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ABSTRACT

This paper analyzes the impact of differential tariffs on consumption and investment in a specific factors model of a small open economy in which capital is accumulated over time. Particular attention is devoted to the welfare aspects, highlighting the cost of the intertemporal distortions produced by protective trade policies. Several specific welfare propositions are obtained. First, tariff protection is shown to create short-run benefits but long-run costs in welfare. Secondly, the second-best policy for the two tariffs is characterized. Finally, several propositions summarizing the implications of our analysis for tariff reform are derived.

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I. INTRODUCTION

Theoretical work on capital accumulation under protective trade regimes has produced a substantial literature on the subject of "immiserizing growth." Much of the motivation for this literature derives from the experience of developing countries, since as Johnson (1967, p. 152) noted, the "possibility of income–reducing growth is relevant to the fact that countries industrializing by means of protectionist and import–substituting policies are frequently dissatisfied with the results." Most theoretical analyses of immiserizing growth, including Bhagwati (1973), Brecher and Diaz–Alejandro (1977), and Casas (1985), have stressed the ambiguous welfare consequences of an *exogenous* capital inflow (such as an unrequited transfer) in the presence of a tariff. In an important recent article, Neary and Ruane (1988) have analyzed the full equilibrium effects of an *endogenous* tariff–induced capital inflow. In so doing, they have provided an important clarification to the literature on immiserizing growth by showing that, unlike an exogenous capital inflow, a tariff–induced capital inflow will never be welfare improving in a standard convex economy.

Despite the use of the term "immiserizing growth," existing studies have conducted their analyses using a static framework, in which all capital accumulation is assumed to occur instantaneously. In this paper we extend the welfare analysis of immiserizing growth to a dynamic setting in which capital accumulates gradually over time. Like Neary and Ruane, we are concerned with the full equilibrium effects of tariff–induced capital inflows, and we discuss how the welfare consequences of tariff policy can be captured by a welfare integral over the time path of discounted instantaneous utility. We are unaware of any previous such dynamic welfare analysis of tariff protection.

The model we have chosen to analyze is the Jones (1971)—Samuelson (1971) specific factors model of trade in which the import–competing sector uses capital and the export sector uses land, both in conjunction with intersectorally mobile labor. This choice of production structure orients the analysis toward developing countries and, for a similar reason, was the structure chosen by Dixit and Grossman (1982) to model the effect of a

uniform tariff in a model with multistage production, and by Brecher and Findlay (1983) to examine immiserizing growth in the presence of a tax on foreign investment.

The model includes three elements of the production technology that allow us to extend the welfare analysis of tariffs within a specific factors setting in several new directions. The first element is the specification of differential tariffs on the import–competing sector and on the imported investment good. Although previous welfare analyses of protection have focused on the case of uniform tariffs, differential tariffs on capital goods and consumer goods are the rule, rather than the exception, in developing countries.[1]

The second element of the model's technology is the specification of an endogenous labor supply. Although trade models typically assume an exogenously–given labor supply, we find that the elasticity of labor supply is an important determinant of the welfare cost of tariffs. We also find that the elasticity of labor supply is an important determinant of the initial employment effects of a tariff and that these initial effects may be reversed over time as the capital stock adjusts.

The third element of the model's technology is an adjustment cost function that is increasing in the rate of capital accumulation. The use of such a function has been made in the microeconomics literature beginning with the work of Lucas (1967), Treadway (1969) and others in the 1960s, and has been incorporated into trade models beginning with the work of Frenkel and Rodriguez (1975). We show that one determinant of the welfare cost of protection is the convexity of the adjustment cost function, since the speed (and, hence, the welfare cost) of the economy's adjustment to changes in tariffs depends in part on the marginal installation costs of new capital.

We provide a positive analysis of the dynamic adjustment of an economy to tariff changes and derive several welfare results. Our first result is that, starting from free trade, a uniform tariff increase distorts the time path of instantaneous utility, so that instantaneous utility is initially raised above the free–trade level before declining to a long–run level that is lower than the initial free–trade level. That is to say, tariff protection creates short–run

benefits and long-run costs in welfare terms. Second, we show that a second-best optimal investment tariff will exceed the consumption tariff, both because investment goods in the model are general equilibrium substitutes for the exportable good and because the tariff on the investment good helps to correct factor price distortions caused by the consumption tariff.

The next two results extend the literature on the welfare gains associated with the concertina and radial tariff reduction methods of piecemeal tariff reform. The welfare calculations carried out for these methods include, in addition to the usual static gains, an intertemporal welfare term. Our fifth result concerns the welfare-improving effects of a reduction in the consumption tariff in conjunction with an increase in the tariff on the investment good, a method of piecemeal tariff reform that we label the "two-handed concertina" method. We view this last result as an important one, since several well-known trade liberalizations began by raising tariff rates on investment goods at the same time that tariff rates on consumption goods were lowered.[2]

The paper proceeds as follows. Sections II and III lay out the analytical framework. This framework is the infinitely-lived utility-maximizing representative agent model that has been recently employed to analyze a variety of macroeconomic disturbances in open economies.[3] Section IV describes some of the macroeconomic adjustments to tariff changes, while Section V conducts the welfare analysis of tariff changes. Both the short-run and long-run welfare implications are discussed. Section VI discusses some welfare propositions relevant to issues pertaining to tariff reform. Section VII concludes, while much of the technical detail is relegated to the Appendix.

II. THE ANALYTICAL FRAMEWORK

The economy we consider is inhabited by a single, infinitely-lived representative agent who rents out an inelastic quantity of land (T) at its competitive rental rate, accumulates capital (K) for rental at its competitively determined rental rate, and supplies labor at

The importable consumption good is subject to a tariff (τ^c) levied by the government. Imports of the investment good are subject to a separate tariff (τ^i). Revenues from both tariffs are distributed as lump sum transfers (z) by the government back to the representative agent.

The agent also accumulates net foreign bonds (b) that pay an exogenously-given world interest rate (r). Equation (1) describes the agent's instantaneous budget constraint

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