Pareto-improving tariff-tax reforms under imperfect competition

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ABSTRACT

Constructing a duopoly model with non-constant marginal costs and a strict Pareto criterion, this paper examines welfare effects of world-price-fixing tariff reductions accompanied by adjustments of a domestic tax. If a destination-based consumption tax is used, this reform achieves a strict Pareto improvement under sufficiently decreasing marginal costs. If, in contrast, an origin-based production tax is employed, a strict Pareto improvement holds whether marginal cost is decreasing or not. Thus, we can conclude that tariff-tax reforms that improve the world welfare and are irrelevant of tax bases are possible if the targeted industry exhibits sufficiently decreasing marginal costs.

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1. Introduction

Trade liberalization in the form of trade tax/subsidy reductions has remarkably increased the world trade flow.[1] As international economics suggests, freer trade benefits an individual country and the world. Despite such advocacy of free trade, there is persistent hesitation to liberalize trade in both developing and developed countries. On the one hand, developing countries fear the expected loss in trade tax revenue that has a large share in overall government revenue as long as they are a big importing or exporting country.[2] In order to compensate for such a decline in trade tax revenue, the IMF and the World Bank have suggested combining trade tax reductions with appropriate adjustments of domestic taxes. On the other hand, tariff-tax reforms may make sense for developed countries since they may play a role of mitigating the negative income distribution effect on the comparative disadvantage sector led by trade liberalization.

Then, one may naturally ask how domestic taxes are adjusted to trade liberalization for ensuring welfare gains. This paper theoretically answers this question, but we differentiate it from the previous works in the following respects. First, we extend a duopoly model of Keen and Ligthart (2005). They show that a country loses from point-by-point tariff reductions combined with (destination-based) consumption tax increases, which are welfare-improving under perfect competition (Hatzipanayotou,

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[1] Baier and Bergstrand (2001), for example, find evidence that tariff reductions have much larger impacts on world trade growth than trade cost reductions and income equalization.

[2] IMF (2005, p. 3) offers evidence suggesting that 'the revenue from trade taxes ... continues to be a major source of government finance in many low- and middle income countries.'

Michael, & Miller, 1994; Keen & Ligthart, 2002). Furthermore, they prove that the same is true of the tariff-tax reform that leaves the consumer price unchanged. While these results provide new insights on tariff-tax reforms, Keen and Ligthart (2005, p. 389) state that their negative results are 'not to say, of course, that there are no circumstances in which such a coordinated tax-tariff reform will increase welfare even in the presence of imperfect competition. We leave to future work, however, the characterization of preference and market structures that are conductive to such an outcome.'

We address the above agenda Keen and Ligthart (2005) leave, and seek welfare-improving programs of tariff reductions and domestic tax adjustments. To this end, we introduce three new ingredients into the Keen and Ligthart (2005) model. First, we allow for non-constant marginal costs in order to identify that the detrimental effects in Keen and Ligthart (2005) hinge on the assumption of constant marginal cost.[3] Second, we consider not only destination-based consumption taxes but also origin-based production taxes. This extension is theoretically and practically interesting since Keen and Ligthart (2005) confine analysis to the destination tax.

Finally and most importantly, we consider a tariff-tax reform that fixes the world price. The reason for paying special attention to this reform is that the terms of trade effect is arguably the most crucial elements in the arguments over trade liberalization.[4] While Bagwell and Staiger (1999, 2002, 2011, 2012a, 2012b) are concerned with multilateral trade policy reforms rather than unilateral domestic policy reforms, the terms of trade effect is still significant in evaluating the unilateral tariff-tax reforms.

Besides the theoretical and empirical relevance of the terms of trade effect stressed by Bagwell and Staiger (1999, 2002, 2011, 2012a, 2012b), the world-price-fixing tariff-tax reform has the following advantages. First, under our assumption of linear demand, the proposed reform is shown to fix foreign welfare, and hence induces no foreign retaliation. Second, our reform can leave the foreign country no-worse-off just by targeting the world price that is observable. This property is important in view of the reality that foreign welfare is unobservable.[5] Third, our reform strategy is useful in considering whether it yields a strict Pareto improvement, i.e., it raises the home welfare without hurting the foreign country. That is, we can conclude that this reform leads to a world welfare improvement just by checking the effect on the domestic welfare.

Our conclusion is summarized as follows. If a destination-based consumption tax is employed, a tariff reduction accompanied by a consumption tax adjustment that fixes the world price raises domestic welfare when the degree of decreasing costs is sufficiently large. If, in contrast, an origin-based production tax is adopted, the world-price-fixing tariff-tax reform definitely improves welfare. These findings may serve an answer to the question raised by Keen and Ligthart (2005) above.

This paper is organized as follows. Sections 2 and 3 consider the case of a destination consumption tax and an origin-based production tax, respectively. Section 4 concludes.

2. Destination-based consumption tax

2.1. Model

We incorporate non-constant marginal costs into the Keen and Ligthart (2005) model. Suppose a market of a country, say Home, in which a Home firm (firm X) and a Foreign firm (firm Y) compete in quantities with a Cournot conjecture. Home's inverse demand is assumed linear, and denoted by $p(x + y)$ with $p'(\cdot) < 0$ and $p''(\cdot) = 0$, where x and y are the output of the Home and Foreign firms, respectively.[6] The production cost of each firm is given by $c(x)$ and $c_*(y)$ with $c'(\cdot) > 0$ and $c_*(\cdot) > 0$. The Foreign government observes laissez-faire.

The Home government imposes a destination-based consumption tax $\tau \geq 0$ and an import tariff $t \geq 0$. Then, the profit of each firm is defined by

$$\text{Home firm} : p(x + y)x - c(x) - \tau x \tag{1}$$

$$\text{Foreign firm} : p(x + y)y - c_*(y) - \tau y - ty. \tag{2}$$

The first-order conditions for profit maximization are[7]

$$xp'(x + y) + p(x + y) - c'(x) - \tau = 0 \tag{3}$$

$$yp'(x + y) + p(x + y) - c_*'(y) - \tau - t = 0. \tag{4}$$

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[3] Since a seminal paper of Krugman (1984), there are many works studying the role of non-constant marginal cost in international trade, e.g., Zhang and Zhang (1998), Ishikawa (2004), Ishikawa and Kuroda (2007), and Ishikawa and Mukunoki (2008a, 2008b).

[4] See Bagwell and Staiger (1999, 2002, 2012a, 2012b) and Bagwell and Staiger (2011) for the theoretical and empirical importance of the terms of trade effect, respectively.

[5] While the idea of fixing welfare of the rest of the world is familiar in the literature on customs unions, e.g., Kemp and Wan (1976), implementing it is practically difficult since welfare is unobservable. Lahiri and Raimondos-Møller (1997, p. 487) admittedly state that 'the information requirement (of the donor-welfare-fixing reform) is quite demanding.'

[6] The results in this paper admittedly depend on the linear demand assumption, and one can obtain no clear result under non-linear demand.

[7] The second-order conditions are $2p'(x + y) - c''(x) < 0$ and $2p'(x + y) - c_*''(y) < 0$.