The Endogenous Trade Policy Formation and Outsourcing

Chelsea C. Lin ** and Ray-Yun Chang

National Dong Hwa University

Abstract This paper considers the formation of trade policies when a domestic firm outsources the intermediate input from its foreign final good competitor. This paper considers three policy instruments when the intra-industry trade occurs: domestic specific subsidy on intermediate import, domestic specific tariff on final import, and foreign specific tariff on final import. We find that the joint determination of import subsidy on intermediate good and import tariff on final good leads to a lower intermediate import subsidy and a lower final import tariff than the case in which the domestic government can only choose to intervene in either the intermediate good market or the final good market. We also discovered that the levels of these three policies are higher when firms are capable of lobbying for a higher level of trade intervention.

Keywords: Outsourcing, trade policy formation, lobbying

JEL Classifications: F12, F13

Introduction

One of the most notable trends in international trade has been a marked increase in the disintegration of the production process (i.e., outsourcing). Several recent examples illustrate this phenomenon, such as the fact that the American aircraft manufacturer Boeing currently outsources over 34,000 of the components necessary to assemble its 747 passenger aircraft (see, Shy and Stenbacka, 2003) and Sun MicroSystem purchases between 75 to 80 percent of its components from other companies (see, Domberger, 1999). ¹

Outsourcing is often viewed as a means by which firms can maintain lower costs to deal with increasing international competition. Coase's (1937) pioneering study on outsourcing explains firms' boundaries from the aspect of transaction costs and imperfect information. Following Coase (1937), Williamson (1975, 1985), Grossman and Hart (1986) and Hart and Moore (1990) discuss the factors that determine a firm's boundary in the context of contractual incompleteness and asset specificity. Using these studies as a benchmark, Grossman and Helpman (2001, 2002) develop a general equilibrium model to ascertain the determinants of a firm's equilibrium production mode (i.e., vertical integration vs. outsourcing). ²

In addition to the aforementioned research conducted on transaction costs and imperfect information, various studies also explored the ways in which outsourcing affects a firm's strategic behavior regarding its competition. For example, Shy and Stenbacka (2003) discuss further the role of subcontracting in industries in which firms utilize their design of
organizational production modes as a strategic instrument and investigate decisions regarding which fraction of components to produce internally and which fraction to subcontract when taking the monitoring costs and market structure into account. Chen et al. (forthcoming) identify a firm's strategic incentive for international outsourcing and demonstrate that the trade liberalization in intermediate goods can lead to higher prices for both intermediate and final goods. 

Since firms engage in outsourcing to conduct segments of production process across borders, trade barriers should affect firms' outsourcing decision as trade barriers are supposed to impose some constraints or add some costs to the outsourcing firms. However, it is quite surprising indeed that only a few studies have addressed the effects of trade liberalization on a firm's outsourcing decision. Moreover, the levels of trade protection are only often taken as given in the current literature, but the links between trade policy formation and outsourcing are often ignored as well.

In most cases, outsourcing firms and their intermediate input providers are rivals in the final goods markets. This case has been discussed in some strategic aspects in vertically related markets (e.g., Spencer and Jones, 1992 and Chen et al., forthcoming). These studies have determined that a vertical relationship may lead to some “collusive” effects on the competition for final goods.

As opposed to the studies mentioned above, this paper focuses specially on the formation of trade policies when the domestic firm outsources the intermediate input from its foreign final good competitor in the occurrence intra-industry trade in the context of political economy. It does so by taking the following three policy instruments when the intra-industry trade occurs: domestic specific subsidy on intermediate import, domestic specific tariff on final import, and foreign specific tariff on final import into considerations. We find that the joint determination of import subsidy on intermediate good and import tariff on final good leads to a lower intermediate good subsidy and lower import tariff than case in which the domestic government only chooses to intervene either in the intermediate good market or in the final good market. We also discover that the levels of these three policies are higher when firms are able to lobby for higher levels of trade intervention.

The rest of the paper is organized as follows: Section 2 describes the model's basic structure, section 3 deals with the formation of trade policies in the absence of lobbying, section 4 concerns the formation of trade policies in the presence of lobbying, and the final section is the concluding remarks.

The Basic Model

Following Chen et al. (forthcoming), we begin with a two-country duopoly model in which the domestic firm $D$ and the foreign firm $F$ produce a differentiated final product $Y$, using a homogeneous intermediate good $X$. The production of one unit of good $Y$ requires one unit of the intermediate good $X$, assuming that there is potential trade in both goods and that the two firms compete in a Cournot manner in both the domestic market and foreign market. The inverse demand functions for the final goods in the domestic market and foreign market are given as $p(q^D, q^F)$ and $p^*(q^D, q^F)$, respectively. Since firm $F$ is more efficient in producing the intermediate good $X$, we assume that firm $F$ will remain integrated throughout the model and that the marginal cost of producing the intermediate good is $m$. The price for firm $D$ to
outsource the production of intermediate good is \( w \) where \( w-m \geq 0 \) captures the rent that the foreign firm can obtain from the export of intermediate good. Other costs of producing \( Y \) are normalized to zero. Regarding the issue of trade relations between the two countries, we assume that the domestic government offers a specific subsidy \( s \) on intermediate good import and imposes a specific tariff \( \tau \) on final import, and the foreign government imposes a specific tariff \( \tau^* \) on final import.

Total population is normalized to one in each country. A fraction \( \alpha^Y \) of the population owns the specific factor used in the production of final good \( Y \) and has a direct stake in firm \( D \) and the remaining \( 1-\alpha^Y \) (hereafter, \( \alpha^M \)) individuals are domestic labors who earn a fixed return normalizing to one. Labor is assumed to be inactive politically. Similarly, a fraction \( \alpha^Y \) of the population owns the specific factor used in the production of final good \( Y^* \) and has a direct stake in the domestic firm \( F \). The remaining \( 1-\alpha^Y \) (hereafter, \( \alpha^M^* \)) individuals are foreign labors, which are used in both the manufacture and the numeraire sectors.

In the present paper, we model a two-stage game. In the first stage, both the domestic and the foreign governments set the level of trade protection. In the second stage, firm \( D \) and firm \( F^* \) compete for the differentiated final good \( Y \) in both the domestic and the foreign markets in a Cournot manner. As usual, the subgame perfect equilibrium of the model is solved by backward induction.

The domestic firm \( D \) maximizes profit \( \pi^Y \) and the foreign firm \( F \) maximizes profit \( \pi^{Y^*} \)

\[
\pi^Y (q^D, q^{D^*}, q^{F^*}, \tau, \tau^*, s, p, p^*, w, m)
= p(q^D, q^{F^*})q^D + p^*(q^{D^*}, q^{F^*})q^{D^*} - (w-s+1)q^D - (w-s+\tau^*+1)q^{D^*},
\]

\[
\pi^{Y^*} (q^D, q^{F^*}, q^{D^*}, q^{F^*}, \tau, \tau^*, s, p, p^*, w, m)
= p(q^D, q^{F^*})q^D + p^*(q^{D^*}, q^{F^*})q^{F^*} - (m+\tau+1)q^D - (m+1)q^{F^*}
+ (w-m)(q^D + q^{D^*}),
\]

where \( p(q^D, q^{F^*}) \) and \( p^*(q^{D^*}, q^{F^*}) \) are the inverse demands for final good in the domestic market and the foreign market, respectively. \( w \) and \( m \) are the marginal costs of firm \( D \) and firm \( F^* \), respectively. The first-order conditions for profit maximization are the following

\[
\pi^Y_{q^D} = p_{q^D} q^D + p - w + s - 1 = 0,
\]

\[
\pi^Y_{q^{D^*}} = p^*_{q^{D^*}} q^{D^*} + p^* - w + s - 1 - \tau^* = 0,
\]

\[
\pi^Y_{q^{F^*}} = p_{q^{F^*}} q^{F^*} + p - m - 1 - \tau = 0,
\]

\[
\pi^{Y^*}_{q^D} = p_{q^D} q^D + p - m - 1 = 0,
\]

\[
\pi^{Y^*}_{q^{D^*}} = p^*_{q^{D^*}} q^{D^*} + p^* - m - 1 = 0,
\]

with the second-order conditions \( \pi^Y_{q^D,q^D} < 0, \pi^Y_{q^{D^*},q^{D^*}} < 0, \pi^Y_{q^{F^*},q^{F^*}} < 0, \pi^{Y^*}_{q^D,q^D} < 0, \pi^{Y^*}_{q^{D^*},q^{D^*}} < 0 \) and the
Routh-Hurwitz condition: $D = \pi_Y^{d^q q^q} - \pi_Y^{d^q q^q} \pi_Y^{d^q q^q} > 0$ and $D^* = \pi_Y^{d^q q^q} \pi_Y^{d^q q^q} - \pi_Y^{d^q q^q} \pi_Y^{d^q q^q} > 0$ being satisfied.

Using Cramer's rule, we can show the following comparative statics:
- $d\pi_Y / ds > 0$, $d\pi_Y / ds \geq 0$,
- $d\pi_Y / d\tau > 0$, $d\pi_Y / d\tau \geq 0$, and $d\pi_Y / d\tau < 0$, and $d\pi_Y / d\tau \geq 0$. The aforementioned comparative statics demonstrate that the three policy instruments have definite effects on domestic firm's profit, whereas they exhibit ambiguous effects on the foreign firm's profit.

All individuals in the domestic country have the same preferences, and maximize the utility function given by

$$ U^i(a, Z^i) = a^i + u(Z^i), $$

where $i = Y, M$ represent the shareholders of the domestic firm $D$, and the labors respectively; $a^i$ is the consumption of numeraire good; $Z^i = z^D + z^F$ is the total consumption of differentiated goods $z^D$ and $z^F$ by individual $i$. The function $U(.)$ is differentiable, increasing, and strictly concave in all arguments. Utility is maximized subject to budget constraint $I^i \geq a^i + p^F Z^i$. From the above, the indirect utility function of each domestic individual in group $i$ has the form as

$$ V^i = I^i + u(Z^i) - p^F Z^i = I^i + CS\left(p^F\right), $$

where $i = Y, M$; $CS$ is the consumer surplus from goods other than the numeraire good, $CS\left(p^F\right) = U\left(Z^i\left(p^F\right)\right) - p^F Z^i$.

The gross indirect utility functions for each domestic individual in each group are given by

$$ V^Y = \frac{\pi_Y}{\alpha_Y} + \tau q^F - s\left(q^D + q^D^*\right) + CS, $$

$$ V^M = \frac{\pi_M}{\alpha_M} + \tau q^F - s\left(q^D + q^D^*\right) + CS, $$

where $\pi_Y$ is described as mentioned above; $\pi_M$ is the total constant return of the labor factor; $(\tau q^F - s\left(q^D + q^D^*\right))$ is the net revenue from the import subsidy and import tariff.

Taking the import subsidy and import tariff set by the domestic government as given, the indirect utility function identifies the utility level of an individual in group $i$ that could be attained in the absence of lobbying.

Similarly, the gross indirect utility functions for each foreign individual in each group are given by

$$ V^{Y^*} = \frac{\pi_Y^*}{\alpha_Y} + \tau^* q^D + CS^*, $$

$$ V^{M^*} = \frac{\pi_M^*}{\alpha_M^*} + \tau^* q^D + CS^*, $$

where $\pi_Y^*$ is described as mentioned above; $\pi_M^*$ is the total constant return of the labor factor; $\tau^* q^D$ is the revenue from the import tariff.
Equilibrium Policies in the Absence of Lobbying

In the absence of lobbying, the domestic government sets the levels of trade intervention by maximizing the aggregate social welfare. The domestic government's objective function is

\[ W = \alpha^Y V^Y + \alpha^M V^M, \]

where \( W \) is the social welfare level which can be attained in the absence of any political contributions to the domestic government. The first-order conditions for domestic government's objective function maximization are

\[ W_y = \alpha^Y V^Y_y + \alpha^M V^M_y = 0, \tag{1} \]

\[ W_s = \alpha^Y V^Y_s + \alpha^M V^M_s = 0. \tag{2} \]

Similarly, the foreign government's objective function is

\[ W^* = \alpha^Y V^{Y^*} + \alpha^M V^{M^*}, \]

where \( W^* \) represents the social welfare level which can be attained in the absence of any political contributions to the foreign government. The first-order condition for the foreign government's objective function maximization is

\[ W^*_y = \alpha^Y V^{Y^*}_y + \alpha^M V^{M^*}_y = 0. \]

For sake of simplicity, we assume that \( \alpha^Y = \alpha^r \) and \( \alpha^M = \alpha^m \). After solving the first-order conditions, the optimal levels of trade intervention for the domestic and foreign economy are the following

\[ \tau^W = \frac{[q^D + q^D - \pi^Y_s - CS_s]q^D_t + [q^E + \pi^Y_t + CS_t]}{q^D_t q^E_s - (q^D_t + q^D_s)q^E_t} \geq 0, \tag{3} \]

\[ s^W = \frac{[q^D + q^D - \pi^Y_s - CS_s]q^E_t + [q^E + \pi^Y_t + CS_t]}{q^D_t q^E_s - (q^D_t + q^D_s)q^E_t} \geq 0, \tag{4} \]

\[ \tau^{W^*} = \frac{-q^D - \pi^Y_t - CS_t}{q^D_t} \geq 0, \tag{5} \]

where the superscript \( W \) denotes the intervention levels which maximize the aggregate social welfare and \( CS_s = -p^Y Z^c Z^c > 0, CS_t = -p^E Z^c Z^c < 0, CS^*_s = -p^{W^*} Z^c Z^c < 0. \)

In the standard strategic trade policy literature, the optimal import policy is always positive when the demand is not “too” convex to the origin. After considering the vertical
relationship in the intermediate good and final good markets and taking the intra-industry into account, we can conclude that the signs of the intermediate subsidy and final tariffs all turn to be ambiguous. These results are due to the substitution between the import policies on intermediate good and final good in the domestic country and the collusive effect in the foreign country. Let's examine the following case. Assuming that the only policy instrument available to the domestic government is specific final import tariff, the optimal tariff is

$$\tau^0 = -\frac{\pi^Y - q^F - CS^f}{q^F} > 0.$$  

By substituting $\tau^0$ into Eq. (1), we come up with

$$W_{Y^F} = \frac{\pi^y - q^F - CS^f}{q^F} q^F + q^F - sq^D + CS^f = -sq^D < 0.$$  

The above implies that the equilibrium import tariff on final good is higher when the domestic government is only allowed to intervene in the final good market. This explains why the domestic import tariff on final good can result in being either positive or negative in our case.

Similarly, we can show that the domestic intermediate import subsidy in the absence of tariff on final good is

$$s^0 = \left(\frac{\pi^y - (q^D + q^D') + CS^s}{q^D + q^D'}\right) > 0.$$  

Substituting $s^0$ into Eq. (2), we have

$$W_{Y^D} = \frac{\pi^s + \tau q^F}{(q^D + q^D')} - \left(\frac{\pi^y - (q^D + q^D') + CS^s}{q^D + q^D'}\right)\left(q^D + q^D'\right) - \left(\pi^y - q^D - q^D'\right) + CS^s = \tau q^F < 0,$$

which implies that the equilibrium import intermediate subsidy is higher when the domestic government is only allowed to intervene in the intermediate good market.

Proposition 1: The joint determination of intermediate import subsidy and final import tariff leads to a lower trade intervention level than the case in which the domestic government is only allowed to intervene in one market at a time.

Proposition 2: The signs of domestic import policy on both intermediate good and final good are ambiguous due to the substitution between the two policies. The sign of foreign import policy on final good is ambiguous due to the foreign firm's incentive of extracting rents from the export of intermediate good.

Equilibrium Policies in the Presence of Lobbying

The lobbying structure follows Grossman and Helpman (1994) framework to Bernheim
and Whinston's (1986) study on menu-auction. The interest group, as the bidder, offers various contribution schedules corresponding to a different set of policies to the incumbent government at the first stage. The government, as the auctioneer, sets the policy by evaluating the weighted sum of contributions and aggregated social welfare at the second stage. An equilibrium is a set of contribution schedules and a set of trade policies.

Following lemma 2 of Bernheim and Whinston (1986) and proposition 1 of Grossman and Helpman (1994), we only consider the case in which the contribution schedules are differentiable around the equilibrium point. The necessary conditions for a subgame perfect Nash equilibrium when the domestic firm $D$ offers the government political contribution schedules are

$$
\left( \tau^G, s^G \right) \in \arg \max \left( \beta - 1 \right) C^Y + W,
$$

$$
\left( \tau^G, s^G \right) \in \arg \max \left\{ V^G + \alpha^Y V^Y - C^Y \right\},
$$

where the superscript $G$ denotes the levels of intervention determined by the political process; $C^Y$ is the contributions provided by firm $D$ to the domestic government; $W$ is the (gross) voter's welfare and $\beta > 1$ is the weight that the government attaches to political contributions relative to the welfare of the public.

Eq. (6) is the domestic government's objective function of maximizing the possibility of being reelected. With lobbying, other than providing high standard of living to the general public, the government has another resource to enhance its possibility of being re-elected, i.e., the contributions provided by the interest groups. Eq. (7) requires that $s^G$ and $\tau^G$ must also maximize the joint payoff of the interest group and the domestic government. From Eq. (6) and Eq. (7), we have

$$
\alpha^Y V^Y = C^Y; \alpha^Y V^Y = C^Y.
$$

Eq. (8) imply that the interest group makes contributions up to the point where the marginal benefit from the resulting change in the intervention level exactly equals to the marginal contribution costs. Thus, as noted by Grossman and Helpman, the political contribution schedules are locally truthful. As in Bernheim and Whinston and Grossman and Helpman, this concept can be extended to a contribution schedule that is globally truthful.

Using Eq. (1), Eq. (2), Eq. (6), and Eq. (8), the first-order conditions of the domestic government's optimization problem are

$$
V^G = \left( \beta - 1 \right) C^Y + W = \beta \alpha^Y V^Y + \alpha^M V^M = 0,
$$

$$
V^G = \left( \beta - 1 \right) C^Y + W = \beta \alpha^Y V^Y + \alpha^M V^M = 0.
$$

From the above, the equilibrium intervention levels with lobbying in the domestic country are
\[ \tau^G = \frac{A^* q^D + B^* \left(q^D_s + q^D_q\right)}{\left(\alpha^y + \frac{\alpha^M}{\beta}\right) \left[q^D q^F_s - \left(q^D_s + q^D_q\right) q^F_s\right]} > 0, \quad (9) \]

\[ s^G = \frac{A^* q^F + B^* q^F_s}{\left(\alpha^y + \frac{\alpha^M}{\beta}\right) \left[q^D q^F_s - \left(q^D_s + q^D_q\right) q^F_s\right]} > 0, \quad (10) \]

where \[ A = \left(\alpha^y + \frac{\alpha^M}{\beta}\right) (q^D + q^D_q - CS) - \pi^y; \quad B = \left(\alpha^y + \frac{\alpha^M}{\beta}\right) (q^F + CS) + \pi^y. \]

Similarly, the equilibrium contribution schedule of the interest group in the foreign country satisfies \[ \alpha^y V^y = C^y \] and the foreign import tariff is

\[ \tau^G = -\frac{\pi^y}{\left(\alpha^y + \frac{\alpha^M}{\beta}\right) q^D_q} = \frac{q^D + CS^*}{q^D_q} > 0. \quad (11) \]

Comparing Eq. (9) and Eq. (10) with Eq. (3) and Eq. (4), we have

\[ \tau^G - \tau^W = \frac{\left[\pi^y q^D_s - \pi^y \left(q^D + q^D_q\right)\right] \left(\alpha^y + \frac{\alpha^M}{\beta} - 1\right)}{\left(\alpha^y + \frac{\alpha^M}{\beta}\right) \left[q^D q^F_s - \left(q^D_s + q^D_q\right) q^F_s\right]} > 0, \]

\[ s^G - s^W = \frac{\left[\pi^y q^F_q - \pi^y q^F_q\right] \left(\alpha^y + \frac{\alpha^M}{\beta} - 1\right)}{\left(\alpha^y + \frac{\alpha^M}{\beta}\right) \left[q^D q^F_s - \left(q^D_s + q^D_q\right) q^F_s\right]} > 0. \]

Comparing Eq. (11) with Eq. (5), we have

\[ \tau^G - \tau^W = \frac{\left(\alpha^y + \frac{\alpha^M}{\beta} - 1\right) \pi^y}{\left(\alpha^y + \frac{\alpha^M}{\beta}\right) q^D_q} > 0. \]

We find that the level of these three policy instruments are higher when firms are able of lobbying for a higher level of trade intervention.

**Proposition 3:** The equilibrium import intervention in both countries is higher with
lobbying, i.e., \( \tau^G > \tau^W, s^G > s^W \), and \( \tau^* G > \tau^* W \).

**Concluding Remarks**

This paper applies a political economy framework to link trade policy formation and outsourcing in the presence of intra-industry trade by taking the formation of domestic specific import subsidy on intermediate good, domestic specific import tariff on final good, and foreign specific import tariff on final good in the occurrence of the intra-industry trade into consideration.

Our results indicate that when the vertical relationship in the intermediate good and final good markets is considered and the intra-industry trade is taken into account, the signs of domestic import policy on both intermediate good and final good are ambiguous, due to the substitution between the two policies. The sign of foreign import policy on final good is ambiguous due to the foreign firm's incentive of extracting rents from the export of intermediate good.

We also consider the formation of trade policies when governments use trade policies to maximize their possibility of being re-elected. When firms are allowed to lobby, the level of trade intervention is higher than that set by a benevolent dictator.
Appendix

The comparative statics of domestic specific subsidy on intermediate imports

\[
\frac{dq^D}{ds} = -\frac{\pi^Y_{q^D q^F}}{D} > 0
\]

\[
\frac{dq^D^*}{ds} = -\frac{\pi^Y_{q^D^* q^F^*}}{D} > 0
\]

\[
\frac{dq^F}{ds} = \frac{\pi^Y_{q^D q^D^*}}{D} < 0
\]

\[
\frac{dq^F^*}{ds} = \frac{\pi^Y_{q^D^* q^D^*^*}}{D} < 0
\]

\[
\frac{d\pi^Y}{ds} = \frac{\pi^Y_{q^D q^D}}{q^D} + \frac{\pi^Y_{q^D^* q^D^*}}{q^D^*} + \frac{\pi^D_{q^F q^F^*}}{q^F^*} + \frac{\pi^Y_{q^D q^D^*}}{q^D^*} + \frac{\partial \pi^Y}{\partial s} = p^*_q q^D q^D + p^*_q q^D^* q^D^* + \left(q^D + q^D^*\right) > 0
\]

\[
\frac{d\pi^Y}{ds} = \frac{\pi^Y_{q^D q^D}}{q^D} + \frac{\pi^Y_{q^D^* q^D^*}}{q^D^*} + \frac{\pi^D_{q^F q^F^*}}{q^F^*} + \frac{\pi^Y_{q^D q^D^*}}{q^D^*} + \frac{\partial \pi^Y}{\partial s} = p^*_q q^D q^D + p^*_q q^D^* q^D^* + \left(q^D^* + q^D^*^*\right) \geq 0
\]

\[
\frac{dQ}{ds} = \frac{dq^D}{ds} + \frac{dq^F}{ds} = \frac{\pi^Y_{q^D q^D}}{q^D} - \frac{\pi^Y_{q^D q^D^*}}{q^D^*} + \frac{\partial \pi^Y}{\partial s} > 0
\]

\[
\frac{dQ^*}{ds} = \frac{dq^D^*}{ds} + \frac{dq^F^*}{ds} = \frac{\pi^Y_{q^D^* q^D^*^*}}{q^D^*^*} - \frac{\pi^Y_{q^D^* q^D^*^*}}{q^D^*^*} + \frac{\partial \pi^Y}{\partial s} > 0
\]

The comparative statics of domestic specific tariff on final imports

\[
\frac{dq^D}{d\tau} = -\frac{\pi^Y_{q^D q^F}}{D} > 0
\]

\[
\frac{dq^F}{d\tau} = \frac{\pi^Y_{q^D q^D^*}}{D} < 0
\]

\[
\frac{d\pi^Y}{d\tau} = \frac{\pi^Y_{q^D q^D}}{q^D} + \frac{\pi^Y_{q^D^* q^D^*}}{q^D^*} + \frac{\pi^D_{q^F q^F^*}}{q^F^*} + \frac{\pi^Y_{q^D q^D^*}}{q^D^*} + \frac{\partial \pi^Y}{\partial \tau} = p^*_q q^D q^F > 0
\]

\[
\frac{d\pi^Y}{d\tau} = \frac{\pi^Y_{q^D q^D}}{q^D} + \frac{\pi^Y_{q^D^* q^D^*}}{q^D^*} + \frac{\pi^D_{q^F q^F^*}}{q^F^*} + \frac{\pi^Y_{q^D q^D^*}}{q^D^*} + \frac{\partial \pi^Y}{\partial \tau} = p^*_q q^D q^F + \left(w - m\right) q^D^* \geq 0
\]
\[
\frac{dQ}{d\tau} = \frac{dq^D}{d\tau} + \frac{dq^F}{d\tau} = \frac{\pi_{q^D}^{\gamma \rho} - \pi_{q^F}^{\gamma \rho}}{D} < 0
\]

The comparative statics of foreign specific tariff on final imports

\[
\frac{dq^F}{d\tau^*} = -\frac{\pi_{q^F}^{\gamma \rho}}{D} > 0
\]

\[
\frac{dq^D}{d\tau^*} = \frac{\pi_{q^D}^{\gamma \rho}}{D} < 0
\]

\[
\frac{d\pi^\gamma}{d\tau} = \pi_{q^D}^{\gamma \rho} q^D_{z^*} + \pi_{q^F}^{\gamma \rho} q^F_{z^*} + \pi_{q^D}^{\gamma} q^D_{z^*} + \pi_{q^F}^{\gamma} q^F_{z^*} + \partial \pi^\gamma_{\partial \tau^*} = p^* q^D_{z^*} q^F_{z^*} - q^D_{z^*} < 0
\]

\[
\frac{d\pi^\gamma}{d\tau^*} = \pi_{q^D}^{\gamma \rho} q^D_{z^*} + \pi_{q^F}^{\gamma \rho} q^F_{z^*} + \pi_{q^D}^{\gamma} q^D_{z^*} + \pi_{q^F}^{\gamma} q^F_{z^*} + \partial \pi^\gamma_{\partial \tau^*} = p^* q^D_{z^*} q^F_{z^*} + (w - m) q^D_{z^*} \geq 0
\]

\[
\frac{dQ^*}{d\tau^*} = \frac{dq^D}{d\tau^*} + \frac{dq^F}{d\tau^*} = \frac{\pi_{q^D}^{\gamma \rho} - \pi_{q^D}^{\gamma \rho}}{D^*} < 0
\]
Footnotes

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** Corresponding author: Chelsea C. Lin, Assistant Professor, Department of Economics, National Dong Hwa University, Shou-Feng, Hualien, 974, Taiwan; E-mail: clin@mail.ndhu.edu.tw; Tel: 886-3-863-5540; Fax: 886-3-863-5530. Chelsea C. Lin appreciates funding from National Science Council in Taiwan (NSC 93-2415-H-259-002).


3. McLaren (2000), Grossman and Helpman (2001) and Chen et al. (forthcoming) discuss the ways in which trade liberation affects firms’ outsourcing decision; however, the authors do not address the formation of trade policy in their work.

References


