

Consumer purchasing decisions and welfare under country of origin. Labelling regulation

Lana Awada¹ and Amalia Yiannaka²

¹ MAICh, Crete, Greece, ланаawada@yahoo.com

² Department of Agricultural Economics, University of Nebraska-Lincoln, 314D H.C.
Filley Hall, Lincoln, NE 68583-0922, USA, yiannaka2@unl.edu



Paper prepared for presentation at the 98th EAAE Seminar ‘Marketing Dynamics within the Global Trading System: New Perspectives’, Chania, Crete, Greece as in: 29 June – 2 July, 2006

Copyright 2006 by [Lana Awada, Amalia Yiannaka]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

CONSUMER PURCHASING DECISIONS AND WELFARE UNDER COUNTRY OF ORIGIN LABELING REGULATION

LANA AWADA¹, AMALIA YIANNAKA^{2,*}

¹M.A.I.Ch, Crete, Greece, ланаawada@yahoo.com.

²Department of Agricultural Economics, University of Nebraska-Lincoln
314D H.C. Filley Hall, Lincoln, NE 68583-0922 USA,

*Corresponding author: yiannaka2@unl.edu, Tel. (402) 472-2047, Fax: (402) 472-3460.

Abstract

This study develops a theoretical framework of heterogeneous consumer preferences to examine the effect of voluntary and mandatory country of origin labeling (COOL) on consumer purchasing decisions and welfare when consumers view COOL information as an attribute that differentiates products vertically and horizontally. Analytical results of both the vertically and horizontally differentiated product models show that the change from a no COOL to a mandatory COOL regime decreases (increases) the welfare of consumers with weak (strong) preference for COOL. A change from a no COOL to a voluntary COOL regime leads to an undisputed increase in consumer welfare which results from an increase in the welfare of consumers with strong preference for COOL, while the welfare of consumers with weak preference for COOL remains unchanged. A change from a voluntary to a mandatory COOL regime leads to a consumer welfare loss in the vertically differentiated product model and in the horizontally differentiated product model when product relocation is prohibitively costly. In both the above models, a switch from voluntary to mandatory COOL decreases the welfare of consumer with weak preference for COOL, while it keeps the welfare of consumers with strong preference for COOL unchanged. A change from a voluntary to a mandatory COOL regime in the horizontally differentiated product market when product relocation is possible leads to a decrease in the welfare of consumer with both weak and strong preference for COOL and to possible welfare gains for those consumers who place greater value in country of origin information under mandatory than under voluntary COOL.

Keywords: country of origin labeling, heterogeneous consumer preferences, vertical and horizontal product differentiation.

Copyright 2006 by Lana Awada and Amalia Yiannaka. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

1. Introduction

In the absence of labeling the country of origin of a product is a credence attribute. Labeling can be used as a means of differentiating products and facilitating consumer purchasing decisions by transforming credence attributes into search attributes. In recent years, the increasingly expressed need of consumers to be informed about credence product attributes in general (e.g., the process of genetic modification) and country of origin in particular, has motivated policy makers to establish and implement labeling policies related to a product's country of origin.

The European Union, through its regulations (EEC) 2081/92 and (EEC) 2082/92 protects and promotes labeling policies of agricultural products (European Commission Directorate-General for Agriculture 2004) and through its regulation NO 1760/2000 requires that all member countries indicate the country of origin of beef and beef products (The New Rules Project-Agriculture 2003). Japan, under the amended Agricultural Standard (JAS) law requires country of origin for all grocery products ((Japan External Trade Organization (JETRO) 2004)). Canada, under the Canadian Cattle Identification Agency (CCIA) requires all cattle to be tagged with an approved CCIA ear tag before their herd of origin (CCIA 2005). Mexico, under the Certification Labeling Decree requires COOL on more than 400 products (Gatti 1995).

In the US, mandatory country of origin labeling regulation for agricultural products was issued by the US congress on May 13, 2002 (the 2002 Farm Bill) and the law was supposed to become effective by September 30, 2004.¹ However, the implementation of mandatory COOL has been delayed twice for some of the covered commodities and is now supposed to become effective in September 2008; in the meantime COOL remains voluntary.² Commodities that are currently

¹ The US Department of Agriculture (USDA)/Agricultural Marketing Service (AMS) is responsible for issuing and implementing the regulations for mandatory country of origin labeling.

² In January 27, 2004, President Bush signed the public law 108-199 delaying the implementation of mandatory COOL until September 30, 2006 and in November 10, 2005 he signed the public law 109-97, delaying the implementation of mandatory COOL until September 30, 2008.

covered by mandatory COOL are wild and farm-raised fish and shellfish while the rest of the commodities for which COOL implementation has been delayed include muscle cuts of beef (including veal), lamb and pork; ground beef, ground lamb, and ground pork; fresh and frozen fruits and vegetables; and peanuts.³

The proposed COOL law requires retailers to credibly inform consumers of the country of origin of covered commodities by using a clear and visible sign. For this information to be transferred to consumers, all firms in the supply chain for the covered commodities are expected to be affected by the proposed rule (USDA/AMS 2003).⁴ The cost of implementing the COOL program is expected to be higher for the meat industries, compared to other agricultural industries, due to the different stages of processing and the different number of participants in the supply chain that are covered by the regulation. It is also expected that the cost of labeling products with mixed origin will be higher than for domestic products, due to the higher cost of obtaining and verifying the related information (USDA/AMS 2003).

COOL has incited great controversy both in the literature and in the political arena. COOL proponents argue that US consumers have the right to know where their products are coming from and to choose their products from the country that they have confidence in. The studies conducted by Sterns et al. (2004), Umberger et al. (2003), and Loureiro and Umberger (2003) find that a large group of consumers prefer products with COOL and are willing to pay a premium for them. These studies also showed that consumers may use the information provided by COOL as an indicator of

³The law requires that for beef, lamb and pork to carry the US country of origin, they should be born, raised, and slaughtered in the US; for fish and shellfish hatched to carry, they should be raised, harvested in the US; and for fresh and frozen fruits and vegetables, and peanuts to carry the US country of origin label, they should be grown in the US. Otherwise the covered commodities will carry other country of origin label which could be a mixed origin label if the product comes from more than one country ((US Department of Agriculture/Agricultural Marketing Service, (USDA/AMS) 2003).

⁴Products and services exempt of the COOL legislation include food services such as restaurants and cafeterias, the poultry sector and small retailers that have invoice cost of all purchases of produce of less than \$230,000. The law contains enforcement provisions of \$10,000 for each violation that could be made by both retailers and suppliers (USDA/AMS 2003).

evaluating food safety and product quality. COOL supporters also argued that groups representing the majority of US producers such as The National Cattlemen's Beef Association (NCBA), the National Pork Producers Council (NPPC), the National Fisheries Institute (NFI), the United Fresh Fruit and Vegetable Association (UFFVA) and the Produce Marketing Association (PMA) are supporting COOL regulation. According to these groups, US producers have already invested time and resources to meet strict US government regulations related to food safety and quality and labeling will allow them to promote, market and advertise their products, increase their market share and realize greater returns (Farmers' Advance 2004). Buhr (2003) suggests that the impact of COOL on the firms in the supply chain could be positive, even without any increase in consumer willingness to pay while Becker (1999) suggests that the cost of implementing COOL is minimal.

COOL opponents, on the other hand, argue that traceability related to COOL can only trace the product back to the farmer and may not provide consumers with information about credence attributes other than the country of origin. At the same time, critics argue that it is unclear whether consumers use the information provided by COOL as an indirect way of evaluating food product quality and safety. A study conducted by Dickinson and Bailey (2002) indicates that, in the case where beef traceability/COOL was not combined with other attributes related to food safety, consumers did not have a strong desire for traceability/COOL and they were willing to pay the minimum premium for it. COOL opponents also argue that the costs of implementing COOL will be large and if COOL is a quality indicator for consumers, it is more efficient for firms to signal quality directly to consumers through quality verification institutions rather than by using COOL or traceability guarantee as an indirect quality signal (Hobbs 2003). Another criticism is that COOL will likely create a trade barrier by increasing the cost of imported products and by encouraging the perception that foreign products are less safe compared to domestic products (Becker 1999).

Food handlers, including processors, are the main group opposing COOL. According to a study conducted by Schupp and Gillespie (2001) these groups perceive COOL as an unnecessary and undesirable intervention in free trade and commerce by the government and argue that COOL will reduce firms' opportunities of freely substituting between imported and domestic products and will subsequently increase firms' costs.

According to the USDA the lack of participants in voluntary COOL programs in the last three years provides evidence that consumers do not have a strong preference for country of origin labeling and will not increase their purchases and willingness to pay for the covered commodities. In addition, according to USDA estimates COOL implementation costs will outweigh the benefits of the program and will result in an increase in food prices and a decrease in production in the next decade. The USDA estimates the net economic effect from COOL implementation to be negative and to range between \$138 and \$596 million (USDA/AMS 2003).⁵

Lusk and Anderson (2004), Brester et al. (2004) and Hanselka et al. (2004) studied the effect of country of origin labeling on economic welfare. The results of these studies indicated that an increase in consumer demand is necessary to offset the incremental costs from implementing COOL on both consumer and producer welfare for both the beef and the pork sectors. The results of these studies also indicated that consumer and producer surplus for the poultry sector (a substitute product

⁵ On November 21, 2002, the USDA published an estimate of recordkeeping costs for the covered commodities in the Federal Register ("a Notice of Request for Emergency Approval of a New Information Collection (67 FR 70205) for the Interim Guidelines for Voluntary Country of Origin Labeling"). The estimated first-year incremental costs of establishing and maintaining the recordkeeping associated with COOL for all affected industries was \$1.968 billion (USDA/AMS 2003). After receiving feedback from a number of affected firms that have already begun to make changes in their operations to implement the proposed rules and from various studies that have estimated COOL costs (e.g., VanSickle et al. (2003), Sparks companies, Inc., and Cattle Buyers Weekly (Sparks/CBW) (2003), Hayes and Meyer (2003), Davis (2003)), in October 2003, the USDA developed a range of estimated incremental costs for the first year for the affected firms. The lower range was \$582 million and reflects the minimum cost needed to modify and maintain an existing recordkeeping system while the upper range was \$3.9 billion and reflects the cost of establishing a recordkeeping system and other capital and labor costs and expenses needed to implement the proposed rule. It is expected that the ongoing cost will be lower than the first year costs; according to the USDA estimations the ongoing cost is \$458 million, including maintenance and operation of recordkeeping costs.

that is not covered by COOL) will be positive as consumers substituted the relatively more expensive beef and pork products for the relatively less expensive poultry.

Even though existing studies shed some light on the expected costs and benefits of the implementation of COOL, definitive conclusions about the nature and magnitude of these costs and benefits as well as the effect of COOL on economic welfare cannot be drawn given the lack of consensus in the literature. However, there is consensus in the literature as to that consumer attitudes towards COOL information and the value that consumers place on this information are not homogenous. That is, consumers may use information concerning the country of origin as an indicator of product quality and/or because they value other characteristics related to the product's place of origin (e.g., support for the country's economy, fond memories of a given country, consumer sense of belonging to a certain country).

Schupp and Gillespie (2001) suggest that the majority of Louisiana consumers consider US beef to be of a better quality than imported beef. Umberger et al. (2003) argue that food safety concerns, a strong desire to support US producers and beliefs that the US beef is of higher quality, were reasons that Chicago and Denver consumers preferred COOL. Haucap et al. (1997) find that consumers use COOL information as a signal for product quality and that countries with high production costs must produce high quality products to be competitive in international markets. Ittersum et al. (2003) find that the purchasing decisions of consumers in the Netherlands are influenced by consumer sense of belonging to the country of origin and the information available in memory about the country to which the product belongs. A similar survey in Italy on extra virgin olive oil indicates that consumer awareness combined with strong and favorable association with the region, have a positive and direct influence on regional product preference (Lans et al. 2001).

The contribution of the present study is that it develops a theoretical framework to examine the market and consumer welfare effects of COOL that allows for consumer heterogeneity in terms

of consumer preferences for the provision of country of origin information. Specifically, the study examines and compares the market and consumer welfare effects of mandatory and voluntary COOL when consumers view COOL information as an attribute that differentiates products vertically and when they view it as an attribute that differentiates products horizontally.

The models developed in this study build on previous work by Giannakas (2002), Giannakas and Yiannaka (2003) and Giannakas and Fulton (2004), who study the purchasing decisions of heterogeneous consumers in vertically differentiated markets. In addition to analyzing the effects of mandatory and voluntary COOL on consumption decisions and consumer welfare in vertically differentiated markets, this study also examines the above effects in horizontally differentiated markets.

The rest of this paper is organized as follows. Section two develops a model of heterogeneous consumers that view COOL as a vertical attribute and examines the market and consumer welfare effects of mandatory and voluntary country of origin labeling. Section three develops a model of heterogeneous consumers that view COOL as a horizontal attribute and examines the market and consumer welfare effects of mandatory and voluntary country of origin labeling. Section four summarizes the main findings and concludes the study.

2. The market and consumer welfare effects of mandatory and voluntary COOL when COOL is viewed as a vertical attribute

2.1 Model Assumptions

The model is developed to capture the case where consumers use information concerning a product's country of origin as an indicator of the product's quality. In this context, quality refers to both observable (search and experience) and unobservable (credence) product attributes. Considered a market where a product, A, is available in two different forms related to its origin; domestically produced and imported. It is assumed that when consumers are informed about the product's

country of origin they perceive the domestic version of product A as the high quality product and the imported one as the low quality product.⁶ In this context, the domestic and the imported versions of product A are treated by consumers as vertically differentiated products; if offered at the same price all consumers prefer the high quality domestic product. In this market, a substitute for product A is also available. It is assumed that the substitute product is a product that is not covered by the mandatory country of origin labeling regulation⁷.

Consumers are assumed to be heterogeneous, uniformly distributed in the interval [0, 1], each buying one unit of their preferred product and the purchasing decision represents a small share of their budget. The utility function of the consumer is then given by:

$$(1) \quad U_s = U - p_s \quad \text{If a unit of a substitute product is consumed}$$

$$(2) \quad U_i = U - p_i + q_i C \quad \text{If a unit of the imported product is consumed}$$

$$(3) \quad U_d = U - p_d + q_d C \quad \text{If a unit of the domestic product is consumed}$$

where U_s , U_i and U_d are the per unit utilities associated with the consumption of the substitute, imported and domestic versions of product, A, respectively. The parameter U is the per unit base level of utility derived from the consumption of product, A, and its substitute and it is constant across consumers. The terms p_s , p_i , and p_d denote the prices of the substitute, imported and domestic product, respectively. The parameter C captures heterogeneous consumer preferences (and thus, differences in the willingness to pay) toward the importance that consumers place on the country of origin information as an indicator of evaluating product quality. It is assumed that the differentiating consumer attribute, C , is uniformly distributed with unit density $f(C) = 1$ in the

⁶ Notice that the assumption as to which product is the high quality product (i.e., the domestic or the imported) does not change the qualitative nature of the results.

⁷ Notice that mandatory country of origin regulation does not cover all food products, and thus, it is possible for a covered product to have a substitute non-labeled product in the market (e.g., beef is covered by COOL while chicken is not covered). In addition, this assumption greatly simplifies the analysis when voluntary country of origin labeling is examined.

interval $C \in [0,1]$ and that the greater is C , the greater is the consumer reliance on country of origin information as a means of distinguishing between product qualities. Thus, consumers with higher C values derive greater utility from consuming a product that bears country of origin labeling and have higher willingness to pay for such a product, compared to consumers with low C values. Note that consumers with a value of C equal to zero place no value on the provision of information regarding the product's country of origin and are thus indifferent between consuming products with or without country of origin labeling when these products are offered at the same price. The terms q_i and q_d are non-negative utility enhancement factors associated with the consumption of the imported and domestic versions of product, A, respectively. It is assumed that $q_d > q_i$, that is, that the domestic product is perceived to be of a higher quality than the imported product. Thus, for a consumer with attribute C , the terms $q_i C$ and $q_d C$ give the utility enhancement from consuming the imported and domestic versions of product A, respectively. For simplicity and without loss of generality, it is assumed that the utility enhancement parameter of the substitute product (q_s) is equal to zero; thus, the substitute product is the product with the lowest quality in the market considered.

2.2 The Effect of Country of Origin Labeling on Consumer Purchasing Decisions and Welfare

2.2.1 Consumer Purchasing Decisions and Welfare under No Country of Origin Labeling

Without labeling (mandatory or voluntary) the imported and the domestic versions of product, A, are marketed together as a non-labeled product and sold at the same price, denoted by p_{nl} , as consumers are unable to determine the origin of the product at the point of purchase. Thus, consumers have a choice between the non-labeled product, A, and the substitute product. If consumers can assign a probability, denoted by φ , that the non-labeled product is domestically

produced, the utility derived from the consumption of one unit of the non-labeled product is given by:

$$(4) \quad U_{nl} = U - p_{nl} + q_{nl}C$$

where $q_{nl} = \varphi q_d + (1 - \varphi)q_i$.⁸ In equation (4) U_{nl} is the expected utility associated with the unit consumption of the non-labeled product. For any value of φ , the term q_{nl} is a non-negative utility enhancement factor associated with the consumption of the non-labeled product. The greater is the probability that the non-labeled product is domestically produced, the higher is the utility derived from its consumption. Since when $\varphi=1$ the utility enhancement factor $q_{nl} = q_d$, and when $\varphi=0$ the utility enhancement factor $q_{nl} = q_i$, it follows that $q_{nl} \in [q_i, q_d]$.

In the absence of country of origin labeling a consumer's purchasing decision is determined by comparing the utilities derived from consuming the non-labeled product and its substitute. The consumer with a differentiating characteristic $\hat{C}_1^N = \frac{p_{nl} - p_s}{q_{nl}}$ is indifference between consuming the non-labeled product and its substitute (i.e., at $\hat{C}_1^N U_s = U_{nl}$). Consumers with characteristics $C \in [0, \hat{C}_1^N)$ find it optimal to buy the substitute product, while consumers with characteristics $C \in (\hat{C}_1^N, 1]$ find it optimal to buy the non-labeled product. Since consumers are uniformly distributed in the interval $[0,1]$, buying only one unit of their preferred product, and the purchasing decision represents a small amount of their budget, the indifferent consumer \hat{C}_1^N determines the

⁸Note that when consumers are ignorant as to the possible origin of the product (i.e., they cannot assign a probability to the product's possible origin), consumers still get utility enhancement from consuming the non-labeled product since the product can be either imported or domestically produced. The utility received from consuming one unit of the non-labeled product is in this case equal to $U'_{nl} = U - p_{nl} + q'_{nl}$, where q'_{nl} is a non-negative utility enhancement factor associated with the consumption of the non-labeled product. Under this case, the qualitative results will be equivalent to the results where consumers are able to assign a probability to the origin of the non-labeled product.

market share of the substitute product X_s^N while $1 - \hat{C}_1^N$ the market share of the non-labeled product X_{nl}^N as shown in equations (5) and (6), respectively.

$$(5) \quad X_s^N = \frac{p_{nl} - p_s}{q_{nl}}$$

$$(6) \quad X_{nl}^N = 1 - X_s^N = \frac{q_{nl} - p_{nl} + p_s}{q_{nl}}$$

Equation (5) indicates that for the substitute product to have a positive market share its price, p_s , should be less than the price of the non-labeled product, p_{nl} , which is consistent with the assumption that the substitute product is the lowest quality product in this market. The smaller is the price difference between the substitute and the non-labeled product, the greater is the market share of the non-labeled product. Equation (6) indicates that for the non-labeled product to have a positive market share its price, p_{nl} , should be less than $q_{nl} + p_s$; otherwise the utility curve of the non-labeled product lies below the utility curve of the substitute product for all values of C and all consumers find it optimal to buy the substitute product. Figure 1 illustrates consumption decisions and welfare when $p_s < p_{nl}$ so that both products enjoy a positive market share. The aggregate consumer welfare is determined by the area below the effective utility curve, which is depicted by the kinked dashed line in Figure 1.

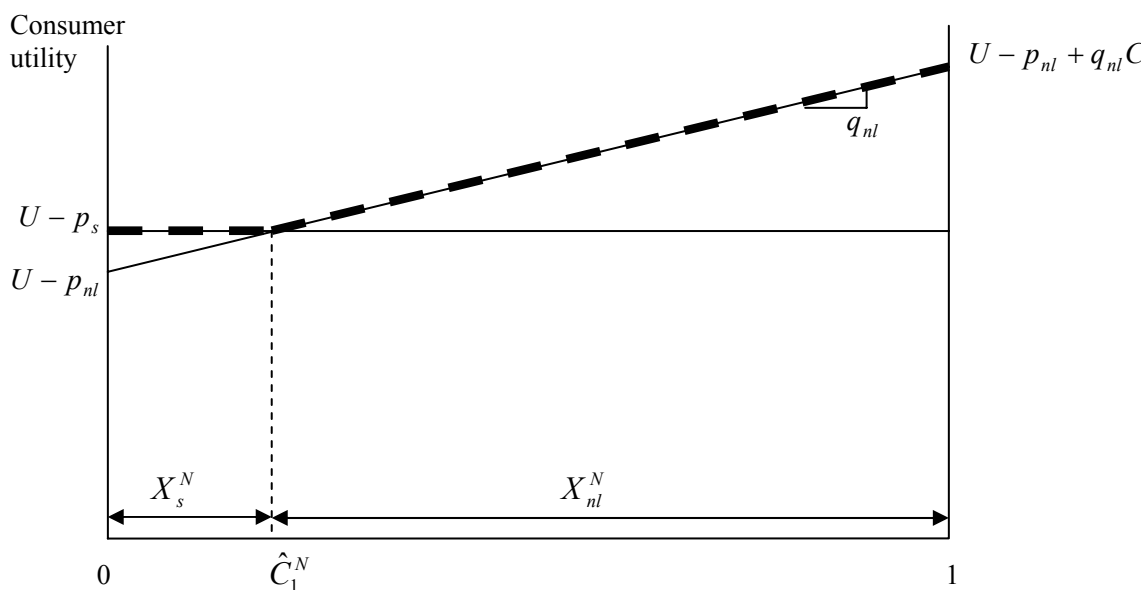


Figure 1. Purchasing Decisions and Consumer Welfare under No COOL

Normalizing the mass of consumers to one, the market shares X_s^N and X_{nl}^N represent the demands for the substitute and the non-labeled products, respectively (Mussa and Rosen 1978). By solving equation (6) for the price p_{nl} we obtain the inverse demand for the non-labeled product,

$$(D_{nl}^N) : p_{nl} = q_{nl} + p_s - q_{nl} X_{nl}^N$$

2.2.2 Consumer Purchasing Decisions and Welfare under Mandatory Country of Origin Labeling

Under mandatory country of origin labeling, all covered products should be labeled with respect to their country of origin at the retail level. In this case, consumers are able to distinguish and choose among the domestically produced, imported and substitute products depending on their preferences. Consumer purchasing decisions under mandatory COOL are determined by comparing the utilities derived from consuming the three products represented by equations (1), (2) and (3). The distribution of consumer preferences, the value that consumers place on the country of origin

attribute and the price of the domestically produced, imported and substitute products determine the market share of these products.

To keep the analysis simple, free entry and no market power in all product markets is assumed throughout the analysis, which imply that the market equilibrium is determined by the intersection of a horizontal MC curve and the market demand curve. Note that, the above assumptions guarantee that when the price of one of the products considered in this analysis increases (e.g., due to an increase in production or labeling costs) the prices of the remaining products remain unaffected, even though their production shares change.

Part or all of the costs associated with the supply of the product in the market, including production and labeling costs, may be transferred to the consumer through the product price. The cost of country of origin labeling may increase the price of the covered product, and thus, it is assumed that the price of the labeled product, A (imported or domestic) is higher than the price of the non-labeled product, A. In addition, as suggested in the literature, the cost of implementing country of origin labeling is expected to be higher for the imported than the domestic product (USDA/AMS 2003). Therefore, it is assumed that for the imported product to be priced cheaper than the domestically produced product, its production cost should be lower than the production cost of the domestically produced product (given the assumption of no market power in all product supply chains).

Given the above, the consumer with a differentiating characteristic $\hat{C}_1^M = \frac{P_i - P_s}{q_i}$, is indifferent between consuming a unit of the substitute and a unit of the imported product (i.e., $U_s(\hat{C}_1^M) = U_i(\hat{C}_1^M)$) and the consumer with differentiating characteristic $\hat{C}_2^M = \frac{P_d - P_i}{q_d - q_i}$, is indifferent between consuming a unit of the imported and a unit of the domestically produced

product (i.e., $U_i(\hat{C}_2^M) = U_d(\hat{C}_2^M)$). Consumers with relatively weak preferences for country of origin labeling (i.e., consumers with characteristics $C \in [0, \hat{C}_1^M)$), keep buying the substitute product, consumers with medium preferences for country of origin labeling (i.e., consumer with characteristics $C \in (\hat{C}_1^M, \hat{C}_2^M)$), find it optimal to consume the imported labeled product and consumers with strong preference for country of origin labeling (i.e., consumer with characteristics $C \in (\hat{C}_2^M, 1]$), find it optimal to consume the domestic product. In this case, \hat{C}_1^M , $\hat{C}_2^M - \hat{C}_1^M$ and $1 - \hat{C}_2^M$ give the consumption share of the substitute, X_s^M , the imported, X_i^M , and the domestic product, X_d^M , respectively. The above consumption shares are given by equations (7), (8) and (9).

$$(7) \quad X_s^M = \hat{C}_1^M = \frac{p_i - p_s}{q_i}$$

$$(8) \quad X_i^M = \frac{p_d q_i - p_i q_d + p_s (q_d - q_i)}{q_i (q_d - q_i)}$$

$$(9) \quad X_d^M = \frac{(q_d - q_i) - (p_d - p_i)}{(q_d - q_i)}$$

Figure 2 depicts the effective utility curves under mandatory country of origin labeling when $p_s < p_i < p_d$ and consumer preferences are such that all three products capture positive market shares. Aggregate consumer welfare is determined by the area below the effective utility curve, which is depicted by the kinked dashed line in Figure 2.

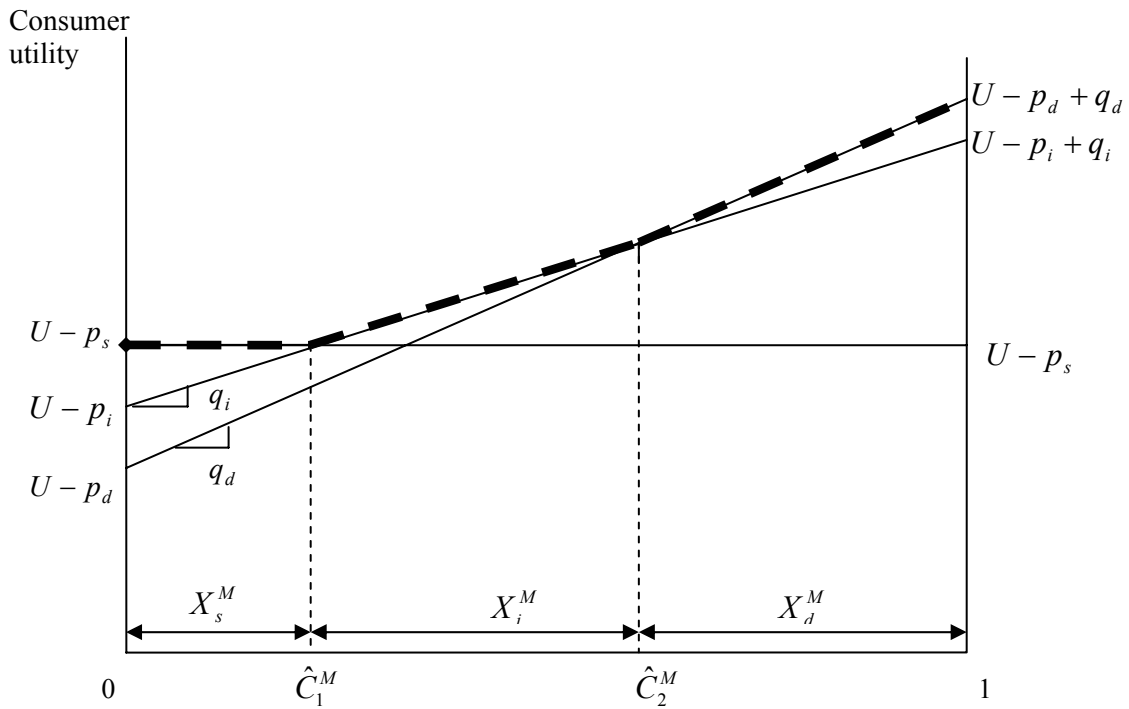


Figure 2. Purchasing Decisions and Consumer Welfare under Mandatory COOL

The market shares of any of the three products clearly depend on consumer preferences and product prices. The increase in the cost of any product may increase the price of this product, and switch consumer preference from consuming the relatively more expensive product to the relatively less expensive product⁹. For instance, equation (7) indicates that when the price of the substitute product increases, *ceteris paribus*, and this increase is high enough so that the price of the substitute product is higher than or equal to the price of the imported product, the utility curve of the substitute product lies underneath the utility curve of the imported product in Figure 2 and the substitute product is driven out of the market (i.e., $X_s^M = 0$). In this case, consumers with weak preferences for the product's country of origin find it optimal to switch their consumption from the substitute to the imported product since the imported product is ranked by all consumers as a product of higher quality to the substitute product.

⁹ Recall that due to the assumptions of free entry and no market power in the supply chains of the products examined, an increase in the price of one product will not cause the price of the other products to change.

Similarly, equation (8) indicates that for the imported product to have a positive market share its price, p_i , should be less than $\frac{p_d q_i + p_s (q_d - q_i)}{q_d}$ and/or the consumer preference parameter for the imported product, q_i , should be greater than $\frac{q_d (p_i - p_s)}{(p_d - p_s)}$; otherwise, the utility curve of the imported product in Figure 2 lies underneath the utility curves of the domestic product and/or the substitute product for all consumers. In this latter case, consumers find it optimal to switch their consumption from the imported product to the substitute and domestically produced products.

Equation (9) indicates that for the domestic product to have a positive market share its price, p_d , should be less than $p_i + q_d - q_i$ and/or the consumer preference parameter for the domestic product, q_d , should be greater than $p_d - p_i + q_i$; otherwise, the utility curve of the domestic product lies underneath the utility curve of the imported product in Figure 2. In this latter case, consumers with characteristics $C \in (\hat{C}_2^M, 1]$ find it optimal to switch their consumption from the domestically produced to the imported product, and the market share of the domestic product, X_d^M , is equal to zero.

2.2.3 Consumer Purchasing Decisions and Welfare under Voluntary Country of Origin Labeling

Under voluntary country of origin labeling, both the labeled and non-labeled products may be available in the market along with the substitute product. For simplicity it is assumed that the prices of the labeled products under the voluntary and the mandatory country of origin regimes are the same. Consumer purchasing decisions under voluntary COOL are determined by comparing the utilities derived from consuming the substitute (equation (1)), the non-labeled (equation (4)), the imported (equation (2)) and the domestically produced (equation (3)) products.

The consumer with differentiating characteristic $\hat{C}_1^V = \frac{P_{nl} - P_s}{q_{nl}}$ is indifferent between consuming a unit of the substitute and a unit of the non-labeled product (i.e., $U_s(\hat{C}_1^V) = U_{nl}(\hat{C}_1^V)$), the consumer with differentiating characteristic $\hat{C}_2^V = \frac{P_i - P_{nl}}{q_i - q_{nl}}$ is indifferent between consuming a unit of the non-labeled and a unit of the imported product (i.e., $U_{nl}(\hat{C}_2^V) = U_i(\hat{C}_2^V)$) and the consumer with differentiating characteristic $\hat{C}_3^V = \frac{P_d - P_i}{q_d - q_i}$ is indifferent between consuming a unit of the imported and a unit of the domestically produced product (i.e., $U_i(\hat{C}_3^V) = U_d(\hat{C}_3^V)$).

As explained previously, the market shares of the substitute, the non-labeled, the imported and the domestically produced products, X_s^V , X_{nl}^V , X_i^V and X_d^V , are equal to \hat{C}_1^V , $\hat{C}_2^V - \hat{C}_1^V$, $\hat{C}_3^V - \hat{C}_2^V$ and $1 - \hat{C}_3^V$, respectively, and given by:

$$(10) \quad X_s^V = \frac{P_{nl} - P_s}{q_{nl}}$$

$$(11) \quad X_{nl}^V = \frac{q_{nl}(p_i - p_s) - q_i(p_{nl} - p_s)}{q_{nl}(q_i - q_{nl})}$$

$$(12) \quad X_i^V = \frac{q_i(p_d - p_{nl}) - q_{nl}(p_d - p_i) - q_d(p_i - p_{nl})}{(q_d - q_i)(q_i - q_{nl})}$$

$$(13) \quad X_d^V = \frac{(q_d - q_i) - (p_d - p_i)}{(q_d - q_i)}$$

Equation (10) indicates that the greater is the probability that the non-labeled product is domestically produced, the greater is the consumer preference for the non-labeled product, q_{nl} , and the smaller is the market share of the substitute product, X_s^V . For any positive quantity of the substitute product to be demanded, p_s should be less than p_{nl} . Similarly, equation (11) indicates

that for the non-labeled product to have a positive market share its price, p_{nl} , should be less than

$$\frac{q_{nl}(p_i - p_s) + q_i p_s}{q_i} \text{ and/or the consumer preference parameter for the non-labeled product, } q_{nl},$$

should be greater than $\frac{q_i(p_{nl} - p_s)}{(p_i - p_s)}$. Equation (12) shows that for the imported product to have a

positive market share its price, p_i , should be less than $\frac{p_d(q_i - q_{nl}) + p_{nl}(q_d - q_i)}{(q_d - q_{nl})}$ and/or the

consumer preference parameter for the imported product, q_i , should be greater than

$$\frac{q_{nl}(p_d - p_i) + q_d(p_i - p_{nl})}{(p_d - p_{nl})}. \text{ Finally, equation (13) shows that for the domestic product to have a}$$

positive market share its price, p_d , should be less than $p_i + (q_d - q_i)$ and/or its consumer preference parameter, q_d , should be greater than $q_i + (q_d - p_i)$.

Figure 3 depicts the effective utility curves under voluntary country of origin labeling when $p_s < p_{nl} < p_i < p_d$ and consumer preferences are such that all four products enjoy a positive market share. The aggregate consumer welfare is determined by the area below the effective utility curve, which is depicted by the kinked dashed curve in Figure 3.

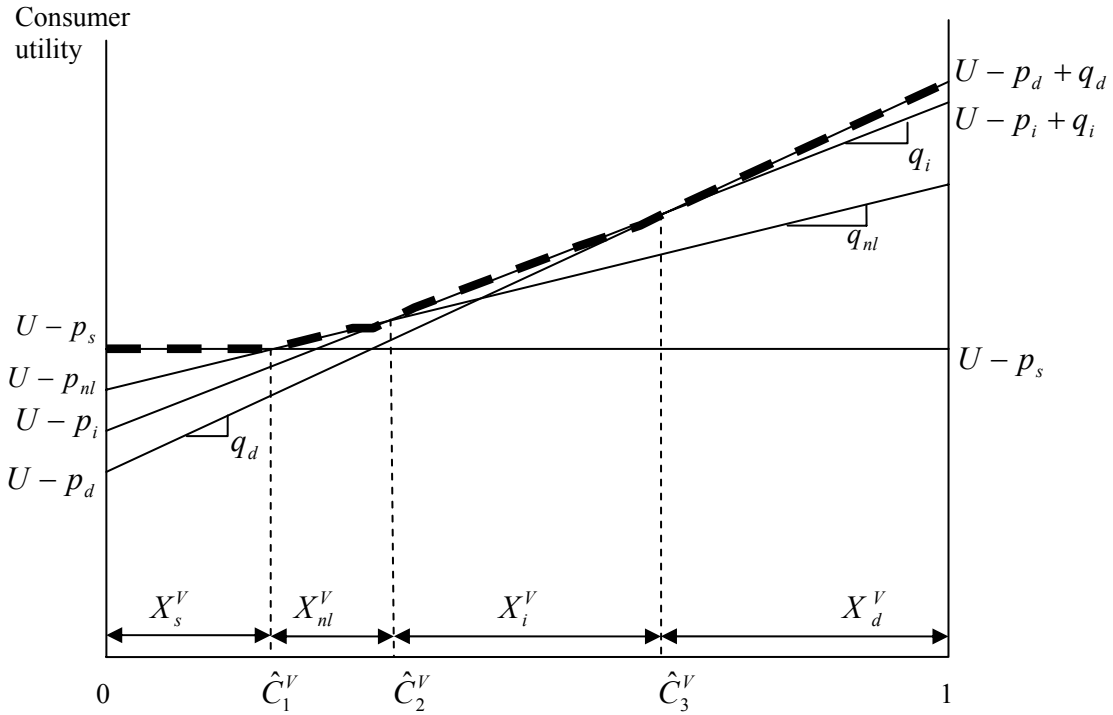


Figure 3. Purchasing Decisions and Consumer Welfare under Voluntary COOL

2.3 Welfare Effects of Changes in the Products' Labeling Regime

2.3.1 Welfare Effects of a Change from a No Labeling to a Mandatory Country of Origin Labeling Regime

Figure 4 depicts the effective utility curves under no country of origin labeling and mandatory country of origin labeling, when $p_s < p_{nl} < p_i < p_d$ and the preference parameters are such that the substitute and the non-labeled products have a positive market share under no COOL and the substitute, imported and domestically produced products have a positive market share under mandatory COOL.

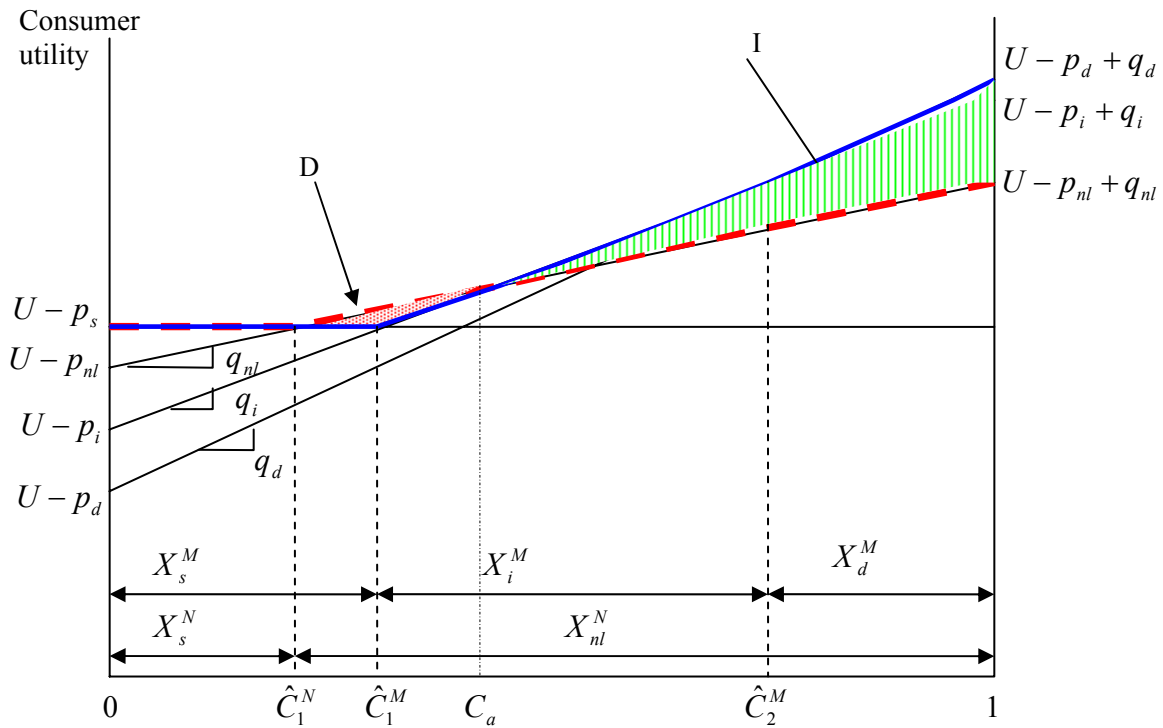


Figure 4. Market and Welfare Effect of a Change from a No COOL to a Mandatory COOL Regime

Aggregate consumer welfare under no COOL is determined by the area under the dashed kinked curve and aggregate consumer welfare under mandatory COOL is determined by the area under the solid kinked curve. The introduction of mandatory country of origin labeling decreases consumer welfare by the dotted area (D) and increases it by the vertically hatched area (I) in Figure 4. The increase in consumer welfare under mandatory country of origin labeling results from an increase in the utility of consumers with medium to high C values (i.e., consumers with $C \in (C_a, 1]$ in Figure 4), since the utility increase from the consumption of the labeled imported and domestically produced products exceeds the utility discount from their higher prices. The decrease in consumer welfare under mandatory country of origin labeling results from a decrease in the utility of consumers with low to medium C values (i.e., consumers with $C \in [\hat{C}_1^N, C_a)$ in Figure 4),

who are no longer able to consume the cheaper non-labeled product. The welfare loss due to mandatory COOL results from a decrease in the utility of two different groups of consumers; the first group is located between $(\hat{C}_1^N, \hat{C}_1^M)$ and they find it optimal to switch their consumption from their preferred non-labeled product, which is no longer available, to the substitute product, which despite being cheaper, is viewed as being inferior to the non-labeled product; the second group is located between (\hat{C}_1^M, C_a) and they find it optimal to switch their consumption from the non-labeled product which is no longer available to the imported product, which, despite being viewed as superior to the non-labeled product, is more expensive.

The net effect of introducing mandatory COOL on the aggregate consumer welfare clearly depends on consumer preferences and product prices. In addition, it has been assumed that consumers are uniformly distributed between zero and one. Relaxing this assumption has welfare implications. Thus, if the distribution is skewed to the left (i.e., more consumers are located closer to zero and have weak preferences for country of origin labeling), the decrease in consumer welfare will be greater. Figure 4 depicts the case where the net welfare effect of introducing mandatory COOL is positive.

Note that, an increase in the price of the imported product, p_i , will increase the loss in consumer welfare (area D) and increase the demand for the substitute and domestic products, and vice versa. An increase in the price of the domestic product, p_d , will reduce the gain in consumer welfare (area I) and increase the demand for the imported product. The greater is the cost of country of origin labeling, the greater are the prices of the imported and domestically produced products, and the smaller is the consumer welfare gains from consuming these products. Obviously, if the prices of the imported and domestically produced products, p_i and p_d , respectively, are high, such that their utility curves lie below the utility curve of the non-labeled product, the introduction of

mandatory COOL will have a negative effect on the aggregate consumer welfare. The greater are the utility enhancement parameters, q_i and q_d , from consuming the imported and the domestically produced products under mandatory country of origin labeling, the greater is the gain (area I) and the smaller is the loss (area D) in consumer welfare. The greater is the probability φ that the non-labeled product is domestically produced, the greater is the utility received from consuming the non-labeled product and the smaller is the utility received from introducing mandatory country of origin labeling.

2.3.2 Welfare Effects of a Change from a No Labeling to a Voluntary Country of Origin Labeling Regime

Figure 5 depicts the effective utility curves under no labeling and voluntary country of origin labeling, when $p_s < p_{nl} < p_i < p_d$ and the preference parameters are such that the substitute and the non-labeled products have positive market shares under no COOL and the substitute, the imported and the domestically produced products have positive share in the market under voluntary COOL.

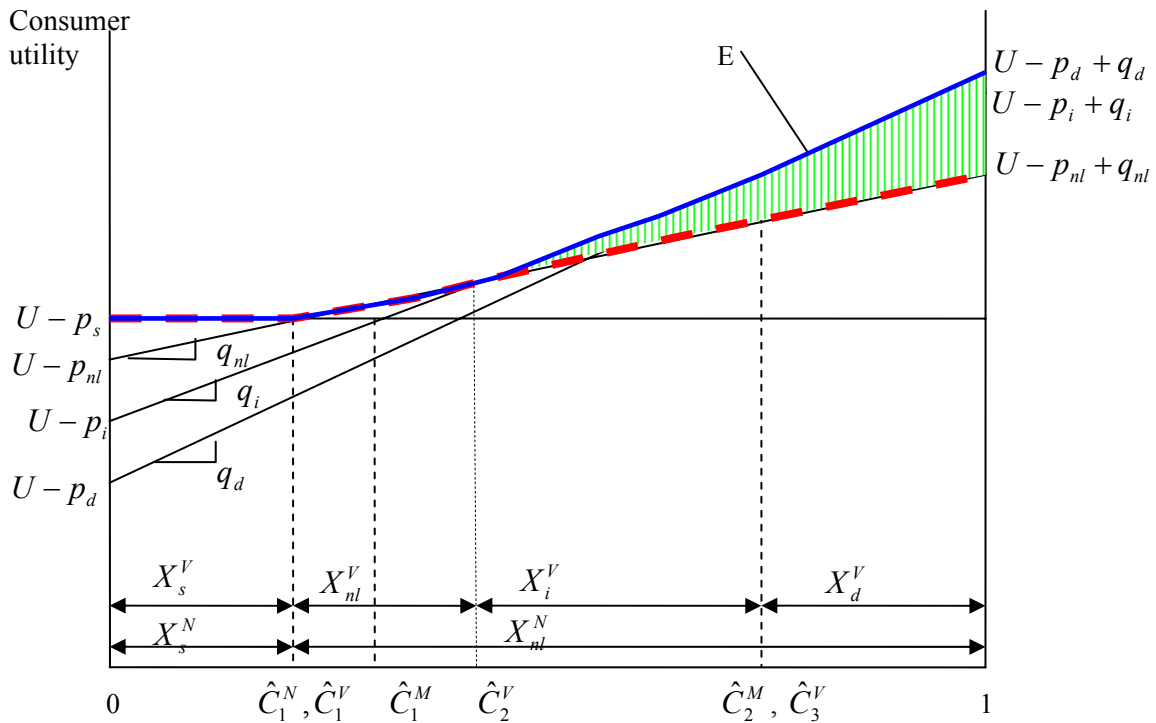


Figure 5. Market and Welfare Effect of a Change from a No COOL to a Voluntary COOL Regime

Aggregate consumer welfare under no country of origin labeling is determined by the area below the dashed kinked curve and aggregate consumer welfare under voluntary country of origin labeling is determined by the area below the solid kinked curve in Figure 5. The introduction of voluntary country of origin labeling results in an undisputed increase in the aggregate consumer welfare, given by the vertically hatched area (E) in Figure 5. The increase in consumer welfare under voluntary country of origin labeling results from an increase in the utility of consumers with medium to high preference for country of origin labeling (i.e., consumers with $C \in (\hat{C}_2^V, 1]$ in Figure 5). For this group of consumers, the utility increase from consuming the labeled imported and domestic products exceeds the utility discount due to their higher prices. Consumers with low to medium preference for country of origin labeling (i.e., consumers with $C \in (0, \hat{C}_2^V)$ in Figure 5)

keep buying the substitute and the non-labeled product, and thus, their welfare does not change. Therefore, unlike the mandatory COOL case where the non-labeled product is not available in the market and consumers with low to medium preferences for country of origin labeling are unable to consume their preferred non-labeled product and have to switch their consumption either to the perceived inferior substitute product or to the more expensive imported product, thus incurring a utility loss; voluntary COOL allows all consumers to choose their preferred product and a utility loss does not occur.

Note that, if the prices of the imported and the domestically produced product, p_i and p_d , respectively, are high such that their utility curves lie underneath the utility curve of the non-labeled product, aggregate consumer welfare will not be affected by the introduction of voluntary country of origin labeling, as consumers will not alter their consumption decisions, i.e., they will keep purchasing either the substitute or the non-labeled product. The greater are the utility enhancement parameters, q_i and q_d , associated with the consumption of the imported and the domestically produced products, respectively, the greater is the gain from introducing voluntary country of origin labeling.

2.3.3 Welfare Effects of a Change from a Voluntary to a Mandatory Country of Origin Labeling Regime

Note that it is assumed that the prices of the domestically produced and imported products will be the same under mandatory and voluntary labeling. Thus, it is implicitly assumed that under mandatory COOL only the producers for whom the cost of COOL does not exceed the benefits of the program will find it profitable to supply in the market (the rest will have to exit the market) and these producers will also find it profitable to voluntarily label their produce when mandatory COOL is not imposed. As a consequence, the market quantities of the imported and domestically produced

products will be the same under voluntary and mandatory COOL implying that the prices of these products will be the same under voluntary and mandatory COOL.

Figure 6 depicts the effective utility curves under mandatory and voluntary country of origin labeling, when $p_s < p_{nl} < p_i < p_d$ and the preference parameters are such that the substitute, the non-labeled, imported and domestically produced products have positive market shares under voluntary COOL, and the substitute, the imported and the domestically produced products have positive market shares under mandatory COOL.

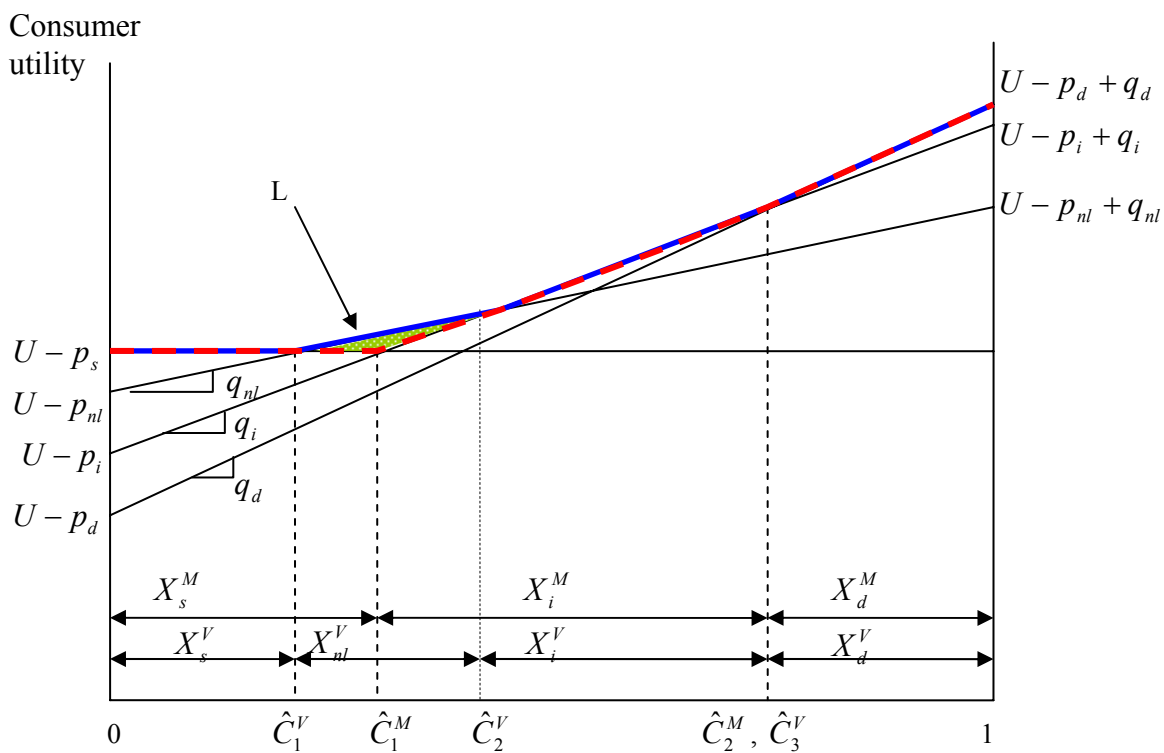


Figure 6. Market and Welfare Effect of a Change from a Voluntary to a Mandatory COOL Regime

Aggregate consumer welfare under voluntary COOL is determined by the area below the solid kinked curve and aggregate consumer welfare under mandatory COOL is determined by the area below the dashed kinked curve in Figure 6. Under mandatory country of origin labeling, the

market share of the non-labeled product is captured by the substitute and the labeled imported products in Figure 6. In this case, the introduction of mandatory country of origin labeling decreases consumer welfare by the dotted area (L) in Figure 6. The decrease in consumer welfare under mandatory country of origin labeling results from a decrease in the utility derived by consumers with characteristics $C \in (\hat{C}_1^V, \hat{C}_2^V)$ that are no longer able to consume their preferred non-labeled product. These consumers are divided into two groups; the first group with low to medium preference for country of origin labeling (i.e., consumers with characteristics $C \in (\hat{C}_1^V, \hat{C}_1^M)$) find it optimal to consume the cheaper inferior substitute product while the second group with relatively stronger preference for country of origin labeling (i.e., consumers with characteristics $C \in (\hat{C}_1^M, \hat{C}_2^V)$) find it optimal to consume the more expensive higher quality labeled imported product.

Figure 6 depicts the case where the net effect of the switch from a voluntary to a mandatory regime on the aggregate consumer welfare is negative. The negative effect (area L) is a result of a decrease in the utility of consumers that were able to consume their preferred non-labeled product under voluntary COOL, but are unable to do so under mandatory COOL. Note that the size of the negative effect (area L) can be reduced if the difference between the prices of and/or consumer preferences towards the non-labeled and labeled products (imported and domestically produced) is small. Figure 6 depicts the case where the prices and the consumer preference parameters are such that the substitute, non-labeled, imported and domestically produced products have a positive market share under voluntary COOL. In this case, the negative effect (area L) can not be eliminated since the difference in prices and/or consumer preferences for the non-labeled and labeled products exists. Under voluntary COOL, if the price of the non-labeled product, p_{nl} , is greater than

$\frac{q_{nl}(p_i - p_s) + q_i p_s}{q_i}$ and/or consumer preferences for the non-labeled product, q_{nl} , are less than

$\frac{q_i(p_{nl} - p_s)}{(p_i - p_s)}$, the non-labeled product will be driven out of the market ($X_{nl}^V=0$). In this case, only

the substitute and the labeled products (imported and domestically produced) will be supplied in the market under voluntary COOL and the switch from voluntary to mandatory COOL will keep consumer welfare unchanged (area L in Figure 6 will disappear).

3. The market and consumer welfare effects of mandatory and voluntary COOL when COOL is viewed as a horizontal attribute

In the vertically differentiated product market examined previously, consumers use the information concerning the country of origin of a product as an indicator of the product's quality and all consumers can uniformly rank the available products in the market in terms of the quality that they possess. Thus, when all products are offered at the same price only the high quality product has a positive market share. In the vertical differentiation model differences in the willingness to pay for the products that are available in the market stem from consumer differences in how much they value quality and/or their ability to pay for their most preferred quality.

However, country of origin labeling may be important for consumers not just for the information that it provides regarding a product's production process and physical attributes, which are directly associated with a product's perceived quality, but also because this information may allow consumers to express their support for the country's economy through their purchasing decisions and may be associated with fond memories of a sense of belonging to a certain country. In this context, consumers may view the different product forms that are available in the market as different product varieties, which may be common in all other characteristics except for the country of their origin.

In this context, the product that is available in different forms related to its origin (i.e., non-labeled, domestically produced and imported) is treated by consumers as a horizontally differentiated product; the different forms/varieties are not uniformly utility-ranked by all consumers as in the vertical differentiation case, and if they are sold for identical prices, each form can have a positive market share. Under this setting, the non-labeled, imported and domestically produced products can be viewed as having a particular location in the product characteristics space and each consumer has a location in this product space as well, which determines the utility derived from the consumption of the products that are available in the market. The horizontal differentiation model developed in this section captures this situation.

3.1 Model Assumptions

The model that is used to examine the market where the products available (i.e., non-labeled, domestically produced and imported) are viewed by consumers as being horizontally differentiated is the unit circle model introduced by Salop (1979). In the circle model, consumers are assumed to be heterogeneous, uniformly distributed around a circle that is of unit circumference, each buying one unit of their preferred product and the purchasing decision represents a small share of their budget. The products available in the market are located at an equal distance from each other.¹⁰ The main advantage of using Salop's circle model rather than the commonly used Hotelling linear model is that the circle does not have end points; the existence of end points in Hotelling's linear model causes non-existence of equilibrium in a game where firms first choose their locations and then compete in prices.¹¹

¹⁰ This assumption stems from the fact that the firms that supply the products in the market have an incentive to locate the furthest away possible from their rivals to increase their market power over consumers located near them (Carlton and Perloff 2004).

¹¹ In Hotelling's model when two firms choose their locations, they have an incentive to locate next to each other in the middle of the line to capture as many consumers as possible from either side of the line while when they compete in prices, they have an incentive to locate the furthest away possible from each other to maximize product differentiation and thus relax price competition (Shy 2004).

Given the above, a consumer's location in the unit circle represents her most preferred product variety associated with the product's country of origin. The further away a consumer is located from an available product, the greater is the disutility derived from consuming that product (i.e., the greater is the difference between the consumer's most preferred country of origin for a given product and the product origins that are available in the market). In general, the utility function from consuming a horizontally differentiated product, κ , where

$\kappa = \{\text{non-labeled, imported, domestically produced}\}$ is given by:

$$(14) \quad U_{\kappa} = U - p_{\kappa} - t|R_{\kappa} - R^*|$$

where U_{κ} is the per unit utility associated with the consumption of product κ . The parameter U is per unit base level of utility derived from the consumption of any form of product κ and it is constant across consumers. The parameter p_{κ} denotes the price of product κ , while the term t is the rate at which consumer utility decreases as a consumer is unable to consume her most preferred product of origin. In other words, t is associated with the disutility derived from not consuming the ideal product of origin and it is assumed to be constant across all consumers. The term R^* denotes a consumer's most preferred product form, regarding the product's country of origin. Finally, $|R_{\kappa} - R^*|$ is the distance between the product R_{κ} and the consumer's favorite product R^* . To keep the analysis simple, it is assumed that the utility derived from consuming product κ is greater than the utility derived from consuming a substitute product for all consumers located on the circle. That is, $U_{\kappa} = U - p_{\kappa} - t|R_{\kappa} - R^*| > U_s \geq 0$.

3.2 The Effect of Country of Origin Labeling on Consumer Purchasing Decisions and Welfare

3.2.1 Consumer Purchasing Decisions and Welfare under No Country of Origin Labeling

Under no country of origin labeling, all product forms (non-labeled, imported and domestically produced) are marketed together as a non-labeled product and sold at the same price. Figure 7 illustrates the horizontally differentiated product space under no country of origin labeling.

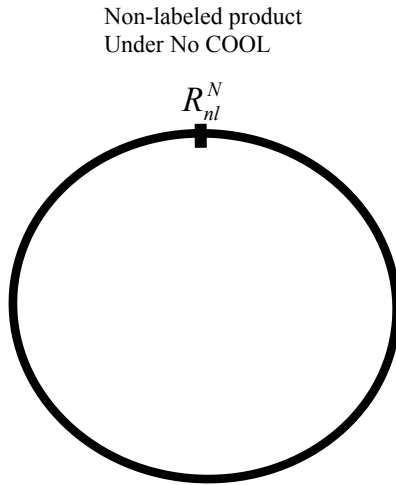


Figure 7. The Horizontally Differentiated Product Space under No COOL

The utility function of the non-labeled product is given by:

$$(15) \quad U_{nl}^N = U - p_{nl} - t|R_{nl}^N - R^*| \quad \text{If a unit of the non-labeled product is consumed}$$

where U_{nl}^N is the per unit utility associated with the consumption of the non-labeled product under no COOL, p_{nl} , denotes the price of the non-labeled product and R_{nl}^N is the location of the non-labeled product under no COOL. All other parameters are as previously defined. Figure 8 depicts the effective utility curve under no country of origin labeling where the horizontally differentiated product circle is stretched into a line.

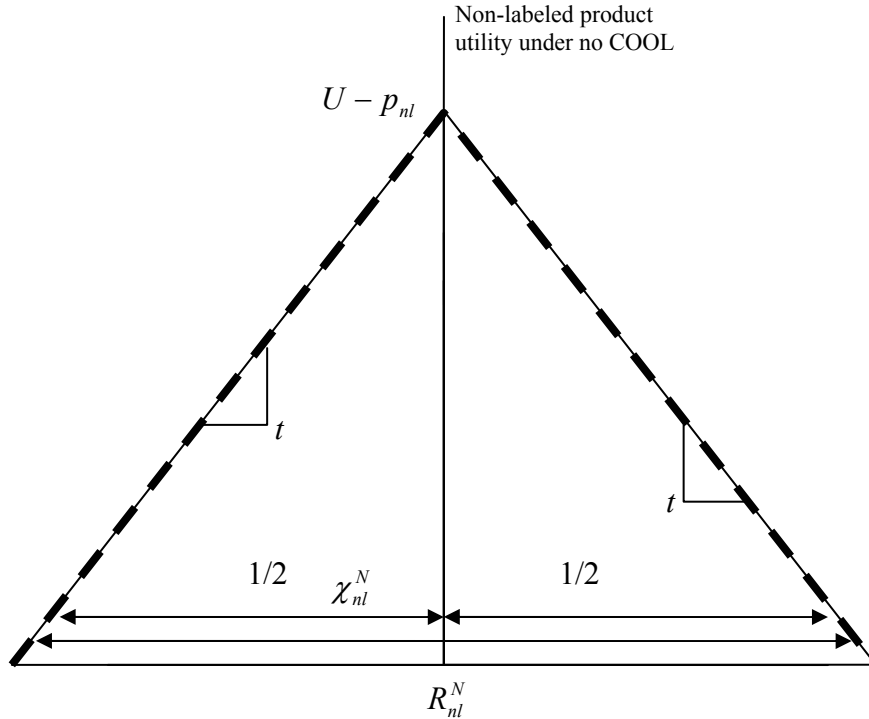


Figure 8. Consumer Purchasing Decisions under No COOL

In Figure 8 consumers located at R_{nl}^N receive the maximum utility from consuming the non-labeled product (i.e., the consumers' most preferred product form is the non-labeled product). The utility received at R_{nl}^N is equal to $U - p_{nl}$. The further away the consumer is located from R_{nl}^N , the lower is the utility received from consuming the non-labeled product. Given our assumption that the substitute product is viewed as inferior by all consumers on the circle, Figure 8 depicts the case where the non-labeled product dominates the market and all consumers participate in the market (i.e., $U_{nl} > U_s \geq 0$ for all consumers on the circle).¹² Thus, the non-labeled product will capture all consumers located at a distance $|R_{nl}^N - R^*| \leq \frac{U - p_{nl}}{t}$. Due to symmetry, the market share of the non-labeled product χ_{nl}^N is then given by:

¹² It is thus assumed that the consumer who is indifferent to the choice between participating and not participating in the market, i.e., the consumer with utility $U_{nl} = 0$, will participate in the market.

$$(16) \quad \chi_{nl}^N = 2|R_{nl}^N - R^*| = 2 \frac{(U - p_{nl})}{t}$$

Equation (16) indicates that when p_{nl} and t increase and/or U decreases, the market share of the non-labeled product decreases. The market share of the non-labeled product is equal to zero when $U = p_{nl}$; that is, when the product is priced such that the consumer consuming her most preferred product (the consumer located at R_{nl}^N) derives zero utility from the product's consumption (i.e., the consumer has all her surplus extracted).

Normalizing the mass of the consumers to one, the market share of the non-labeled product, χ_{nl}^N , represents the demand for non-labeled product (Mussa and Rosen 1978). By solving equation (16) for the price p_{nl} the inverse demand for the non-labeled product is obtained,

$$d_{nl}^N = p_{nl} = U - \frac{t\chi_{nl}^N}{2}. \text{ The aggregate consumer welfare is determined by the area below the}$$

effective utility curve, which is depicted by the kinked dashed line in Figure 8.

3.2.2 Consumer Purchasing Decisions and Welfare under Mandatory Country of Origin Labeling

Under mandatory country of origin labeling, all the covered products should be labeled with their country of origin. In this case, the non-labeled product is not available in the market and consumer purchasing decisions consist of buying the imported or the domestically produced product.

According to the assumption that the available products are located on a unit circle and are equidistant from each other, the distance between the imported product, R_i^M , and the domestically produced product, R_d^M , is $1/2$. Figure 9 illustrates the horizontally differentiated product space under mandatory country of origin labeling, where both the imported and the domestically produced products, R_i^M and R_d^M , respectively, are available in the market.

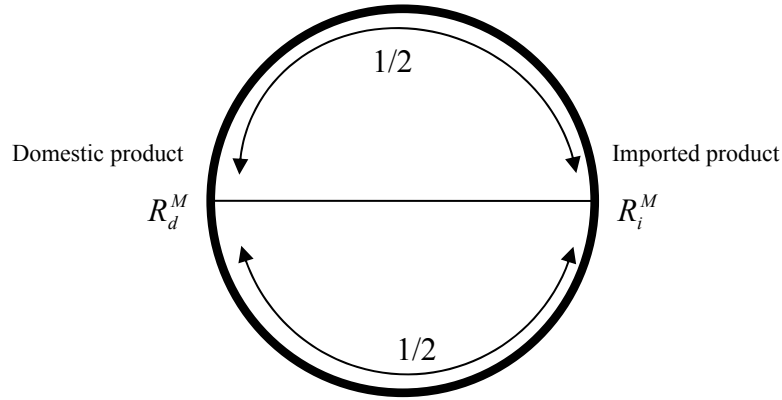


Figure 9. The Horizontally Differentiated Product Space under Mandatory COOL

Consumer purchasing decisions under mandatory COOL are determined by comparing the utilities derived from consuming the two products represented by equations (17) and (18).

$$(17) \quad U_i^M = U - p_i - t|R_i^M - R^*| \quad \text{If a unit of the imported product is consumed}$$

$$(18) \quad U_d^M = U - p_d - t|R_d^M - R^*| \quad \text{If a unit of the domestic product is consumed}$$

where U_i^M and U_d^M are the per unit utilities associated with the consumption of the imported and the domestically produced products, respectively. The parameters p_i and p_d denote the prices of the imported and domestically produced products, respectively. All other parameters are as previously defined.

Figure 10 depicts the effective utility curves under mandatory country of origin labeling where the horizontally differentiated product circle is stretched into a line, all consumers participate in the market, $p_i < p_d$ ¹³ and both products have positive market shares.

¹³ Note that this assumption does not change the qualitative nature of our results and is made for consistency with the vertical differentiation model where $p_i < p_d$ ensured that the imported product would capture a positive market share (i.e., general case). In the horizontally differentiated model where consumers cannot uniformly rank the products, however, even when the prices of the imported and domestically produced product are equal, both products would have a positive market share.

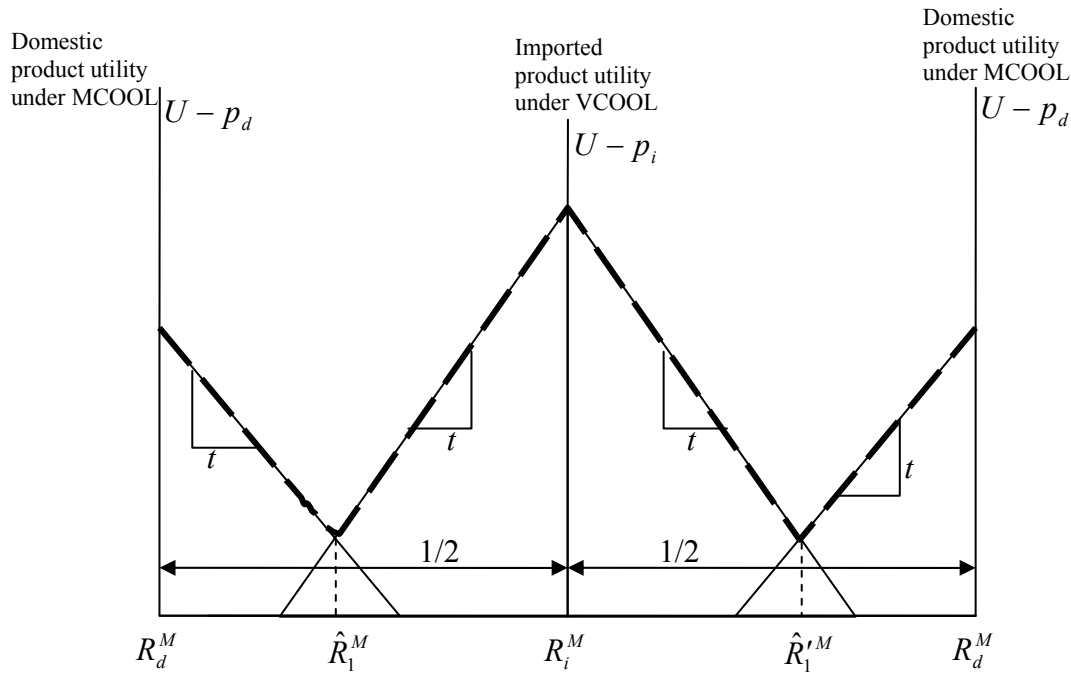


Figure 10. Purchasing Decisions and Consumer Welfare under Mandatory COOL

In Figure 10 consumers located at R_d^M and R_i^M receive maximum utility from consuming the domestically produced and imported products, respectively. The utility received at R_d and R_i is equal to $U - p_d$ and $U - p_i$, respectively. The intersection of the domestically produced and the imported product curves at \hat{R}_1^M corresponds to the consumer who is indifferent between consuming the domestically produced and the imported product and receives the same utility from her consumption ($U_d^M(\hat{R}_1^M) = U_i^M(\hat{R}_1^M) \Rightarrow U - p_d - t|\hat{R}_1^M| = U - p_i - t\left|\frac{1}{2} - \hat{R}_1^M\right|$). The consumer with the differentiating characteristic \hat{R}_1^M , given by $\hat{R}_1^M = \frac{p_i - p_d}{2t} + \frac{1}{4}$, is indifferent between consuming a unit of the domestically produced and imported products (same interpretation for the other segment of the circle). Thus, consumers located in the interval $R \in (R_d, \hat{R}_1^M)$ prefer the domestically produced product and receive utility U_d , while consumers located in the interval $R \in (\hat{R}_1^M, R_i)$

prefer the imported product and receive utility U_i . Due to symmetry, the market share of the domestically produced product χ_d^M is equal to $2|\hat{R}_1^M|$; recall that the domestic product has customers on both the left and right sides of the circle and is given by:

$$(19) \quad \chi_d^M = \frac{p_i - p_d}{t} + \frac{1}{2}$$

Similarly the market share of the imported product χ_i^M is equal to $2\left|\frac{1}{2} - \hat{R}_1^M\right|$ and is given by:

$$(20) \quad \chi_i^M = \frac{p_d - p_i}{t} + \frac{1}{2}$$

Aggregate consumer welfare is determined by the area below the effective utility curve, which is depicted by the kinked dashed line in Figure 10.

Equations (19) and (20) indicate that when the price of the domestically produced, p_d and imported products, p_i increases and/or the rate of disutility t increases, the market share of this product decreases. Note that, when $p_d = p_i$, each of the domestically produced and imported products receives a positive market share equal to $\frac{1}{2}$. The steeper are the utility curves in Figure 10, that is, the greater is t , the lower is the market share gain from a price decrease. Conversely, a small t makes a price decrease more tempting, as it leads to greater market share gains.

Equations (19) and (20) indicate that for the domestic product to have a positive market share its price p_d should be less than $p_i + \frac{t}{2}$. In the case where $p_d \geq p_i + \frac{t}{2}$ the domestic product is driven out of the market, $\chi_d^M = 0$, and the imported product captures the entire market, $\chi_i^M = 1$.

3.2.3 Consumer Purchasing Decisions and Welfare under Voluntary Country of Origin Labeling

Under voluntary country of origin labeling, the non-labeled, imported and domestically produced products may all be available in the market. Given that the available products are located on a unit circle and at an equal distance from each other, the distance between them is $\frac{1}{3}$. Figure 11

illustrates the horizontally differentiated product space under voluntary country of origin labeling, where the non-labeled, R_{nl}^V , domestically produced, R_d^V , and imported, R_i^V , products are available in the market.

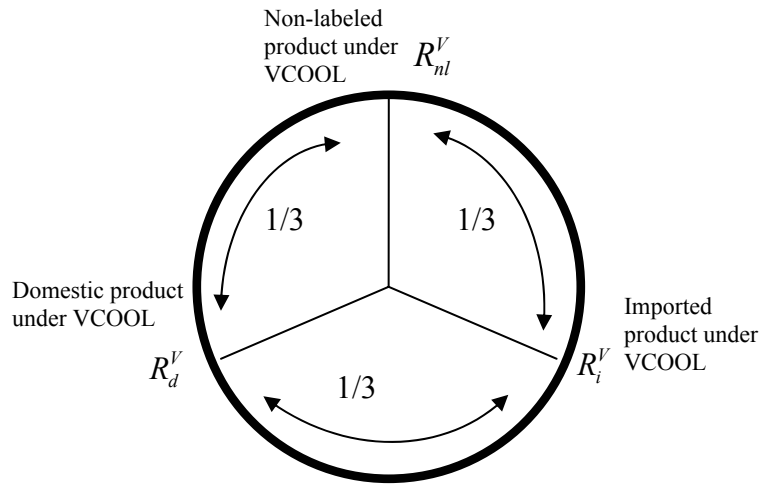


Figure 11. The Horizontally Differentiated Product Space under Voluntary COOL

Consumer purchasing decisions under voluntary COOL are determined by comparing the utilities derived from consuming the three products, represented by equations (21), (22) and (23).

$$(21) \quad U_{nl}^V = U - p_{nl} - t|R_{nl}^V - R^*| \quad \text{If a unit of the non-labeled product is consumed}$$

$$(22) \quad U_i^V = U - p_i - t|R_i^V - R^*| \quad \text{If a unit of the imported product is consumed}$$

$$(23) \quad U_d^V = U - p_d - t|R_d^V - R^*| \quad \text{If a unit of the domestic product is consumed}$$

where U_{nl}^V , U_i^V and U_d^V are the per unit utilities associated with the consumption of the non-labeled, imported and domestically produced products, respectively. The parameters p_{nl} , p_i and p_d denote the prices of the non-labeled, imported and domestically produced products, respectively. All other parameters are as previously defined.

Figure 12 depicts the effective utility curves under voluntary country of origin labeling, where the horizontally differentiated product circle is stretched into a line, all consumers participate in the market, $p_{nl} < p_i < p_d$ and the non-labeled, the domestically produced and the imported products all have positive market shares.

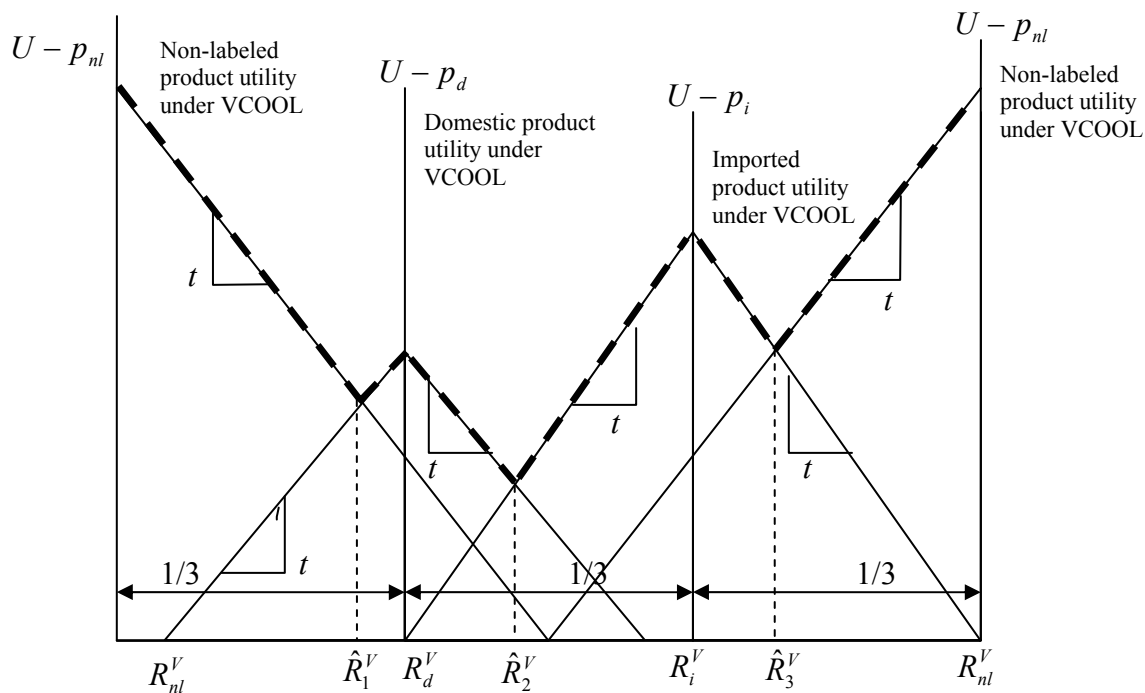


Figure 12. Purchasing Decisions and Consumer Welfare under Voluntary COOL

In Figure 12, consumers located at R_{nl}^V , R_d^V and R_i^V receive maximum utility from consuming the non-labeled, domestically produced and imported products, respectively. The utility

received at R_d^V , R_{nl}^V and R_i^V is equal to $U - p_d$, $U - p_{nl}$ and $U - p_i$, respectively. The consumer with the differentiating characteristic \hat{R}_1^V is given by $\hat{R}_1^V = \frac{p_d - p_{nl}}{2t} + \frac{1}{6}$ and is indifferent between consuming one unit of the domestically produced and non-labeled products (i.e.,

$$U_d^V(\hat{R}_1^V) = U_{nl}^V(\hat{R}_1^V) \Rightarrow U - p_{nl} - t|\hat{R}_1^V| = U - p_d - t\left|\frac{1}{3} - \hat{R}_1^V\right|.$$

The consumer with the differentiating characteristic \hat{R}_2^V is given by $\hat{R}_2^V = \frac{p_i - p_d}{2t} + \frac{1}{6}$ is indifferent between consuming one unit of the

imported and domestically produced products (i.e., $U_d^V(\hat{R}_2^V) = U_i^V(\hat{R}_2^V)$

$$\Rightarrow U - p_d - t|\hat{R}_2^V| = U - p_i - t\left|\frac{1}{3} - \hat{R}_2^V\right|.$$

Finally, the consumer who is indifferent between consuming

one unit of the imported product and one unit of the non-labeled product and receives the same utility from her consumption (i.e., $(U_i^V(\hat{R}_3^V) = U_{nl}^V(\hat{R}_3^V) \Rightarrow U - p_i - t|\hat{R}_3^V| = U - p_{nl} - t\left|\frac{1}{3} - \hat{R}_3^V\right|)$ is

$$\text{given by } \hat{R}_3^V = \frac{p_{nl} - p_i}{2t} + \frac{1}{6}.$$

In Figure 12 consumers that are located in the intervals (R_{nl}^V, \hat{R}_1^V) and (\hat{R}_3^V, R_{nl}^V) prefer the non-labeled product; the closer is the consumer to R_{nl}^V , the weaker is the consumer preference for the product's origin and the greater is the utility received from consuming the non-labeled product. Consumers that are located in the intervals (\hat{R}_1^V, R_d^V) and (R_d^V, \hat{R}_2^V) buy the domestic product; the closer is the consumer to R_d^V , the greater is her utility from consuming the domestic product. Finally, consumers that are located in the intervals (\hat{R}_2^V, R_i^V) and (R_i^V, \hat{R}_3^V) prefer the imported product; the closer is the consumer to R_i^V , the greater is her utility from consuming the imported product.

Given the above, the market share of the non-labeled product under voluntary COOL, χ_{nl}^V ,

is equal to $\left| \hat{R}_1^V \right| + \left| \frac{1}{3} - \hat{R}_3^V \right|$

$$(24) \quad \chi_{nl}^V = \frac{p_d + p_i - 2p_{nl}}{2t} + \frac{1}{3}$$

The market share of the domestically produced product χ_d^V is equal to $\left| \frac{1}{3} - \hat{R}_1^V \right| + \left| \hat{R}_2^V \right|$

$$(25) \quad \chi_d^V = \frac{p_{nl} + p_i - 2p_d}{2t} + \frac{1}{3}$$

The market share of the imported product χ_i^V is equal to $\left| \frac{1}{3} - \hat{R}_2^V \right| + \left| \hat{R}_3^V \right|$

$$(26) \quad \chi_i^V = \frac{p_{nl} + p_d - 2p_i}{2t} + \frac{1}{3}$$

Equations (24), (25) and (26) indicate that when $p_{nl} = p_d = p_i$ the non-labeled, domestically produced and imported products each has a positive market share equal to $\frac{1}{3}$.

Aggregate consumer welfare is determined by the area below the effective utility curves, which is depicted by the kinked dashed curve in Figure 12.

Equation (24) indicates that when p_d and p_i decrease and/or p_{nl} and t increase, the market share of the non-labeled product, χ_{nl}^V , decreases. For the non-labeled product to have a positive market share, its price p_{nl} should be less than $\frac{p_d + p_i}{2} + \frac{t}{3}$; otherwise, $\chi_{nl}^V = 0$. Similarly, equations (25) and (26) indicate that for the domestically produced and imported products to have a positive market share, their prices p_d and p_i should be less than $\frac{p_{nl} + p_i}{2} + \frac{t}{3}$ and $\frac{p_{nl} + p_d}{2} + \frac{t}{3}$, respectively.

3.3 Welfare Effects of Changes in the Products' Labeling Regime

2.3.1 Welfare Effects of a Change from a No Labeling to a Mandatory Country of Origin Labeling Regime

Figure 13 depicts the effective utility curves under no labeling and mandatory country of origin labeling, when $p_{nl} < p_i < p_d$, the non-labeled product has a positive market share under no country of origin labeling and the imported and the domestically produced products have positive market shares under mandatory country of origin labeling.

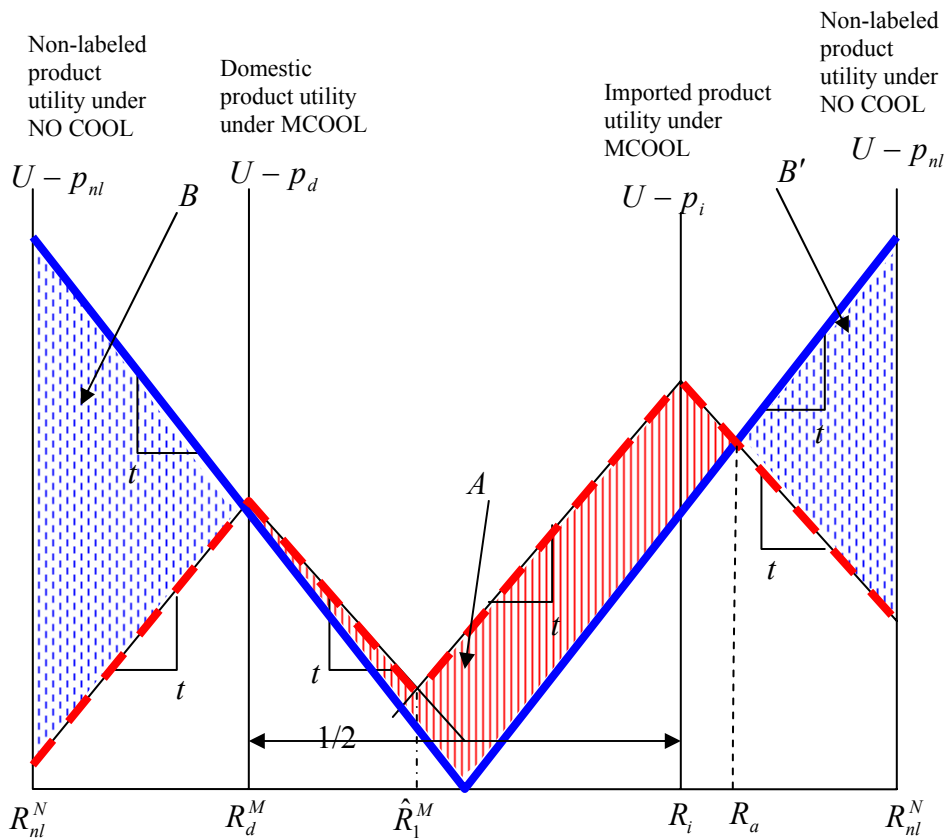


Figure 13. Market and Welfare Effect of a Change from a No COOL to a Mandatory COOL Regime

Aggregate consumer welfare under no country of origin labeling is determined by the area below the solid kinked curve and aggregate consumer welfare under mandatory country of origin

labeling is determined by the area below the dashed kinked curve in Figure 13. The introduction of mandatory country of origin labeling decreases consumer welfare by the dotted areas (B) and (B') , while increases it by the vertically hatched area (A) in Figure 13. The increase in consumer welfare under mandatory COOL results from an increase in the utility of consumers located in the interval (R_d^M, R_a) , in Figure 13, who have a relatively strong preference for country of origin labeling (i.e., they are located closer to the imported and domestically produced labeled product). These consumers receive an increase in their utility under mandatory COOL as the utility received from the consumption of the labeled imported and domestically produced products exceeds the utility discount from the products' higher prices (compared to price paid for the non-labeled product). The decrease in consumer welfare under mandatory COOL is due to the decrease in the utility of consumers located in the intervals (R_{nl}, R_d^M) and (R_a, R_{nl}) in Figure 13. The welfare loss due to mandatory COOL results from a decrease in the utility of consumers with weak preference for country of origin labeling (i.e., consumers located close to the relatively cheaper non-labeled product) and under mandatory COOL cannot consume their preferred non-labeled product.

Figure 13 depicts the case where the net effect of introducing mandatory COOL on the aggregate consumer welfare is negative. Notice that a decrease in the price of the labeled domestically produced and imported products will increase the gain in consumer welfare, area (A) and decrease the welfare loss areas, (B) and (B') , from introducing mandatory COOL. In addition, it has been assumed that consumers are uniformly distributed on a unit circle and the rate at which consumer utility is lowered as a consumer is unable to consume her most preferred product of origin, t , is constant across all the consumers. The relaxing of these assumptions has welfare implications. Thus, if the distribution of consumers is skewed near to the non-labeled product, then the decrease in consumer welfare will be greater as a result of the introduction of mandatory COOL.

In addition, if the rate at which consumer utility decreases as a consumer is unable to consume her most preferred product form is smaller for the non-labeled product than it is for the labeled domestically produced and imported product, the utility curve of the non-labeled product will be flatter and the decrease in consumer welfare will be greater as a result of the introduction of mandatory COOL.

3.3.2 Welfare Effects of a Change from a No Labeling to a Voluntary Country of Origin Labeling Regime

Figure 14 depicts the effective utility curves under no COOL and voluntary COOL, when $p_{nl} < p_i < p_d$, the non-labeled product has a positive market share under no COOL and the non-labeled, the imported and the domestically produced products have positive market shares under voluntary COOL.

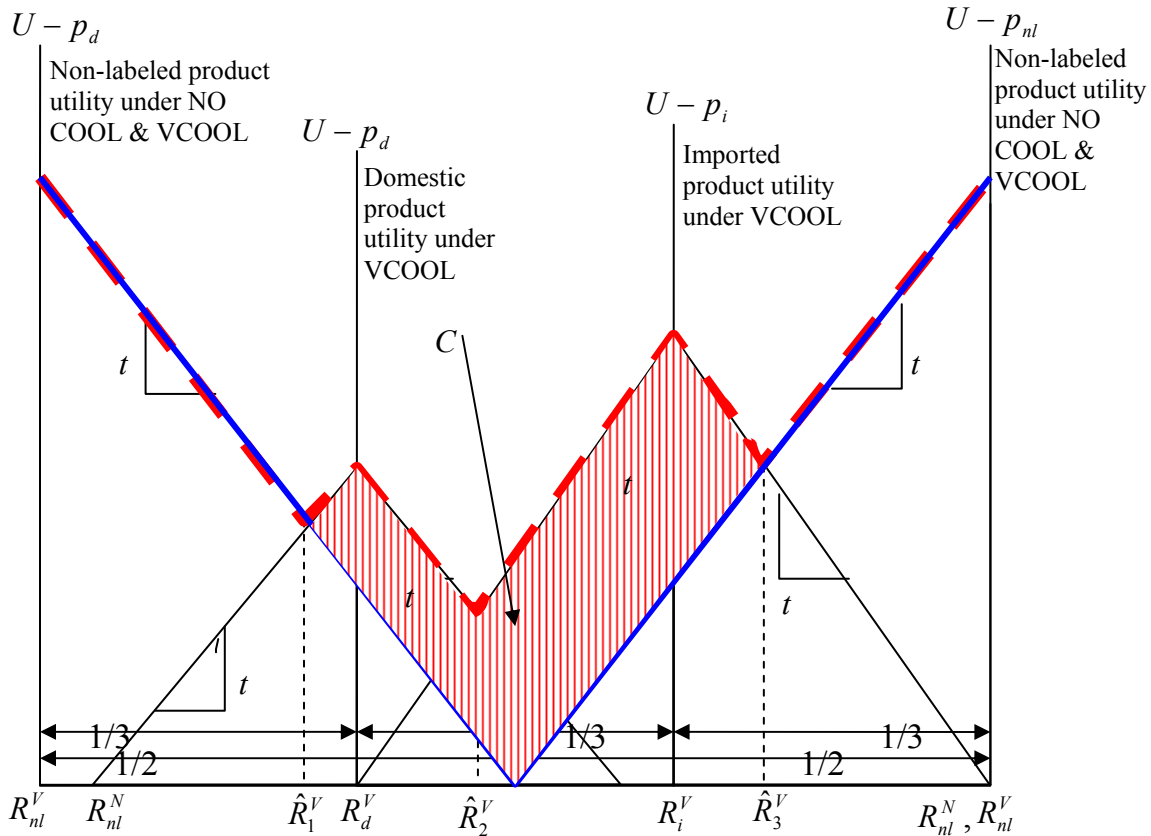


Figure 14. Market and Welfare Effect of a Change from a No COOL to a Voluntary COOL Regime

Aggregate consumer welfare under no country of origin labeling is determined by the area below the solid kinked curve and aggregate consumer welfare under voluntary country of origin labeling is determined by the area below the dashed kinked curve in Figure 14. The introduction of voluntary COOL results in an undisputed increase in the aggregate consumer welfare given by the vertical hatched area (C) in Figure 14.

The increase in consumer welfare under voluntary COOL results from an increase in the utility of consumers located in the interval $(\hat{R}_1^V, \hat{R}_3^V)$, as shown in Figure 14, who have relatively strong preference for country of origin labeling (i.e., they are located close to the labeled (imported and domestically produced) products). For these consumers, the utility received from the consumption

of the labeled imported and domestically produced products exceeds the utility discount from the products' higher prices.

Therefore, unlike the mandatory COOL case, where the non-labeled product is not available in the market and consumers with weak preferences for country of origin labeling (consumers located close to the non-labeled product) have to switch their consumption to the relatively more expensive labeled products, voluntary COOL allows consumers more choices, thus a utility loss does not occur. Note that an increase in the price of the labeled domestically and imported product and/or a decrease in the price of the non-labeled product decrease the gain in consumer welfare (area *C*) from the introduction of voluntary COOL.

2.3.3 Welfare Effects of a Change from a Voluntary to a Mandatory Country of Origin Labeling Regime

Two cases must be considered when examining the welfare effects of a change from a voluntary to a mandatory country of origin labeling regime. The first case, depicted in Figure 15, considers the welfare effects of the change in the labeling regime when relocation of the available products is prohibitively costly. Thus, in this case, when the labeling regime changes from voluntary to mandatory labeling, the imported and domestically produced products do not change their positions on the unit circle. The second case, depicted in Figure 16, considers the welfare effects of a change in the labeling regime when relocation of the available products is possible and costless. In this case, the imported and domestically produced products will relocate under mandatory COOL so that they are located at an equal distance from each other. The case where relocation is possible and costly is also discussed in what follows.

Note that, under the first case, the assumption that relocation does not occur implies that consumer preferences do not change because of a switch in the labeling regime; that is, the consumer who receives maximum utility from consuming the domestically produced or the

imported product is located at the same point on the circle under both voluntary and mandatory labeling. Under the second case, the assumption that relocation occurs implies that consumer preferences (i.e., their location on the unit circle) change because of a change in the labeling regime. Thus, when products relocate under mandatory COOL and are positioned at an equal distance from each other, the consumer who derives maximum utility from a product's consumption is different from the consumer who derives maximum utility from the same product's consumption under voluntary COOL. This situation could arise, for instance, when under voluntary COOL consumers do not place the same level of trust on country of origin labeling as they do when country of origin labeling is mandatory.

Figure 15 depicts the effective utility curves under mandatory and voluntary country of origin labeling, when $p_{nl} < p_i < p_d$, the non-labeled, imported and domestically produced products have positive market shares under voluntary COOL, and the imported and domestically produced products have positive market shares under mandatory COOL and their location does not change because of a change in the labeling regime.

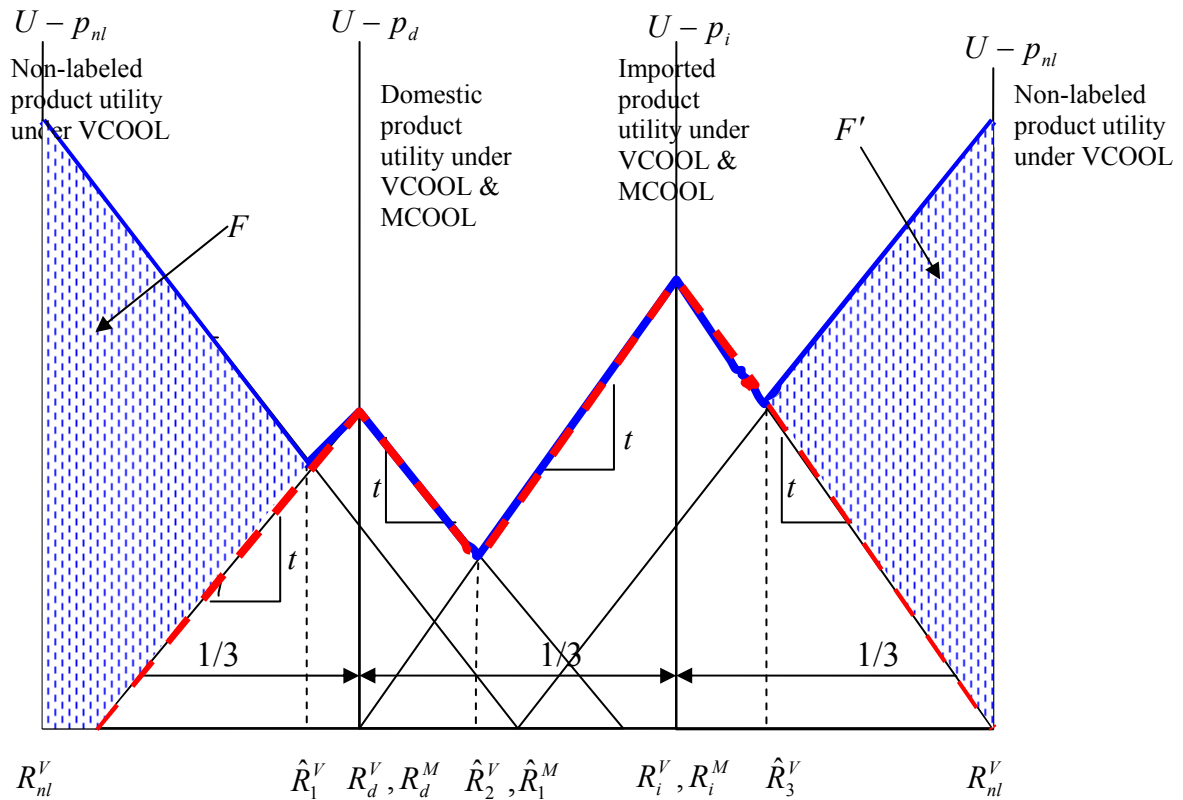


Figure 15. Market and Welfare Effect of a Change from a Voluntary to a Mandatory COOL Regime when the Locations of the Domestically Produced and Imported Products do not Change

Aggregate consumer welfare, when relocation of the available products is prohibitively costly, is determined under voluntary COOL by the area below the solid kinked curve and under mandatory COOL by the area below the dashed kinked curve in Figure 15. Figure 15 depicts the case where the distance between the domestically produced and imported product is $\frac{1}{3}$ under both mandatory and voluntary COOL. The introduction of mandatory COOL decreases consumer welfare by the dotted areas F and F' in Figure 15. The decrease in consumer welfare, under mandatory COOL results from a decrease in the utility of consumers that are no longer able to consume their preferred and relatively cheaper non-labeled product, thus, they switch their

consumption to the relatively more expensive labeled imported and domestically produced products.

Figure 16 depicts the effective utility curves under mandatory and voluntary country of origin labeling, when $p_{nl} < p_i < p_d$, the non-labeled, the imported and the domestically produced products have positive market shares under voluntary COOL, and the imported and the domestically produced products have positive market shares under mandatory COOL and they relocate at an equal distance from each other.

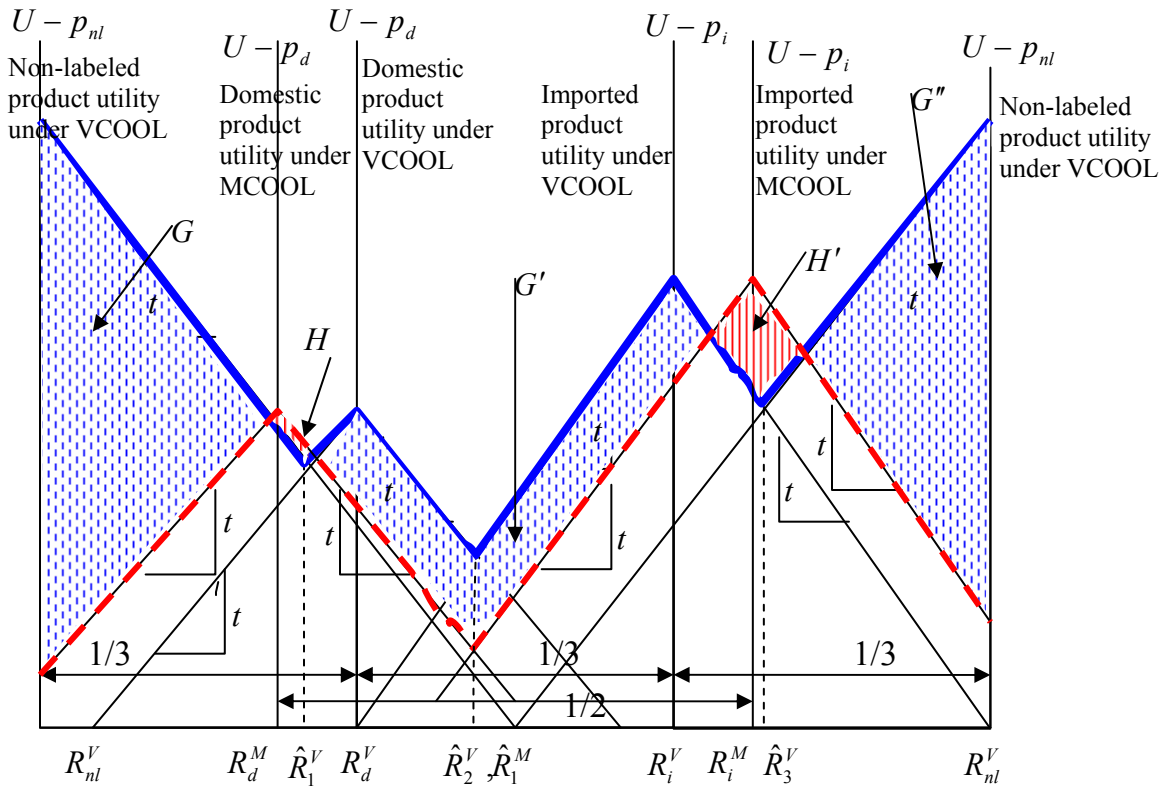


Figure 16. Market and Welfare Effect of a Change from a Voluntary to a Mandatory COOL Regime when the Locations of the Domestically Produced and Imported Products Change

Aggregate consumer welfare, when relocation is possible and costless, is determined under voluntary COOL by the area below the solid kinked curve and under mandatory COOL by the area below the dashed kinked curve in Figure 16. Figure 16 depicts the case where the distance between the domestically produced and the imported product is $\frac{1}{2}$ under mandatory COOL and $\frac{1}{3}$ under voluntary COOL. The introduction of mandatory COOL decreases consumer welfare by the dotted areas G , G' and G'' , while increases it by the vertical hatched areas H and H' in Figure 16. The decrease in consumer welfare, areas G and G'' , results from a decrease in the utility of consumers that are no longer able to consume the relatively cheaper non-labeled product and they switch their consumption to the relatively more expensive labeled imported and domestically produced product. The decrease in consumer welfare (area G') results from a decrease in the utility of consumers that are still consuming the labeled products (imported and domestically produced) under mandatory COOL, but are located further away from the available labeled product forms under mandatory than under voluntary COOL as a result of the products' relocation. The increase in consumer welfare is due to an increase in the utility of consumers that either switch their preferences from the non-labeled to the labeled product, or due to the increase in the utility of consumers that place greater value to country of origin information under mandatory than under voluntary COOL.

Figure 16 depicts the case where the net effect of the switch from a voluntary to mandatory COOL regime is negative. Note that the size of the negative effect areas G , G' and G'' can be reduced if the difference in price between the non-labeled and the labeled product is small, but can not be eliminated even if the prices of the non-labeled and the labeled products are equal.

In addition, Figure 16 depicts the case where the relocation of the imported and the domestically produced products is possible and costless under mandatory COOL. When relocation is costly, however, the prices of the imported and domestic products under mandatory labeling may reflect these costs which will cause the effective utility curve shown by the kinked dashed curve to

shift downward and may eliminate the utility gain areas H and H' and increase the utility loss areas G , G' and G'' . Under this case where relocation is possible but costly and relocation costs are passed on to consumers the change of the labeling regime from voluntary to mandatory COOL will have an undisputed negative effect on consumer welfare.

The country of origin of any given product is a credence attribute, thus, in the absence of labeling consumers cannot generally observe the country of origin of any given product. Labeling can be used as an instrument to transform credence attributes into experience and search attributes, differentiate products and facilitate consumer purchasing decisions.

3. Concluding Remarks

Consumer attitudes towards information concerning country of origin labeling are not homogenous and they can differentiate products vertically or horizontally. Two theoretical models one of vertical and one of horizontal product differentiation were developed and were used to examine the effects of mandatory and voluntary country of origin labeling on consumer purchasing decisions and welfare.

Under the vertical differentiation model, consumers view COOL information as an indicator of a product's quality and all consumers can uniformly rank the products available in the market; thus, in the vertically differentiated market product quality can be viewed as an 'objective' product attribute since all consumers agree on which product possesses the highest quality in the market. Under the horizontal differentiation model, COOL information is not linked to the product's quality in a way that allows consumers to uniformly rank the available product forms. In the horizontally differentiated product market consumers may use COOL information to express political and/or economic support for a given country, thus, their purchasing decisions may not be based only on the product's attributes. The horizontal differentiation model thus allows the study of a market where

product quality is a subjective attribute and consumers do not agree on which product possesses the highest quality.

The analytical results of the vertically differentiated product model show that the market effects of the introduction of mandatory and voluntary COOL depend on the relative prices of the products available in the market, the distribution of consumer preferences, and the value that consumers place on country of origin labeling information as an indicator of the product's quality. In general, the greater is the price of the labeled product (imported or domestically produced) and/or the lower is the consumer preference for information conveyed through country of origin labeling, the smaller is the market share of the labeled products (imported and domestically produced) under both voluntary and mandatory COOL.

The analytical results of the horizontally differentiated product model show that the market effects of the introduction of mandatory and voluntary COOL are determined by the relative prices of the products available in the market and the difference between the consumers' most preferred country of origin for a given product and the product origins available in the market. When the price of a given product is sufficiently high and/or the difference between the consumer's most preferred product origin and the product origins available in the market is sufficiently large and/or the rate of disutility derived when consumers are unable to consume their most preferred product of origin is sufficiently high, the product can be driven out of the market under both voluntary and mandatory COOL.

The horizontally and the vertically differentiated product models are also used to examine the welfare effects of changes in the product's labeling regimes. The analytical results of both models show that the change from a no COOL to a mandatory COOL regime decreases the welfare of consumers with weak preference for COOL, while increases the welfare of consumers with strong preference for COOL. The net welfare effect of the change depends on the distribution of

consumer preferences and the relative product prices. If, for instance, the distribution of consumer preference is not uniform, as it has been assumed throughout the study, but skewed such that more consumers have weak/strong preference for country of origin labeling then the introduction of mandatory COOL may lead to a decrease/increase in aggregate consumer welfare. In addition, the smaller/larger is the difference between the prices of the non-labeled and the labeled products (imported and domestically produced), the greater/smaller is the likelihood that mandatory COOL will lead to an increase/decrease in aggregate consumer welfare.

Both models show that a change from a no COOL to a voluntary COOL regime leads to an undisputed increase in consumer welfare. Specifically, a change from a no COOL to a voluntary COOL regime increases the welfare of consumers with strong preference for COOL, while keeping the welfare of consumers with weak preference for COOL unchanged. In addition, both models predict that the smaller/greater is the price difference between the non-labeled and the labeled products (imported and domestically produced) the greater/smaller is the consumer welfare gain from the introduction of voluntary COOL.

The welfare effects of a switch from a voluntary to a mandatory COOL regime differ in the vertically and horizontally differentiated product models depending on whether product relocation is possible in the horizontally differentiated product market. Thus, the analytical results of the vertically differentiated product model show that a change from voluntary to mandatory COOL leads to a net consumer welfare loss. Specifically, the introduction of mandatory COOL limits consumer choices since the non-labeled product is not available in the market and leads to a decrease in the welfare of consumers with weak preference for COOL, and it keeps the welfare of consumers with strong preference for COOL unchanged. The lower is the price of the non-labeled product under voluntary COOL, the greater is the consumer welfare loss of the introduction of mandatory COOL.

In examining the welfare effects of a change from voluntary to mandatory COOL in the horizontally differentiated product market two cases are considered; the case where products do not relocate as a result of the introduction of mandatory COOL and the case where products relocate. This distinction is made to capture the situation where after the introduction of mandatory COOL the labeled imported and domestically produced products may find it optimal to relocate to maximize the market shares that can be captured.

The analytical results of the horizontally differentiated product model when the labeled products do not change location as a result of the switch from voluntary to mandatory COOL are similar to those in the vertically differentiated model. Specifically, a change from voluntary to mandatory COOL leads to a decrease in aggregate consumer welfare which results from a decrease in the welfare of consumers with weak preference for COOL, while the welfare of consumers with strong preference for COOL remains unchanged.

When the labeled products change their locations as a result of the switch from voluntary to mandatory COOL, the welfare of consumer with both weak and strong preference for COOL decreases but there may be some welfare gains for consumers who place greater value in country of origin information under mandatory COOL than under voluntary COOL. However, even in this case, the net consumer welfare effects of a change from voluntary to mandatory COOL are negative.

The present research focused on the effect of country of origin labeling on the demand side of the market under the no COOL, mandatory and voluntary COOL regimes. The results of this study are based on the assumption of free market entry and no market power in all product markets. The implication of relaxing this assumption is that a price change of one of the products considered (e.g., due to an increase in labeling and/or production costs) will affect the prices of the remaining

products and will thus affect the relative market shares and consumer welfare. The relaxing of this assumption is the focus of future research.

Future research could also examine the effect of country of origin labeling on the supply side of the market under the no COOL, mandatory and voluntary COOL regimes. A theoretical framework can be developed that allows for heterogeneity of producers, processors and/or retailers with respect to the returns those agents can capture from implementing country of origin labeling. This framework can then be used to examine the welfare implications of voluntary and mandatory COOL for the agents in the supply chain that may be affected from a change in the labeling regime.

References

- Becker, G. S. (1999), "Country-of-Origin Labeling for Foods: Current Law and Proposed Changes." The Committee for the National Institute for the Environment, 1725 K Street, NW, Suite 212, Washington DC, October 21, 1999.
- Brester, G. W., Marsh, J. M., and Atwood, J. A. (2004), "Distributional Impacts of Country of-Origin Labeling in the U.S. Meat Industry", *Journal of Agricultural and Resource Economics*, 29(2):206-227.
- Buhr, B. L. (2003), "Traceability, Trade and COOL: Lessons form the E.U Meat and Poultry Industry", presented at the International Agricultural Trade Research Consortium Meeting, Monterey, CA, December. Working Paper# 03-5.
- Canadian Cattle Identification Agency (CCIA) (2005), Canadian Cattle Identification Program. Available at: <http://www.canadaid.com>.
- Carlton, D. W. and Perloff, J. M. (1999), "Modern Industrial Organization", Third Edition, Addison-Wesley publishers.
- Davis, E. E. (2003), "Estimate of Start-up Costs Country of Origin Labeling Requirements to the Texas Beef Cattle and Beef Sectors." Texas A&M University extension Fact Sheet (July 2003), Available at: <http://www.livestock-marketing.tamu.edu/COOL.html>.
- Dickinson, D. L., and Bailey, D. (2002), "Meat Traceability: Are US Consumers Willing to Pay for it?" *Journal of agricultural and Resource Economics*, 27(2), 348-364.
- European Commission Directorate-General for Agriculture. (2004), "Protection of Geographical Indications, Designations of Origin and Certificates of Specific Character for Agricultural Products and Foodstuffs", Available at: http://www.fsai.ie/industry/forums/artisan/docs/EC_WD_overview.pdf.
- Farmers' Advance (2004), "Producer Groups Applaud Proposed COOL Program", your Farm and Auction Weekly Newspaper. Top news stories vol.106, NO.25. Available at: http://www.farmersadvance.com/june23_1.html.
- Fulton, M., and Giannakas, K. (2004), "Inserting GM Products into the Food Chain: The Market and Welfare Effects of Different Labeling and Regulatory Regimes", *American Journal of Agricultural Economics*, 86, 42-60

- Gatti, M. M. (1995), "Labeling Requirement in Canada and Mexico", Article appeared in the 1995 North American Trade Guide, Available at:
<http://www.gattiassociates.com/CM/Articles/Articles1295.asp>.
- Giannakas, K. (2002), "Information Asymmetries and Consumption Decisions in Organic Food Product Markets", *Canadian Journal of Agricultural Economics*, 50, 35-50.
- Giannakas, K. and Yiannaka, A. (2003), "Agricultural Biotechnology and Organic Agriculture: National Organic Standards, Labeling and Second Generation of GM Products", European Association of Agricultural Economists (EAAE) Seminar in Chania, Greece.
- Hanselka, D., Davis, E., Anderson, D., and Capps, O. (2004), "Demand Shifts in Beef Associated with Country-of-Origin Labeling to Minimize Losses in Social Welfare", CHOISES, the magazine of food, farm and resource issues.
- Haucap, J., Wey, C., and Barmbold, J. F. (1997), "Location Choice as a Signal for Product Quality: the Economics of Made in Germany", *Journal of Institutional and Theoretical*, 153, 510-531.
- Hayes, D. J., and Meyer, S. R. (2003), "Impact of Country of Origin Labeling on US Pork Exports." White paper, Department of Economics, Iowa State University, Ames, 2003.
- Hobbs, J. E. (2003), "Traceability and Country of Origin Labeling," Farm Policy Developments and Policy Tensions Under NAFTA, Policy Disputes Information Consortium, Montreal, Quebec, April 23-26, 2003.
- Ittersum, K. V., Meulenberg, M. T. G. and Van Trijip, H. C. M. (2003), "Determinants of the Accessibility of Regional-Product Information", *Advances in Consumer Research*, 30, 180-187.
- Japan External Trade Organization (JETRO) (2004), "Guide to the JAS System. For Agricultural and Forest Products", Available at:
<http://www.jetro.go.jp/en/market/regulations/pdf/jas2004mar-e.pdf>
- Lans I., Van D., Ittersum, K., Cicco, A. and Loseby, M. (2001), "The Role of the Region of Origin and E.U Certificates of Origin in Consumer Evaluation of Food Products", *European Review of Agricultural Economics*, 28, pp. 451-477.
- Loureiro, M. L., and Umberger, W. J. (2003), "Estimating Consumer Willingness to Pay for Country-of-Origin Labeling" *Journal of Agricultural And Resource Economics*, 28, 287-301.

- Lusk, J. L., and Anderson, J. D. (2004), "Effects of Country-of- Origin Labeling on Meat Producers and Consumers", *Journal of Agricultural and Resource Economics*, 29(2), 185-205.
- Moussa, M. and Rosen, S. (1978), "Monopoly and Product Quality", *Journal of Economic Theory*, 18, 301-17
- Schupp, A. and Gillespie, J. (2001b), "Handler Reactions to Potential Compulsory Country of Origin Labeling of Fresh and Frozen Beef", *Journal of Food Distribution Research*, 33(1), 161-171
- Shy, O. (1995), "Industrial Organization: Theory and Applications". The MIT Press, Cambridge, Massachusetts.
- Sparks companies, INC. (2003), "COOL Cost Assessment", Prepared by the Sparks/CBW Cansortium Memphis, TN.
- Sterns, J., House, L., VanSickle, J., and Wysocki, A. (2004), "COOL and Consumers' Willingness to Pay in the Fresh Produce Industry-Some Initial Impressions from the Field" Selected Paper Prepared for Presentation at the Southern Agricultural Economics Association Annual Meeting, Tulsa, Oklahoma.
- The New Rules Project-Agriculture (2003), "European Union Country-of-Origin Labeling", Available at: <http://www.newrules.org/agri/cooEU.html>
- Umberger, W. J., Feuz, D. M., Calkins, C. R. and Sitz, B. M. (2003), "Country of Origin Label of beef products: U.S. Consumers' Perceptions", *Journal of Food Distribution Research*, 34(3), 103-116.
- US Department of Agriculture, Agricultural Marketing Service (2003), "Mandatory Country of Origin Labeling of Beef, Lamb, Pork, Fish, Perishable Agricultural Commodities, and Peanuts", Available at: <http://burns.senate.gov/files/interimfinalruleforfish&shellfish.pdf>.
- US Department of Agriculture, Agricultural Marketing Service (2002), "Information on the Estimated Costs of the Annual Reporting and Recordkeeping Burden Associated with the Guidelines for the Interim Voluntary Country of Origin Labeling for Beef, Lamb, Pork, Fish, Fresh and Frozen Fruits and Vegetables, and Peanuts", Available at: <http://www.ams.usds.gov/cool/costs.htm>

VanSickle, J. R., McEowen, C. R., Taylor, N. H. and Connor, J (2003), “Country of Origin Labeling: A Legal and Economic Analysis”, International Agricultural Trade & Policy Center PBTC 03-5. May 2003.