AN ESSAY ON THE CONCEPT OF ECONOMIC EQUILIBRIUM

This dissertation attempts to settle some challenging historiographic issues concerning the origin and development of the concept of economic equilibrium. Specifically, our research goal is to identify the philosophical and historical drivers of the mathematization of economic theory. To this end, we attempt to answer three fundamental research questions. First, *why (and not how) has economics become a mathematical science?* Second, *what are the major methodological blunders that lie at the foundations of Modern General Equilibrium Theory*? Third, *is the contemporary criticism of Modern General Equilibrium Theory meaningful and well-founded*? In order, chapters 1-3 address the first question, chapters 4 and 5 address the second, whereas chapter 6 addresses the third question.

Regarding the first question, we investigate the methodological relationships between Modern Physics, Modern Philosophy, and Walras's Theory of General Equilibrium. Interestingly, our findings reveal that while the study of motion in Modern Physics relies upon a clear distinction between static and dynamic equilibrium, early mathematical economics borrows its methodology from Modern Physics but relies upon an Aristotelian conception of equilibrium. Furthermore, we identify exciting analogies between Kant's philosophy and Walras's *Elements*. Finally, we show that the so-called Walras Paradox also features another unexplored dimension. Namely, Walras's work overall relies upon a bottom-up approach to mathematics. Yet Walras's work includes problems that require a top-down approach to mathematics to be solved.

Regarding the second question, we delve into the tight relationship between the History of Mathematics in the 19th Century, the Philosophy of Mathematics in the 20th Century, and the development of Modern General Equilibrium Theory in the 20th Century. Notably, we find that the top-down approach to mathematics provides economists with a reliable methodology to resolve the problems in Walras's original work. Hence, the mathematization of General Equilibrium Theory in the 20th Century is a child of its time that carries the inapplicability of pure mathematics to real-world problems along with itself. Therefore, although the mathematization of General Equilibrium Theory is an unprecedented milestone in economic theory, the foundations of Modern General Equilibrium Theory inherit the methodological shortcomings of Contemporary

Mathematics. That is why the Sonnenschein-Mantel-Debreu does not overtake the Aristotelian conception of equilibrium. Accordingly, we rebut the claim that Debreu and colleagues' mathematization of General Equilibrium Theory resolves the fundamental methodological shortcomings of Walras's original work.

Eventually, we use our answers to our first and second research questions to address the contemporary criticism of General Equilibrium Theory. On the one hand, we show that the latter criticism does not account for the fact that General Equilibrium Theory inherits the scientific realism and determinism of Modern Physics. In other words, we argue that the inability of General Equilibrium models to manage uncertainty effectively has nothing to do with its mathematization in the 20th Century. Instead, it results from the unexplored dimension of the Walras Paradox, which we uncover. On the other hand, we show that common accusations of inconsistency, incompleteness, and undecidability in General Equilibrium Theory are ill-founded. That is because other rigorous alternatives to axiomatization in economics are not paradox-free.

On these grounds, we conclude that a much better option is to employ a topic-neutral language to provide rigorous presentations of contested concepts in economics. Particularly, we show that formal mereology offers a convenient methodological framework to resolve the disagreement between the Neoclassical and Institutionalist economists' respective definitions of the concept of the market. In this way, we show that the latter concept is definable as a process. But, more importantly, we note that formal mereology also offers a convenient framework to reformulate other economic concepts concisely and rigorously. In this regard, we observe that formal mereology might provide a resolution for Hayek's Problem because it would enable economists to define general equilibrium as a perduring socioeconomic process.