The Heckscher-Ohlin Model with Endogenous Sector-Specific Capital

Jürgen Meckl*
University of Konstanz

Abstract

This paper considers the long-run properties of a dynamic specific-factors model with endogenous capital stocks providing a dynamic foundation for the Heckscher-Ohlin model. The long-run equilibrium is fully determined by a static Heckscher-Ohlin model in primary factors although capital rentals may not be equal between sectors. All theorems of the static model carry over to the present model's steady state as long as countries diversify. Primary-factor endowments determine long-run comparative advantage and long-run capital stocks. Capital endowments are completely irrelevant for the determination of the long-run trade pattern.

I. Introduction

The extreme assumptions on intersectoral capital mobility characteristic of the specific-factors (SF) and the Heckscher-Ohlin (HO) model usually are justified with the different time horizons of these models. Empirical evidence supports the interpretation of the SF model as a short-run model (cf. Grossman and Levinson [1989]). As pointed out by Mayer [1974] and Jones [1975], short-run intersectoral differences in rental rates of capital enforce capital real-

* University of Konstanz/SFB178, PO-Box 5560, D-78434 Konstanz, Germany. I am grateful to Max Albert and two referees for valuable comments and suggestions. Financial support from the "Deutsche Forschungs Gemeinschaft" is gratefully acknowledged.

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location processes, reducing rental-rate differences over time and generating a long-run equilibrium with the characteristics of the HO model. This adjustment process was first analyzed by Neary [1978, 1982], but with an exogenously given, and hence arbitrary, speed of adjustment. The first microeconomic foundation of such a process of time-consuming adjustment was provided by Mussa [1978]. He introduced investment theory to analyze the capital-reallocation process. Time-consuming adjustment is the consequence of increasing marginal costs of adjustment (strictly convex adjustment costs) arising from decreasing returns in a special sector reallocating capital. This approach, however, is subject to Neary's [1978] critique that in reality investment is the process of building up sector-specific capital stocks rather than transferring physical capital units from one sector to the other. In this view reallocation of capital between sectors is the result of different rates of sectoral net investment and involves no physical mobility of capital. It is impossible to discriminate between reallocation and accumulation of capital: reallocation is only a side effect of different sectoral rates of accumulation. Looking at capital allocation this way, the HO model's requirement of a fixed total stock of capital will never be satisfied; the HO model seems to be inappropriate even for long-run analysis and "the usual long-run Heckscher-Ohlin-Samuelson predictions will not follow in general" (Neary [1978], p. 508).

Taking account of Neary's critique, Murphy [1988] developed a dynamic model of a small open economy with endogenous sector-specific capital stocks. He used the adjustment-cost approach of Hayashi [1982] and Abel and Blanchard [1983] in a two-sector framework with one single primary factor (labor). Due to this specification of the adjustment cost function long-run capital rentals are fixed. As a consequence of the nonsubstitution theorem the steady state is characterized by specialization in general. In order to overcome this implausible result, Murphy endogenizes commodity prices by assuming one good to be non-traded. Unfortunately a simple extension of Murphy's framework to a two-country model with two traded goods yields rather unsatisfying results concerning the validity of the HO model: Assuming identical preferences in both countries, as it is usually done in the HO model, autarky prices will be identical in the long-run and no trade will take place; as long-run capital rentals must be identical between sectors and countries in this case, each country will accumulate capital up to the point where per-head capital endow-