Tariffs and quotas in a spatial duopoly with a land market

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Abstract. This paper develops a spatial duopoly model by taking land consumption and mobile households into consideration and examines the respective effects of a tariff and a quota on an open economy with various price conjectural variations (including Löschian, H-S and G-O competition). The main conclusions are: (i) The Metzler Paradox does not occur under a tariff but occurs under a quota in Löschian competition; (ii) The tariff and the quota are completely equivalent under H-S competition if the nature of the quota constraint does not affect the original price conjectures; (iii) If an import equivalent quota induces a change in the domestic producer’s strategy from Löschian (H-S and G-O) competition to the price leadership position, then the quota yields domestic prices which are lower (higher) than those induced by a tariff.

1. Introduction

In his classic work, Bhagwati (1965) demonstrated that tariffs and quotas are not equivalent in the presence of a domestic monopoly in a partial equilibrium model. On publication of this paper, international economists began to address this interesting issue from the point of view of imperfectly competitive market structures. For example, Itoh and Ono (1982, 1984) developed a price-leadership model to show that the domestic price is always higher under a quota than under a tariff. Later, Hwang and Mai (1988) presented a conjectural variations approach to illustrate that whether tariffs and quotas are equivalent or not depends crucially upon the value of the conjectural variations. In particular, they concluded that the equivalence holds in a Cournot conjecture. Apparently, these results were derived in nonspatial trade models. Meanwhile, by recognizing that both foreign and domestic transportation

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costs are significant, Benson and Hartigan (1984) employed the standard model of spatial competition along the lines suggested by Capozza and Van Order (1978), in order to examine the relative impacts of a tariff and a quota, concluding that they are completely equivalent under Löschian competition. In addition, in a separate proposition, they extended Benson and Hartigan’s (1983) result that a tariff can lead to the Metzler (1949) Paradox (a fall in domestic prices after imposition of the tariff) in a partial equilibrium spatial model to a case of an import quota. This striking result contrasts with those derived by Falvey (1975), Tower (1977) and Panagariya (1982) in their general equilibrium nonspatial models.

However, the standard model of spatial competition assumes the distribution of consumers as given, and typically uniform, and ignores the consumption of land by both consumers and producers. This led Fujita and Thisse (1986) to undertake an integration of the Hotelling-type spatial competition model with the von Thünen model of land use. Furthermore, Hatzipanayotou and Heffley (1991) and Heffley and Hatzipanayotou (1993) pointed out the weaknesses of Benson and Hartigan’s analysis and developed a limited general equilibrium spatial model in the spirit of Fujita and Thisse (1986) to reexamine the effects of tariff protection in an open spatial economy where households not only choose between domestic goods and imports, but also consume variable amounts of residential space and move in response to tariff-induced changes in the pattern of delivered prices. Heffley and Hatzipanayotou’s research generated several interesting results summarized as follows: (i) the Metzler Paradox never occurs with a tariff; (ii) the domestic firm’s market area expands with a tariff; and (iii) the common equilibrium level of utility declines monotonically with an increase in the tariff rate and can only be restored to its initial level by outmigration. However, their analysis is limited to certain particular values of conjectural variations which are positive and exogenously given. More specifically, they fail to consider Löschian and G-O competition, which are widely-used conjectures in spatial pricing literature.

The purpose of the present paper is to extend Heffley and Hatzipanayotou’s (1993) analysis to include an import quota under various conjectural variations (including Löschian, H-S and G-O competition) and to explore the possibility of the equivalence of a tariff and a quota. In the process, we will reexamine the impacts of the tariff and make a comparison of our results with Heffley and Hatzipanayotou’s (1993) results. It will be shown that our results are significantly different from those of previous studies.

The paper is organized as follows. Section 2 presents a spatial equilibrium model to analyze the impacts of a tariff on an open economy with alternative exogenous conjectures. Section 3 examines the impacts of a quota with exogenous conjectures, while Sect. 4 explores the same issue by assuming that a quota will induce the domestic producer to take a price leadership position. Some concluding remarks are presented in the final section.

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They pointed out that the Benson-Hartigan analysis is correct but limited in three respects: (i) consumer locations are fixed; (ii) tariff effects are limited to the traded good; and (iii) consumer welfare is based solely on the delivered prices that must be paid for this one good, rather than on some broader utility-based notion of welfare.