An Economic Analysis of the 'Buy Local' Trend

by Susweta Ray and Konstantinos Giannakas

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Abstract

Buying local food products has become particularly popular in recent years due to a perceived freshness and superior quality of these products and the 'Buy Local' trend's potential to support the local community. This paper develops a novel framework of heterogeneous consumers and producers to analyze the market and welfare impacts of the 'Buy Local' trend and determine whether the trend is serving its purpose. In particular, the study determines the impacts of the trend on equilibrium prices and quantities in the locality and the welfare of the interest groups involved (i.e., consumers and producers of local and non-local products affected by the trend). Analytical results show that the market and welfare impacts of the 'Buy Local' trend depend on the size of the locality and whether the locality is an exporter or an importer of the products in question. For instance, while the trend benefits both consumers and producers of a large importing locality, it leaves producers of small exporting localities unaffected. The presence of the trend in large localities affects also outside consumers and producers with the impact on their welfare depending on whether the large locality is an importer or an exporter of the goods in question.

Keywords: Buy Local, welfare impacts, importer, exporter, consumer heterogeneity, heterogeneous preferences, product differentiation.

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Introduction

With ever changing consumer preferences, the market has witnessed different trends in the food sector, with 'Organic', 'Fair trade' and 'Natural' being some prominent examples of new products and concepts. Another trend that has gained significant popularity over the past decade is 'Buy Local', under which consumers prefer locally grown products over the non-locally grown ones. Although in 2008 the U.S. Congress, in the Food, Conservation and Energy Act (2008 Farm Act) defined 'local' as food produced in the same state or within 400 miles from the point of consumption (Martinez et al., 2010), there are still different understandings of 'local' among the producers and consumers. While, for example, sellers consider anything grown within 100 miles of the selling point to be local (Durham, King & Roheim, 2009), this concept does not always align with what consumers consider as local, especially if the growing area is located in a different state. Darby, Batte, Ernst, & Roe (2008), Clifford (2010) and Martinez et al. (2010) found that "grown in state" or "grown nearby" are the most common understandings of local among consumers.

Durham and Roheim (2009) show that the reasons behind the consumer preference for locally-grown products are a perceived freshness of local products and the willingness to help the local farming community and local businesses, followed by perceived environmental benefits and food safety. Similarly, using survey data from consumers in the Washington county of Nebraska, Schneider and Francis (2005)[1] found that consumers prefer locally grown products because of better taste and quality, lower environmental impact, and better returns to the farming community.

[1] Schneider & Francis (2005) found that 34% of the consumers surveyed were willing to pay 10% premium, 1% would pay 25% and 1% would pay more than 25% premium for locally grown food.

Khanal et al. (2020), using cow milk purchase data in New England region between 2007 and 2016, identifies the presence of significant local bias, which is conceptually similar to the home bias concept developed by Armington (1969). Overall, the main reasons behind the consumer preference for local products have been identified to be a perceived freshness and better quality, environmental concerns, and consumers' desire to support and help the local economy grow (Winter, 2003; Schneider & Francis, 2005; Chambers et al., 2007; Durham & Roheim, 2009; Conner et al., 2010).

Despite the intended impact of the 'Buy Local' trend on local producers, the literature on the 'Buy Local' trend has, to our knowledge, focused mainly on the demand side of the market. The only study that examines the impacts of the trend on both the demand and the supply sides of the market is Winfree & Watson (2017), which shows that, unless there are strong positive externalities from locally-grown products, the trend can be welfare-reducing due to the increased deadweight loss stemming from the violation of comparative advantage. A similar argument is made by Lusk & Norwood (2011), without providing any systematic analysis of the effect of the 'Buy Local' trend on consumer and producer welfare, however.

While Winfree & Watson (2017) show that the trend can reduce overall welfare, their study does not provide any insights about the impacts of the trend on different consumers and agricultural producers. The reason is that their study is based on some restrictive assumptions about consumer behavior and the structure of the market. In particular, Winfree and Watson (2017) focus on the "representative consumer" (ignoring empirically-relevant differences in the strength of the consumer preferences for local products and their substitutes) and monopoly in the production side (ignoring the substantial heterogeneity among agricultural producers and suppliers of food

products). By ignoring consumer and producer heterogeneity, Winfree & Watson (2017) cannot provide insights on the impact of the trend on different consumers and producers.

The objective of this study is to systematically analyze the systemwide market and welfare impacts of the 'Buy Local' trend by explicitly accounting for both the demand and supply effects of this trend. Specifically, our study analyzes the impacts of the trend on:

1. the prices and quantities/market shares of the relevant, local and non-local products
2. the welfare of consumers of local and non-local products
3. the welfare of local agricultural producers
4. the consumers and producers outside the locality who can be affected by changes in the consumption and/or production pattern(s) in the locality

To systematically analyze the market and welfare impacts of the 'Buy Local' trend, our study develops a theoretical framework that explicitly accounts for the empirically-relevant heterogeneity in consumer preferences for local and non-local products and differences in producer agronomic characteristics. The framework is an adaptation of the Giannakas (2019) framework of heterogeneous agents in the agri-food marketing system. In addition to being empirically relevant, the explicit consideration of consumer and producer heterogeneity enables us to capture the impacts of the 'Buy Local' trend on the different consumers and different producers affected by this trend. The (neglected in the literature) possibility of negative externalities associated with the production of local is also taken into consideration. Such externalities can arise when local operations face challenges with waste, manure and/or odor management that would have been absent if the food product (like pork, poultry, beef etc.) were "imported" from outside the confines of the locality.

Market and Welfare Effects of the 'Buy Local' Trend

To determine the market and welfare effects of the 'Buy Local' trend, our study derives, compares and contrasts the equilibrium conditions (i.e., prices, quantities and welfare of the interest groups involved) before and after the trend.

Conditions before the 'Buy Local' Trend

Consumer decisions and welfare

We assume that consumers have three options, which are the conventional and organic variations of the product under consideration and some alternative. We also assume that these products are vertically differentiated, i.e., uniformly quality ranked by consumers so that, if offered at the same price everyone would prefer the higher quality organic product. While consumers agree on the relative quality ranking of organic and conventional products, they differ in their valuation of, and willingness to pay for the perceived quality difference between these products. Let $\lambda \in [0,1]$ be the differentiating attribute of consumers, with higher values of λ indicating a stronger preference for quality. Assuming consumers buy one unit of their preferred product and that the unit consumption represents a small share of their total budget, we can represent the utility function of the consumer with differentiating attribute λ as follows:

$U_C = U - p_C + \alpha\lambda$ if a unit of conventional product is consumed

$U_O = U - p_O + \beta\lambda$ if a unit of organic product is consumed

$U_A = U$ if a unit of alternative good is consumed

The parameter U is the base level utility associated with the unit consumption of organic, conventional and alternative products; p_C and p_O are the consumer prices of conventional and

organic products, respectively, while α and β are preference parameters associated with the consumption of conventional and organic product, respectively. In this context, $U + \alpha\lambda$ and $U + \beta\lambda$ capture the valuation of the conventional and organic product, respectively, of the consumer with differentiating attribute λ. To capture the vertical differentiation of organic and conventional products, we assume $\beta > \alpha$, while to ensure coexistence of conventional and organic products in the market, we assume $p_O > p_C$. Finally, to maintain tractability of the model, we assume that the utility associated with the consumption of the alternative product is given by the base level of utility.

Figure 1 graphs U_C, U_O and U_A for the case in which the three products coexist in the market.

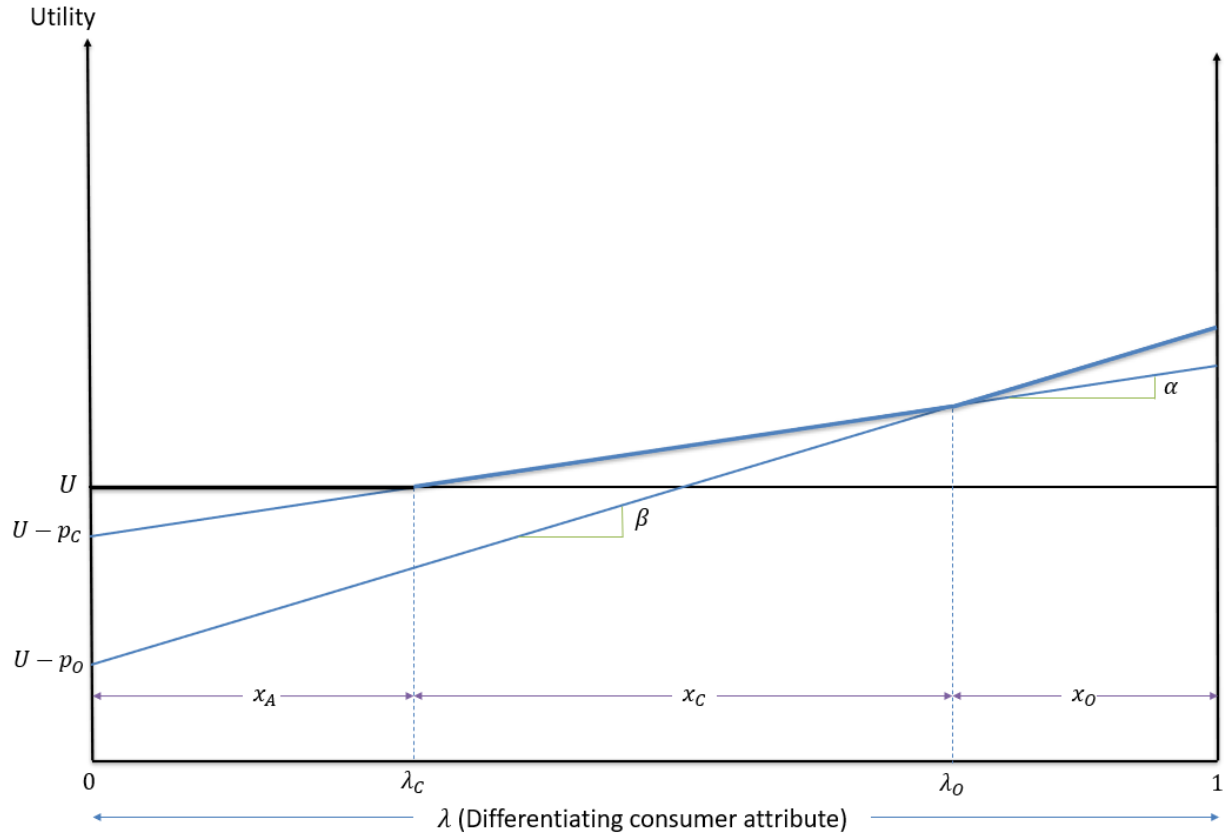

Figure 1: Consumer utilities from conventional, organic and alternative products

The consumer with differentiating attribute λ_C: $U_A = U_C \Rightarrow U = U - p_C + \alpha\lambda \Rightarrow \lambda_C = \frac{p_C}{\alpha}$ is indifferent between the alternative and conventional products, while the consumer with differentiating attribute λ_O: $U_C = U_O \Rightarrow U - p_C + \alpha\lambda = U - p_O + \beta\lambda \Rightarrow \lambda_O = \frac{p_O - p_C}{\beta - \alpha}$ is indifferent between the conventional and organic variations of the product.

When consumers are uniformly distributed between $\lambda = 0$ and $\lambda = 1$, we can derive the market share of the conventional product (x_C) as $\lambda_O - \lambda_C$ and the market share of its organic counterpart (x_O) as $1 - \lambda_O$. From the market shares, we can derive the demand for these products by normalizing the total number of consumers to unity. In this context, the market shares of, and consumer demands for the conventional and organic products are given by:

$$x_C = \lambda_O - \lambda_C = \frac{p_O - p_C}{\beta - \alpha} - \frac{p_C}{\alpha} = \frac{\alpha p_O - \beta p_C}{\alpha(\beta - \alpha)}$$

$$x_O = 1 - \lambda_O = 1 - \frac{p_O - p_C}{\beta - \alpha} = \frac{\beta - \alpha + p_C - p_O}{\beta - \alpha}$$

The inverse demand functions are then:

$$p_C = \frac{\alpha}{\beta} p_O - \frac{\alpha(\beta - \alpha)}{\beta} x_C \qquad \ldots (1)$$

$$p_O = \beta - \alpha + p_C - (\beta - \alpha) x_O \qquad \ldots (2)$$

As the utility functions U_A, U_C and U_O give the consumer utility associated with consumption of alternative, conventional, and organic products, respectively, for the consumer with differentiating attribute $\lambda \in [0,1]$, the area under the effective utility curve, marked in bold in Figure 1, gives the welfare of consumers of alternative, conventional and organic products, as:

$$W_O^D = \int_{\lambda_O}^{1} U_O d\lambda = (U + \alpha x_C)x_O - \frac{1}{2}\beta x_O^2$$

$$= \left[U + \alpha \frac{\alpha p_O - \beta p_C}{\alpha(\beta - \alpha)}\right]\left(\frac{\beta - \alpha + p_C - p_O}{\beta - \alpha}\right) - \frac{1}{2}\beta\left(\frac{\beta - \alpha + p_C - p_O}{\beta - \alpha}\right)^2$$

$$W_C^D = \int_{\lambda_C}^{\lambda_O} U_C d\lambda = \left(U + \frac{1}{2}\alpha x_C\right)x_C = \left[U + \frac{\alpha p_O - \beta p_C}{2(\beta - \alpha)}\right]\left[\frac{\alpha p_O - \beta p_C}{\alpha(\beta - \alpha)}\right]$$

$$W_A^D = \int_0^{\lambda_C} U_A d\lambda = U x_A = \frac{U p_C}{\alpha}$$

Producer decisions and welfare

On the supply side, we assume producers have the options of producing either the conventional or organic variation of the product under consideration or an alternative product. We also assume that, due to differences in age, level of education, experience, management skills etc., the local producers (i.e., producers of the locality) differ in their costs of producing the different products. Let $C \in [0,1]$ be the producers' differentiating attribute, with higher values of C corresponding to increased costs/reduced efficiency. The net returns function of the producer with differentiating attribute C is given by:

$$NR_C = p_C - w_C - aC \qquad \text{if a unit of conventional product is produced}$$

$$NR_O = p_O - w_O - bC \qquad \text{if a unit of organic product is produced}$$

$$NR_A = 0 \qquad \text{if a unit of alternative product is produced}$$

where p_C and p_O are the producer prices of conventional and organic products, respectively. For simplicity and without loss of generality, we assume that there is no market power among the middlemen and that the processing cost is zero, so that $p_i^D = p_i^S = p_i$ $(i = C, O)$, where D and S indicate demand and supply sides, respectively. The parameters w_C and w_O are the costs that are exogenous to producers, while the parameters a and b are cost enhancement factors, which, when multiplied by the value of C, give the idiosyncratic costs of producing conventional and organic products, respectively. To ensure a non-negative relation between quality and cost of production, we assume $b > a$, while, for simplicity and tractability, the net returns associated with the production of the alternative product are normalized to zero.

Figure 2 graphs the net returns function for the case in which the three different products enjoy positive production shares.

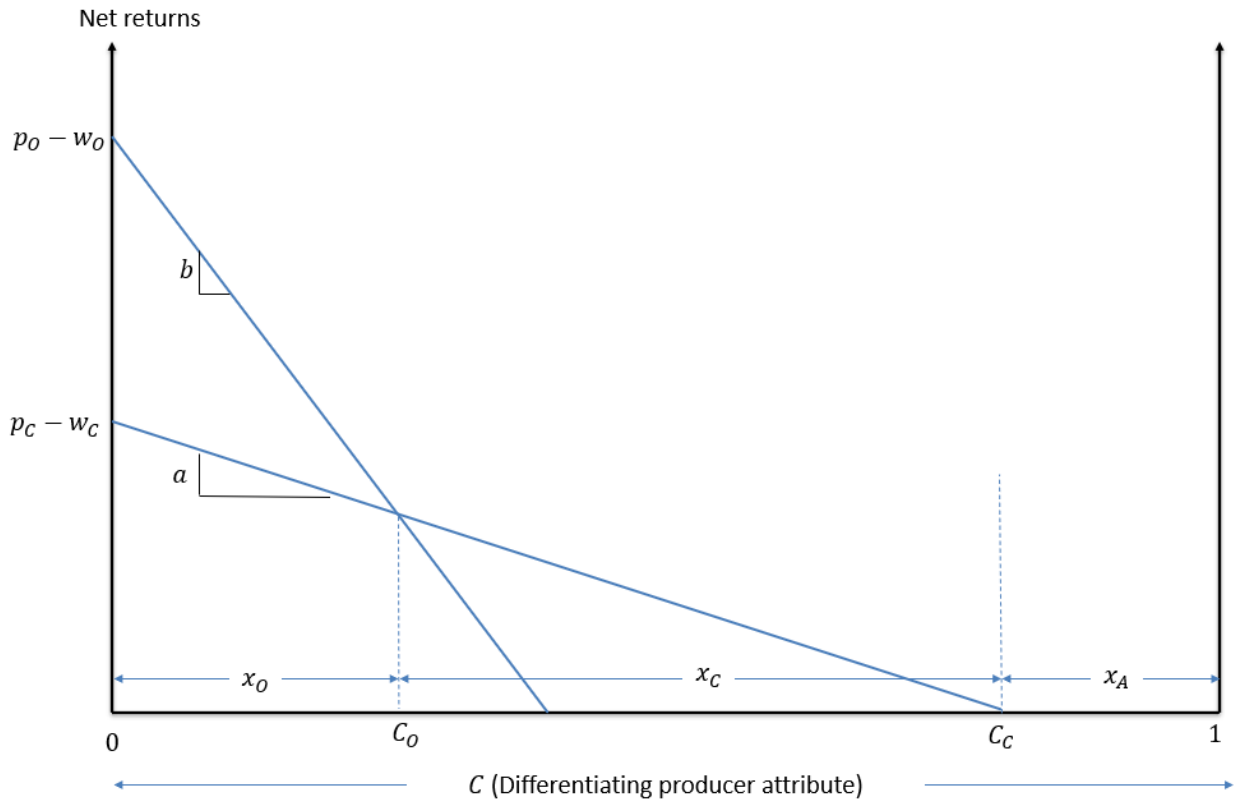

Figure 2: Local producers' net returns from conventional, organic, and alternative products

The producer with differentiating attribute $C_O : NR_C = NR_O => p_C - w_C - aC = p_O - w_O - bC => C_O = \frac{(p_O - w_O) - (p_C - w_C)}{b - a}$ is indifferent between producing organic and conventional product, while the producer with differentiating attribute $C_C : NR_C = NR_A => p_C - w_C - aC = 0 => C_C = \frac{p_C - w_C}{a}$ is indifferent between producing conventional and alternative product.

The shares of conventional (x_C) and organic (x_O) products in the total production can be derived as $C_C - C_O$ and $C_O - 0$, respectively, and equal:

$$x_C = C_C - C_O = \frac{b(p_C - w_C) - a(p_O - w_O)}{a(b - a)}$$

$$x_O = C_O - 0 = \frac{(p_O - w_O) - (p_C - w_C)}{b - a}$$

By normalizing the number of producers to unity, we can derive the supply functions from x_C and x_O as:

$$p_C = \frac{a}{b}(p_O - w_O) + w_C + \frac{a(b-a)}{b}x_C \quad \ldots(3)$$

$$p_O = (p_C - w_C) + w_O + (b-a)x_O \quad \ldots(4)$$

Figure 3 graphs the supply functions of conventional and organic products in the locality.

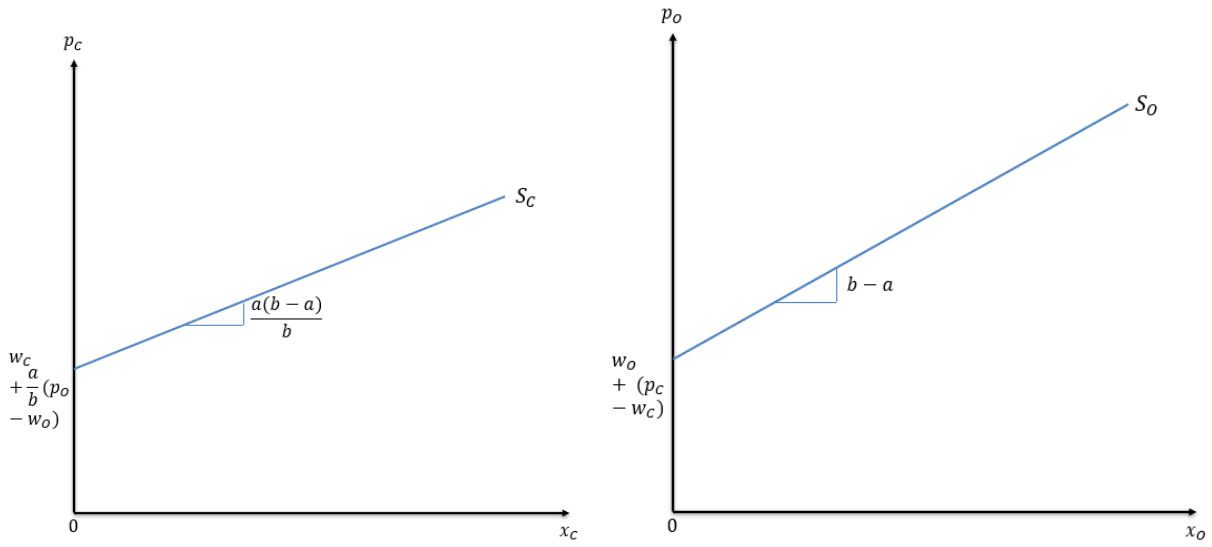

Figure 3: Inverse supply functions of conventional and organic products by local producers

Regional prices and trade of the locality

The consumer and producer prices of the conventional and organic products in the locality are determined by the regional demand and supply conditions and are denoted by p_i^R for $i = C, O$. Figures 4 and 5 depict the before 'Buy Local' market equilibrium in the price-quantity space, which indicate that whether a locality is an importer or an exporter of a product is determined by the regional price. If the regional price is higher (lower) than the market clearing price of a product in the locality, the locality will produce more (less) than consumed locally and will be an exporter (importer) of the product in question. Figures 4 and 5 show the conditions under which the locality is an exporter or an importer of a product, where D_i is the domestic demand for product i, S_i is the domestic supply, and x_i^D and x_i^S are the quantities demanded and supplied of product i in the locality, respectively.

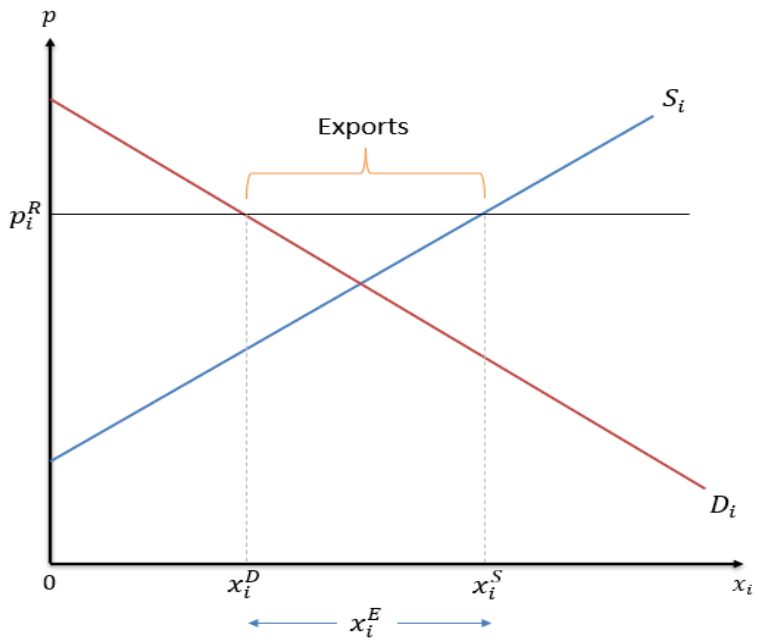

Figure 4: Market conditions that result in the locality being an exporter of a product

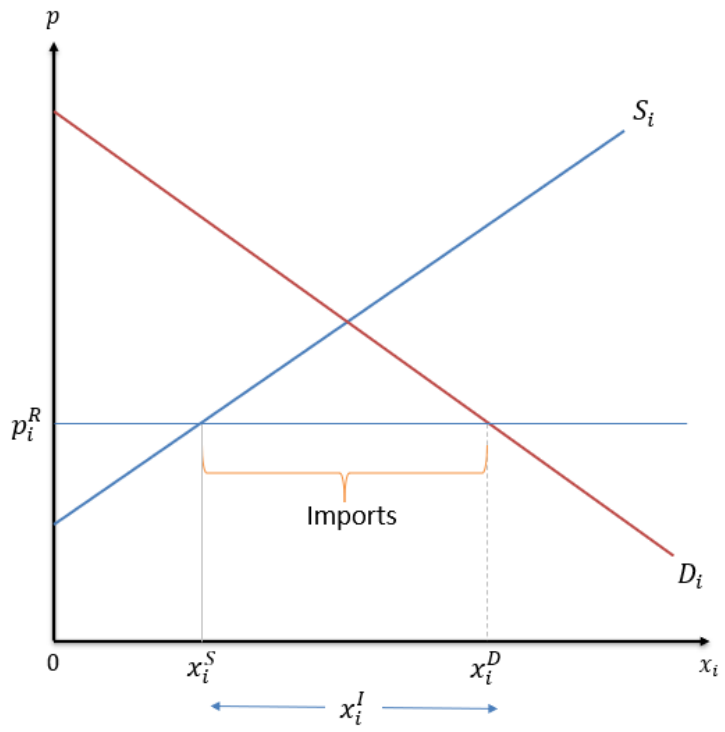

Figure 5: Market conditions that result in the locality being an importer of a product

The amount x_i^E in Figure 4 is the difference between the supplied quantity and the demanded quantity in the locality at the regional price and it is the quantity exported by the locality. In Figure 5, x_i^I is the amount that the locality imports to meet the domestic demand, as the quantity demanded in this case is higher than the quantity supplied to the market at the regional price.

Conditions after the 'Buy Local' Trend

This part will analyze the equilibrium conditions under, and the market and welfare impacts of the 'Buy Local' trend both in exporting and importing localities. Since the size of the locality can impact (or not) the regional prices and, through this, the welfare of the consumers and producers involved, our analysis will also differentiate between small and large localities. In this context, the cases of small and large exporting localities are considered first, followed by the cases of small and large importing ones.

Case I. Small Exporting Locality

At the epicenter of the 'Buy Local' trend is an increased valuation of locally grown goods. With the increased valuation of the local products, the utility that the consumer with differentiating attribute λ derives from consuming the locally produced product (there is no non-local product in the case of an exporting locality) is given by the following utility function:

$U_{CL} = U - p_{CL} + (\alpha + \delta)\lambda$	if a unit of locally produced conventional product is consumed
$U_{OL} = U - p_{OL} + (\beta + \delta)\lambda$	if a unit of locally produced organic product is consumed
$U_A = U$	if a unit of alternative product is consumed

where p_{CL} and p_{OL} are the prices of the conventional and organic products, respectively, under the 'Buy Local' trend, and δ is a non-negative parameter capturing the increase in consumer valuation of locally grown products. The higher the value of δ, the stronger is the consumer preference for

locally produced goods. All other parameters are as defined previously. Note that our formulation assumes that people who value quality more, place a greater value ($\delta\lambda$) on local. This is consistent with previous studies showing that consumers prefer local products because, among other things, they assume that they are of higher quality.

It is important to note that, by definition, when the locality is a small exporter, then the increased popularity of local products in that locality does not affect the regional supply to an extent that can change the regional price. Consequently, the regional prices remain unaffected by the 'Buy Local' trend in the small exporting locality so that $p_C = p_{CL} = p_C^R$ and $p_O = p_{OL} = p_O^R$. The impact of the 'Buy Local' trend on the consumer utility associated with the consumption of the different products is shown graphically in Figure 6.

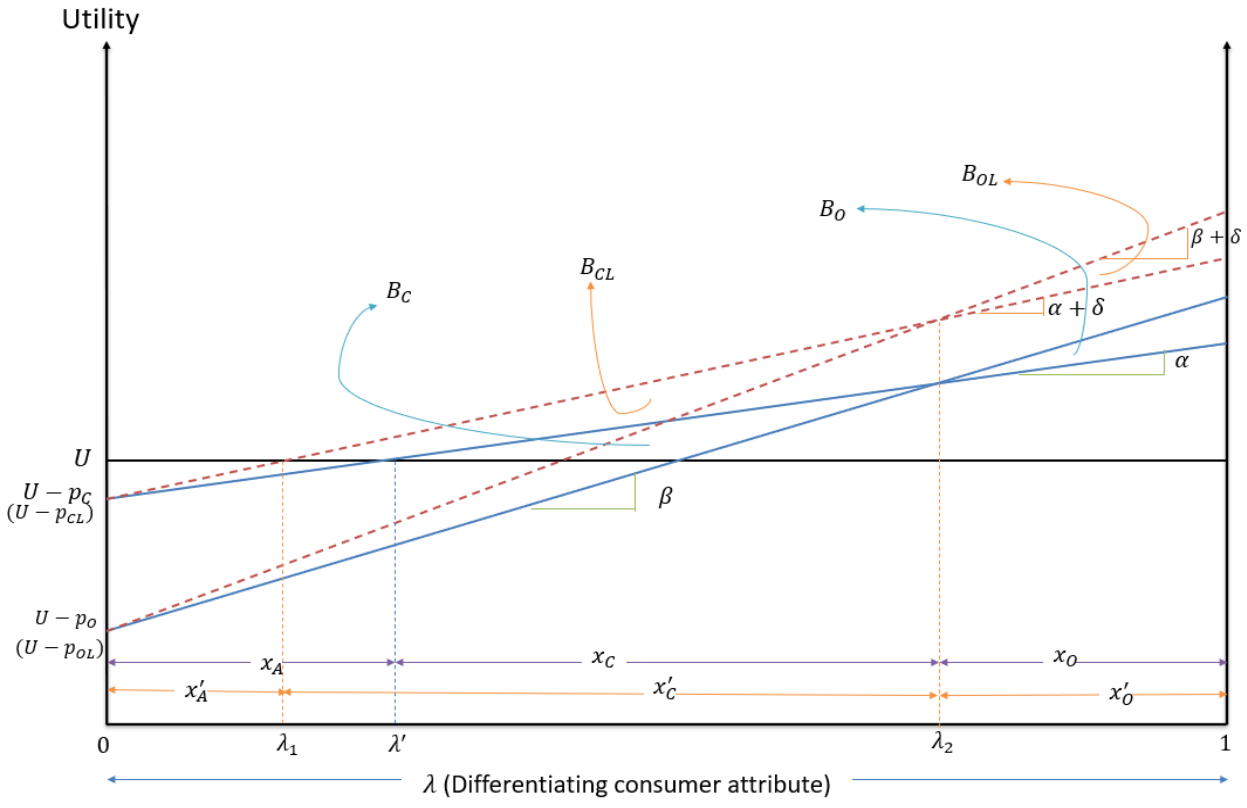

Figure 6: Consumer utilities from conventional, organic and alternative products, before and after the 'Buy Local' trend in a small exporting locality

The consumers with differentiating attributes λ_1 and λ_2 are indifferent between consuming the alternative and conventional products and between conventional and organic products, respectively. Thus, at λ_1, $U_A = U_{CL}$, which gives

$$\lambda_1 = \frac{p_{CL}}{\alpha + \delta}$$

Similarly, at λ_2, $U_{CL} = U_{OL}$, which gives

$$\lambda_2 = \frac{p_{OL} - p_{CL}}{\beta - \alpha}$$

The market shares of conventional and organic products after the 'Buy Local' trend are then:

$$x'_C = \lambda_2 - \lambda_1 = \frac{(\alpha + \delta)p_{OL} - (\beta + \delta)p_{CL}}{(\alpha + \delta)(\beta - \alpha)}$$

$$x'_O = 1 - \lambda_2 = \frac{\beta - \alpha + p_{CL} - p_{OL}}{\beta - \alpha}$$

From the market shares, we can derive the inverse demands for conventional and organic products in the locality after the trend as

$$p_{CL} = \frac{\alpha + \delta}{\beta + \delta} p_{OL} - \frac{(\beta - \alpha)(\alpha + \delta)}{\beta + \delta} x'_C \qquad \ldots (5)$$

$$p_{OL} = \beta - \alpha + p_{CL} - (\beta - \alpha)x'_O \qquad \ldots (6)$$

where $p_C = p_{CL} = p_C^R$ and $p_O = p_{OL} = p_O^R$.

From Figure 6 we can see that, while the market share of the conventional product is higher after the trend (as consumers with $\lambda \in (\lambda_1, \lambda']$ find it optimal to switch from the alternative to the

conventional product), the market share of the organic product remains unchanged. The higher market share of conventional product translates into increased demand for this product, while the demand for the organic product remains the same. This is so, because there is no change in the difference between the utility obtained from conventional and organic products under the 'Buy Local' trend, as the consumer valuation for both products increases by the same amount δ. On the other hand, the increase in the consumer valuation of the conventional product under the trend increases the difference in the utility obtained from the conventional product relative to that obtained from the alternative product. Figure 7 graphs the change in the consumer demand for the conventional product under the trend in the price-quantity space.

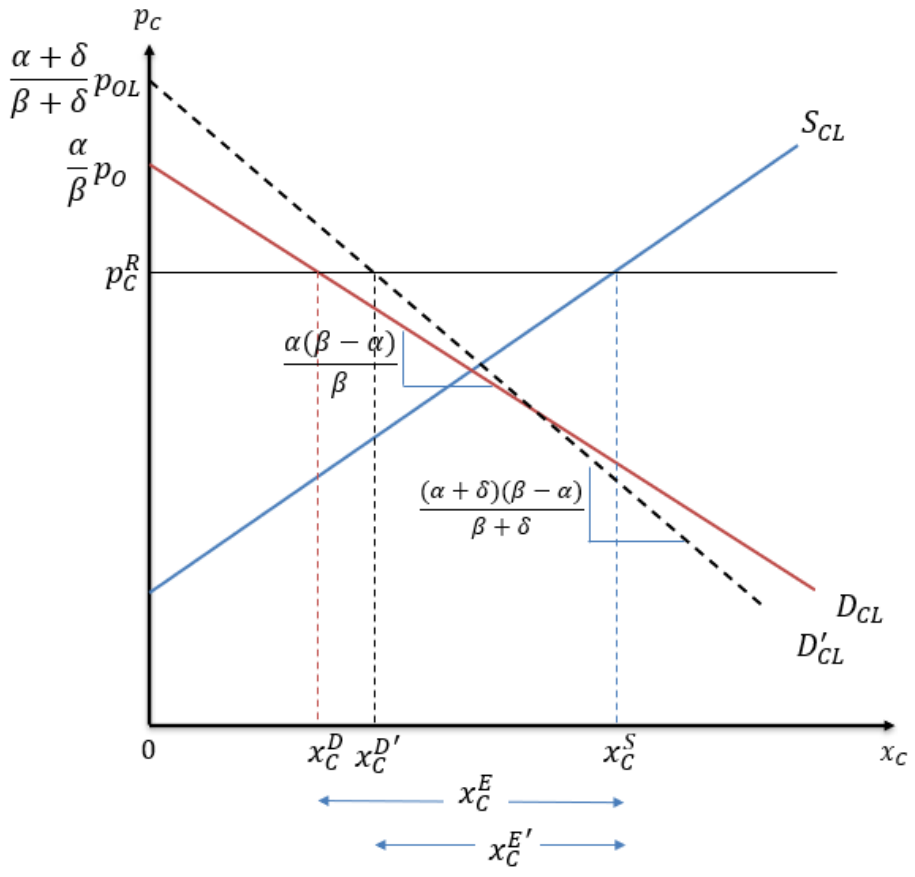

Figure 7: Changes in the equilibrium conditions for the conventional product due to the 'Buy Local' trend in a small exporting locality

As shown in Figure 7, the increased consumer valuation for local conventional products increases the quantity demanded from x_C^D to $x_C^{D\prime}$, which, in turn, reduces the amount exported by the locality from x_C^E to $x_C^{E\prime}$.

Figure 8 shows the unaltered demand for organic products after the trend. Since the demand and supply of the organic product are unaffected by the 'Buy Local' trend, the exported quantity of this product (x_O^E) also remains the same.

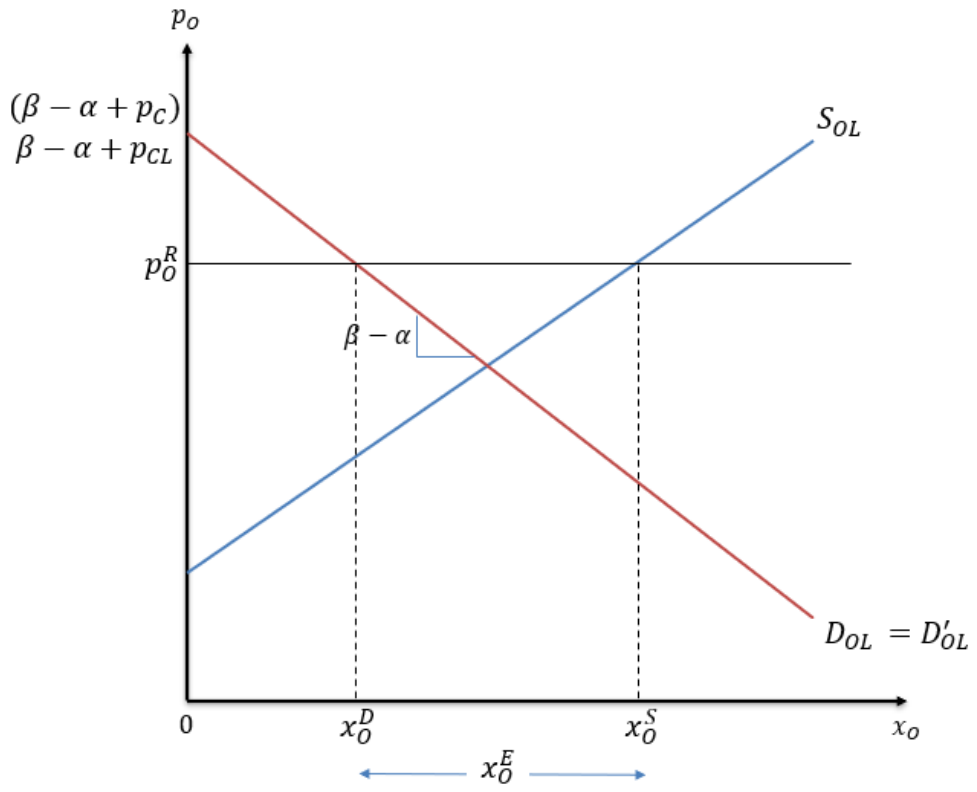

Figure 8: Changes in the equilibrium conditions for the organic product due to the 'Buy Local' trend in a small exporting locality

The area under the demand curve and above the market price represents the consumer surplus obtained from the consumption of a product, that is, the benefit obtained from the consumption of a product over its next best alternative. Since the valuation for both conventional and organic

products increases by the amount δ, the benefit obtained by the consumers of organic product over its next best alternative (i.e., conventional product) remains the same. Mathematically, the change in consumer surplus for consumers of the organic product is given by:

$$\Delta CS_O = CS_{OL} - CS_O = \frac{1}{2}x_O^D(\beta - \alpha + p_{CL} - p_O^G) - \frac{1}{2}x_O^D(\beta - \alpha + p_C - p_O^G)$$

As, in this case, $p_{CL} = p_C$, it follows that $\Delta CS_O = 0$.

While the surplus of the consumers of organic products remains unaffected, the welfare of these consumers increases under the 'Buy Local' trend due to the increased consumer valuation of locally grown organic products. These consumer welfare gains are given by:

$$\Delta W_O^D = \int_{\lambda_2}^{1}(U_{OL} - U_O)d\lambda = [U + (\alpha+\delta)x_C']x_O' + \frac{1}{2}(\beta + \delta){x_O'}^2 - (U + \alpha x_C)x_O - \frac{1}{2}\beta x_O^2$$

Since $x_O' = x_O$ (see Figure 6), the above expression can be rewritten as:

$$\begin{aligned}
\Delta W_O^D &= [(\alpha + \delta)x_C' - \alpha x_C] + \frac{1}{2}\delta {x_O'}^2 \\
&= \left[(\alpha + \delta)\frac{(\alpha + \delta)p_{OL} - (\beta + \delta)p_{CL}}{(\alpha + \delta)(\beta - \alpha)} - \alpha\frac{\alpha p_O - \beta p_C}{\alpha(\beta - \alpha)}\right] \\
&\quad + \frac{1}{2}\delta\left(\frac{\beta - \alpha + p_{CL} - p_{OL}}{\beta - \alpha}\right)^2 \\
&= \left[\frac{(\alpha + \delta)p_{OL} - (\beta + \delta)p_{CL} - \alpha p_O + \beta p_C}{\beta - \alpha}\right] + \frac{1}{2}\delta\left(\frac{\beta - \alpha + p_{CL} - p_{OL}}{\beta - \alpha}\right)^2 \\
&= \frac{\delta(p_{OL} - p_{CL})}{\beta - \alpha} + \frac{1}{2}\delta\left(\frac{\beta - \alpha + p_{CL} - p_{OL}}{\beta - \alpha}\right)^2
\end{aligned}$$

ΔW_O^D is clearly greater than zero, indicating that the welfare of organic product consumers increases with the trend.

The welfare gains of the consumers of conventional product can also be derived from the utility space as the difference between the utility obtained from the consumption of conventional products before and after the trend, and are equal to:

$$\Delta W_C^D = \int_{\lambda_1}^{\lambda'} (U_{CL} - U_A) d\lambda + \int_{\lambda'}^{\lambda_2} (U_{CL} - U_C) d\lambda$$

$$= \frac{1}{2}(\alpha+\delta)(x_A - x_A')^2 + \left[(\alpha+\delta)(x_A - x_A')x_C + \frac{1}{2}(\alpha+\delta)x_C^2\right] - \frac{1}{2}\alpha x_C^2$$

$$= \frac{1}{2}(\alpha+\delta)(x_A - x_A')^2 + (\alpha+\delta)(x_A - x_A')x_C + \frac{1}{2}\delta x_C^2$$

$$= (\alpha+\delta)(x_A - x_A')\left(x_C + \frac{x_A - x_A'}{2}\right) + \frac{1}{2}\delta x_C^2$$

$$= (\alpha+\delta)\left(\frac{p_C}{\alpha} - \frac{p_{CL}}{\alpha+\delta}\right)\left[\frac{\alpha p_O - \beta p_C}{\alpha(\beta-\alpha)} + \frac{\frac{p_C}{\alpha} - \frac{p_{CL}}{\alpha+\delta}}{2}\right] + \frac{1}{2}\delta\left(\frac{\alpha p_O - \beta p_C}{\alpha(\beta-\alpha)}\right)^2$$

$$= \frac{\delta p_C}{\alpha}\left[\frac{\delta p_C(\alpha p_O - \beta p_C)}{2\alpha^2(\alpha+\delta)(\beta-\alpha)}\right] + \frac{1}{2}\delta\left[\frac{\alpha p_O - \beta p_C}{\alpha(\beta-\alpha)}\right]^2$$

As $\left[(\alpha+\delta)(x_A - x_A')x_C + \frac{1}{2}(\alpha+\delta)x_C^2\right] - \frac{1}{2}\alpha x_C^2 > \frac{1}{2}(\alpha+\delta)(x_A - x_A')^2$ (see Figure 6) it follows that the consumers of conventional product before and after the trend gain more compared to the consumers who switch from the alternative to conventional product due to the trend. However, both groups see gains in welfare, making the 'Buy Local' trend welfare increasing for the consumers of conventional products in the locality.

The change in the surplus of the consumers of the conventional product due to the 'Buy Local' trend can be derived from Figure 7 as

$$\Delta CS_C = CS_{CL} - CS_C = \frac{1}{2}x_C^{D'}\left(\frac{\alpha+\delta}{\beta+\delta}p_{OL} - p_C^R\right) - \frac{1}{2}x_C^D\left(\frac{\alpha}{\beta}p_O - p_C^R\right)$$

As $x_C^{D\prime} > x_C^D, \frac{\alpha+\delta}{\beta+\delta} p_{OL} > \frac{\alpha}{\beta} p_O$ and $p_{OL} = p_O$, it follows that $\Delta CS_C > 0$, that is the consumer surplus of the conventional product consumers increases due to the trend.

While we showed the consumer surplus derived from the price-quantity space, the change in consumer surplus for both products can also be derived, form the utility space in Figure 6, as the difference in the benefit obtained from the consumption of a product over its next best alternative, that is, $\Delta CS_C = B_{CL} - B_C$ and $\Delta CS_O = B_{OL} - B_O$ where B_C, B_O, B_{CL} and B_{OL} correspond to the areas shown in Figure 6.

Even though consumer surplus measures are widely used to derive consumer welfare gains and losses, the case of the organic product shows that the general consumer surplus measures of welfare may not be able to capture the welfare gains for some groups of consumers (the consumers of organic product in our case[2]). In addition, even when we can derive the overall benefit from the consumption of a product over its next best alternative from the price-quantity space, such measure does not provide any insight on how much each consumer benefits from a trend, policy, economic shock etc. Thus, if there are asymmetric effects on consumers, that may not be obvious from the consumer surplus measures of welfare. Our framework, however, enables us to capture the welfare gains of consumers differing in their preference for quality and consumers who switch from one product to another due to the trend. In the case of the small exporting locality, the stronger is the consumer preference for quality, the greater is their valuation of locally produced products and the greater are the consumer welfare gains from the trend. In addition, consumers consuming the same (conventional or organic) product before and after the trend gain more relative to those who switch from the alternative product to the conventional due to the trend.

[2] On this point see also Giannakas (2019)

Similarly, we can calculate the welfare of the local producers of conventional and organic products from the net returns space, as the area under the respective net returns curves. Figure 9 indicates that producers with cost efficiency of at least C_O produce the organic product and producers with cost efficiency between C_O and C_C produce the conventional product in the locality.

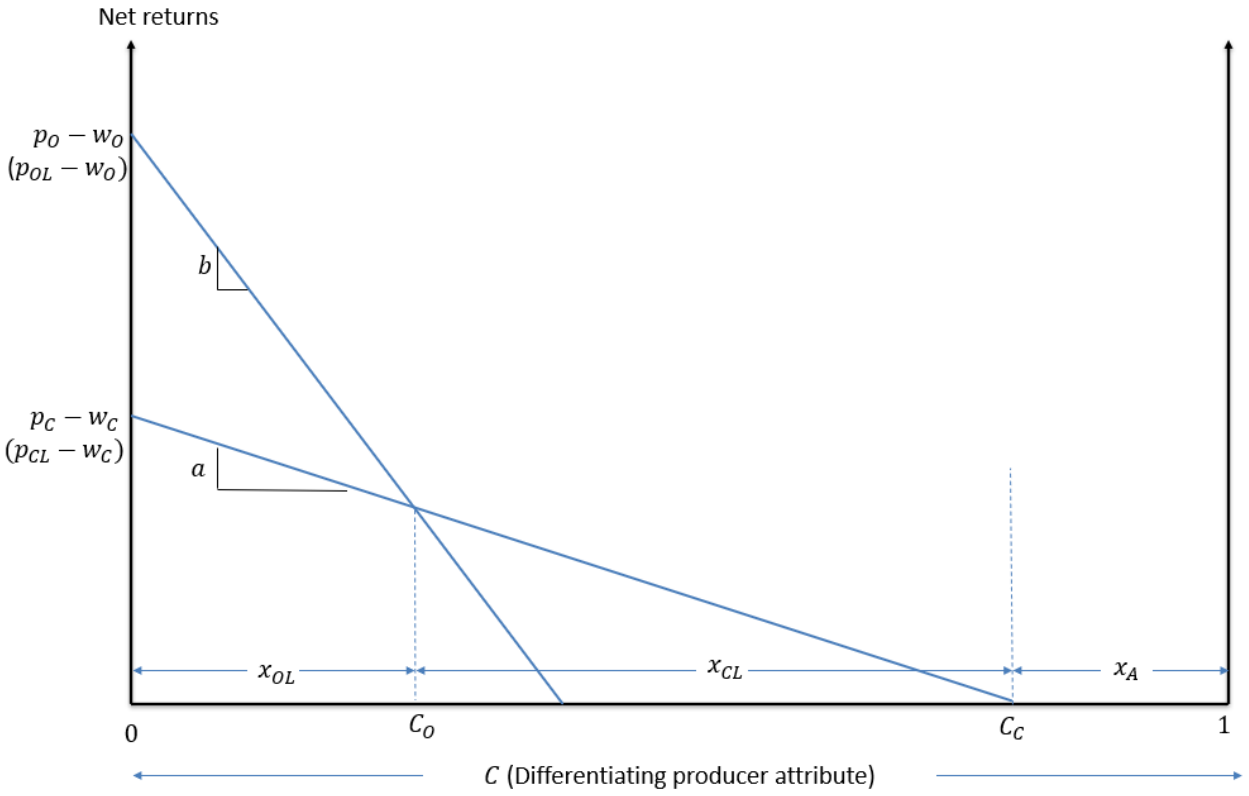

Figure 9: Net returns of local producers of a small exporting locality, before and after the 'Buy Local' trend

The above figure shows that, as the prices for conventional and organic products remain unchanged in the case of a small exporting locality, the net returns function remains unaltered, that is $NR_{OL} = NR_O$ and $NR_{CL} = NR_C$. As a result, the local producer welfare is not affected by the 'Buy Local' trend, i.e.,

$$\Delta W_C^S = \int_{C_O}^{C_C} (NR_{CL} - NR_C) dC = 0$$

$$\Delta W_O^S = \int_0^{C_O} (NR_{OL} - NR_O) dC = 0$$

Producer surplus, defined as the benefit obtained by the producer for producing one good over the next best alternative, can be derived as the area above the supply curve and below the price. Figures 7 and 8 show that the producer surplus also remains unaffected by the trend in a small exporting locality, as the prices and supplies of these products do not change.

Result 1: The 'Buy Local' trend in a small exporting locality increases consumer welfare, while leaving the welfare of local producers unaffected. The greater is the consumer valuation of locally produced food products, the greater are the welfare gains of consumers of conventional and organic products in the locality. Consumers of conventional product before and after the trend gain more than those who switch to the conventional product due to the trend, while the greatest beneficiaries of the 'Buy Local' trend are the organic product consumers who value quality (and the local attribute) the most.

Case II: Large Exporting Locality

As shown in the previous section, the increased consumer valuation of local products increases the local demand for the local-conventional product and reduces the quantity exported by the locality. If the locality is large enough, the reduction in exports would cause a fall in regional supply and an increase in the regional price of the product ($p_C^{R\prime} > p_C^R$). In this case, the producers of conventional product in the locality will receive a higher price. Regarding the organic product market, contrary to the small exporting locality case where the demand for local organic did not change due to the trend, when the locality is large enough to affect the regional price for conventional product, the higher price of local conventional product will induce some consumers to switch to the organic product. The increased demand for organic product in the local market will reduce exports and increase the regional price of the organic product ($p_O^{R\prime} > p_O^R$) when the locality is a large exporter of this product. Therefore, the market prices of local products in the large exporting locality will be higher than those before the trend for both the conventional and organic products (and higher than the market prices in the small exporting locality).

In addition to affecting the welfare of consumers and producers in the locality, the increase in the regional prices of conventional and organic products that takes place in the case of a large exporting locality, will also have an effect on the consumers and producers of those products located outside the locality (but still in the relevant regional market). In particular, outside consumers will lose and outside producers will gain from the increased prices resulting from reduced exports by the large exporting locality in the presence of the 'Buy Local' trend.

Figure 10 graphs the impact of the 'Buy Local' trend on the decisions and welfare of consumers in a large exporting locality.

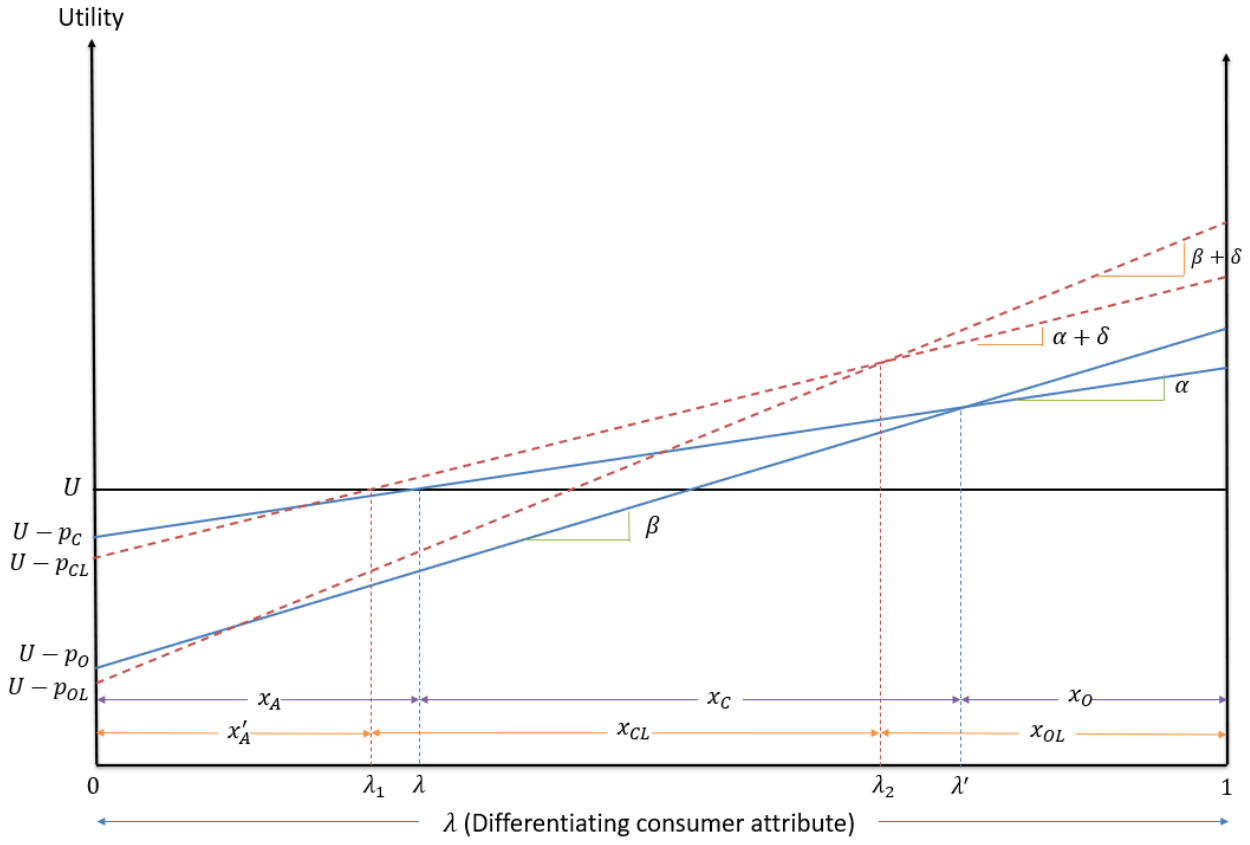

Figure 10: Consumer utilities from conventional and organic products before and after the 'Buy Local' trend in a large exporting locality

The consumer demands for conventional and organic products under the 'Buy Local' trend are given by:

$$x_{CL} = \lambda_2 - \lambda_1 = \frac{p_{OL} - p_{CL}}{\beta - \alpha} - \frac{p_{CL}}{\alpha + \delta} = \frac{(\alpha + \delta)p_{OL} - (\beta + \delta)p_{CL}}{(\alpha + \delta)(\beta - \alpha)}$$

$$x_{OL} = 1 - \lambda_2 = 1 - \frac{p_{OL} - p_{CL}}{\beta - \alpha} = \frac{\beta - \alpha + p_{CL} - p_{OL}}{\beta - \alpha}$$

The inverse demand functions are then:

$$p_{CL} = \frac{\alpha + \delta}{\beta + \delta} p_{OL} - \frac{(\alpha + \delta)(\beta - \alpha)}{\beta + \delta} x_{CL} \qquad \ldots (7)$$

$$p_{OL} = \beta - \alpha + p_{CL} - (\beta - \alpha)x_{OL} \qquad \ldots(8)$$

where $p_{OL} = p_O^{R\prime} > p_O^R = p_O$ and $p_{CL} = p_C^{R\prime} > p_C^R = p_C$.

The change in welfare for the consumers of the conventional product due to the trend is given by:

$$\Delta W_C^D = \int_{\lambda_1}^{\lambda} (U_{CL} - U_A)d\lambda + \int_{\lambda}^{\lambda_2} (U_{CL} - U_C)d\lambda$$

$$= \frac{1}{2}(\alpha + \delta)(x_A - x_A')^2 + (\alpha + \delta)(x_A - x_A')[x_{CL} - (x_A - x_A')]$$

$$+ \frac{1}{2}(\alpha + \delta)\left(x_{CL} - (x_A - x_A')\right)^2 - \frac{1}{2}\alpha[x_{CL} - (x_A - x_A')]^2$$

$$= \frac{1}{2}(\alpha + \delta)(x_A - x_A')^2 + (\alpha + \delta)(x_A - x_A')[x_{CL} - (x_A - x_A')]$$

$$+ \frac{1}{2}\delta[x_{CL} - (x_A - x_A')]^2$$

$$= (\alpha + \delta)(x_A - x_A')\left[\frac{2x_{CL} - (x_A - x_A')}{2}\right] + \frac{1}{2}\delta[x_{CL} - (x_A - x_A')]^2$$

$$= (\alpha + \delta)\left(\frac{p_C}{\alpha} - \frac{p_{CL}}{\alpha + \delta}\right)\left\{\frac{2\left[\frac{(\alpha + \delta)p_{OL} - (\beta + \delta)p_{CL}}{(\beta - \alpha)(\alpha + \delta)}\right] - \left(\frac{p_C}{\alpha} - \frac{p_{CL}}{\alpha + \delta}\right)}{2}\right\}$$

$$+ \frac{1}{2}\delta\left[\frac{(\alpha + \delta)p_{OL} - (\beta + \delta)p_{CL}}{(\beta - \alpha)(\alpha + \delta)} - \left(\frac{p_C}{\alpha} - \frac{p_{CL}}{\alpha + \delta}\right)\right]^2$$

As $(\alpha + \delta)(x_A - x_A')[x_{CL} - (x_A - x_A')] + \frac{1}{2}\delta[x_{CL} - (x_A - x_A')]^2 > \frac{1}{2}(\alpha + \delta)(x_A - x_A')^2$, it follows that the welfare gain is greater for the consumers who consume conventional product before and after the trend relative to those who switch from the alternative to the conventional product due to the trend (see Figure 10). This result is similar to the one in the case of a small

exporting region. While the overall welfare change for the consumers of conventional product in this case is positive, it is lower than that in the small exporting locality due to the increased prices faced by the consumers of the large exporting locality.

Regarding the change in the welfare of the consumers of the organic product, it is given by

$$\Delta W_O^D = \int_{\lambda_2}^{\lambda'} (U_{OL} - U_C)d\lambda + \int_{\lambda'}^{1} (U_{OL} - U_O)d\lambda$$

$$= \frac{1}{2}(\beta+\delta)\left\{\left[\frac{(\beta+\delta)(p_O - p_C) - (\beta-\alpha)p_{OL}}{(\beta+\delta)(\beta-\alpha)}\right]^2 \right.$$

$$\left. - \left[\frac{(\alpha+\delta)p_{OL} - (\beta+\delta)p_{CL}}{(\beta+\delta)(\beta-\alpha)}\right]^2\right\} - \frac{1}{2}\alpha\{x_C^2 - [x_C - (x_{OL} - x_O)]^2\}$$

$$+ \frac{1}{2}(\beta+\delta)\left\{\left(\frac{\beta+\delta-p_{OL}}{\beta+\delta}\right)^2 - \left[\frac{(\beta+\delta)(p_O - p_C) - (\beta-\alpha)p_{OL}}{(\beta+\delta)(\beta-\alpha)}\right]^2\right\}$$

$$- \frac{1}{2}\beta\left\{\left(\frac{\beta-p_O}{\beta}\right)^2 - \left[\frac{\alpha p_O - \beta p_C}{\beta(\beta-\alpha)}\right]^2\right\}$$

$$= \frac{1}{2}(\beta+\delta)\left\{\left[\frac{(\beta+\delta)(p_O - p_C) - (\beta-\alpha)p_{OL}}{(\beta+\delta)(\beta-\alpha)}\right]^2 \right.$$

$$\left. - \left[\frac{(\alpha+\delta)p_{OL} - (\beta+\delta)p_{CL}}{(\beta+\delta)(\beta-\alpha)}\right]^2\right\}$$

$$- \frac{1}{2}\alpha\left\{\left[\frac{\alpha p_O - \beta p_C}{\alpha(\beta-\alpha)}\right]^2 \right.$$

$$\left. - \left[\frac{\alpha p_O - \beta p_C}{\alpha(\beta-\alpha)} - \left(\frac{\beta-\alpha+p_{CL}-p_{OL}}{\beta-\alpha} - \frac{\beta-\alpha+p_C-p_O}{\beta-\alpha}\right)\right]^2\right\}$$

$$+ \frac{1}{2}(\beta+\delta)\left\{\left(\frac{\beta+\delta-p_{OL}}{\beta+\delta}\right)^2 - \left[\frac{(\beta+\delta)(p_O - p_C) - (\beta-\alpha)p_{OL}}{(\beta+\delta)(\beta-\alpha)}\right]^2\right\}$$

$$- \frac{1}{2}\beta\left\{\left(\frac{\beta-p_O}{\beta}\right)^2 - \left[\frac{\alpha p_O - \beta p_C}{\beta(\beta-\alpha)}\right]^2\right\}$$

From Figure 10 we see that the consumers who switch from the conventional to the organic product due to the trend experience a lower gain compared to the consumers who consume the organic product before and after the trend. The trend is welfare increasing for the consumers of organic

product in the locality, although the welfare gain is smaller than that in the small exporting locality as consumers are paying a higher price.

While the increased prices reduce the consumer welfare gains from the trend, they result in welfare gains for the producers of the conventional and organic products in the large exporting locality. Figure 11 depicts the impact of the trend on producer decisions and welfare in the net returns space.

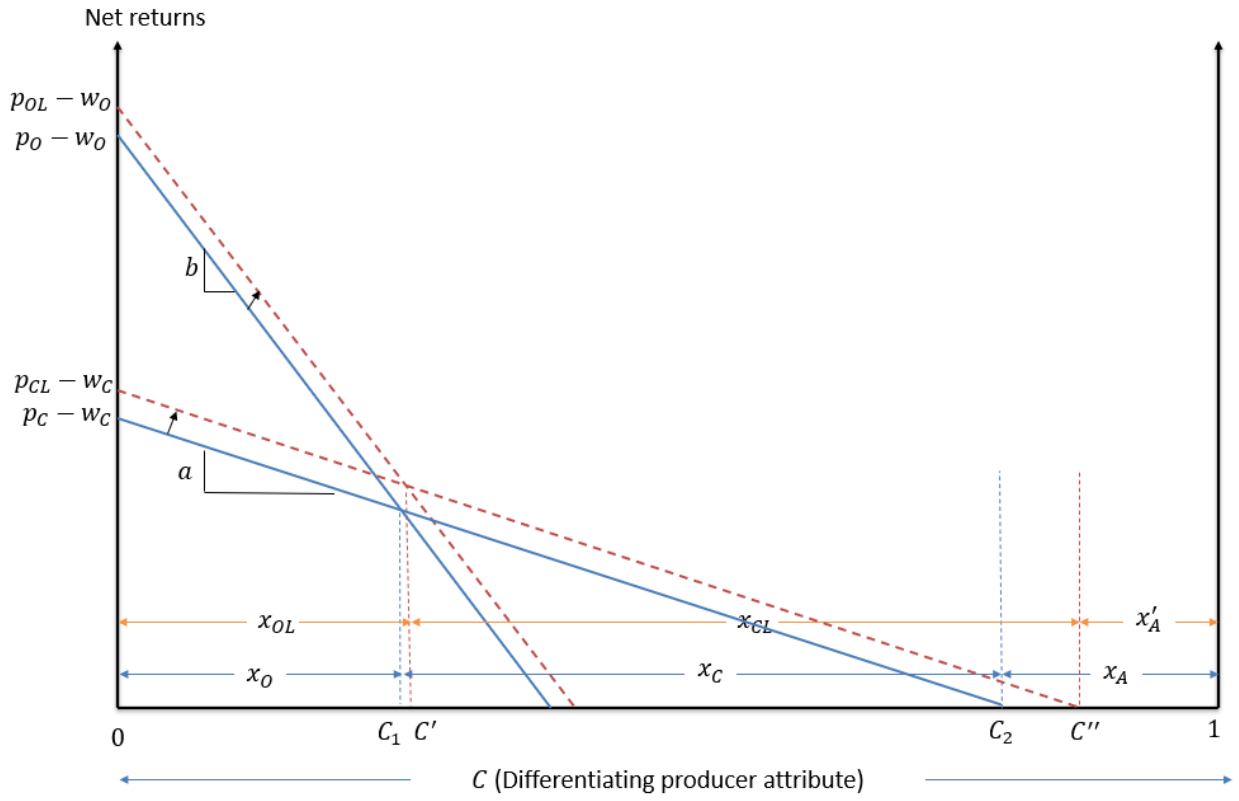

Figure 11: Net returns of local producers of a large exporting locality, before and after the 'Buy Local' trend

If the increase in the price of conventional product is higher (lower) than the increase in the price of the organic product, producers of organic (conventional) with a lower (higher) cost efficiency switch to conventional (organic) product. Figure 11 graphs the case where $x_{OL} > x_O$.

The increased regional prices of conventional and organic products in the case of a large exporting locality cause an upward parallel shift of the net returns curves associated with the production of these products and producer welfare gains given by:

$$\Delta W_C^S = \int_{C_1}^{C_2} (NR_{CL} - NR_C)dC + \int_{C_2}^{C''} (NR_{CL} - NR_A)dC$$

$$= \left[\frac{1}{2}ax_{CL}^2 - \frac{1}{2}a(x_A - x_A')^2\right] - \frac{1}{2}a[x_{CL} - (x_A - x_A')]^2 + \frac{1}{2}a(x_A - x_A')^2 - 0$$

$$= \frac{1}{2}a[x_{CL} + (x_A - x_A')][x_{CL} - (x_A - x_A')] - \frac{1}{2}a[x_{CL} - (x_A - x_A')]^2$$

$$+ \frac{1}{2}a(x_A - x_A')^2$$

$$= \frac{1}{2}a[x_{CL} - (x_A - x_A')][x_{CL} + (x_A - x_A') - x_{CL} + (x_A - x_A')] + \frac{1}{2}a(x_A - x_A')^2$$

$$= a(x_A - x_A')[x_{CL} - (x_A - x_A')] + \frac{1}{2}a(x_A - x_A')^2 = a(x_A - x_A')\left(x_{CL} - \frac{x_A - x_A'}{2}\right)$$

$$= a\left(\frac{p_{CL} - p_C}{a}\right)\left[\frac{b(p_{CL} - w_C) - a(p_{OL} - w_O)}{a(b-a)} - \frac{p_{CL} - p_C}{2a}\right]$$

$$\Delta W_O^S = \int_0^{C_1} (NR_{OL} - NR_O)dC$$

$$= \left[(p_{OL} - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right] - \left[(p_O - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right]$$

$$= (p_{OL} - p_O)x_O$$

Since $x_{CL} - (x_A - x'_A) > (x_A - x'_A), \quad a(x_A - x'_A)[x_{CL} - (x_A - x'_A)] > \frac{1}{2}a(x_A - x'_A)^2,$ which implies that the producers producing conventional product before and after the trend gain more than those who switch from the alternative to the conventional product due to the trend. As both producer groups gain from the trend, $\Delta W_C^S > 0$. Unlike the small exporting locality case, the trend is welfare increasing for the producers of conventional product in a large exporting locality.

Regarding the changes in the welfare of producers of organic, as $p_{OL} > p_O$, ΔW_O^S is greater than zero, indicating that local producers of organic products also benefit from the 'Buy Local' trend in a large exporting locality.

Figures 12 and 13 depict the impacts of the 'Buy Local' trend on the markets for conventional and organic products, respectively, in the price-quantity space. Figure 12 shows that the quantity demanded and supplied of the conventional product increases in the locality, while the quantity exported by the locality falls from x_C^E to $x_C^{E'}$.

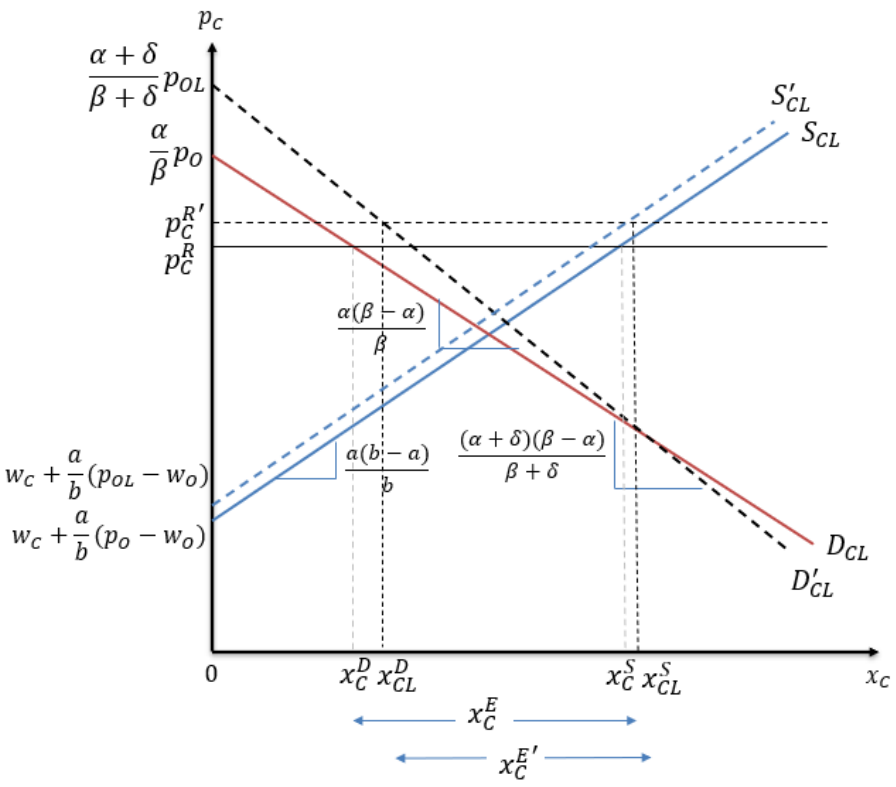

Figure 12: Impact of the 'Buy Local' trend on the market for the conventional product in a large exporting locality

As noted earlier, while the demand for organic product increases in the locality, its supply can increase or decrease. Figure 13 depicts the case where the equilibrium quantity of the organic product in the locality increases due to the trend and the increased local demand causes the exports to fall from x_O^E to $x_O^{E\prime}$.

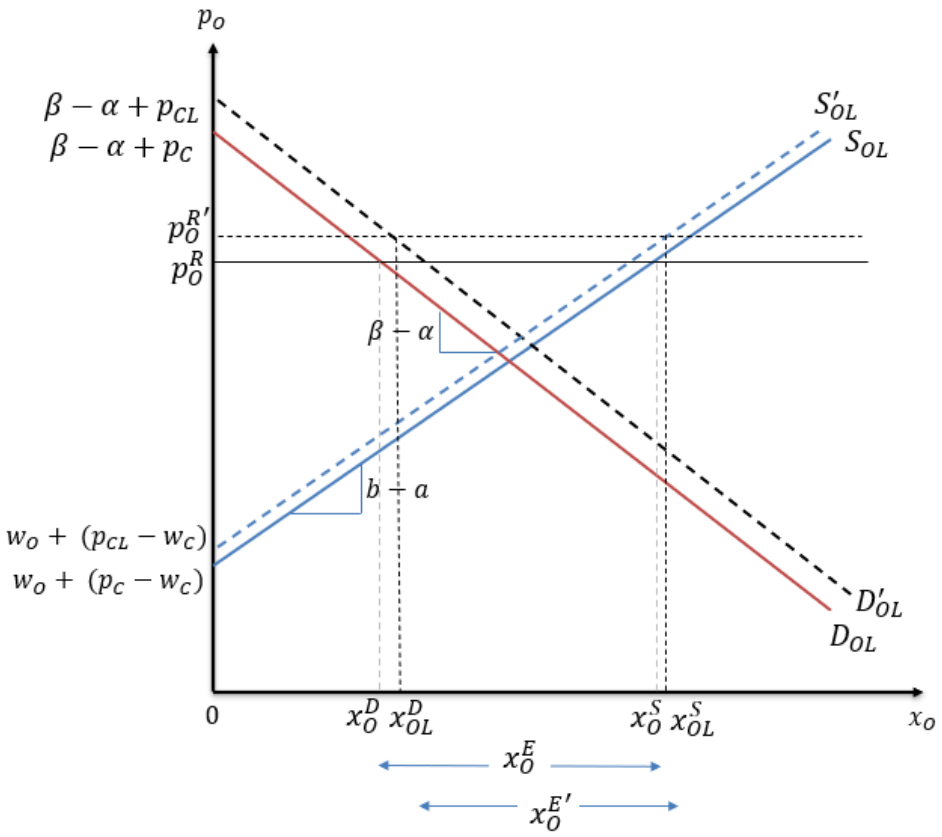

Figure 13: Impact of the 'Buy Local' trend on the market for the organic product in a large exporting locality

Before concluding this section, it is important to note that, in addition to affecting local consumers and producers, the change in the regional prices of the conventional and organic products caused by the 'Buy Local' trend in a large exporting locality also impacts the consumers and producers of these products that are located outside the locality but within the affected region. In particular, the increased prices benefit producers while hurting the consumers of conventional and organic products affected by the 'Buy Local' trend in a large exporting locality.

Result 2: The 'Buy Local' trend in a large exporting locality results in welfare gains for consumers of conventional product in the locality and these welfare gains increase with the strength of the consumer preference for quality. The welfare gains are greater for the consumers who consume conventional product before and after trend relative to those who switch to conventional product due to the trend. Similarly, the trend is welfare increasing for the consumers of organic product with the consumers who consume organic before and after the trend gaining more than those who switch from conventional to organic product. Ceteris paribus, the consumers of organic gain more than the consumers of conventional product as the former have a stronger preference for quality and locally produced goods. The gains in consumer welfare in the case of a large exporting locality are lower than those in a small exporting locality, due to the higher product prices that emerge. Regarding local producers of organic and conventional products, the analysis shows that producers who produce conventional product before and after the trend gain more compared to the producers who switch from alternative product to conventional due to the trend. The trend is welfare increasing for both conventional and organic producers in the locality, and, while the gains are different between the producers of conventional and organic products, they are the same within each group. Consumers and producers of conventional and organic products outside the locality experience losses and gains in welfare, respectively, due to the higher product prices caused by reduced exports by the locality.

Case III: Small Importing Locality

Consider now the impact of the 'Buy Local' trend in a small importing locality. Similar to the exporting locality cases considered previously, with the introduction of the 'buy local' trend, locally produced products gain popularity and consumer valuation of these products increases. Unlike the exporting locality cases, however, consumers in the importing locality have the choice between local and non-local variations of a product (conventional and organic). If the importing locality is small, the increase in the consumer valuation for locally grown products will, by definition, not affect the regional demand for the products under consideration. Thus, the regional prices remain unaffected and are the prices for non-local/imported products in the locality. The utility function of the consumer with differentiating attribute λ in a small importing locality is given by:

$U_{CN} = U - p_{CN} + \alpha\lambda$	if a unit of non-local conventional product is consumed
$U_{CL} = U - p_{CL} + (\alpha + \delta)\lambda$	if a unit of local conventional product is consumed
$U_{ON} = U - p_{ON} + \beta\lambda$	if a unit of non-local organic product is consumed
$U_{OL} = U - p_{OL} + (\beta + \delta)\lambda$	if a unit of local organic product is consumed
$U_A = U$	if a unit of alternative product is consumed

While consumers value the local-conventional products higher than before the trend, their valuation of these products may or may not be higher than their valuation of 'organic'. Bond, Thilmany and Keeling Bond (2008a) show that consumers desire attributes like pesticide-free ('Organic') over attributes like familiarity ('Local'), whereas Onozaka and McFadden (2011), studying consumer valuations for different sustainable product claims (like local, organic, low

carbon footprint, fair trade etc.) show that local is the most highly valued attribute. Throughout the analysis we assume $(\alpha + \delta)$ to be smaller than β. If $(\alpha + \delta) \geq \beta$ and $p_{CL} < p_{ON}$, then the non-local organic products will be driven out of the market.

Figure 14 graphs the utilities associated with the consumption of the different local and non-local products when these products coexist in the small importing locality.

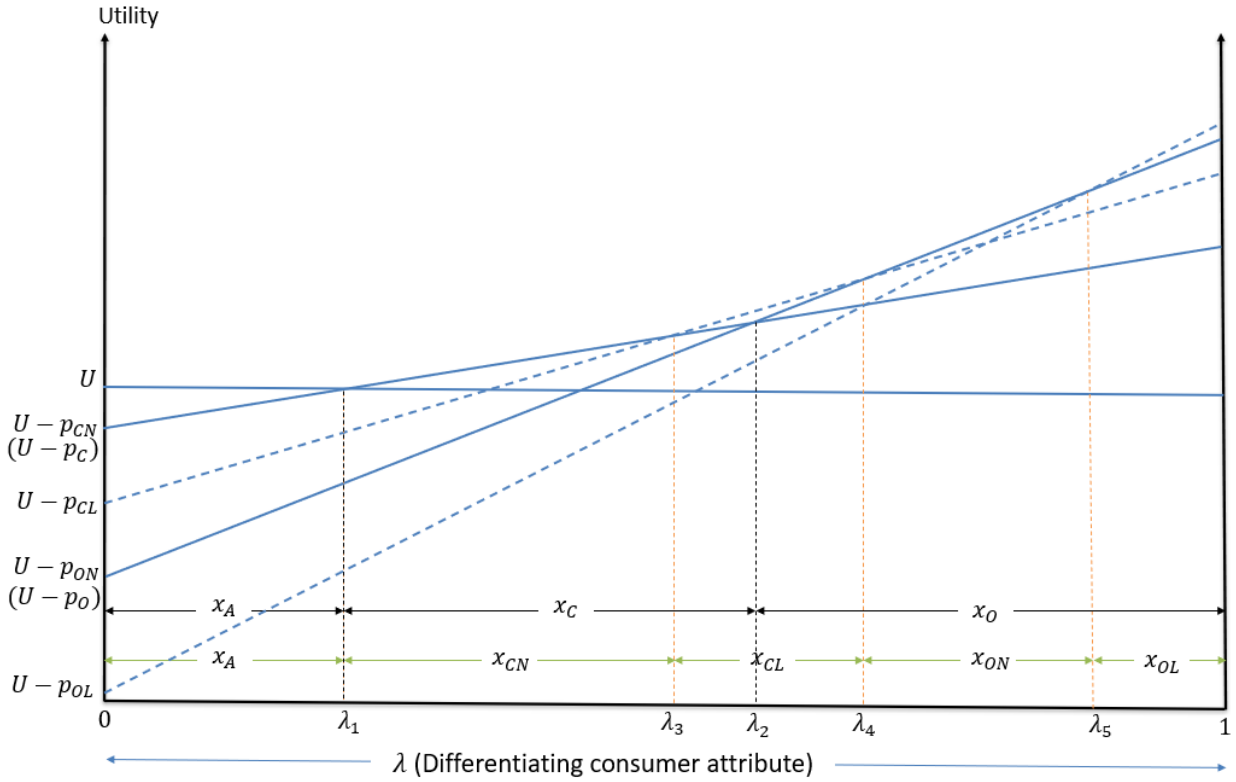

Figure 14: Consumer utility from local and no-local conventional, organic and alternative products, in a small importing locality

The parameters $\lambda_1, \lambda_3, \lambda_4$ and λ_5 are differentiating attributes of the consumers who are indifferent between consuming alternative and non-local conventional, non-local conventional and local conventional, local conventional and non-local organic, and non-local organic and local organic, respectively, where:

$$\lambda_1 = \frac{p_{CN}}{\alpha}$$

$$\lambda_3 = \frac{p_{CL} - p_{CN}}{\delta}$$

$$\lambda_4 = \frac{p_{ON} - p_{CL}}{\beta - \alpha - \delta}$$

$$\lambda_5 = \frac{p_{OL} - p_{ON}}{\delta}$$

Using the above relationships, we can derive the market shares of, and consumer demands for the different products as follows:

$$x_{CN} = \lambda_3 - \lambda_1 = \frac{\alpha p_{CL} - (\alpha + \delta) p_{CN}}{\alpha\delta}$$

$$x_{CL} = \lambda_4 - \lambda_3 = \frac{\delta p_{ON} + (\beta - \alpha - \delta) p_{CN} - (\beta - \alpha) p_{CL}}{\delta(\beta - \alpha - \delta)}$$

$$x_{ON} = \lambda_5 - \lambda_4 = \frac{(\beta - \alpha - \delta) p_{OL} + \delta p_{CL} - (\beta - \alpha) p_{ON}}{\delta(\beta - \alpha - \delta)}$$

$$x_{OL} = 1 - \lambda_5 = \frac{\delta + p_{ON} - p_{OL}}{\delta}$$

The inverse demand functions for local and non-local conventional and organic products are, then:

$$p_{CN} = \frac{\alpha}{\alpha + \delta} p_{CL} - \frac{\alpha\delta}{\alpha + \delta} x_{CN} \qquad \ldots (9)$$

$$p_{CL} = \frac{\delta}{\beta - \alpha} p_{ON} + \frac{\beta - \alpha - \delta}{\beta - \alpha} p_{CN} - \frac{\delta(\beta - \alpha - \delta)}{\beta - \alpha} x_{CL} \qquad \ldots (10)$$

$$p_{ON} = \frac{\beta - \alpha - \delta}{\beta - \alpha} p_{OL} + \frac{\delta}{\beta - \alpha} p_{CL} - \frac{\delta(\beta - \alpha - \delta)}{\beta - \alpha} x_{ON} \quad \ldots (11)$$

$$p_{OL} = \delta + p_{ON} - \delta x_{OL} \quad \ldots (12)$$

Figure 14 also shows that the total (local and non-local) demand for conventional products increases whereas the total demand for organic products falls due to the trend, as consumers with $\lambda \in (\lambda_2, \lambda_4]$ find it optimal to switch from organic to local-conventional product.

Figure 15 depicts the total demand for conventional products after the trend (D_C^T) along with the demand for conventional product before the trend (D_C). Figure 15 also graphs the demand for local-conventional product (D_{CL}) to illustrate how the 'Buy Local' trend impacts the equilibrium price in the locality. Apparently, the total demand for conventional product in the presence of the trend is the sum of the demand for local and non-local conventional products, i.e., $D_C^T = D_{CL} + D_{CN}$.

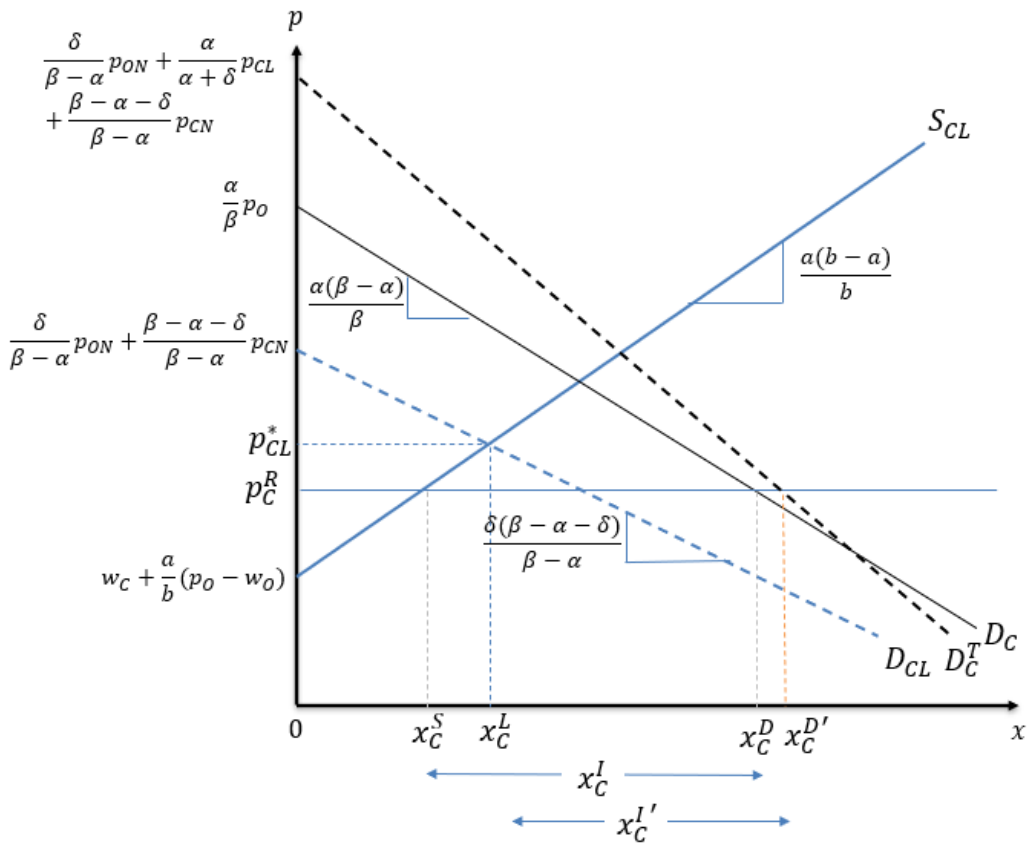

Figure 15: Changes in the equilibrium conditions for local and non-local conventional products due to the 'Buy Local' trend in a small importing locality

As shown in Figure 15, the total quantity demanded of conventional product increases from x_C^D to $x_C^{D'}$, with x_C^L being the equilibrium quantity of the locally-grown conventional product, which is higher than before the trend (x_C^S). The demand for local conventional product (D_{CL}) along with the local supply determine the price of the local conventional product (p_{CL}^*), which exceeds the price of its non-local/imported counterparts (p_C^R).

On the other hand, the total quantity demanded of organic product falls from x_O^D to $x_O^{D'}$ due to the trend, even though the quantity of local-organic product in the locality increases from x_O^S to

x_O^L (see Figure 16 below). As noted earlier, the total demand for organic falls after the trend, as some organic consumers with weaker preference for quality switch to the consumption of local-conventional product. The total demand for organic after the trend is denoted by D_O^T, which is the sum of demand for local and non-local organic, while the demand for organic product before the trend is D_O. The demand for local-organic product (D_{OL}) along with the local supply determine the price of the local-organic product (p_{OL}^*), which exceeds the price of its non-local/imported counterparts.

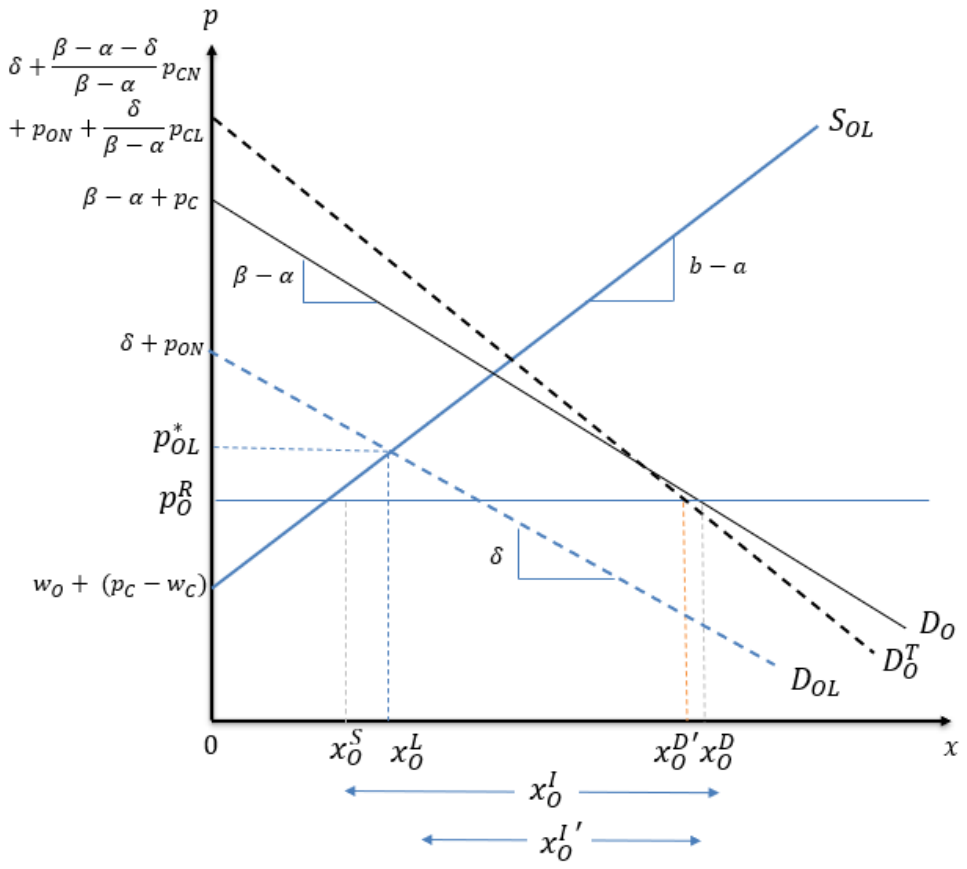

Figure 16: Changes in the equilibrium conditions for local and non-local organic products due to the 'Buy Local' trend in a small importing locality

Overall, the increased consumer valuation for local products (captured by δ) increases the demand for these products and reduces the demand for their non-local counterparts. As a result, the quantity imported of conventional and organic products drops from x_C^I to $x_C^{I\prime}$ and x_O^I to $x_O^{I\prime}$, respectively, whereas the consumption of local conventional and organic products increases from x_C^S to x_C^L and x_O^S to x_O^L, respectively. Local producers enjoy higher prices, while non-local products are still receiving the (same) regional prices. The higher is the value of δ, the higher is the demand for local, the higher is the price earned by the producers in the locality, and the lower the market share of 'imported' products.

To determine whether the trend is welfare increasing or not for the consumers of the locality, we compare the consumer welfare before and after the trend. The change in consumer welfare for the consumers of local and non-local products in the locality can be derived from the utility space in Figure 14. Under this scenario, the welfare of the consumers who consume non-local products after the trend does not change, as the prices of these products are not affected by the 'Buy Local' trend in the small importing locality, i.e.,

$$\Delta W_{CN}^D = \int_{\lambda_1}^{\lambda_3} (U_{CN} - U_C) d\lambda = 0$$

$$\Delta W_{ON}^D = \int_{\lambda_4}^{\lambda_5} (U_{ON} - U_O) d\lambda = 0$$

The welfare change of the consumers of local-conventional product in the small importing locality is given by:

$$\Delta W_{CL}^{D} = \int_{\lambda_3}^{\lambda_2} (U_{CL} - U_C) d\lambda + \int_{\lambda_2}^{\lambda_4} (U_{CL} - U_O) d\lambda$$

$$= \left\{ \frac{1}{2}(\alpha+\delta) \left[\frac{(\alpha+\delta)(p_{ON} - p_{CN}) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)} \right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta) \left[\frac{\alpha p_{CL} - (\alpha+\delta)p_{CN}}{\delta(\alpha+\delta)} \right]^2 \right\} - \left(\frac{1}{2}\alpha x_C^2 - \frac{1}{2}\alpha x_{CN}^2 \right)$$

$$+ \left\{ \frac{1}{2}(\alpha+\delta) \left[\frac{(\alpha+\delta)p_{ON} - \beta p_{CL}}{\delta(\alpha+\delta)} \right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta) \left[\frac{(\alpha+\delta)(p_{OL} - p_{ON}) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)} \right]^2 \right\}$$

$$- \left\{ \frac{1}{2}\beta \left[\frac{(\alpha+\delta)p_{ON} - \beta p_{CL}}{\beta(\beta-\alpha-\delta)} \right]^2 - \frac{1}{2}\beta \left[\frac{\alpha p_{ON} - (\beta-\alpha)p_{CN}}{\beta(\beta-\alpha)} \right]^2 \right\}$$

$$= \left\{ \frac{1}{2}(\alpha+\delta) \left[\frac{(\alpha+\delta)(p_{ON} - p_{CN}) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)} \right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta) \left[\frac{\alpha p_{CL} - (\alpha+\delta)p_{CN}}{\delta(\alpha+\delta)} \right]^2 - \frac{1}{2}\alpha \left[\frac{\alpha p_O - \beta p_C}{\alpha(\beta-\alpha)} \right]^2 \right.$$

$$\left. + \frac{1}{2}\alpha \left[\frac{\alpha p_{CL} - (\alpha+\delta)p_{CN}}{\alpha\delta} \right]^2 \right\}$$

$$+ \left\{ \frac{1}{2}(\alpha+\delta) \left[\frac{(\alpha+\delta)p_{ON} - \beta p_{CL}}{\delta(\alpha+\delta)} \right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta) \left[\frac{(\alpha+\delta)(p_{OL} - p_{ON}) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)} \right]^2 - \frac{1}{2}\beta \left[\frac{(\alpha+\delta)p_{ON} - \beta p_{CL}}{\beta(\beta-\alpha-\delta)} \right]^2 \right.$$

$$\left. + \frac{1}{2}\beta \left[\frac{\alpha p_{ON} - (\beta-\alpha)p_{CN}}{\beta(\beta-\alpha)} \right]^2 \right\}$$

$$= \frac{1}{2}\alpha \left[\frac{\alpha p_{CL} - (\alpha+\delta)p_{CN}}{\alpha\delta} \right]^2 - \frac{1}{2}(\alpha+\delta) \left[\frac{\alpha p_{CL} - (\alpha+\delta)p_{CN}}{\delta(\alpha+\delta)} \right]^2$$

$$+\frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)p_{ON}-\beta p_{CL}}{\delta(\alpha+\delta)}\right]^2-\frac{1}{2}\beta\left[\frac{(\alpha+\delta)p_{ON}-\beta p_{CL}}{\beta(\beta-\alpha-\delta)}\right]^2$$

$$+\frac{1}{2}\beta\left[\frac{\alpha p_{ON}-(\beta-\alpha)p_{CN}}{\beta(\beta-\alpha)}\right]^2-\frac{1}{2}\alpha\left[\frac{\alpha p_O-\beta p_C}{\alpha(\beta-\alpha)}\right]^2-\frac{1}{2}\beta\left[\frac{(\alpha+\delta)p_{ON}-\beta p_{CL}}{\beta(\beta-\alpha-\delta)}\right]^2$$

The higher is the consumer valuation of local products (δ) and/or the lower the price of local-conventional products, the greater the welfare gains of the consumers of these products. Consumers of conventional who consume local-conventional product after the trend gain and so do the consumers who switch from organic to local-conventional product, with these welfare gains increasing with the consumer preference for quality (λ) for the first group and falling with λ for the second group (see Figure 14).

Regarding the consumers of local-organic products, the change in their welfare is given by:

$$\Delta W_{OL}^{D} = \int_{\lambda_5}^{1} U_{OL} d\lambda - \int_{\lambda_5}^{1} U_{O} d\lambda$$

$$= \left\{ \frac{1}{2}(\beta+\delta)\left(\frac{\beta+\delta-p_{OL}}{\beta+\delta}\right)^2 - \frac{1}{2}(\beta+\delta)\left[\frac{\beta p_{OL}-(\beta+\delta)p_{ON}}{\delta(\beta+\delta)}\right]^2 \right\}$$

$$- \left\{ \frac{1}{2}\beta\left(\frac{\beta-p_{O}}{\beta}\right)^2 - \frac{1}{2}\beta\left[\frac{\beta p_{OL}-(\beta+\delta)p_{O}}{\beta\delta}\right]^2 \right\}$$

$$= \frac{1}{2}(\beta+\delta)\left(\frac{\beta+\delta-p_{OL}}{\beta+\delta}\right)^2 - \frac{1}{2}\beta\left(\frac{\beta-p_{O}}{\beta}\right)^2 + \frac{1}{2}\beta\left[\frac{\beta p_{OL}-(\beta+\delta)p_{O}}{\beta\delta}\right]^2$$

$$- \frac{1}{2}(\beta+\delta)\left[\frac{\beta p_{OL}-(\beta+\delta)p_{ON}}{\delta(\beta+\delta)}\right]^2$$

$$= \frac{1}{2}\frac{(\beta+\delta-p_{OL})^2}{\beta+\delta} - \frac{1}{2}\frac{(\beta-p_{O})^2}{\beta} + \frac{1}{2}\frac{[\beta p_{OL}-(\beta+\delta)p_{O}]^2}{\beta\delta^2}$$

$$- \frac{1}{2}\frac{\beta p_{OL}-(\beta+\delta)p_{ON}}{(\beta+\delta)\delta^2}$$

The above expression indicates that the welfare gain of the consumers of local-organic products increases with the consumer valuation of local products and falls with the price of these products. While all consumers of local-organic products benefit from the trend, the impact of the trend on the welfare of these consumers is asymmetric; the stronger is the consumer preference for quality, the greater are the welfare gains from the trend.

Regarding the producers of the local products, as noted earlier, due to the 'Buy Local' trend, local producers see a higher price for their products. The higher price for local attracts previous producers of alternative products to the production of conventional product (see Figure 17).

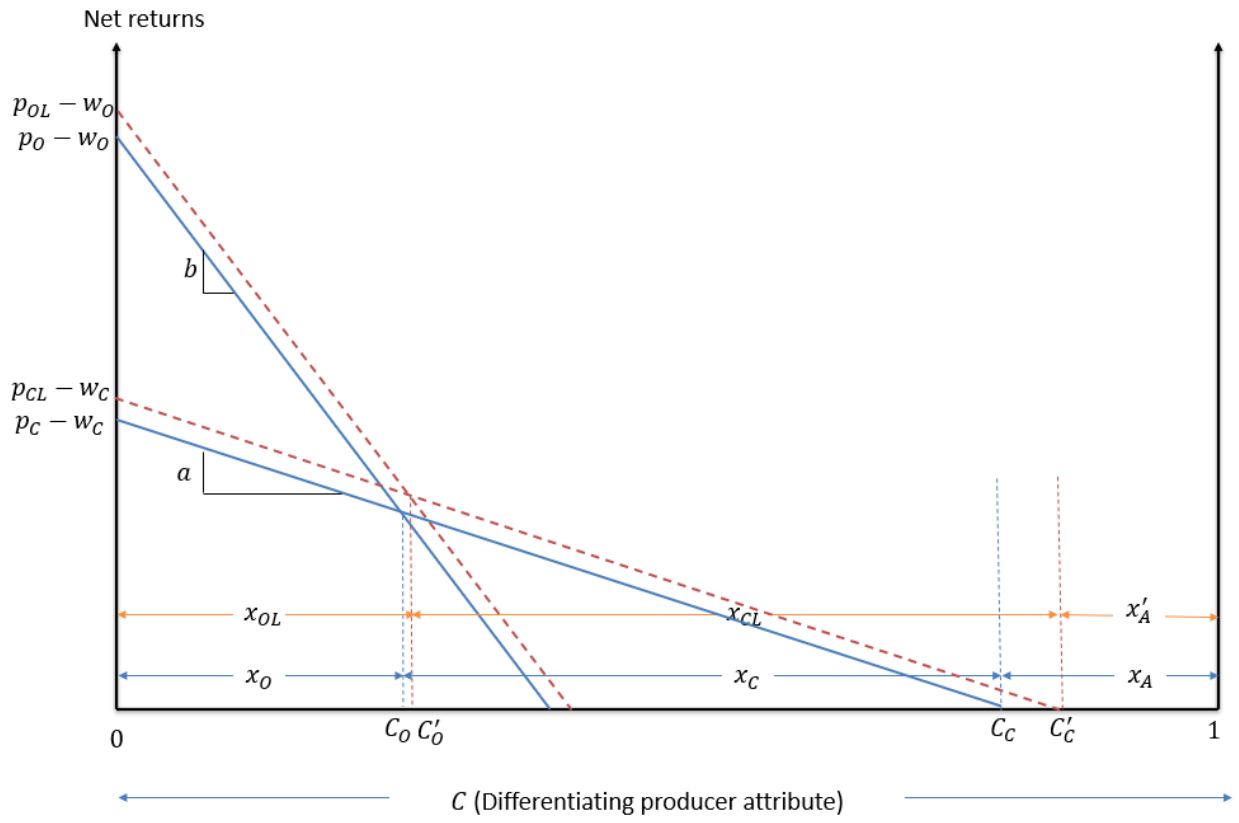

Figure 17: Net returns of local producers of a small importing locality, before and after the 'Buy Local' trend

In particular, local producers with differentiating attribute $C \in (C_C, C'_C]$ switch from alternative to conventional product to capture the price premium generated by the 'Buy Local' trend. The production share of the organic product in the small importing locality depends on the relative increase in the prices of the local organic and local conventional products. If the increase in the price of local organic product is higher (lower) than the increase in the price of local conventional

product, the production share of the organic product increases (falls) as a result of the trend. Figure 17 graphs the case in which $x_{OL} > x_O$.

The effect of the trend on the welfare of the local producers of conventional product can be expressed as (see Figure 17):

$$\Delta W_{CL}^{S} = \int_{C_O'}^{C_C} (NR_{CL} - NR_C)dC + \int_{C_C}^{C_C'} (NR_{CL} - NR_A)dC$$

$$= \frac{1}{2}ax_{CL}^2 - \frac{1}{2}a(x_A - x_A')^2 - \frac{1}{2}a[x_{CL} - (x_A - x_A')]^2 + \frac{1}{2}a(x_A - x_A')^2 - 0$$

$$= \frac{1}{2}ax_{CL}^2 - \frac{1}{2}a[x_{CL} - (x_A - x_A')]^2$$

$$= \frac{1}{2}a\left[\frac{b(p_{CL} - w_C) - a(p_{OL} - w_O)}{a(b-a)}\right]^2$$

$$- \frac{1}{2}a\left[\frac{a(p_{CL} - w_C) + (b-a)p_C - a(p_{OL} - w_O)}{a(b-a)}\right]^2$$

The trend is welfare increasing for the producers of local-conventional product as $\frac{1}{2}ax_{CL}^2 - \frac{1}{2}a(x_A - x_A')^2 - \frac{1}{2}a\left(x_{CL} - (x_A - x_A')\right)^2 > \frac{1}{2}a(x_A - x_A')^2$.

Regarding the local-organic producers, the change in their welfare is given by:

$$\Delta W_{OL}^{S} = \int_{0}^{C_O} (NR_{OL} - NR_O)dC + \int_{C_O}^{C_O'} (NR_{OL} - NR_C)dC$$

$$= \left[(p_{OL} - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right] - \left[(p_O - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right]$$

$$+ \left[(p_{OL} - w_O - ax_{OL})x_{OL} + \frac{1}{2}b{x_{OL}}^2\right] - \left[(p_{OL} - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right]$$

$$- \left\{\frac{1}{2}ax_C^2 - \frac{1}{2}a[x_C - (x_{OL} - x_O)]^2\right\}$$

$$= (p_{OL} - w_O - ax_{OL})x_{OL} - (p_O - w_O - ax_O)x_O + \frac{1}{2}b{x_{OL}}^2 - \frac{1}{2}bx_O^2$$

$$- \left\{\frac{1}{2}ax_C^2 - \frac{1}{2}a[x_C - (x_{OL} - x_O)]^2\right\}$$

$$= \left\{p_{OL} - w_O - a\left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a}\right]\right\}\left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a}\right]$$

$$- \left\{p_O - w_O - a\left[\frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]\right\}\left[\frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]$$

$$+ \frac{1}{2}b\left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a}\right]^2 - \frac{1}{2}b\left[\frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]^2$$

$$- \left\{\frac{1}{2}a\left[\frac{b(p_C - w_C) - a(p_O - w_O)}{a(b - a)}\right]^2\right.$$

$$- \frac{1}{2}a\left\{\frac{b(p_C - w_C) - a(p_O - w_O)}{a(b - a)}\right.$$

$$\left.\left.- \left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a} - \frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]\right\}^2\right\}$$

As $p_{OL} > p_O$, the trend is welfare increasing for organic producers in the locality, and the producers gain equally irrespective of their cost efficiency.

Result 3: In a small importing locality, the 'Buy Local' trend is welfare increasing for the consumers of local conventional and local organic products. The greater the consumer valuation of local products and/or the lower the prices of these products, the greater the welfare gains of the consumers of local. Among the consumers who consume conventional product before and after the trend, those with stronger preference for quality gain more, whereas, among the ones who switch from organic to local-conventional it is those with weaker preference for quality that gain more. The gains of the consumers of local-organic product are also asymmetric and increasing with the preference for quality. The trend is also welfare-increasing for the local producers of conventional and organic products, and the producers who switch from alternative to conventional product due to the trend. Producers who produce conventional product before and after the trend gain more compared to the producers who switch from alternative to local-conventional product. As the trend in a small importing locality does not affect the regional prices of conventional and organic products, the trend leaves the welfare of non-local consumers and producers unaffected.

Case IV: Large Importing Locality

As shown in the small importing locality case, the 'Buy Local' trend results in increased demand for local products and reduced imports of conventional and organic products to the locality. If the locality is a major/large importer of the products under consideration, a decrease in imports by the locality will reduce the regional demand and prices of the products from p_C^R and p_O^R to $p_C^{R''}$ and $p_O^{R''}$. As a result, consumers of non-local products are paying a lower price relative to the small importing locality case. The lower prices for non-local products result in greater market share of these products, and lower market share for local products relative to the small importing locality.

Figure 18 graphs the impact of the trend on the utility associated with the consumption of the different products in the large importing locality and shows that the total market share of conventional products increases, while the total market share of organic products falls due to the trend.

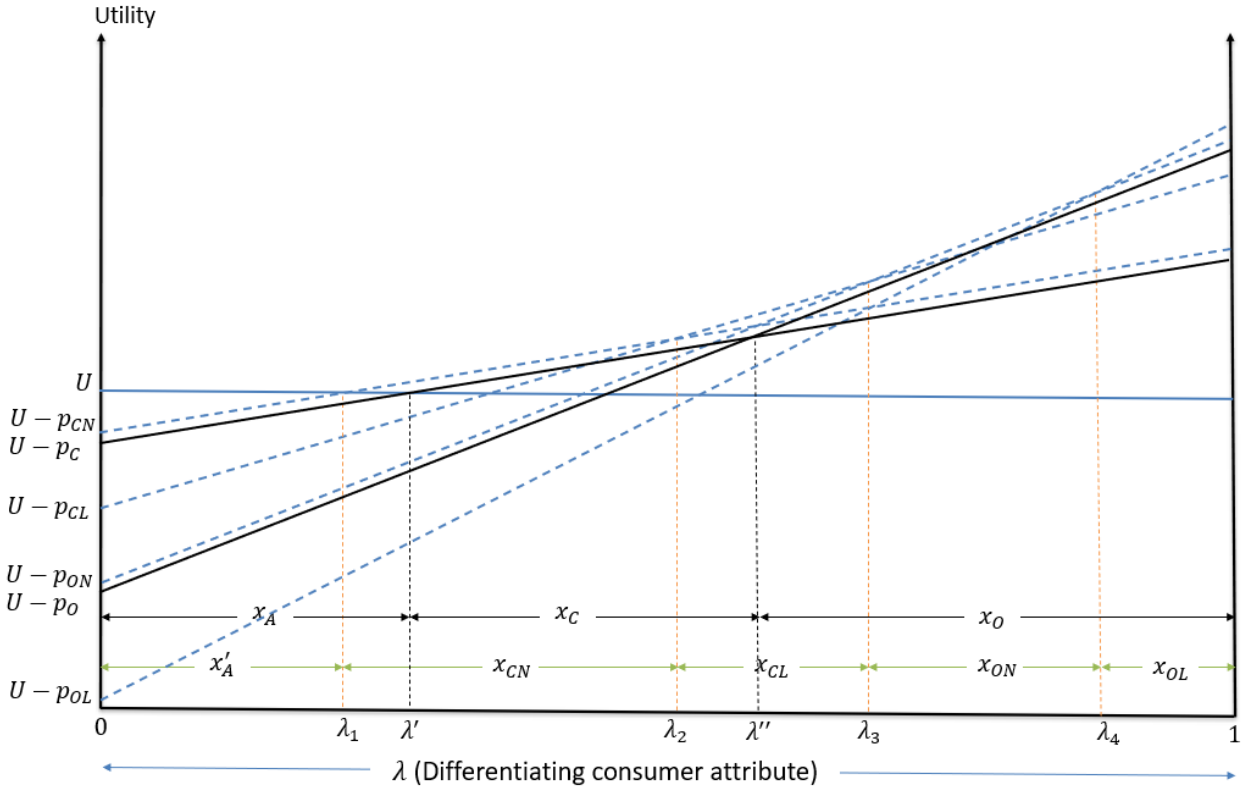

Figure 18: Consumer utility from conventional, organic and alternative products in a large importing locality before and after the 'Buy Local' trend

The demand functions for local and non-local conventional and organic products in a large importing locality are given by

$$p_{CN} = \frac{\alpha}{\alpha + \delta} p_{CL} - \frac{\alpha\delta}{\alpha + \delta} x_{CN}$$

$$p_{CL} = \frac{\delta}{\beta - \alpha} p_{ON} + \frac{\beta - \alpha - \delta}{\beta - \alpha} p_{CN} - \frac{\delta(\beta - \alpha - \delta)}{\beta - \alpha} x_{CL}$$

$$p_{ON} = \frac{\beta - \alpha - \delta}{\beta - \alpha} p_{OL} + \frac{\delta}{\beta - \alpha} p_{CL} - \frac{\delta(\beta - \alpha - \delta)}{\beta - \alpha} x_{ON}$$

$$p_{OL} = \delta + p_{ON} - \delta x_{OL}$$

where $p_{CN} = p_C^{R''}$ and $p_{ON} = p_O^{R''}$, which are lower than the prices of non-local products in a small importing locality.

Figure 19 graphs the equilibrium conditions in the market for conventional product in a large importing locality with D'_{CL} and D''_{CL} representing the demand for local-conventional product in the small and large importing locality, respectively. Figure 19 shows that the local-conventional product receives a higher price and its non-local counterpart receives a lower price under the trend. The equilibrium quantity of both local ($x_C^{L''}$) and non-local ($x_C^{D''} - x_C^{L''}$) conventional product in the locality is greater than before the trend (compared to x_C^S and $x_C^D - x_C^S$, respectively). The lower price of non-local conventional product in the large importing locality reduces the demand for local conventional product and, thus, reduces the price (p_{CL}^{**}) and equilibrium quantity($x_C^{L''}$) of local conventional product relative to the small importing locality. The lower the price of non-local conventional products, the higher is their demand and imports ($x_C^{I''}$) in the large importing locality.

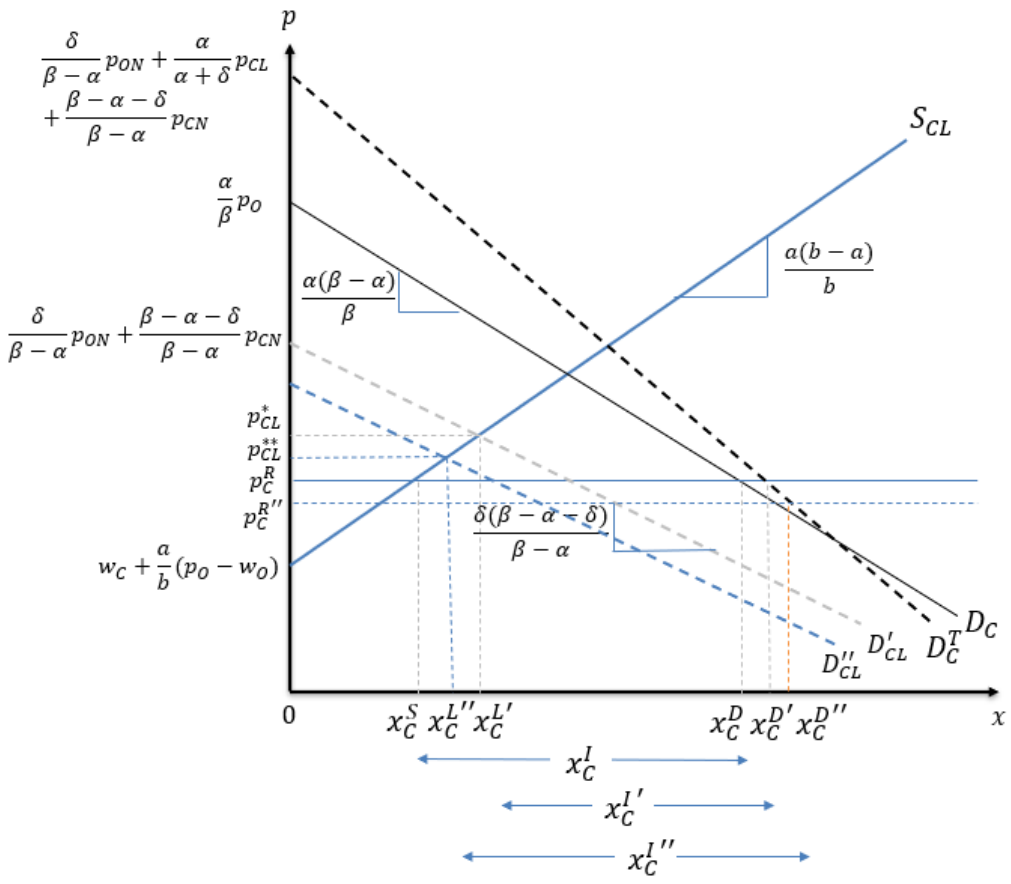

Figure 19: Changes in the equilibrium conditions for local and non-local conventional products in a large importing locality

Similarly, as shown in Figure 20, the price of local-organic is higher under the trend ($p^{**}_{OL} > p^R_O$), whereas its non-local counterpart receives a lower price than before the trend ($p^{R\prime\prime}_O < p^R_O$). The total quantity of organic products falls from x^D_O to $x^{D\prime\prime}_O$ due to the trend, as the consumers of organic with weaker preference for quality switch to local-conventional product (recall Figure 18). The quantity of non-local organic product is higher compared to the small importing locality due to the lower price of non-local products, but still smaller than the pre-trend level of imports by the locality ($x^I_O > x^{I\prime\prime}_O > x^{I\prime}_O$) because of the increased consumer valuation of local. And, for the same

reasons, the quantity of local-organic product is higher than before the trend, but lower than that in a small importing locality ($x_O^{L\,''} < x_O^{L\,'}$).

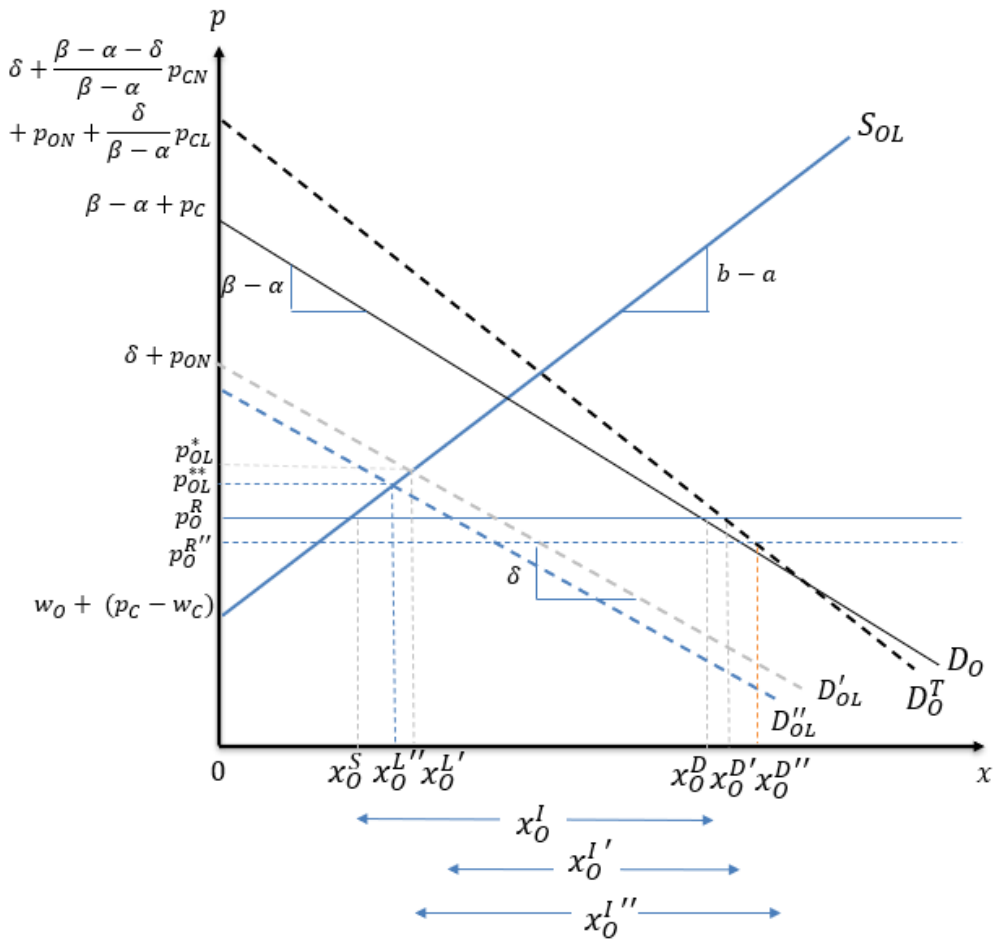

Figure 20: Changes in the equilibrium conditions for local and non-local organic products in a large importing locality

The change in the welfare of the consumers of non-local conventional products in the locality is given by:

$$\Delta W_{CN}^{D} = \int_{\lambda_1}^{\lambda'} (U_{CN} - U_A)d\lambda + \int_{\lambda'}^{\lambda_2} (U_{CN} - U_C)d\lambda$$

$$= \frac{1}{2}\alpha(x_A - x_A')^2$$

$$+ \left[\alpha(x_A - x_A')\left(x_{CN} - (x_A - x_A')\right) + \frac{1}{2}\alpha\left(x_{CN} - (x_A - x_A')\right)^2\right.$$

$$\left. - \frac{1}{2}\alpha\left(x_{CN} - (x_A - x_A')\right)^2\right] = \frac{1}{2}\alpha(x_A - x_A')^2 + \alpha(x_A - x_A')\left(x_{CN} - (x_A - x_A')\right)$$

As $\left(x_{CN} - (x_A - x_A')\right) > (x_A - x_A')$ (see Figure 18), it follows that the reduced price of non-local conventional products benefits all consumers of these products in the large importing locality. While the trend is welfare increasing for all consumers of non-local conventional product in the locality, the consumers of conventional product who consume non-local products before and after the trend gain more compared to the consumers who switch from alternative to non-local conventional products due to the trend (i.e., consumers with $\lambda \in [\lambda_1, \lambda')$ in Figure 18).

Similarly, the welfare change for the consumers of non-local organic products in the large importing locality are given by:

$$\Delta W_{ON}^{D} = \int_{\lambda_3}^{\lambda_4} (U_{ON} - U_O)d\lambda$$

$$= \left\{\left[U + \frac{\beta(p_{ON} - p_{CL}) - (\beta - \alpha - \delta)p_{ON}}{\beta - \alpha - \delta}\right]x_{ON} + \frac{1}{2}\beta x_{ON}^2\right\}$$

$$- \left\{\left[U + \frac{\beta(p_{ON} - p_{CL}) - (\beta - \alpha - \delta)p_O}{\beta - \alpha - \delta}\right]x_{ON} + \frac{1}{2}\beta x_{ON}^2\right\}$$

$$= \left[\frac{(\beta - \alpha - \delta)(p_O - p_{ON})}{\beta - \alpha - \delta}\right]x_{ON} = (p_O - p_{ON})x_{ON}$$

As the price of non-local organic products falls due to the 'Buy Local' trend in the large importing locality (i.e., $p_O > p_{ON}$), consumers of these products realize welfare gains (i.e., $\Delta W_{ON}^{D} > 0$).

Regarding the consumers of local-conventional product in the locality, the change in their welfare is given by:

$$\Delta W_{CL}^{D} = \int_{\lambda_2}^{\lambda''} (U_{CL} - U_C)\, d\lambda + \int_{\lambda''}^{\lambda_3} (U_{CL} - U_O)\, d\lambda$$

$$= \left\{ \frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)(p_O - p_C) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)}\right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta)\left[\frac{\alpha p_{CL} - (\alpha+\delta)p_{CN}}{\delta(\alpha+\delta)}\right]^2 \right\}$$

$$- \left\{ \frac{1}{2}\alpha x_C^2 - \frac{1}{2}\alpha\left[x_C - \left(\frac{p_O - p_C}{\beta-\alpha} - \frac{p_{CL} - p_{CN}}{\delta}\right)\right]^2 \right\}$$

$$+ \left\{ \frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)p_{ON} - \beta p_{CL}}{(\alpha+\delta)(\beta-\alpha-\delta)}\right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)(p_O - p_C) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)}\right]^2 \right\}$$

$$- \left\{ \frac{1}{2}\beta\left[\frac{\beta(p_{ON} - p_{CL}) - (\beta-\alpha-\delta)p_O}{\beta(\beta-\alpha-\delta)}\right]^2 - \frac{1}{2}\beta\left[\frac{\alpha p_O - \beta p_C}{\beta(\beta-\alpha)}\right]^2 \right\}$$

$$= \left\{ \frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)(p_O - p_C) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)}\right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta)\left[\frac{\alpha p_{CL} - (\alpha+\delta)p_{CN}}{\delta(\alpha+\delta)}\right]^2 \right\}$$

$$- \left\{ \frac{1}{2}\alpha\left[\frac{\alpha p_O - \beta p_C}{\alpha(\beta-\alpha)}\right]^2 - \frac{1}{2}\alpha\left(\frac{p_{CL} - p_{CN}}{\delta} - \frac{p_C}{\alpha}\right)^2 \right\}$$

$$+ \left\{ \frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)p_{ON} - \beta p_{CL}}{(\alpha+\delta)(\beta-\alpha-\delta)}\right]^2 \right.$$

$$\left. - \frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)(p_O - p_C) - (\beta-\alpha)p_{CL}}{(\alpha+\delta)(\beta-\alpha)}\right]^2 \right\}$$

$$- \left\{ \frac{1}{2}\beta\left[\frac{\beta(p_{ON} - p_{CL}) - (\beta-\alpha-\delta)p_O}{\beta(\beta-\alpha-\delta)}\right]^2 - \frac{1}{2}\beta\left[\frac{\alpha p_O - \beta p_C}{\beta(\beta-\alpha)}\right]^2 \right\}$$

$$= \frac{1}{2}(\alpha+\delta)\left[\frac{(\alpha+\delta)p_{ON}-\beta p_{CL}}{(\alpha+\delta)(\beta-\alpha-\delta)}\right]^2 + \frac{1}{2}\alpha\left(\frac{p_{CL}-p_{CN}}{\delta}-\frac{p_C}{\alpha}\right)^2$$

$$-\frac{\beta-\alpha}{2\alpha\beta}\left[\frac{\alpha p_O-\beta p_C}{\beta-\alpha}\right]^2 - \frac{1}{2}\beta\left[\frac{\beta(p_{ON}-p_{CL})-(\beta-\alpha-\delta)p_O}{\beta(\beta-\alpha-\delta)}\right]^2$$

and it is also positive. The higher the consumer valuation of locally produced goods (δ) and/or the lower the price of the local conventional product, the greater are the welfare gains of local conventional product consumers in the large exporting locality.

Similarly, the change in the welfare of consumers of the local organic product in the locality is positive and given by:

$$\Delta W_{OL}^D = \int_{\lambda_4}^{1}(U_{OL}-U_O)\,d\lambda$$

$$= \left\{Ux_{OL} + \frac{1}{2}(\beta+\delta)\left(\frac{\beta+\delta-p_{OL}}{\beta+\delta}\right)^2 - \frac{1}{2}(\beta+\delta)\left[\frac{\beta p_{OL}-(\beta+\delta)p_{ON}}{\delta(\beta+\delta)}\right]^2\right\}$$

$$-\left\{Ux_{OL} + \frac{1}{2}\beta\left(\frac{\beta-p_O}{\beta}\right)^2 - \frac{1}{2}\beta\left[\frac{\beta(p_{OL}-p_{ON})-\delta p_O}{\beta\delta}\right]^2\right\}$$

$$= \frac{1}{2}(\beta+\delta)\left(\frac{\beta+\delta-p_{OL}}{\beta+\delta}\right)^2 - \frac{1}{2}\beta\left(\frac{\beta-p_O}{\beta}\right)^2 + \frac{1}{2}\beta\left[\frac{\beta(p_{OL}-p_{ON})-\delta p_O}{\beta\delta}\right]^2$$

$$-\frac{1}{2}(\beta+\delta)\left[\frac{\beta p_{OL}-(\beta+\delta)p_{ON}}{\delta(\beta+\delta)}\right]^2$$

The higher the consumer valuation of local products (δ) and/or the lower the price of the local-organic product, the greater are the welfare gains for the consumers of local-organic product in the locality.

Regarding the local producers of conventional and organic products, they receive higher prices under the 'Buy Local' trend but lower than the producers in a small importing locality. As a result, local producers in the large importing locality benefit from the trend but their welfare gains are lower than those in the small importing locality case.

Figure 21 graphs the net returns and welfare gains of the producers in a large importing locality for the case in which the increase in the price of local organic is higher than the increase in the price of local conventional product and the production share of the local organic product increases under the trend.

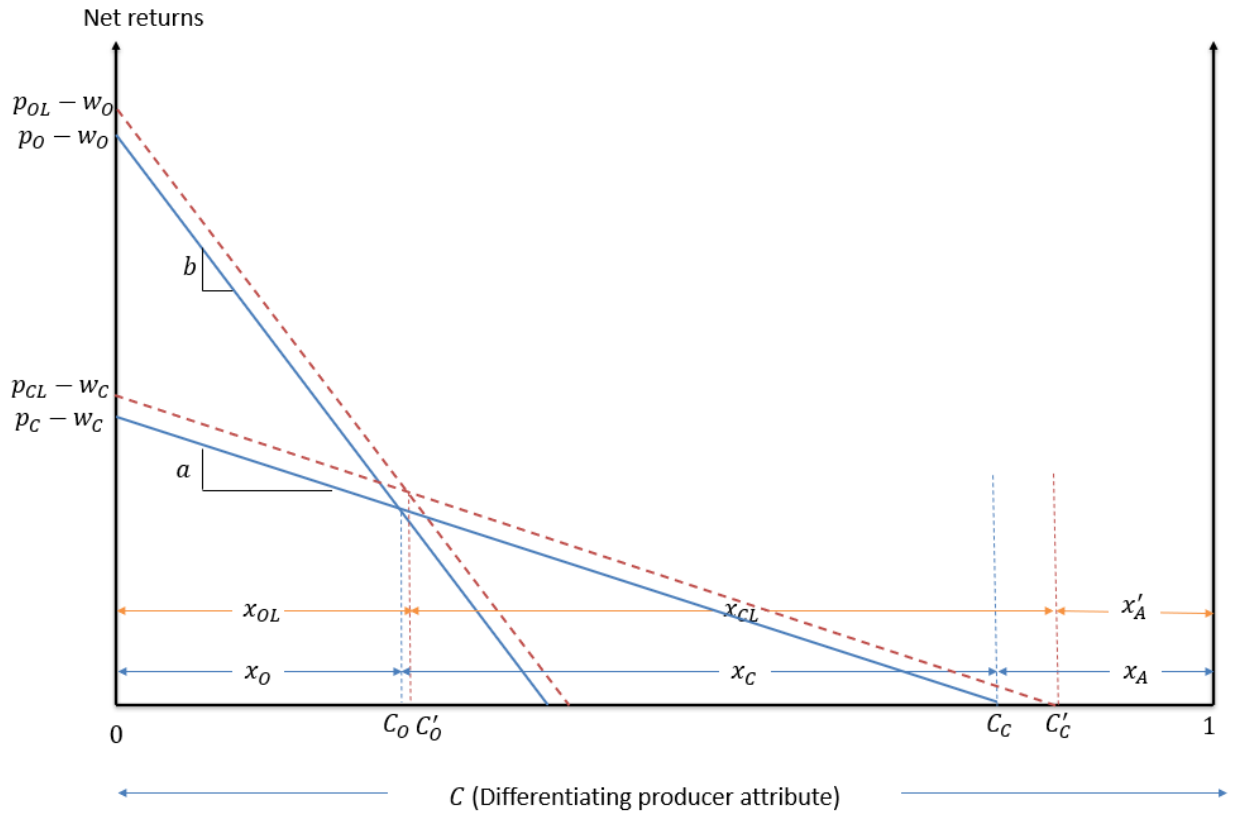

Figure 21: Net returns of local producers of a large importing locality, before and after the 'Buy Local' trend

The welfare gains of the producers of conventional product in the large importing locality are given by:

$$\Delta W_{CL}^{S} = \int_{C_O'}^{C_C} (NR_{CL} - NR_C)dC + \int_{C_C}^{C_C'} (NR_{CL} - NR_A)dC$$

$$= \frac{1}{2}ax_{CL}^2 - \frac{1}{2}a(x_A - x_A')^2 - \frac{1}{2}a[x_{CL} - (x_A - x_A')]^2 + \frac{1}{2}a(x_A - x_A')^2 - 0$$

$$= \frac{1}{2}a{x_{CL}}^2 - \frac{1}{2}a[x_{CL} - (x_A - x_A')]^2$$

$$= \frac{1}{2}a\left[\frac{b(p_{CL} - w_C) - a(p_{OL} - w_O)}{a(b-a)}\right]^2$$

$$- \frac{1}{2}a\left[\frac{b(p_{CL} - w_C) - a(p_{OL} - w_O)}{a(b-a)} - \frac{p_{CL} - p_C}{a}\right]^2$$

Similar to the small importing locality case, producers who produce conventional product before and after the trend gain more compared to the producers who switch from alternative to conventional product.

The change in the welfare of the producers of organic product in a large importing locality is given by:

$$\Delta W_{OL}^{S} = \int_{0}^{C_O} (NR_{OL} - NR_O)dC + \int_{C_O}^{C_O'} (NR_{OL} - NR_C)dC$$

$$= \left[(p_{OL} - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right] - \left[(p_O - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right]$$

$$+ \left[(p_{OL} - w_O - ax_{OL})x_{OL} + \frac{1}{2}b{x_{OL}}^2\right] - \left[(p_{OL} - w_O - ax_O)x_O + \frac{1}{2}bx_O^2\right]$$

$$- \left\{\frac{1}{2}ax_C^2 - \frac{1}{2}a[x_C - (x_{OL} - x_O)]^2\right\}$$

$$= (p_{OL} - w_O - ax_{OL})x_{OL} - (p_O - w_O - ax_O)x_O + \frac{1}{2}b{x_{OL}}^2 - \frac{1}{2}bx_O^2$$

$$- \left\{\frac{1}{2}ax_C^2 - \frac{1}{2}a[x_C - (x_{OL} - x_O)]^2\right\}$$

$$= \left\{p_{OL} - w_O - a\left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a}\right]\right\}\left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a}\right]$$

$$- \left\{p_O - w_O - a\left[\frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]\right\}\left[\frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]$$

$$+ \frac{1}{2}b\left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a}\right]^2 - \frac{1}{2}b\left[\frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]^2$$

$$- \left\{\frac{1}{2}a\left[\frac{b(p_C - w_C) - a(p_O - w_O)}{a(b - a)}\right]^2\right.$$

$$- \frac{1}{2}a\left\{\frac{b(p_C - w_C) - a(p_O - w_O)}{a(b - a)}\right.$$

$$\left.\left.- \left[\frac{(p_{OL} - w_O) - (p_{CL} - w_C)}{b - a} - \frac{(p_O - w_O) - (p_C - w_C)}{b - a}\right]\right\}^2\right\}$$

where $p_{OL} = p_{OL}^{**}$ and $p_{CL} = p_{CL}^{**}$

While the overall welfare change for the producers of organic is positive, producers who produce organic before and after the trend experience greater gains compared to the ones who switch from conventional to organic (if any).

Finally, regarding the consumers and producers outside the locality, their welfare is also affected by the trend when the locality where the 'Buy Local' trend is taking place is a large importing one. Specifically, the higher demand for local products in the large importing locality reduces the regional prices of non-local products (by reducing the quantity imported by the locality), which results in the consumers of conventional and organic products outside the locality realizing a welfare gain and the producers of non-local products experiencing a loss in their welfare. The greater is the impact of the trend in the large importing locality on the regional prices of conventional and organic products, the greater are the consumer welfare gains and producer welfare losses outside the locality.

Result 4: When the locality where the 'Buy Local' trend is taking place is a large importer of the products in question, the trend is welfare-increasing for consumers of local conventional and organic products with the magnitude of the consumer welfare gains determined by the consumer valuation of local products and the prices of these products. Among the consumers who consume conventional products before and after the trend, those with stronger preference for quality gain more, while, among the consumers who switch from organic to local conventional product due to the trend, those who benefit more are those with weaker preference for quality. Consumers of non-local products in the locality realize welfare gains, while the greatest beneficiaries of the trend are the consumers of local-organic product with stronger preference for quality. The trend is also welfare-increasing for producers of conventional and organic products in the large importing locality with producers who produce the same product before and after the trend gaining more than those who switch from one product to another because of the trend. While positive, the gains in producer welfare are not as great as those in a small importing locality due to lower prices of local products in the large importing locality case. Finally, the reduced prices of non-local products due to the 'Buy Local' trend in a large importing locality benefit the consumers and hurt the producers of these products. The stronger is the consumer preference for local products, the greater is the magnitude of the welfare impacts on non-local consumers and producers.

Table 1 summarizes the impact of the 'Buy Local' trend on the interest groups involved (i.e., consumers and producers of the local and non-local conventional and organic products affected by the trend) under the four different scenarios considered in this study and highlights the scenario that would result in maximum welfare gains for each group.

Locality	Consumers of non-local conventional product	Consumers of local-conventional product	Consumers of non-local organic product	Consumers of local-organic product	Producers of non-local conventional product	Producers of local-conventional product	Producers of non-local organic product	Producers of local-organic product
Small Exporting	*NC*	**+**	*NC*	**+**	*NC*	*NC*	*NC*	*NC*
Large Exporting	−	+	−	+	**+**	**+**	**+**	**+**
Small Importing	*NC*	+	*NC*	+	*NC*	**+**	*NC*	**+**
Large Importing	**+**	+	**+**	+	−	+	−	+

Table 1: The welfare impacts of the 'Buy Local' trend on the consumers and producers of local and non-local products

In the above table '+' and '−' indicate welfare gains and losses, respectively, while '*NC*' implies that the welfare remains unaffected by the trend. A bold '+' sign indicates the maximum welfare gains for a group due to the 'Buy Local' trend.

Table 1 shows that the welfare gains of the consumers of local-conventional and organic products are the highest under the trend in a small exporting locality due to no change in the prices of local products (while all other localities experience increased prices of local products under the trend). Regarding the local producers, depending on the relative magnitude of the increase in prices of local products, their gains are the highest in either a large exporting locality (where the increase in prices is caused by reduced exports of the locality) or in a small importing locality (where the price increase is caused by the increased demand for local products). On the other hand, the welfare

gains of the consumers of non-local products are highest in a large importing locality because of the lower prices of these products, while the producers of non-local products gain only when the trend is taking place in a large exporting locality.

Extension of the Analysis: Externalities

The previous analysis and results on the market and welfare impacts of the 'Buy Local' trend have not considered the possibility of negative externalities that may arise from the increased production activity in the locality. For example, a pig farm or a poultry operation close to a residential area may generate foul smell, problems with waste disposal at animal farms and/or use of pesticides, chemical fertilizers at the crop field may cause environmental (water, soil etc.) pollution, which could be harmful for the residents of the locality. If consumers incur such costs for having increased local production, they can be expected to reduce their valuation of local products (and see their welfare benefits from the 'Buy Local' trend decline).

In particular, if there are any negative externalities to the consumers that arise from the local production, consumers will incur a cost, which will, in turn, reduce their valuation of local products. With a reduction in the consumer valuation of local products, the demand for these products falls in the locality and so do the welfare gains of the local consumers (and local producers in the case of large exporting and importing localities) of these products. The lower the consumer preference for/valuation of local products, the lower the market share of these products, and the lower the welfare gains from the 'Buy Local' trend. When the externalities are significant, consumer valuation of local can be expected to dissipate and so will the trend and its benefits.

In fact, for sufficiently high externality costs from local production, consumers can be expected to develop an aversion (rather than preference) for locally produced products. In such a case, the preference parameter δ would become negative, the 'Buy Local' would become a 'Buy Non-local' trend and the results of our study would be reversed.[3]

[3] Consumer aversion to local products in a small exporting locality would cause the demand for conventional product to fall, while leaving the demand for organic product in the locality unchanged (as the change in consumer valuation of local is the same for both conventional and organic products). Consumer welfare would also be reduced in this case, while the welfare of local agricultural producers would remain unaffected. The aversion towards local products in a large exporting locality would reduce the demand for conventional product, increase exports and reduce the regional price of these products. The lower price of the conventional product would attract some of the consumers of organic product, which would reduce the demand for, and price of the organic product in the locality. Unless the aversion to local products were significantly high (greater than the consumer preference for conventional and organic product before the 'Buy Local' trend), the lower prices could result in welfare gains for the consumers of conventional and organic products. On the other hand, as soon as the preference for local products became aversion due to externalities in the small and large importing localities (and assuming consumers can distinguish between local and non-local products), the demand for local products in these localities would fall which, in turn, would reduce the price of local products below the regional level. If consumers cannot differentiate between local and non-local products, then both products would receive the regional price.

Intriguingly, if the externality-generating investments made in the locality are sunk/irreversible, the consumer desire to support the local community can result in costs to the locality that outlive the trend and negate its noble intents.

Summary and Concluding Remarks

The ‘Buy Local’ trend became extremely popular recently because of its potential to provide consumers with fresher and/or better quality food products, while supporting the local farming community. In our study, we analyzed the market effects of the ‘Buy Local’ trend and its welfare impacts on the heterogeneous consumers and producers in exporting and importing localities and those outside the localities affected by the trend. The consideration of heterogeneity in our framework enables us to disaggregate the welfare impacts of the trend and determine the gains/losses of different consumers and producers in the locality and beyond.

The literature on ‘Buy Local’ identified the perceived freshness and better quality of local agricultural products and the willingness to help to local farming community as the driving forces behind the popularity of the ‘Buy Local’ trend. With the focus of the existing literature being on the factors affecting consumer attitudes towards local food products, it was not clear how the trend might impact different consumers and producers until our study developed the theoretical framework of heterogeneous consumers and producers to systematically analyze the systemwide market and welfare impacts of the trend. Our analysis shows that the two crucial factors that determine the impacts of the trend on the consumers and producers are the size of the locality where the ‘Buy Local’ trend is taking place and whether the locality is an importer or an exporter of the product(s) in question.

In particular, the analysis shows that the consumers of a small exporting locality gain from the ‘Buy Local’ trend, while the producers in the locality remain unaffected. The higher is the consumer valuation of local, the greater are these consumer welfare gains. Consumers with stronger preference for quality (the consumers of organic in our case) gain more, while consumers

consuming the same product before and after the trend gain more than those who switch from one product to another due to the trend.

The ‘Buy Local’ trend is also welfare-increasing for the consumers in a large exporting locality, although these gains are smaller than those in a small exporting locality due to the higher prices of local products. Consumers with stronger preference for quality gain more, while, among the consumers of conventional products, those who consume conventional product before and after the trend gain more compared to those who switch to conventional product due to the trend. Producers of conventional and organic products in the locality experience gains, which, while differing between groups, are the same within each group. Unlike a small exporting locality, the ‘Buy Local’ trend in a large exporting locality affects (increases by reducing exports by the locality) the regional price. Consumers and producers outside the locality experience losses and gains in welfare, respectively, due to higher product prices.

In a small importing locality, the ‘Buy Local’ trend increases the welfare of consumers of local (conventional and organic) products. These gains increase with the consumer valuation of local and fall with the prices of local products. Among the consumers of local-conventional and local-organic products, those with stronger preference for quality gain more, with the exception of the consumers who switch from organic to local conventional product where it is the consumers with weaker preference for quality who gain the most. The producers of organic and conventional products and those who switch from alternative to conventional product due to the trend also experience welfare gains with those producing the same product before and after the trend gaining more than those who switch from alternative to conventional product and conventional to organic product (if any) due to the trend.

In a large importing locality, the 'Buy Local' trend is welfare-increasing for consumers of local (conventional and organic) products, and, similar to a small importing locality, the extent of these gains depends on the consumer valuation of local products and the prices of these products. Consumers with stronger preference for quality gain more, which makes the local-organic consumers the greatest beneficiaries of the trend in the large importing locality. However, among the consumers who switch from organic to local-conventional product due to the trend, it is those with weaker preference for quality that gain more. The producers of conventional and organic products in the large importing locality experience gains in welfare, although these gains are smaller than those in a small importing locality due to lower prices of local products. Finally, the lower prices of non-local conventional and organic products, that result from reduced imports by the large importing locality due to the trend, result in welfare gains and losses for the consumers and producers, respectively, of these products, with the magnitude of these impacts increasing with an increase in the consumer valuation of local products.

The analysis also considered the possible negative externalities that might arise from changes in production pattern and/or the level of production in the locality due to the 'Buy Local' trend. Our framework can be easily adapted to analyze the market and welfare impacts of the 'Buy Local' trend in the presence of externalities. Any negative externalities that might arise from local production (like pig farms and/or poultry operations near residential areas causing foul odor and waste management problems, use of chemical fertilizers and/or pesticides polluting water etc.) would reduce the consumer valuation of local products. The reduction in the consumer valuation would cause the demand for local products and welfare of local consumers (and the producers in large exporting and importing localities) to fall. When the costs of externalities are significant, the

preference for local products could become aversion to these products and the results of our analysis would be reversed.

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