# Impacts of Globalization on Tariff Settings[*]

## Masafumi Tsubuku [†]

### Abstract

This study investigates the effects of globalization—specifically, a reduction in trade costs—on trade policies implemented under unilateral and cooperative policy regimes. The results demonstrate opposite responses to the advancement of globalization under the two regimes: (i) the unilateral policy regime induces governments to raise tariff rates with the progress of globalization, while (ii) the cooperative policy regime allows governments to reduce tariffs.

**JEL classification** F12, F13, F68

**Keywords** Trade Costs, Tariff Policy, Cooperative Trade Policy, Imperfect Competition.

# 1  Introduction

The progress of globalization so far can be interpreted as the increasing integration of national economies across the world induced by various factors, such as advances in transportation, information technologies, electronic trading, and international legal systems. As stated in Derher (2008), who develops an index of globalization, the progress of globalization consists of three dimensions: economic, social, and cultural integration, and globalization have been proceeding in most countries for 1970–2000. Tariff reduction, among other features, has played a critical role in the promotion of globalization by removing international trade barriers.

However, tariff reduction has a distinct feature from the other driving forces of globalization. Trade policy, including tariff settings, is determined by governments according to various policy objectives, which include the protection of infant industries, securing political contributions from lobby groups, or abiding by international trade policy agreements. Actually, we can observe a difference in trends of tariff rates according to country or period, despite the progress of globalization. For example, during the 1950s and 1960s, developing countries often implemented protectionist policy in order to promote domestic industries at the expense of imports. On the other hand, more recently, numerous new free trade agreements are evidence that governments are cooperating to reduce trade barriers under the auspices of international institutions, such as the General Agreement on Tariffs and Trade and the World Trade Organization. Such differences in government responses to globalization lead us to recognize the importance of separately treating tariff reduction and the progress of globalization without tariff reduction.

The main purpose of this study is to clarify how the tariff rate changes with the progress of globalization in two different policy regimes: noncooperative and cooperative regimes. In this study, we assume that the progress of globalization is captured by the reduction of trade costs, which have been recognized widely in economic integration.[1]

_____

[1]Although the extent of globalization is represented in various ways, the reduction of broadly-

The results show that policy regimes matter decisively for the response of tariff setting to the progress of globalization. In the first regime, in which all governments choose their tariff rate noncooperatively, they choose higher tariff rates as trade costs decrease. In traditional trade theory, Johnson (1954) shows that uncooperative governments set inefficiently high tariffs in order to improve their terms of trade at the expense of foreign countries (this is known as a terms-of-trade externality). This result also appears in our model, which focuses on intraindustry trade.[2] In addition, our analysis implies that this externality is dependent on the volume of international trade and amplified by economic integration that intensifies competition. Such amplification leads governments to employ protectionist trade policy in the form of higher tariffs with the progress of globalization. By contrast, in the second regime, in which all governments cooperate to set tariff rates, the results would be reversed: in the cooperative regime, globalization leads to tariff reduction. The cooperative regime tends to pursue economic efficiency and a reduction in trade costs creates incentives to expand the volume of international trade, which can achieve tariff reduction by governments facing the progress of globalization. Consequently, governments with cooperative policy regimes tend to show favorable reactions to globalization.

Many economists have analyzed intraindustry trade policy.[3] However, the literature has not incorporated the effects of globalization on trade policy, and pays less attention to trade costs and its effect on trade policy outcomes.[4] As all countries face continuous

---

defined trade costs is standard way to represent the progress of globalization. According to Anderson and Van Wincoop (2004), trade costs broadly refer to the costs of transportation, information, contract enforcement, and adjustment to foreign standards, which are intimately related to globalization. The reduction of trade costs facilitates the expansion of international trade, which results in economic integration and, subsequently, globalization.

[2]The intraindustry trade model was established by Brander (1981) and Brander and Krugman (1983). Then, Gros (1987) was the first to show that, according to an intraindustry trade model, even small countries have incentives to impose tariffs to relocate production and manipulate terms of trade.

[3]In particular, studies in strategic trade policy have developed the intraindustry trade model, as shown in the detailed survey of Brander (1995).

[4]Trade costs are often treated as a factor that enables analysis of firms' distribution in the "new economic geography." Mai et al. (2008) differentiate trade costs from tariffs imposed by governments and explore the relationship between tariff competition and firms' distribution between countries using a quantitative approach. In our study, however, we construct a simpler model in order to characterize equilibrium analytically and explore the effect of the reduction in trade costs on the trade policy.

changes over time owing to globalization, the choice of trade policy must be affected by the progress of globalization. Our analyses present the different outcomes of the two policy regimes and provide rationale for cooperative policy regimes in the more globalized economy.

The remainder of the paper is organized as follows. Section 2 presents the simple intraindustry trade model with trade costs. In Section 3, we analyze two trade policy regimes, unilateral and cooperative trade policies. The impacts of globalization on policy choices under the different regimes are then analyzed. We conclude the paper in Section 4.

# 2 The Model

We construct an intraindustry trade model following Furusawa and Konishi (2007).[5] There are two symmetric countries ($r = H, F$) in the economy. Each country has two sectors, the agricultural sector and the manufacturing sector. Consumers in both countries have identical preferences for agricultural and manufacturing goods. We assume that each consumer supplies one unit of labor and, thus, the population size $l$ in each country is equal to labor force endowment.

## 2.1 Technology

The agricultural sector operates under perfect competition and constant returns to scale using only labor. To produce one unit of the agricultural good, one unit of labor needs to be employed in this sector. Assuming that agricultural goods are numeraire, the price and wage rate are equal to one.

The manufacturing sector produces horizontally differentiated goods that are imperfectly substitutable for each other. The production of manufacturing goods operates under imperfect competition. The one variety $\omega$ is produced by one manufacturing

---

[5]Furusawa and Konishi (2007) employ a network formulation game and analyze whether global free trade is stable among $n$ countries with an intraindustry trade model. Unlike their study, we introduce trade costs and explore the properties of trade policy in the presence of trade costs.

firm, which is negligibly small and does not influence the behavior of other firms in the sector. Formally, there is a continuum $\Omega$ of manufacturing firms in the economy. Note that the set $\Omega$ also represents the set of all varieties of manufacturing goods in the economy. Assuming no entry to this sector, we normalize the size of the set, $|\Omega| = 1$. These firms are located evenly in each country so that domestic consumers own half of the total number of firms in the economy. The set of firms located in country $r$ is denoted by $\Omega_r \subset \Omega$, whose size is one half, $|\Omega_r| = 1/2$.

International transportation of manufacturing goods incurs trade costs $\tau$. To purchase one unit of the manufacturing good from abroad, consumers have to pay $\tau$ in addition to the good's price and the tariff imposed by the government. If we suppose the trade costs are compensation for transport services supplied by the private sector, which is perfectly competitive, transport services are inelastically delivered with marginal cost pricing. It is reasonable that the trade costs $\tau$ are exogenously given as constant marginal costs in the competitive transport sectors.[6] Furthermore, each national government imposes import tariff $t_r$ on manufacturing goods. In contrast to trade costs, the tariff is imposed on imported goods and is evenly distributed to consumers in each country. To simplify the analysis, agricultural goods are assumed to be shipped without trade costs.

## 2.2   Consumers

All consumers in the economy are assumed to be identical. We formulate the preferences of consumers with a quadratic utility function as follows:

$$
\begin{aligned}
&u(q(\omega), q_0; \omega \in \Omega) \\
&= \int_\Omega q(\omega) d\omega - \frac{1-\gamma}{2} \int_\Omega q(\omega)^2 d\omega - \frac{\gamma}{2} \left( \int_\Omega q(\omega) d\omega \right)^2 + q_0,
\end{aligned} \tag{1}
$$

---

[6]Some studies introduce the mechanism that transport costs are determined endogenously and explore its effects on the economy (see, e.g., Takahashi, 2006; Mun and Nakagawa, 2010; Tsubuku, 2014).

where $q(\omega)$ $(q_0)$ is the amount of manufacturing (agricultural) goods consumption and $\gamma$ denotes the degree of substitutability between manufacturing goods. A lower $\gamma$ means that consumers recognize manufacturing goods as more differentiated. If $\gamma = 0$, manufacturing goods are perfectly different from one another. If $\gamma = 1$, every manufacturing good is recognized as identical. Consumers in country $r$ maximize utility subject to the following budget constraints:

$$\int_{\Omega_r} p(\omega)q(\omega)d\omega + \int_{\Omega_s} [p(\omega) + t_r + \tau]q(\omega)d\omega + q_0 = y_r, \tag{2}$$

for $r \neq s$, $r, s = H, F$. $y_r$ represents a consumer's income, including wage, rent from firm ownership, and tax distribution. The consumers in country $r$ have to pay the trade costs and tariffs to purchase the variety of manufacturing goods produced by firm $\omega \in \Omega_s$. From the utility maximization problem, we can deduce the demand functions for manufacturing goods as follows:

$$q_{rr}(\omega) = \frac{1}{1-\gamma}[1 - p_{rr}(\omega) - \gamma(1 - P_r)], \qquad if \ \ \omega \in \Omega_r, \tag{3}$$

$$q_{sr}(\omega) = \frac{1}{1-\gamma}[1 - p_{sr}(\omega) - t_r - \tau - \gamma(1 - P_r)], \quad if \ \ \omega \in \Omega_s. \tag{4}$$

where $q_{sr}(\omega)$ $(p_{sr}(\omega))$ represents the consumption (price) of manufacturing goods in country $r$, produced in country $s$ $(r, s = H, F)$. $P_r$ is a price index defined by

$$P_r \equiv \int_{\Omega_r} p_{rr}(\omega)d\omega + \int_{\Omega_s} [p_{sr}(\omega) + t_r + \tau]d\omega. \tag{5}$$

This price index represents the sum of the consumer's price and average price supplied in country $r$ as there is one firm in the economy.

## 2.3 Firms

The manufacturing firm producing a variety of $\omega$ supplies to both the domestic and foreign countries. Therefore, the operating profit $\pi_r(\omega)$ of the firm located in country

$r$ is

$$\pi_r(\omega) = l p_{rr}(\omega) q_{rr}(\omega) + l p_{rs}(\omega) q_{rs}(\omega), \quad r \neq s, \ r, s = H, F. \tag{6}$$

Each firm maximizes profit with respect to price given the price index $P_r$ and other firms' behavior in the economy.[7] According to the first-order conditions of the profit maximization problem, all the firms in country $r$ set their own prices as follows:

$$p_{rr} = \frac{1}{2}[1 - \gamma(1 - P_r)], \tag{7}$$

$$p_{rs} = p_{ss} - \frac{t_s + \tau}{2}. \tag{8}$$

Regardless of the variety of differentiated goods, manufacturing goods are symmetrically priced by firms. Thus, hereafter, we omit an expression of the variety of $\omega$. Domestic goods are set at a higher price than exported goods but consumers have to pay trade costs and tariffs in addition to the price, $p_{rs} + t_s + \tau$, which results in a higher price for exported goods than domestic goods. Furthermore, utilizing the definition of price index $P_r$, equilibrium prices are determined as follows:

$$p_{rr} = \frac{4(1 - \gamma) + \gamma(t_r + \tau)}{4(2 - \gamma)}, \tag{9}$$

$$p_{rs} = \frac{4(1 - \gamma) - (4 - 3\gamma)(t_s + \tau)}{4(2 - \gamma)}. \tag{10}$$

From the first-order condition, we deduce the relationship, $p_{rs} = (1 - \gamma)q_{rs}$, which gives the quantities in the equilibrium.

$$q_{rr} = \frac{4(1 - \gamma) + \gamma(t_r + \tau)}{4(1 - \gamma)(2 - \gamma)}, \tag{11}$$

$$q_{rs} = \frac{4(1 - \gamma) - (4 - 3\gamma)(t_s + \tau)}{4(1 - \gamma)(2 - \gamma)}. \tag{12}$$

The equilibrium prices depend on tariff rates imposed by governments. From Eq. (9), the domestic price in country $r$ increases as the government of country $r$ imposes a

---

[7]In the present context, in which differentiated goods in the manufacturing sector are denoted by the continuum of manufacturing firms, the same equilibrium is deduced, regardless of price or quantity competition, so that our model excludes strategic interaction among manufacturing firms.

higher import tariff. Imposing a higher import tariff protects domestic firms from competition with foreign firms. More detail about this point is offered Subsection 2.4. It follows from Eq. (6) that the equilibrium profits distributed to firms' owners are $\pi_r = (1 - \gamma) \sum_i q_{ri}^2$. In this study, our focus is limited to cases in which international trade between countries is feasible. To make sure that the volume of demand from the foreign country is positive in equilibrium, we assume that

$$t_r + \tau < \frac{4(1 - \gamma)}{4 - 3\gamma}. \tag{13}$$

The right-hand side (RHS) in this condition is reduced by increasing $\gamma$. When $\gamma = 1$, which indicates that manufacturing goods are identical, the RHS approximates zero, so that international trade is not feasible given positive trade costs or tariffs. Consumers can perfectly substitute domestic goods for imported goods with higher prices due to trade costs.

## 2.4 Welfare

We now characterize national welfare in equilibrium. In our model, welfare can be decomposed into gross welfare, or the values of imports and exports. Decomposed welfare helps us explore the two different trade policy regimes and effects of globalization. Per-capita income in country $r$ is constituted by the total of wage rate, $w_r$, rents of production activities, and distributed tax revenue:

$$y_r = w_r + \frac{1}{2}\frac{\pi_r}{l} + \frac{TR_r}{l}, \tag{14}$$

where the wage rate is equal to one. In the RHS of Eq. (14), the third term represents tariff revenue distributed by the government. The government of each country imposes a unit tax on imported manufacturing goods, so that total tariff revenue in country $r$ is

$$TR_r = \frac{l}{2}t_r q_{sr}. \tag{15}$$

8

Following Furusawa and Konishi (2004, 2007) and using Eqs. (6), (14) and (15), we can decompose per-capita welfare in country $r$. Decomposed welfare $V_r(t_r, t_s, \tau)$ is represented by

$$V_r(t_r, t_s, \tau) = U_r(t_r, \tau) + EX_r(t_s, \tau) - IM_r(t_r, \tau), \tag{16}$$

where, in the RHS of (16), each term is defined by

$$U_r(t_r, \tau) \equiv \frac{1}{2} \sum_{i=r,s} q_{ir} - \frac{1-\gamma}{4} \left[ \sum_{i=r,s} q_{ir}^2 \right] - \frac{\gamma}{8} \left[ \sum_{i=r,s} q_{ir} \right]^2 + 1, \tag{17}$$

$$EX_r(t_s, \tau) \equiv \frac{1}{2} p_{rs} q_{rs}, \tag{18}$$

$$IM_r(t_r, \tau) \equiv \frac{1}{2} (p_{sr} + \tau) q_{sr}, \tag{19}$$

where the value of production and price are evaluated by Eqs. (9), (10), (11), and (10). $U_r(t_r, \tau)$ refers to gross utility and $EX_r(t_s, \tau)(IM_r(t_r, \tau))$ denotes the value of exports to (imports from) country $s$. Taking the first derivatives of Eqs. (17), (18), and (19), we find the features of equilibrium. All values of Eqs. (17), (18), and (19) are reduced as tariffs increase. The intuitions behind these derivatives are clear. Although domestic consumption $q_{rr}$ in both countries increases with tariffs, total consumption $\sum_{i=r,s} q_{ir}$ decreases, which decreases gross utility when tariffs increase. However, the increase in $q_{rr}$ means the profits of manufacturing firms (the rents from ownership) increase as domestic manufacturing market becomes less competitive due to tariff increases. The government of each country can implement tariff policy to protect domestic industries in exchange for consumer surplus. The values of exported and imported goods decrease as tariffs increase. It is obvious that increasing tariffs induce consumers in each country to reduce their consumption of goods from the foreign country. Regarding responses to trade costs, changes in the gross utility and value of exports are the same as the responses to tariffs, but the value of imports changes differently. An increase in trade costs does not always lead to a decrease in the value of imports as the value of imports includes payments for transport services, which increase with trade costs.

9

# 3 Trade Policy under Trade Costs

Thus far, tariff rates are exogenously given for consumers and firms as trade costs. However, the governments impose tariffs in accordance with a trade policy regime. In this section, we explore the two types of trade policy regimes under trade costs and demonstrate that the progress of globalization has different effects on tariffs determined by governments, depending on the regime.

## 3.1 Unilateral Trade Policy

In this subsection, we analyze the unilateral trade policy regime, under which each government uncooperatively determines its level of import tariff. In addition, we show the effects of globalization on the tariffs imposed by governments. There are negative externalities under this regime. The tariff levels under unilateral trade policy are higher than those under optimal trade policy. This point is discussed in more detail in Subsection 3.2. The governments choose tariff levels to maximize national welfare. It follows that the maximization problem of the government of country $r$ is

$$\max_{t_r} V_r(t_r, t_s, \tau). \tag{20}$$

From (16), the first-order condition of this problem is:

$$\frac{\partial U_r}{\partial t_r} - \frac{\partial IM_r}{\partial t_r} = 0. \tag{21}$$

In the left-hand side (LHS) of Eq. (21) denoting the effects of tariffs on national welfare in country $r$, the first term denotes the loss of gross utility and the second term refers to the reduction of expenditure relative to imports induced by the import price increase. Each term, respectively, represents the benefit and cost of imposing tariffs on imported goods. From Eq. (21), we find that the tariff level imposed by the government does not depend on the tariff level imposed by the other government, so there is no strategic interdependence, as shown in Yi (1996). This feature of our formulation allows us to analyze trade policy more simply. By using Eqs. (17), (18), and (19), we can derive

the tariff level under unilateral trade policy as follows:

$$t^N = \frac{2(1-\gamma)(1-\tau)}{6-5\gamma}. \tag{22}$$

Eq. (22) shows that the tariff imposed under the uncooperative policy regime is always positive owing to $\gamma \in (0,1)$ and Eq. (13). Moreover, the effect of globalization is denoted by $dt^N/d\tau < 0$. From Eq. (22), we have Proposition 1.

**Proposition 1** *When each government pursues trade policy unilaterally, positive tariffs are imposed on imported goods to protect domestic industry. In this case, as the trade costs decrease, tariff rates increase, implying that globalization fosters protectionist trade policy.*

Under unilateral trade policy, each government imposes positive tariffs on imports. Tariffs on imported goods increase domestic production and decrease foreign production, thus, the rents of domestic firms increase at the expense of foreign firms. In addition, applying tariff policy for national welfare, the governments can shift rents from foreign firms through the redistribution of tariff revenues. This is why tariffs under unilateral trade policy are always positive.

In addition, Proposition 1 implies that the advancement of globalization leads the governments to implement higher tariffs. We can interpret this result as follows. Globalization prompts consumers to substitute imported goods for domestic goods and, thus, reduces the rents of domestic firms. Therefore, tax bases expand, which amplifies the effects of imposing tariffs, and so, the governments have an incentive to increase tariffs and shift rents from the foreign country through the redistribution of tariff revenues. Consequently, with the progress of globalization, the governments employ more protectionist trade policies and implement further redistribution to increase consumer incomes at the expense of the foreign country.

## 3.2 Cooperative Trade Policy

We assume that each government can agree on cooperative trade policy and cooperation is enforceable. This assumption excludes the problem of deviation from a trade agreement. When governments cooperate in setting trade policy, the maximization problem is given by

$$\max_{t_H, t_F} V_H(t_H, t_F, \tau) + V_F(t_F, t_H, \tau). \tag{23}$$

The first-order conditions of this problem are

$$\frac{\partial U_r}{\partial t_r} + \frac{\partial EX_s}{\partial t_r} - \frac{\partial IM_r}{\partial t_r} = 0, \quad r \neq s, \ r, s = H, F. \tag{24}$$

$t^C$ denotes the tariff imposed under cooperative trade policy, which satisfy Eq. (24). Comparing Eqs. (21) and (24), we show that tariffs under the cooperative regime are lower than those under unilateral trade policy. From Eq. (24) and the derivatives of Eqs. (17), (18), and (19), we show that

$$\frac{\partial U_r}{\partial t_r} - \frac{\partial IM_r}{\partial t_r} = -\frac{\partial EX_s}{\partial t_r} > 0, \tag{25}$$

and thus, $t^N > t^C$ owing to the concavity of $\partial U_r/\partial t_r - \partial IM_r/\partial t_r$. The tariff level imposed by each government has negative effects on imports and results in a loss of welfare in the other country. Under unilateral trade policy, these effects $(\partial EX_r/\partial t_r)$ are not considered by the governments when they determine the tariff level and, thus, a negative externality occurs. Under the cooperative policy regime, such effects are taken into account by both governments in pursuit of the welfare of the economy, as shown in Eq. (24). This means that the negative externality is internalized by cooperation between governments. As a result, the tariff levels imposed under cooperative trade policy are lower than those determined under the uncooperative policy regime.

Next, we explore the features of a tariff imposed under a cooperative regime and analyze the effects of globalization on the tariff. Solving Eq. (24) for $t$, the tariff level

is

$$t^C = \frac{(5\gamma^2 - 12\gamma + 8)\tau - 8(1-\gamma)^2}{\gamma^2 - 8\gamma + 8}. \tag{26}$$

In contrast with the uncooperative policy regime, each government can implement a subsidy on imported goods. The sign of Eq. (26) depends on trade costs and the degree of substitutability among manufacturing goods. By cooperating, both governments adopt the subsidy policy, if the following condition is fulfilled:

$$\tau < \frac{8(1-\gamma)^2}{5\gamma^2 - 12\gamma + 8} \equiv \tau^{sub}. \tag{27}$$

Eq. (27) is represented in Figure 1, which shows which trade policies, tariffs, or subsidies are applied under the cooperative regime, depending on trade costs and the degree of substitutability among manufactured goods. In the shaded area, international trade is not feasible owing to high trade costs, and the high degree of substitutability tends to be an obstacle to trade. [8] The implications of Figure 1 are summarized by Proposition 2.

**Proposition 2** *If trade costs and the degree of substitutability among manufactured goods are so high (low) that the condition, Eq. (27), holds, the governments cooperate in adopting the tariff (subsidy) policy.*

We now analyze the trade policies in the unshaded area. In the case of cooperative trade policy, the governments impose tariffs but not in order to increase tariff revenues or domestic incomes. Considering the objective function of cooperative trade policy, an increase of tariff revenue in one country results in a decrease of income in the other country and these effects cancel each other out, so cooperation between countries internalizes the negative externality. It follows that cooperative trade policy is implemented

---

[8]$\tau^{trade}$ in Figure 1 can be derived by substituting $t^C$ into Eq. (13) as follows:

$$t^C + \tau < \frac{4(1-\gamma)}{4 - 3\gamma} \Leftrightarrow \tau < \frac{2(1-\gamma)(8 - 7\gamma)}{(4 - 3\gamma)^2} \equiv \tau^{trade}$$
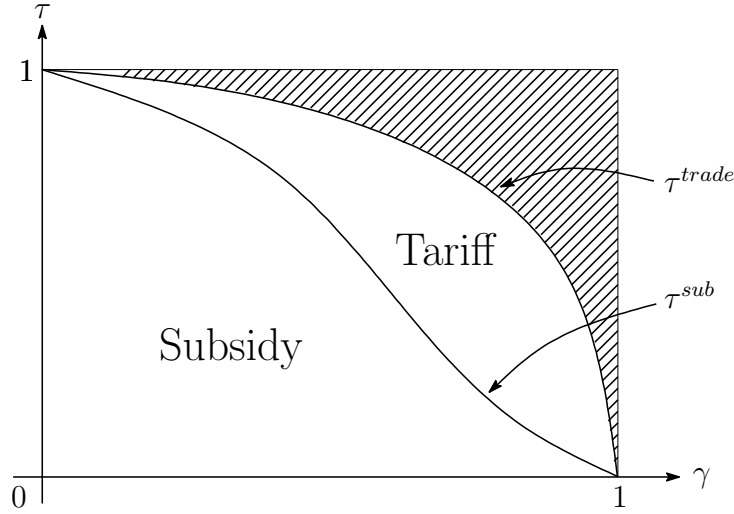
Figure 1: Trade policy in the trade agreement

in order to achieve efficiency in the economy. Specifically, there are two objectives for achieving efficiency: adjustment of distorted prices in manufacturing sectors and mitigation of losses owing to international transportation. As Figure 1 shows, the combination of relatively large $\tau$ and $\gamma$ implies that the governments agree to impose tariffs on imported goods. If international transportation is very costly, the governments impose tariffs to restrict importing of manufacturing goods so as to avoid the reduction of firms' rents from international transportation. On the other hand, a large $\gamma$ facilitates the substitution of imported goods so that the consumer price of a manufacturing good is sensitive to other prices and is not so distorted by the firms. In the case of a large $\gamma$, governments are obliged to constrain losses due to international transportation rather than adjust to distorted prices by using subsidy policy.

Furthermore, globalization affects trade policy under the cooperative regime differently than under the uncooperative regime. From Eq. (26), we demonstrate that the tariff level decreases with the progress of globalization, $dt^C/d\tau > 0$. As mentioned above, the governments have no incentive to protect domestic industry under the cooperative regime because the tariff effects on the foreign country are perceived by each government. As long as the governments implement cooperative trade policy,

14

the decrease in trade costs as globalization advances motivates governments to adjust distorted prices rather than mitigate losses due to international transportation. As a result, cooperative trade policy facilitates the removal of trade barriers in order to increase efficiency. These findings lead to Proposition 3.

**Proposition 3** *As trade costs decrease, the tariff rate is reduced in the cooperative regime, implying that globalization induces the governments to implement policy so as to foster international trade.*

The effects of globalization on cooperation are opposite to those in the case of unilateral trade policy. This is obvious, given that cooperation in trade policy works to eliminate the negative externality caused by unilateral trade policy. In the presence of a negative externality, governments have more incentive to increase tariffs to shift rents from the foreign country through the redistribution of tariff revenues. In contrast, given the internalization of the negative externality through cooperation, the progress of globalization induces cooperative governments to adjust distorted manufacturing prices rather than mitigate losses caused by international transportation in order to maximize social welfare. Therefore, with the progress of globalization, tariffs decrease under the cooperative regime and, thus, international trade is fostered.

# 4 Conclusion

We constructed a two-country model with trade costs in which the government of each country can implement tariffs. The main argument of this study is that the trade policy regime under which governments implement tariffs determines whether the progress of globalization results in trade liberalization. Under the unilateral trade policy regime, in which the governments determine their tariff levels independently, the governments impose higher tariffs than those required for efficiency and they tend to employ protectionist policy with the progress of globalization. In this case, the governments care about the reduction of domestic rents caused by intensive competition

resulting from globalization. By contrast, the cooperative trade policy regime, in which the governments implement trade policy that accounts for the effects on the other country, enables internalization of the negative externality. In this regime, the reduction of trade costs does not affect the income allocation between countries, so there is no incentive for protectionist policy. As a result, globalization contributes to further trade liberalization.

In closing, we offer some suggestions for further research. First, we can extend our model to asymmetric countries in order to capture the features of specific countries. For example, considering the relationship between developing and developed countries, firms' distribution is not symmetric. If we allow any asymmetry between two countries, based on our symmetric analysis, we might provide the following conjecture. The government in the country with a relatively large number of firms would set a high tariff rate compared with other countries. This is in order to protect the relatively large number of firms from competition with firms of other countries. Second, our study analyzed cooperative trade policy under the assumption that cooperation between countries is self-enforceable. As shown in Johnson (1954), however, each government has an incentive to deviate from cooperation and this is not necessarily sustainable for cooperative setting on trade policy. By applying our model to the analysis of self-enforcing trade agreements, following Dixit (1987), it could be possible to explore the relationship between globalization and the sustainability of trade agreements.

# References

[1] Anderson, J.E., Van Wincoop, E., 2004 "Trade Costs." *Journal of Economic Literature*, 42, 691–751.

[2] Brander, J.A., 1981 "Intra-industry Trade in Identical Products." *Journal of International Economics*, 11, 1–14.

[3] Brander, J.A., 1995 "Strategic Trade Policy." In: Grossman, G., Rogoff, K,. (Eds) *Handbook of International Economics* Vol III, North-Holland, Amsterdam.

[4] Brander, J.A., Krugman, P.R., 1983 "A Reciprocal Dumping Model of International Trade" *Journal of International Economics*, 15, 313–389.

[5] Derher, A., 2008 "Does Globalization Affect Growth? Evidence from a New Index of Globalization." *Applied Economics*, 38, 1091–1110

[6] Dixit, A., 1987 "Strategic Aspects of Trade Policy." In: Bewley, T. (Ed.) *Advances in Economic Theory.* Cambridge University Press, Cambridge.

[7] Furusawa, T., Konishi, H., 2004 "A Welfare Decomposition in Quasi-linear Economies." *Economics Letters* 85, 667–690.

[8] Furusawa, T., Konishi, H., 2007 "Free Trade Networks." *Journal of International Economics* 72, 310–335.

[9] Gros, D., 1987 "A Note on the Optimal Tariff, Retaliation and the Welfare Loss from Tariff Wars in a Framework with Intra-industry Trade." *Journal of International Economics* 23, 357–367.

[10] Johnson, H.G., 1954 "Optimum Tariffs and Retaliation." *Review of Economic Studies*, 21, 142–153.

[11] Mai, C.-C., Peng, S.-K., Tabuchi, T., 2008 "Economic Geography with Tariff Competition." *Regional Science and Urban Economics*, 38, 478–486.

[12] Mun, S., Nakagawa, S,. 2010 "Pricing and Investment of Cross-border Transport Infrastructure." *Regional Science and Urban Economics*, 40, 228–240.

[13] Takahashi, T., 2006 "Economic Geography and Endogenous Determination of Transport Technology." *Journal of Urban Economics*, 60, 498–518.

[14] Tsubuku, M., 2014 "Endogenous Transport Costs and Firm Agglomeration in New Trade Theory." *Papers in Regional Science*, DOI: 10.1111/pirs.12126.

[15] Yi, S.-S., 1996 "Endogenous Formation of Customs Unions under Imperfect Competition: Open Regionalism is Good." *Journal of International Economics*, 41, 153–177.