International distribution of wealth and indeterminacy

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This paper presents a simple two-country model with externality in which international debt and capital accumulation are jointly determined, shows that under certain conditions on externality the world economy is indeterminate in the sense that for a given initial condition there is a continuum of dynamic general equilibrium paths which commonly converge to a steady state, and investigates how the existence of indeterminacy may affect the comparative steady-state analysis.

When we apply a dynamic general equilibrium model with time-separable preferences and constant rates of time preference to distributional issues, we face a theoretical problem. As is well known since Becker (1980), if the rates of time preference are not equal among countries, we have an unrealistic long-run international distribution of wealth in the sense that wealth concentrates on the most patient country. On the other hand, if all countries have a common rate of time preference, the steady state generally depends on the initial condition, and the analysis becomes relatively intractable.

Devereux and Shi (1991) has overcome the problem by adopting the Epstein-Obstfeld-Uzawa endogenous time preference. They present a two-country dynamic general equilibrium model with endogenous time preference, prove the existence and the saddlepoint stability of a steady state, and successfully make several interesting comparative steady-state analysis.

While their contribution is definitely remarkable, the Epstein-Obstfeld-Uzawa endogenous time preference is still heavy for many technically less equipped trade theorists like us. Instead, let us simply assume *externality in consumption*, i.e., let us assume that each agent's felicity at an future time t depends on the time profile of the average consumption in his society from now to time t . As we show later, this assumption is sufficient to overcome the above problem concerning distributional issues.

The introduction of externality in consumption has a couple of further interesting implications.

First, by introducing Marshallian externality in production at the same time, we can show that *indeterminacy* arises under certain conditions. Thus, by introducing both consumption and production externalities, we can relate a central theme in international macroeconomics to a new topic in equilibrium dynamics. Since the occurrence of indeterminacy generally means that sunspot equilibria are possible, it follows that our model can explain international economic fluctuations. Second, the occurrence of indeterminacy brings us a new dimension for comparative steady-state analysis. Consider the Jacobian matrix evaluated at the steady state that corresponds to the dynamic general equilibrium model. Its structure is different between the case of a saddle-point-stable steady state and the case of a stable steady state. As a result, we generally obtain different comparative steady-state results between the two cases. As a matter of fact, we shall show that many comparative steady-state results are completely different between the two cases. Note that the steady states in both cases are dynamically stable in the sense that equilibrium paths converge to the unique steady state. Thus, those comparative steady-state results suggest that in a dynamic framework stability conditions do not give sufficient information for establishing how the steady state depends on changes in exogenous parameters. “Correspondence Principle” is attenuated in the present dynamic general equilibrium model.

One may wonder whether indeterminacy is possible under the Epstein-Obstfeld-Uzawa endogenous time preference. We show that it is impossible, irrespective of the extent of Marshallian externality in production. Both externalities in consumption and production are necessary for indeterminacy to arise in our model.

References

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