LEARNING IN COMMON VALUE AUCTIONS\(^1\)
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Abstract: We distinguish between two types of learning processes on the part of decision makers: (1) Those in which competitive selection forces drive from the market all but the efficient profit maximizers, and in which agents act as efficient profit maximizers in response to displacements from equilibrium and (2) trial and error learning processes that may result in stable response functions that are not "best replies", and in which agents fail to "understand" the underlying economic process, so that changes in economic conditions result in sharp disruptions to the market, and the learning process must repeat itself. Data from a series of common value auction market experiments indicates that the second of these two learning processes characterizes behavior in these markets as bidders adjust to the "winner's curse".

Models of bounded rationality in experimental games and markets must, of necessity, analyze learning in these markets. I say must because: (1) The whole concept of bounded rationality invokes, at least in part, the concept of a trial and error learning process, a search for the best, or at least a satisfactory, reply to one's rivals, and (2) There is a growing realization in the experimental literature that, more often than not, subject's responses change with experience, and that experience is an important treatment variable. Note that in this last respect, there are no essential differences between experimental games and markets and their field counterparts. Learning must occur in both settings, as there is only so much training one can absorb through formal education, or that transfers readily to field environments, especially since the latter typically do not conform, in all their particulars, to the formal classroom models studied.

Traditional, or orthodox, economic theory is reluctant to talk about learning in terms of decision maker's conduct. (There is an extensive literature on "learning by doing" and its implications for organization of industry, which we do not deal with here. This liter-

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ature might be classified as the effects of learning on economic structure, which completely knowledgable decision makers account for in their conduct.) In scanning the economics literature the most extensive discussions of learning in terms of agents conduct can be found in the literature on evolutionary theories of economic change. In looking at this literature one identifies two distinctly different points of view. First, a large number of orthodox economists use evolutionary arguments to buttress orthodox predictions: they believe that competitive selection forces will drive from a market all but the efficient profit maximizers. Milton Friedman articulates this position: "Let the apparent immediate determinate of business behavior be anything at all - habitual reaction, random chance or what not. Whenever this determinate happens to lead to behavior consistent with rational and informed maximization of returns, the business will prosper and acquire the resources with which to expand; whenever it does not business will tend to lose resources and can be kept in existence only by the addition of resources from outside. The process of natural selection helps to validate the hypothesis (of maximizing behavior) - or, rather, given natural selection, acceptance of the hypothesis can be based largely on the judgment that it summarizes appropriately the conditions for survival" (FRIEDMAN, 1953, p.22 parentheses added). An important corollary of this line of reasoning is that once the environment has shaped decision rules so that agents act "as if" they have attained an equilibrium in which they are maximizing utility, they will be responsive, in the way the theory predicts, to displacements from that equilibrium. That is, the comparative static predictions of the model will hold on both the firm and market level.

The alternative point of view, held by those offering evolutionary models of economic change as distinct alternatives to orthodox economic theory, is that a true appreciation of the implications of trial and error learning processes results in important differences from orthodox theory. First, since the selection process operates on "actions actually tried", and not on the set of all possible actions, whether a particular set of stable response rules corresponds to the best replay to rivals actions (i.e., a Nash equilibrium) depends critically on: (a) The selection criteria for actions tried, (b) The ability to classify the outcome of a trial as a success or failure and (c) An economic structure where one can attain an optimum optimorum through a series of gradual approximations with outcomes always (or on average) improving profits (ALCHIAN, 1950, NELSON and WINTER, 1982, chpt. 6). That is, it is important to distinguish between stable response functions on agents part, and genuine Nash equilibrium behav-