SOE 13: Economic Models I

Time: Wednesday 10:15–11:15 Location: H36

SOE 13.1 Wed 10:15 H36

A Meta-Theory of Economic Models - General Constrained Dynamic Models (GCDM) in Analogy to Classical Mechanics — •Florentin Glötzl — Wirtschaftsuniversität Wien, Institute for Ecological Economics, Welthandelsplatz 2/D5, AT 1020 Wien

Drawing from classical mechanics, we propose General Constrained Dynamic Models (GCDM) as the basis for a novel and encompassing understanding of economic models from a mathematical and theoretical perspective. Economic models differ in their essence in the choice of which variables are exogenous an which are endogenous i.e. assumptions about the power of agents to influence variables.

In analogy to classical mechanics we explicate the power of in GDCM in a formal framework in which the dynamics of the system are determined by the economic force f applied by an agent (or aggregated sector) to change a variable and his power p (the analogy to 1/inertial mass in physics) to enforce his interest.

In the GCDM framework the difference between various economic theories and models is explicitly shown to be the result of different assumptions about the power relationships in the economy. The assumption that an agent has complete power to determine the change of a certain variable corresponds to the variable being exogenous. If no agent has full power to influence the variable it is endogenous.

While in standard economic models power is always dichotomously one-sided, GCDM allows allows for mixed power relationships. It can thus can also illustrate the result space between the various common economic models and thus better depict reality.

SOE 13.2 Wed 10:30 H36

The Convergence to General Equilibrium in an Agent-Based Model in Continuous Time — •Oliver Richters — International Economics, Carl von Ossietzky University Oldenburg

General Constrained Dynamic Models (GCDM) have been proposed as a meta theory of economic models. This contribution studies the capacities of this approach to reproduce General Equilibrium Models that are at the core of today's macroeconomic research. They attempt to provide a set of prices leading to an equilibrium of supply and demand on interacting markets.

The models are formulated such that a unique, stable equilibrium exists and deviations can be treated in linear order. They generally rely on some form of representative agent 'mean field' hypothesis, because given heterogeneity in preferences and endowment among agents, multiple equilibria may exist. Within these models, spontaneous emergence of extreme events or endogenous instabilities are impossible.

Most models assume that the price determination process happens instantly and trade 'at wrong prices' is absent. The contribution shows that this assumption can be dropped, leading to a path dependend convergence path.

SOE 13.3 Wed 10:45 H36

A prisoners dilemma model with continous time and continous decision space — •Erhard Gloetzl — Karl-Kautsky-Weg 26, 4040 Linz Österreich

Recently in close analogy to constrained dynamics in classical mechanics *General Constrained Dynamic Models* (GCD-models) were introduced as general framework for economic models. A lot of economic models can be understood as special cases of GCD-models. We show that even game theoretical models can be understood as discretisation of GCD-models. Especially we discuss a *continuous prisoners dilemma* with continuous time and continuous decision space which yields the standard prisoner dilemma by discretisation of time and discretisation of decision space (cooperation, defection). An essential feature of GCD-models are so called *power factors* which correlate more or less to the inverse of the inertial mass. We discuss the introduction of power factors to the prisoners dilemma and the application of this model to political economy. Further extensions to other game theoretical models are discussed.

SOE 13.4 Wed 11:00 H36

Agent-Based Post-Keynesian Stock-Flow Consistent Models in Continuous Time — •Oliver Richters — International Economics, Carl von Ossietzky University Oldenburg

General Constrained Dynamic Models (GCDM) have been proposed as a meta theory of economic models. This contribution studies the capacities of this approach to reproduce Stock-Flow Consistent (SFC) models widely used in Post-Keynesian Economics. SFC models are usually formulated in discrete time and their proponents underline the necessity to model monetary stocks and flows and their accounting identities consistently. The latter constrain the dynamics of the model economy.

The SFC approach is transformed into continuous time dynamics and respecting accounting identities leads to dynamics under constraints similar to Newtonian mechanics. Some adaptions of existing SFC models are presented.

The formalism allows to study these models mit methods of Lagrangian mechanics that are also widely used in other fields of economics, but not yet in the Post-Keynesian school of thought.