

The Economic Long Wave: Theory and Evidence

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11.1. Introduction

The economic malaise of the 1970s and 1980s has revived interest in the economic long wave or Kondratieff cycle (Kondratieff, 1935, 1984). Numerous theories of the long wave have emerged in the past 10 years, including theories stressing innovation, labor dynamics, resource scarcity, and class struggle [1]. Since 1975 the System Dynamics National Model (NM) has provided an increasingly rich theory of the long wave (Forrester, 1981, 1979, 1977, 1976; Graham and Senge, 1980; Senge, 1982; Sterman, 1985a,b). Though the model focuses primarily on economic forces, the theory emerging from the NM is not monocausal: it relates capital investment; employment, wages, and workforce participation; inflation and interest rates; aggregate demand; monetary and fiscal policy; innovation and productivity; and even political values. The NM is unique among recent theories of the long wave in that it views the long wave as a syndrome consisting of interrelated symptoms and springing from the interactions of many factors. The NM integrates diverse hypotheses about the genesis of the long wave. The NM also provides an analytical framework in which alternative theories can be tested in a rigorous and reproducible manner.

This chapter describes the integrated theory of the long wave that has now emerged from the NM. The behavioral underpinnings of the theory are discussed and contrasted against traditional economic theory. The major sources of the long wave are presented and analyzed through simulations. Though not intended as a definitive treatment of empirical evidence for long waves, the chapter presents some of the basic corroborative evidence to show how the NM endogenously generates a wide range of economic data.

11.2. Behavioral Foundations

The NM is a dynamic, disequilibrium model. These features distinguish the NM from econometric and optimizing models (such as general equilibrium models) in several important respects.

11.2.1. Macrobbehavior from microstructure

The NM is a structural model. Structure as used here includes the physical structure of the economy (the stock and flow networks of capital, goods, people, and money), flows of information about the state of the system, and the behavioral decision rules people use to manage their affairs. The structure of the economy is represented at the microeconomic level of individuals and firms. By modeling decision making and physical structure at the microlevel, the macrolevel dynamics of the economy emerge naturally out of the interactions of the system components. Because such models provide a behavioral description of the economy firmly rooted in managerial practice, they are well suited for examining the dynamic effects of policy initiatives.

11.2.2. Disequilibrium dynamics

The model does not assume that the economy is always in equilibrium, or that it moves smoothly from one equilibrium to another. Although individuals may be striving for balance, disequilibrium is the rule rather than the exception. To properly model adjustment dynamics, one must not presume the stability of the system; rather one must model the pressures that may lead to equilibrium, including the ways people perceive and react to imbalances, and the delays, constraints, and inadequate information that often confound them.

11.2.3. Bounded rationality

The behavioral assumptions of the model rest on the theory of bounded rationality (Cyert and March, 1963; Merton, 1936; Nelson and Winter, 1982; Simon, 1947, 1957, 1978, 1979). The essence of the theory is summarized in the principle of bounded rationality, as formulated by Herbert Simon (1957):

The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problem whose solution is required for objectively rational behavior in the real world or even for a reasonable approximation to such objective rationality (p. 198).

Behavioral modeling emphasizes the heuristics used by real people to make adequate decisions in a reasonable period of time, given the constraints of human cognitive capabilities and the limited information available.