

MISES, MORGENSTERN, HOSELITZ, AND NASH: THE AUSTRIAN CONNECTION TO EARLY GAME THEORY

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ABSTRACT: This paper examines the connection between Ludwig von Mises and early contributors to game theory. What becomes clear is that early game theorists were trained by Austrians who thus influenced the field from its beginning. The connection most commonly known is the influence Mises had on Oskar Morgenstern, however, this paper reveals a previously unknown connection between Mises, Bert Hozelitz, and John Nash.

I. INTRODUCTION

The earliest work in the field of game theory may have originated with the work of James Waldegrave who in 1713 analyzed a card game (Watson 2008). Following this, Antoine Augustine Cournot contributed an equilibrium model in the 1830s as he designed reaction curves to describe how firms in a duopoly chose the quantity to produce as a reaction to the amount they anticipated the other firm would produce (Ekelund and Hebert 2007). Francis Ysidro Edgeworth independently examined a bargaining problem in duopoly in 1897. Later, Ernest Zermelo provided one of the first mathematical theorems for a game in 1913 (Watson 2008).

The field of game theory came to the forefront following a rigorous analysis of the subject by John von Neumann (1903–1957) and Oskar Morgenstern (1902–1977) who published *An Economic Theory of Games*

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and Behavior in 1944. This seminal work created the framework for modern game theory. Their book developed the topics of zero sum games, extensive form and normal form games, and, the maximin solution to games (von Neumann and Morgenstern 1990). While von Neumann and Morgenstern may have intellectually furthered the earlier work of Cournot, their primary economic influence came from the Austrian School of economics.

II. MORGENSTERN AND MISES

John von Neumann was a brilliant and creative mathematician who was responsible for most of the mathematical insights contained in *An Economic Theory of Games and Behavior*. However it was Oskar Morgenstern who provided the economic theory for the structure of the problems (Leonard 1999). The trained economist of the duo, Morgenstern had been a student of Ludwig von Mises while in Austria. He attended Mises's seminar in Vienna held in Mises's office every other Friday in May, 1924 (Hülsmann 2007).

In 1931 Morgenstern succeeded Friedrich Hayek as the director of the Institute for Business Cycle Research in Vienna. During his time in that post Morgenstern authored *The Limits of Economics* in which he clearly took a Misesian view toward economic policy. In chapter seven of that work he argued that governments are not capable of coordinating markets; he continued with the contention that statistics can not be used to completely comprehend the status of an economy "because the whole economic process cannot be statistically portrayed" (Morgenstern 1937, p. 83).

Morgenstern later immigrated to the United States in 1938 and remained in the U.S. following the Nazi invasion of Austria, eventually taking an economics position at Princeton University (Leonard 1995).

III. HOSELITZ AND MISES

Bert F. Hoselitz (1913–1995) was an economist and also a former student of Mises. Hoselitz had attended two of Mises's seminars in 1933 and 1934, the first on distributions and the second on social and free market economies (Hoselitz 1941a). After his immigration to the U.S. from Austria, correspondence indicates that Hoselitz asked for and received a letter of reference from Mises when he wanted to leave a faculty position at Manchester College for one at the University of Chicago (Hoselitz 1941b). Mises often helped former students find employment after his immigration to New York. Hülsmann (2007) lists Hoselitz as an

example of Mises's generosity saying, "Mises was often asked for help by friends, acquaintances, an often people who only knew him indirectly" (p. 797).

While at the University of Chicago, Hoselitz's primary work was in the field of economic development, founding the journal of *Economic Development and Cultural Change* in 1952 (University of Chicago 1995). While most of his work was not in pure Austrian theory, in 1950, with the encouragement of Friedrich Hayek, he and James Dingwall translated Menger's *Principles of Economics* into English, describing the book as the theoretical core of the Austrian School (Menger 1976).

IV. HOSELITZ AND NASH

The connection between Bert Hoselitz and game theory is perhaps less well known than the connection between Mises and Morgenstern. In 1947 Hoselitz traveled from the University of Chicago to Carnegie Tech where he served a one year appointment as a visiting associate professor (Hoselitz 1977). While there he taught a course in International Economics where, unbeknownst to him, he had a student who would go on to win the Nobel Prize in economics—John F. Nash, Jr. (Nash 2005). This would prove to be the only course in economics ever taken by Nash (Nobelprize.org 2004), who was influenced by the course and which contributed in the development of his equilibrium theory.

The Nash equilibrium has been described as being similar to that of Cournot (Heertje 1996). However after reviewing International Economics text books of the time, it becomes clear that Nash's creative solution was in all probability done independently of Cournot. A brief survey of International Economics texts from the late 1930s to late 1940s revealed a field fascinated by the new Keynesian ideas and by changes emanating from World War II and its conclusion. The International Monetary Fund and the World Bank received much attention in these texts, as did the gold standard. Traditional coverage of Jacob Viner, David Ricardo, John Stuart Mill and comparative advantage along with reciprocal demand were present as well (Enke and Salera 1947). The work of Taussig was used to restate the classical theory of trade. However as Keynesian theory moved to the forefront, its impact was observed in Harrod (1939) as he criticized classical theory for its weaknesses in the areas of the division of labor and the influence of monopolies. Enke and Salera go so far as to conclude "the classical theories are now obsolete" (1947, p. 214).

There is no inclusion of Cournot's reaction curves in these texts, and so any influence Cournot had on Nash would have had to come from his individual study of Cournot or from lectures by Hoselitz. It is unlikely

that either of these happened, but instead there exists the distinct possibility that Nash's thought process in formulating the equilibrium was influenced by Austrian thought. Indeed Nash himself states,

By coincidence the person who taught the course was someone that came from Austria. . . . Austrian economics is like a different school than typical American or British. So by coincidence I was influenced by an Austrian economist which may have been a very good influence. (Nobleprize.org 2004)

V. MISES AND GAME THEORY

Despite having this direct and indirect influence on the principle proponents of early game theory Mises had, at best, a distrust toward the subject. In *Human Action* (1998) he criticizes von Neumann and Morgenstern for comparing solitaire to a communist society (Mises 1998). He goes further in *The Ultimate Foundation of Economic Science* (2006) writing:

One could hardly misinterpret more fundamentally the essence of social cooperation and the economic effort of civilized mankind than by looking upon it as if it were a fight or the playful duplication of fighting, a game. (p. 87)

Mises's disagreement with game theory in both of these cases stems from a viewpoint of the game as one in which a business and its customers are pitted against one another in a savage zero-sum game. He instead insists that both parties benefit in transactions in what can be described as a type of cooperative game.

While Mises may have disagreed with early game theory, it is doubtful that Morgenstern and Nash would have disagreed with Mises. As Foss (2000) points out, game theory takes up "issues that have been central in Austrian economics for a very long time" (p. 42). The competition that exists in business is between the businesses as they try to meet the needs of the customers through formulating strategies that will allow their firms to be successful. Themes from Hayek, particularly spontaneous order and conventions, are developed in game theory (Foss 2000) and solutions to these are found using the Nash equilibrium.

Game theory provides a methodology for an analysis of strategy, the underpinnings of which appear to have been derived from Austrian economic thought. The link between Mises and Morgenstern and between Mises through Hoselitz to Nash is one that future research could examine more closely to determine the depth of influence. Subsequent game

theorists, and their contributions, may as well have been subject to Austrian philosophies, perhaps unknowingly. Further research into areas such as bounded rationality, repeated play games, and social mechanism design could reveal interesting links to or deviations from Austrian thought.

VI. CONCLUSION

The influence of Mises on Morgenstern, and the influence of Mises through Hoselitz to Nash, which has previously been unmentioned in the literature, reveals that the game theoretic evaluation of situations using strategic thinking was directly influenced by the Austrian School. While Morgenstern's work was not in pure Austrian theory and while Hoselitz did not train Nash to become an Austrian per se, the Austrian school influence on the two is apparent.

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