THE ECONOMICS OF ASYMMETRIC INFORMATION

Also by Brian Hillier

Macroeconomics: Models, Debates and Developments

The Macroeconomic Debate: Models of the Closed and Open Economy

THE ECONOMICS OF ASYMMETRIC INFORMATION

Brian Hillier

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*To my children
Michael and Victoria (Vicky Sox)*

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Preface

Since the 1970s there have been rapid developments in the economics of asymmetric information. This sphere of economics deals with situations where agents on one side of the market know something that agents on the other side do not: for example, a seller of a second-hand car may have knowledge of its qualities unknown to a potential buyer. Such situations are very different from those dealt with in the more conventional analysis which assumes that buyers and sellers have the same information about goods being sold. On reflection, however, situations of asymmetric information seem to be widely prevalent in the real world, so that moving beyond the conventional analysis yields fascinating and handsome rewards.

This book makes the economics of asymmetric information accessible to students at an intermediate to advanced undergraduate level. It is also hoped that graduate students and others looking for a readable introduction to the area will find this text to be interesting. Furthermore, since the book is organised in terms of individual markets and topics such as auctions, it is hoped that it will prove useful as a reference or revision source for anyone interested in those specific areas. The terms ‘he’ and ‘his’ are used throughout the book only to avoid the clumsier alternatives, ‘his/her’ and ‘she/he’ and to render the arguments easier to follow. There is no intention to offend.

The level of mathematical sophistication required of the reader is kept to a minimum, and much use is made of verbal reasoning and diagrammatic analysis. The intention is to take the reader beyond the level of coverage possible in an intermediate microeconomics text, such as Varian (1992), which has an excellent chapter on information, without requiring a level of mathematical expertise beyond that of an intermediate-level student.

Much of the material in the book has been tried and tested for a number of years at the University of Liverpool, where Tim Worrall and I taught a third year microeconomics course and offered an option on Information Economics to Master-level students. In our experience, students take naturally to the strategic implications of behaviour under asymmetric information and the course was well received.

Our course was of the standard length at Liverpool; that is, about twenty lectures plus half a dozen tutorials. We did not cover all the material included in this book in the course: we omitted a couple of topics each year in order to fit

the timetable. I recommend that anyone considering using the book as a text for a course, or part of a course, should cover the first four chapters to introduce the key issues of asymmetric information, cover Chapters 5–7 to introduce risk aversion (unless the students have already grasped these ideas from an earlier microeconomics course), and then pick and choose from the remaining chapters according to their own timetable and interests.

I thank Tim Worrall, now at the University of Keele, for his help and patience as we discussed how best to present certain topics in the classroom as well as in the book. I must also thank Murad Ibrahimo, whose Ph.D. work at the University of York, with which I was involved as supervisor before moving from York to Liverpool, first kindled my interest in the economics of asymmetric information. Many of the students on the course at Liverpool also deserve my thanks; in particular, I thank Martin Bayntun, Steve Brice, Jon Gershlick and Ben Sanderson. Last, but not least, I thank Jane Powell, the Commissioning Editor at Macmillan: I hope she has found a good solution to her selection problem and commissioned a good book.

BRIAN HILLIER

Introduction

The wisdom of Solomon

A good introduction to the idea of asymmetric information is provided by the well-known story of the wisdom of Solomon, as told in I Kings, 3. In this story, King Solomon, in a dream, has his wish for ‘an understanding heart to judge thy people, that I may discern between good and bad’ granted by God. Solomon’s wisdom is illustrated by a story concerning two women who appear before him seeking judgement.

The women are described as two harlots, or prostitutes, who live together in a house. The women have a young baby with them and each claims to be its mother. Each woman claims that although the other woman also gave birth to a baby it died in the night, and that the other woman is the mother of the dead child and not of the living one. Solomon responds to the women’s contradictory claims by instructing a servant to bring him a sword and to divide the child in half.

On hearing Solomon’s command, the true mother of the child responds by saying that she is not the mother of the child and that it should be given to the other woman. The other woman says that the child should indeed be divided in two. Solomon is then able to tell who is the real mother and instructs that the child should not be killed but given to the true mother, who was prepared to give it away rather than see it die.

This story illustrates a number of points which recur throughout this book. First, there is a clear asymmetry of information; the women know whose baby the child is, but Solomon does not. Second, there is a conflict of objectives; Solomon would like to have the information that is available to the women in order to better achieve his goals. Third, the true mother would like to transmit the information but cannot easily do so because of the actions of the other woman, who also lays claim to the child. Finally, Solomon devises a contract to offer the women, which causes them to reveal their information to him.

We shall see in what follows that these points are mirrored in many market situations. Consider, for example, an insurance company offering accident insurance to car drivers, some of whom are naturally more cautious and less accident-prone than others. The insurance company is like Solomon because it cannot tell who is a safe driver and who is a risky one, but it would like to be able to do

so in order to charge higher premiums to riskier drivers. The drivers are like the women, since both safe and risky drivers will claim to be safe to try to obtain cheaper insurance. Thus the insurance company, like Solomon, has to try to devise a contract to offer the drivers which will cause them to reveal themselves truthfully. Unlike Solomon, however, the insurance company is unlikely to be able to solve its problem perfectly; we shall see that the presence of the risky drivers prevents the safer ones from getting as good an insurance deal as they would otherwise be offered. An element in the story of Solomon which will not be so common in what follows is that he changes his mind and does not go ahead with cutting the child in two, although a similar point will recur in Chapter 10 below.¹

The organisation of topics

Analysing situations of asymmetric information requires two significant departures from conventional analysis. One departure involves recognising and modelling the various types of asymmetry which appear in the literature, and the second involves seeing how the asymmetry affects the nature of the contract entered into by the participants in the market.

One obvious way to proceed is to introduce a type of asymmetry of information and examine how it operates in various markets and how it affects contracts in each market. The trouble with this approach, however, is that it is 'bitty'; it involves jumping from market to market within a chapter, while to get a picture of the impact of asymmetric information on a given market, for insurance, say, would require looking at several sections within a number of different chapters. We therefore follow an alternative approach of dealing with one market at a time, beginning with the market for investment finance. Our approach has the advantage that the reader may find an overview of how asymmetric information has an impact upon a particular market by looking at one chapter or a few consecutive chapters on that market, thus providing a useful introductory reference source for information problems in the markets covered in the book.

New terminology and techniques are introduced gradually as the analysis proceeds, and the reader new to this type of analysis is recommended to read the first seven chapters of the book consecutively. In particular, the ideas presented in Chapters 1–4 are drawn on throughout the remaining chapters and may be unfamiliar to readers. The last four chapters of the book use the ideas developed in the first seven chapters, and may be read in any order.

Most chapters end with some recommended reading and some problems. The recommended reading presents key articles that the reader might like to check to see how the ideas were developed in the original literature, or to delve deeper into any particular topic. The reader's appreciation of the ideas will be enhanced if he or she looks at some of the references given. The problems are designed to test the reader's understanding of the material covered and the reader will benefit from tackling them. Throughout the book I have tried not to avoid

covering difficult ideas, and have tried to handle them in a simplified and accessible way. On the other hand, I have attempted to maintain the flow of the argument even if at times this has meant omitting a fairly interesting or relevant implication or extension. In some cases, the problems cover such points.