade linkage system designed to capture the network efficiencies of market consolidation—through intermarket communication—might actually develop.¹²² In essence, one would expect competitors to emerge with alternative communications systems directed to the information sharing and trading needs of an interlinked market. In ordinary market competition, market share would ultimately be distributed among such competitors, such that even the least successful could recoup their sunk costs.¹²³ In the presence of network effects, however, the winner takes all.¹²⁴ The sponsor of the prevailing standard secures not only the

tendency of debt markets to appear more quickly than equities markets in emerging economies, including Russia. *See* Yeager, *supra* note 99, at 83.

119. *See* Coffee, *supra* note 95, at 1802–03.

120. This choice, it bears noting, may potentially have significant welfare implications, if a dealer versus an auction market, for example, would be pareto optimal, either generally or in a particular case. *See* Borrelli, *supra* note 10, at 895–97. *See also* Aggarwal & Angel, *supra* note 96, at 272; Pirrong, *supra* note 106, at 541.

121. *See* Katz & Shapiro, *supra* note 81, at 95. *See also* Di Noia, *supra* note 31, at 52 ("Thus, the essential relationship between the components of a network are complementarity, compatibility, and coordination.").

122. Characterizing the mechanisms by which information is collected and disseminated as value-added networks, Heal suggests that they themselves exhibit a "critical mass" phenomenon (i.e., network effects). *See* Geoffrey Heal, *Price and Market Share Dynamics in Network Industries*, in *MARKETS, INFORMATION, AND UNCERTAINTY*, *supra* note 1, at 191. In reality, however, it is the underlying market that is network driven.

123. *See* William J. Baumol, Janusz A. Ordover & Robert D. Willig, *Parity Pricing and Its Critics: A Necessary Condition for Efficiency in the Provision of Bottleneck Services to Competitors*, 14 *YALE J. ON REG.* 145, 160 (1997) (noting that in competitive market, forces of competition will lead to price that returns to each firm cost incurred in supplying product and return to investors on outlay).

124. "[S]ince systems competition is prone to tipping, there are likely to be strong winners and strong losers under incompatibility." Katz & Shapiro, *supra* note 81, at 111. *See* Jonathan B. Baker, *Promoting Innovation Competition Through the Aspen/Kodak Rule*, 7 *GEO. MASON L. REV.* 495, 497

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and Solutions, FUTURES, Sept. 1998, at 82; *Finance and Economics: LIFFE Alone*, ECONOMIST, July 25, 1998, at 70. *See also* Pirrong, *supra* note 106, at 531–41 (describing slightly superior liquidity and depth of smaller DTB market in early 1990s, before market share tipped from LIFFE to DTB).

This can be seen in the network competition between VHS and Betamax standards.¹²⁹ Faced with some pattern of shift toward VHS, increasing numbers of consumers selected VHS. Rather than some division of market share among them, consequently, the conclusion of the network competition in VCR formats was the disappearance of Betamax from the market.¹³⁰ The Bell Telephone monopoly similarly emerged as the winner of a network competition among alternative systems, the balance of which have been lost to history.¹³¹ Perhaps most relevant to the potential for tipping in emerging securities markets, however, is eBay's near complete dominance of the Internet auction market. In that case, Internet shoppers have dramatically exhibited the network tendency to go where everyone else is going, producing eBay's dominant market share.

While not unexpected in the face of natural monopoly-like network effects,¹³² this tendency has the potential to retard market development. Most importantly, it may deter competitive entry. This arises from potential expectations failures.¹³³

Issues of expectations are important in every market, but are especially so in network industries.¹³⁴ For the reasons noted above, the expectations of network market participants (or potential market participants, in emerging markets) regarding the future size of any given

129. See Geier, *supra* note 128, at 297 ("Strong economies of scale and network effects lead to markets dominated by one firm."). Cf. Di Noia, *supra* note 31, at 46 (arguing that only one exchange, and not necessarily the most efficient one, is likely to survive).

130. See Michael A. Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. PA. L. REV. 761, 823 n.271 (2002) (noting Betamax's loss to VHS). See also James Boyle, *Intellectual Property Policy Online: A Young Person's Guide*, 10 HARV. J.L. & TECH. 47, 50 (1996) (arguing that market may tip in favor of one standard, such as VHS, and against another, such as Betamax).

131. Cf. Bruce Abramson, *Promoting Innovation in the Software Industry: A First Principles Approach to Intellectual Property Reform*, 8 B.U. J. SCI. & TECH. L. 75, 141 (2002) ("The network nature of the platform market suggests that this situation is unstable. Eventually, users would tip the market towards one platform that would become a *de facto* standard.") (emphasis in original); *id.* at 141 n.255 ("Tipping to a standard was inevitable.").

132. While potentially producing similar results as network effects, natural monopolies are a fundamentally different, and much better understood, economic phenomenon. Both will often arise from scale economies. In the case of natural monopolies of scale (as distinct from those arising from inelastic demand, coupled with high barriers to entry), the relevant scale economy is supply-side: "[M]arginal and average costs of production decline throughout the demand curve." Lemley & McGowan, *supra* note 7, at 484. With network effects, on the other hand, the demand curve is shaped by increasing demand. See *id.*

133. See Pirrong, *supra* note 34, at 155 n.24 (describing network barriers to entry by traders).

134. See Katz & Shapiro, *supra* note 81, at 93-94; Ribstein & Kobayashi, *supra* note 38, at 112 ("In general, entrepreneurs can help shape users' expectations by convincing potential users that a new form is likely to become a standard. These expectations, in turn, determine whether users will adopt or shun a new form."). See also Clayton P. Gillette, *Lock-In Effects in Law and Norms*, 78 B.U. L. REV. 813, 818-19 (1998); Warner, *supra* note 46, at 132-35.

network are crucial.¹³⁵ Given a likely winner-take-all outcome, each present or potential consumer/adopter must develop accurate expectations as to the ‘right’ market—the one that will win any network competition—as this will determine whether he or she ends up in the market or excluded from it.

The array of market actors in Russia, for example, from existing and potential market sponsors and issuers, to individual market professionals and investors, must develop expectations, at the outset, as to whether strong public markets will even appear in Russia, or alternative arrangements (e.g., bank financing) will suffice.¹³⁶ Further, they must predict whether Russia will maintain its orientation toward a continental, order-driven electronic trading model,¹³⁷ or fall back on the traditional exchange auctions of the early days of its transition. Finally, they must adopt expectations as to the fashion in which Russian securities markets are likely to be linked into a common market, if they are to efficiently and effectively participate in that market.

Such expectations are hard to develop, however, and prone to error. Consequently, commitment of the initial investment to develop a new *network*—whatever it might be—becomes a far more risky venture than ordinary market entry.¹³⁸ In this circumstance, even a far clearer and less costly network technology (for example, a new telephone technology) might go unintroduced, on account of the tipping effect risk that it might not prevail.¹³⁹

This may be easiest to visualize in the standards context, where network analysis is quite often brought to bear. Ordinarily, the emergence

135. See Christopher S. Yoo, *Vertical Integration and Media Regulation in the New Economy*, 19 YALE J. ON REG. 171, 280 (2002) (“People concerned about lock-in will focus on the size of the network that will exist in the future, not the size of the one that exists today.”). See also Klausner, *supra* note 38, at 779–80 (describing benefits that can accrue from future adoption of similar terms in contracts). “When the good is durable, an individual’s consumption benefits will depend on the future size of the relevant network. Consumers will base their purchase decisions on *expected* network sizes.” Katz & Shapiro, *supra* note 38, at 426 (emphasis in original). See Domowitz, *supra* note 33, at 164 (“Nascent mergers under the electronic umbrella will encourage traders to expect electronic market structure to be dominant in the provision of exchange services. If traders expect this outcome, it will indeed occur through individual adoption decisions.”).

136. See Black, *supra* note 5, at 832–34 (describing advantages of public securities markets over bank financing). See also Buckley, *supra* note 95, at 40.

137. See Poser, *supra* note 21, at 523.

138. See Katz & Shapiro, *supra* note 81, at 102 (citing “‘chicken and egg’ problem in launching a new communications network”).

139. See Lemley & McGowan, *supra* note 7, at 503–04 (describing tipping effect barriers to entry in network industries). See also Heal, *supra* note 122, at 213 (“The industry either takes off, and is likely to be monopolized, or does not grow at all.”).

of a single, universal standard is most efficient and sustainable, given the network-style compatibility gains that result. Given as much, however, one may observe a rational hesitancy to enter and incur the costs of developing, or possibly commercializing, a potential standard, for fear it will not be the *one* to prevail.¹⁴⁰ In microeconomic terms, thus, tipping effects may produce multiple fulfilled expectations equilibria, including the inefficient prospect of no entry.¹⁴¹

A prominent example of network effect barriers to entry in the standards context is the continued absence of high-definition television (“HDTV”) from the commercial marketplace, notwithstanding its technical availability for more than a decade.¹⁴² For the moment, potential producers in Europe, Japan, and the United States continue to maintain distinct technological standards.¹⁴³ In this situation, the risk of market tipping to a competing standard remains substantial, and candidates to produce and distribute the necessary hardware and software (i.e., programming) for

140. See Douglas D. Leeds, *Raising the Standard: Antitrust Scrutiny of Standard-Setting Consortia in High Technology Industries*, 7 *FORDHAM INTELL. PROP. MEDIA & ENT. L.J.* 641, 648 (1997) (“If the network externalities are strong, the consumer may choose to forego adopting the new standard despite the new innovation. Recognizing this, firms would be less likely to invest in innovation.”). An intertwined phenomenon involves the creation of the compatible products necessary to support any given standard. Thus, the success of an HDTV standard depends upon the willingness of independent production companies to produce compatible programs. See Katz & Shapiro, *supra* note 81, at 94 (“A firm contemplating whether to develop and release a new architecture of microprocessor, for example, must know whether software will be provided to work on the new microprocessor.”).

141. Economides has observed that:

In fact, it is not difficult to show that *any size of participation is an equilibrium, including zero participation*. If everyone expected no one else to participate in the call, he would not participate himself, and the market would not exist. Given the wide multiplicity of expectations equilibria, it is clear that *there is a need to create a specific mechanism that can support a single equilibrium of large participation*.

Economides, *supra* note 24, at 92–93 (emphasis in original). See Katz & Shapiro, *supra* note 81, at 96–97. Cf. Di Noia, *supra* note 31, at 53 (“network externalities can lead to inefficient equilibria”). Coulson, Liang, and Wang point to an analogous pattern in labor markets. See N. Edward Coulson, Derek Liang & Ping Wang, *Spatial Mismatch in Search Equilibrium*, 19 *J. LABOR ECON.* 949, 968 (2001) (noting that network externalities in labor markets permit multiple stable equilibria, including an “equilibrium trap” of high unemployment).

142. See generally Joy R. Butler, *HDTV Demystified: History, Regulatory Options, & the Role of Telephone Companies*, 6 *HARV. J.L. & TECH.* 155 (1992) (describing HDTV and its technological underpinnings). The network character of HDTV is readily apparent. As with personal computer operating systems, the scope of available ‘software’ here, programming—as well as support services, is essential to the utility, or even use, of HDTV hardware. In such circumstances, the arrival of additional users of the technology can be expected to enhance the value of the network, and hence the network hardware, to earlier purchasers—a standard network effect.

143. See *id.* at 158–64 (noting development of different HDTV standards in Europe, Japan, and United States).

HDTV are rationally hesitant to undertake the substantial costs of entry.¹⁴⁴ Some regulatory role in shaping a standard, as described in the following section, may therefore be essential to the widespread commercialization of HDTV technology.¹⁴⁵

In networked securities markets, therefore, where tipping means that slight advantages will translate into “increasing volume inequality among financial exchanges,”¹⁴⁶ no potential sponsor may be willing to incur the substantial costs of developing the infrastructure of a new trading network, for fear that its network may not win the ensuing standards competition.¹⁴⁷ In some industries, such a network barrier to entry might have limited consequences. Where entry costs are substantial and variable costs limited, however, as in securities market infrastructure, network effects may be a major obstacle to market entry.¹⁴⁸

144. See *id.* at 162 (highlighting risks and costs associated with development and marketing of HDTV as discouraging individual companies from allocating significant resources towards its development). See also Susan R. Athari, *High Definition Television: A New Breed of Television Enters the Regulatory Jungle*, 1 *COMMLAW CONCEPTUS* 87, 90, 94, 97 (1993) (noting both producer and consumer reticence to invest in HDTV technologies absent clearer indication of future demand). Cf. Butler, *supra* note 142, at 162 (noting that American antitrust laws prevent companies from sharing risks and costs of development of HDTV); Joseph Farrell & Carl Shapiro, *Standard Setting in High-Definition Television*, in *BROOKINGS PAPERS ON ECONOMIC ACTIVITY* 1, 26–27 (William C. Brainard & George L. Perry eds., 1992).

145. See MICHEL DUPAGNE & PETER B. SEEL, *HIGH-DEFINITION TELEVISION: A GLOBAL PERSPECTIVE* 3–4 (1998). Law’s domain in HDTV may even be international in scope, given the need for coordination not only within, but among, states. See *id.*

146. Economides, *Impact of the Internet*, *supra* note 33, at 10. See Di Noia, *supra* note 31, at 54–55 (noting tipping-style “exponential growth” in trading system membership and “tendency for order

147. See Di Noia, *supra* note 31, at 56 (reasoning that “the sunk costs of the in-place investment force exchanges to keep their technology”). See also Economides & Siow, *supra* note 32, at 109 (“On the other hand, liquidity is self-reinforcing. Given an existing market structure, new markets may find it impossible to open because nobody wants to use a new market with low liquidity. There may be fewer markets than is necessary for efficiency, and yet new markets will not open.”); *id.* at 111 (“There are many equilibria in this game, including quite unreasonable ones. For example, there is an equilibrium in which everybody stays home because everyone expects all others to stay home.”). Conversely, tipping effects and the resulting potential for monopoly rents may produce just the opposite result, excess entry, characterized by some as “insufficient friction.” See Michael L. Katz & Carl Shapiro, *Product Introduction with Network Externalities*, *J. INDUS. ECON.*, Mar. 1992, at 55, 73. See also *infra* Part II.B.2. In essence, network industries may exhibit a bias toward new technologies, even where stranding of certain consumers produces a net social loss. See Katz & Shapiro, *supra*, at 73. Oddly enough, then, size and tipping effects in network industries may produce a wide range of potential inefficiencies, from no entry, to insufficient entry, to excess entry.

148. See Heal, *supra* note 122, at 192 (discussing importance of attracting “critical mass” in networks characterized by large fixed costs and low variable costs).

[E]ven restricting attention to rational expectations equilibrium—which may strike many people as already placing unjustified faith in the computational ability of consumers—still allows multiple equilibria to occur. Sticking with the example of fax machine, clearly no consumer would value owning the only fax machine in existence. If each consumer supposed

This can be readily appreciated with reference to the network market need to construct an effective communications linkage among competing trading sites. Such a system, with its requirements of real time posting, multiple relaying of trades, and extended reach, will necessarily involve substantial sunk costs. With tipping effects, however, such costs may not be subject to recovery, if a competing system (or standard) is ultimately favored.

In Russia, to this effect, notwithstanding the existence of any number of small- to medium-sized exchanges and a large number of brokers,¹⁴⁹ none proved willing to take the initiative to develop a national—or even moderately efficient—trading system in the early 1990s.¹⁵⁰ This was the case notwithstanding quickly growing demand for capital and an essentially open regulatory and competitive field. Not until the Federal Commission on Securities Markets (“FCSM”), at the prompting of U.S.A.I.D. advisors, brought together a handful of Russia’s more established and trusted brokers to form the self-regulatory organization NAUFOR was the process of creating a common market structure set in motion.¹⁵¹ Until that time, market participants faced substantial risks that no public securities markets of any substance would emerge, and that even if they did, they might not be compatible with their chosen trading model (for example, order- versus quote-driven, and/or floor-based versus electronic).¹⁵²

that no other consumer purchases a fax machine, then no one will purchase it, and there is a fulfilled expectations equilibrium with no sales.

Katz & Shapiro, *supra* note 81, at 97. *See also* Liebowitz & Margolis, *supra* note 37, at 144 (“The representative network effects problem is this: Some action would be socially wealth increasing if enough people joined in, but each agent finds that independent action is unattractive.”). It bears emphasizing that network markets will not invariably tip, but *may* do so, depending on an array of factors, including the balance of network and inherent value in the given industry, and the resulting capacity of competitors to tweak inherent value to maintain market share. For similar reasons, network barriers to entry are simply *possible* welfare deficiencies in network industries, which may not arise in many cases, if not most.

149. *See* Brown, *supra* note 94, at 185 (stating that privatization in Russia immediately caused “plethora of banks, brokers, and stock exchanges [to spring] to life, most of which were undercapitalized, disorganized, and poorly policed”).

150. *See* TIMOTHY FRYE, *BROKERS AND BUREAUCRATS: BUILDING MARKET INSTITUTIONS IN RUSSIA* 48 (2000).

151. *Cf.* FRYE, *supra* note 150, at 127. *See generally* Jacques de Lisle, *Lex Americana?: United States Legal Assistance, American Legal Models, and Legal Change in the Post-Communist World and Beyond*, 20 U. PA. J. INT’L ECON. L. 179, 233 (1999) (describing U.S.A.I.D.’s role in establishment of stock exchanges, securities and exchange commissions, and clearance and settlement organizations).

152. *See* Poser, *supra* note 21, at 523 (noting problematic incompatibility of quote-driven NASDAQ system with most European trading systems). It bears noting that even exchanges and alternative trading systems not seeking to fill a network sponsorship role in the market face tipping effect barriers to entry. Every trading system must make the difficult choice of which particular trading network to link to, given the prospect that only one will come to dominate the market, if not survive.

What progress has been made in Russian equities markets has thus arisen from the government's facilitation of NAUFOR's creation of the Russian Trading System ("RTS"). First coordinating the establishment of NAUFOR, and then assisting in the development and implementation of the RTS,¹⁵³ the government essentially gave its imprimatur to NAUFOR and the RTS, and thereby 'tipped' the market. In this way, it obviated some part of the resistance to entry based on unresolved questions concerning whether public securities markets would play any significant role in the Russian economy, whether exchanges or electronic markets would come to dominate, and how traders across Russia would be effectively linked. Given market tipping, finally, it should come as no surprise that RTS and its offshoots (including RTS-2) have since come to dominate equities trading in Russia.¹⁵⁴

Furthermore, the same reticence to enter applies to traders, issuers, and the secondary service providers that facilitate the securities markets' operation. "If the benefit of others' participation in the market is gained only *after* these entries, then there could be an incentive for firms and intermediaries not to enter and wait until the exchange grows to the point that their utility reach[es] a certain level." Di Noia, *supra* note 31, at 55 n.44 (emphasis in original). *See also id.* at 55 (noting that "liquidity attracts

Thus, assuming costs attendant to any decision by traders, issuers, and others to enter; concomitant costs of exit (including development of expertise, nurturing of contacts, and choice of location and equipment); and an inability to participate in multiple networks (that is, exclusivity), *see* Lemley & McGowan, *supra* note 7, at 599 (noting importance of exclusivity in producing network inefficiencies), which can functionally be assumed, to at least some degree, even in the case of traders, who commonly direct their transactions to a single or small handful of potentially-available trading sites (as with consumers of VCR's and computers, thus, traders could use multiple systems, but ordinarily do not), these parties may also sit back and await the outcome of any inter-network competition. *See* Katz & Shapiro, *supra* note 81, at 94.

To this effect, notwithstanding a fair amount of trading activity in Russia in the early 1990s, the professional standards of Russia's brokers and dealers remained low. *Cf.* Dimitri V. Ponomarev, *Self-Regulation of the Securities Market in Russia*, in INVESTING IN RUSSIA'S SECURITIES MARKET: AN INDEPENDENT ASSESSMENT OF THE STATE OF PLAY 50-51 (1996) [hereinafter RUSSIA'S SECURITIES MARKET] (noting broker-dealers' "refusal to enter organizations in late 1994 and early 1995," "followed by a complete, if temporary, assimilation" in 1995 and 1996). Potential market participants may simply have been unwilling to commit the necessary resources to develop specialized skills, absent greater clarity on the ultimate form of the market. Once NAUFOR was tapped as the major self-regulatory organization on Russia's equities markets, thus, the professionalism of brokers and dealers began to improve. *See* FRYE, *supra* note 150, at 127-29. To similar effect, one might note Russian corporate issuers' tendency to seek bank financing, or issue debt securities, rather than undertake to designate a single listing site (and hence network), with its attendant risks.

153. *See* Natalia Gurushina, *Regulating the Nascent Security Markets*, 2 TRANSITION 34, 34 (Oct. 4, 1996) (describing RTS as "NASDAQ-type computer network set up by the Federal Commission on Securities and the Capital Market").

154. *See* FRYE, *supra* note 150, at 132 (reasoning that "[a]bout one-half of all trades are formally conducted through the RTS, but brokers note that price and counterparty information obtained through the RTS is responsible for almost all trades"); Greg Lumelsky, *Does Russia Need a Securities Law?* 18 N.W. J. INT'L L. & BUS. 111, 152-54 (1997) (describing interrelated role of RTS and RTS-2 in Russian equities trading). While emerging markets are emphasized herein, it should again be noted that even in

2. Excess Entry and Inefficient Network Competition

Tipping effects in network markets may also have other problematic implications for securities market transition. Even if potential network sponsors can be convinced to enter, and to compete actively to establish a securities market trading network, the resulting competition will be, in some respects, inefficient.¹⁵⁵ To begin with, network industries may exhibit “insufficient friction,” causing more competitors to enter than the market can bear.¹⁵⁶ Additionally, first-order standards competition (i.e., competition to define the prevailing network) will often prove economically wasteful, as compared with second-order, intrastandard competition.¹⁵⁷

Where excess returns are expected, as in winner-take-all network competition, a competitive “fight” can be expected, which “fighting [will] thus encourage predatory practices and penetration pricing, among other costly attempts to undermine competing products.¹⁵⁸ In the presence of

developed countries, new market mechanisms may not emerge in the face of network effect barriers to entry. On this count, the U.S. Securities and Exchange Commission’s drive to create a National Market System, based on the failure of U.S. markets to develop and adopt network communications systems that would allow broader collection and dissemination of trading information, might be highlighted. *See infra* note 193. Given the regulatory complexity of the National Market System, moreover, it might even be concluded that network-driven market tipping is an even higher barrier to market restructuring than market creation, given the greater network lock-in enjoyed by existing systems.

155. *See* Joseph F. Brodley & Ching-to Albert Ma, *Contract Penalties, Monopolizing Strategies, and Antitrust Policy*, 45 STAN. L. REV. 1161, 1173 (1993) (“If two or more equally efficient entrants enter the market simultaneously, it appears that the entrants will earn no economic profit because competition between the entrants will lower price to the entrants’ marginal cost.”); Katz & Shapiro, *supra* note 81, at 107 (describing “especially intense” competition in network industries until a clear winner is determined).

156. *See supra* note 147.

157. *See* Lemley & McGowan, *supra* note 7, at 495 (highlighting potential for inefficient competitive strategies, where firms seek to “establish their own products as standards on which competition in the market, or in after-markets for complementary goods, will be based”: “Because the returns to the standards winner will be higher than in ‘normal’ markets, relatively risky strategies, such as predation or, at a minimum, penetration pricing, might be rational in a networks market.”). *But see* Klock, *supra* note 20, at 773–74.

158. *See* Besen & Farrell, *supra* note 114, at 118 (“The more skewed are the returns, the harder the firms will fight; and the sharper the available tactics the more the fighting will dissipate profits.”). Besen and Farrell note, however, that this will not occur in all circumstances. *See id.* at 120–21 (“Price competition is more intense when vendor’s products are compatible.”).

159. *See* Patrick Bolton, Joseph F. Brodley & Michael H. Riordan, *Predatory Pricing: Strategic Theory and Legal Policy*, 88 GEO. L.J. 2239, 2241 (2000) (noting that modern economic analysis recognizes that predatory pricing conduct may, in fact, be rational under select circumstances). *But see* Katz & Shapiro, *supra* note 81, at 107 (noting that firm’s “market dominance” does not inherently mean that it is experiencing “super-normal profits” that would render it susceptible to promotional strategies by new entrants).

network effects, such as inefficiently aggressive pricing and similar competitive strategies may be rational, given the supercompetitive returns to be garnered by the victor.¹⁶⁰ Competition among securities market trading networks may therefore be an inefficient use of resources.¹⁶¹ Instead, it would be preferable for such competition to occur in the second-order, with competition over price within the network.¹⁶²

Of course, network competition is not always inefficient. Rather, it may sometimes identify the optimal network in a cost-efficient manner.¹⁶³ At least sometimes in the presence of network effects, however, it may prove gravely inefficient. Until the establishment of the RTS, costly competition among an array of Russian exchanges was the norm. Notwithstanding the stakes, however, this competition did not produce any substantial advances in the market's development. Rather, several years of this pattern came to a close with no dramatic market growth—either by any individual exchange or by the collection of them.¹⁶⁴

Notably, just such concerns with inefficient competition helped motivate the attempt to create a National Market System in the United

160. See Shelanski & Sidak, *supra* note 7, at 10 (network industry participants “are competing not just for market share, but for commercial viability and the market itself”). Notably, similar competitive behavior can be expected in natural monopoly industries. It is for this reason that the selected monopolist is not only heavily regulated, but that entry is restricted.

161. It should be clear that this analysis does not involve a choice between competition or a lack of competition. Rather, it is the nature of what is being competed over that varies. See William McChesney Martin, Jr., *A Report, With Recommendations*, Sec. Reg. & Leg. Rep. (BNA) No.114, at E-1 (August 5, 1971) (“The dispersion of trading from a central auction market is a fragmentation of that market. This fragmentation has been lauded by some who contend that competition between markets is desirable. But for competition to be beneficial, it must exist under similar rules and in the same arena.”).

162. According to Lemley and McGowan,

Significantly, private group standard-setting may also be more efficient than de facto standardization, since having multiple companies participating in a standard means that those companies can compete to offer products incorporating the standard after it is selected, thus expanding output and lowering prices. In Katz and Shapiro's model, group standard-setting trades off first-round competition (to set the de facto standard) to achieve competition within the standard in later periods.

Lemley & McGowan, *supra* note 7, at 517 (citation omitted). See also *id.* at 525–26 (acknowledging argument that reverse engineering designed to encourage standardization should be permitted, in order to promote competition within a standard, rather than over it).

163. See Klock, *supra* note 20, at 771–72 (describing benefits of competition among parallel markets). Furthermore, as with the very existence of tipping effects, the extent of any potential inefficiency will vary depending on the proportion of network to inherent value in the relevant good or service.

164. Such inefficient competition can also be expected, in the ordinary case, between competing floor-based exchanges and electronic trading systems. In that case, in fact, such competition may be particularly sharp, and hence costly.

States.¹⁶⁵ In essence, the notion was to move the equities markets to engage in second-order competition among linked trading systems, based on price and other aspects of individual transactions, rather than first-order competition over which trading system might be the best trading site.¹⁶⁶ Reducing economic waste by eliminating barriers to competition was hence a central theme of the National Market System project.¹⁶⁷

3. First-Mover Advantages, Market Lock-In, and Technological Stagnation

Beyond inefficient standards competition, a final set of potential network inefficiencies in securities market transition arise from tipping effects' tendency to produce problematic first-mover advantages.¹⁶⁸ In essence, because of the importance of network size to the value of any given trading network, the most efficient network may not prevail at the outset, or remain the most efficient, if it does.¹⁶⁹ Instead, an early entrant—or first-mover—by starting to build its network slightly ahead of its competitors, may acquire slight size advantages that tipping effects will quickly translate into predominant market share.¹⁷⁰ The winner may

165. See Joel Seligman, *The Future of the National Market System*, 10 J. CORP. L. 79, 81 (1984). See also *Policy Statement of the Securities and Exchange Commission on the Structure of a Central Market System*, Sec. Reg. & L. Rep. (BNA) No. 196, at D-5 (April 4, 1973) [hereinafter *Structure of a Central Market System*]; *Statement on the Future Structure of the Securities Market*, Sec. Reg. & L. Rep. (BNA) No. 137 at 3 (Feb. 2, 1972) [hereinafter *Structure of the Securities Market*] (suggesting SEC's shift to preference for central market system, over competing but separate markets, "resulted from technological developments which made it possible to tie markets together so that one could foster competition within a central market rather than among separate competing markets").

166. See Donald L. Calvin, *The National Market System: A Successful Adventure in Industry Self Improvement*, 70 VA. L. REV. 785, 810 (1984) ("National market system initiatives during the past nine years have generated more intense competition for public orders, greater cost-effectiveness in the markets, and specific benefits to investors."); Joel Seligman, *Rethinking Securities Markets: The SEC Advisory Committee On Market Information and the Future of the National Market System*, 57 BUS. LAW. 637, 662 (2002). See also *Structure of the Securities Market*, *supra* note 165, at 4.

167. See U.S. Securities & Exchange Commission, *Transmittal Letter—Institutional Investor Study Report*, H.R. DOC. NO. 92-64, PT. 8, at 22 (1971) [hereinafter *Institutional Investor Study Report*] ("The evolution of the securities markets has been, and [may] continue to be, affected and distorted by barriers to competition. Among the most significant of these are minimum commission rates and rules that insulate markets, market makers and broker-dealers from each other."); *Structure of a Central Market System*, *supra* note 165, at D-2 ("Perhaps the most important objective of the system is to foster the development of strong competition among its participants.")

168. See Lemley & McGowan, *supra* note 7, at 495 (noting "possibility of material first-mover advantages"); Shelanski & Sidak, *supra* note 7, at 8-9 (describing consequences of early lead for long-term structure of network markets).

169. See Katz & Shapiro, *supra* note 81, at 94 (noting first-mover advantages arising from sunk costs of particular computer systems). As noted above, this outcome assumes exclusivity (that is, an inability to join multiple networks). See *supra* note 152.

170. Cf. Economides, *supra* note 35, at 694; Katz & Shapiro, *supra* note 85, at 107. See also Brodley & Ma, *supra* note 155, at 1163-64 (noting that new entrants into market often find themselves

achieve market dominance, then, not through the quality or efficiency of its product, but on account of its slight time advantage.¹⁷¹

In securities markets, such patterns have long been recognized. Early emerging exchanges in various financial products are likely to secure a dominant market position, notwithstanding any number of structural, and potentially persistent, inefficiencies.¹⁷² The initial dominance of exchange-based auction trading in Russia, which built on established commodities exchange mechanisms, is illustrative. Notwithstanding various seeming inefficiencies, exchanges remained in the forefront until the government intervened in the formation of the RTS, an unsurprising result, given the first-mover advantages of their early entrance.¹⁷³

This might be of little concern, if such an initial advantage could be easily broken. But tipping effects in network industries produce relatively strong lock-in effects as well.¹⁷⁴ Thus, once a network has secured a dominant or even exclusive position, it may be difficult to break its hold, no matter how inefficient it is.¹⁷⁵ This arises from the unwillingness of

handicapped by their late arrival). By way of example, one might note the decision of Island ECN—motivated by its appreciation of such first-mover advantages—to open its limit order book to the public, in order to increase successively its liquidity and market share, and thereby achieve market dominance. See Economides, *Impact of the Internet*, *supra* note 33, at 10.

171. See Karl Wärneryd, *Network Externality and Convention*, in 2 *DICTIONARY OF ECONOMICS AND THE LAW*, *supra* note 52, at 676 (noting decisive character of initial player's strategy in sequential coordination game). Conversely, however, potential first-mover advantages and tipping-related monopoly rents may also spur competition and industry growth, as some believe has occurred in Silicon Valley. Rather than excess competition, tipping effects may produce heightened (but still efficient) competition. Rather than technological stagnation, as discussed below, first-mover advantages may produce dramatic technological advancement.

172. See *supra* note 110; *infra* note 192. Cf. Paul G. Mahoney, *The Allocation of Government Authority: The Exchange As Regulator*, 83 VA. L. REV. 1453, 1488 (1997) (noting first-mover advantages in securities market trading).

173. On this general pattern in the choice of a floor-based versus electronic trading model, Domowitz has reasoned:

[S]uppose that an electronic exchange is superior to the floor in the long run, once the network gets large. It may, however, take a long time for the network of traders to get established on the new type of exchange. Early electronic traders would pay a disproportionate share of the temporary, but real, costs associated with trading on a system that is not compatible with the floor. If such early adopters are unwilling to do so, floor trading will remain the standard, despite any long-run benefits to be gained from the alternative. This is a likely outcome, given that the floor, where it exists, is often truly predominant, and electronic trading is very unattractive when there are very few traders on the system.

Domowitz, *supra* note 33, at 167.

174. See Di Noia, *supra* note 31, at 43 (“The model shows that network externalities may lock-in exchanges into inefficient outcomes, due to a lack of coordination, even in perfect competition.”); Sean P. Gates, *Standards, Innovation, and Antitrust: Integrating Innovation Concerns into the Analysis of Collaborative Standard Setting*, 47 EMORY L.J. 583, 609–10 (1998); Klausner, *supra* note 38, at 791.

175. See Economides, *supra* note 30, at 93.

market participants to move to a smaller-sized network, even given potential improvements in product quality.¹⁷⁶ Network industries may thus exhibit “excess inertia.”¹⁷⁷ “The network effect makes it possible that, even in case of higher prices in both services, the exchange with the higher price can be chosen.”¹⁷⁸ One consequently observes the path dependent result¹⁷⁹ that early movers may determine the shape of the market long after they have grown inefficient.

For this reason, spontaneous evolution will not necessarily produce efficient markets. With network effects, it is no longer clear that an

Lock-in is particularly important in the presence of market power in sponsored networks. In general, firms may be very reluctant to change their way of operation, especially if they have to pay the costs of transition. The self-reinforcing nature of networks creates switching costs for the existing customers. The existence of positive critical mass often means that in the presence of one network, a differently organized one may not even exist. These facts give market power to firms that sponsor networks, and may impede technological innovation.

Id.

176. See Catherine Fazio & Scott Stern, *Innovation Incentives, Compatibility, and Expropriation as an Antitrust Remedy: The Legacy of the Borland/Ashton-Tate Consent Decree*, 68 ANTITRUST L.J. 45, 52 (2000) (discussing lock-in effects resulting “[w]hen marginal consumers weigh the network externality more heavily than the intrinsic value of each technology”).

[C]onsumers might have difficulty moving to a new standard—even if they all agreed that the adopted standard was suboptimal—because of collective action problems. The value of any alternative system would depend on the number of users adopting it; the rational consumer might well choose to wait until an alternative had been adopted by others who incurred the costs of shifting to the new standard but reaped fewer benefits relative to later adopters.

Lemley & McGowan, *supra* note 7, at 497 (citation omitted). See also Shelanski & Sidak, *supra* note 7, at 5 (“As the benefits offered by one network grow, so too do the costs to consumers of choosing, or

See also Lewis M. Branscomb & Brian Kahin, *Standards Processes and Objectives for the National Information Infrastructure*, in STANDARDS POLICY FOR INFORMATION INFRASTRUCTURE 5–6 (Brian Kahin & Janet Abbate eds., 1995). Pirrong argues that:

Successful entry requires the new [network] to attract a sufficient number of traders from the incumbent *simultaneously*. If this does not occur, the new [network] is very costly to [operate] because it is illiquid. . . . Given the difficulty of coordinating the simultaneous defection of large numbers of traders, it is quite costly for an entrant [network] to survive, even if its terms and . . . policies [are preferable].

Pirrong, *supra* note 34, at 155 (emphasis in original).

177. See James B. Speta, *Handicapping the Race for the Last Mile?: A Critique of Open Access Rules for Broadband Platforms*, 17 YALE J. ON REG. 39, 80 (2000) (describing potential “excess inertia” in network industries). See also Joseph Farrell & Garth Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND J. ECON. 70, 71 (1985) (indicating that “it is plausible that the industry, once firmly bound together by the benefits of compatibility or standardization, will be inclined to move extremely reluctantly to a new and better standard because of the coordination problems involved”). But see Katz & Shapiro, *supra* note 147, at 73 (suggesting potential for “insufficient friction” in some network markets and resulting stranding of earlier purchasers).

178. Di Noia, *supra* note 31, at 61. See Gillette, *supra* note 134, at 818–19 (explaining that transfer to new network would only occur if benefits exceed substantial costs of leaving established network).

179. Note that this is a different type of lock-in than path dependence, as formally defined. Whereas path dependence is grounded in historical patterns, network lock-in is tied to the present state of the market. See Lemley & McGowan, *supra* note 7, at 495.

inefficient exchange will, in fact, lose out.¹⁸⁰ Rather, tipping effects may allow it to gain and maintain a dominant position.¹⁸¹ In network industries, including securities markets, “[i]nefficient institutions that are not conducive to economic growth and development can emerge and survive.”¹⁸² In Russia, thus, commodities exchange-based equities trading persisted past its point of inefficiency on account of strong lock-in effects in the networked securities markets.¹⁸³

Of course, this does not mean that a new network can never displace an established first-mover. If the new technology is sufficiently advantageous, its inherent value can overcome the network effect.¹⁸⁴ In such circumstances, the new technology “leapfrogs” the established one.¹⁸⁵ In the presence of network effects, however, this cannot be assumed, and requires not merely somewhat more advanced or cheaper technology, but a significant technological improvement or cost-savings.¹⁸⁶

If one reasonably expects the inherent characteristics of the network system to weigh more heavily in consumer calculus early on, however,¹⁸⁷ the circumstance in which the prevailing network is inefficient from the

180. See Fischel & Grossman, *supra* note 16, at 292.

181. In corporate law, this pattern has led some to conclude that network lock-in may stymie state charter competition. See Kamar, *supra* note 48, at 1923–24. To similar effect, Michael Klausner, alone and together with Marcel Kahan, has challenged the contractarian paradigm of corporate law, arguing that the selection of corporate contract terms may be substantially influenced by network effects. See Klausner, *supra* note 38, at 759, 761; Kahan & Klausner, *supra* note 52, at 726.

The pattern of first-mover advantage and subsequent lock-in would also appear to characterize the internet auction market, in which network effects are likewise present. Early player eBay has thus emerged with an overwhelming and seemingly quite secure share of its market.

182. Voigt & Engerer, *supra* note 77, at 139. See Shelanski & Sidak, *supra* note 7, at 9 (“The market leaders will set the technological standard . . . even if other technological standards are superior in some economic or engineering sense.”).

183. Arguably, this pattern of lock-in may again be occurring in Russia, as the still imperfect NASDAQ-style RTS faces little competitive pressure on its position of market dominance.

184. See Dwight R. Lee & Richard B. McKenzie, *A Case for Letting a Firm Take Advantage of “Locked-In” Customers*, 52 HASTINGS L.J. 795, 796–98 (2001) (noting that “if the gains from switching are greater than the costs of doing so, incentives exist for entrepreneurs—so-called ‘network sponsors’—to overcome the built-in resistance to change”).

185. See Michael H. Knight & Nicholas A. Widnell, *Dark Clouds in the Distance? Network Effects and the Approaching B2B Storm*, 9 GEO. MASON L. REV. 599, 619 (2001) (describing how Sega gained substantial share from Nintendo through “leapfrog technology”); Lemley & McGowan, *supra* note 7, at 517; Melonie L. McKenzie, *How Should Competing Software Programs Marry? The Antitrust Ramifications of Private Standard-Setting Consortia in the Software Industry*, 52 SYRACUSE L. REV. 139, 155 (2002).

186. See McKenzie, *supra* note 185, at 155. The actual extent of network lock-in has been contested. See Evans & Schmalensee, *supra* note 51, at 37; S.J. Liebowitz & Stephen E. Margolis, *Should Technology Choice Be a Concern for Antitrust Policy?*, 9 HARV. J.L. & TECH. 283, 310–12 (1996). In any given instance, of course, this is necessarily a question for empirical study.

187. Given smaller network size at the outset, this would appear to be a reasonable assumption.

outset may not be the greatest concern. Rather, one would expect the most efficient network to prevail at the outset. There is nothing in the theory of network effects, thus, that suggests that efficient network sponsors cannot win standards competitions.

The greater difficulty, in this view, may be that initially efficient sponsors will grow inefficient through the evolution of technology and other natural patterns. In network industries, ordinary competition cannot be relied upon to ensure efficient levels of innovation, given the size effects described above and the fact that network lock-in will necessarily undermine the network sponsor's incentive to modernize¹⁸⁸—by undercutting competitors' ability to enter.¹⁸⁹ Technological and other improvements will therefore not be produced either by the dominant network or by its potential competitors.¹⁹⁰

This pattern is readily envisioned in the securities markets, given rapid changes in the forms of securities, the volume and speed of trading, available technology, and the like. Even if potential sponsors of new market institutions overcome entry barriers and survive the process of inefficient first-order competition, therefore, we may not end up with the most efficient market. Rather, inefficient market structures may continue to prevail on account of strong first-mover advantages. Thus, the first trading system or independent provider to seek to construct a new trading network or other market system may emerge as the dominant provider, even if alternative institutional arrangements prove more efficient. Moreover, because of lock-in effects, this inefficient network may persist

188. See Katz & Shapiro, *supra* note 81, at 108 (discussing reduced innovation incentives in presence of network externalities). Cf. Economides, *supra* note 35, at 695 (arguing that when "new technology" and "old technology" are alternative equilibria, either "excess momentum" or "excess

189. See Leonard W. Weiss, *The Structure-Conduct-Performance Paradigm and Antitrust*, 127 U. PA. L. REV. 1104, 1132–33 (1979) (discussing lock-in effect barriers to entry in software market). A reduced incentive to innovate may also arise from free-rider problems in farreaching technological networks. See Frischmann, *supra* note 39, at 34.

190. See Economides, *supra* note 30, at 93; Leeds, *supra* note 140, at 648 ("If the network externalities are strong, the consumer may choose to forego adopting the new standard despite the new innovation. Recognizing this, firms would be less likely to invest in innovation."). Inversely, there is the possibility that a dominant network competitor, especially in a high fixed cost industry, might utilize recurring technological innovation to further deter entry, a strategy Microsoft might be argued to be pursuing, with its recurring upgrades of its Windows operating system. At least in the case of the New York Stock Exchange, see *infra* note 192, and the state of Delaware, in corporate law, see Klausner, *supra* note 38, at 850 n.283, this has not been the pattern. There is nothing in the network model of securities markets, however, to preclude it from being so.

in its market dominance, notwithstanding substantial failures to maintain and update its technological standards.¹⁹¹

This has long been the circumstance in U.S. securities markets, which have lagged in their technological development. Most significantly, the New York Stock Exchange has long been criticized for its lack of technological innovation, or even sophistication.¹⁹² Thus, technology was another central element in the push toward a National Market System in the United States.¹⁹³ Notwithstanding the explosion in trading volume through the 1950s and 1960s, U.S. securities markets continued to rely on a paper system to clear and settle trades.¹⁹⁴ This resistance ultimately brought on the “paperwork crisis” of the late 1960s, and the ensuing effort to create the National Market System.¹⁹⁵ In the U.S. securities markets, thus, the challenge of effective market linkage was not addressed until regulatory intervention was considered in the 1970s.¹⁹⁶

191. See Economides, *supra* note 30, at 92–93 (“A third consequence of the self-reinforcing nature of networks is that history matters. There is a possibility of lock-in at a Pareto inferior equilibrium.”) (citation omitted).

192. See Dale Arthur Oesterle, Donald A. Winslow & Seth C. Anderson, *The New York Stock Exchange and Its Outmoded Specialist System: Can the Exchange Innovate To Survive?*, 17 J. CORP. L. 223, 226 (1992) (“In this changing environment, the NYSE generated very few significant innovations in trading procedures, membership policies, or product listing.”). See also Thomas H. McNish & Robert A. Wood, *Competition, Fragmentation, and Market Quality*, in THE INDUSTRIAL ORGANIZATION AND REGULATION OF THE SECURITIES INDUSTRY 63, 84–85 (Andrew W. Lo ed., 1996).

[A]ll of the extensive technological innovations in market mechanisms during the past thirty years have been initiated by the regional exchanges, the third-market dealers, and the proprietary trading systems (PTS), with the NYSE matching innovations to avoid loss of market share . . . Dominant competitors have little incentive to innovate.

Id. Cf. Martin, *supra* note 161, at E-6. Evidencing the tendency toward lock-in in network markets, however, the NYSE continues to occupy a dominant position in the global securities markets, even notwithstanding some recent loss of market share to electronic trading systems.

193. See Calvin, *supra* note 166, at 790; Macey & Haddock, *supra* note 14, at 332. See also *Institutional Investor Study Report*, *supra* note 167, at 23 (“We believe that because of modern communication and data processing facilities it is possible to preserve geographically separated trading markets while at the same time tying them together on a national basis.”).

194. See Walter Werner, *The SEC as a Market Regulator*, 70 Va. L. Rev. 755, 770–78 (1984). To similar effect is the continued reliance of even the largest U.S. securities markets on artificial mechanisms of liquidity. See Lawrence R. Glosten & Paul R. Milgrom, *Bid, Ask, and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders*, 14 J. FIN. ECON. 71, 71 (1985) (“[T]rading on exchanges takes place over time, and some institutional arrangements are necessary to help match buyers and sellers whose orders arrive at different times.”). See also Sanford J. Grossman, Merton H. Miller, Kenneth R. Cone, Daniel R. Fischel & David J. Ross, *Clustering and Competition in Asset Markets*, 40 J.L. & ECON. 23, 57–58 (1997); Madhavan, *supra* note 24, at 607–08.

195. See Werner, *supra* note 194, at 770–78.

196. Once again, it is apparent that network effects, far from impacting only emerging markets, have important implications for the restructuring of established markets as well.

III. HOW LAW MATTERS: COORDINATED EXPECTATIONS AND THE ROLE OF LAW IN SECURITIES MARKET TRANSITION

*But creating strong securities markets is hard.*¹⁹⁷

If the network analysis of securities markets to this point highlights why law might matter in the emergence of strong securities markets, the question of how law matters—of what precise function law might have in that process—remains an open question.¹⁹⁸ Where network effects are wide in scope and substantial in strength, as suggested above, and size and tipping effects are therefore consequential, the appropriate role of law, if any, has yet to be identified.¹⁹⁹

Law and economics has traditionally addressed this inquiry with an eye to the insights of Ronald Coase, who is most appropriately—if rarely—recalled as the original advocate of the notion that “law matters” in securities markets, contrary to neoclassical economics’ basic assumptions.²⁰⁰ In particular, legal scholarship has highlighted two functions of law in this regard. At the outset, law must provide clear property entitlements.²⁰¹ At the other end of the market process, law must offer reliable contract enforcement mechanisms.²⁰² With time, these functions have come to be widely acknowledged.²⁰³

197. Black, *supra* note 5, at 782.

198. Cf. Coffee, *Future as History*, *supra* note 3, at 649–50 (“This debate over what may happen has not yet shifted to its next predictable stage: a policy-oriented discussion of the tradeoffs and the most effective policy levers by which the law can influence the course and pace of this transition.”).

199. Herein, I primarily aim to define law’s particular *function* in securities market transition, and to justify that role. I outline some preliminary thoughts on the preferred forms and mechanisms of law that would appear to follow from this analysis, but largely leave this issue for a forthcoming work that focuses on regulatory *form* in market transition, from a game-theoretic perspective.

200. See R.H. COASE, *THE FIRM, THE MARKET, AND THE LAW* 9 (1988) (highlighting need for regulation to facilitate operation of securities markets); R.H. Coase, *Law and Economics & A.W. Brian Simpson*, 25 J. LEGAL STUD. 103, 104 (1996) (“[I]n a regime of positive transaction costs, the character of the law becomes one of the main factors determining the performance of the economy.”). Cf. Robert C. Ellickson, *The Case for Coase and Against “Coaseanism,”* 99 YALE L.J. 611, 611 (1989) (“The ‘Coasean world’ is not only not Coase’s world but, ironically, is more like the world of the economic theorists that Coase has attacked.”).

201. See COASE, *supra* note 4, at 5; Cross, *supra* note 4, at 1741 (2002) (describing role of law in defining property rights). See also Klock, *supra* note 20, at 781 (“The nice thing about the property-rights approach is that the amount of off-board trading for each security is determined by the invisible hand of the market rather than the visible, and clumsy, hand of the SEC.”).

202. See Cross, *supra* note 20, at 1743–53 (describing need for law in contract enforcement); Van Zandt, *supra* note 4, at 991.

203. See Partnoy, *supra* note 6, at 775. He argues:

Economists generally agree that markets function properly only within a well-defined legal and institutional framework, although there is debate about whether such institutions must be created by concerted action (which is really simply helping markets to work, and not

Of late, Bernard Black and John Coffee have revived the thesis that “law matters.” Drawing on insights gleaned from the attempt to create securities markets in Central and Eastern Europe,²⁰⁴ they have argued that law may also matter, on account of its protection of minority investors.²⁰⁵ Such protections, they propose, permit entrenchment of the separation of ownership and control, which recent empirical analysis has correlated with accelerated economic growth and development.²⁰⁶

The present analysis, again looking to the post-communist experience, seeks to add to this line of work. In particular, it suggests that a more complete appreciation of how law matters in the creation of strong securities markets—whether in the definition of property rights, the enforcement of contracts, the protection of minority investors, or otherwise—must depend on a better understanding of why law might matter in that process. It is an answer to this question that the proposed network model of securities markets provides.

The present evaluation does not dispute that the aforementioned functions of law are important in building strong securities markets. It does, however, question whether law’s role is limited to the margin, as these tasks suggest. Instead, it points to network effects in securities markets to suggest that law may have a direct role to play in the very creation—the making—of strong markets.²⁰⁷ In doing so, it also challenges

inappropriate governmental intervention), or whether such institutions will develop spontaneously when the social costs of building them exceed their transactions cost.

Id. It bears noting, however, that even this limited conception of law’s role represented a divergence from the presumption in neoclassical economics and finance economics that markets can form and function without legal intervention. See FRIEDRICH A. HAYEK, *LAW, LEGISLATION AND LIBERTY* 107 (1976); LEE, *supra* note 20, at 264–65, 308–09 (arguing for highly constrained securities market regulation, operating through market mechanisms); Frank H. Easterbrook, *International Corporate Differences: Markets or Law?*, 9 J. APP. CORP. FIN. 23, 29 (1997). Cf. Partnoy, *supra* note 6, at 773; David E. Van Zandt, *The Regulatory and Institutional Conditions for an International Securities Market*, 32 VA. J. INT’L L. 47, 70–79 (1991).

204. See Black, *supra* note 11, at 1734 n.3; John C. Coffee, Jr., *Privatization and Corporate Governance: The Lessons from Securities Market Failure*, 25 J. CORP. L. 1, 9 (1999).

205. See *supra* note 5. Coffee has particularly emphasized the role of securities law, as distinct from substantive corporate law, in the creation of strong markets. Nonetheless, the protection of minority investors remains his focus. See, e.g., Coffee, *supra* note 204, at 17.

206. See *supra* note 10.

207. Notably, even the literature of the post-Soviet transition has failed to grapple directly with the origin and making of markets. Instead, legal and economic scholarship has focused on privatization, see Black, *supra* note 11, at 1739, price liberalization, see *id.*, elimination of public subsidies, see McCoy, *supra* note 94, at 47–49, and other legislative precursors to markets. By implication, this focus would suggest, markets are *notmade*—by policy, law, or otherwise—but simply *emerge* out of transactions cost minimizing moves by those who have capital, those who seek it, and those who wish to trade it. See Klock, *supra* note 20, at 763 (quoting Lawrence Harris, *Consolidation*,

certain conclusions reached based on the “law matters” scholarship’s orientation to traditional corporate and securities law. In this vein, John Coffee’s recent contribution to that discourse warrants some attention.²⁰⁸

In *The Rise of Dispersed Ownership*, Coffee presents a historical analysis of securities market development in the United States, the United Kingdom, France, and Germany.²⁰⁹ Most significantly, he highlights the absence of legal protections of minority investors before the emergence of strong securities markets in the United States and the United Kingdom.²¹⁰ Given this observation,²¹¹ Coffee challenges the standing assertion that law matters in the creation of strong securities markets. Rather than seeking to overturn the identification of law’s protection of minority investors as an essential precondition to strong securities markets—a conclusion he helped establish²¹²—Coffee instead recharacterizes *law*.²¹³ Specifically, he points to the role of private bonding mechanisms and self-regulation as sources of minority investor protections in the United States and the United Kingdom.²¹⁴ The importance of such “functional substitutes for formal law,” Coffee argues, preserves the adage: law still matters.²¹⁵

Fragmentation, Segmentation, and Regulation, in GLOBAL EQUITY MARKETS, *supra* note 24, at 269, 274).

Definitions of markets as that realm within which homogenous goods are identically priced, *see* Carney, *supra* note 20, at 730, may impliedly suggest a theory of arbitrage as the mechanism of market creation. *See* William J. Carney, *Two Modes of Discourse in the Stakeholder Debate*, 43 U. TORONTO L.J. 379, 383 (1993) (suggesting dynamic application of law of one price, in which price moves toward uniformity would “describe the creation of new markets”); Peter H. Huang & Michael S. Knoll, *Corporate Finance, Corporate Law and Finance Theory*, 74 S. CAL. L. REV. 175, 177 n.10 (2000) (highlighting role of arbitrage in ensuring that financial substitutes sell for same price). Ultimately, however, this may be largely a matter of semantics. In the latter situation, the still difficult question of market creation simply becomes how one creates the necessary infrastructure (that is, market) for arbitrage. The network effects—and resulting coordination difficulties—described herein remain.

208. *See* Coffee, *Rise of Dispersed Ownership*, *supra* note 3.

209. *See id.* at 7.

210. Coffee further describes the adverse consequences of public interference in the development of securities markets in both France and Germany.

211. Some argument can be made to challenge this conclusion. *See generally* Carney, *supra* note 88 (noting unanimity requirement for fundamental corporate changes that were the norm in U.S. securities markets in 19th Century).

212. *See* Coffee, *Future as History*, *supra* note 3, at 644, 647; Coffee, *supra* note 204, at 38. *Cf.* Cheffins, *supra* note 3, at 460 n.3.

213. *See* Coffee, *Rise of Dispersed Ownership*, *supra* note 3, at 60 (emphasizing that “much depends on what we count as ‘law’”).

214. *See id.* at 9.

215. *See id.* at 10.

While Coffee's emphasis on the public-private character of law is affirmed by the present analysis,²¹⁶ the network understanding of securities markets outlined herein, together with its implications for market transition, cannot be reconciled with the ultimate conclusion that he seeks to derive from his historical data. Coffee thus concludes that the true precondition to strong markets is a *laissez faire* approach to economic governance.²¹⁷ Such a hands-off approach, he argues, will best encourage the development of the aforementioned private mechanisms of "law," the primary determinant of the emergence of strong securities markets. Law matters in securities market transition, therefore, but not—in Coffee's terms—"formal" law.

It is unclear that Coffee's historical analysis can reach this far. While that history effectively challenges the need for law (that is, public law) to protect minority investors, and highlights the dangers of excessive public intervention in securities markets (as in France and Germany), it cannot support this broader thesis. That public law did not matter in the protection of minority investors says nothing about whether it might matter in distinct other respects—ones that Coffee's analysis, and the corporate and securities law-oriented "law matters" literature generally, may simply have overlooked. Likewise, that the gross interference in securities markets in France and Germany might be harmful to securities market development says nothing about whether other, milder forms of intervention might be both necessary and efficient.

The network inefficiencies outlined above thus raise questions of whether law might not have some affirmative role in the creation of strong securities markets, even if not in the creation of strong minority investor protections. By limiting his attention to corporate and securities law as traditionally understood, Coffee overlooks this possibility.²¹⁸

To avoid such omissions, I would instead seek the character of any law that might facilitate securities market transition in the source of any such need. In regulation theory, Stephen Breyer has termed this the "matching" of regulation with justification.²¹⁹ Where does such an analysis

216. See *infra* notes 295–303 and accompanying text.

217. See Coffee, *Rise of Dispersed Ownership*, *supra* note 3, at 9–10, 52, 61, 76. He argues: Decentralization in turn made possible private lawmaking and the growth of self-regulatory bodies. Ultimately, this in turn facilitated the development of market-based institutions, such as stock exchanges [History] confirms this emphasis on decentralization and the growth of a private sector as the initial precondition.

Id. Cf. *id.* at 9 (identifying hospitability of common law world to private regulatory institutions as central element in emergence of strong markets).

218. See *id.* at 81 (highlighting that "private institutional structures played the pivotal role in the rise of dispersed ownership in the United States and the United Kingdom").

219. See STEPHEN BREYER, *REGULATION AND ITS REFORM* 191 (1982).

lead us here? Most significantly, it points to the importance of expectations in network industries. Thus, highlighting the failure to align market expectations as the most significant potential inefficiency in network markets—producing tipping effect barriers to entry, first-mover advantages, and excess inertia—I will conclude that it is law’s *coordination of expectations* that is its essential function in securities market transition.²²⁰

A. EXPECTATION AND TRANSITION IN SECURITIES MARKETS

As described above, a central theme in the study of network effects has been the importance of adoption expectations.²²¹ Expectations are also central features of securities markets, on account of the presence of network effects and more generally. The formation of expectations regarding future growth and earnings, future interest in any given stock, and future liquidity enhancements are thus prominent aspects of the operation of securities markets.

Expectations are relevant to every economic exchange, of course, but raise particularly difficult issues in network economies, where value relies so heavily on the future behavior of other consumers and/or producers of the same or compatible goods. Such behavior has the potential to dramatically devalue securities market goods, whether it be exchange membership, equity listing, or market servicing.²²² Expectations are especially important in network transition, meanwhile, given the broader range of potential variance from any given equilibrium.²²³

Much of the potential inefficiency of market transition thus turns on market participants’ inability to communicate, match, or otherwise form reliable expectations regarding the adoption behavior of other market participants.²²⁴ In securities market transition, the inability to develop firm expectations regarding what particular market forms will predominate, and which among a variety of competing market mechanisms will prevail, has

220. Cf. Lisa Bernstein, *Private Commercial Law in the Cotton Industry: Creating Cooperation Through Rules, Norms, and Institutions*, 99 MICH. L. REV. 1724, 1762–64 (2001) (describing role of private legal system in facilitating cooperation).

221. See *supra* notes 134–37 and accompanying text.

222. See *supra* Part II.

223. Cf. Coffee, *supra* note 204, at 4 (highlighting importance of regulation in transition context, where nexus of contracts underpinning corporation is difficult to construct).

224. To be clear, not all network inefficiencies are grounded in expectations failures. While size effects can be constructed as expectations problems, they can also be understood as arising from the limits of network ownership structures. The more significant tipping effects in network industries, on the other hand, are primarily expectations-based phenomena.

the potential to delay or even prevent the emergence of new markets institutions.²²⁵

In concrete terms, the importance of expectations can be observed in the selection of an order- or quote-driven trading system and in the effective linkage of trading systems in a given emerging market. From the outset, potential sponsors of new markets (e.g., electronic communications networks), as well as new or improved market structures (e.g., the Consolidated Quotation System), may decline to pursue efficiently their market innovations, based on an inability to determine whether the market will tip in their favor or to some other network trading system or technology.²²⁶ For example, such sponsors might rationally hesitate to develop a quote-driven electronic trading site, or create a linkage system operating within particular technological and financial parameters (e.g., demand-based versus ticker; fractional versus decimal quantification), if they cannot develop somewhat firm expectations as to whether competing or constituent trading sites will adopt compatible standards; whether corporate issuers will favor (and therefore elect to trade on) electronic versus physical exchanges; and whether traders and investors are prepared to invest the resources needed for the acquisition of new technologies. Meanwhile, traders, issuers, and secondary service providers may also inefficiently hold back from market entry, given their analogous need to develop expectations regarding future adoption decisions by similarly situated market participants, and the difficulty of developing such expectations. Again, each issuer must know whether other issuers will turn to an order- or quote-driven system,²²⁷ each trader must know where other traders are likely to direct their transactions, and so on.

Beyond such barriers to entry, expectations are also central to the existence of potentially inefficient first-mover advantages in securities market transition, to the tendency of securities markets to exhibit excess inertia, or lock-in, and to resulting technological stagnation in those markets.²²⁸ Thus, where floor-based auction trading has secured a preliminary advantage, as it did in Russia, newly arriving issuers and traders will likely turn to such systems, absent some expectation that issuers and traders will turn to some alternative trading system.²²⁹

225. Other sources of delay might also be cited, however, including conditions of uncertainty. See Armen A. Alchian, *Uncertainty, Evolution, and Economic Theory*, 58 J.POL. ECON. 211, 212 (1950).

226. See *supra* Part II.B.1.

227. See Karmel, *supra* note 96, at 371.

228. See *supra* Part II.B.3.

229. Much of the complexity of securities market transition, this suggests, lies in the multiplicity of participants whose expectations intertwine. Thus, while potential market sponsors must develop

In economic terms, the creation and restructuring of networked securities markets produces multiple fulfilled expectations equilibria.²³⁰ Efficient entry by market sponsors, traders, and issuers, among others, is one potential expectations equilibrium. But the inefficient prospect of no entry is also possible, given strong network effects.

Consider the following problem. A firm is considering whether to adopt a new, superior product standard. The good marketed by the firm is such that a consumer's utility is increasing in the number of other users of a good adhering to the same standard. Then there may be multiple equilibria If each consumer expects all other consumers to switch, it is rational for the individual to switch, and those expectations are indeed fulfilled. Conversely, if each consumer expects all other consumers to stay with the status quo, it is rational not to switch, so this is another fulfilled expectations equilibrium.²³¹

B. COORDINATED EXPECTATIONS

The remedy to expectations obstacles in securities market transition lies in mechanisms of coordination.²³² The potential expectation inefficiencies of network transition can thus be analogized to "classical coordination failure," in which pairs of symbiotic markets fail to open, each on account of the closure of the other.²³³ In such circumstances,

expectations regarding the behavior of other potential sponsors, and issuers must develop expectations regarding other issuers, each must also develop, at greater cost and difficulty, expectations regarding one another's behavior, as well as the behavior of securities market regulators, professional traders, investors, bankers, and others. Hence the complexity of coordination, as discussed below. *See infra* Part III.B.

230. *See supra* note 141.

231. Warneryd, *supra* note 171, at 676.

232. *See* Dennis W. Carlton & J. Mark Klammer, *The Need for Coordination Among Firms, With Special Reference to Network Industries*, 50 U. CHI. L. REV. 446, 465 (1983); Philip B. Heymann, *The Problem of Coordination: Bargaining and Rules*, 86 HARV. L. REV. 797, 800-01 (1973) (describing law's interest in coordination problems); Van Zandt, *supra* note 203, at 69 (describing coordination as difficulty in securities market creation). *See also* Coffee, *Rise of Dispersed Ownership*, *supra* note 3, at 11-12 (describing role of law in overcoming obstacles inherent in transitional markets); Klausner, *supra* note 38, at 764-65 (reasoning that "corporate law may perform a coordinating function similar to that of technical standards"); Judith B. Sedaitis, *Network Dynamics of New Firm Formation: Developing Russian Commodity Markets*, in RESTRUCTURING NETWORKS IN POST-SOCIALISM: LEGACIES, LINKAGES, AND LOCALITIES 153 (Gernot Grabher & David Stark eds., 1997) [hereinafter RESTRUCTURING NETWORKS] (highlighting mechanisms by which entrepreneurs come together as key determinant to success of emerging markets).

233. *See* Heller, *supra* note 1, at 236.

notwithstanding the enhanced efficiency of open markets, each will remain closed, given an expectation of the continued closure of the paired market.

In the latter circumstance, as “in a network setting, coordination to a particular ‘good’ equilibrium is important.”²³⁴ In each case, coordination allows expectations to be aligned, and markets opened. Coordination may therefore play a central role in securities market transition, by helping market participants match expectations and thereby move toward the efficient equilibrium of market participation.

This coordinative role for law in securities market transition goes beyond “the dominant view of the problem that the law solves—that of ²³⁵ In the latter case—exhibited by the standard Prisoner’s Dilemma game—players’ interests diverge.²³⁶ In coordination games, on the other hand, players’ interests are substantially aligned.²³⁷ In the absence of coordination, however, such common interests may not be enough to ensure efficient outcomes.²³⁸

In coordination problems, moreover, the precise character of the equilibrium solution is often not essential.²³⁹ Thus, in the choice of whether to drive on the left or right side of the road—a classic example in the literature of both coordination games and network effects—the particular outcome is less crucial than the identification of some standard.²⁴⁰

234. Economides, *supra* note 30, at 93. See also Economides, *supra* note 24, at 92 (“Given the wide multiplicity of expectations equilibria, it is clear that *there is a need to create a specific mechanism that can support a single equilibrium of large participation.*”) (emphasis in original).

235. McAdams, *supra* note 9, at 1651. See also Eric A. Posner, *Symbols, Signals, and Social Norms in Politics and the Law*, 27 J. LEGAL STUD. 765, 778–89 (1998) (describing the role of law in cooperation games).

236. See McAdams, *supra* note 9, at 1654–55.

237. See Van Zandt, *supra* note 203, at 69 n.84.

238. See McAdams, *supra* note 9, at 1654–55.

239. See Jack L. Goldsmith & Eric A. Posner, *A Theory of Customary International Law*, 66 U. CHI. L. REV. 1113, 1128 (1999) (noting example of coordination game in which selection of standard takes priority over identity of standard); Richard Warner, *Coordination by Default: Comment on Steven Burton*, 3 S. CAL. INTERDISC. L.J. 209, 209–10 (1993) (describing irrelevance of which outcome is selected in coordination games, so long as all players select same outcome).

240. See Lemley & McGowan, *supra* note 7, at 544 (describing network effects character of choice of which side of road to drive on); McAdams, *supra* note 9, at 1652 (describing government announcement regarding left or right-hand driving that is not oriented to outcome, but to need for common standard). Voigt and Engerer describe the coordination paradigm:

In this paradigm, coordination is not brought about by some allocation deemed to be desirable on the outcome level, but by asking what set of institutions will be able to produce expectations that will make it possible for individuals who do not follow a central plan and who have largely differing goals to coordinate their plans successfully. This could therefore be called the coordination paradigm.

Voigt & Engerer, *supra* note 77, at 134.

Securities market transition, given the network effect implications outlined above, is appropriately evaluated within a coordination game paradigm. In the process of market transition, as in such games, a Nash equilibrium is sought.²⁴¹ With this outcome, neither player would seek to alter their choice, given an expectation that the other player will not do so. Hence, the “equilibrium is . . . [the] pair of strategies such that when both players’ expectations are coordinated on it, neither one has an incentive to deviate.”²⁴²

An efficient equilibrium of securities market transition therefore necessitates some coordination of expectations.²⁴³ In the absence of such coordination, strong securities markets may not emerge, at least not in a timely and efficient fashion. Focusing on the preliminary question of whether public securities markets, as distinct from commercial banks, will be looked to for corporate financing,²⁴⁴ this potential outcome is readily observed. If expectations are not reasonably coordinated around the construction of public securities markets, potential market sponsors, issuers, and secondary service providers may prove unwilling to make the necessary investments to build such markets. More narrowly, even a failure to coordinate expectations regarding a preferred trading model (e.g., order- or quote-driven)²⁴⁵ may delay or stymie efficient investment in market transition.

As emphasized by the New Institutional Economics, coordination may be the central prerequisite to effective institution-building.²⁴⁶ If so, a coordination of expectations may be especially critical in emerging

241. See Warneryd, *supra* note 171, at 676. See also McAdams, *supra* note 9, at 1656–57.

242. Warneryd, *supra* note 171, at 676. See Van Zandt, *supra* note 203, at 69.

243. It is important to note that coordination of network expectations becomes less essential as the relevant adoptions/choices become increasingly sequential, rather than simultaneous. See Warneryd, *supra* note 171, at 676. Where the former is the case, each adoption decision can incorporate existing information regarding prior adoptions, and a form of de facto coordination can be expected to result.

244. See Black, *supra* note 5, at 831.

245. See Aggarwal & Angel, *supra* note 96, at 271–72; Borrelli, *supra* note 10, at 895–98; Karmel, *supra* note 96, at 371; Pirrong, *supra* note 106, at 519–20.

246. See Voigt & Engerer, *supra* note 77, at 134. Notably, the present emphasis on coordination in the creation of securities market institutions echoes the analysis of the New Institutional Economics. “Transaction cost economics has begun to focus upon norm formation within institutions and the way in which an ethos of cooperation, public orientation, and rational decisionmaking might develop.” Edward L. Rubin, *The New Legal Process, the Synthesis of Disclosure, and the Microanalysis of Institutions*, 109 HARV. L. REV. 1393, 1427 (1996). As such, an institutional emphasis may also be useful in evaluating mechanisms of coordination, especially mechanisms of the public/private variety that, as described below, would appear warranted in securities market transition. See *id.* at 1415. To this effect has Douglass North evaluated “the relevance of shared mental models and ideologies for the development of institutions,” Voigt & Engerer, *supra* note 77, at 129, the very same transition issue presented by the existence of network effects in securities markets.

securities markets, given the scope of the institutional transformation underway.²⁴⁷

C. THE POSSIBILITIES OF PRIVATE COORDINATION

Even if coordination is essential in securities market transition, there is nothing inherently public in its character. Rather, private institutions can also facilitate coordination.²⁴⁸ Among the paradigmatic examples of private coordination is the widespread practice of group standard-setting. As highlighted in recent scholarship, such formalized private standard-setting, through groups such as the American Society for Testing & Materials, InterNIC, and the American Society of Mechanical Engineers, has come to serve central regulatory functions in the modern economy.²⁴⁹ It will often serve these functions, in fact, more effectively than legally defined standards.²⁵⁰

Private coordination of securities market transition will not necessarily be effective, however.²⁵¹ The obstacles are several, and rooted in a mix of traditional coordination difficulties and obstacles specific to the presence of network effects.

Private attempts to coordinate securities market transition are likely to be particularly undermined by the heterogeneity of market participants.²⁵² The categories of such participants include traditional exchanges, screen-based trading (and listing) systems, issuers, institutional investors, brokers, and dealers, among others. Within each of these categories, meanwhile,

247. Cf. Van Zandt, *supra* note 4, at 989–90 (highlighting greater ease of market creation where some precursor collective institution already exists).

248. See Bernstein, *supra* note 220, at 1762–82 (describing role of private legal system in creating and maintaining cooperation in cotton industry); Kahan & Klausner, *supra* note 52, at 737–39 (describing coordinative function of underwriters and lawyers in corporate law networks). Cf. Klock, *supra* note 20, at 792 (criticizing active role for government in “free markets”).

249. See Michael P. Van Alstine, *The Costs of Legal Change*, 49 UCLA L. REV. 789, 803–09 (2002) (analyzing public versus private standard-setting). See also Coffee, *Rise of Dispersed Ownership*, *supra* note 3, at 81 (describing how private actors help fill legal vacuum in transitional markets); Jody Freeman, *Private Parties, Public Functions, and the New Administrative Law*, 52 ADMIN. L. REV. 813, 826–31 (2000) (describing standard-setting roles of private enterprise).

250. See Lemley & McGowan, *supra* note 7, at 516–17 (discussing ways in which “private standard-setting organizations are more efficient than government organizations”); Van Alstine, *supra* note 249, at 803–09.

251. See COASE, *supra* note 200, at 10 (noting limitations of private law as source of regulation in markets).

252. See Cheffins, *supra* note 3, at 475 (suggesting that self-regulation in the securities market is effective where there exists some level of homogeneity). Cf. Branscomb & Kahin, *supra* note 176, at 20.

one can find a broad array of players, from the NYSE to the Pacific Stock Exchange, and from Microsoft to FFLC Bancorp.²⁵³

This heterogeneity distinguishes private coordination of securities market transition from private standard-setting. Participants in the latter projects tend to be at least somewhat homogenous. Trade groups catering to a specific industry often undertake such standard-setting.²⁵⁴ The relative heterogeneity of securities market participants might not be an insurmountable obstacle to private coordination given a stable equilibrium. In the midst of transition, however, the nexus of informal contracts that would undergird any private attempt at coordination would likely be difficult to build.²⁵⁵

A further obstacle to private coordination of securities market transition is its necessarily gradual nature. Such gradualism is likely to have substantial ill consequences in the sensitive, and vital, securities markets.²⁵⁶ Private coordination will produce at least temporary illiquidity, with its attendant ill consequences for price discovery and efficient capital markets. Thus, for even a small subset of the market to coordinate its transition to new market institutions would be incredibly disruptive, not only to the participating entities, but to the market as a whole.²⁵⁷

Other obstacles to private coordination of expectations can also be highlighted. The limited efficacy of so-called “cheap talk” is one

253. Among such an array of players, appropriately matched market participants are unlikely to even find each other, let alone achieve meaningful coordination.

If there were a merger of the two marketmakers, the externalities would be internalized and the market failure would vanish. However, in a complex system of markets without a rich variety of communication channels, the two marketmakers are unlikely to find each other.

These are precisely the circumstances where incomplete markets are a likely outcome of private calculation, and some government coordination is desirable.

Heller, *supra* note 1, at 240.

254. See Freeman, *supra* note 249, at 826–31. See also Eric A. Posner, *The Regulation of Groups: The Influence of Legal and Nonlegal Sanctions on Collective Action*, 63 U. CHI. L. REV. 133, 136 (1996) (suggesting that transferring power to cohesive trade groups can yield greater returns than traditional regulation).

255. Cf. Coffee, *supra* note 204, at 4 (describing unstable character of newly-privatized corporate entities).

256. Coordination is inherently gradual, of course, even if it is publicly administered. Otherwise, it would not be coordination, but dictation. See Douglass C. North, *Towards a Theory of Institutional Change*, 31 Q. REV. ECON. & BUS. 3, 6 (1991). See also Voigt & Engerer, *supra* note 77, at 161 (“Representatives of NIE reject the assumption that institutional change can be carried out overnight.”). Public coordination is, however, likely to be less gradual than market-based coordination.

257. Cf. Voigt & Engerer, *supra* note 77, at 175. (“Institutional experiment by a single firm is fine, because it does not matter much for the economy as a whole if it does not work. Institutional experimentation at the level of the whole economy gives one more pause.”) (quoting R.C.O. Matthews, *The Economics of Institutions and the Sources of Growth*, 96 ECON. J. 903, 917 (1986)).

limitation,²⁵⁸ although this should be of somewhat lesser consequence in the coordination game of securities market transition.²⁵⁹ Even in cases of coordination, however, cheap talk continues to taint the efficacy of communication as an efficient source of private coordination, so long as some level of conflict continues to exist. In that case, parties continue to have some incentive to distort their incentives and intentions, in hopes of achieving a coordinated solution that is also in line with their distinct preferences.²⁶⁰ Separately, potential free rider problems in private standard-setting, arising from broad access to any network standard (i.e., market or market information),²⁶¹ may also limit the effectiveness of private coordination.

Ultimately, however, the very same network effects that make coordination necessary in securities market transition may stand in the way of any attempt at private coordination. Tipping effects can be expected to dissuade market participants from coordinating market entry/transition with anything less than a dominant collection of other participants, for fear that the coordinated outcome achieved thereby may lose any subsequent network competition.²⁶² As such, many will sit out any attempt at coordination, just as they would any direct pass at market transition. Ordinary obstacles to coordination may therefore be aggravated in the presence of network effects.²⁶³

Related to the possibility of private coordination, the mechanism of clearly defined property entitlements—and ownership generally—have been posited as a means of internalizing negative,²⁶⁴ as well as network externalities.²⁶⁵ It has been suggested that network ownership can,

258. See Warneryd, *supra* note 171, at 676 (stating “[t]alk is cheap”).

259. Here, the matched interests of players reduces the benefits of strategic talk, and hence the devaluation of communication. See McAdams, *supra* note 9, at 1658 n.20.

260. The aforementioned heterogeneity must necessarily aggravate such cheap talk problems, absent some strong repeat-player tendency.

261. See Branscomb & Kahin, *supra* note 176, at 21.

262. For this reason, while it is true that not all market participants must join in any attempt at private coordination, most would have to.

263. See Lemley & McGowan, *supra* note 7, at 517–22 (discussing coordination problems in network markets generally).

264. See Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL’Y REV. 23, 29 (1996) (describing government’s role in internalizing externalities as enforcement of property rights); Jerry Ellig, *The Economics of Regulatory Takings*, 46 S.C. L. REV. 595, 596 (1995) (positing clear property rights, rather than government regulation, as preferred mechanism for internalizing externalities).

265. See William E. Cohen, *Competition and Foreclosure in the Context of Installed Base and Compatibility Effects*, 64 ANTITRUST L.J. 535, 544 n.40 (1996) (citing Katz & Shapiro, *supra* note 81, at 107, who argue that property rights may help internalize network externalities); Liebowitz &

literally, compensate for such externalities.²⁶⁶ Network owners would make side payments to new users for their entry, to the full amount of the marginal network enhancement they bring.²⁶⁷ In securities markets, for example, the owners of any given trading system would subsidize the efficient entry of new traders and issuers.

While ownership may serve a salutary function in facilitating the internalization of network externalities, it is not a panacea, at least in networked securities markets. To begin with, ownership shares the limitations of any attempt at internalization. As described above, the network owner's efficient distribution of the costs of any entry subsidy among market participants would at best be difficult. Compounding this difficulty, ownership in securities markets is ordinarily limited to components of the entire relevant 'market.' Trading in any given security, and by any given trader, on the other hand, commonly takes place on an array of independent trading systems.²⁶⁸ A distinct network owner who can efficiently subsidize new entry is therefore lacking.²⁶⁹

Ownership may also be of limited efficacy, given that some substantial part of the social benefits of enhanced securities market networks goes un-internalized by the given market *or* its membership/participants. Rather, price information—if openly available—is itself a positive externality.²⁷⁰ Given as much, owners may not subsidize efficient network entry—for which they will go uncompensated.²⁷¹

Margolis, *supra* note 52, at 671; Liebowitz & Margolis, *supra* note 37, at 141–42 (stating that through ownership, a network owner could be motivated to make investments or provide incentives to increase the value of the network, by internalizing any externalities). Thus, the owner of a securities market communications system (i.e., network sponsor) can subsidize membership/participation in order to internalize the network benefit created.

266. See Lemley & McGowan, *supra* note 7, at 560 (describing how network ownership would best internalize externalities).

267. See Kolasky, *supra* note 39, at 579 (describing how externalities will result if network owners do not compensate additional users); Lemley & McGowan, *supra* note 7, at 594.

268. See Seligman, *supra* note 165, at 85–86 (describing regional exchanges' trade in dually-listed and unlisted securities). See also Dale A. Oesterle, *On the Business of Defending NYSE Specialists*, 18 J. CORP. L. 79, 86 (1993) (describing the increase in trading on regional exchanges and electronic crossing networks).

269. Particularly with certain specialized financial instruments, however, such a single-owner 'market' could at least be imagined.

270. See Stephen J. Choi, *Selective Disclosures in the Public Capital Markets*, 35 U.C. DAVIS L. REV. 533, 534–35 (2002) (describing benefits of access to stock prices). See also Hasbrouck, *supra* note 27, at 1185 (noting appropriation of informational value of price by derivative markets, which do not engage in their own price discovery). This potentially significant positive externality can be expected to lead to substantial under-production of information, or at least accurate information. See Economides, *supra* note 30, at 94. See also Mulherin, *supra* note 2, at 605–25, for a discussion of the

Even if network ownership could overcome the foregoing obstacles, however, it would still address only one part of the potential network inefficiencies of market transition. Tipping effect inefficiencies are thus less susceptible than size effects to amelioration through mechanisms of ownership. Even with clear property interests, some role for law in securities market transition therefore persists.²⁷²

That role, moreover, goes beyond traditional conceptions of law's function in the emergence of strong securities markets. While merely coordinative in nature, it goes to the heart of the market creation process. Unlike the definition of property rights or the protection of minority investors, law's coordinative role is structural in nature. Through it, law makes markets.

As John Coffee has noted, however, we know little about law's role in facilitating structural change.²⁷³ Neoclassical economics, traditional finance economics, and, for the most part, law and economics have questioned any role for law in shaping structure.²⁷⁴ Rather, they have sought to rely on the efficiency of market mechanisms themselves to shape

historical differences arising from this pattern. Its modern application arises, of course, in the trading activity of the exploding number of alternative trading systems.

271. See Economides & Siow, *supra* note 32, at 116 ("Thus, even when market makers are aware of the gains from liquidity, and there is competition in fees between market makers and free entry of market makers, the externality caused by liquidity is still not completely internalized."). A related issue is that even a single owner would have difficulty allocating the cost of any subsidy among existing members/participants in an efficient manner, for the reasons described above.

272. In the context of transition, market participants themselves may not internalize and efficiently compensate for the network externalities of liquidity and price discovery. Cf. Romano, *supra* note 85, at 518 n.341 ("Some important exchange services that have a network effect are fully priced: the provision of liquidity is borne by market participants in the form of the bid-ask spread . . ."). For the most part, this arises from the same factors that lessen the efficacy of network ownership as a remedy to network externalities in securities market transition. The size of the bid-ask spread, for example, may not efficiently capture the entire, likely fragmented, market, or be reflected fully in investor returns. Further, incorporation of any network externality into price will not resolve the uniquely *transitional* inefficiencies of market tipping, described above.

273. See Coffee, *Future as History*, *supra* note 3, at 649–50. Some commentary on anticipatory versus reactive regulation, including in securities law, however, might resonate with this function of law. Cf. Branscomb & Kahin, *supra* note 176, at 9 (noting distinction between anticipatory and reactive standards); Emil Bukman, *The Cart Before the Horse: Anticipatory Securities Regulation in Kazakhstan*, 22 BROOK. J. INT'L L. 535, 563–64 (1997) (distinguishing between anticipatory and responsive securities regulation).

274. See Coffee, *supra* note 204, at 2 n.6. Again, this can be contrasted with the New Institutional Economics. See *supra* note 246. A related point is the relative disregard in the law and economics literature of positive externalities, and related network effects, as distinct from more familiar negative externalities. See Peter Bohm, *External Economies*, in 2 DICTIONARY OF ECONOMICS, *supra* note 78, at 262 ("Eventually, diseconomies emerged as the important case and economies as the exceptional case, whereas earlier hardly any importance was attached to technological *diseconomies*.") (emphasis in original) (internal citation omitted).

market structure.²⁷⁵ The microeconomics of network effects, however, may suggest at least some circumstances in which law not only matters in market structure and transition, but is central to it.

D. THE DESIGN AND OPERATION OF LAW'S COORDINATIVE FUNCTION

*[I]n a complex system of markets without a rich variety of communication channels, the two market makers are unlikely to find each other. These are precisely the circumstances where incomplete markets are a likely outcome of private calculation, and some government coordination is desirable.*²⁷⁶

Given the foregoing, securities market transition to a new or restructured network likely requires some form of public coordination.²⁷⁷ If the efficacy of private action or ownership in securities market transition varies from conventional assumptions, however, the form of law in that process is likewise unique. Just as securities markets may not efficiently emerge if left to purely private initiative, they are also unlikely to emerge through a series of linear directives from above.²⁷⁸ If law matters in the coordination of market expectations needed for securities market transition, the precise form law might take in the coordination process remains to be seen.

What, then, are the characteristics of law's coordinative function in securities market transition?²⁷⁹ Most significant is its limited nature.²⁸⁰

275. See LEE, *supra* note 20, at 264–65, 308–09; Klock, *supra* note 20, at 797 (arguing that market would have solved problem of market fragmentation, if SEC had not complicated it).

276. Heller, *supra* note 1, at 240.

277. See Di Noia, *supra* note 31, at 68 (“In the absence of any coordination or policy guide, implicit merger will not arise.”). An entirely separate network-related role for law in securities markets arises from the claim that network effects favor harmonization of disclosure, accounting, and other securities market standards. See *supra* note 8. See also Uri Geiger, *The Case for the Harmonization of Securities Disclosure Rules in the Global Market*, 1997 COLUM. BUS. L. REV. 241, 295–97, 305 (1997) (arguing that network effects in corporate disclosure standards favor global harmonization). Cf. William J. Carney, *Large Bank Shareholders in Germany: Saviors or Substitutes?*, 9 J. APPLIED CORP. FIN. 74, 77 (1997) (noting comparison difficulties arising from varied accounting methods in Germany). The relative significance of network effects in corporate and securities law standards, however, remains in dispute. See Romano, *supra* note 85, at 514–27 (2001) (disputing network effects arguments for regulatory harmonization of disclosure standards).

278. “The spontaneous nature of the process . . . requires an alternative view in which transition unfolds according to its own logic, produced by a specific system of incentives.” SERGUEY BRAGUINSKY & GRIGORY YAVLINSKY, *INCENTIVES AND INSTITUTIONS: THE TRANSITION TO A MARKET ECONOMY IN RUSSIA* 9 (2000).

279. This question of regulatory form is preliminarily treated here, but is more fully developed in a forthcoming work.

Any public coordination of expectations grounded in the network character of securities market transition need not be primarily directive in nature, nor directed to any specific regulatory outcome.²⁸¹

This holds true for two interrelated reasons. First, given a coordination game, such as securities market transition, the aligned interests of the private market players can be expected to alleviate at least part of the need for public direction. Private interests can be expected to efficiently interact without legal intervention, once an initial, coordinated equilibrium is established.²⁸²

Matched private interests, however, are not sufficient. Whenever market participants engage in collusion, matched interests—however destructive—exist. The second justification for a limited coordinative role for law thus arises from the general correlation of social and private utility, where network effects are at work. With network effects, as distinct from negative externalities, any market failure that arises involves no conflict of public and private values. Rather, both social and individual utility are maximized through coordination, and the network efficiencies that follow from it.²⁸³ In the case of negative externalities, on the other hand, law's

280. "Here government appears to have a critical, if restrained, role." Branscomb & Kahin, *supra* note 176, at 25. Branscomb and Kahin further argue:

De facto [National Information Infrastructure] standards will emerge whether or not the government plays a significant role in organizing and leading standards activity. However, full realization of Internet-style interoperability requires institutionalized, technically insightful, industry-spanning capacity to develop anticipatory standards. . . . *It calls for both public-private consensus and leadership to help the consensus come about.*

Id. at 25 (emphasis added). Cf. Farrell & Saloner, *supra* note 177, at 79–80 (noting minimal communication necessary to overcome excess inertia in network industries). Such restraint is especially advisable, in the absence of empirical evidence suggesting that the presence of network effects in a particular securities market are actually producing transitional inefficiencies. See Klock, *supra* note 20, at 764. Cf. COASE, *supra* note 200, at 13.

281. See McAdams, *supra* note 9, at 1652 ("[W]hen people are otherwise at a loss for how to coordinate, it takes surprisingly little to guide expectations and behavior."). See also Branscomb & Kahin, *supra* note 176, at 19 ("Visions, rather than plans, should guide public/private. . . [standard-setting] strategy.").

282. "When individuals have a common interest in coordinating, as frequently occurs, a legal rule may guide behavior merely by influencing expectations about how others will behave." McAdams, *supra* note 9, at 1651.

283. Both private welfare and public welfare were thus served by the coordination to a common standard in HDTV technology, as described below. Nagel analogizes this to:

the familiar and unproblematic Hobbesian basis for coercion: I may want to be forced to do something as part of a practice whereby everyone else is forced to do the same, with results that benefit us all in a way that would not be possible unless we could be assured of widespread compliance. This is not really forcing people to do what they don't want to do, but rather enabling them to do what they want to do by forcing them to do it.

Thomas Nagel, *Moral Conflict and Political Legitimacy*, 16 PHIL. & PUB. AFF. 215, 224 (1987).

intervention is designed to alter privately efficient behavior, in order to achieve goals of social efficiency.²⁸⁴

As a result, law's coordinative function would appear to involve primarily the provision of the initial impetus necessary to coordinate expectations and hence achieve network efficiencies.²⁸⁵ Beyond this initial step, private action can be expected to approach network efficient outcomes.²⁸⁶ Rather than the imposition of sanctions, the crucial role of law in securities market transition is therefore to provide a preliminary mechanism of coordination, or standardization. It must "[t]ry to identify the productive potential and hitherto unexploited potential of internal institutions and help private actors to realiz[e] it by acting as a catalyst."²⁸⁷

This expressive function of law in securities market transition is well matched to the potential expectations failure arising from the presence of network effects.²⁸⁸ Regulation going beyond a coordinative function, on the other hand, is likely to mismatch the network need. Such overreaching, moreover, carries the greater risks of lock-in and technological stagnation that characterize public standard-setting.²⁸⁹

One way we might conceptualize such a nontraditional role for law is as shaping conventions, which more directly govern the conduct of private market participants.²⁹⁰ Coordination thus produces informal institutions, in the form of 'conventions.' These, in turn, are self-enforcing, because no individual party can improve upon their efficiency unilaterally.²⁹¹ In securities markets, to this effect, preferred or even standardized trading patterns can be characterized as market conventions, which require some initial public impetus to form.

284. Just as law's goal in network transition—coordination—varies from the standard orientation of law—cooperation—so does its tool of choice. While sanctions are the ordinary solution law offers, in securities market transition, law's expressive function may be its most essential contribution. See McAdams, *supra* note 9, at 1650–51 (describing expressive function of law).

285. "In short, standards strategy . . . should be enabling, not prescriptive." Branscomb & Kahn, *supra* note 176, at 19. See *id.* at 4 (in standard-setting, government operates "in the role of enabler").

286. See *id.* at 13 (noting government's role in "convening diverse interests and facilitating cooperation across industry and sectoral boundaries"). For similar reasons, the law's coordinative directions in securities market transition will often be implicit, versus explicit, in nature.

287. Voigt & Engerer, *supra* note 77, at 174.

288. Cf. BREYER, *supra* note 219, at 191 (describing need to match regulatory response to underlying market failure).

289. See Lemley & McGowan, *supra* note 7, at 544 (discussing problems of government standard-setting).

290. The role of conventions has been particularly emphasized, notably, in the study of network effects. See Warneryd, *supra* note 171, at 675 (discussing how conventions are used to solve coordination problems created by network effects).

291. See McAdams, *supra* note 9, at 1694; Voigt & Engerer, *supra* note 77, at 133.

Such conventions in securities market transition might include, among others, the initial determination of whether to rely on banks or securities markets for corporate financing,²⁹² and the subsequent election of a floor-based or electronic trading system, and an order- or quote-driven system.²⁹³ In these cases, law would serve to make one of the possible equilibria focal, by simultaneously highlighting an efficiency preference for a coordinated outcome generally and creating a preliminary referent to help facilitate private bargaining toward one particular coordinated equilibrium. As suggested in the following Section,²⁹⁴ securities regulators can thus help encourage coordination around a network-efficient common standard, including the development of strong securities markets and the use of an electronic trading model, for example.

As this perspective suggests, the coordination of expectations in securities market transition is ultimately as much a private process as a public one. Rather than directives from public to private, it is characterized by the use of incentives.²⁹⁵ The relationship of public and private in securities market transition can thus be thought of as a “loose coupling,”²⁹⁶ in which public and private jointly shape market growth and development.²⁹⁷ In this view, securities market transition arises from initial and limited legal coordination, followed by extended and substantial private action/regulation.²⁹⁸

A regulatory model grounded in private execution of law’s signal is especially appropriate in securities markets, given the centrality of private regulation in strong securities markets.²⁹⁹ In securities markets, interdependent public and private rules are the norm, creating a balance

292. See Black, *supra* note 5, at 832–34.

293. See *supra* note 245.

294. See *infra* Part III.E. As noted above, the precise mechanisms of law’s coordination function are further analyzed in a forthcoming work.

295. See BRAGUINSKY & YAVLINSKY, *supra* note 278, at 9 (suggesting limited efficacy of efforts “to steer . . . developments” toward a market system, as opposed to using “a specific system of

296. Gernot Grabher & David Stark, *Organizing Diversity: Evolutionary Theory, Network Analysis, and Post-Socialism*, in *RESTRUCTURING NETWORKS*, *supra* note 232, at 1, 11.

297. Cf. Coffee, *supra* note 204, at 22.

298. “That is, in place of the dichotomously forced choice of restructuring directed by state agencies versus restructuring via market processes . . . [securities market transition may involve] the possibilit[y] of alternative co-ordinating mechanisms governed neither by hierarchy nor by markets.” Grabher & Stark, *supra* note 296, at 3. See also Walter W. Powell, *Hybrid Organizational Arrangements: New Form or Transitional Development?*, 30 CAL. MGMT. REV. 67 (1987).

299. See Partnoy, *supra* note 6, at 773–75 (discussing ways market reduces agency and information costs on its own). But see *id.* at 775 n.159 (noting risk of extensive role for private regulation).

that ordinarily ought not be disrupted.³⁰⁰ By way of example, one might highlight the complex public-private character of the National Association of Securities Dealers (“NASD”) and the Financial Accounting Standards Board (“FASB”), central institutions in the regulation of U.S. securities markets.³⁰¹ Subject to the oversight and veto of the SEC, these formally private entities³⁰² nonetheless enjoy substantial regulatory authority over the securities markets, arguably playing a greater role in their day-to-day operations than the SEC itself. A public-private model of securities market transition is also favored, then, by the sensitive regulatory equilibrium that has emerged in the securities markets.³⁰³

Law’s coordination of expectations in securities market transition, along the broad lines described to this point, does not readily fit within ordinary models of law’s domain. On the other hand, neither is it without precedent. Rather, it has been manifest in technology standard-setting for some time, including in the development of HDTV technology.

As noted above, the development of HDTV continues to be hampered by divergent technology standards among the leading industrial states.³⁰⁴ Nonetheless, the important milestone of a unified standard within the United States was recently achieved through public coordination of a similar sort to that described herein. At the outset, this involved an extended dialogue among the public and private parties of interest, initiated by government regulators.³⁰⁵ As this process dragged on, the threat of FCC action to mandate its own standard played a decisive role, prompting U.S. private industry to voluntarily form a “Grand Alliance” around a particular digital standard.³⁰⁶

300. See Craig Pirrong, *A Theory of Financial Exchange Organization*, 43 J.L. & ECON. 437, 468 (2000) (stating that caution is balanced against regulation).

301. See Shelley A. Finger, *Jones v. SEC: Upholding the SEC’s Ability to Impose Sanctions in Addition to Those of the NASD*, 51 ADMIN. L. REV. 989, 1007 n.99 (1999); Steve Cocheo, *Enron Comes to Main Street*, A.B.A. BANK. J., May 2002, at 8 (referring to “quasi-public Financial Accounting Standards Board”). See also Alan Palmiter, *Toward Disclosure Choice in Securities Offerings*, 1999 COLUM. BUS. L. REV. 1, 24; Comment Letter of Securities Industry Association to SEC, Regarding Proposed Rule Changes of Self-Regulatory Organizations, Apr. 6, 2001, available at http://www.sia.com/2001_comment_letters.

302. See *Jones v. SEC*, 115 F.3d 1173, 1183 (4th Cir. 1997) (classifying NASD as private party).

303. As described above, even strong network inefficiencies need not undermine the place of private regulation, beyond law’s initial coordination of market participants, given some proximate correlation of private and public interests in network transition. See *supra* notes 283–284 and accompanying text.

304. See *supra* note 143.

305. See Branscomb & Kahin, *supra* note 176, at 14–15.

306. See *id.* Given the long delay in getting to even a U.S. standard, as well as some continued criticism of the standard identified, the government’s coordinative role in HDTV standardization is

This pattern can be favorably contrasted with the FCC's unwillingness to play a coordinative role in the development of AM stereo in the early 1980s. Absent such coordination, private industry proved unwilling to devote the necessary resources to develop the technology. Needless to say, it never took hold.

E. LAW'S COORDINATION OF EXPECTATIONS IN SECURITIES MARKET
TRANSITION

The nature of any public coordination of expectations in securities market transition is necessarily specific to individual circumstances, including the existence of sufficient evidence that network inefficiencies are actually impeding market creation or restructuring. Nevertheless, two preliminary elements of such a coordinative role—the elimination of barriers to coordination, and the government's role as a “market participant”—can be highlighted. In addition, a pair of examples of more affirmative coordination—one in Russia and one in the United States—can be evaluated for additional features of this rough portrait of law's coordinative role.

Among the most basic elements in law's coordination of expectations is the elimination of barriers to its occurrence, whether public or private in nature. Potential antitrust restraints on effective coordination, in particular, must be identified and kept in check if securities market transition is to efficiently occur.³⁰⁷ Rather than barring coordination through antitrust law, regulation may instead need to facilitate its occurrence.³⁰⁸ Again suggesting the unique role of law in market transition, its primary regulatory function in this case would seemingly be to minimize, rather than enhance, restraints on market activity.

The coordination needed to align market expectations across a multiplicity of participants is a form of horizontal agreement among competitors, which ordinarily might be circumscribed by Section 1 of the

probably best recalled as an example, rather than a model, of law's coordinative role in market transition.

307. See Carlton & Klammer, *supra* note 232, at 465; Van Zandt, *supra* note 4, at 980 n.54 (describing Supreme Court's antitrust protection of market-making by Chicago Board of Trade).

308. See Di Noia, *supra* note 31, at 68 (suggesting that “[r]egulation should guide or favour implicit merger, eliminating all obstacles to listing and delisting in exchanges and to trading, implementing, in full, remote access”). As this suggests, antitrust restraints not only on coordination itself, but on the potential increase in market consolidation that can be expected to follow from it, must be carefully managed.

Sherman Act.³⁰⁹ Such horizontal agreement is precisely what efficient transition requires, however, if network effects are to be overcome.³¹⁰ It is therefore essential that antitrust law not ordinarily, let alone invariably, stand in the way of such outcomes.³¹¹ Rather, the economic effects of such ‘collusion’ (i.e., coordination) must be considered under a rule of reason, with particular attention given to network effects’ implications for securities markets.³¹²

Notably, such protection from the strictures of antitrust law has long been a feature of U.S. securities markets.³¹³ The presence of network effects may thus help explain the securities markets’ long-standing, if still ambiguous, immunity from antitrust scrutiny.³¹⁴ While neither the Supreme Court’s decisions in *U.S. v. NASD*³¹⁵ and *Gordon v. NYSE*,³¹⁶ nor the SEC’s pronouncements on implied antitrust immunity have suggested as much, nor have they explicitly tied antitrust immunity in securities markets to the need for effective market coordination, such immunity is

309. See Mark A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 CONN. L. REV. 1041, 1079 (1996). See also Lemley & McGowan, *supra* note 7, at 518; Manisha M. Sheth, *Formulating Antitrust Policy in Emerging Economies*, 86 GEO. L.J. 451, 455 (1997) (describing basis for antitrust law prohibition of horizontal agreements, especially in developing countries). Such resistance to standard-setting among competitors is hardly unwarranted, given the risks of price-fixing and the exclusion of potential competitors that arise from such arrangements. See Lemley, *supra*, at 1079–80. Analogous self-regulation has thus received mixed judicial reviews. See *Silver v. NYSE*, 373 U.S. 341 (1963) (questioning permissible scope of self-regulation under antitrust and securities market legislation); *Fashion Originators’ Guild of America v. FTC*, 312 U.S. 457, 467–68 (1941) (condemning self-regulatory arrangement among market participants asserted to “protect the manufacturer, laborer, retailer and consumer”) (internal quotations omitted).

310. “In fact, a cartel of exchanges may be socially desirable.” Domowitz, *supra* note 33, at 169–70. See Lemley & McGowan, *supra* note 7, at 518 (suggesting horizontal standard-setting agreements should be viewed more leniently in network industries).

311. See Di Noia, *supra* note 31, at 68.

312. See Lemley & McGowan, *supra* note 7, at 509–10 (noting need to deal flexibly with agreements among competitors in network industries). A fascinating account of the need to temper antitrust restraints on coordination in industries characterized by network effects can be found in Carlton & Klammer, *supra* note 232. Coming before the wave of economic analysis and characterization of the network effects phenomenon, Carlton and Klammer foreshadow many of its central elements and implications. Ultimately, however, they fail to characterize, in economic terms or otherwise, the specific economic condition of network effects.

313. Cf. Katz & Shapiro, *supra* note 38, at 439 (noting importance of antitrust exemptions in achieving network compatibility).

314. See Dan W. Schneider, *Evolving Proof Standards Under Section 7 and Mergers in Transitional Markets: The Securities Industry Example*, 1981 WIS. L. REV. 1, 14 (noting Supreme Court’s holding of antitrust law to be largely inapplicable to securities markets because of SEC’s overarching supervisory role). But see *id.* at 13 (noting absence of any specific exemption of securities regulation from antitrust law).

315. 422 U.S. 694 (1975).

316. 422 U.S. 659 (1975). See also *Silver v. NYSE*, 373 U.S. 341 (1963).

both consistent with and readily understood with reference to a network analysis of the securities markets.³¹⁷

Beyond eliminating obstacles to coordination, another feature of the law's role in coordinating securities market transition comes through the government's role as "market participant."³¹⁸ While not without some controversy, the government does play at least some participatory role in securities markets.³¹⁹ Such indirect 'intervention' in the market, moreover, raises fewer efficiency concerns than other possibilities.³²⁰

In coordinating securities market transition, this market participant function may play an important role. Thus, the selection of trading mechanisms and trading sites by the government and its satellite agents can help coordinate the process of market creation and restructuring. The particular investment vehicles selected in such circumstances might play a similar role. The timing and mechanism of debt issues by the government, finally, can also be expected to influence the market transition process.³²¹

317. To be clear, I do not mean to suggest that network effects obviate the role of antitrust law in securities markets and their transition. To the contrary, assurance of access to "essential [network] efficient market. See David McGowan, *Regulating Competition in the Information Age: Computer Software As an Essential Facility Under the Sherman Act*, 18 HASTINGS COMM. & ENT. L.J. 771, 782-83 (1996). In essence, transition to an efficient market, with maximum participation, may necessitate public intervention to prevent the exclusion of participants. Individual participants' refusal to participate is also problematic. Thus, just as traders and exchanges cannot be efficiently denied access in the presence of network effects, efficiency may also dictate that they not be able to operate independent of the dominant network. Recent claims directed against Island ECN, which has failed to submit its best bid and ask prices to the Intermarket Trading System, highlight this issue. Given the network efficiency demands, the SEC has appropriately been questioned for its decision to direct the NASD to drop a suit seeking to force Island ECN to comply. See Gretchen Morgenson, *In a New World, a Puzzling Directive from the SEC*, N.Y. TIMES, Jan. 27, 2002, at C1.

318. See Lemley & McGowan, *supra* note 7, at 541 n.273, 544-45 (describing role of government as "market participant" in network industries). See also Howard S. Dakoff, *The Clipper Chip Proposal: Deciphering the Unfounded Fears That Are Wrongfully Derailing Its Implementation*, 29 J. MARSHALL L. REV. 475, 482-84 (1996) (describing example of government's use of purchasing power to shape network standard).

319. In the United States, present and potential examples include the federal employee retirement savings plan, proposals to allow individual investment of Social Security funds, see Roberta S. Karmel, *Regulatory Implications of Individual Management of Pension Funds: The Challenge to Financial Regulators Posed by Social Security Privatization*, 64 BROOK. L. REV. 1043 (1998), and the possible investment of federal surplus funds in equities, see *The Rubin-Jackson Raid*, WALL ST. J., Feb. 1, 1999, at A20, available at 1999 WL-WSJ 5438938. For the moment, however, the government's most significant "market participant" impact on equities markets comes in its debt functions, which have substantial implications for the stock market.

320. See Lemley & McGowan, *supra* note 7, at 541 n.273; *id.* at 545 ("But even when the government acts deliberately to support (or undermine) a standard, such action does not raise the same sorts of concerns as mandatory standards, at least when the government lacks monopsony power.").

321. See Jody Freeman, *The Contracting State*, 28 FLA. ST. U. L. REV. 155, 168 & n.57 (2000) (highlighting government's influence as market participant).

In Russia, to this effect, the government's early pattern of offering short-term debt at incredibly high rates of return served to strengthen the banking industry, which held much of this debt, and weaken the securities markets, which could not offer a similar return.³²²

In addition to eliminating barriers to effective coordination in securities market transition, and asserting its buying power to assist in the latter process, the law may also play an affirmative role in coordinating transition. Some features of the role of law in directly *facilitating* coordination can be extracted from two examples of such coordination. The first is the Russian Federal Commission on Securities Markets' ("FCSM") role in the establishment of NAUFOR, the major self-regulatory organization of brokers and dealers in Russia, and in the creation of the Russian Trading System ("RTS"). The second is the U.S. Securities and Exchange Commission's ("SEC") pursuit of a National Market System since the early 1970s.³²³

The FCSM's exceptional approach to Russian securities markets received wide attention among observers of law in Moscow during the 1990s. Dating to its establishment in 1993, the FCSM focused as much of its regulatory energy on creating the infrastructure of efficient capital markets in Russia, as on adopting the rules to support that infrastructure—the conventional task of securities regulation.³²⁴ These structural efforts have included work to facilitate the development of reliable nationwide share registration and depository services,³²⁵ to encourage the establishment and growth of unit investment funds (i.e., mutual funds),³²⁶ and to delineate the role of commercial banks in Russia's capital markets.³²⁷

Most important, however, has been the FCSM's role in the establishment of NAUFOR and the RTS. In May 1994, as privatization progressed and the availability of public subsidies declined, and the

322. See Asya S. Alexandrovich, *Bankruptcy Law, an Economic Medicine: How Russia's New Bankruptcy Legislation Facilitated Recovery From the Nationwide Financial Crisis of August 17, 1998*, 34 CORNELL INT'L L.J. 95, 105 (2001).

323. As noted above, the present treatment of these examples is not intended to be comprehensive, but introductory.

324. See, e.g., Brown, *supra* note 102, at 522–25.

325. See Richard P. Cunningham, Jr., *Corporate Governance and Foreign Investment Nightmares in Russia: A Case Study of Unified Energy Systems*, 42 VA. J. INT'L L. 889, 898–99 (2002) (describing depository requirements promulgated under FCSM); Lumelsky, *supra* note 154, at 139–42 (noting FCSM's efforts to reform registration process).

326. See Ratinov, *supra* note 109, at 1795 (describing emerging Russian mutual fund market).

327. See Lumelsky, *supra* note 154, at 127 (describing commercial banks as main threat to FCSM's goal of strong securities market).

demand for private capital consequently began to grow, the FCSM convened a small group of reputable brokers and dealers to help carry forward the evolution of Russia's capital markets.³²⁸ From this group, there emerged the self-regulatory organization NAUFOR. The FCSM delegated substantial regulatory authority to the organization, including the authority to develop market rules and impose discipline.³²⁹ Additionally, it provided technical assistance, through U.S.A.I.D. consultants, to the broker members of NAUFOR and paid the operating expenses of the organization during its first eighteen months of operation.³³⁰

NAUFOR, in turn, established RTS as a NASDAQ-style, screen-based equities trading system for Russia's largest corporate enterprises. This system—it was expected, and it has proven true—would replace the thousands of equity trading operations that had formed across Russia. The FCSM again played a central role, financing purchase of the computers and modems necessary for NAUFOR members to utilize RTS, once more with U.S. assistance.³³¹

Since their establishment, NAUFOR and RTS have emerged as the dominant institutions in Russian equities markets, arguably overshadowing even the FCSM itself. In 1994, with a market consisting of small groups of traders, spread over Russia's fifteen time zones and trading paltry share volumes, the mechanisms of the market's evolution could not have been discerned. It was entirely unclear whether a strong securities market would even be pursued, whether a quote-driven electronic system or a floor-based auction system would be favored, and how Russia's traders would effectively be linked.

With the government's May 1994 signal, as subsequently reinforced by its financial assistance to brokers seeking to participate in RTS, these expectations barriers were effectively overcome. The FCSM's coordinative intervention involved minimal public direction, let alone dictation of outcomes. Rather than insisting upon a quote-based screen system, for example, the FCSM simply convened the initial founders of

328. See FRYE, *supra* note 150, at 127.

329. See *id.* at 127–28.

330. See *id.* at 127.

331. See Michael P. Claudon & Andrey F. Yakushin, *The Sell-Side of the Russian Securities Market*, in *INVESTING IN RUSSIA'S SECURITIES MARKET: AN INDEPENDENT ASSESSMENT OF THE STATE OF PLAY* 34 (Geonomics Institute ed., 1996) (noting U.S.A.I.D. sponsorship of development of RTS). See also FRYE, *supra* note 150, at 48, 127 (noting FCSM's provision of computers and other technical and financial assistance in formation and early operation of RTS).

NAUFOR, and then facilitated their efforts, allowing them to develop and evolve the trading system largely without public intervention.³³²

Several elements of law's coordinative role in securities market transition might be distilled from this first example. Most clear is the public role in bringing the relevant parties together. In essence, the FCSM created the necessary interface for coordination to occur. Additional interrelated elements of law's coordination of market transition suggested by the Russian case are the government's educational/training function and its provision of necessary financing. As to the former, the FCSM helped inexperienced Russian brokers and dealers develop the basic skills necessary for increased efficiency. It further provided needed financing both for the coordinative mechanism of NAUFOR, and for brokers to actually participate in the RTS system.³³³

The coordination of expectations in the case of the FCSM thus involved a careful balance. On the one hand, the public intervention did not dictate outcomes at any level of specificity. Yet it did favor certain trends, as in the selection of an electronic trading mechanism. Such coordination, however, unlike direct regulation, did nothing to prevent market participants from electing to adopt alternative arrangements, if otherwise more efficient.

One can understand the SEC's contribution to the development of the National Market System in a similar light. In the wake of U.S. securities markets' "paperwork crisis" in the late 1960s, the SEC issued a series of policy statements on the utility and form of a more nationalized market in equity shares.³³⁴ In this world, as described by the SEC statements, improved technology and resulting communications linkages among exchanges and other trading systems would enhance trading competition, and thereby increase market efficiency.³³⁵

332. See FRYE, *supra* note 150, at 128.

333. See *id.* at 127. Cf. Cybo-Ottone et al., *supra* note 32, at 251-52 (noting potential use of payments to induce coordination).

334. See J. Robert Brown, Jr., *The Shareholder Communication Rules and the Securities and Exchange Commission: An Exercise in Regulatory Utility or Futility?*, 13 J. CORP. L. 683, 720-21 (1988) (describing SEC call for national transactional system in response to "paperwork crisis"). See also *Structure of a Central Market System*, *supra* note 165; *Structure of the Securities Market*, *supra* note 165.

335. See Brown, *supra* note 334, at 722-24 (describing increased efficiencies from national market); David A. Lipton, *Best Execution: The National Market System's Missing Ingredient*, 57 NOTRE DAME L. REV. 449, 508 (1982) ("The national market system is an innovative effort to link our various securities markets in order to enhance competition, to foster efficient execution, to make available current quotation and sale information and to assure the practicability of best execution.").

The SEC's drive seemingly bore fruit in 1975, with Congress' adoption of Section 11A of the Securities Acts Amendments, in which it directed the commission to "facilitate the establishment of a national market likewise reached its acme in 1975, with the elimination of fixed commissions.³³⁷ Thus, both the SEC's five-year drive for congressional authority to create a National Market System and its contribution to that process largely ended in 1975.

While much ink has consequently been spilled over the success or failure of the National Market System,³³⁸ the coordinative role of law in securities market transition may readily explain this otherwise ambiguous legislative pattern. This understanding begins with an appreciation that, in substantial part, a national market in equity securities now exists in the United States.³³⁹ While its establishment cannot be tied to any particular date, it is clear that technological developments, and their adaptation and adoption by private market participants, have moved U.S. securities markets much of the way to such a system.

The SEC's contribution, in this light, can be seen as providing a regulatory signal that advances in technology and some form of national market in equity shares were essential. This signal, given in the commission's nonbinding policy pronouncements and confirmed by Congress' legislative sanction, served a coordinative, or focal function in the markets.³⁴⁰ Specifically, it led private entities to take the initiative to develop a national trading market analogous to, yet distinct from, that preliminarily defined by the SEC.³⁴¹ In the case of the National Market System, then, the seeming threat of directive public intervention may have

336. 15 U.S.C. § 78k-1(a)(2) (1982).

337. See Edmund W. Kitch, *Hard Thinking about Inevitable Developments?*, 2000 COLUM. BUS. L. REV. 37, 38 (noting elimination of fixed commissions by 1975); A.C. Pritchard, *Markets as Monitors: A Proposal to Replace Class Actions with Exchanges As Securities Fraud Enforcers*, 85 VA. L. REV. 925, 1012 (1999) (describing demise of fixed commissions).

338. See, e.g., Calvin, *supra* note 166, at 810 (suggesting National Market System regulatory effort succeeded); Macey & Haddock, *supra* note 14, at 322–25 (challenging SEC's failure to implement National Market System).

339. See Calvin, *supra* note 166, at 800–01.

340. See Klausner, *supra* note 38, at 800–01, 828–30 (discussing function of "focal points" in corporate law); McAdams, *supra* note 9, at 1651, 1659.

341. See Lemley & McGowan, *supra* note 7, at 545 ("The market can and will ignore government efforts at leadership if its interests lie elsewhere."). Such flexibility should not be overstated, however. Public coordination of expectations does carry some force. See Klausner, *supra* note 38, at 765 n.20 (noting that "voluntary standards are 'a little stronger than voluntary'").

been an additional element in law's coordinative function.³⁴² Private market participants saw fit to develop their own market infrastructure, to avoid the SEC's imposition of its model.

The SEC's role in the creation of a National Market System also suggests one further element of law's coordinative role. In the case of the National Market System, the SEC delineated the broad parameters of a potential market structure in a series of policy statements. This 'model' provided a common starting point from which market participants could move forward. Such government proposals may therefore constitute another component in law's coordination of securities market transition.

Such a facilitative role for law in securities market transition, it should be clear, is not uncontroversial. Rather, no less than Adam Smith dissented from any such public role:

People of the same trade seldom meet together even for merriment or diversion, but the conversation ends in a conspiracy against the publick, or in some contrivance to raise prices. It is impossible indeed to prevent such meetings, by any law which either could be executed, or would be consistent with liberty and justice. But though the law cannot hinder people of the same trade from sometimes assembling together, it ought to do nothing to facilitate such assemblies; much less to render them necessary.³⁴³

These fears may not be entirely unwarranted. In the presence of strong network effects, however, law's facilitation—its coordination—may nonetheless be essential to an efficient process of securities market transition.

Ultimately, then, law matters vitally in securities market transition on account of the presence of network effects that can delay or stymie the efficient creation and restructuring of securities markets. Given as much, a central role for law in the very creation and shaping of securities markets is its coordination of market expectations, by acting as a catalyst in the market-making process.

342. Cf. Branscomb & Kahin, *supra* note 176, at 24 ("As in the HDTV proceeding, perhaps the threat of intervention should be the big stick that is carried but never fully used.").

343. ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF THE NATIONS 145 (Mortimer J. Adler ed., 1990) (1776).

CONCLUSION

In this Article, I have offered the preliminary outlines of an alternative model of securities markets' basic functions and nature, grounded in the microeconomics of network effects and finance theory. This proposed network model of securities markets can serve as a useful tool in seeking better to understand, assess, and shape securities market transition. Its benefits are especially apparent in transitional states such as Russia. Yet the model also suggests useful lessons for market transitions in established economies, including the United States.³⁴⁴

Network effects in securities markets may produce a number of dynamic inefficiencies, including market underutilization, barriers to entry, and technological lock-in, which may delay or even prevent the efficient creation and restructuring of securities markets. In the face of these inefficiencies, the denial of any role for law in strong securities markets is difficult to sustain. Even the service of law as a source of property rights, contract enforcement, and minority investor protections, however, may not capture the full role of law, or even its most significant elements.

Instead, law appears to have a structural role in securities market transition, helping to coordinate market expectations toward the efficient equilibrium of compatible entry. This nontraditional role for law, more directed to process than to outcome, might actually be the central way in which law matters in securities market transition, if not in the presence of network effects generally. This suggests both a greater and a more limited function for law in market transition than previously acknowledged, highlighting the potential need for a public impetus in securities market transition, but also emphasizing the appropriately constrained scope of any such intervention.

Contrary to the traditional assumption that markets will spontaneously emerge, and the recent assertion that law's protection of minority investors is the law that matters in transition, this Article suggests that law has a critical role to play in overcoming network effect obstacles to efficient transition. By helping to coordinate market expectations, law may thus

344. This Article thus joins the growing number of analyses that have found Russia and other transitional states to be useful laboratories for the study of economic and legal transition generally. *See, e.g.,* Coffee, *supra* note 204, at 25–37; Fox & Heller, *supra* note 26, at 1720. Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998). *See also* AHDIEH, *supra* note 10, at 2 (highlighting lessons of Russia's constitutional transition for United States); Edward Glaeser, Simon Johnson & Andrei Shleifer, *Coase Versus the Coasians*, 116 Q.J. ECON. 853, 855 (2001) (drawing on experience of Czech Republic and Poland to evaluate the appropriate regulatory role of government).

facilitate the long-delayed emergence of strong securities markets in Central and Eastern Europe, and ensure the continued modernization of markets in the United States and across the globe.