

Book Reviews

Market Microstructure Theory. Maureen O Hara. Cambridge, Mass.: Blackwell, 1995. 290 pp. \$44.95. ISBN 1-55786-44343.

Whether or not you work in the field of market microstructures, you will appreciate this very readable and insightful book. In a seemingly effortless style, Maureen O Hara surveys the theory side of market microstructure - the study of the process and outcomes of exchanging assets under explicit trading rules. She conveys the ideas underlying microstructure theory before delving into the sometimes complex models that characterize the field. Thus, the book is accessible to the dabbler in microstructure theory and is valuable as well to the serious student of the field. While she will occasionally make reference to empirical findings, her emphasis is on theoretical models. When done reading, one has a grasp of the subject, a sense of continuity in the field, and an appreciation of its applicability to policy questions. O Hara is not only a leading researcher in market microstructure but also a gifted expositor of the subject.

In Chapter 1, O Hara provides a nice introduction to the process of price determination in organized markets. In Chapter 2, she surveys inventory models of market making, including the Poisson order arrival models of Garman and of Amihud and Mendelson, the single-period dealer model of Stoll, the multiperiod dealer models of Ho and Stoll and of Oldfield and O Hara. As she notes, competition in the supply of immediacy (from limit orders or from competing dealers) complicates the determinants of the market spread and the behavior of inventories, and she reviews early work on this issue by Cohen, Maier, Schwartz and Whitcomb, and Ho and Stoll. While some interesting recent theory on this subject (by Laux and by Biais) did not make the book, O Hara does not claim to provide an exhaustive review. The strength of this chapter (and of the entire book) is that it is much more than an annotated bibliography or mere summary.

The dealer models discussed in Chapter 2 seem a natural extension of the 1960s and 1970s literature on portfolio theory and capital asset pricing under risk aversion and homogeneous expectations; yet other factors clearly matter. Investors are not homogeneous in their information. In the 1980s, models of asymmetric information and signaling became new paradigms for corporate finance, and similarly, they provided a new way of looking at market microstructure issues. The remaining seven chapters of the book develop microstructure theory primarily on the basis of the adverse information paradigm.

In Chapter 3, O'Hara nicely summarizes the papers of Copeland and Galai, and Glosten and Milgrom, which derive a bid-ask spread for a risk-neutral market maker in the presence of informed traders. The dealer sets a spread sufficient to earn from the uninformed what is lost to the informed, an idea first discussed by Jack Treynor writing under the pseudonym, Bagehot. As O'Hara notes, Glosten and Milgrom go on to establish the properties of the price process implied by their model of information. Price changes are serially uncorrelated (whereas in an inventory/order processing model sequential price changes are negatively correlated). The well-known Easley and O'Hara model, in which trade size provides information, is clearly summarized. (O'Hara avoids the tendency of many authors to complicate their own work.) Chapter 3 contains a useful appendix on Bayesian learning and its use in updating quotes on the basis of observed transactions.

Chapter 4, titled Strategic Trader Models I, covers the 1985 Kyle model and some of its extensions. The word *strategic* is used because the informed trader (who has exclusive access to information) affects prices by his trades and must determine how much to trade. In addition, Kyle solves for the rational market clearing price that reflects the information contained in the order flow. O'Hara reviews extensions of Kyle that allow for multiple informed traders and for risk averse traders. O'Hara also addresses the question of how trading mechanism affects equilibrium outcome for prices and trades. For example, she notes that a market that permits traders to condition demands on price, including the final equilibrium price, will have a different outcome than an otherwise identical market in which the trader may specify only one quantity. She reviews Kyle's extension to the contingent demand case. Chapter 4 contains a helpful appendix on rational expectations models.

Chapter 5, "Strategic Trader Models II," recognizes that the uninformed or noise traders are not naive. They have reason to adopt a trading strategy that recognizes the presence of informed traders. O'Hara reviews the work of Admati and Pfleiderer, Forster and Viswanathan, Seppi, and others. She provides a helpful caveat that these

increasingly complex strategic models, developed with a game theoretic approach, are solved only with restrictions on the agents' strategies. Consequently their empirical validity depends on the validity of the strategies, as well as other aspects of the models.

Chapter 6, *Information and the Price Process*, focuses on the short-run dynamics of prices. In the model of Glosten and Milgrom the market maker sets bid and ask prices conditional on all information, including the information in trades at the bid or ask. So, observing the price conveys no new information, and the price process is a martingale. Similarly, in the Kyle model, the market maker observes the (informed plus uninformed) order flow before establishing the price, and again the price provides no new information. By contrast, Chapter 6 examines models in which traders learn from the sequence of prices or volumes, somewhat in the way technicians say they learn. O'Hara reviews noisy rational expectations models of Brown and Jennings, and Grundy and McNichols, in which several traders receive different signals of an asset's value. Under appropriate conditions, the asset's value can be inferred from the sequence of prices. O'Hara also reviews models in which volume, or lack thereof, conveys information. On this subject she covers the Blume, Rasley and O'Hara paper in which traders learn from price and volume and the Rasley and O'Hara paper in which traders learn from the absence of volume (as well as from volume).

Chapters 7, 8, and 9 adopt a more applied orientation (if that is possible in a theory book). Chapter 7 reviews papers that examine the effect of market design on market performance. Three questions are nicely treated. The first asks what market structure (dealer, auction, continuous, call) most effectively limits the power of informed traders while still providing incentives for information collection. O'Hara focuses, in particular, on Glosten's analysis of the specialist and Madhavan's analysis of call versus continuous markets. The second question asks how a limit order book affects the pattern of observed prices. O'Hara reviews Rock's analysis of this question. The third question asks how dynamic hedging affects price stability. O'Hara focuses on papers by Gennotte and Leland; Kleidon and Pfleiderer; and on the sunshine trading paper of Admati and Pfleiderer.

Chapter 8 reviews various approaches to liquidity, the effect of multiple markets on liquidity, block trading, and the role of stock index futures on liquidity. Chapter 9 examines some policy issues including: Is market transparency a good thing? What is the effect of trader anonymity? What is a good market design?

The book is 280 pages long with references to about 170 market microstructure papers. O'Hara provides a guided tour through these many references with stops at the most important guideposts. Given

that the tour is only one of the theoretical work and not of the equally large, if not larger, body of empirical work, one is left with a real appreciation that a viable subfield of finance has been established.

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Financial Innovation and Risk Sharing. Franklin Allen and Douglas Gale, Cambridge, MA: MIT Press, 1994. 379 pp. \$40.00. ISBN 0-262-01141-7.*

In the last 30 years, new financial instruments have been introduced at an unprecedented rate. From standardized options and financial futures to mortgage-backed securities and interest rate swaps, the scope and the magnitude of financial innovations has been extraordinary. The theory which models financial innovation is still young, but is also beginning to experience rapid growth. Franklin, Allen and Douglas Gale's book could not be more timely. As the first book focused on the theory of financial innovation, it is almost assured to be a success¹ That success will be well deserved as Allen and Gale have done a nice job of laying the foundation for a theory of financial innovation built on the sharing of risk.

Financial Innovation and Risk Sharing offers a theoretical look at the endogenous introduction of securities. The book does not provide a comprehensive survey of the theoretical research relating to financial innovation,² nor does it extend that theory. Instead, the book motivates the authors' approach to studying financial innovation and then presents a coherent and directed look at that approach, based on the authors' collected works on the subject.

Allen and Gale use risk sharing as both the primary incentive for financial innovation, and the ruler by which the efficiency of innovation is judged. Markets are initially incomplete and wealth is randomly distributed across various states.

Investors trade securities in order to smooth their income across states. The authors analyze the choice of securities to be marketed un-

* Chester Spatt acted as Executive Editor for this review.

¹ There are other books which address issues of financial structure and innovation. For example, see Miller (1991) and Townsend (1990).

² Surveys exist which examine various issues dated to financial innovation. To mention a few: Allen (1989) (reprinted as Chapter 11) discuss the theory concerning the optimality of debt and equity, as well as the theory of financial innovation. Harris and Raviv (1992) survey contract theory. Duffie and Rahl (1995) present a broad look at the theory of financial innovation.