Trade policy: Home market effect versus terms-of-trade externality

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ABSTRACT

We study trade policy in a two-sector Krugman (1980) trade model, allowing for wage, import and export subsidies/taxes. We study non-cooperative trade policies, first for each individual instrument and then for the situation where all instruments can be set simultaneously, and contrast those with the efficient allocation. We show that in this general context there are four motives for non-cooperative trade policies: the correction of monopolistic distortions; the terms-of-trade manipulation; the delocation motive for protection (home market effect); the fiscal-burden-shifting motive. The Nash equilibrium when all instruments are available is characterized by first-best-level wage subsidies, and inefficient import subsidies and export taxes, which aim at relocating firms to the other economy and improving terms of trade. Thus, the dominating incentives for non-cooperative trade policies are the fiscal-burden-shifting motives and terms-of-trade effects.

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1. Introduction

The aim of this paper is to study optimal trade policy in the canonical two-sector Krugman (1980) model, where one sector is characterized by monopolistic competition, increasing returns and iceberg trade costs, while the other features perfect competition and constant returns. Within this framework we allow for wage, import and export subsidies/taxes. We study non-cooperative trade policies, first for each individual instrument and then for the case where all instruments are set simultaneously, and contrast those with the efficient allocation.

The common wisdom of the literature[1] (Venables, 1987; Helpman and Krugman, 1989; Ossa, 2011) is that in this model unilateral trade policy is set so as to agglomerate firms in the domestic economy in order to reduce transport costs. This reduces the domestic price index thereby increasing domestic welfare.[2] According to the literature, this

delocation motive (also called home market effect) provides a reason for protectionist and ultimately welfare detrimental unilateral trade policy in the Krugman (1980) model and, as argued by Ossa (2011), gives an alternative theoretical justification to the neoclassical terms-of-trade externality explanation (Johnson, 1953–1954; Grossman and Helpman, 1995; Bagwell and Staiger, 1999) as to why countries need to sign trade agreements. Similarly, the same mechanism also provides a theoretical justification for the World Trade Organization (WTO)'s limitation of production and export subsidies,[3] which cannot be explained within the neoclassical framework.[4]

By considering a situation where countries can simultaneously choose all three policy instruments (wage, import and export taxes), we contribute to the literature in three ways. First, we show that in this more general setting there are four motives behind non-cooperative trade policies: the correction of monopolistic distortions,[5] the terms-of-trade manipulation, the delocation motive for protection,

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[1] A detailed review of the literature is provided in the next section.
[2] An import tariff makes foreign differentiated goods more expensive relative to domestic ones so that domestic consumers shift expenditure towards domestic differentiated goods. This triggers entry into the domestic differentiated sector and exit out of the foreign differentiated sector, thereby reducing the domestic price index – since now less of the domestically consumed goods are subject to transport costs – and increasing the foreign one. Similarly, a production or an export subsidy also renders the domestic market a more attractive location and reduces the domestic price index at the expense of increasing the foreign one.

[3] See, e.g., WTO (2006). GATT Article XVI and the Uruguay Round Subsidies Code prohibit the use of export subsidies, while the latter also establishes that countervailing duties can be imposed on countries using production subsidies subject to an injury test.
[4] Production and export subsidies are puzzling within the neoclassical framework because they increase foreign welfare at the expense of domestic welfare.
[5] Observe that monopolistic distortions arise because there are two sectors in the model, so that monopolistic markups lead to too low a provision of variety in the monopolistically competitive sector. In their seminal paper, Dixit and Stiglitz (1977) show that the market solution is not first-best Pareto optimal in such a model, and that subsidies on fixed costs and on marginal costs are required to implement it. Thus, policymakers try to improve the use of domestic resources by increasing entry into the differentiated sector.

and the fiscal-burden-shifting motive. The last motive arises when countries use wage subsidies in order to correct for the monopolistic distortions. When this is the case, there is an incentive to relocate firms to the foreign economy, so as to shift the fiscal burden of the subsidy to the other country. Second, and most importantly, we show that the Nash equilibrium is characterized by the first-best level of wage subsidies, and inefficient import subsidies and export taxes. This result has several implications. It shows that, in contrast to the previous literature, the delocation motive for protection is not the dominating motive for strategic trade policy in the Krugman (1980) model once a sufficient number of policy instruments are available. This is so because countries choose to *subsidize* imports and *tax* exports with the intention to relocate firms to the other economy. It also shows that when all three policy instruments are available, the Krugman (1980) model cannot rationalize why countries would set import tariffs and export subsidies in the absence of trade agreements. Finally, following Bagwell and Staiger (1999, 2009), we consider which international externalities countries try to remedy by signing trade agreements. We do so by looking at the *politically optimal policy*, which is defined as the one that noncooperative policymakers would choose if they did not try to manipulate their terms of trade. We find that the politically optimal policy is still distortive. This implies that, differently from Bagwell and Staiger (2009) – who consider simultaneous choice of import and export taxes in the Krugman (1980) model – terms-of-trade externalities are not the only source of inefficiencies which trade agreements try to solve. Instead, the fiscal-burden-shifting motive – which leads to import subsidies and export taxes – is an additional externality that can be eliminated with international trade agreements. Similarly to Bagwell and Staiger (2009), we also find that the delocation motive is not an externality which needs to be corrected by international trade agreements, when all three policy instruments are available.

To clarify policymakers' incentives, we start by considering wage subsidies/taxes as the only available policy instrument. A wage subsidy increases profits of firms in the domestic differentiated sector, and triggers a relocation of firms from the foreign to the domestic economy, thereby reducing monopolistic distortions and exploiting the delocation motive. However, this comes at the cost of a negative terms-of-trade effect because the wage subsidy reduces the international price of domestically produced varieties. We show that the balance always tips in favor of the terms-of-trade effect before monopolistic distortions are eliminated: the non-cooperative outcome is a wage subsidy that is always lower than the first-best one. Thus, the delocation effect does not induce inefficiently large wage subsidies. Instead, the terms-of-trade effect leads to an inefficiently low subsidy level.

The result on wage subsidies makes it clear that the desire to eliminate monopolistic distortions is an important motive for non-cooperative policy choice. Keeping this in mind, we next study import subsidies/tariffs. First, when starting from the (inefficient) free trade allocation, both monopolistic distortions and the delocation motive for protection call for a tariff, which reduces the domestic price level. This is the case studied by Ossa (2011). Next, we consider a situation where monopolistic distortions have been eliminated by appropriate wage subsidies, so that the market allocation is first-best efficient. In this case the motives for import policy are the delocation motive and the fiscal-burden-shifting effect. It turns out that the optimal non-cooperative import policy entails import subsidies, which aim at relocating firms to the foreign economy and thereby shifting part of the subsidy burden to the other country. Thus, the fiscal-burden-shifting effect dominates the delocation motive.

A similar result holds for non-cooperative export policy. When starting from the (inefficient) free trade allocation, non-cooperative policymakers set export subsidies, which are intended to induce entry into the domestic differentiated sector by relocating firms from the foreign economy and thus reduce monopolistic distortions and exploit the delocation effect. These motives dominate the negative terms-of-trade effect of export subsidies. In contrast, when monopolistic distortions

have been eliminated by appropriate wage subsidies, the prevailing incentives are terms-of-trade effects and the fiscal-burden-shifting motive. Indeed, in this case the Nash equilibrium is characterized by an export tax, which aims at improving domestic terms of trade and shifting the fiscal burden of the subsidy to the other country.

Finally, we analyze a situation where countries can set wage, import and export policy instruments simultaneously. This is the relevant situation if one wants to address the question of why countries need to sign trade agreements, given that in the absence of such agreements the set of tax instruments that can be used strategically is not limited to a single wage tax or trade tax instrument. In line with the above results for single instruments, we find that non-cooperative policymakers choose the level of wage subsidies that exactly offsets the monopolistic distortions, and that they set import subsidies and export taxes, which aim at improving domestic terms of trade and shifting the subsidy burden to the other country. This result is important since it clarifies that in the Krugman (1980) model, the role of international trade agreements is to solve international externalities due to both terms-of-trade effects and fiscal-burden-shifting motives. Delocation effects only become a relevant motive for trade policy, once the set of policy instruments is restricted.

1.1. Related literature

Our results differ markedly from those of the previous literature on trade policy in the two-sector Krugman (1980) model (Venables, 1987; Helpman and Krugman, 1989 chapter 7; Ossa, 2011). All these contributions find that in this model non-cooperative trade policy is driven by delocation effects, leading to inefficiencies compared to free trade. In particular, Venables (1987) studies unilateral incentives to set, alternatively, tariffs, production or export subsidies and shows that any of those can improve domestic welfare compared to free trade due to the delocation effect. However, he does not study the welfare consequences of a strategic game. Helpman and Krugman (1989) limit their discussion to unilaterally set tariffs, while Ossa (2011) considers a tariff game, where positive tariffs are set in equilibrium due to the delocation effect. While we also find that non-cooperative import policy leads to tariffs, this is true only when wage subsidies and export taxes are not available. Moreover, we find that strategically set production (= wage) subsidies are welfare enhancing compared to free trade.

Closely related to our paper is Bagwell and Staiger (2009), who consider a two-sector Krugman (1980) model with quasi-linear utility allowing policymakers to simultaneously choose import and export taxes. They show that in this case Nash-equilibrium policy choices are explained exclusively by the terms-of-trade effects and not by the delocation motive, because import-tariff-induced delocation effects are counterbalanced by export-subsidy-induced delocation effects. Compared to their work, we use the same utility specification as in Ossa (2011), thus allowing for income effects, and add wage subsidies to the set of policy instruments available to policymakers. We show that when all three policy instruments can be set strategically and income effects are allowed for, there is a new international externality – the fiscal-burden-shifting effect – that can be solved by trade agreements, in addition to the terms-of-trade externality.

Other related work is Gros (1987), who studies an import tariff game in the one-sector variant of the Krugman (1980) model. In that version of the model relocation effects are absent and the free trade allocation is Pareto optimal. He finds that in the Nash equilibrium policymakers set import tariffs which aim at increasing domestic wages due to terms-of-trade effects. Finally, Flam and Helpman (1987) and Helpman and Krugman (1989) chapter 7 discuss a production efficiency effect of trade policy. Since with imperfect competition prices are set above marginal costs, domestic consumption of any given variety is too low. Thus, an import tariff (or a production or export subsidy), which shifts demand towards domestic varieties, can reduce monopolistic distortions. However, their effect refers to a change in average cost induced by a