Directed Research Projects on Agent-Based Models

Document of Information

Host Organization

*Department*: Department of Finance Canada, 90 Elgin, Ottawa, Ontario

*Group / Division / Branch*: Macro Analysis / Economic Studies and Policy Analysis / Economic and Fiscal Policy

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Project Description

The recent financial crisis has led to a renewed interest in models that provide more insight on the many dynamic relationships that take place within an economy. Agent-based models (ABMs) have been proposed as a way of analyzing these dynamics. These models are a bottom-up approach to economic modelling that consist of using a computer program to simulate a population of ‘agents’, such as households, firms, or other economic actors, that react to their environment according to behavioural rules set by the modeller. Heterogeneity among agents—in terms of income, preference, or productivity, for example—can be accounted for or tracked as the agents are individually simulated.

In contrast to standard general equilibrium models, there are no global coordination devices that ensure market-clearing conditions in every period and every market. The overall system evolves as a result of the multiplicity of bilateral interactions. Aggregate statistics can be gathered during the simulation to gain insights on the dynamics of the system, as well as how these dynamics change if policy variables are changed.

The student will be asked to compare standard macroeconomic models with ABMs, and in which areas ABMs could provide more insight for policymakers.

Benefits to the Student

The project would provide the student the opportunity to learn about economic models that are commonly used by macroeconomists, as well as a new class of economic models that is gaining popularity. The student would also develop the necessary computer skills required to conduct economic simulations, something that is increasingly valued in policymaking circles. This would also be an occasion to collaborate and establish contacts with economists at the Department of Finance.

Commitments, Tasks, and Deliverables

The expected deliverable would be an analytical note highlighting common features of ABMs; the types of policy questions that ABMs would be best suited to answer and why; and, a detailed comparison of standard macroeconomic models with ABMs. Depending on the student’s previous programming experience, illustrating these ideas in a simple model would be encouraged but not required.

Specific Qualifications

The student must be familiar with macroeconomic and programming concepts. Conceptual knowledge of general equilibrium models would be an asset. The compulsory macroeconomics course (ECO 3152) is a minimum requirement, as well as an introductory programming course (ITI 1120 or equivalent).