Nontariff protection without an outside good

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ABSTRACT

Assuming an outside good, the existing intra-industry trade models show that the domestic price index is lowered and the welfare is improved by unilateral nontariff protection against foreign products. Removing the outside good, we reexamine this issue incorporating the factor-price changes to capture the terms-of-trade effect. In the case of one production factor (immobile labor), we find that unilateral protection is neither price-index lowering nor welfare improving. In the case of two production factors (immobile labor and mobile capital), the same result holds if the elasticity of substitution between varieties is as large as that observed in empirical studies. Therefore, the outside-good assumption is not harmless to evaluate trade policies.

1. Introduction

The general-equilibrium framework of new trade theory (NTT) has been applied recently to various policy analyses involving trade, tax, and international and regional economies. By use of an outside good, existing literature shows that unilateral nontariff protection lowers price index and increases the welfare. Removing the outside good to capture some relevant effects, this paper finds that unilateral nontariff protection is neither price-index lowering nor welfare improving.

Earlier papers assume immobile labor as the only production factor. Venables (1987, p.713) finds that the welfare in a country is improved by unilateral nontariff protection. This result is further applied to examine trade negotiations governed by the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO) by Ossa (2011). Intuitively, a direct result of unilateral protection is that the prices of imported goods are increased. This negative *direct effect* reduces the national welfare. However, unilateral protection in a country protects domestic firms from competition with imports and thus encourages more firms to locate there. This increases the varieties available in the domestic market (extensive margin). This *extensive-margin effect* lowers the price index in the protected country (Helpman & Krugman, 1989, § 7.4) and thus increases the national welfare. Venables (1987) concludes that the extensive-margin effect dominates the direct effect.

Baldwin et al. (2003, § 12.2) reproduce the result by a two-factor model à la Martin and Rogers (1995), which includes mobile capital as a fixed input. Their model describes foreign direct investment (FDI) of firms, which has been significantly increased over the last 30 years. The extensive-margin effect of protection is observed again, which is supported by empirical studies of tariff-

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jumping FDI that foreign firms relocate their production within countries with stronger protection to avoid trade barriers (e.g., Blonigen, 2002, 2005). A new feature of the two-factor model is the *profit-repatriation effect*—capital returns are repatriated to their countries of origin. They find that national welfare increases again as a balance of the extensive-margin effect, the profit-repatriation effect, and the direct effect.

It is noteworthy that the above papers implicitly assume that labor prices (wages) are independent of protection policies and FDI. Specifically, their models guarantee a perfectly elastic labor supply in differentiated-good production, keeping wages constant. This is due to the assumption that a homogeneous good is produced under constant returns to scale (CRS) and its consumption share is large enough that both countries always produce the good. Under the setting (with homogeneous labor), even if the differentiated-good sector protected by policies absorb labor force from the homogeneous-good sector, domestic demand of the homogeneous good can be met without raising the price of labor (i.e., the wage rate) by importing the good from foreign countries. The assumption simplifies their analysis a lot and such a homogeneous good is often dubbed an *outside good*.[1]

However, in general, protection policies increase the demand for domestic goods and the wage rate is expected to rise, which is pointed out by Baldwin et al. (2003, p.280). Empirical studies on the relationship between FDI and the domestic labor market also clarify that FDI increases the demand of (skilled) workers and raises (skilled) wages (e.g., Driffield & Taylor, 2000). Although the wage appreciation improves the terms of trade, the *terms-of-trade effect* is not captured in the models with the outside good. Furthermore, the extensive-margin effect may be overrated in the existing models because higher wages (higher production costs) are a dispersion force of firm location. Therefore, the net effect of the wage appreciation due to unilateral protection is ambiguous and needs to be clarified by explicitly considering wage appreciation.

Because of the existence of an outside good, the production volume of each firm is also independent of unilateral protection in either Venables (1987) or Baldwin et al. (2003). As shown later, removing this outside good in a two-factor model allows us to observe the *intensive-margin effect* of unilateral protection, that the output per variety in the protected country decreases. The fall in production reduces the degree of economies of scale and thus the welfare.[2]

To examine the above effects of unilateral protection all together, we reformulate both one-factor and two-factor models corresponding to Venables (1987) and Baldwin et al. (2003) by removing the outside good. Having only one sector with immobile labor between countries, our models exhibit a perfectly inelastic labor supply curve and wage appreciation via unilateral protection. These new models derive contrastive results, showing that the outside good is *not* innocuous to evaluate trade policies.[3]

The one-factor case is simpler. Without the outside good, the terms-of-trade effect of protection appears, while both the extensive- and intensive-margin effects disappear because the labor demand in each firm is constant and thus the number of firms is fixed under the Dixit and Stiglitz (1977) framework with iceberg trade costs. Therefore, while Venables' result is based on the balance of the extensive-margin effect and the direct effect, our result is determined by the balance of the terms-of-trade effect and the direct effect. The opposite result is now derived that unilateral protection in a country raises the price index and lowers the welfare.

There are a few one-factor papers exploring the relationship between the effects of nontariff protection and the outside good in the literature of firm heterogeneity. Relying on the outside-good assumption, earlier papers (Demidova, 2008; Melitz & Ottaviano, 2008) find that unilateral trade protection improves the local welfare. Meanwhile, Felbermayr and Jung (2012) and Demidova (2015) examine this issue without the outside good and find the opposite result. In their mechanism, unilateral protection in a country lowers its average productivity and raises the price index there, resulting in a lower level of local welfare. In contrast, we find that the result is true even in the case of homogeneous firms by incorporating the terms-of-trade effect.

The two-factor case with mobile capital is more interesting. Takahashi, Takatsuka, and Zeng (2013) examine the relationship among country size, firm location (FDI), and relative wages in such a two-factor model without protection policy instruments. The mobile capital generates a channel to offset the trade imbalance in goods (see Takatsuka and Zeng (2012a, 2012b) for details). Both firm location and factor prices are flexible to respond to the level of protection, and reflecting the phenomenon of tariff-jumping FDI. Introducing protection policies into Takahashi et al. (2013), we are able to fully include the extensive-margin effect, the intensive-margin effect, and the terms-of-trade effect to evaluate the impact of unilateral protection. We find that the welfare results of unilateral protection depend on the elasticity of substitution between varieties, σ. Specifically, results similar to those of Venables (1987) could hold when σ is small. However, if $\sigma \geq 2$ (as observed in many empirical studies), unilateral protection is again neither price-index lowering nor welfare improving again. Intuitively, a small σ implies a large agglomeration force, making the extensive-margin effect dominant.

Some papers on *tariff* protection consider factor price changes removing the outside good as in the present paper. For example, Gros (1987) examines optimal tariffs and retaliation using the model of Krugman (1980, Section II), and show that there is a positive optimal tariff even for a small country. More recently, Felbermayr, Jung, and Larch (2013) explore the effect of tariff policy in

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[1] The outside good is usually assumed to be traded without costs. Yet, even if trade costs of the good are positive, the relative wage is unchanged when the good remains tradable and the trade direction is not changed by policies.

[2] Instead, Helpman and Krugman (1989, § 7.3) emphasize the *production-efficiency effect*, that unilateral protection in the manufacturing sector increases the total national production in this sector. This effect can be divided into the extensive- and intensive-margin effects.

[3] There are alternative ways to make factor prices vary in response to the level of protection rather than eliminating the outside good. For example, to make labor supply inelastic, we can consider the case in which the homogeneous good is only domestically supplied due to its high trade costs (Davis, 1998). Yet, the case is essentially the same as our case at least when labor is the only production factor since a constant share of labor is used in the homogeneous-good sector (see Takatsuka & Zeng, 2012b, p.312). Meanwhile, we can let the outside good be nationally differentiated, but the analysis is more complicated. Analytical results are limited even without the protection policy instruments. See Crozet and Trionfetti (2008, Section 3.1) and Zeng and Kikuchi (2009). In contrast, our model is tractable to derive analytical results.