

Sensitive Products: Selection and Implications for Agricultural Trade Negotiations

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It has been widely recognized in the Doha negotiations that a formula-based negotiation on agricultural tariffs is essential if significant progress is to be made in these negotiations. The Framework Agreement (WTO 2004) that guides the current negotiations specifies that the reductions should be undertaken using a tiered formula, in which larger cuts are made in higher tariffs.

While there is general agreement on the tiered formula approach, there are widespread demands for exceptions from the application of such a formula. From the industrial countries, the demands for “sensitive” products seem likely to result in agreement that countries can subject a specified proportion of tariff lines to reduced disciplines. A number of developing countries have, in addition, sought latitude to subject an additional set of products to reduced disciplines on the grounds that they are “special” products, particularly important for livelihoods or for food self-sufficiency.

Unlike a specific tariff reduction formula, there is no mechanical way to identify the implications of allowing countries to designate a certain percentage of their tariff lines as ‘sensitive’. A key question, and the one on which we focus, is the choices that countries are likely to make in the designation of such sensitive products within an agreed framework on multilateral liberalization, and the implications of these choices for market access liberalization. To do this, we first propose a simple model of the preferences of policy makers, and use it to assess which products they are likely to designate as sensitive given the option to do so. Our approach focuses very much on policy choices within a single country, following in the footsteps of Grossman and Helpman (1994).

We make the fundamental assumption that the demands for flexibility are the result of a government seeking to maximize the same political-economy function that gave rise to the original tariffs, while being willing to undertake international trade negotiations because of the potential for greater gains through these negotiations. We recognize that this is not the only possible perspective on this issue. An alternative view might see the demand for flexibility as a consequence of a lack of correspondence between current tariffs and the current political-economy function. Within the context of a negotiated agreement that is the best available outcome from a Grossman-Helpman (1995) negotiation, governments may wish to adjust some tariffs in ways not consistent with the agreed formula because the political support for these tariffs no longer justifies their being treated symmetrically with other tariffs.

We tend to favor the first explanation because the second would see a willingness to reduce some tariffs by more than the agreed formula amount—and we almost never observe such willingness in the negotiations. Further, the first interpretation has value for the sub-game in which countries choose the products to be treated with flexibility within an overall agreement, whether the international agreement is the best available outcome or not. Analysis of the question we examine has important informational value. Individual WTO members will generally have available to them information on the effects of a tariff-cutting formula on their own tariffs. Their information on the implications for other countries' tariffs—and hence for their market access opportunities—is much less readily available and a key purpose of this paper is to provide information on these implications.

We see this single-country analysis as a potential building-block towards an analysis of the best approach to manage such demands for flexibility in international trade negotiations, while maintaining the broad goals of the negotiations. An important extension for future work would examine approaches that could be used to achieve the goals of international trade negotiations in spite of the behavior at the national level examined in this paper.

Our first step in this paper is to develop a framework for predicting the choices of national governments on the products to be treated as “sensitive” and subjected to reduced disciplines. Then, we turn to an assessment of the implications of these choices for average tariffs, and for market access.

The Selection of Sensitive Products

To help formulate the problem, we begin by specifying an objective function for policy makers that follows Grossman and Helpman (1994) in taking into account the benefits to politicians from providing protection to particular sectors. At the same time, it takes into account the costs to consumers and taxpayers of providing this protection. Our objective function is expressed in money terms as:

$$(1) \quad W(\mathbf{p}, \mathbf{u}, \mathbf{v}) = -e(\mathbf{p}, \mathbf{u}) + g(\mathbf{p}, \mathbf{v}) + \mathbf{h}'\mathbf{p} + \mathbf{z}_p(\mathbf{p}-\mathbf{p}^*)$$

where e is the consumer expenditure function, defined over a vector of domestic prices, \mathbf{p} and the utility level of the representative household, \mathbf{u} ; $g(\mathbf{p}, \mathbf{v})$ is a net revenue or GDP function defined over domestic prices and a vector of specific factors, \mathbf{v} ; \mathbf{p}^* is the vector of foreign market prices for traded goods, so that $(\mathbf{p}-\mathbf{p}^*)$ gives tariff rates; \mathbf{e}_p and \mathbf{g}_p are vectors of first derivatives and, by the envelope theorem, the demand and supply of each good; $\mathbf{z}_p = \mathbf{e}_p - \mathbf{g}_p$ is a vector of net imports; $\mathbf{z}_p(\mathbf{p}-\mathbf{p}^*)$ is tariff revenues, assumed to be

redistributed to the household; and the elements of \mathbf{h} are the differences from the unitary weights on benefits to consumers, producers and taxpayers used in the Balance of Trade function (see Anderson and Neary 1992) and those that motivate political decisions.

We focus on the sub-game in which a country, even a large country, takes as given the policy choices of other countries and, hence, the vector of world prices, p^* . While we recognize that large economies such as the US, the EU, China and India, could recognize that they affect world prices for some commodities by their decisions on sensitive products, we assume that these effects are either ignored, or assumed equal across commodities—by the policy makers responsible for decisions on the small number of products to be designated as sensitive. This seems consistent with the choices made by such economies on technical issues such as the “tariffication” of non-tariff barriers (Hathaway and Ingco 1996).

The \mathbf{h} weights reflect four distinct features identified by Anderson (1986) and Lindert (1991): (i) the political-economy power of the sectors that benefit from protection (almost always producer interests, as observed by Smith (1776)); (ii) the impact of own output prices on the returns to specific factors in that sector; (iii) the adverse impacts on the costs of other politically-influential groups of protecting a particular sector; and (iv) the import share that determines the balance of benefits between tariff revenues and transfers to producers. If we have available a complete model of the economy, we can directly observe impacts of changes in tariffs on sectoral profits; on the costs of other powerful sectors; and the relative importance of transfers and tariff revenues. Since we would like to work at a much higher level of disaggregation than the production and intermediate input data available to us, we must treat the elements of the \mathbf{h} vector as

reduced form coefficients incorporating all four elements involved in the political-economy determination of protection.

Formally, our \mathbf{h} term is derived from the weighting of different factor returns in Grossman and Helpman (1994). Since it does not appear to have been used before, we present its relation to other measures. If we begin from the function $g(\mathbf{p}, \mathbf{v})$ in (1), we note that:

$$g(\mathbf{p}, \mathbf{v}) = \mathbf{v}' \mathbf{g}_v = \mathbf{p}' \mathbf{g}_p$$

where \mathbf{g}_v is the vector of returns to fixed factors, and \mathbf{g}_p is the vector of derivatives of g with respect to \mathbf{p} which, by the envelope theorem, equals the net output of goods. By the Stolper-Samuelson theorem:

$$\mathbf{g}_v = \mathbf{S} \cdot \mathbf{p}$$

where \mathbf{S} is the Stolper-Samuelson matrix relating output prices to factor returns.

In addition, we need to take into account the weights that Grossman and Helpman suggest politicians apply to non-numeraire factor returns. We do this by using a diagonal matrix, \mathbf{B} giving the weights applied to non-numeraire factor returns. Using this, we may write:

$$g(\mathbf{p}, \mathbf{v}) + \mathbf{h}' \mathbf{p} = \mathbf{v}' \mathbf{B} \mathbf{S} \mathbf{p}$$

Given this, we can write $\mathbf{h}' \mathbf{p} = \mathbf{v}' (\mathbf{B} - \mathbf{I}) \mathbf{S} \mathbf{p}$

where \mathbf{I} is the identity matrix.

The first order conditions for maximization of the objective function are:

$$(2) \quad \mathbf{h} = - \mathbf{z}_{pp} (\mathbf{p} - \mathbf{p}^*)$$

It seems reasonable to assume that current protection rates in agriculture are largely determined by the interaction of different political interests in each country. The Uruguay

Round was the first multilateral negotiation that attempted to shape world agricultural trade policies through international trade negotiations, and these negotiations were famously unsuccessful in disciplining these distortions (Hathaway and Ingco 1996). Only in the case of the US and the EU does it seem likely that agricultural policy formulation takes into account the likely response of policies in trading partners, and even for this pair of traders, agricultural trade policy formulation seems to be much more strongly driven by domestic considerations than by the likelihood of foreign response.

While \mathbf{p}^* is exogenous in our analysis of the sub-game in which decisions about a country's sensitive products are taken, it is endogenous in the overall negotiating game in which countries seek, and obtain, concessions from their trading partners (see Grossman and Helpman 1995). An understanding of how the sub-game on which we focus is, however, essential to an understanding of how the overall game will operate.

If we assume that a country's protection patterns are generated by the domestic political considerations summarized in (1), we can simplify (2) by noting that, in the neighborhood of the optimum, $\mathbf{z}_{pp}\mathbf{p} = 0$ by the nature of the optimization process—expenditure at domestic prices cannot be reduced further by changes in quantities, and producer revenues cannot be further increased by changes in quantities. In this situation, (2) may be rewritten:

$$(2') \quad \mathbf{h} = \mathbf{z}_{pp} \mathbf{p}^*$$

This allows us to rewrite (1) as

$$(1') \quad W = -z(\mathbf{p}, \mathbf{v}, u) + \mathbf{p}^* \mathbf{z}_{pp} \mathbf{p} + \mathbf{z}_p(\mathbf{p} - \mathbf{p}^*)$$

Since we are interested in the impact of changes in tariffs, and hence in \mathbf{p} on W , we differentiate (1') with respect to prices. If we assume that $\mathbf{z}_{ppp} = 0$ because the demand

functions are approximately linear in p , or equivalently that the expenditure and revenue functions can be approximated by quadratic functions, then this yields:

$$(3) \quad dW/dp = z_{pp}P$$

As we have observed above, this first derivative is zero in the neighborhood of the welfare-maximizing solution. However, we are interested in discrete—and potentially very large—reductions in tariffs associated with tariff-reduction formulas, and we need to consider higher-order derivatives if we are to adequately represent the effects of these changes.

A second-order estimate of the implications of reducing tariffs is provided by the Taylor-Series expansion:

$$\Delta W = dW/dp \cdot \Delta p + \frac{1}{2} d^2W/dp^2 \cdot \Delta p^2$$

In the current context, this expansion can be expressed as:

$$(4) \quad \Delta W = \frac{1}{2} z_{pp} \Delta p^2$$

If we further assume, for want of better information, that the elasticities of demand are equal across commodities¹, and that the cross-price impacts can be ignored either because of a lack of information about the relevant elasticities, or because of a view that individual products are sufficiently small, and cross-price effects sufficiently symmetric, then we can focus only on a simplified criterion for own-price impacts.

Under these assumptions, equation (4) may be rewritten for any tariff, say on good i , as:

$$(4') \quad \Delta W = \frac{1}{2} \cdot (z_{ii} \cdot p_i / z_i) (p_i z_i) (\Delta p_i / p_i)^2 = \frac{1}{2} \cdot \eta \cdot [(p_i z_i) (\Delta p_i / p_i)] \cdot (\Delta p_i / p_i)$$

¹ A possible alternative would be to utilize the recently-estimated elasticities of import demand from Kee, Nicita and Olarreaga (2005).

where η is a common elasticity coefficient which is, like the $\frac{1}{2}$ term, irrelevant to the decision about which products are to be treated as sensitive. The term in square brackets in (4') is, however, an important term. It shows the change in tariff revenues, at initial trade volumes, associated with the tariff reform. It implies that governments will, other things equal, be more inclined to treat as sensitive the products that are important in terms of their trade value, and important in the sense that their domestic prices will be substantially reduced by the tariff reform. In fact, (4') shows that the price reduction associated with the tariff change will be doubly important, and should enter in squared form. This is not surprising, as it indicates that the costs to governments of moving away from their initial, optimal choices are likely to be quadratic.

If this approach to formulating the problem is accepted, then policy makers confronted with an opportunity to designate a certain percentage of tariff lines as “sensitive” and subject to smaller reduction commitments, can be expected to select those tariff lines on which the greatest reductions in tariff revenues, at initial quantities, would otherwise have been required, and those on which the reductions in domestic prices are particularly large in proportional terms. In our empirical analysis, we compare the results of this approach with one based on the term in square brackets—the tariff revenue loss criterion of Jean, Laborde and Martin (2005).

To determine the reductions in tariff revenues, or in the political-economy objective function, we must first consider the alternative—what would have happened to the tariffs if they had not been classified as ‘sensitive’. This is a complex question in the context of the current trade negotiations, since the negotiations focus on bound tariffs, while the preceding discussion involved only applied tariff rates. The questions are

further complicated by the presence of non-*ad valorem* tariffs that must be converted from specific into *ad valorem* form, and by issues such as preferences. We consider each of these issues in the following section.

Implications of Liberalization Formulas

Analysis of approaches to market access expansion must confront some key methodological challenges. One of these is inherent in the nonlinear nature of a tiered formula. Analysis must be undertaken using information on tariffs at a disaggregated level. Applying a tiered formula to tariff averages will not yield correct results. For this reason, we have based our analysis on applied and bound tariffs at the finest level at which tariffs are internationally compatible: the 6-digit level of the Harmonized System.² For this purpose, we use the MACMap dataset prepared by CEPII and the International Trade Centre (see Bouet et al. 2004), combined with an equally detailed dataset on bound duties, using a methodology consistent with MACMaps (see Bchir et al. 2005).

Another important condition for well-founded analysis is that it includes the effects of tariffs that are not *ad valorem*. Conventional tariff data sets that include only *ad valorem* tariffs are quite inadequate for analysis (World Bank 2003). The most restrictive tariffs in developed countries are typically nontransparent specific, compound or mixed tariffs. Tariff data sets based only on conventional *ad valorem* tariffs lead to misleading estimates, such as an average tariff of 6.2 percent for Japanese agriculture reported in Francois and Martin (2003).

² Martin and Wang (2004) experiment with using tariff-line level data instead of 6-digit data, but find that the broad results are not greatly affected.

The implications of tariff preferences also need to be addressed. The effects of tariff cuts on market access may be quite different for countries receiving effective tariff preferences than for countries subject to Most-Favored-Nation status. For a country receiving MFN status, tariff cuts will generally increase market access. For countries receiving preferential status, the result may be an erosion in preference margins and a reduction in prices received for exports.

Tariff rate quotas (TRQs) raise some similar issues. As noted by de Gorter and Kliaugas (2005), a substantial share of developed country imports, and a much larger share of production, is subject to TRQs. Under these, imports up to a quota limit are permitted at an in-quota tariff which is unbound and lower than the MFN (out-of-quota) rate. If imports are occurring at the in-quota rather than the out-of-quota rate, then reductions in bound tariffs may not liberalize imports until the bound tariff falls below the in-quota tariff. This may reduce the effectiveness of cuts in bound tariffs in reducing applied rates relative to a situation where imports were restricted by MFN tariffs.

An important complication for the evaluation of agricultural tariff reform is the frequent, wide divergences between bound tariffs and the tariff rates actually applied. This binding overhang means that reductions in bound tariffs will not always bring about corresponding reductions in applied rates and hence increases in market access. While the phenomenon of binding overhang is widely associated with developing country agricultural tariffs, it is prevalent in developed countries as well (Martin and Wang 2004). The binding overhang can change radically the outcome of a given tariff-cutting formula. To the extent that the gap between MFN and bound tariff is far from being uniform

across products (especially in developed countries), it is difficult to gauge *a priori* how much it would interfere with the application of a given formula (see Bchir et al. 2005).

Experiments on Sensitive Products

The analysis begins with the 2001 tariffs that are the basis for the GTAP-6 database. But prior to the experiments proper, a pre-experiment was performed to introduce a number of developments agreed prior to any tariff reductions arising from the Doha Agenda. These include: the expansion to the EU-25, the phase-in of remaining agricultural commitments by developing countries,³ and the tariff reforms agreed by accession countries, and in particular by China.

The experiments proper, descriptions of which are summarized in Table 1, begin with a tiered formula using the parameters in the Harbinson proposal (WTO, 2003) but implemented on a marginal-cut basis, as in progressive income tax systems, to avoid the discontinuities created by having different proportional cuts in different tiers noted in Jean, Laborde and Martin (2005). We then compare the tiered-formula results with a proportional cut approach to examine the robustness of our findings on sensitive products. Next, we examine whether the impact of including Sensitive Products is greatly affected by the choice of trade value rather than number of tariff lines as a limitation criterion. Finally, after noting that some of the products frequently chosen as sensitive are “sin” commodities such as tobacco products and alcoholic beverages (see Table 3), we examine the sensitivity of the results to excluding these products from consideration..

³ Developing countries had 10 years from 1994 to implement their Uruguay Round commitments, as for a few number of products for developed countries.

As an initial attempt to capture the key elements of likely liberalization proposals, we first examine “Tier” a tiered formula with inflexion points at 15 and 90 percent and marginal tariff cuts⁴ of 40, 50 and 60 percent based on Harbinson’s proposal (WTO 2003). For developing countries, the inflexion points were placed at 20, 60 and 120 percent and the marginal cuts at 25, 30 percent, 35 and 40 percent. Consistent with the Framework, least-developed countries were not required to undertake any reduction commitments. The cuts are applied to the bound tariffs, but results are presented for impacts on applied tariffs, under the assumption that cuts in bound tariffs only require reductions in applied rates when the bound rates come below the applied rates.

A key issue is the extent to which countries will reduce tariffs on sensitive products. While the Framework aims to improve market access for all such products, and envisages doing so through a combination of tariff reductions and expansion of tariff-rate-quotas (WTO 2004, paras 32-34). However, it is clear that products designated as “sensitive” or “special” products are likely to be those on which countries are extremely reluctant to make commitments. While some are optimistic that tariff-rate-quota expansion will succeed in achieving substantial improvements in market access, there seem to be good reasons for caution about such a conclusion. As a very simple, and crude, rule of thumb, we therefore assume that bound tariffs on these products are cut by 15 percent of their initial level. This provides a simple rule, and one consistent with the

⁴ An initial simulation was undertaken with cuts of 35, 60 and 65 percent and is reported in agricultural scenario 7. It was not chosen as the base for further simulations because it created insufficient liberalization to allow evaluation of the effects of liberalization erosion through the addition of Sensitive and Special Products.

willingness of countries to accept such reductions, when proposing the Uruguay Round approach⁵.

Scenarios Tier-Sens 2 and Tier-Sens 5 examine the consequences of allowing 2 and 5 percent of six-digit tariff lines to be treated as Sensitive products by every country when the tiered formula is applied.

Scenario Prop considers the impact of a proportional cut formula that brings about the same reduction in average bound tariffs in developed countries as a group, and developing countries as a group, as the tiered formulas used in Scenarios 1 (respectively an average cut of 64.13% for developed countries and 45.07% for developing countries). Prop-Sens 2 adds 2 percent Sensitive Products in developed and developing countries.

In Tier Sens-T2 and Tier-Sens T5, we return to the tiered formula with the proportion of Sensitive Products specified using the value of trade in those products, rather than the number of tariff lines.

Finally, in Tier-Sin, we consider the effects of excluding alcohol and tobacco products (frequently termed “sin” tax commodities) from those treated as Sensitive products. While it is clear that production of alcohol and tobacco are protected in some cases, there appear to be other cases where tariffs on these products are used either as a revenue-raising device, or as a means to discourage their consumption for social purposes. In these cases, governments might refrain from treating alcohol and tobacco products as Sensitive or, even if they did, replace these tariffs with excise duties, and hence offset part of the benefit in terms of market expansion.

⁵ Under the Uruguay Round approach, countries were to meet a requirement of a 36 percent average-cut in tariffs, with a 15 percent minimum reduction in all bound tariffs. The average-cut requirement was meaningless (World Bank 2003b) because of the ability to make larger reductions in trivial tariffs, but the 15 percent minimum cut was meaningful, albeit relatively small.

Results with Products Selected by Applying the Political Economy Criterion

The first set of results presented is based on the assumption that sensitive products are selected according to the political cost defined by equation (4') that would follow the implementation of the proposed tariff-cutting rule. Table 3 displays the more frequent products selected as sensitive by developed and developing countries when we apply the Tier Sens 2 formula. Table 4 shows the detailed list of these products for a few set of countries (European Union, USA, Japan, Brazil, China, South Africa)

The resulting implications for countries' own weighted-average tariffs are presented in Table 2. Even though the tiered formula being used in this analysis is an extremely aggressive one that results in almost a halving of the average bound tariff worldwide, the reductions in applied rates are much smaller because of the binding overhang problem. The average applied rate is cut by 6.7 percentage points from 16.3 percent to 9.5 percent.

Among the main countries shown in Table 2, only the EU, EFTA, Japan and South Korea display more than a 5 percentage point cut in applied duties. Indeed liberalization appears to be overwhelmingly concentrated in Japan and Korea, with very limited liberalization elsewhere. For many countries applied duties are hardly changed: 7 out of the 18 countries and groups shown in Table 2 experience a decline in applied duties of less than two percentage point. For Pakistan, for instance, the cut in applied rates is only 0.5 point even though average bound rates were cut by 39 percent (see Bchir et al. 2005). Given the extent of the binding overhang in developing countries, the formula considered only narrows the binding overhang in many cases, without substantially changing applied duties.

When 2 percent of “Sensitive Products” are exempted from applying the formula (Tier-Sens 2), the cut in the average applied duty drops from 6.7 percentage points to only 2.6 percentage points. Excluding 2 percent of products is thus enough to reduce the extent of delivered liberalization of applied duties by almost two-third, and even more than this in countries such as Japan and Canada. This results from the strong unevenness of protection across products in most countries, with a few tariff peaks on important traded goods accounting for a substantial part of total average protection. If we look at the HS2 level⁶ for developed countries, we see that 4 chapters, namely Meat and Meat offal (02), Cereals(10), Fruits(08) and Sugar(17), explaining 52% of the tariff cut without exclusion, represent 81 % of the fall in protection reduction when 2% of sensitive products are selected. For developing countries, taking only 2 chapters (10-Cereals and 12-Oil seeds) we explain 47% of the basic cut but 70% of the anesthetic effects of the sensitive products.

Raising the number of Sensitive Products to 5 percent (Tier-Sens 5) does not change the broad picture a great deal. The extent of delivered liberalization is somewhat lower, but this does not modify the qualitative assessment and the general conclusion: the pass-through from liberalization of bound duties to liberalization of applied duties is weak, in a tiered formula as the one studied here; and even in this case, the little action that takes place is concentrated on a very small number of products, so that excluding 2 percent of tariff lines as sensitive products is enough to empty the agreement of any substantive liberalization.

The proportional cut scenario (Prop) is included to show the importance of the interaction between the nature of the cutting formula and the implications of any given

⁶ 33 chapters of the HS nomenclature include agricultural products following the WTO classification.

procedure for dealing with sensitive products. The proportional cut scenario was calibrated so that the cut in average bound tariffs would be the same in industrial countries, and in developing countries, as under the tiered formula. On a country-by-country basis, the outcome is not substantially different from the tiered formula, with the exception of Korea, where the cut in applied duties is significantly lower (38.3 points, as compared to 45.5 points), and to a lesser extent of EFTA (9.7 point cut instead of 11.5). The proportional cut in applied tariffs, worldwide, is 6.5 percent, as against 6.7 percentage points using the tiered formula.

When the impact of introducing flexibility is taken into account, an important advantage emerges for the proportional cut approach as against the tiered formula. When 2 percent of tariff lines are allowed the smaller tariff reduction, the cut in world wide average tariffs falls from 6.5 percent to 2.9 percent. While this is a sharp decline, it is smaller than the reduction from 6.7 to 2.6 percent observed in the tiered formula case. The more aggressive reductions involved in the tiered formula approach fall most heavily on a relatively smaller number of products, and the use of sensitive products more readily allows these products to be sheltered from the reductions.

While the theoretical framework laid out above provides a rationale for anticipating the choice of sensitive products by policy-makers, alternative selection methods can be thought of. Scenario Tier-Sens 2R is computed assuming that sensitive products are picked up so as to minimize tariff receipt losses, for initial trade volumes. At the aggregated level, the outcome using this intuitive alternative selection criterion hardly differs from the one found in Tier-Sens 2 and we have to look at a disaggregated level, starting at the hs2 chapter level, to see the main differences. 9.5% of the global set

of sensitive products are changed and Table 5 gives a flavor of the changes for some countries. The political criterion seems relevant and allow to pick up some products such as olive oil for European Union not captured with the tariff revenue loss criterion.

Scenarios Tier-Sens 2T and Tier-Sens 5T shed light on the importance of the way in which the share of products to be accorded Sensitive Product treatment is specified. Under Tier-Sens 2 and Tier-Sens 5, this was done by setting the proportion of tariff lines at a maximum of 2 percent and 5 percent respectively. Under Sens 2T and Sens 5T, the criterion is shifted to 2 percent and 5 percent of trade, rather than tariff lines. Comparing Sens 2T with Sens 2 on its impact on applied tariffs, we see that the global reduction in average tariffs is 5.3 percent under Tier-Sens 2T, as against 2.6 percent under Sens 2. As compared to the "Tier" scenario, allowing 2 percent of imports as Sensitive Products based on trade causes the reduction in world average tariffs to decline from 6.7 percent to 5.3 percent, and reduces the size of the resulting cut in tariffs by 15-30 percent in most cases, in contrast with the dramatic and unpredictable reductions in disciplines associated with allowing Sensitive Products based on tariff lines.

Comparing Sens 2T with Sens 5T now shows that expanding the number of products allowed as sensitive to 5 percent diminishes the resulting disciplines on market access: the world average agricultural tariff falls by 4.3 percent, rather than 5.3 in Sens 2T. However, the reduction in discipline associated with 5 percent Sensitive Products based on trade does not involve complete abandonment of discipline like even 2 percent Sensitive Products based on the number of tariff lines.

Graph 1 illustrates this in a more general way, by plotting the relationship between the number of sensitive products allowed, and the average level of applied

protection resulting from the application of the tiered formula. When the constraint is expressed in terms of number of products, the curb is indeed extremely steep near the y-axis: a very small share of sensitive products is enough to sweep out a significant part of the applied tariff cut. This is even clearer for developing countries than for developed countries. When defined as an import share, in contrast, the number of sensitive products has a far smoother impact on tariff cuts. As far as developed countries are concerned, allowing 5% of initial imports to be defined as sensitive products reduces tariff cuts by approximately one third, 10% of imports would reduce them by around two-third.

While trade is also an imperfect criterion – since highly-restricted products are likely to have small imports – it seems clear that its deficiencies as a basis for allowing sensitive products are less serious than those associated with using the number of tariff lines as a criterion. There is an important underlying reason for this relatively better performance in that the trade weighting by external trade weights reflects the interests of the exporter rather than the political-economy interests that are responsible for protection in the importing country. In this sense, a trade-weighted average can be seen imposing a constraint akin to that imposed under the Mercantilist Trade Restrictiveness Index (Anderson and Neary 2003). If weakened disciplines associated with the type of “flexibility” envisaged through allowing sensitive products are to be permitted, it seems important to discipline them in terms of their impact on exporters’ interests if a successful basis for negotiations is to be obtained.

When the number of tariff lines is used, a large and variable amount of trade can be sheltered from disciplines. Given the results in Tier-Sens 2, it seems doubtful whether a pure tariff-line criterion for allowing Sensitive Products could be combined

successfully with the expansion of market access required in both the initial Doha Agenda (WTO 2001) or the Framework (WTO 2004). Use of a fraction of trade could potentially be made consistent with the focus on number of tariff lines in the Framework Agreement. It would simply require defining the number of tariff lines allowed as sensitive in each country as that accounting for a specified volume of trade.

As is clear from Table 3, a number of the WTO-agricultural products selected as “sensitive” using our criterion are products such as cigarettes or alcoholic beverages. There is some risk that these products are subject to high duties for revenue-raising as well as protective reasons. There is some doubt about whether countries would use their scarce Sensitive Products allocation to shelter these products, or whether they would replace duties on these products with taxes, thus eliminating the demand response to lower tariffs. To guard against this possibility, Tier-Sin examines the implications of excluding “sin” commodities such as alcohol and tobacco from the Sensitive Product category. The results of Tier-Sin are to be compared with those for Tier, since both involve allowing 2 percent of tariff lines to be treated as sensitive. Comparing these scenarios in Table 2 shows that excluding these commodities does increase the size of the cut in applied tariffs very slightly in the developed countries (3.0 percent, rather than 2.9 percent), but actually reduces the size of the tariff cut in the industrial countries. This exclusion reinforces the share of sensitive products in the raw meat, cocoa and prepared non-meat/fish HS2 chapters for developed countries and in the dairy products, sugar and meat/fished prepared products for developing ones.

Concluding remarks

While it is usual to assume the general rule to prevail upon the exceptions, this is not necessarily as good way to think about the agricultural negotiations. The way exceptional treatment is designed and enforced for so-called sensitive products might well prove central in determining the effective outcome of multilateral negotiations in agriculture. We show in this paper that, in a given negotiation perspective (and hence for given expectations about the evolution of partners' protection), the choice of these sensitive products can be linked to a simple indicator, linked to the value of the import, and the squared, proportional reduction in the price of the import brought about by reductions in the bound rate.

In the current framework, a number of products allowed sensitive products is to be negotiated. Assuming that these products are accorded relatively small tariff reductions, we examine the effects of allowing an extremely small share of tariff lines (2 percent). We find that even this small number of tariff lines has dramatic, adverse impacts on the expansion of market access achieved under the Framework agreement. With a tiered formula using a tiered formula based on the Harbinson proposal, we find that allowing 2 percent of tariff lines to be treated as sensitive reduces the cut in average industrial-country tariffs from 7.7 percent to 2.9 percent. Increasing the share of sensitive products to 5 percent reduces the tariff cut only slightly, to 2.0 percent.

Moving from a tiered formula cut to a proportional cut reduces the vulnerability of the tariff-cutting regime to sensitive products slightly. In this case, the cut in average applied tariffs associated with the same reduction in industrial-country bound tariffs is 7.5 percent. Allowing 2 percent of sensitive products reduces this average cut in tariffs to 3.3 percent.

The problem for exporters associated with allowing a certain number of tariff lines is that this does not take into account the importance of these tariff lines to the exporter. If we do this in a crude way by restricting the number of products on the basis of their share in total imports, we find a dramatic reduction in the damage to market access created by sensitive products. With the tiered formula, the cut in average tariffs after allowing 2 percent of imports to be exempted is 5.8 percent, only 2 percentage points less than in the absence of sensitive products.

We show that the criterion of tariff revenue losses used in our earlier work appears to track very closely the results obtained in our political economy framework at the aggregated level. While there are some differences, these are very slight. In addition, we examine the potential impact of excluding “sin” tax commodities from the sensitive product group. While these products are prominent in the list defined as sensitive, particularly in developing countries, their exclusion appears to have relatively little impact on the extent of market access liberalization achieved in the negotiations.

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Table 1. Summary of Reform Scenarios

Base	2001 applied protection
Pre	Pre-experiment (EU enlargement + WTO commitments)
Tiered	Tiered formula
Tier-Sens 2	Tiered formula with Sensitive ^a Products not exceeding 2% of the number of HS6 products
Tier-Sens 5	Tiered formula with Sensitive ^a Products not exceeding 5% of the number of HS6 products
Prop	Proportional Cut
Prop-Sens 2	Proportional Cut + Sensitive ^a Products 2%
Tier-Sens T2	Tiered formula with Sensitive ^a Products not exceeding 2% of trade
Tier-Sens T5	Tiered formula with Sensitive ^a Products not exceeding 5% of trade
Tier-Sens R2	Tiered formula with Sensitive ^a Products not exceeding 2% of the number of products and using the tariff revenue losses as in Jean et al. (2005).
Tier-Sin	Tiered formula but alcohol and tobacco products excluded from sensitive

Table 2. Implications of Sensitive Products for Reductions in Countries' Average Tariffs

<i>Country:</i>	Base %	Tier pctg point cut	Tier- Sens 2 pctg point cut	Tier- Sens 5 pctg point cut	Prop pctg point cut	Prop- Sens 2 pctg point cut	Tier- Sens T2 pctg point cut	Tier- Sens T5 pctg point cut	Tier- Sens R2 pctg point cut	Tier Sin pctg point cut
DyppedC	14.6	7.7	2.9	2.0	7.5	3.3	5.8	4.5	2.9	3.0
Australia	3.0	1.0	0.4	0.3	1.5	0.7	0.8	0.6	0.4	0.7
Canada	9.7	4.4	1.0	0.3	4.0	1.0	3.0	1.5	1.0	1.0
EFTA	28.2	11.5	6.1	3.8	9.7	5.5	8.7	6.6	6.0	6.1
European Union	13.2	7.2	2.9	2.0	7.4	3.4	5.4	4.1	2.9	2.9
Japan	34.5	19.9	7.3	5.2	18.7	7.9	14.9	12.3	7.3	7.3
USA	2.7	0.9	0.3	0.2	1.2	0.5	0.6	0.4	0.3	0.4
DyppingC	18.6	5.4	2.1	1.8	5.2	2.3	4.8	4.0	2.1	1.5
ASEAN	8.8	2.2	0.8	0.7	2.2	0.9	1.8	1.2	0.8	2.4
China	9.9	2.3	1.5	1.2	2.8	1.7	2.2	1.7	1.4	1.9
India	55.3	4.6	2.0	1.8	5.4	2.1	4.0	3.7	2.0	2.2
Korea	90.4	45.5	14.8	13.4	38.3	15.1	40.8	34.3	14.8	14.8
Maghreb	19.0	4.2	1.9	1.5	4.8	2.1	3.7	3.0	1.8	2.5
Mercosur	12.8	0.4	0.1	0.0	0.8	0.3	0.3	0.2	0.1	0.1
Mexico	9.4	1.5	0.3	0.2	1.8	0.3	1.3	1.1	0.3	0.3
OthSSA	25.3	2.8	1.0	0.7	2.9	1.0	2.6	1.6	1.0	1.9
Pakistan	31.3	0.5	0.0	0.0	1.2	0.0	0.3	0.3	0.0	0.0
SACU	12.5	0.7	0.2	0.2	1.1	0.4	0.4	0.3	0.2	0.3
Turkey	14.1	1.6	0.6	0.4	1.9	0.7	0.8	0.5	0.6	0.6
ROW	10.2	2.3	1.2	1.1	2.6	1.4	2.0	1.9	1.2	1.6
Non LDC WTO members	16.3	6.7	2.6	1.9	6.5	2.9	5.3	4.3	2.6	2.8

Note: Numbers in first column refer to the average agricultural tariff in 2001 adjusted for tariff reductions agreed to come into effect irrespective of the Doha Agenda outcome. Numbers in all subsequent columns are the reductions in percentage points from that level Only non-LDC WTO members are taken into account in the aggregate figures.

Table 3. Products Most Frequently Selected as “Sensitive”

Industrial Countries

1	020130	FRESH OR CHILLED BOVINE MEAT BONELESS
2	020230	BONELESS FROZEN MEAT OF BOVINE ANIMALS
3	040690	CHEESE EXCL. FRESH CHEESE INCL. WHEY C
4	060310	FRESH CUT FLOWERS AND FLOWER BUDS FOR B
5	070200	TOMATOES FRESH OR CHILLED
6	100190	WHEAT AND MESLIN EXCL. DURUM WHEAT
7	170111	RAW CANE SUGAR EXCL. ADDED FLAVOURING O
8	210690	FOOD PREPARATIONS N.E.S.
9	220290	NON ALCOHOLIC BEVERAGES EXCL. WATER FR
10	220830	WHISKIES
11	240220	CIGARETTES CONTAINING TOBACCO
12	020319	FRESH OR CHILLED MEAT OF SWINE EXCL. CA
13	020329	FROZEN MEAT OF SWINE EXCL. CARCASSES AND
14	020713	FRESH OR CHILLED CUTS AND EDIBLE OFFAL O
15	020714	FROZEN CUTS AND EDIBLE OFFAL OF FOWLS OF
16	040630	PROCESSED CHEESE NOT GRATED OR POWDERED
17	070990	FRESH OR CHILLED VEGETABLES N.E.S.
18	100620	HUSKED OR BROWN RICE
19	100630	SEMI MILLED OR WHOLLY MILLED RICE
20	110710	MALT EXCL. ROASTED

Developing Countries

1	240220	CIGARETTES CONTAINING TOBACCO
2	170199	CANE OR BEET SUGAR AND CHEMICALLY PURE S
3	220300	BEER MADE FROM MALT
4	220830	WHISKIES
5	220421	WINE OF FRESH GRAPES INCL. FORTIFIED WI
6	210690	FOOD PREPARATIONS N.E.S.
7	020714	FROZEN CUTS AND EDIBLE OFFAL OF FOWLS OF
8	170111	RAW CANE SUGAR EXCL. ADDED FLAVOURING O
9	240310	SMOKING TOBACCO WITH OR WITHOUT A PROPOR
10	100630	SEMI MILLED OR WHOLLY MILLED RICE
11	220210	WATERS INCL. MINERAL AND AERATED WITH
12	220290	NON ALCOHOLIC BEVERAGES EXCL. WATER FR
13	220890	ETHYL ALCOHOL OF AN ALCOHOLIC STRENGTH B
14	220710	UNDENATURED ETHYL ALCOHOL OF ACTUAL ALC
15	220820	SPIRITS OBTAINED BY DISTILLING GRAPE WIN
16	010111	PURE BRED BREEDING HORSES
17	040221	MILK AND CREAM IN SOLID FORMS OF A FAT
18	180690	CHOCOLATE AND othr PREPARATIONS CONTAIN
19	220870	LIQUEURS AND CORDIALS
20	020230	BONELESS FROZEN MEAT OF BOVINE ANIMALS

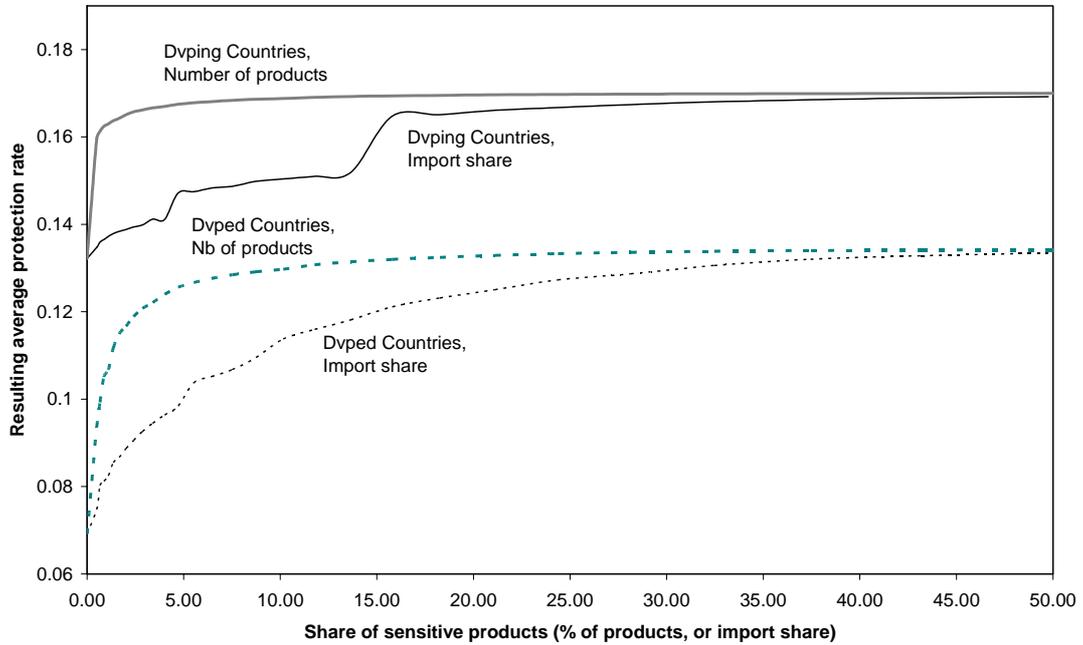
Table 4. Detailed list of the 2% more sensitive products for some countries (ranked list).

Brazil		China	
200870	PEACHES PREPARED OR PRESERVED WHETHER	100300	BARLEY
290544	D GLUCITOL `SORBITOL`	151190	PALM OIL AND ITS FRACTIONS WHETHER OR N
170410	CHEWING GUM WHETHER OR NOT SUGAR COATED	050400	GUTS BLADDERS AND STOMACHS OF ANIMALS O
180631	CHOCOLATE AND othr PREPARATIONS CONTAIN	020714	FROZEN CUTS AND EDIBLE OFFAL OF FOWLS OF
330210	MIXTURES OF ODORIFEROUS SUBSTANCES AND M	120500	RAPE OR COLZA SEEDS WHETHER OR NOT BROK
210390	PREPARATIONS FOR SAUCES AND PREPARED SAU	210390	PREPARATIONS FOR SAUCES AND PREPARED SAU
350190	CASEINATES AND othr CASEIN DERIVATIVES.	151620	VEGETABLE FATS AND OILS AND THEIR FRACTI
350400	PEPTONES AND THEIR DERIVATIVES. othr AL	120100	SOYA BEANS WHETHER OR NOT BROKEN
180632	CHOCOLATE AND othr PREPARATIONS CONTAIN	210690	FOOD PREPARATIONS N.E.S.
382460	SORBITOL EXCL. GOODS OF SUBHEADING NO 2	150810	CRUDE GROUND NUT OIL
350510	DEXTRINS AND othr MODIFIED STARCHES E.	240220	CIGARETTES CONTAINING TOBACCO
350110	CASEIN	151529	MAIZE OIL AND FRACTIONS THEREOF WHETHER
110710	MALT EXCL. ROASTED	200911	FROZEN ORANGE JUICE WHETHER OR NOT CONT
South africa		USA	
040410	WHEY WHETHER OR NOT CONCENTRATED OR SWE	170111	RAW CANE SUGAR EXCL. ADDED FLAVOURING O
170199	CANE OR BEET SUGAR AND CHEMICALLY PURE S	040690	CHEESE EXCL. FRESH CHEESE INCL. WHEY C
240220	CIGARETTES CONTAINING TOBACCO	170490	SUGAR CONFECTIONERY NOT CONTAINING COCOA
040390	BUTTERMILK CURDLED MILK AND CREAM KEPH	120220	SHELLED GROUND NUTS WHETHER OR NOT BROK
170111	RAW CANE SUGAR EXCL. ADDED FLAVOURING O	170199	CANE OR BEET SUGAR AND CHEMICALLY PURE S
190530	SWEET BISCUITS WAFFLES AND WAFERS WHET	200811	GROUND NUTS PREPARED OR PRESERVED N.E.S
110100	WHEAT OR MESLIN FLOUR	220421	WINE OF FRESH GRAPES INCL. FORTIFIED WI
220290	NON ALCOHOLIC BEVERAGES EXCL. WATER FR	240130	TOBACCO REFUSE
200210	TOMATOES WHOLE OR IN PIECES PREPARED O	180620	CHOCOLATE AND othr FOOD PREPARATIONS CO
190590	BREAD PASTRY CAKES BISCUITS AND othr	210690	FOOD PREPARATIONS N.E.S.
180631	CHOCOLATE AND othr PREPARATIONS CONTAIN	220429	WINE OF FRESH GRAPES INCL. FORTIFIED WI
040299	MILK AND CREAM CONCENTRATED AND SWEETEN	040630	PROCESSED CHEESE NOT GRATED OR POWDERED
040291	MILK AND CREAM CONCENTRATED BUT UNSWEET	190120	MIXES AND DOUGHS OF FLOUR MEAL STARCH
European Union		Japan	
170111	RAW CANE SUGAR EXCL. ADDED FLAVOURING O	100630	SEMI MILLED OR WHOLLY MILLED RICE
080300	BANANAS INCL. PLANTAINS FRESH OR DRIED	170111	RAW CANE SUGAR EXCL. ADDED FLAVOURING O
230890	MAIZE STALKS MAIZE LEAVES MARC AND OTH	100190	WHEAT AND MESLIN EXCL. DURUM WHEAT
020230	BONELESS FROZEN MEAT OF BOVINE ANIMALS	020329	FROZEN MEAT OF SWINE EXCL. CARCASSES AND
100630	SEMI MILLED OR WHOLLY MILLED RICE	020319	FRESH OR CHILLED MEAT OF SWINE EXCL. CA
020130	FRESH OR CHILLED BOVINE MEAT BONELESS	100620	HUSKED OR BROWN RICE
070320	GARLIC FRESH OR CHILLED	100640	BROKEN RICE
170199	CANE OR BEET SUGAR AND CHEMICALLY PURE S	020130	FRESH OR CHILLED BOVINE MEAT BONELESS
040510	BUTTER EXCL. DEHYDRATED BUTTER AND GHEE	100590	MAIZE EXCL. SEED
021090	MEAT AND EDIBLE OFFAL SALTED IN BRINE	020230	BONELESS FROZEN MEAT OF BOVINE ANIMALS
100620	HUSKED OR BROWN RICE	100300	BARLEY
150910	VIRGIN OLIVE OIL AND ITS FRACTIONS	110710	MALT EXCL. ROASTED
230910	DOG OR CAT FOOD PUT UP FOR RETAIL SALE	160249	PREPARED OR PRESERVED MEAT AND OFFAL OF

Table 5. Changes in the list of sensitive products for some countries by using alternative criteria

Country	Selected with Political criterion but not with Tariff Revenue crit.	Selected with Tariff Revenue Loss criterion but not with Pol. crit.
Australia	220429 WINE OF FRESH GRAPES INCL. FORTIFIED WI	190590 BREAD PASTRY CAKES BISCUITS AND othr
	220510 VERMOUTH AND othr WINE OF FRESH GRAPES	220890 ETHYL ALCOHOL OF AN ALCOHOLIC STRENGTH B
	220600 CIDER PERRY MEAD AND othr FERMENTED B	330210 MIXTURES OF ODORIFEROUS SUBSTANCES AND M
Brazil	180632 CHOCOLATE AND othr PREPARATIONS CONTAIN	080231 FRESH OR DRIED WALNUTS IN SHELL
	382460 SORBITOL EXCL. GOODS OF SUBHEADING NO 2	080232 FRESH OR DRIED WALNUTS SHELLLED AND PEEL
Canada	040490 PRODUCTS CONSISTING OF NATURAL MILK CONS	220290 NON ALCOHOLIC BEVERAGES EXCL. WATER FR
	040630 PROCESSED CHEESE NOT GRATED OR POWDERED	220421 WINE OF FRESH GRAPES INCL. FORTIFIED WI
Japan	160249 PREPARED OR PRESERVED MEAT AND OFFAL OF	220421 WINE OF FRESH GRAPES INCL. FORTIFIED WI
Korea	100630 SEMI MILLED OR WHOLLY MILLED RICE	121490 SWEDES MANGOLDS FODDER ROOTS HAY ALF
Mexico	040630 PROCESSED CHEESE NOT GRATED OR POWDERED	220830 WHISKIES
	240220 CIGARETTES CONTAINING TOBACCO	350110 CASEIN
Morocco	040221 MILK AND CREAM IN SOLID FORMS OF A FAT	050400 GUTS BLADDERS AND STOMACHS OF ANIMALS O
	100630 SEMI MILLED OR WHOLLY MILLED RICE	240220 CIGARETTES CONTAINING TOBACCO
Norway	020130 FRESH OR CHILLED BOVINE MEAT BONELESS	200980 JUICE OF FRUIT OR VEGETABLES WHETHER OR
	040900 NATURAL HONEY	150710 CRUDE SOYA BEAN OIL WHETHER OR NOT DE G
Tunisia	060220 EDIBLE FRUIT OR NUT TREES SHRUBS AND BU	230400 OIL CAKE AND othr SOLID RESIDUES WHETH
	190590 BREAD PASTRY CAKES BISCUITS AND othr	240220 CIGARETTES CONTAINING TOBACCO
	020230 BONELESS FROZEN MEAT OF BOVINE ANIMALS	071340 DRIED SHELLLED LENTILS WHETHER OR NOT S
Turkey	200290 TOMATOES PREPARED OR PRESERVED othrWIS	120600 SUNFLOWER SEEDS WHETHER OR NOT BROKEN
	200819 NUTS AND othr SEEDS INCL. MIXTURES PR	151211 CRUDE SUNFLOWER SEED OR SAFFLOWER OIL
	200911 FROZEN ORANGE JUICE WHETHER OR NOT CONT	230990 PREPARATIONS OF A KIND USED IN ANIMAL FE
	040630 PROCESSED CHEESE NOT GRATED OR POWDERED	180690 CHOCOLATE AND othr PREPARATIONS CONTAIN
USA	220429 WINE OF FRESH GRAPES INCL. FORTIFIED WI	200310 MUSHROOMS PREPARED OR PRESERVED othrWIS
	240130 TOBACCO REFUSE	220290 NON ALCOHOLIC BEVERAGES EXCL. WATER FR
	150910 VIRGIN OLIVE OIL AND ITS FRACTIONS	020714 FROZEN CUTS AND EDIBLE OFFAL OF FOWLS OF
European Union	170199 CANE OR BEET SUGAR AND CHEMICALLY PURE S	040690 CHEESE EXCL. FRESH CHEESE INCL. WHEY C
	230910 DOG OR CAT FOOD PUT UP FOR RETAIL SALE	240220 CIGARETTES CONTAINING TOBACCO

Graph 1. Average applied protection level resulting from the application of the tiered formula, depending on the criterion and threshold used to define sensitive products



Note: This graph plot the average applied protection level by group of non-LDC WTO member countries, once the Harbinson Formula is applied (see text for details). The share of sensitive products is reported on the x-axis. It is alternatively defined as a share in the number of agricultural products, or as a share in imports.