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# Fair Trade Organizations, Buyer Power, and Optimal Trade Policy under Oligopsony: A Welfare Analysis

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*Abstract*

It has long been observed that markets for certain agricultural products and raw materials (mostly in developing countries) are controlled by a few international buyers. In dealing with this issue, earlier studies in the literature have suggested the use of an export tax to mitigate market power exerted by oligopsonists. In this paper, we develop a product differentiation model to characterize explicitly the role that international fair trade organizations (FTOs) play in coping with market power under oligopsony. The model allows for the endogeneity of competitive producers in supplying a high quality commodity to an FTO and a low quality commodity to a conventional buyer. We show that an FTO and the "warm glow" preferences of consumers over fair trade goods have a positive effect on the aggregate benefit of the FTO producers and a negative effect on that of the non-FTO producers. We further derive the conditions under which there is a *laissez faire* equilibrium.

*JEL codes*: F12, F13, Q13, Q17
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# 1. Introduction

According to WTO (2003, p. 4), wholesales in certain agricultural commodities (such as coffee beans, cocoa, soybeans, cotton, and rice, etc.) and raw materials in the past several decades have increasingly turned into markets with strong buyer power exerted by a few firms. There are two crucial elements contributing to the buyer power exploitation in commodity markets.[1] First, due to a large number of real-time manufacturing for meeting the final good consumption, the sources of commodities are combined with the large-scale procurement, classification, management and marketing. As such, a few large firms have economies of scale on these activities and are able to effectively channel commodities from suppliers to retailers. Second, to qualify for financial assistances from organizations such as IMF or World Bank, exporting countries may not be allowed to sell their commodities through state-run agencies. This creates a disadvantage for individual farmers as they are often unable to obtain fair deals from their buyers under oligopsony.[2] It has been documented that the coffee exporters' association in a country like Haiti was the major source of oligopsony power (Lopez and You, 1993).

In order to counter the buying power manipulation, there are movements of international organizations to promote "fair trade" in commodity markets. One major aim of protecting small or competitive producers in developing countries is to ensure that they maintain livelihoods through a sustainable trading platform. Fairtrade Labeling Organizations International, for example, is committed to providing the staple cereal producers a guaranteed purchase price, which serves as a mechanism to prevent farmers from facing price fluctuations of their commodities. Raynold and Long (2007) indicate that through the fair trade organizations to

[1] See, for example, the analysis in Fitter and Kaplinsky (2001).
[2] Using international market for coffee beans as an example, it is estimated that there are 25 million coffee farmers around the world, scattered in more than 50 developing countries, mainly dependent on coffee tree planting subsistence (Talbot, 2004).

promote fair trade in the past two decades, the FLO labeled merchandises have made a huge growth in sales. FLO (2012) also indicates that continued global fair trade merchandise sales amount to an annual average rate of more than 30% in Europe and the United States and some other places since 2005. In 2010, the amount of sales has been reached $ 8.06 billion U.S. dollars. Fair trade commodities in the E.U. and U.S. markets have established a good sales channel because of a very strong support from the consumers. Nevertheless, fair trade commodities in their global markets remain small in terms of their market shares. For example, the share of fair trade coffee in the world coffee market is still less than 1% (FLO, 2010).

Due to the increasingly important roles that fair trade organizations (FTOs) play for various commodities, there has been a growing interest in analyzing the economic aspects of FTOs and fair trade goods under imperfect competition. For example, using a North-South trade framework, Becchetti and Adriani (2004) examine the scenario where the Northern consumers with "international equality concerns" are willing to pay a premium for fair trade commodities produced in the South. The authors show that the introduction of fair trade generates a welfare improvement for both the northern consumers and the southern producers. Loureiro and Lotade (2005) conduct a face-to-face survey to study consumer preferences and find that consumers are willing to pay higher premiums for fair trade and shade grown coffee labels than for the organic coffee. Richardson and Stähler (2007) analyze the behavior of a vertically integrated FTO, market power, and a 'warm grow effect' which represents consumers' extra utility from consuming commodities in markets under oligopsony. They show that trade integration increases the volume of the fair trade but its relative size compared to its rivals shrinks. Poret and Chambolle (2007) develop a theoretical model of vertical relationships and second degree price discrimination to examine the motivation of a large-scale retailer to offer fair trade products.

The authors conclude that the most important parameter for a retailer's decision to sell fair trade products is not the number of "fair trade lovers" but the premium that they are willing to pay. In analyzing fair trade coffee, Piyapromdee, Hillberry, and MacLaren (2008) develop a model to show that a fair trade firm is able to reduce the market power exerted by oligopsonists. The authors further point out that although the fair trade movements constitute an effective mechanism to alleviate an oligopsony market distortion, the effect on farm incomes appear to be small. Baumann, Oschinski, and Stähler (2012) examine the impact of fair trade on agricultural producers in developing countries. They conclude that the importers of fair trade products gain from selling the products and the producers obtaining the fair trade certification are also better off.

Despite compelling explanations for fair trade products, it appears that relatively little research has been conducted to examine optimal trade policies toward markets characterized by oligopsony with the presence of international FTOs and the "warm glow" preferences of consumers. In this paper, we develop a product differentiation model of oligopsony, hoping to shed light on this unanswered trade policy issue as well as some other related questions. We first characterize explicitly the role that an FTO plays in coping with buyer power under oligopsony. In the analysis, we take into account possible effects that the consumers' warm glow preferences over a fair trade product may have in influencing the benefits of competitive producers and social welfare. The product differentiation model allows for the endogeneity of the numbers of competitive producers in supplying their products to an FTO and a conventional buyer. Further, the model considers differences in product quality between an FTO commodity and a generic commodity. As such, we are able to draw implications concerning how an FTO and the warm glow preferences affect the benefits of the two different groups of producers differently. The key

findings of our analysis are summarized as follows. (i) Imposing a non-discriminatory tax on the export of a commodity has a negative effect on commodity price. (ii) The higher the export tax, the higher the premium that an FTO commits to their member producers. (iii) An increase in the quality requirement of the FTO commodity has a positive effect on the premium committed by the FTO to member producers. This positive effect on the premium also emerges when there are "warm glow" preferences of consumers. (iv) It comes as no surprise that an increase in export tax on a commodity, either the FTO or the generic one, lowers the aggregate amount of the commodity. (iv) A stronger warm glow preference has a positive effect on the market share of the FTO. The FTO and the warm glow effect increase the aggregate benefit of the FTO members and decrease that of the nonmembers. (v) Without the warm glow preferences of consumers, the socially optimal trade policy for the domestic country is to impose an export tax. (vi) For the case in which the FTO cares about the benefits of their member producers, who produce a sufficiently high quality of the FTO labeled commodity, the socially optimal trade policy may require the export tax be set at zero (i.e., there is a *laissez faire* equilibrium) when the warm glow effect is significantly strong.

As in Richardson and Stähler (2007), we consider the situations where an FTO purchases a high quality commodity while the conventional firm purchases a low quality commodity. The authors treat an FTO as a vertically integrated firm returning all surpluses to its member suppliers and show that the FTO has its limitation in size compared to its competitors. But unlike Richardson and Stähler (2007), we consider an FTO as an independent entity which takes into account the welfare of member producers in its objective function when making buying decisions. We find that although an FTO is able to make a profit for its operations and also commits their member producers a positive premium (over the commodity price paid by a

conventional firm), the presence of the FTO does not alter the trade policy of imposing an export tax on the commodity. But for the case in which there is a sufficiently strong warm glow effect, the socially optimal trade policy under oligopsony may require that the export tax be set to zero.

The remainder of the paper is organized as follows. In Section 2, we develop a product differentiation model to derive the commodity supply curves of competitive producers in a domestic country. In Section 3, we examine the buying decisions of an international FTO and a conventional firm under imperfect competition. We further take into account the warm glow preferences of consumers and examine the possible effects on the benefits of domestic producers. In Section 4, we analyze the trade policy options of the domestic country government. Section 5 contains concluding remarks.

# 2. The Model

## 2.1 *Basic Assumptions*

We consider an oligopsonistic market for commodity $X$ in a domestic country. The supply side of the commodity market is characterized by a large number of small or competitive producers in the country. But the procurement of the commodity and the subsequent management and marketing channel are controlled by two international agents: one is a conventional buyer, denoted as $M$, and the other is a fair trade organization, denoted as $F$. We wish to examine the role and functioning of such an FTO in a duopsonistic commodity market.

We define a buying contract as $\{w_i, q_i\}$ for $i = M$ or $F$, where $w_i$ is the purchase price that buyer $i$ offers and $q_i$ represents quality requirements or commodity specifications as set

forth by the buyer.[3] In practice, fair trade organizations require that commodity suppliers be their members when producing FTO products. As such, it is plausible to assume that $q_F > q_M$. For the ease of our analysis, we adopt the following assumption:

**Assumption 1**: *Due to differences in the quality of commodities sold to the conventional firm and an FTO, the later of which explicitly specifies quality requirements and hence has a product labeling, we assume that* $q_F = (1+\Delta)q_M$, *where* $\Delta > 0$.

The higher the value of $\Delta$ exogenously set by a fair trade organization, the higher the quality of the commodity sold to the FTO relative to that sold to the conventional firm. We use $\Delta$ to capture the quality differential between the two commodities.

The domestic country government imposes a non-discriminatory volume-based tax, $t$, on each unit of the commodity $X$ exported to its competitive international market. Denote $X_F$ and $X_M$ as the quantities of the commodity purchased and exported to the world market by the FTO and the conventional firm, respectively. That is, the $X_F$ amount is FTO labeled, but the $X_M$ amount is not and hence is simply a generic commodity. Product labeling makes it possible to partition the commodity market into two separate submarkets in terms of their prices. The competitive market price for the generic commodity that the conventional firm receives is assumed to be $P$.[4] The market price for the FTO labeled commodity that the FTO receives is given by $P' = P + g$, where $g(>0)$ reflects the premium that consumers are willing to pay due to their warm glow preferences over the fair trade commodity.

[3] For example, quality requirements or specifications can be imposed in terms of color, composition, weight, and size of a commodity or with restrictions on the use of child labor, herbicides, and pesticides etc.

[4] We focus the analysis on the buyer power of the commodity in the input market and assume that the output market is characterized by perfect competition. For the general case of oligopsony and oligopoly see, for example, Chang and Tremblay (1991).

## 2.2 *Competitive producers and their aggregate supply functions*

Without lost of generality, we assume that the total number of the potentially competitive suppliers in the domestic country is $L$ and that each one producers only one unit of commodity $X$. Note that production costs are not identical to all suppliers because of differences in their locations in a "linear country." Imagine the production of coffee bean in which farmers at different locations have varying climate and weather conditions. We hypothesize that farmers with better climate and weather conditions require *less* amounts of efforts in producing the commodity. We use the parameter $\theta$ to capture total effort cost to a producer due to differences in natural endowments, which are exogenously given. For analytical simplicity, the value of $\theta$ is uniformly dispersed as a single distribution over the range $[0, L]$ in the linear country. That is, $\theta \in [0, L]$. As discussed in the subsequent analysis, this simple approach allows us to measure the size of each commodity, the FTO labeled or the generic one, as well as the market shares of the two competing buyers, $M$ and $F$. We wish to derive the commodity supply curves of the competitive producers to these two buying agents.

Defining $b_F$ as the net benefit to a producer who sells one unit of the commodity to the FTO, we have

$$b_F = w_F - \theta q_F, \tag{1}$$

where $w_F$ is the FTO's purchase price. The term $\theta q_F$ measures total effort cost of producing the FTO commodity with quality $q_F (> q_M)$. Likewise, defining $b_M$ as the net benefit to a producer who sells one unit of the generic commodity to the conventional firm, we have

$$b_M = w_M - \theta q_M, \tag{2}$$

where $w_M$ is the firm's purchase price. The term $\theta q_M$ measures total effort cost of producing

the generic commodity with quality $q_M (< q_F)$. We further consider the scenario where FTO member producers are guaranteed with a price higher than that offered by the conventional firm.[5] In this case, we have

$$w_F = (1+\mu)w_M, \tag{3}$$

where $\mu(>0)$ is the unit premium committed by the FTO to its members of supplying the fair trade commodity.

We define an "indifferent supplier" as the one who receives exactly the same amount of benefit from selling his product to either the FTO or the conventional buyer, i.e., $b_F = b_M$. Substituting the benefit functions from equations (1) and (2) and the premium function from (3) into this equality condition, making use of Assumption 1 and normalizing $q_M$ to one, we have

$$\theta_{FM} = \frac{\mu w_M}{\Delta}. \tag{4}$$

This indicates that producers located a point $\theta$ at which $\theta < \theta_{FM}$ supply their products to the FTO. Next, we determine the critical value of $\theta$, denoted as $\theta_{MO}$, above which the potential producers choose to quit the commodity market. Setting $b_M$ in equation (2) to zero, noting the assumption that $q_M = 1,$ we have

$$\theta_{MO} = w_M. \tag{5}$$

This indicates that producers located at a point $\theta$ where $\theta_{FM} < \theta < \theta_{MO}$ sell their products to the conventional firm. Those individuals lying to the right of $\theta_{MO}$ choose not to produce the commodity at all. Figure 1 presents a graphical illustration of these results.

[5] See, for example, Becchetti and Adriani (2004) and Poret and Chambolle (2007).

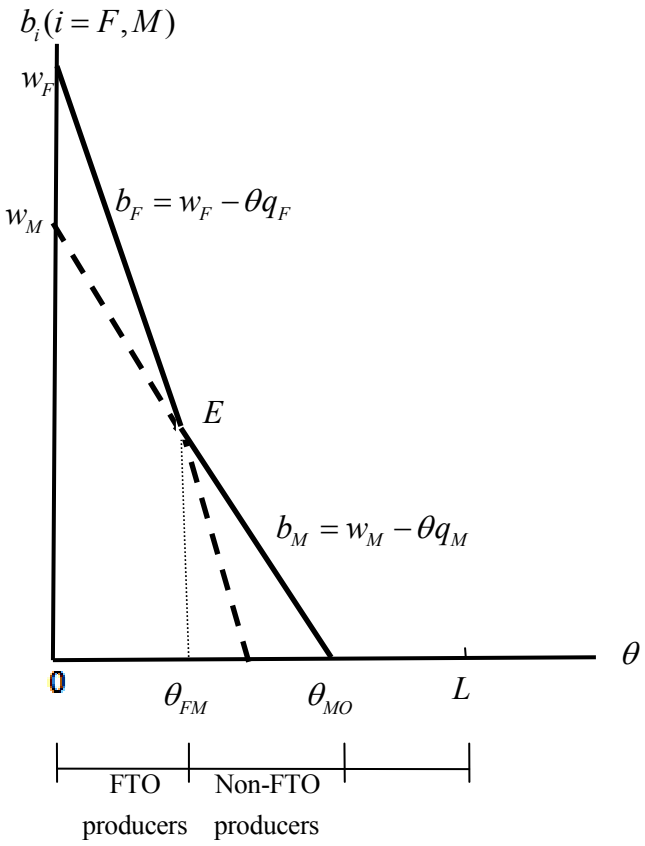


**Figure 1:** *The composition of the FTO and non-FTO producers due to the commodity quality differential*

Given the simple assumption that each producer supplies one unit of the commodity, the amounts of the commodity purchased by the FTO and the conventional firm are given, respectively, as

$$X_F = \theta_{FM} = \frac{\mu w_M}{\Delta}, \tag{6a}$$

$$X_M = \theta_{MO} - \theta_{FM} = \frac{(\Delta - \mu) w_M}{\Delta}. \tag{6b}$$

These equations in (6a) and (6b) define the aggregate supply curves of the commodity by the competitive producers to the two buyers. In view of equation (6b), we imposed the assumption

that $\mu < \Delta$ for the generic commodity's aggregate supply to be positive.

Summing the individual benefit function $b_F$ in (1) over the range of $0 \le \theta \le \theta_{FM}$, we calculate the total benefit to the FTO member producers as

$$B_F = \int_0^{\theta_{FM}} (w_F - \theta q_F) d\theta = \int_0^{\frac{\mu w_M}{\Delta}} [(1+\mu)w_M - \theta(1+\Delta)] d\theta = \frac{\mu w_M^2 [(2+\mu)\Delta - \mu]}{2\Delta^2}. \qquad (7a)$$

In Figure 1, this total benefit $B_F$ is measured by the area $0b_F E\theta_{FM}$. Summing the individual benefit function $b_M$ in (2) over the range of $\theta_{FM} \le \theta \le \theta_{MO}$, we calculate the total benefit to the generic commodity producers as

$$B_M = \int_{\theta_{FM}}^{\theta_{MO}} (w_M - \theta q_M) d\theta = \int_{\frac{\mu w_M}{\Delta}}^{w_M} (w_M - \theta) d\theta = \frac{(\Delta - \mu)^2 w_M^2}{2\Delta^2}. \qquad (7b)$$

In Figure 1, this total benefit $B_M$ is measured by the area of $\theta_{FM} E \theta_{MO}$.

## 2.3 *Objective functions of the FTO and the conventional firm*

Having determined the aggregate supplies of the commodity and the total benefit functions for the two different groups of producers, our next step is to examine the optimal decisions of the two buyers.

The objective of the FTO is to choose an optimal premium $\mu$ on top of whatever the purchase price paid by the conventional firm. This optimal premium maximizes the FTO's objective function, which is defined as the weighted sum of its variable profits and the total benefit of the FTO producers. That is,

$$R_F = \pi_F + \alpha B_F = (P + g - t - w_F) X_F + \alpha B_F, \qquad (8)$$

noting that $P$ is the competitive market price of the generic commodity. The parameter $\alpha$ $(0 < \alpha \le 1)$ represents the altruism coefficient that the FTO places on the total benefit of its

member producers, and $w_F = (1+\mu)w_M$. The parameter $g$, as discussed earlier, is used to capture the warm glow preferences of consumers. Supportive consumers are willing to pay the incremental amount of money in their consumption of the fair trade products.[6]

The conventional firm determines an optimal purchase price $w_M$ to maximize its variable profit:

$$\pi_M = (P - t - w_M)X_M . \tag{9}$$

In the analysis, the structure of the game involves three stages. At the first stage, the domestic government determines its optimal trade policy in order to maximize the country's welfare, which is taken to be the sum of benefits to domestic producers and tax revenues collected from the FTO and the conventional firm. At the second stage, the FTO decides on an optimal premium to be added to whatever the price paid by the conventional firm. This optimal premium maximizes the FTO's objective function which, as discussed above, is the weighted sum of its variable profits and the total benefit of the FTO member producers. At the third and last stage of the game, the conventional firm determines an optimal price to maximize its own profit. As in game theory, we use backward induction to derive the sub-game perfect Nash equilibrium.

## 3. The Equilibrium Analysis and Its Economic Implications

We begin our analysis with the third and last stage of the game where the conventional firm determines a purchase price to maximize its profit function. Substituting the commodity supply

[6] This assumption is consistent with the analyses in Becchetti and Adriani (2004) and Poret and Chambolle (2007).

function from (6b) into the profit function of the conventional firm in (9) yields

$$\pi_M = (P - t - w_M)\frac{(\Delta - \mu)w_M}{\Delta}.$$

Solving the profit maximization problem for $w_M$ yields

$$w_M^* = \frac{P - t}{2}. \tag{10}$$

It comes as no surprise that the equilibrium purchase price offered by the conventional firm increases with the market price that the firm receives. But the firm's purchase price of the commodity decreases with the export tax rate. We thus have

**PROPOSITION 1**. *The higher the specific export tax, t, the lower will be the purchase price* $w_M^*$ *offered by the conventional firm to the generic commodity producers. Nevertheless, the values of* $\mu$ *and other parameters such as the altruism coefficient* $\alpha$, *the warm glow preference* $g$, *and the commodity quality differential* $\Delta$ *have no direct impacts on* $w_M^*$.

We proceed to the second stage of the game where the FTO determines an optimal premium $\mu$ over $w_M^*$ in order to maximize its objective function as specified in equation (8). To solve for the optimal premium, we rewrite the objective function by substituting the aggregate supply function of the FTO producers from (6a) and their total benefit function from (7a) into equation (8) to obtain

$$\begin{aligned} R_F &= \pi_F + \alpha B_F \\ &= (P + g - t - w_F)X_F + \alpha B_F \\ &= \frac{\mu w_M (P + g - t - w_F)}{\Delta} + \frac{\alpha\mu w_M^2[(2+\mu)\Delta - \mu]}{2\Delta^2}. \end{aligned}$$

Note that $w_M^*$ is independent of $\mu$ and that $w_F = (1+\mu)w_M^*$. Taking the first-order derivative of

$R_F$ with respect to $\mu$ and setting the resulting expression to zero, we solve for the optimal premium as

$$\mu^* = \frac{\Delta}{(2-\alpha)\Delta+\alpha}\left[1+\alpha+\frac{2g}{P-t}\right] > 0. \tag{11}$$

It follows from equation (11a) that

$$\frac{\partial \mu^*}{\partial t} = \frac{2\Delta g}{[(2-\alpha)\Delta+\alpha](P-t)^2} > 0, \tag{12a}$$

$$\frac{\partial \mu^*}{\partial \Delta} = \frac{\alpha}{[(2-\alpha)\Delta+]^2}\left[1+\alpha+\frac{2g}{P-t}\right] > 0, \tag{12b}$$

$$\frac{\partial \mu^*}{\partial g} = \frac{2\Delta}{[(2-\alpha)\Delta+\alpha](P-t)} > 0. \tag{12c}$$

These results in equations (12) are explained as follows. First, because an increase in the export tax lowers the purchase price for the generic commodity as shown in Preposition 1, the FTO responds to this by increasing the optimal premium for its member producers. Second, since an increase in $\Delta$ increases the quality requirement of the FTO commodity relative the generic commodity, the FTO finds it optimal to raise the premium for its members. Third, an increase in the warm glow effect (due to an increase in $g$) leads consumers to consume more of the FTO product. In response to this increase in demand, the FTO raises the optimal premium for its member producers. It should be noted that the effect of altruism coefficient is indeterminate since the sign of the derivative $\frac{\partial \mu^*}{\partial \alpha}$ can be positive, zero, or negative. These results permit us to establish the proposition as follows:

**PROPOSITION 2**. *The higher the level of export tax, t, the higher will be the value of* $\mu^*$. *Moreover, an increase in the commodity quality differential* $\Delta$ *or an increase in the degree of the warm glow preferences has a positive effect on the premium* $\mu^*$ *optimally set by the FTO. But the effect of* $\alpha$ *on* $\mu^*$ *cannot be determined unambiguously.*

Note the assumption that $\mu^*$ is taken to be less than $\Delta$ for the aggregate supply of the generic commodity to be positive (see $X_M$ in (6b)). To guarantee that this condition holds at the equilibrium, we subtract $\Delta$ from $\mu^*$ in equation (10) and obtain the following:

$$0 < g < \bar{g}\ (= \frac{(P-t)[(2-\alpha)\Delta - 1]}{2}).$$

This inequality condition indicates the restriction that should be placed on the value of $g$ for $X_M$ to be positive.

Since we have solved for the optimal values of $w_M^*$ and $\mu^*$, given the value of $t$, we can derive other equilibrium results of the model. Before do so, we need the following assumption to make sure the existence of the commodity supply curves.

**Assumption 2**. *We assume that the quality differential between the FTO commodity and the generic commodity satisfies the condition as follows:*

$$\Delta > \max\left\{\mu, \frac{1}{2-\alpha}\right\} > 0.$$

## 3.1 *Equilibrium quantities of the commodity produced by the domestic suppliers*

Substituting the conventional firm's purchase price $w_M^*$ and the optimal premium $\mu^*$ from (11)

back into equations (6a) and (6b), we obtain the equilibrium quantities supplied by the two groups of producers:

$$X_F^* = \frac{(1+\alpha)(P-t)+2g}{2[\alpha+(2-\alpha)\Delta]}, \tag{13a}$$

$$X_M^* = \frac{[(2-\alpha)\Delta-1](P-t)-2g}{2[\alpha+(2-\alpha)\Delta]}. \tag{13b}$$

It is easy to verify that $X_F^* > 0$. Assumption 2 implies that $X_M^* > 0$.

It is instructive to calculate the market shares of the FTO and the conventional firm. We first calculate the overall amounts of the commodity purchased by the two firms as

$$X^* = X_F^* + X_M^* = \frac{P-t}{2}. \tag{13c}$$

Denoting $S^*$ as the market share of the FTO, where $S^* = X_F^* / X^*$, we have from equations (13b) and (13c) that

$$S^* = \frac{1+\alpha}{\alpha+(2-\alpha)\Delta} + \frac{2g}{(P-t)[\alpha+(2-\alpha)\Delta]}.$$

The comparative statics of the market share reveals the following:

$$\frac{\partial S^*}{\partial t} = \frac{2g}{(P-t)^2[\alpha+(2-\alpha)\Delta]} > 0, \tag{14a}$$

$$\frac{\partial S^*}{\partial \alpha} = \frac{(3\Delta-1)(P-t)+2g}{(P-t)[\alpha+(2-\alpha)\Delta]^2} > 0, \tag{14b}$$

$$\frac{\partial S^*}{\partial \Delta} = \frac{-(2-\alpha)[(1-\alpha)(P-t)+2g]}{(P-t)[\alpha+(2-\alpha)\Delta]^2} < 0, \tag{14c}$$

$$\frac{\partial S^*}{\partial g} = \frac{2}{(P-t)[\alpha+(2-\alpha)\Delta]^2} > 0. \tag{14d}$$

Based on the findings in equations (14), we have

**PROPOSITION 3**. *An increase in export tax increases the market share of the FTO commodity, despite the equilibrium outcome that the tax lowers the overall amounts of the commodity purchased by the two buyers. Other things being equal, an increase in the quality requirement of the FTO commodity lowers the market share of the FTO. An increase the altruism coefficient or an increase in the degree of warm glow preferences has a positive effect on the market share of the FTO commodity.*

We find that the warm glow preferences have a positive effect on increasing the volume of fair trade. This result stands in contrast with the finding of Richardson and Stähler (2007). Considering the case of a vertically integrated FTO, the authors show that trade integration increases the volume of the fair trade but its size relative to that of non-FTO products decreases.

## 3.2 *Equilibrium purchase prices of the FTO and the conventional firm*

As the FTO guarantees a premium to its member producers such that $w_F^* = (1+\mu^*)w_M^*$, we substitute $w_M^*$ from (10) and $\mu^*$ from (11) into this expression to calculate the equilibrium purchase price as

$$w_F^* = \frac{(\alpha+3\Delta)(P-t)+2\Delta g}{2[\alpha+(2-\alpha)\Delta]} > 0. \tag{15}$$

It follows from equation (15) that

$$\frac{\partial w_F^*}{\partial t} = -\frac{(\alpha+3\Delta)}{2[\alpha+(2-\alpha)\Delta]} < 0. \tag{16a}$$

The equilibrium purchase price for the generic commodity implies that

$$\frac{\partial w_M^*}{\partial t} = -\frac{1}{2} < 0. \tag{16b}$$

A comparison between equations (16a) and (16b) reveals that

$$\frac{\partial w_F^*}{\partial t} < \frac{\partial w_M^*}{\partial t} < 0. \tag{16c}$$

These results indicate that an increase in export tax lowers the market prices of both the FTO and the generic commodities. Moreover, the negative price effect on the FTO commodity is more severe greater than that on the generic commodity. In other words, an export tax does more harm to the FTO producers than the non-FTO producers.

It follows from (15) that the comparative-static derivatives of $w_F^*$ with respect to $\alpha$, $\Delta$, and $g$ are:

$$\frac{\partial w_F^*}{\partial \alpha} = -\frac{\Delta[(1-3\Delta)(P-t)+2(1-\Delta)g]}{2[\alpha+(2-\alpha)\Delta]^2} > (=)(<)0, \tag{16d}$$

$$\frac{\partial w_F^*}{\partial \Delta} = \frac{\alpha[(1+\alpha)(P-t)+2g]}{2[\alpha+(2-\alpha)\Delta]^2} \geq 0, \tag{16e}$$

$$\frac{\partial w_F^*}{\partial g} = \frac{\Delta}{\alpha+(2-\alpha)\Delta} > 0. \tag{16f}$$

The findings of the above analyses are summarized in the following proposition:

**PROPOSITION 4**. *An increase in the export tax unambiguously lowers the purchase price to each commodity, regardless of the FTO premium to its member producers. The effect of an increase in altruism coefficient on the FTO's purchase price cannot be determined unambiguously. An increase in the relative quality of the FTO commodity may increase its purchase price. However, a stronger degree of the warm glow preferences unambiguously*

*raises the purchase price of the FTO commodity.*

Although the domestic government's imposition of an export tax on the commodity exported is able to raise the premium optimally chosen by the FTO over the conventional firm's purchase price, this tax reduces the purchase price of the later. Proposition 4 indicates that an export tax has a negative effect on the commodity prices offered by the buyers.

## 3.3 *Total benefits of the FTO and the non-FTO producers*

Substituting the optimal values of the premium and the conventional firm's purchase price into equations (7a) and (7b), we calculate the total benefits to the two groups of competitive producers as follows:

$$B_F^* = \frac{(1+\alpha)(P-t)+2g}{8[(2-\alpha)\Delta+\alpha]^2}\left\{2(\Delta-1)g+[(5-\alpha)\Delta+\alpha-1](P-t)\right\}, \tag{17a}$$

$$B_M^* = \frac{\left\{-2g+[(2-\alpha)\Delta-1](P-t)\right\}^2}{8[(2-\alpha)\Delta+\alpha]^2}. \tag{17b}$$

The effects on the benefits of the two groups of producers when there is a change in the export tax are:

$$\frac{dB_F^*}{dt} = -\frac{2(3\Delta-1)g+[(5-\alpha)\Delta+\alpha-1](P-t)}{4[(2-\alpha)\Delta+\alpha]^2} < 0, \tag{18a}$$

$$\frac{dB_M^*}{dt} = -\frac{\left\{[(2-\alpha)\Delta-1](P-t)-2g\right\}[(2-\alpha)\Delta-1]}{4[(2-\alpha)\Delta+\alpha]^2} < 0. \tag{18b}$$

The negative signs in equations (18) follow directly from Assumption 2 that $\Delta > 1/(2-\alpha)$. Thus, an export tax lowers the total benefit of each group of producers, whether they produce an FTO or a generic commodity.

Moreover, we have the following comparative-static derivatives:

$$\frac{\partial B_F^*}{\partial \alpha} = \frac{\left[(3\Delta - 1)(P - t) + 2(\Delta - 1)g\right]^2}{4\left[\alpha + (2 - \alpha)\Delta\right]^3} > 0, \tag{18c}$$

$$\frac{\partial B_F^*}{\partial \Delta} = \frac{-[(1+\alpha)(P-t) + 2g]}{8[\alpha + (2-\alpha)\Delta]^3}\left\{[\alpha^2(1-\Delta) + (7\Delta - 1)\alpha + 4 - 10\Delta](P-t) + 2[(1-\Delta)\alpha - 2(2-\Delta)]g\right\}, \tag{18d}$$

$$\frac{\partial B_F^*}{\partial g} = \frac{(3\Delta - 1)(P - t) + 2(\Delta - 1)g}{2[\alpha + (2 - \alpha)\Delta]^2} > 0, \tag{18e}$$

$$\frac{\partial B_M^*}{\partial \alpha} = -\frac{[(3\Delta - 1)(P - t) + 2(\Delta - 1)g]\{[(2 - \alpha)\Delta - 1](P - t) - 2g\}}{4\left[\alpha + (2 - \alpha)\Delta\right]^3} < 0, \tag{18f}$$

$$\frac{\partial B_M^*}{\partial \Delta} = \frac{(2 - \alpha)\left[(1+\alpha)(P - t) + 2g\right]}{4\left[\alpha + (2 - \alpha)\Delta\right]^3}\{[(2 - \alpha)\Delta - 1](P - t) - 2g\} > 0, \tag{18g}$$

$$\frac{\partial B_M^*}{\partial g} = \frac{-\{[(2 - \alpha)\Delta - 1](P - t) - 2g\}}{2\left[\alpha + (2 - \alpha)\Delta\right]^2} < 0. \tag{18h}$$

The implications of these derivatives are summarized in the following proposition:

**PROPOSITION 5**. *The imposition of an export tax unambiguously lowers the total benefits of the FTO and the generic producers. An increase in altruism coefficient increases the total benefit for the FTO producers but decreases the total benefit for the non-FTO producers. The effect of an increase in the FTO commodity's relative quality on the total benefits cannot be determined unambiguously. The warm glow preferences of consumers positively affect the total benefit of the FTO producers but negatively affect the total benefit of the non-FTO producers.*

## 4. Socially Optimal Trade Policy under Oligopsony

Finally, we examine the first stage of the game where the domestic government determines its

optimal trade policy in order to maximize the country's social welfare. Social welfare is defined as the sum of benefits to the two groups of competitive producers and tax revenues collected from the FTO and the conventional firm. That is,

$$SW(t) = B_F^*(t) + B_M^*(t) + tX^*(t). \tag{19}$$

Differentiating the social welfare function in (19) with respect to *t*, evaluating the resulting expression at the point where $t = 0,$ we have

$$\frac{dSW}{dt}\Big|_{t\to 0} = \frac{1}{4[\alpha + (2-\alpha)\Delta]}\left\{-2\Delta(1+\alpha)g + P\underbrace{\left[(2-\alpha)^2\Delta^2 - (3\alpha^2 - 2\alpha + 1)\Delta + \alpha^2\right]}_{D}\right\}. \tag{20}$$

We show in Appendix B that the sign of the term D on the right-hand-side of equation (20) is positive. As a result, we cannot sign the curly term and the derivative unambiguously. But for the case in which there are no warm glow preferences of consumers such that $g = 0,$ the derivative is strictly positive. This implies that the implementation of a (positive) export tax is welfare-improving. This result continues to hold in the absence of an FTO. That is,

$$\frac{dSW}{dt}\Big|_{t\to 0} = \frac{P\alpha}{4} > 0 \text{ when } g = \Delta = 0.^{7}$$

We thus have

**PROPOSITION 6**. *Without the warm glow preferences of consumers over an FTO labeled product, the socially optimal trade policy involves a non-discriminatory export tax on the commodity produced either by the FTO or non-FTO producers. This result holds, irrespective of*

[7] When there is no FTO, there is only one buyer in the commodity market. The three-stage game discussed in this paper then reduces to a two-stage game in which the domestic government sets its trade policy at the first stage and the conventional firm determines its purchase price at the second stage of the game. In this two-stage game without an FTO, there is no product quality differential under monopsony and hence the value of $\Delta$ is equal to zero.

*the presence of an FTO*.

The result in Proposition 6 is consistent with the finding of Deardorff and Rajaraman (2009). But it should be noted that our analysis shows that the level of the export tax may be lower once there is a warm glow effect on the parts of consumers. Actually, we can further show that the socially optimal export tax be set to zero provided the degree of warm glow preferences is sufficiently strong. We include the detailed analysis in Appendix C.

Defining $g^* = PD/2\Delta(1+\alpha)$, the results obtained in Appendix C lead to the following:

**PROPOSITION 7**. *For the case in which the FTO has a strong degree of altruism* $(\alpha > 1/2)$ *and the quality of the FTO commodity is sufficiently high* $(\Delta > \alpha/(2\alpha - 1))$, *a laissez faire policy turns out to be socially optimal, provided that the warm glow effect is as large as* $g^*$.

To see why the presence of the warm glow effect may alter the equilibrium outcome, we set the first-order derivative to be zero, $\frac{dSW}{dt} = 0$, and solve the welfare-maximizing problem. This leads to the optimal export tax as follows:

$$t^* = \frac{\left[(2-\alpha)^2\Delta^2 - (1-2\alpha+3\alpha^2)\Delta + \alpha^2\right]P - 2\Delta(1+\alpha)g}{3(2-\alpha)^2\Delta^2 - (1-10\alpha+7\alpha^2)\Delta + 3\alpha^2}. \tag{21}$$

Note that the denominator is strictly positive according to the second-order condition for welfare maximization. Taking the derivative of $t^*$ in (21) with respective to $g$ yields

$$\frac{\partial t^*}{\partial g} = -\frac{2\Delta(1+\alpha)}{3(2-\alpha)^2\Delta^2 - (1-10\alpha+7\alpha^2)\Delta + 3\alpha^2} < 0. \tag{22}$$

This indicates that an increase in the degree of the warm glow preferences, which increases market demand for the FTO commodity, causes the optimal tax rate to decline. The economic reasons are as follows. An increase in the export tax is shown to lower purchase prices to both

the FTO commodity producers and the generic commodity producers (see the analysis in Section 3.2 and Proposition 4). But the warm glow preferences of consumers change the endogenous structure of the production in that the there are more producers of the FTO commodity and less producers of the generic commodity. Although this leads to a decrease in the total benefit of the generic commodity producers, the increase in the total benefit of the FTO member producers is relatively greater (see the analysis in Section 3.3 and Proposition 5). Consequently, the level of the export tax for coping with the buyer power decreases. In other words, the warm glow preferences over the FTO commodity help to mitigate market power exerted by oligopsonists, with the result that the optimal export tax is relatively lower.

The finding in Proposition 7 further shows that if the warm glow preferences are sufficiently strong, coupled with strong altruism on the part of the FTO in determining its purchase price for a quality FTO commodity, then the trade policy requires that the optimal export tax be set to be zero. That is, we have from equation (21) that[8]

$$t^* = 0 \text{ when } g^* = \frac{P\left[(2-\alpha)^2\Delta^2 - (1-2\alpha+3\alpha^2)\Delta + \alpha^2\right]}{2\Delta(1+\alpha)}.$$

We use a simple numerical example to highlight the findings of the analysis. Assuming that $P = 1,\quad \alpha = 1,$ and $\Delta = 2$, we follow equation (21) and calculate the optimal export tax to be

$$t^* = \frac{1-8g}{19}. \tag{23}$$

Note in this case the upper limit on the value of $g$ is given by $\overline{g} = 0.5$. Thus, we have from equation (23) that $t^* = 0$ for $g^* = 0.125,$ which is less than $\overline{g}$.

[8] There is a theoretical possibility that $t^* < 0$ when the warm glow effect is such that $g > g^*$. In this case, the optimal trade policy involves the use of an export subsidy. We rule out this possibility due to the financial constraints facing developing countries.

## 5. Concluding Remarks

In this paper, we have developed a product differentiation model to characterize the role that fair trade organizations play in coping with buyer power in markets under oligopsony. In the analysis, we take into account effects that the warm glow preferences of consumers over FTO products have in influencing the benefits of competitive producers and social welfare. The product differentiation model allows for the endogeneity of competitive producers in supplying their products to an FTO and a conventional buyer. Further, the model considers differences in product quality between an FTO commodity and a generic commodity. As such, we are able to draw implications concerning how an FTO and the warm glow preferences affect the benefits of the two different groups of competitive producers differently.

We show that imposing a specific tax on the export of a commodity lowers the price that a conventional firm offers to the producers of the commodity without FTO labeling. The higher the export tax, the higher the premium that an FTO commits to their member producers for raising the price of the FTO commodity. Other things being equal, an increase in the quality of the FTO commodity has a positive effect on the optimal premium for member producers. This positive effect on the premium also emerges when there are warm glow preferences of consumers. We further find that an increase in an export tax unambiguously lowers the aggregate amount of a commodity, whether it is FTO label or generic. We show that an FTO and the warm glow preferences have a positive effect on the aggregate benefit of the FTO members and a negative effect on that of the non-members. Without the warm glow preferences of consumers, the socially optimal trade policy is to impose an export tax. But for the case in which an FTO cares about the benefits of their member producers, the welfare-maximizing trade policy may require the export tax be set to zero when the warm glow effect is sufficiently strong.

# Appendix

**Appendix A**: ***Can the FTO's profit be positive?***

Calculating $P+g-t^*-w_F^*$, we have

$$\begin{aligned} & P+g-t^*-w_F^* \\ &= \frac{1}{2\left[\alpha+(2-\alpha)\Delta\right]}\left\{\underbrace{\left[(1-2\alpha)\Delta+\alpha\right]}_{A}\left(P-t\right)+2\left[\alpha+(1-\alpha)\Delta\right]g\right\} \end{aligned}$$

Assumption 2 that $\Delta > \frac{1}{2-\alpha}$ implies that item A in the curly bracket is always positive. Thus, we have $\pi_F^* > 0$.

**Appendix B**: ***Determining the sign of item D***

Rewriting the first-order condition for social welfare maximization, evaluating the resulting expression at where $t=0$, we have

$$\frac{dSW}{dt}\Big|_{t\to 0} = \frac{1}{4\left[\alpha+(2-\alpha)\Delta\right]}\left\{-2\Delta(1+\alpha)g+P\underbrace{\left[(2-\alpha)^2\Delta^2-\left(3\alpha^2-2\alpha+1\right)\Delta+\alpha^2\right]}_{D}\right\}$$

Step 1: under Assumption 2 that $\Delta > \frac{1}{2-\alpha}$, we have

$$\begin{aligned} \frac{\partial D}{\partial \Delta} &= 2(2-\alpha)^2\Delta-3\alpha^2+2\alpha-1 \\ &> 2(2-\alpha)^2\frac{1}{2-\alpha}-3\alpha^2+2\alpha-1 = 3(1-\alpha^2) > 0 \end{aligned}$$

Therefore, *D* is increasing in Δ.

Step 2: Note that the sign of *D* is positive at Δ = 0. Further, we have found that D increases with Δ. Thus, the value of *D* is always positive with a low bound of $\alpha^2$.

**Appendix C**: ***Condition to achieve the laissez faire equilibrium***

Observing the expression that $\frac{dSW}{dt}\big|_{t\to 0}$, it is easy to find a critical value of $g$, denoted as $g^*$, such that the sign of the derivative is zero. Formally, $g^*$ is calculated as follows:

$$g^* = \frac{PD}{2\Delta(1+\alpha)},$$

where *D* is defined earlier in Appendix B. Note that $g$ has an upper limit, i.e., $g < \bar{g}$. For the case in which $g^* < \bar{g}$, setting the export tax to zero turns out to be socially desirable. The mathematic manipulation below demonstrates that this argument holds under some certain conditions. Direct calculation reveals that

$$\bar{g} - g^* = \frac{P\left[\alpha + (2-\alpha)\Delta\right]}{2\Delta(1+\alpha)}\left[(2\alpha - 1)\Delta - \alpha\right],$$

The first item on the right-hand side of the above expression is positive. The sign of $\bar{g} - g^*$ is then determined by that of $\left[(2\alpha - 1)\Delta - \alpha\right]$. It follows that $\bar{g} - g^*$ is strictly positive when both of the following conditions are satisfied: (i) $\alpha > 1/2$ and (ii) $\Delta > \frac{\alpha}{2\alpha - 1}$.

# References

Baumann, F., M. Oschinski, and N. Stähler, 2012, "On the effects o fair trade on the welfare of the poor," *Journal of International Developmen*t, 24, S159–S172.

Becchetti, L., and F. Adriani, 2004, "Fair trade—A third generation welfare mechanism to make globalization sustainable," *CEIS Working Paper* No.62.

Chang, Y.-M. and V. J. Tremblay, 1991, "Oligopsony/oligopoly power and factor market performance," *Managerial and Decision Economics*, 12, 405–409.

Deardorff, A.V. and I. Rajaraman, 2009, "Buyer concentration in markets for developing country exports," *Review of Development Economics,* 13, 190–199.

Fitter, R., and R. Kaplinsky, 2001, "Who gains from product rents as the coffee market becomes more differentiated?" *IDS Bulletin*, 32, 69–82.

FLO, 2010, Annual report 2009/10, available from http://www.fairtradelabel.org.za/news/ FLO-ANNUAL-REPORT-2009-2010.22.html.

FLO, 2012, www.fairtrade.net.

Lopez, R. A. and Z. You, 1993. "Determinants of oligopsony power: The Haitian coffee case." *Journal of Development Economics* 41: 275-284.

Loureiro, M.L., and J. Lotade, 2005, "Do fair trade and eco-labels in coffee wake up the consumer conscience?" *Ecological Economics*, 53, 129–138.

Piyapromdee, S., R. Hillberry, and D. MacLaren, 2008, "'Fair trade coffee and the mitigation of local oligopsony power," Department of Economics Working Papers Series 1057, The University of Melbourne.

Poret, S., and C. Chambolle, 2007, "Fair trade labeling: in or out the market?" *Journal of Agricultural & Food Industrial Organization*, 5(9), Berkeley Electronic Press.

Raynolds, L.T., and M.A. Long, 2007, "Fair/Alternative trade—historical and empirical dimensions," in: Raynolds, L.T., D. Murray, and J. Wilkinson (eds.): *Fair trade—The challenges of transforming globalization*, Routledge: New York.

Richardson, M., and F. Stähler, 2007, "Fair Trade," *Working Papers in Economics and Econometrics*, 481, The Australian National University: Canberra.

Talbot, J., 2004. *Grounds for agreement: The political economy of the coffee commodity chain*. Rowman & Littlefield, Lanham.

World Trade Organization, 2003, Non-paper on the need for Urgent action in WTO to deal with the crisis situation created by the long-term trend towards decline in prices of primary commodities to the trade and development of developing countries which are heavily dependent on their exports, WT/COMTD/W/113.