A Short Course in Intermediate Microeconomics with Calculus

This book provides a concise treatment of the core concepts of microeconomic theory at the intermediate level with calculus integrated into the text. The authors, Roberto Serrano and Allan M. Feldman, start with consumer theory and then discuss preferences and utility, budget constraints, the consumer’s optimal choice, demand, and the consumer’s choices about labor and savings. They next turn to welfare economics: When is one policy better for society than another? Following are chapters presenting the theory of the firm and profit maximization in several alternative models. Next they discuss partial equilibrium models of competitive markets, monopoly markets, and duopoly markets. The authors then provide general equilibrium models of exchange and production, and they analyze market failures created by externalities, public goods, and asymmetric information. They also offer introductory treatments of decision theory under uncertainty and of game theory. Graphic analysis is presented when necessary, but distractions are avoided.

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Preface

Welcome to this intermediate microeconomics course. At this point, you should already have taken an introductory economics class that exposed you to the method and main ideas of the two parts of economic theory, microeconomics and macroeconomics. In addition, you should have taken a calculus course. The reason is simple: calculus is basic to microeconomics, much of which is about maximizing something (for instance, utility, or profit), or about minimizing something else (for instance, costs). Calculus is the area of mathematics most suited to maximization and minimization problems; using it makes microeconomic theory straightforward, transparent, and precise.

Microeconomics begins with the study of how economic agents in the private sector (consumers and firms) make their decisions. We start this course with a brief introduction, in Chapter 1. Then we turn to the main events: Part I of our course (Chapters 2 through 7) is about the theory of the consumer, and Part II (Chapters 8 through 10) is about the theory of the producer – that is, the firm. Part I provides a foundation for the demand curves that you saw in your principles course, and Part II provides a foundation for the supply curves that you saw.

Most economic decisions are made in the private sector, but governments also make many important economic decisions. We touch on these throughout the course, particularly when we discuss taxes, monopolies, externalities, and public goods. Our main focus, though, is the private sector, because in market economies the private sector is, and should be, the main protagonist.

Next, Part III (Chapters 11 through 13) combines theories of the consumer and the producer into the study of individual markets. Here, our focus is on different types of market structure, depending on the market power of the firms producing the goods. Market power is related to the number of firms in the market. We begin, in Chapter 11, with the case of perfect competition, in which each firm is powerless to affect the price of the good it sells; this is usually a consequence of there being many firms selling the same good. In Chapter 12, we analyze the polar opposite
case, called \textit{monopoly}, in which only one firm provides the good. We also consider intermediate cases between these extremes: in Chapter 13 we analyze \textit{duopoly}, in which two firms compete in the market. One important point that we emphasize is the strong connection between competition and the welfare of a society. This is the connection that was first discussed by Adam Smith, who wrote in 1776 that the invisible hand of market competition leads self-interested buyers and sellers to an outcome that is beneficial to society as a whole.

Our analysis in Part III is called \textit{partial equilibrium} analysis because it focuses on one market in isolation. In Part IV (Chapters 15 and 16), we develop models that look at all markets simultaneously; this is called \textit{general equilibrium} analysis. The general equilibrium approach is useful to understand the implications of interactions among the different markets. These interactions are, of course, essential in the economy. A main theme in Part IV is the generalization of the invisible hand idea that market competition leads to the social good. We shall see that under certain conditions there are strong connections between competition in markets and the efficient allocation of resources. These connections, or \textit{fundamental theorems of welfare economics}, as economists call them, are important both to people interested in economic ideas and to people simply interested in what kind of economic world they want to inhabit.

Finally, Part V (Chapters 17, 18, and 20) focuses on the circumstances under which even competitive markets, left by themselves, fail to allocate resources efficiently. This is a very important area of study, because these market failures are common; when they occur, governments, policy makers, and informed citizens must consider what policy interventions would best improve the performance of the unregulated market.

Our course includes two chapters that are not really part of the building-blocks flow from consumer theory through market failure. Chapter 14 is a basic introduction to game theory. The use of game theory is so prevalent in economics today that we think it is important to provide a treatment here, even if the theories of the consumer, the firm, competitive markets, and market failure could get along without it. A similar comment applies to Chapter 19, on uncertainty and expected utility. Although most of this course describes decision problems and markets under complete information, the presence of uncertainty is crucial in much of economic life, and much modern microeconomic analysis centers around it. Some instructors may choose to ignore these chapters in their intermediate microeconomics courses, but others may want to cover them. To free up some time to do that, we offer some suggestions:

We include two alternative treatments of the theory of the firm in this book. The first is contained in Chapter 8, the single-input model of the firm, which abstracts from the cost minimization problem. The second is contained in Chapters 9 and 10, the multiple-input model of the firm, which includes the cost minimization problem. Chapter 8 can be viewed as a quick route, a “highway” to the supply
curve. An instructor looking for time to teach some of the newer topics covered in Chapter 14 or Chapter 19 might cover Chapter 8 and omit Chapters 9 and 10. Another shortcut in the theory of firm section would be to omit Chapter 10, on the short-run, multiple-input model. Furthermore, our chapters on market failure generally contain basic theory in their first sections and applications in later sections. Instructors might choose to include or omit some of the theory or some of the applications, depending on time and interests.

This book has grown out of the lecture notes that Roberto Serrano developed to teach the Intermediate Microeconomics course at Brown University. The notes were shared with other instructors at Brown over the years. One of these instructors, Amy Serrano (Roberto’s wife), first had the idea of turning them into a book: “This looks like a good skeleton of something; perhaps flesh can be put around these bones.” Following this suggestion, Roberto and Allan began work on the book project.

We are grateful to all our Intermediate Microeconomics students who helped us develop and present this material. Martin Besfamille, Dror Brenner, Pedro Dal Bó, EeCheng Ong, and Amy Serrano were kind enough to try out preliminary versions of the manuscript in their sections of the course at Brown. We thank them and their students for all the helpful comments that they provided. Amy also provided numerous comments that improved the exposition throughout, and her input was especially important in Chapter 7. EeCheng provided superb assistance completing the exercises and their solutions, as well as doing a comprehensive proofreading and editing. Elise Fishelson gave us detailed comments on each chapter at a preliminary stage; Omer Ozak helped with some graphs and TEX issues; and Rachel Bell helped with some graphs. Barbara Feldman (Allan’s wife) was patient and encouraging. We thank the anonymous reviewers selected by Cambridge University Press for their helpful feedback, Scott Parris and Chris Harrison, our editors at Cambridge, for their encouragement and support of the project, and Deborah Wenger, our copy editor.