From Theory to Practice: Mixed Complementarity Problems in General Equilibrium Modeling

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Summary of the Training Session:

This introductory course covers CGE modeling using a Mixed Complementarity Problem (MCP) formulation in GAMS. MCP is particularly valuable in economic modeling for naturally handling inequalities and complementary slackness conditions, making it ideal for representing market equilibria. In CGE models, MCP captures complex relationships including tax distortions and price floors/ceilings with ease. The course also explains the function calibration process—parameterizing model functions to replicate benchmark equilibrium data. A small example of a CGE model will be presented and prepared during the course. While participants won't leave ready to build comprehensive CGE models, they will gain the essential foundation in MCP formulation and calibration techniques that will significantly accelerate their path toward advanced CGE modeling capabilities.

Outline:

First Session *Mixed Complementarity Problems (MCP).*

Second Session *Economic equilibrium models in algebraic MCP format.*

Third Session *Function Calibration.*

Fourth Session *Basic MCP formulation of a CGE.*

Prerequisites:

Participants should have a basic level of GAMS programming. They should at least go through the basic tutorials at https://www.youtube.com/@GAMSLessons/videos (at least "A brief introduction to modeling in GAMS" and "An introduction to GAMS Studio"). To be able to execute the files while following the course, laptops with GAMS installed are required. Thoroughly restudying the Karush-Kuhn-Tucker conditions for optimality is strongly advised.

Suggested References:

Mathiesen, Lars (1977) *Marginal cost pricing in a linear programming model: a case with constraints on dual variables.* The Scandinavian Journal of Economics, Vol. 79, No. 4. (1977), pp. 468-477.

Rutherford, T.F (2002) Mixed Complementarity Programming with GAMS. Mimeo.