Trade Policy Reform: How to Win Wide-ranging Support?

Fabian Bergès, Sylvette Monier-Dilhan

Dans Recherches économiques de Louvain 2013/2 (Vol. 79), Pages 27 à 43

Éditions De Boeck Supérieur

ISSN 0770-4518
ISBN 9782804180454
DOI 10.3917/rel.792.0027

Article disponible en ligne à l’adresse

Découvrir le sommaire de ce numéro, suivre la revue par email, s’abonner...
Flashez ce QR Code pour accéder à la page de ce numéro sur Cairn.info.

Distribution électronique Cairn.info pour De Boeck Supérieur.
La reproduction ou représentation de cet article, notamment par photocopie, n’est autorisée que dans les limites des conditions générales d’utilisation du site ou, le cas échéant, des conditions générales de la licence souscrite par votre établissement. Toute autre reproduction ou représentation, en tout ou partie, sous quelque forme et de quelque manière que ce soit, est interdite sauf accord préalable et écrit de l’éditeur, en dehors des cas prévus par la législation en vigueur en France. Il est précisé que son stockage dans une base de données est également interdit.
Trade Policy Reform:
How to Win Wide-ranging Support?

Fabian Bergès*
Sylvette Monier-Dilhan**

1 Introduction

The international trade liberalization advocated by the World Trade Organization (WTO, 2010) during the past few decades has had an ambiguous effect on trade policy strategies. While tariffs have undergone continuous reduction, the adoption of various Non-Tariff Barriers (NTBs) has increased (Yu, 2000). Anderson and Schmitt (2003) show that this phenomenon, known as the “Law of constant protection”, arises from rational government strategy when negotiating tariff decreases bilaterally.

Although quotas and antidumping procedures are the most common NTBs, there are also non-price (or quantity) barriers called technical barriers to trade (TBTs), the use of which has almost doubled from 32% to 59% of affected tariff lines over the 1994-2004 period (UNCTAD, 2005). Some TBTs impose specific requirements on imported goods in such a way that compliance renders the imported product very similar to the domestic one, but at a higher production cost for the international producer (see Anders & Caswell, 2007). Others TBTs do not impose such requirements, but instead differentiate the domestic good from the imported one by emphasizing its

---

* Toulouse School of Economics (Gremaq-Inra) & IDEI, MF 217, 21 Allée de Brienne, F-31000 Toulouse, France
Mail: Fabian.Berges@toulouse.inra.fr
Phone: +33.5.61.12.85.80
Fax: +33.5.61.22.55.63

** Observatoire du Développement Rural (ODR), Institut National de la Recherche Agronomique
Chemin de BORDE ROUGE, BP 52627, F-31326 CASTANET TOLOSAN – Cédex (France)
Mail: Sylvette.Monier@toulouse.inra.fr

1 However, there is mixed evidence from an empirical point of view. Feindberg and Reynolds (2007) confirmed the law of constant protection for developing countries based on a sample of 41 WTO member countries. The same conclusion was confirmed for India by a recent study by Bown and Tobar (2011). Nevertheless, Moore and Zanardi (2009) tempered previous conclusions by finding a strong correlation between less trade liberalization and antidumping success, using a sample of 23 developing countries.
intrinsic characteristics through designations of origin labeling and domestic content requirement schemes (for example, Country Of Origin Labeling and certification policies like the European Union Geographic Indication system, or certification marks in the United States of America). In this paper, we focus on the latter kind of TBTs, which decrease the degree of substitutability between the imported good and the domestic one for consumers.

Popular opinion holds that a decrease in tariffs leads to more trade between countries and thus improves social welfare. This is based on the classic Ricardo and Hecksher-Ohlin models, which assume no market power for firms in trading countries. However, the introduction of vertical structure in the domestic market, in the form of intermediate firms such as retailers between manufacturers and consumers, may jeopardize such a favorable conclusion. By adapting their contracts with retailing firms, domestic manufacturers can restrict new international suppliers from entering the domestic market, thereby reducing imports (see Spencer & Jones, 1991 and 1992). Avenel & Barlet (2006) show that this is especially the case when local anti-trust authorities are lenient.

In this paper, we explicitly examine contractual agreements in an imperfect competition framework by introducing a vertical structure in the domestic country between a manufacturer (upstream firm) and a retailer (downstream firm). The vertical structure allows us to uncover the retailer’s strategy of using imports as a tool to increase his bargaining power relative to that of the manufacturer. We consider two different trade policies: tariff decrease and NTBs increase. The tariff is assumed to be an import tax rate on the final good that the retailer pays when he buys from the competitive world market, whereas the non-tariff barriers are modeled as a proxy for the degree of substitutability between the domestic good and the imported good. We then analyze the impact of each policy (or a combination of both) on firms’ profits, consumers’ surplus and social welfare.

Our first finding is that a trade reform aimed only at decreasing the import tariff is not accepted by all agents; especially not by upstream firms. However, every increase in NTBs is profitable to the vertical structure, because it reduces domestic competition between goods, and favorable to consumers, who enjoy greater product variety. The main conclusion is that the implementation of NTBs can overcome the reluctance of agents harmed by a tariff decrease, so that everyone is better off.

Our’s is a positive economic paper in the sense that it highlights the conflicts of interests that arise from trade policy reform in a simple economy; distinguishing trade obstacles by their nature (tariff barriers and labeling that communicates the origin of products is becoming prominent in the agrofood sector (Anders and Caswell, 2009).

Note that the retailer just resells the good without any transformation, so the producer is selling the retailer a final manufactured good. Tariffs and non-tariff barriers apply exclusively to the final good and the input market is not considered at all in our framework. 

2 Labeling that communicates the origin of products is becoming prominent in the agrofood sector (Anders and Caswell, 2009).

3 Note that the retailer just resells the good without any transformation, so the producer is selling the retailer a final manufactured good. Tariffs and non-tariff barriers apply exclusively to the final good and the input market is not considered at all in our framework.
non-tariff barriers) and telling them apart from market structure complexity (upstream and downstream conflict of interests).

The paper is structured as follows: Section 2 presents the framework we use to analyze trade policy reform, while section 3 exhibits the market equilibrium with a producer-retailer vertical structure. Section 4 then analyzes the consequence of various trade policy reforms and, finally, section 5 concludes.

2 The Framework

We consider a vertical structure composed of a manufacturer and a retailer. Manufacturer $M$ produces a good domestically with a quadratic cost function: $c(q) = \frac{c}{2} q^2$, where $q$ is the quantity level and $c$ a cost parameter. His products can be sold on two markets. First, he sells part of his production output ($q^D$) to a domestic retailer $R^4$. The retailer incurs no cost for his activities and sells the good to final consumers at price $p^D$. We assume a two-part tariff contract between the manufacturer and the retailer, where the wholesale price $w^D$ and the franchise fee $F^D$ are fixed according to a Nash Axiomatic framework$^5$. The parameter $\gamma$ denotes the manufacturer’s bargaining power, and $(1-\gamma)$ that of the retailer. Second, the manufacturer can also sell part of his production ($q^X$) on the «World Market». We assume that the World Market is perfectly competitive, which implies that the manufacturer is anonymous and not big enough to influence the world equilibrium price. Since NTBs are generalized across countries and practices, we assume that the manufacturer of the domestic country acts as a price-taking agent$^6$. In this framework, we suppose there are no export taxes. Assuming that the world price is exogenous and equal to $w$, the manufacturer can export any quantities he wants (completely elastic world demand); his revenues will thus be $w \cdot q^X$.

Analogously, the retailer has two supply sources. He can either buy from the domestic manufacturer, paying him the unit wholesale price $w^D$ and the franchise fee $F^D$, or buy from the World Market. In the latter case, the retailer faces an *ad-valorem* import tax set to $t$ by the domestic

---

$^4$ All variables related to the domestic market will be denoted with a D superscript, the ones related to the imported good will be denoted with the I subscript, and X will denote variables related to exportation.

$^5$ For a detailed presentation of the Nash negotiation game and its topological characteristics, see the book by Osborne & Rubinstein (1990). For its application to trade negotiations, see Chan (1988) and Hamilton and Requate (2004).

$^6$ According to Finger, Ingco and Reincke (1996) the number of NTBs increases with the number of countries involved in these NTBs. We observe the same trend for geographical indications (Josling, 2006), which can be viewed as technical barriers to trade that typically modify the degree of substitutability between the domestic good and the imported one.
Government. Therefore, the unit price paid by the retailer to import is \( w(1 + t) \). The final price charged to consumers for the imported good is \( p' \). Note that the manufacturer’s good is the final good, in the sense that the good is not transformed by the retailer\(^7\).

Consumers do not consider the domestic good and the imported good as perfect substitutes. This can be explained by the fact that the domestically produced good may meet certain domestic standard requirements and/or may be labeled differently from the imported good\(^8\). Because many countries supply goods to the World Market, the imported product may differ from the domestic good. The label allows consumers to distinguish between the imported good and the domestic one.

The representative consumer’s utility function is assumed to have a quasi-linear and quadratic form:

\[
U(q^0, q^D, q^I) = (1 + \alpha)q^D + (1 + \alpha)q^I - \frac{1}{2} ((q^D)^2 + \beta q^D q^I + (q^I)^2) + q^0
\]

where \( q^0 \) is the Hicksian composite commodity with a price normalized to 1.\(^9\) The parameter \( \alpha \) is a measure of the market size for total demand, while the parameter \( \beta \in [0,1] \) denotes the degree of substitutability between the domestic and the imported good in consumers’ demand\(^10\). Demands for the domestic good (denoted \( q^D(p^D, p^I) \)) and the imported good (denoted \( q^I(p^D, p^I) \)) derived from such preferences are given by:

\[
\begin{align*}
q^D(p^D, p^I) &= \frac{1 + \alpha}{1 + \beta} \frac{1}{1 - \beta^2} \cdot p^D + \frac{\beta}{1 - \beta^2} \cdot p^I \\
q^I(p^D, p^I) &= \frac{1 + \alpha}{1 + \beta} \frac{\beta}{1 - \beta^2} \cdot p^D - \frac{1}{1 - \beta^2} \cdot p^I
\end{align*}
\]

The parameter \( \beta \) summarizes the NTBs by reflecting the degree of differentiation between the two goods: when \( \beta \to 0 \), goods are independent, i.e. demand for the domestic good (resp. imported good) depends only on its own price; and when \( \beta \to 1 \), consumers tend to consider goods as perfect substitutes\(^11\). This parameter can also be interpreted as a measure of the importance consumers attach to the standard. By increasing product differentiation, the creation of a label (such as PDO or certification trademarks)

\(^7\) The result is that the import tariff has an impact on the final price through the taxation of the intermediate (import) price.
\(^8\) The cost of presenting domestic production to the Domestic Standards Agency that provides the label is not formalized.
\(^9\) This form of utility function is widely used in industrial organization to tackle imperfect competition, as well as in international economics to model differentiation between domestic and imported goods. See, for example, Bernhofen (2001) or Raff and Schmitt (2009).
\(^10\) The interpretation of \( \alpha \) as the market size parameter in the comparative static analysis has to be considered for a given level of \( \beta \). For more details, see Irmen (1997).
\(^11\) For example, country-of-origin labeling (COOL) is a horizontal product characteristic.
mechanically lowers product substitutability. This will clearly differentiate
the imported good from the domestic one, and can thus be regarded as an
increase in NTB, because it is prejudicial to the imported good. The more
consumers care about the domestic label, the more independent the goods
will be. One can also imagine compatibility issues by which the domestic
good and the imported good may not be fully compatible for use on a given
device (see Régibeau and Rocketty, 2006).

Demand equation (1) depicts symmetry in consumers’ reactions to a
change in the price of the domestic or the imported good. Nevertheless, it
turns out that, in market equilibrium, consumers are more sensitive to a
change in the price of the imported good than of the domestic one\textsuperscript{12}. This
reflects the fact that consumers care about the domestic label.

The framework is summarized in Figure 1.

\textbf{Figure 1} The economic framework with vertical structure

We now turn to the negotiation process and solve for the equilibrium
wholesale price and franchise fee between the manufacturer and the retailer.

\textsuperscript{12} We want to thank one anonymous referee for this point. Using equations (6)
and (7) which characterize the market equilibrium, one can easily show that
\[
\frac{p^R(t)}{q^R(\beta t)} < \frac{p^I(t)}{q^I(\beta t)} \Rightarrow \left| \epsilon_t \right| < \left| \epsilon_t \right| \quad \text{since} \quad \frac{dq^I}{dp^I} = \frac{dq^I}{dp^R} = - \frac{1}{1 - \beta^2}.
\]
3 Market Equilibrium with the Vertical Structure

The manufacturer and the retailer negotiate the domestic product’s wholesale price and the associated franchise fee. Since we assume that this negotiation takes place according to a Nash Axiomatic framework, we first need to consider the disagreement equilibrium. This is comprised of the threat points of the negotiation and stipulates the profit each agent will make if the negotiation on the domestic product fails.

We first define each agent’s reservation profit when the manufacturer and the retailer do not reach an agreement (see Appendix A for more details of the resolution): The manufacturer sells all his production output to the World Market (pure exporting), while the retailer buys exclusively from the World Market and pays the import tariff. The reservation profits are:

\[
\begin{align*}
\pi^M &= \frac{w^2}{2c} \\
\pi^R &= \frac{1}{4}(1 + \alpha - w(1 + t))^2 
\end{align*}
\]  

(2)

The retailer and the manufacturer negotiate in order to reach an agreement on the sale of the domestic product. The gross surplus (GS) of the two products is thus defined by (see Appendix B for more details of the resolution):

\[
GS(\beta, t) = (p' - w(1 + t)) \cdot q'(p^D, p') + p^D \cdot q^D(p^D, p') + w \cdot q^X - c \left( \frac{(q^X + q^D(p^D, p'))^2}{2} \right)
\]  

(3)

The net surplus (NS) necessary to find an agreement takes account of each firm’s threat point, that is:

\[
NS^*(\beta, t) = GS(\beta, t) - \pi^M - \pi^R = \frac{(1 + \alpha)(1 - \beta) + w(1 + t)\beta - w)^2}{4(1 - \beta^2)} > 0
\]  

(4)

The wholesale price is set to the equilibrium marginal cost \( w^{DR} = w \) and the franchise fee is only used to split the net surplus between the two agents according to their bargaining power parameter (\( \gamma \in [0, 1] \)):

\[
\pi^{M*}(\beta, t) = \gamma \cdot NS^*(\beta, t) + \pi^M \quad \text{and} \quad \pi^{R*}(\beta, t) = (1 - \gamma) \cdot NS^*(\beta, t) + \pi^R.
\]

At the end, each agent gets:

\[
\begin{align*}
\pi^{M*}(\beta, t) &= \gamma \left( \frac{(1 + \alpha)(1 - \beta) + w(1 + t)\beta - w)^2}{4(1 - \beta^2)} + \frac{w^2}{2c} \right) \\
\pi^{R*}(\beta, t) &= (1 - \gamma) \left( \frac{(1 + \alpha)(1 - \beta) + w(1 + t)\beta - w)^2}{4(1 - \beta^2)} + \frac{1}{4}(1 + \alpha - w(1 + t))^2 \right)
\end{align*}
\]  

(5)
The equilibrium prices are:

\[
\begin{align*}
p^{*r}(t) &= \frac{1}{2} \left(1 + \alpha + w(1 + t)\right) \\
p^{*p}(t) &= \frac{1}{2} \left(1 + \alpha + w\right)
\end{align*}
\]  

(6)

The equilibrium quantities are:

\[
\begin{align*}
q^{*r}(\beta, t) &= \frac{(1 + \alpha)(1 - \beta) - w(1 - \beta) - wt}{2(1 - \beta^2)} \\
q^{*p}(\beta, t) &= \frac{(1 + \alpha)(1 - \beta) - w(1 - \beta) + w\beta t}{2(1 - \beta^2)} \\
q^{*x}(\beta, t) &= \frac{1}{4} \left[ \frac{4w}{c} - \frac{wt}{1 - \beta} + \frac{w(2 + t) - 2(1 + \alpha)}{1 + \beta} \right]
\end{align*}
\]  

(7)

Note that \(q^{*r}(\beta, t)\), \(q^{*p}(\beta, t)\) and \(q^{*x}(\beta, t)\) are positive as long as \(t < \frac{(1 + \alpha - w)(1 - \beta)}{w} = \overline{t}(\beta)\).

When both goods are sold, the domestic government benefits from fiscal revenues given by:

\[
G^*(\beta, t) = wtq^{*r}(p^{*r}) = \frac{wt \left[ (1 + \alpha)(1 - \beta) - w(1 + t - \beta) \right]}{2(1 - \beta^2)} > 0 \text{ when } t < \overline{t}(\beta) \]  

(8)

A first remark is that domestic sales are greater than those of imported products. This is quite trivial as the retailer pays \(w^{*p} = w\) for each domestic unit whereas he pays \(w(1 + t)\) for the imported ones.

A second remark is that the total quantity produced by the manufacturer does not depend on import taxes: \(q^{*p} + q^{*x} = \frac{w}{c}\). This is due to the fact that the equilibrium wholesale price is set to \(w^{*p} = w\). The manufacturer earns the same unit revenue from exports as from domestic sales. Therefore, the total quantity produced is based on the marginal cost, which depends on the opportunity cost embodied in the World Market price.

The equilibrium strategies for the manufacturer and the retailer are to find an agreement in order to be able to sell both goods on the domestic market and enjoy the monopoly outcome. This monopoly outcome is then split between them in the vertical structure according to their respective bargaining strengths. Note that an agreement is always found, as the net surplus to be divided is strictly positive. Therefore, the disagreement outcome, in which the manufacturer only exports and the retailer only imports goods, is not implemented in equilibrium. The disagreement outcome only acts as a threat point in the negotiation, which allows each agent to secure some minimal profits.
Regarding consumers, their net surplus is defined by (see Appendix C):

\[
CS^* (\beta t) = U(q^D, q^J, q^0) - p^D q^D - p^J q^J - q^0
\]

\[= \frac{1}{2} ((q^D)^2 + 2 \beta q^D q^J + (q^J)^2) \]

We now analyze the effects of trade policy reform on the domestic economy. According to the observed facts, such a policy consists of lowering import taxes and/or increasing non-tariff barriers that translate into less substitutability between products. The next section will consider the impact of the trade policy reforms on the market and its consequences for agents’ profits.

4 The Effects of Trade Policy Reforms

We first analyze the effects of a decrease in the import tax on each agent’s surplus. We then turn to an analysis of the impact of label requirement modifications that affect the substitution parameter. Finally, we look at how these different trade policy tools may be combined to create a broad consensus among economic actors.

4.1 Import Tariff Reform

A decrease in the tax translates into a decrease in the production of the domestic good and an increase in the quantity of imported goods. The total quantity sold on the market rises because the deadweight loss created by taxation is reduced.

Trade liberalization through the lowering of import tariffs has often been deemed to improve welfare. International trade may stimulate competition between firms and achieve an efficient allocation of production between countries. In addition to this, trade liberalization improves product diversity, which may be favoured by consumers. In our framework, lowering the import tariff does not benefit the vertical structure surplus, even if it improves social welfare.

**Proposition 1.** Lowering the import tariff decreases the net surplus to be split in the negotiation between the manufacturer and the retailer. The manufacturer will not benefit from a tariff decrease, whereas the retailer’s profit will increase.

**Proof:**

The derivative of the net surplus of the negotiation (eq. 4) with respect to \(t\) is given by:

\[
\frac{\partial NS^* (\beta, t)}{\partial t} = \frac{w\beta((1 + \alpha)(1 - \beta) + w(1 + t)\beta - w)}{2(1 - \beta^2)} > 0
\] (9)
This derivative is always positive, indicating that the net surplus decreases when \( t \) is reduced.

As the manufacturer’s profit is defined by \( \pi^M(\beta, t) = \gamma NS^*(\beta, t) + \frac{w^2}{2c} \), and \( NS^*(\beta, t) \) decreases as \( t \) decreases, \( \pi^M(\beta, t) \) also decreases whatever his bargaining power.

The retailer’s profit is: \( \pi^R(t) = (1 - \gamma)NS^*(t) + \frac{1}{4}(1 + \alpha - w(1 + t))^2 \). So:

\[
\frac{\partial \pi^R(\beta, t)}{\partial t} < 0 \quad \text{for} \quad t < \frac{(1 + \alpha - w)(1 - \beta)(1 + \beta \gamma)}{w(1 - \beta^2 \gamma)}
\]

As \( t \) is only relevant in \([0, \bar{t}]\) and because \( \frac{1 + \beta \gamma}{1 - \beta^2 \gamma} > 1 \), we have \( \frac{(1 + \alpha - w)(1 - \beta)(1 + \beta \gamma)}{w(1 - \beta^2 \gamma)} > \bar{t} \). Therefore, the retailer’s profit always increases as long as \( t \) decreases in \([0, \bar{t}]\).

Equation (10) summarizes the different effects of a tariff decrease in the vertical structure’s net surplus.

\[
NS(t) = [p^I - w(1 + t)]q^I + p^D q^D + wq^X - c \frac{(q^D + q^X)^2}{2} - \pi^V - \pi^R
\]  

A decrease in the import tariff lowers the price of the imported good and its demand rises. But since the price decreases at a lower rate than the cost of the imported good (see eq. (6)), the retailer’s margin on the imported good increases and the retailer’s profit earned on the imported good therefore increases\(^{13}\). With regards to the domestic product, a decrease in \( t \) makes the domestic quantities sold by the manufacturer fall, and as the final price does not change, domestic sales decrease (see eq. (6) and (7)). Besides, as the manufacturer keeps his total production constant, the quantities he exports to the World market increase due to the loss in domestic demand. The last effect of the tariff decrease concerns the threat points of the manufacturer and the retailer, given in equation (2). Whereas the manufacturer’s reservation profit remains constant, the retailer has a higher disagreement pay-off as the imported good becomes cheaper.

The retailer’s profit increases because the gain on his outside option overrides the lower share he gets from the vertical structure split. The imported good becomes cheaper and this plays to his advantage in the negotiation with the manufacturer. Conversely, the manufacturer’s loss is not compensated for by any modification of his reservation profit, and the reform therefore translates directly into a decrease in the producer’s profits.

\(^{13}\) Profit on the imported good is defined by \( (p^I - w(1 + t)) \cdot q^I \).
This conflict of interest in the vertical structure can shed some light on the reasons why producers are often averse to trade policy reform. In fact, domestic producers’ incentives are clearly stacked up against trade liberalization as the retailer becomes more independent from their domestic product. This forces manufacturers to leave them higher returns in order to find an agreement on the sale of the domestic good. Additionally, trade policy reform fails to provide these two partners with a larger *cake* to split.

Consumers benefit unambiguously from a decrease in the import tariff since it decreases the price of the imported good. This generates more profitable transactions (by decreasing the deadweight loss of the tax) and thus increases consumers’ surpluses (see Appendix C).

The domestic government may either benefit or not from the trade policy reform, depending on the goal it wants to achieve. Its fiscal revenues \( G'(t) \) are at their maximum for a level \( \tilde{t} = \frac{(1 + \alpha - w)(1 - \beta)}{2w} < \bar{t} \). Therefore, if the initial tax rate is above \( \bar{t} \), a decrease in the import tariff makes fiscal revenues higher, but if the initial tax rate is below \( \bar{t} \), the domestic government loses out on fiscal income. Depending on the initial tax rate level, a government attentive to fiscal revenues may be reluctant to ratify trade policy reform despite the resulting increase in social welfare.

### 4.2 Effect of Non-Tariff Barriers

In previous decades, governments used to negotiate substantial import tax reductions, whereas currently trade policy reforms mainly focus on the removal of ‘non-tariff barriers’. As advocated by Marette and Beghin (2010), one can regard either a standard awarded to a domestic good (such as a geographical indication), or weak compatibility between domestic and imported goods, as examples of *non-tariff barriers*. The awarded standard allows the domestic good not to be considered by consumers as being on the same competitive level as the imported one. In our framework, when the horizontal differentiation parameter \( \beta \) decreases, the two goods become less and less of a substitute for consumers. This can be interpreted as the result of higher consumer loyalty to the domestic standard.

**Proposition 2.** When non-tariff barriers increase, it results in a higher net surplus to be split in the vertical structure. The profits of the manufacturer and the retailer increase.

**Proof:**

The derivative of the net surplus to be split between \( M \) and \( R \) is:

\[
\frac{\partial NS^*(\beta, \bar{t})}{\partial \beta} = \frac{w(t - \bar{t})(t \beta + \bar{t})}{2(1 - \beta^2)^2} < 0 \quad \text{when} \quad 0 < t < \bar{t}
\]
As the substitution parameter does not play a part in the reservation profits, it is straightforward that both $\pi^U^*$ and $\pi^R^*$ decrease with respect to $\beta$.

Equation (11) summarizes the different effects of an increase in NTBs (i.e. a decrease in $\beta$) in the vertical structure net surplus.

\[
NS(\beta) = \left[ p^t - w(1+t) \right] \left[ q^t + p^t q^d + w q^d - c \left( \frac{(q^d + q^x)^2}{2} \right) \right] \left( \frac{1}{1+\beta} \right) \left( \frac{T}{t} \right) \beta_t \left( \frac{T}{t} \right) \beta_t
\]

When the two products become more differentiated, the net surplus to be split in the vertical structure is greater. Both agents in the vertical structure are thus inclined to increase non-tariff barriers. The reduced competition between goods resulting from domestic standard enforcement drives up the retailer’s profits on the imported good. The revenue effect of total production (domestic and exports) depends on the level of the import tax.

From a consumer’s point of view, the increase in NTBs translates into less competition between the domestic and the imported good, and thus into higher prices, but above all into greater product variety as product differentiation increases. This latter effect overrides the former one, resulting in an increase in the consumers’ surplus when NTB increases (see Appendix C).

The domestic government gains on fiscal revenues as $q^r$ increases with NTBs. A policy targeting the proliferation of NTBs is an easy way for government to increase fiscal revenues, since all the agents in the economy will benefit from it. This could explain why we observe the implementation of an increasing number of NTBs at national levels in high-income countries (see Beghin, 2006 or Anders and Caswell, 2009).

### 4.3 Coupled Trade Policy Reform

In previous decades, trade policy reform consisted, principally, in negotiating inter-state agreements on reducing import tariffs. However, this policy was not supported by local manufacturers, while an increase in NTBs benefits everyone in the economy. This may therefore explain why governments reinforce NTBs in order to back a targeted decrease in import taxes. The remaining question is whether there is such a thing as a coupled trade policy reform that makes everyone better off?

**Proposition 3.** There exist market conditions such that an import tax decrease and an increase in NTBs are supported by all agents.

**Proof:** The following table summarizes each agent’s profit variation according to the trade policy tool used.
Table 1 Variation in agents’ profits with respect to $t$ and $\beta$

<table>
<thead>
<tr>
<th>Agent</th>
<th>Decrease in import tax</th>
<th>Increase in NTBs</th>
<th>Decrease in import tax and increase in NTBs ($t \downarrow$ and $\beta \downarrow$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer $\pi^M(\beta, t)$</td>
<td>$\downarrow$</td>
<td>$\uparrow$</td>
<td>$\uparrow$ if $\frac{\partial t}{\partial \beta} &gt; \beta(1 - \beta^2)$</td>
</tr>
<tr>
<td>Retailer $\pi^R(\beta, t)$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
</tr>
<tr>
<td>Consumers $CS(\beta, t)$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
</tr>
<tr>
<td>Domestic Government $G(\beta, t)$</td>
<td>$\downarrow$ if initial tax $&lt; \hat{t}$</td>
<td>$\uparrow$</td>
<td>$\uparrow$ if $\frac{\partial t}{\partial \beta} &gt; \frac{t(1 - \beta)\hat{t} + \beta t}{(1 - \beta^2)(t - \hat{t})}$</td>
</tr>
<tr>
<td>Social Welfare $SW(\beta, t)$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
</tr>
</tbody>
</table>

It can be seen that if $\frac{\partial t}{\partial \beta} > \beta(1 - \beta^2)$, then a coupled trade policy is Pareto-improving since reluctance towards the decrease in tariffs can always be compensated for by higher non-tariff barriers in order to please the domestic Government and the manufacturer.

5 Conclusion

By explicitly taking into account the vertical structure of the domestic market, our model reveals the potential conflict of interest between upstream and downstream firms, which would have remained hidden otherwise. We show that a trade policy aimed at decreasing import taxes will raise the reserve profit the retailer secures in his negotiation with the manufacturer of domestic goods. While the development of NTBs has mainly been justified by the improvement in market efficiency, such as increased information on products in the case of labeling, our model stresses the fact that, by strengthening domestic standards, NTBs increase each agent’s payoffs.
In our framework, a government wanting to implement targeted tariff decreases may increase NTBs in order to gain manufacturers’ support and create a broad consensus among the political stakeholders. This can explain the empirical observation that a proliferation of domestic standards (TBTs) at the national level often goes hand in hand with lower tariffs resulting from government negotiations.

There are, however, limits to this article’s conclusions. One of them concerns downstream competition. In our framework, the retailer has a monopoly on both goods sold to consumers. This absence of competition makes NTBs increase, resulting in a higher consumer surplus since the retailer perfectly internalizes interbrand substitutability (prices unchanged). Taking retailer competition into account could lead to higher prices and thus to lower social welfare when goods’ substitutability decreases, which could jeopardize the broad consensus on coupled trade-policy reform. Moreover, we may imagine that fiscal revenues can be used to pay for costly label implementation. A modification of the substitution parameter between products due to a strengthening of the domestic label may also impact on domestic manufacturers’ production costs, making them reluctant to support an increase in NTBs.

Acknowledgments: We wish to thank the participants of the “4ème Colloque International”, jointly organized by the World Trade Organization (WTO), United Nations (UN), Université Lumière Lyon II and Université Mohammed V-Souissi in Rabat (Morocco) on November 11th - 13th 2010, for their discussions.

Appendix A

Determination of the Reservation Profits

When the manufacturer and the retailer cannot agree on the wholesale price and the franchise fee, the retailer only offers the imported good to consumers. In this case, the demand for the imported good is given by:

\[ q'(\infty, p') = (1 + \alpha) - p' \]

The manufacturer sets marginal revenue equal to marginal cost, such that:

\[ c'(q^*) = w \Leftrightarrow q^* = \frac{w}{c} \]

14 The \( \infty \) symbol is used to denote the absence of the domestic good, as if the domestic good price were so high that no consumer would buy it. This demand is found in (1) by replacing the price \( p^D \) by the limit price cancelling the \( q^D \) domestic demand: \( p^D \lim = (1 - \beta)(1 + \alpha) + \beta p' \).
This production gives him a reservation profit equal to:
\[ \pi_M = \frac{w^2}{2c} \]

The retailer maximizes his profit:
\[ \pi^R(p') = (p' - w(1+t)) \cdot q'(x, p') \]

This leads him to set the price of the imported good to:
\[ p'(t) = \frac{1}{2} (1 + \alpha + w(1+t)) \]

thereby achieving a reservation profit of
\[ \pi^R = \frac{1}{4} (1 + \alpha - w(1+t))^2. \]

The domestic government gets a fiscal revenue from import tariffs that is equal to:
\[ G = w \cdot t \cdot q' = \frac{1}{2} wt(1+\alpha-w(1+t)) \]

This fiscal revenue is positive as long as \( w < \frac{1+\alpha}{1+t} \).

**Appendix B**

**Cooperative Nash Negotiation Resolution**

The joint objective function to be maximized is that of an axiomatic Nash framework, which is to say the gross surplus removed from the retailer and manufacturer’s reserve profits. The net surplus to be maximized jointly is thus that computed using equations (9) and (10). The program is:

\[
\max_{\{p', p^D, q, q^D, q^P\}} \left( p' - w(1+t) \right) \cdot q'(p', p^D) + p^D \cdot q^D(p', p^D) \]

\[ -\frac{1}{4} (1 + \alpha - w(1+t))^2 + w \cdot q^X - \frac{c}{2} \left( q^D(p', p^D) + q^X \right)^2 - \frac{w^2}{2c} \]

This leads to the following equilibrium:
\[ p'^*(t) = \frac{1}{2} (1 + \alpha + w(1+t)) \quad \text{and} \quad q'^*(\beta, t) = \frac{(1 + \alpha)(1-\beta) - w(1+t-\beta)}{2(1-\beta^2)} \]
\[ p'^*(t) = \frac{1}{2} (1 + \alpha + w) \quad \text{and} \quad q'^*(\beta, t) = \frac{(1 + \alpha)(1-\beta) - w(1-\beta(1+t))}{2(1-\beta^2)} \]
The wholesale domestic price set by the manufacturer is fixed to the marginal cost, in order to avoid any quantity distortion within the domestic vertical structure. The total production of the manufacturer is given by $q^D + q^X = \frac{w}{c}$. Due to the manufacturer’s quadratic cost structure, the marginal cost of the domestic product in equilibrium is:

$$w^D = \frac{\partial c \cdot (q^D + q^X)}{\partial q^D} = c \cdot (q^D + q^X) = w$$

The franchise fee $F^D$, paid by the retailer to the manufacturer, is then set to split the maximal equilibrium net surplus according to each agent’s bargaining power. It is defined such that:

$$(p' - w(1 + t)) \cdot q'(p', p^D) + (p^D - w^D) \cdot q^D(p', p^D) - F^D = (1 - \gamma) \cdot NS'(\beta t) + \frac{1}{4}(1 + \alpha - w(1 + t))^2$$

where $NS'(\beta t) = \frac{(w + (1 + \alpha)(1 - \beta) + w(1 + t)\beta)^2}{4(1 - \beta^2)}$.

### Appendix C

#### 5.1 Consumers’ Surplus Variation according to Trade Policy Reform

The consumers’ surplus is defined by the gross quadratic utility of quantities consumed minus prices paid, that is:

$$CS'(\beta t) = U(q^0, q^t, p^0) - p^0 q^0 - p^t q^t - q^0$$

where $U(q^0, q^t, p^0) = (1 + \alpha) q^0 + (1 + \alpha) q^t - \frac{1}{2}((q^0)^2 + \beta q^0 q^t + (q^t)^2) + q^0$

Incorporating inverse demand functions $p^D(q^0, q^t, q^0)$, $p^I(q^0, q^t, q^0)$ and $p^0(q^0, q^t, q^0)$ the consumers’ surplus boils down to:

$$CS'(\beta t) = \frac{1}{2}((q^0)^2 + 2\beta q^0 q^t + (q^t)^2)$$

Its variation according to an import tariff decrease is given by:

$$\frac{\partial CS'(\beta t)}{\partial t} = \frac{w(1 + t - \beta) - (1 + \alpha)(1 - \beta)}{4(1 - \beta^2)} = -\frac{wq^t'(\beta t)}{2} < 0$$
Therefore, a decrease in the import tariff increases the consumers’ surplus. The variation in consumers’ surplus according to NTBs is defined by:

$$\frac{\partial CS^* (\beta, t)}{\partial \beta} = \frac{w(1 + t - \beta) - (1 + \alpha)(1 - \beta) - (1 - \beta) - (1 + \alpha)(1 - \beta)}{4(1 - \beta^2)^2}$$

$$= -q^* (\beta, t)q^D (\beta, t) < 0$$

Therefore, an increase in NTBs (translating into a decrease of $\beta$) increases the consumers’ surplus.

Bibliography


