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Sectoral adjustment costs and real exchange rate dynamics in a two-sector dependent economy

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Abstract

This paper develops a two-sector model in which intersectoral capital movements involve adjustment costs, expressed as capital lost in the transformation process. These costs have important consequences for the dynamics of capital accumulation and particularly for real exchange rate dynamics. Persistent deviations of the real exchange rate from its equilibrium are derived and for plausible values of the adjustment cost parameters are consistent with the observed degree of real exchange rate persistence. For low adjustment costs the dynamics are qualitatively similar to those of the standard Heckscher–Ohlin technology. For high adjustment costs, the model converges to the specific-factors model. Thus our framework includes these two standard models as polar extremes. © 2003 Elsevier B.V. All rights reserved.

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1. Introduction

One of the realities facing an open economy is that international trading activities have differential effects on different parts of the economy. The diverse impacts of international conditions on the various sectors were a central issue in the debate over the Dutch disease and the discovery of oil in northern Europe, as well as in assessing the effects of mineral discoveries in Australia. In each case, the discovery of the resource led to a change in the country's terms of trade, and this in turn had effects on both the

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country's traditional export sectors and its import-competing sectors, as well as the internal nontraded sector.

The two-sector dependent economy model is convenient for studying these issues. By distinguishing between traded and nontraded goods, it provides a general equilibrium framework for analyzing the behavior of the real exchange rate, which plays such a critical role in the adjustment process. The earliest applications, associated with the Australian school (e.g. [Salter, 1959](#); [Swan, 1960](#)) were purely static, focusing on the demand-side determinants of the real exchange rate.¹ Subsequent applications have introduced capital accumulation, thereby enabling one to analyze the determination of the real exchange rate as part of a dynamic process in conjunction with the accumulation of capital and foreign assets.

A critical aspect of the dynamic dependent economy model concerns the structure of production. In this respect, the literature usually adopts one of two polar assumptions. Most prevalent is to introduce accumulating capital into the standard Heckscher–Ohlin technology. This approach assumes that, while aggregate capital is accumulated only gradually, it can be allocated instantaneously, along with labor, across the two sectors; see e.g. [Obstfeld \(1989\)](#), [van Wincoop \(1993\)](#) [Brock and Turnovsky \(1994\)](#), [Turnovsky and Sen \(1995\)](#), and [Brock \(1996\)](#). In other words, while it is costly to convert new output to capital, it is costless to transform one form of existing capital to another. Although this assumption is analytically convenient, it is clearly unrealistic. To transform one form of existing capital to another involves demolition and is likely to be more, rather than less, costly than converting some uncommitted new output to capital.

These models also yield strong, though not necessarily plausible, implications for the real exchange rate, making its behavior highly sensitive to the relative sectoral capital intensities. In the event that the traded sector is more capital intensive, the real exchange rate is devoid of any transitional dynamics. Instead, it responds instantaneously and fully to supply shocks, and there is no response at all to demand shocks. In the case where the sectoral capital intensities are reversed, the corresponding adjustments now involve transitional dynamics though the speed of adjustment tends to be unrealistically fast. In either case, instantaneous adjustment in the former case and overly rapid convergence in the latter, is inconsistent with the observed persistence of deviations of the real exchange rate from its equilibrium purchasing power parity conditions; see [Froot and Rogoff \(1995\)](#) [Edwards and Savastano \(1999\)](#), and [Cheung and Lai \(2000\)](#).

At the other extreme, fewer models employ the assumption that capital is completely immobile across sectors, being specific to the sector in which it is located. Rather, changes in capital occur through new capital accumulation in the sector in which the return to capital is higher and through the depreciation of capital in the other sector. These models are known as sector-specific capital models; see e.g. [Ryder \(1969\)](#), [Neary \(1978\)](#), and [Eaton \(1987\)](#).

¹ About the same time the contributions by [Balassa \(1964\)](#) and [Samuelson \(1964\)](#) used a similar framework, but focused more on the supply-side effects (productivity differentials) to explain the behavior of real exchange rates.

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