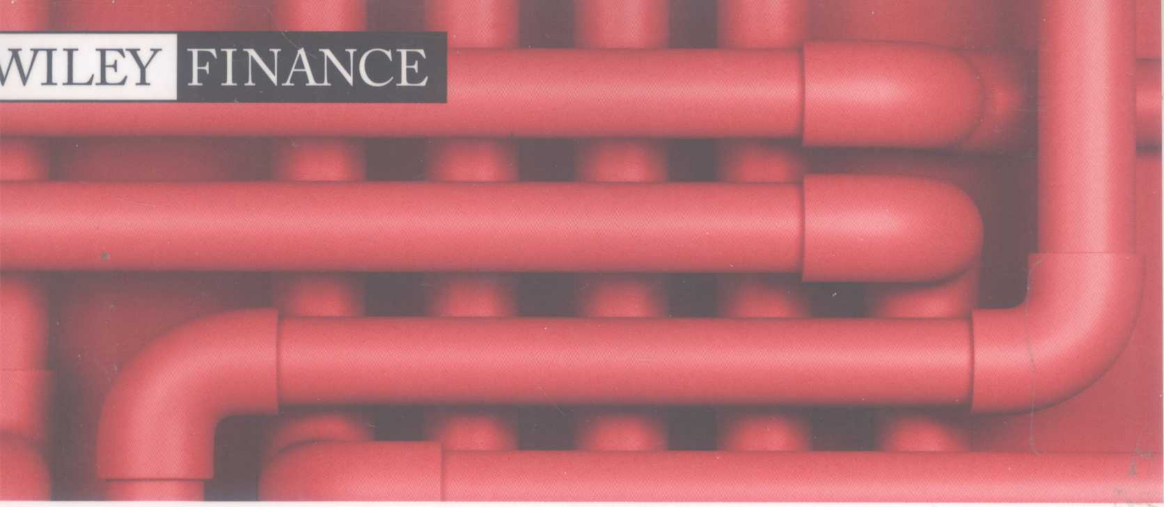

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Micro Markets WORKBOOK

A Market Structure Approach to Microeconomic Analysis

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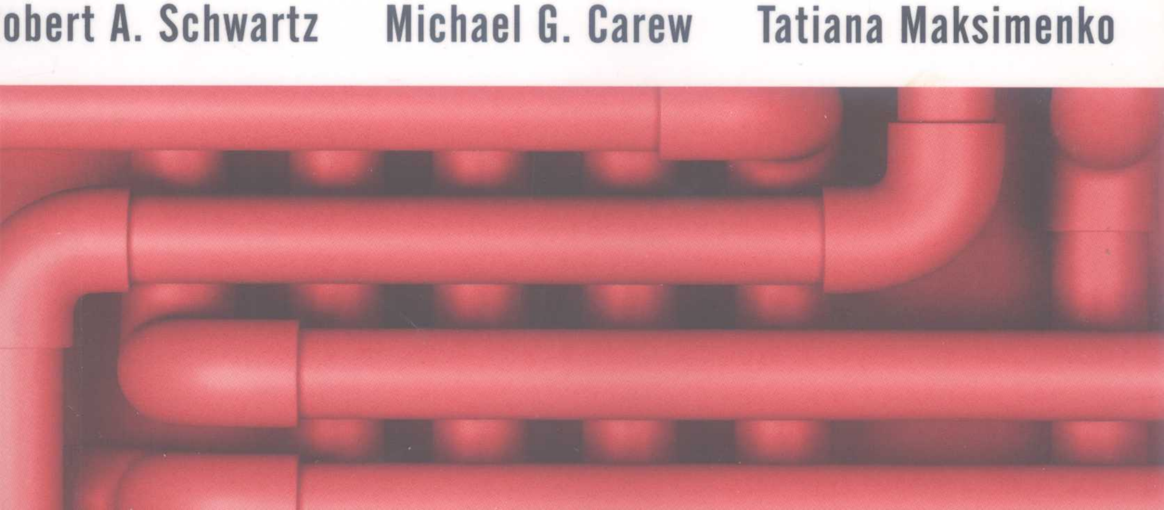

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Preface

This workbook provides readers of *Micro Markets* with a convenient means of reviewing material presented in the text, and of enhancing their understanding of the principles of microeconomic theory. It is designed for use in advanced undergraduate and graduate presentations of microeconomics.

Microeconomics is the study of the behavior of individuals and households as they make consumption and production decisions and interact with each other in a micro market. A micro market is the market for a specific good, service, factor of production, or asset (e.g., books, haircuts, dentists, a house, a factory, or shares of a firm's common stock).

The study of the detailed operations of a micro market (e.g., how orders are submitted, handled, and turned into trades) is called *market microstructure*. Microstructure analysis, a relatively new field in financial economics, has to date been applied to financial markets with a specific focus on equity markets. Being based on microeconomic principles, equity market microstructure is indeed a good application of much traditional microeconomic theory, and it is used to this end in the Micro Markets textbook. We trust that the microstructure application will underscore for you the applicability of microeconomics to a wide range of issues that we face regarding real-world markets.

And so, *Micro Markets* turns to the equities markets as a consistent application of microeconomic theory. This workbook, while also referring to the equities markets, expands the application of microeconomic principles to other markets. We also underscore several realities of markets that are stressed in *Micro Markets*. Real-world markets are not perfectly liquid, frictionless environments. Rather, they are replete with trading costs and blockages. The information sets that agents base their decisions on can be enormous, complex, incomplete, and imprecise. An array of other factors ranging from dishonest and irrational behavior to principal-agent problems and systemic risk perturb the allocational efficiency of a competitive, frictionless, free market environment. Occasionally, the micro markets suffer through widespread, macroeconomic downturns. In the latter chapters of the text and here in the workbook we consider the events that constitute the financial crisis of 2007–2009 as both an example and a test of market based microeconomic theory. All of this raises a fundamental question of the role that government should play in regulating and otherwise controlling micro markets. This workbook should give you further food for thought concerning this vitally important issue.

The workbook provides a convenient track for both simultaneous use while reading *Micro Markets*, and as a study vehicle for summarizing the course. Each of its eight chapters focuses on its corresponding chapter in the textbook. Each chapter in the workbook comprises eight sections that permit the student to anticipate the textual reading as well as subsequent review. The workbook chapter sections are:

1. Learning objectives for the chapter.
2. Chapter summary.
3. Glossary of terms employed in the chapter.
4. Current events reports that illustrate the chapter concepts and attendant questions.
5. Multiple-choice review questions.
6. Applications and issues.
7. Recommended readings for further research.
8. Answers to the multiple-choice review questions.

Throughout, our intention is also for this workbook to be a convenient and thought-provoking resource for classroom discussion and assignments.

Contents

CHAPTER 1

Introduction to Market-Driven Economics

LEARNING OBJECTIVES

- **Understand what microeconomics is all about.** Economics is the study of how societies allocate their scarce resources among competing needs. You should also begin to appreciate the role that market architecture plays in the operations of a marketplace.
- **Understand why scarcity implies trade-offs.** Because individuals (and societies) do not possess unlimited resources, scarcity exists. In choosing both broad economic goals and specific goods and services, societies and individuals curtail their pursuit of some goals or goods/services in order to obtain more of others. In other words, to obtain more of one goal or good/service, the decision maker *must* settle for less of some other goal or good/service. This trade-off lies at the heart of an economic problem.
- **Start to become acquainted with the equities markets and how trades occur.** Buyers and sellers of equity securities (common stock) come together to trade in an equities market. Buyers and sellers have differing estimates about the future value of various stocks, and also different cash flow needs. The buyers and sellers make their purchases and sales based on their individual needs and estimates of future values.
- **Identify the topics covered in microeconomics.** Microeconomics is the study of how individual economic units (households and firms) determine both what and how many goods and services to consume and to produce, respectively. Households' consumption decisions are made in light of their evaluations of the satisfaction (utility) that they receive from the different goods and services that they consume. Firms' production decisions are based upon their technological capabilities and the

cost of obtaining the factors of production which are provided to them by households and other firms.

- **Identify the costs that matter in making decisions.** While consumers seek goods and services that provide them with the highest satisfaction (utility), their consumption is limited by their available income and wealth, and by the cost of the resources that they wish to acquire. Similarly, producers consider consumers' appetites for goods and services, and will not produce units of a good/service when the cost of obtaining them exceeds the value of what they produce to consumers.
- **Understand the use of marginal analysis for making decisions.** Consumers and producers are rational. They assess the cost and satisfaction (utility) of each additional unit of consumption or production. When the cost of producing *an additional unit* exceeds the consumers' appetite *on the margin*, total satisfaction (utility) must decline and production/consumption should be curtailed. On the other hand, if the cost of *an additional unit* is less than the consumers' utility *on the margin*, total production/consumption should be increased.
- **Understand the different ways of classifying and measuring costs.** Costs are classified as either fixed or variable. In the short run some costs are fixed; in the long run all costs are variable. The cost of any output can be measured as total cost, average cost, and/or marginal cost.
- **Why markets are a good, but not a perfect, way to allocate resources.** There are several different methods of allocating scarce resources including coercion, moral authority, and privilege. Free markets tend to achieve an efficient allocation of scarce resources across their alternative uses. Free markets, however, can also fail to achieve textbook efficient results. The chapter introduces you to an array of causes of market failure that are returned to in later chapters of the book.

CHAPTER SUMMARY

In this introductory chapter we establish several key learning goals and concepts that will be themes in our market structure presentation of microeconomics. Here are some highlights:

1. Microeconomics is the study of how economic units determine what and how many goods and services to consume (households) and produce (firms), and what and how much of the factors of production (labor and capital) to supply (households) and to use in production (firms).
2. Microeconomic theory formalizes basic principles concerning how best to resolve the trade-offs involved in consumption, production, and

other allocation decisions. It does so by tying assumptions together to form an economic model. The assumptions individually need not be perfect reflections of real-world economic activity. Theory, by its nature, is abstract, while real-world markets can be very intricate. The hallmark of a good theory is that, although abstract, it provides insights that enable us to understand better the operations of the real-world, micro markets.

3. Market structure refers to the architectural realities of actual marketplaces. These encompass the institutional features that pertain to market design and operations.
4. The power of microeconomic theory can be better understood by applying it to an actual, real-world market. Throughout the book, as we extend our theoretical discussion to a nonfrictionless market characterized by imperfect information, trading costs and blockages, we focus on the equity markets. Specifically, we consider the secondary markets where already issued equity shares trade (not the primary markets where new shares are issued).
5. Equity market microstructure, a relatively new field in financial economics, considers the processes by which orders are submitted to a nonfrictionless marketplace, are handled in the marketplace, and are turned into trades and transaction prices.
6. Market participants (buyers-consumers and sellers-producers) interact to set the prices of goods and services in the context of specific institutional environments. Through price setting, markets allocate scarce resources to participants according to the relative prices that they face, their incomes (or wealth positions), and their tastes for the various goods and services as described by their utility functions (and also by technology which is described by production functions, a topic that we discuss in Chapter 5).
7. A vast array of different markets exists, including commodities (such as coal, crude oil, wheat, and wood), labor (full-time and part-time), managerial resources, and capital (physical and financial.) Equities markets (one of the markets for financial capital) are an excellent target for market microstructure analysis.
8. We have addressed the question, how well do markets function? On one hand, there is the positive force exerted by Adam Smith's invisible hand. On the other hand, the forces of competition that the invisible hand represents are impeded by some agents having market power (at the extreme, monopoly power), and by various other factors including trading costs, imperfect information, and systemic risk.
9. To understand better just how prices and transactions' volumes are determined in an equity market based on the order-flow received by the

market, and to appreciate that trading in an equity market involves making tactical decisions, we have noted that the market can be thought of as an ecology. Traders interact with each other for a multiplicity of motives, and a multiplicity of motives is, in fact, required for an equity market to operate effectively.

10. We have presented seven key concepts: *ceteris paribus*, fixed costs versus variable costs and return, long-run versus short-run analysis, equilibrium, marginal analysis, elasticity, and maximum versus minimum versus optimum. These concepts underlie much of the discussion in the rest of the book. It is important to have a good grasp of them. If you feel comfortable with these concepts you will appreciate your study of this market structure presentation of microeconomics.

GLOSSARY

ceteris paribus Latin for "other things being equal." A methodological treatment that enables the net effect of one variable (an independent variable) on another variable (a dependent variable) to be obtained while holding all other relevant independent variables constant.

demand curve A graph of the relationship between the quantity demanded of a good and the price of the good, all else constant.

effective demand The amount of a good that a buyer actually be willing to purchase.

elasticity The responsiveness of demand or supply to one of its determinants. For instance, let Y be a dependent variable and X be an independent variable. The elasticity of Y with respect to X is the percentage change in Y divided by the percentage change in X. Perhaps X is the quantity of a good demanded and Y is the unit price of X (own price elasticity). Or Y could be income (income elasticity), or Y could be the price of another good that is related in consumption (cross-price elasticity).

equity market microstructure The analysis of the detailed way in which orders to trade equity shares are submitted to the market, handled by the market, and turned into trades and transaction prices. Of particular importance is how the design and operation of a specific market permits price discovery and cost containment.

equities The indicia of ownership in an economic enterprise; typically common stock.

fixed costs Costs of production that do not vary with output. Fixed costs exist in the short run; in the long run, all costs are variable.

frictional and frictionless These opposites reflect the realities of market frictions (the costs, blockages, and imperfect information) compared to a theoretical frictionless market without costs and characterized by perfect information.

initial public offering (IPO) The first public sale of equity shares by a previously privately owned enterprise.

liquidity The characteristic of a micro market that permits buyers and sellers to trade reasonably quickly, in reasonable amounts, at reasonable prices. An attribute of the shares of an asset that, along with risk, affect the expected return and hence the price of an asset.

macroeconomics The economics of national or regional production and consumption emphasizing the formulation of economic policies. Macroeconomics stresses the importance of flow variables such as aggregate income, production, employment, and interest rates, while microeconomics stresses the importance of variables such as relative prices.

marginal utility The change of utility obtained from consuming a good or service with respect to the change in the amount of the good or service consumed, all else equal.

marginal values The change in the value of a depend variable with respect to the change in the value of an independent variable. For instance, with the total cost of production being an increasing function of the total amount of a good or service produced, the marginal cost of production is the amount by which the total cost increases as output increases.

market architecture The design of a trading venue, including the rules and regulations that govern trading.

market breakdown (failure) When a specific market fails to achieve an efficient market outcome from a public policy point of view. The failure can be in terms of price established and/or quantity traded. It can be attributable to factors such as externalities, asymmetric information, or moral hazard problems. In the extreme, a market can actually shut down (that is, totally ceases operations).

market efficiency The quality of a market as manifested in liquidity supply, cost containment, and the sharpness of price discovery.

market microstructure The composition and structure of the market for a particular product (good or service).

microeconomic theory The study of how markets operate. A common definition is the analysis of the allocation of scarce resources between competing ends.

microeconomics The economics of household and firm production and consumption of goods and services, and the supply of factors of production.

movements along a curve For instance, the coordinated change in the price of a good and the quantity of the good that is purchased, all else held constant. In contrast, when variables other than the price of the good change, the curve itself changes position.

optimal amount Neither the maximum nor the minimum, an optimal amount is just the right amount. For instance, in a two-good universe (X and Y), the optimum amount is the best quantity of X to consume when more or less of good X can be purchased. For a household, when the inputs of all goods (X, Y, etc.), have been *optimized*, the decision maker's utility has been *maximized*. Similarly, a firm's profits are maximized when its factors of production (labor and capital) are being used in optimal amounts.

primary markets The market for the offering of new shares of a specific equity (common stock). In secondary market trading, the term is also used to designate the main market where the stock trades when there are several other, smaller markets that orders can be sent to.

secondary markets The markets where already issued equity shares are traded (for instance, the New York Stock Exchange, NASDAQ, the London Stock Exchange, or Deutsche Börse).

shift of a curve Consider, for instance, the undefined consumption good, *X*. Let the demand for *X* be a function of the price of *X*, the price of a related good (call it *Y*), income, and the consumer's tastes as described by a utility function. A change in the price of *X* with all other relevant variables constant (price of *Y*, income, and tastes) results in a move along the consumer's demand curve for *X*. A change in any of the other variables (either the price of *Y*, income, and/or tastes) with the price of *X* constant, results in a shift of (not a movement along) the consumer's demand curve for *X*.

utility value The value to a consumer of a good or service measured in terms of the pure pleasure obtained (or pain avoided). Utility is an abstract, theoretical concept that is represented by ordinal, not cardinal numbers.

variable costs The costs of producing a good that vary with the amount of the good produced. In the long run, all costs are variable.

wishful demand The amount of a good that a buyer would ideally like to consume, but cannot necessarily obtain because he or she does not have the resources to make the purchase.

CURRENT EVENTS DISCUSSIONS

1. Internationally, Markets and Competition Are Viewed Differently. Is Monopoly a Threat to Market Competition?

As we proceed with our examination of the microstructure of markets, we must always keep in mind that different markets for different commodities in different countries have their own individual architectures, participants, rules, and regulators. The focus of our discussion is on the model of the American equities markets, which have evolved over a period of more than 200 years. Not all markets have that length of experience or the volumes and diversity of participants. Therefore, as we go forward using the U.S. equities markets as our model, we should always recognize that the principles we deduce from our observations should be projected with care upon the other markets of the world.

The following article illustrates the particular views of U.S. and European market regulators toward the issue of "market power" and the prospects of monopoly control of a market.

Oceans Apart

Europe still seems to have less faith than America in the ability of the free market to tame monopolies.

America fosters competition; Europe protects competitors. That jeer is tossed across the Atlantic pretty frequently. Watchdogs on both sides of the ocean play down the idea that the Europeans bite more often than the Americans. But although the gap is far narrower than it was a few years ago, it still exists. The commission (the European Union's antitrust authority) is much likelier than the American Department of Justice (DoJ) to fear that a merger of two big firms or the behaviour of a dominant one will force rivals out of business, raising prices and restricting choice. The Americans are more confident that if powerful firms abuse their strength, they may attract competition rather than crush it.

American regulators seem to have become more convinced of this argument than their European counterparts have. The saga of Microsoft illustrates the difference. In 1998 the DoJ charged that by bundling Internet Explorer, its web browser, with Windows, its operating system, Microsoft sought to extend its desktop monopoly into browsers, freezing out Netscape, its main competitor.

The American courts ruled against Microsoft and in April 2000 ordered that the software giant should be split into two—one part owning the operating system and the other owning all other applications. The next year an appeals court said that Microsoft's actions did not warrant dismemberment. The DoJ settled for far more lenient remedies. These would stop Microsoft from bullying PC manufacturers into favouring its add-ons to Windows, but would leave the firm and its most important product intact.

The difference in approach is partly explained by economic philosophy. In America there is a greater faith that markets will fix the problem of monopolies and a belief that market leadership in high-tech is transient. A new product may make today's dominant technology redundant tomorrow. Firms compete for the market as much as in it: temporary monopoly is the reward for innovation.

But in a market where one firm is king, such practices can take on a sinister guise. Dominant firms might use loyalty rebates to stop others from becoming large enough to pose a serious threat. Bundling can be a tactic to compel consumers to buy several things from a firm with a monopoly in one product. It is hard to establish