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Bridging the gap between elementary and advanced approaches to teaching adverse selection

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ABSTRACT

The paper proposes a framework for teaching adverse selection based on simple graphical and numerical arguments. This framework goes beyond the typical case of discrete quality levels currently found in intermediate microeconomics books and allows for a (more realistic) continuum of quality levels without the resort to integral calculus. This proposed approach is useful for putting the emphasis on the beliefs of individuals about the behaviour of others and for considering thin markets and market vanishing as outcomes of dynamic processes.

1. Introduction

Scholars of economic education have postulated that it is necessary to bring the innovations in the science of economics into the teaching of economics (Becker, 2004; Colander, 2004). Those scholars have also remarked that instructors "need to assist students in recognizing the shortcomings of simplistic analyses of old before students rightly dismiss them as irrelevant and then wrongly dismiss all of economics as extraneous to modern day life" (Becker, 2004). A look at the leading principles of economics and microeconomics textbooks (see below) suggests that one of the topics that still have little weight in many textbooks (in contrast with its importance in current research) is asymmetric information. And this occurs even though asymmetric information helps understanding many phenomena observed in the real world.

There may be many reasons for this neglect. One of them may be that teaching asymmetric information may be challenging for instructors. Indeed, although the basic ideas behind asymmetric information problems are usually quite straightforward, rigorous analysis and modelling usually require mathematical tools beyond the reach of many students enrolled in intermediate or upper-intermediate microeconomics courses. In order to avoid such advanced tools, current treatments of

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asymmetric information usually rely on verbal and graphical arguments and examples drawn from the real life (see below). Another important challenge for instructors is that teaching asymmetric information involves taking into account strategic interactions between individuals. This is in contrast with perfect competition or monopoly, for instance, which carry much more weight in current principles of economics textbooks.

This paper presents a simple approach to introduce adverse selection at an intermediate or upper-intermediate level. The approach proposed combines simple diagrams and numerical examples adapted from the models used in more advanced courses and current research. Thus, the approach allows for a continuum of quality levels (rather than the typical case of discrete quality levels currently found in intermediate microeconomics books) without the resort to integral calculus. This way to proceed is useful to introduce students to a systematic way of taking into account their own preferences and their beliefs about the actions of other individuals when making decisions. It is also relevant to stress the dynamic aspects of the outcomes of economic interaction. Besides, the approach may help accommodate different types of learners, such as visual learners and students who prefer numerical examples rather than more abstract introductions.

The paper is organized as follows. First, an outline of Akerlof's (1970) lemons' market model provides the basis upon which the paper's approach is based. The second section presents a brief review of how principles of economics and intermediate microeconomics textbooks deal with asymmetric information in general and adverse selection in particular. The third section sets up the proposed framework for teaching adverse selection at an intermediate or upper-intermediate level. Finally, the last section presents some concluding comments.

2. An advanced approach to adverse selection

As remarked above, an advanced presentation of the effects of asymmetric information on market outcomes requires a level of mathematics which is likely to be beyond the reach of average students. A presentation based on Akerlof's (1970) classical paper on adverse selection may assume that the quality grade of a car (or any other second-hand good) is given by υ. The utility (pay-off) of buyers and sellers can be assumed to be given by $u_b=(3/2)\upsilon-p$ and $u_s=p-\upsilon$, respectively, where p is the market price of the car with quality υ. When there is symmetric information, buyers and sellers know the value of υ. Hence, a transaction will take place whenever $u_b>0$ and $u_s>0$. That is, whenever $p\in(\upsilon,(3/2)\upsilon)$.

Assume now that there is asymmetric information. Now, sellers know the quality of the cars they sell but buyers only know that υ is uniformly distributed over the interval [0,1]. Remember that the probability function of a continuous uniform distribution over the interval (a,b) is given by

$$f(x)=\begin{cases}\dfrac{1}{b-a} & \text{for } a\le x\le b,\\ 0 & \text{for } x<a \text{ or } x>b,\end{cases}$$

and that the expected value is given by

$$E(x)=\int_{-\infty}^{+\infty} x f(x)dx=\int_a^b \frac{x}{b-a}dx=\frac{a+b}{2}.$$

Thus, in this setting buyers know that, since sellers are aware of the quality of their cars, when the market price is p only those sellers who own cars of quality lower than the market price (that is, with $\upsilon<p$) will bring their cars to the market. Hence, given that quality υ is uniformly distributed in the interval [0,1], the expected quality of the cars on the market will be

$$E(\upsilon)=\int_{-\infty}^{+\infty}\upsilon f(\upsilon)d\upsilon=\int_0^p\frac{\upsilon}{p-0}dx=\frac{p}{2}.$$

Given this, the expected utility of a buyer purchasing a car is $E(u_b)=(3/2)(p/2)-p=-(1/4)p$, that is, there is no price for which $E(u_b)>0$. Thus, nobody will want to buy a used car and the market for used cars will vanish completely.