

Trade Liberalisation in the Doha Round

A Global and Danish Perspective¹

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Abstract

This paper provides a qualitative and numerical analysis of a potential Doha agreement of multilateral trade liberalisation following the summer ‘mini-ministerial’ meeting of negotiators in Geneva during July 2008. We discuss the latest draft modalities for agricultural and non-agricultural market access, dated 10 July 2008. For the numerical analysis, we design a Doha-scenario, which reflects the draft modalities as closely as possible, and employ the GTAP model and database to estimate the economic impacts of such an agreement. We find that the agreement has positive global welfare implications of around US\$ 55 billion, corresponding to around 0.2 percent of GDP. The Danish economy also benefits from the agreement, largely due to improved access for the Danish pork industry to important protected export markets such as Japan. Throughout the paper, we take global and Danish perspectives on Doha.

Keywords

WTO, Doha, CGE, GTAP, Agricultural and Non Agricultural Market Access (NAMA), Denmark

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Introduction

This paper provides a qualitative and numerical analysis of a potential Doha agreement of multilateral trade liberalisation following the summer ‘mini-ministerial’ meeting of negotiators in Geneva during July 2008. More specifically, it discusses the latest draft modalities² for agricultural and non-agricultural market access (NAMA), dated 10 July 2008, augmented by a specific proposal for solutions to outstanding issues made by the director-general of WTO, Pascal Lamy, during the mini-ministerial. For the numerical analysis, we design a Doha-scenario, which reflects the draft modalities as closely as possible, and employ the Computable General Equilibrium (CGE) model and database constructed by the Global Trade Analysis Project (GTAP) to estimate the economic impacts of such an agreement. Throughout the paper, we take global and Danish perspectives on Doha.

The mini-ministerial in Geneva in July 2008 ended without the planned agreement on modalities for agriculture and NAMA (The New York Times, 2008). WTO-pessimists would argue that this meeting was the very last call for a successful completion of the Doha round, and that the failure of the meeting has rendered the round definitively dead (Krugman, 2008). Optimists, on the other hand, point to the fact that the round has crept along until now despite repeating statements of ‘very last chance’ and ‘definitively dead’ on numerous occasions in the past, and that although full agreement could not be reached, negotiations advanced considerably forward on a number of thorny issues (Bhagwati and Panagariya, 2008). In any event, most commentators agree that the failure of the meeting makes it very difficult to come to a conclusion of the round within the next few years due to upcoming political events such as elections in USA and India and the appointment of a new EU commission. Further progress on the Doha round is generally not expected until 2010 at the earliest (The Economist, 2008), although as late as September 2008, Pascal Lamy talked about calling ministers back to Geneva in an effort to solve the remaining issues (WTO, 2008e).

Nevertheless, difficulties in reaching a Doha agreement does not diminish the value of detailed qualitative and quantitative studies of the multilateral negotiations. Firstly, this paper serves to highlight the complexities of the modalities, which are the results of intense negotiations necessitating compromises on a wide range of contentious issues, particularly in agricultural market access liberalisation. Thus, it illustrates why

² Modalities refer to the rules and formulae governing each country’s tariff reductions and other concessions. After the modalities have been agreed upon, each country will prepare their new tariff schedules incorporating specific tariff cuts based on the modalities.

multilateral trade agreements are so difficult to conclude. Secondly, it indicates what is at stake for the world economy in general and Denmark in particular. For instance, is the strong commitment to multilateral liberalisation by the Danish political establishment (government as well as opposition) justified? Finally, the authors believe that the Doha round is still alive (if not kicking), and that some agreement will eventually be concluded. The WTO is more than just a forum for negotiating trade liberalisation. It provides a well established rules-based trading system with a Dispute Settlement Body that can adjudicate trade disputes and impose sanctions on transgressors. Even if enthusiasm for further trade liberalisation is presently at a low level, few political leaders are prepared to jeopardize the authority of the WTO by admitting permanent failure of the Doha round.

There is a large and growing literature on applied analysis of the Doha round. Hess and von Cramon-Taubadel (2008) count more than 1200 studies that analyses some aspect of the negotiating round and of these roughly 400 studies that provide numerical estimates of Doha impacts. Researchers at IFPRI and the World Bank (Berishi-Krasniqi, et al, 2008; Laborde, et al, 2008) and Centre d'Études Prospectives et d'Information Internationales (CEPII) (Decreux and Fontagné, 2008) among others follow the negotiations closely and publishes numerical estimates of updated potential Doha agreements at a regular basis.

Results of the studies vary greatly due to differences in methodology and scenario design. Hess and von Cramon-Taubadel (2008) conduct a meta-analysis of a large number of applied analyses of the Doha round. They find that variations in methodology explain an important share of the differences in results. For instance, the choice of Armington elasticities (some of the most important parameters in applied trade models) greatly affects the size of economic impacts, with higher elasticities typically generating larger numbers. In conclusion, they emphasise the importance of carefully stating assumptions and methodology when conducting applied trade analysis. We follow their recommendation by providing such details in the appendix.

Hess and von Cramon-Taubadel (2008) also point to the specific details of the scenarios as important explanatory factors. Scenarios are typically designed as best guesses of the outcome of a Doha agreement made at the time of study and subject to methodological constraints. Hence, older studies lacking the knowledge of the details of a future agreement tend to assume a simple average reduction in all tariffs and subsidies (e.g. 50 percent), possibly including other issues, such as trade facilitation or services liberalisation (e.g. Francois, et al, 2005). As the negotiations progress and countries'

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positions slowly converge on specific issues, the scenarios incorporate more detailed provisions and become much more complicated (e.g. Anderson, et al 2006). One of the latest analyses by CEPII researchers (Decreux and Fontaigné, 2008) estimates the outcome of an agreement resembling the May 2008 draft modalities, incorporating detailed provisions for agricultural and NAMA liberalisation as well as a simple assumption regarding services liberalisation.

The present paper is largely comparable to the CEPII study. We use a similar model and draw on the same base data. However, we focus purely on agricultural and NAMA liberalisation, as the outcome of other parts of the Doha round, such as services liberalisation and trade facilitation, are still uncertain. We further develop the scenarios to include additional issues, such as tariff escalation in agriculture and anti-concentration in NAMA, which are not part of the CEPII study. Also, uniquely in the literature we focus on implications for the Danish economy.

We start by discussing the background of the current Doha round including the key position of some of the major participants and Denmark in particular. Then we describe the contents of the draft modalities for agriculture and NAMA in some detail (even greater details are provided in the appendix). We find that the draft modalities for agriculture are much more complex than those for NAMA, despite the fact that NAMA has a larger global impact than agriculture. This serves to illustrate the sensitivity of the agricultural negotiations – many compromises are needed to make the outcome palatable for all participants. After the qualitative discussion of the draft modalities for agriculture and NAMA, we introduce the model used for the quantitative analysis. Then we present and interpret our results and the paper is concluded by a short discussion.

Background

History

Originally, the declaration from Doha that launched the present round of trade negotiations, November 14, 2001, stipulated that modalities within agriculture were to be agreed upon no later than March 31, 2003. As is apparent, agreement on modalities were not reached by that date. The Cancun ministerial conference in September 2003 ended abruptly without consensus. Nevertheless, at August 1, 2004, an agreement concerning the framework for modalities was reached along with an extension of the

initial deadline, January 1, 2005, for the Doha round of negotiations. Although not specifically a modalities agreement this so-called “July framework package” contained an over-all outline of future more detailed liberalisation commitments. In Hong Kong, December 2005, the ministerial declaration presented a new imminent deadline for modalities for both agriculture and NAMA to be April 20, 2006. This deadline also turned out to be too ambitious.

Although the Doha negotiations have been in a state of limbo for several years, agricultural policies have developed. Particularly, the European Union unilaterally reformed its domestic support regime considerably and promised to phase out export subsidies by 2015. The mid-term review of the EU agricultural policy in 2003 resulted in a conversion of hectare and animal premiums into single farm payments. The objective was to decouple farm subsidies from the production decision, thus reducing market distortions. Thereby most of EU domestic support can be transferred from the blue box (trade distorting domestic support) to the green box (less trade distorting) category, which is not disciplined by WTO agreements. As a result, along with the promise to phase out export subsidies two major areas of contention in the Doha negotiations was settled, at least from the European point of view.

Key positions of major players

The difficulties in reaching an agreement are caused by large divergence in the interests of member countries and their limited willingness to compromise. Previous negotiating rounds, which were not without their share of problems, concentrated mostly on liberalisation of trade in non-agricultural products among industrialised countries. Two aspects of the current round makes consensus hard to achieve, i) agriculture, which is a highly sensitive and greatly distorted sector, is a prominent part of the round; and ii) the Doha round was heralded as a ‘development’ round, in which Special and Differential Treatment (SDT) should be given to developing countries. The last point has been seen by developing countries as an indication that they would not be expected to make significant concessions in return for liberalisation by developed countries, whereas developed countries still expect some liberalisation commitment (albeit at less than full reciprocity) by at least the larger developing countries, such as India, China and Brazil.

The main interests of developing countries are to gain improved market access for agricultural products into developed country markets and to force industrialised countries to reduce (or eliminate) agricultural subsidies. In spite of the fairly comprehen-

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sive reform towards more decoupled domestic support by the EU, developing countries in general consider the over-all amount of agricultural support to be a focal issue in the negotiations. It can be argued that no support is entirely decoupled (non-distorting) and will have some, albeit small, effect on production decisions, wherefore even green box support should be disciplined to some extent. Nevertheless, the distance between the EU and developing countries in general on domestic support and export subsidies has been reduced considerably. The USA, on the other hand, retains most of its domestic support in more coupled forms of payments and plans to strengthen the agricultural support with the Farm Bill 2008 currently underway through Congress. Thus, the main disagreement on domestic support seems to be between developing countries and the USA.

In terms of agricultural market access the largest divergence exists between developing countries and the EU, mainly due to high EU tariffs on agricultural products in general and particularly on commodities, such as bananas, sugar, rice and beef, which are of great interest to developing countries. In return for the high general reductions in tariffs demanded by developing countries, the EU insists on the right to designate a large number of products (tariff lines) as sensitive, implying smaller tariff reductions.

The controversies in the agricultural negotiations are almost exactly mirrored by the disagreements over NAMA liberalisation. In order for developed countries to be able to grant large concessions on agricultural market access and support, they demand reciprocity in terms of greater access to developing country markets for industrial products, particularly in the large growth economies of China, India and Brazil. However, in line with the 'development' objective of the Doha round, these countries demand quite comprehensive Special and Differential Treatment (SDT) together with the other developing countries, a demand that has made the negotiations in the Trade and Development committee under the WTO, where SDT negotiations are meant to take place, very difficult. The EU and the US are prepared to concede extensive SDT provisions for the poorest developing economies but are not willing to let China, India and Brazil obtain the same.

In addition to these main issues, a myriad of smaller controversies in agriculture requires a solution, such as liberalisation of the EU's banana regime demanded by South American banana exporters (opposed by former EU colonies enjoying preferential access), calls for reduction of US cotton subsidies by West African cotton growers, and EU's desire to extend the protection of Geographical Indicators (e.g. Roquefort Cheese) to other products than wine and spirits (opposed by the USA and some

other countries). Also, in addition to agricultural liberalisation and NAMA, a Doha agreement will contain provisions on trade facilitation (e.g. streamlining of customs procedures), and liberalisation of trade in services and environmental goods.

Danish trade policy

In Denmark, a broad majority is very much in favour of multilateral trade liberalisation. However, Denmark is part of the European Union that has been given the mandate to conduct the negotiations on behalf of all the EU member countries. Thus, individual EU member countries do not in principle take part in the WTO negotiations. The Danish position concerning the WTO negotiations is, therefore, a part of the EU policy making process where each member country submits their positions and meets for negotiations in order for the EU commission to formulate a common EU position. All EU member countries have to agree upon the common proposal. Within the EU quite different views of international trade rules are represented. In general, the southern EU countries are reluctant to open up the EU markets too much, whereas the northern countries push for liberalisations.

The general procedure for formulating the Danish position is that involved ministries, particularly the Ministry for Food and the Ministry for Business under the auspices of the Foreign Ministry, gathers interested parties such as business organisations, NGOs, researchers and other, in discussion forums with the aim of collecting different views and demands for the WTO. Specifically, these discussions take place in the so-called Beach Club network. Subsequently, the Foreign Ministry in conjunction with the other involved ministries formulates a position paper, which the government has to agree upon. The governments' position is then subjected to discussion and negotiation with other parliament parties. Since the WTO position is part of EU policy the procedure has to follow the established EU policy making procedure in the Danish Parliament. This involves a practice of establishing a wide consensus in parliament. With regard to WTO positions this has proven fulfilled. Thus, from left to right in the parliament, there is very little disagreement on the Danish WTO position.

In order to further the Danish position in the EU, alliances with other like-minded EU member countries are sought. However, the Danish position is at the extreme end of the EU member countries with a high liberal profile. Thus, only few EU member countries are in line with the Danish position.

Draft modalities on agriculture and NAMA

The Chairman of the World Trade Organizations (WTO) agriculture negotiations, the New Zealand ambassador Crawford Falconer, and the Chairman of the NAMA negotiations, the Canadian ambassador Don Stephenson, issued drafts on modalities on July 10, 2008 (WTO, 2008a; 2008b). These draft modalities (hereafter referred to as the Falconer and Stephenson drafts) present the latest attempt to combine the positions of the WTO member countries on the salient elements in the negotiations into a compromise proposal from which the talks towards a final agreement can proceed. During the mini-ministerial meeting of trade negotiators in Geneva in July 2008, director-general Pascal Lamy put forward proposals for specific numbers on most of the remaining outstanding issues. The two drafts together with Pascal Lamy's compromise proposal were generally accepted by most negotiators, except for one particular issue: the specific rules governing the Special Safeguard Mechanism, a device for protecting farmers in developing countries against surges in imports. In fact, after the mini-ministerial, Pascal Lamy noted that agreement had been reached on 18 topics of list of 20 outstanding issues – the Special Safeguard Mechanism being topic no. 19 and cotton subsidies the 20th. The rest of this section takes a closer look at the Falconer and Stephenson drafts, with more details provided in the appendix.

The Falconer Draft

The Falconer Draft concerns the trade rules for agriculture, arranged under three main headlines, domestic support (i.e. agricultural subsidies), market access (tariffs on agricultural products) and export competition (export subsidies on agricultural products).

Domestic support

In the text from 2006 known as the July framework package an agreement between the WTO members was reached regarding the formula to be used for reducing domestic support. Trade-distorting support is to be reduced according to a tiered formula approach. The tiered formula categorises each country's domestic support according to the total value of the support and assigns progressively higher reduction commitments to tiers of higher support value. Thus, the more domestic support is provided, the larger the required cuts (in percentage terms). Although the Falconer draft provides ranges upon which the different positions tend to converge, the precise required cuts in each tier have yet to be agreed upon. Due to the Special and Differential Treatment provisions, concessions required from developing countries are two-thirds

of reductions demanded from developed countries phased in over longer implementation periods. In addition, particular groups of countries, such as least developed countries and poor net food-importing countries, are exempt from making any commitments. Domestic support is a major issue of contention, particular between the USA on one side and developing countries on the other.

Negotiations are based on Final Bound domestic support determined for each country by the Uruguay Round Agreement. The Final Bound level of support provides the upper limit of trade distorting support allowed by the agreement. However, often actual levels of support are much lower than the Final Bound levels – a phenomenon often referred to as ‘water’ in the domestic support. This implies that even large reductions in bound domestic support may not have much real economic effect if the reduced ceiling is not binding. For instance, the final offer made by the USA during the mini-ministerial was to cap its level of trade distorting domestic support at US\$ 14.5 billion, down from US\$ billion 48.2 representing a 70 percent cut in Final Bound support. However, actual trade distorting payments in 2008 were estimated at around US\$ 7 billion, implying that the concessions by the USA would have no effect on actual payments, at least in the short run. The relatively low level of US domestic support is largely due to the current high agricultural prices and the reduced ceiling may become binding in the future as agricultural prices fall.

Market access

The text on market access for agricultural products is the most complicated part of the draft modalities, suggesting that this area is the most contentious part of the negotiations. The Falconer draft stipulates a general rule for reduction of tariffs, a tiered formula similar to the one used for domestic support (but with a different number of tiers and different coefficients). The text deviates from this general formula by a large number of exceptions (and exceptions to exceptions). Similar to domestic support, the SDT provisions require smaller tariff reductions from developing countries and particular groups of developing countries, such as least developed countries and recently acceded members, make even fewer commitments. In addition, developed countries promised to provide least developed countries tariff- and quota-free access for all products (possibly subject to an implementation period for some sensitive products).

The most important exception to the general rule is the sensitive product designation. Developed countries are allowed to designate 4 percent of all tariff lines as sensitive (under certain circumstances, this percentage may be raised to 6 percent – see appendix for details). Developing countries may designate one third more, i.e. $5\frac{1}{3}$ - 8 per-

cent of tariff lines as sensitive. Sensitive products receive a more lenient treatment than the general tiered formula, allowing members to moderate the ordinary tariff reductions by up to two-thirds in return for expansion of the Tariff Rate Quota (TRQ).

Allowing even a small number of sensitive products can have large implications for the outcome of the Doha round due to the presence of tariff peaks. For many countries, the variation in the size of tariffs is very large. Most tariffs may be low or moderate in size, but often a few key commodities are protected by extremely high tariffs. As the standard tiered formula reduces the highest tariffs the most, this is where the largest gains from agricultural liberalisation can be achieved. Therefore, allowing countries to exempt or greatly moderate tariff reductions for these highly sensitive sectors, which may account for just a few percent of the total number of tariff lines, could substantially diminish the gains from the Doha round. For instance, Anderson et al (2006) find that allowing developed countries to exempt just 2 percent of tariff lines from tariff reductions (and 4 percent for developing countries) would reduce the global welfare impact of a Doha agreement by as much as 76 percent. This is the reason why sensitive product designation has been one of the most contentious issues during the negotiations.

The TRQ was introduced during the Uruguay Round as a means of providing a minimum of market access for products with high import tariffs. The quota establishes a specific quantity of the product, which may enter the country at a special low tariff rate (the in-quota tariff). Any imports above the quantity established by the quota are subject to the general high tariff rate (the over-quota tariff). The difference between the in-quota and over-quota tariff can be quite substantial and often the over-quota rate is prohibitive, i.e. so high that imports (above the quota) is effectively blocked. The Falconer draft provides different options for the treatment of sensitive products and TRQ expansion (the more lenient the treatment, the greater the quota expansion) and the details are extremely complex.

In addition to the sensitive product designation, the SDT provisions of the Falconer draft allow developing countries the use of special product designations and the Special Safeguard Mechanism. Special products are similar to sensitive products. It allows developing countries to designate up to 12 percent of tariff lines as special, which means that they are exempt from tariff reductions according to the general tiered formula. Of those, up to 5 percent of total tariff lines may be fully exempt from any tariff reduction, provided that all special products, including the reduction-exempt ones, are subject to an average cut of 11 percent. There are no requirements for TRQ

expansion, but the special product designation must be based on a list of objective criteria stipulated by the Falconer draft regarding importance of the products for the protection of rural livelihoods, etc.

The Special Safeguard Mechanism (SSM), the issue that stalled the negotiations during the mini-ministerial, is a temporary tool designed to protect poor farmers from a sudden surge in imports of agricultural products. The Falconer draft provides specific criteria for when the SSM may kick-in, such as thresholds for the increase in imports, and rules for the temporary increase in tariffs.

During the negotiations, compromises sometimes took place at the level of specific products or product groups. On *cotton* specifically, developed countries are committed to providing least developed countries immediate and total tariff and quota-free access for cotton (developing countries are encouraged, but not required, to do the same). The Falconer draft provides a list of *tropical and diversification products*, which are of great interest to developing countries in particular. Developed countries shall reduce tariffs on these products by more than what is required by the general tiered formula. *Tariff escalation* refers to a practise, where tariffs on raw materials (e.g. non-roasted coffee beans) are much lower than processed products higher in the value chain (e.g. roasted coffee). This practise provides incentives for developing countries to focus trade on primary rather than processed products and thereby hampers the establishment of a domestic agricultural processing industry. To alleviate tariff escalation, the Falconer draft provides a matrix of primary commodities linked to processed products that use the commodities as inputs. If the general tiered formula results in a tariff schedule where tariffs on processed products are higher than on the linked primary commodities, processed product tariffs will be subject to larger reductions. This requirement applies to developed countries only (developing countries are encouraged to apply it as well).

Export Competition

The previously much contested issue of export subsidies appears to have been settled. This section in the Falconer draft is quite short and consists of general provisions with very few exceptions. Export subsidies are to be phased out. The issues of Export Credits, State Trading Enterprises and Food Aid are subjected to comply with specific provisions.

Current status of agricultural negotiations

The chairman of the Agricultural negotiations states that “there was a credible basis for conclusion on very many (and possibly one could have said “nearly all”) issues” (WTO, 2008d). On domestic support the chairman sees few remaining issues and states that agreement could have been reached on these. Likewise, on export subsidies and export policies an agreement is very close. The major remaining area of controversy concerns market access of which the SSM is part. Besides the SSM disagreement, no convergence has been achieved regarding tariff simplification. However, on most other market access issues the chairman believes consensus is within reach. The outstanding issue of cotton was not substantively addressed before the negotiations broke down. A crude measure of the extent of convergence in the agriculture negotiations can be delivered by the number of brackets in the chairman’s compromise proposal texts on modalities. A bracket in the text shows an issue not agreed upon. At Feb 8, 2008 the agriculture text contained 229 brackets. This was reduced to 37 by May 19 and further reduced to 17 at July 10. Thus, based on this indicator substantial progress has been achieved.

The Stephenson Draft

The Stephenson Draft comprises the issue of market access rules for non-agricultural products. Generally, this issue has not been at the forefront in the Doha round. However, NAMA-negotiations has become much more contentious with the developed countries demanding significantly improved market access for NAMA-products from the large high-growth developing countries in return for concessions on agricultural market access and domestic support.

Tariff reductions

Contrary to the agricultural negotiations where a more complex tiered approach is used for tariff reductions, in the NAMA negotiations the countries have agreed upon a single general formula to be applied on all tariffs, albeit with some exemptions. The formula to be used for tariff reductions has been agreed to be a so-called Swiss formula. A Swiss formula approach entails larger cuts for higher tariffs than for low tariffs. Hence, a convergence of tariffs across the board is intended.

The most important remaining issue regarding the formula is the value of the parameter to apply. The value of the parameter determines the size of the implied tariff reductions. Different parameter values are suggested for developed and developing

countries whereby higher reductions in tariffs are intended for developed members and lower reductions for developing countries.

Flexibilities

In the NAMA negotiations the issue of flexibilities addresses much the same considerations as the issue of sensitive products in the Agriculture negotiations, except that only developing countries are allowed to designate flexibilities and there are no off-set requirements to establish TRQs. A range of different flexibility options for developing countries have been proposed by which a number of tariff lines can be completely exempt from reductions or lower reductions are required. In the Stephenson draft there are five different options stipulating various combinations of Swiss formula parameter, extent of flexibilities (no. of tariff lines) and degree to which the tariff cut requirements for products marked by flexibilities are reduced. Developing countries may each choose one of these options according to their particular interests.

The flexibility tool is supposed to help developing countries shield their nascent industries from competition from developed countries and thereby facilitate industrialisation. However, as some developing countries' tariffs are very high, the exceptions are potentially highly distorting and actually risks hurting other developing countries in the process. Jensen et al (2007) estimates the outcome of flexibility designation and shows that of the 10 countries, whose exports to developing countries are most affected by the flexibility tool, seven are other developing countries. For instance, almost 40 percent of Malawi's non-agricultural exports covers tariff lines that are estimated to be designated as flexible. In contrast, only 0.1 percent of Danish exports are affected. This bias is largely due to a significant south-south trade in industrial goods.

A recent addition to the Stephenson draft is the issue of anti-concentration of flexibility-designation by developing countries. The anti-concentration clause is designed to hinder developing countries designating entire product groups, e.g. the whole automotive industry, as covered by flexibilities. The stipulations are fairly mild, but should ensure that at least some liberalisation takes place in all industries.

Other provisions

SDT provisions in the NAMA negotiations have been granted to different country groups, as under the Agriculture negotiations. Furthermore, proposals have been made that developing country customs unions should be allowed greater flexibility due to the inability of the individual member countries of such a customs union to ex-

ert individual flexibility. Hence, a new set of country group could become eligible for exemptions.

Non-Tariff Barriers (NTB) is also part of the negotiations. These negotiations are very technical due to the nature of the barriers and the vast number of different kinds of barriers in different product categories. Some progress has been made toward identifying, examining and categorising NTBs ultimately aiming at reducing or eliminating barriers to entry.

Current status of the NAMA negotiations

The chairman of the NAMA negotiations states in his report that “there is much in that text on which there is very substantial convergence” (WTO, 2008d). However, several developing countries emphasize that the convergence on NAMA are conditional upon the agriculture negotiations. The overall architecture of the NAMA agreement appear to be in place, however, some countries have specific objections or requests on minor issues, which remain to be solved. The brackets indicator, nevertheless, shows contrary to the agriculture negotiations less convergence from February to July. At Feb 8, 2008 the NAMA text included 56 brackets, which increased to 130 by May 19 and further increased to 159 at July 10. This is mainly due to the inclusion of more options and exceptions, particularly for developing countries, in an effort to reach a compromise.

Conclusion on the Doha negotiations

The failure of the negotiators to reach an agreement has been formally ascribed to the controversy concerning the Special Safeguard Mechanism (SSM). Although the potential import barriers made possible by the suggested SSM are of concern to particularly the US, the issue is of minor importance compared to the scope of the contents of the compromise proposals. Accordingly, commentators have pointed to other reasons for the break down. As seen in previous break downs of the WTO talks various “conspiracy theories” have been introduced as stated by the Director-General of WTO Pascal Lamy (CENTAD, 2008a). One of the difficult outstanding issues not addressed at the failed WTO meeting is the problem of cotton subsidies, where the US has quite substantial support for its cotton farmers. Hence, it has been suggested that US reluctance to address this issue prompted the staunch opposition concerning the SSM. Furthermore, US industry and commerce organisations have been criticising the lack of real market access to the larger developing countries resulting from the proposed

NAMA text as stated for instance by the US National Association of Manufacturers (NAM, 2008).

India has shown at least equal opposition to yield any concessions on SSM as made clear by the Commerce and Industry Minister for India Kamal Nath stating that the Special Safeguard Mechanism is an issue of livelihood security, and not to serve the commercial interests of rich countries, and further he emphasised that there can be no trade-off between livelihood security and commercial interests, saying “I cannot negotiate how many farmers can commit suicide.” (CENTAD, 2008b).

Despite negotiators dismissive attitude towards yielding concession on the SSM substantial progress has been made. The chairman of the Agriculture negotiations and the chairman of the NAMA negotiations each published a report outlining the situation in their respective areas after the break down of the negotiations. Both chairmen point out that significant convergence has been achieved; however, some issues remain to be solved. Furthermore, the chairmen as well as some negotiators emphasize that the agreement reached so far is conditional upon issues in which consensus have not been achieved yet. Thus, although negotiations primarily take place within sub-committees covering different areas the outcome is seen as part of an overall package where “nothing is agreed until everything is agreed”.

Model analysis

This section presents a quantitative analysis on the impact of the Falconer and Stephenson drafts in terms of macroeconomic, trade and distributional effects.

The GTAP model and database

The economic analysis is based on an economic model of the world economy with particular emphasis on global trade and production covering 38 different product categories (of which 12 are primary agricultural products and 8 are processed food products) in 39 countries/regions. The starting point of the analysis is the Global Trade Analysis Projects (GTAP) database and model (Hertel, 1997). The database is the most recent Version 6 GTAP database with the base year 2001 (Dimaranan et al., 2005).

We use the standard version of the GTAP model (please refer to Hertel, 1997 or www.gtap.org for details), except for the modelling of capital accumulation. Whereas

the standard GTAP model assumes fixed capital stock at the national level, we assume that the capital stock is augmented by net investments (often referred to as the Baldwin closure – Francois et al, 1996). A positive change in income raises savings and investments. This is where the standard GTAP model stops. With the Baldwin closure, larger investments expand the capital stock, which in turn increases income, savings and investments further. This process continues until the economy reaches a ‘steady state’, in which gross investments equal depreciation and net investment equals zero. Thus, the model can be viewed as a long-term model.

Updating the database 2001 – 2015

The GTAP database version 6 uses 2001 as the base year. A number of important developments have taken place since then or are planned for the immediate future preceding implementation of a Doha round. In order not to attribute the effect of such developments to the Doha round scenario analysed in this paper, we update/project the database from 2001 to the year 2015, by conducting a “pre-simulation” that involves implementing the assumptions listed in Box 1 below. We then take the resulting data set from the pre-simulation as the base for our Doha analysis.

Box 1. Assumptions used to update/project the database to 2015.

Projections of the world economy from 2001 to 2015

- Regional GDP, capital, labour force and population growth together with regional-specific total factor productivity increases;

Trade policy changes (updating initial 2001 tariff structure)

- Final implementation of the UR commitments for developing countries;
- Accession of China to the WTO;
- Enlargement of the EU to include 12 new members;
- Everything But Arms (EBA) Agreement between LDCs and the EU27;
- The implementation of the TDCA agreement between South Africa and the EU27
- The implementation of the AGOA on textiles and wearing apparel;
- An update of Indian's applied MFN tariff rates to the latest year available;
- Final implementation of the NAFTA agreement;
- Abolishment of export quotas on textiles and wearing apparel;

Domestic policy changes

- A stylized implementation of the Mid-Term Review Reform of the CAP's, decoupling of direct payments to a single farm payment in the EU27;
 - No sugar and milk quotas in the EU27;
 - EU CAP budgetary expenditure fixed in nominal terms;
 - USA agricultural subsidies (expenditure) fixed in nominal terms at its 2001 level.
-

Doha scenario

The Doha scenario analysed in this paper follows the July 10th 2008 revisions of the Falconer and Stephenson drafts, augmented by Pascal Lamy's proposed solution to outstanding issues put forward during the mini-ministerial of July 2008. As briefly discussed above, the draft modalities stipulate the general formulas and rules governing all countries future liberalisation commitments, but not the actual resulting tariff schedule. We therefore have to estimate the every country's future tariff schedule based on the draft modalities and assumptions regarding countries choices among different options. These are detailed in the appendix.

The draft modalities contain some parts that are mandatory and permanent (e.g. tariff reduction formulae), some parts that temporary in nature (such as the Special Safeguard Mechanism) and some parts that are framed as ‘encouragements’ and thus expected to be of a more voluntary nature or subject to future negotiations (e.g. developing countries granting preferential market access to least developed countries or special sectoral initiatives). We take a long term view of the impacts of Doha, and given the general reluctance to liberalise more than absolutely necessary, we choose to take a conservative approach to the scenario design. Hence, we only model the mandatory and permanent parts of the draft modalities, which is a common practise in the literature.

One particular issue we cannot model in this CGE framework, is the expansion of Tariff Rate Quotas in return for lower tariff reductions on sensitive products. Although the GTAP model is in principle capable of modeling tariff quotas, in practice this is extremely difficult at best and forces a number of unpalatable compromises (for instance, how do we aggregate tariff lines to GTAP concordance if some lines face binding quotas and others do not? – how do we aggregate different quotas?). Therefore, TRQ expansion is not part of our Doha-scenario (again, this is standard in the literature). This means that our results may slightly underestimate the impact of the agreement, particularly for agricultural commodities covered by TRQs. Thus, together with the conservative nature of our scenario design, the results can be seen as a lower bound of the impacts of a Doha agreement.

Implementing the scenario

In line with most of the recent literature, we design the Doha-scenario at the 6-digit (tariff line) level of the Harmonised Systems nomenclature. This is necessary in order to properly account for many complex issues of trade negotiations, such as the rules and exceptions of the draft modalities operating at the tariff line level, the impact of tariff peaks and ‘water’ in the tariffs. We use tariff data for the year 2001, obtained from the MAcMap database (Bouët et al 2004) and updated for the period 2001 – 2015 as described above. This is the same data used in the GTAP database and our tariff calculations are therefore directly compatible with standard GTAP tariff data.³ The NAMA product coverage follows the list of Non-Agricultural products included in the Stephenson draft. By definition, products not on this list fall under agriculture.

³ In order to avoid a “mis-marriage” of data with our calculated shocks to the data base, we have first aggregated the MAcMAP database up to GTAP concordance without making any changes to the tariffs. We have then incorporated these tariffs into the initial GTAP data base before we began our update and NAMA reduction scenarios.

The scenario in summary

Table 1 and Table 2 summarises the change in tariffs, from a global and a Danish perspective, due to the Doha agreement as defined in the Doha scenario.

Table 1. Average tariffs of selected countries, percent

	Bound tariffs		Applied tariffs	
	Pre-Doha	Post-Doha	Pre-Doha	Post-Doha
EU				
Agriculture	20.9	8.7	12.5	6.7
Non-agriculture	4.1	2.2	1.8	1.0
USA				
Agriculture	7.1	3.1	3.5	2.0
Non-Agriculture	3.5	1.8	2.5	1.2
Other developed countries				
Agriculture	60.0	19.2	20.7	12.4
Non-Agriculture	7.7	2.7	2.6	1.4
China				
Agriculture	17.0	16.0	14.5	14.2
Non-Agriculture	9.6	6.6	9.5	6.6
India				
Agriculture	115.9	78.1	39.8	38.5
Non-Agriculture	33.6	14.3	15.9	13.9
Other developing countries				
Agriculture	52.9	35.0	17.1	15.6
Non-Agriculture	29.0	12.6	9.6	7.4

Note: The table does not include Least Developed countries, Small Vulnerable Economies or countries with a low binding coverage (see appendix for details on country classifications).

Fejl! Henvisningskilde ikke fundet. presents average bound and applied tariffs (calculated as simple averages) of selected countries before and after the implementation of the Doha scenario. For instance, EUs average bound agricultural tariffs are reduced from 20.9 percent to 8.7 percent, which results in a reduction of actually applied tariffs from 12.5 percent to 6.7 percent.

Three major points can be gathered from the evidence. Firstly, agricultural tariffs tend to be much higher than non-agricultural tariffs, particularly among most developed countries. This is largely due to the successful completion of previous trade liberalisation rounds that concentrated mostly on non-agricultural trade liberalisation among OECD countries. Secondly, the Doha agreement is fairly successful in reducing bound tariffs, in spite of the numerous exceptions and flexibilities granted the member countries. For most developed countries, bound tariffs are reduced by half on average, for developing countries somewhat less. In particular, Chinese cuts to bound tariffs are relatively small, which is due to the fact that China already has reduced tar-

iffs considerably as part of the accession to WTO. Finally, comparing bound tariffs with applied tariffs reveals considerable water in the tariffs. As international trade agreements discipline bound tariffs and not actually applied tariffs directly, the Doha agreement will only affect applied tariffs if bound tariffs are lowered far enough to eliminate the binding overhang. The water in the agricultural tariffs of India and other developing countries is huge, resulting in a very small reduction in actually applied tariffs.

Table 2. Average applied tariffs facing Danish Imports and exports, percent

Sector	Applied tariffs		Share of total	EU trade share
	Pre-Doha	Post-Doha		
Danish Imports				
Total imports	2.5	1.3		68.9
Machinery	0.5	0.4	9.0	73.7
Electronics	1.3	0.9	8.4	76.9
Vehicles	8.1	3.6	4.5	80.7
Clothing	7.9	3.3	3.2	50.3
Dairy	58.8	35.7	0.4	82.0
Beef	77.5	53.7	0.2	93.5
Danish Exports				
Total exports	8.0	4.7		63.8
Medicaments (incl. insulin)	1.3	1.3	3.3	47.7
Pork	53.9	20.3	3.2	54.7
Furniture	0.9	0.7	1.9	76.5
Electrical generators (incl. wind mills)	2.2	1.9	1.4	62.3
Furskins (incl. mink furs)	1.3	1.3	0.5	26.3

Table 2 provides a Danish perspective on the changes in applied tariffs faced by Danish importers and exporters in selected economic sectors due to the Doha agreement. For Danish Imports the tariffs are average Danish (common EU) tariffs weighted by Danish extra-EU imports. Thereby, the averages reflect the tariffs faced by Danish importers. Similarly, for Danish Exports the tariffs are calculated as average trade partner tariffs weighted by Danish extra-EU exports and the averages therefore reflect the tariffs Danish exporters face in destination countries. In addition, the table reports the relative weight of the sector in total import/export as well as the share of Danish trade taking place internally in the EU. For instance, Danish imports of machinery correspond to 9 percent of all imports, of which 73.7 percent originates from other EU countries. The rest faces an average tariff of 0.5 percent reduced to 0.4 percent as a result of the Doha agreement.

The table suggests that the implications of Doha for the Danish economy will be limited. With few exceptions the majority of Danish trade is internal EU trade, which is already fully liberalised and is therefore not directly affected by tariff reductions. Also, most of the large Danish import and export sectors already face very low tariffs. The major exception is the Danish pork industry, which benefits from a very large tariff reduction at important non-EU export destinations (notably Japan). On the import side, consumers (and industries using imported intermediates) are likely to benefit from lower clothing and vehicle tariffs, although the impact of the latter is likely to be small as 80 percent of vehicle imports originate from other EU countries.

The beef and dairy sectors are notable for the high level of protection in the EU and the relatively large reduction in import tariffs due to the Doha agreement. The high barriers on beef and dairy imports are reflected in the fact that Danish imports are almost entirely sourced from other EU members. The improved access for non-EU exporters to Danish market is likely to adversely impact not only Danish beef and dairy industries but also other EU manufacturers, whose preferential access to the Danish market is eroded. Similarly, Danish exports of beef and dairy to other EU countries are likely to take a hit.

Results

The Global Welfare Effects

Table 3 and Table 4 provide a global overview of the welfare implications of the Doha scenario. Welfare is measured in terms of Equivalent Variation, i.e. the monetary value of changes in utility of the representative household measured in pre-simulation prices. Table 3 disaggregates welfare effects by country/region and decomposes the welfare impact into contributions from removal of agricultural export subsidies, liberalisation of agricultural market access and NAMA. Table 4 disaggregates the total welfare impact by sector. Note that the totals in the agricultural and non-agricultural sectors in Table 4 do not equal the contributions from liberalisation in agriculture and non-agriculture in Table 3 due to general equilibrium effects. Thus liberalisation of agricultural trade not only affects agricultural sectors, but also manufacturing and services through competition for primary factors (labour and capital).

Table 3. Impact of Doha on welfare and GDP

	GDP growth	Total welfare	----- Contributions to total welfare from -----		
			Export subsidies	Agriculture Market access	Non-agriculture Market access
	percent	----- Million US\$ (2001) -----			
EU	0.12	8,054	1,603	17	6,433
USA	0.03	391	551	225	-385
Canada	0.10	785	178	350	257
China	0.28	7,218	-49	-265	7,533
India	0.35	2,744	-2	48	2,698
Rest of Asia	0.30	17,803	-271	3,065	15,009
Latin America	0.56	11,833	-272	535	11,570
Africa	0.24	1,087	-371	340	1,117
Rest of World	0.17	5,580	1,713	2,501	1,366
Total world	0.17	55,494	3,080	6,817	45,597

Global welfare is estimated to increase by US\$ 55 billion as a result of the Doha agreement, which is not too far from the most recent results obtained by Decreux and Fontagné (2008), US\$ 43 billion, and by Laborde et al (2008), US\$ 87 billion. Asia and Latin America in particular stand to gain greatly, accounting for more than 70 percent of global welfare gains, whereas the USA breaks even and the EU achieves a respectable US\$ 8 billion in additional welfare. Globally, the income growth corresponds to 0.17 percent of GDP.

The relatively poor results for the USA can largely be explained by the existing patterns of tariffs relative to American trade interests. Duties levied on American exports are already very low, whereas sensitive import sectors, notably textiles and vehicles, enjoy some protection. Therefore, the USA will not gain much from improved access to export markets, and loses a little by opening up to imports. This suggests that current tariffs are close to the optimal tariffs of the USA and may provide an explanation for why the USA seems less interested in pushing for a successful outcome the the negotiations. The opposite argument can be applied to Asian and Latin American countries. They stand to reap the bulk of the global welfare gains because they obtain improved access to export markets and because their relatively protected economies largely benefit from liberalisation. Most developing regions, notably in Africa, actually loses from the elimination of export subsidies. This suggests that many countries are net food importing and experience a deterioration in terms of trade as the elimination of export subsidies causes food prices to increase.

NAMA accounts for the majority of the welfare gains, whereas liberalisation of agriculture only adds about US\$ 10 billion to welfare. This is partly due to the relatively modest reductions in agricultural tariffs by developing countries, partly due to the small weight of agriculture in the global economy. Although Doha only shaves a few percentage points off industrial tariffs (on average – see Table 1), these liberalisation efforts affect the bulk of international merchandise trade, not to mention key industries such as textiles and vehicles that still enjoy some protection. Thus, even with a less than ambitious outcome of the agricultural negotiations, there are still some gains to be extracted from a successful Doha-agreement due to NAMA liberalisation.

Table 4. Global welfare impacts of Doha, by product, Million 2001 US\$

Agriculture	Welfare	Manufacturing	Welfare
Cereals	210	Natural resources	2,058
Other crops	946	Clothing	17,754
Bovine animal products	2,528	Wood and paper	480
Other animal products	1,078	Chemical industry	2,696
Dairy products	795	Metals and minerals	3,230
Other processed agriculture	563	Transport equipment	10,420
		Electronics	3,574
		Machinery	7,604
		Other manufacturing	1,356
Total agriculture	6,121	Total manufacturing	49,146

More than two-thirds of welfare increases in agriculture accrue to the livestock sectors, e.g. beef, dairy and pork, mainly due to the fact that these more highly value added products face higher trade barriers (see e.g. Table 2) and even partial liberalisation provide significant benefits. Within manufacturing industries, the clothing and transport equipment sectors account for more than half of manufacturing sector welfare gains, for much of the same reasons. These two sectors are among the few industries that still encounter relatively high tariff barriers.

The Danish Perspective

Table 5 presents the welfare impact on Denmark of the Doha agreement disaggregated by sector. In total, Doha raises welfare by US\$ 720 million and GDP by 0.3 percent. It is notable that contrary to the global level, most of the changes take place in agriculture. The greatest gains by far (70 percent of total welfare) accrue to the other animal products sector, which includes pork production. As demonstrated in Table 2 above, this is a result of the improvement in market access outside EU, par-

ticularly in Japan and other Asian countries, for the relatively competitive Danish pork industry. Implications for manufacturing products are more modest, due to the fact that trade in the most important non-agricultural products is already liberalised (at least in terms of tariffs) and the Doha agreement brings few further gains. As at the global level, clothing and transport equipment account for the largest impact.

Table 5. Danish welfare impacts of Doha, by product, Million 2001 US\$

Agriculture	Welfare	Manufacturing	Welfare
Cereals	21	Natural resources	3
Other crops	31	Clothing	65
Bovine animal products	-26	Wood and paper	2
Other animal products	504	Chemical industry	-4
Dairy products	-5	Metals and minerals	9
Other processed agriculture	18	Transport equipment	60
		Electronics	16
		Machinery	22
		Other manufacturing	3
Total agriculture	544	Total manufacturing	176

Table 6 elaborate more on the estimated structural changes taking place in the Danish economy following a Doha agreement. It shows the percentage change in production by sector, and decomposes the total change into contributions from elimination of agricultural export subsidies, reductions of tariffs on extra-EU markets, and reduction of EU tariffs. For instance, the production of cereals in Denmark is estimated to increase by 4.9 percent, which is the sum of a decline by 1.9 percent from the elimination of export subsidies, an increase by 6.9 percent resulting from the improved access to markets outside EU as tariffs are reduced, and a 0.1 percent decline due to increased competition on EU markets as EU reduces own tariffs on cereals.

The most significant changes to the Danish economy are expected to take place in the animal products sectors. In particular, the other animal products sector, which in Denmark comprises primarily pork production, is estimated to grow by a significant 18 percent, largely due to better access to markets outside the EU as demonstrated above. This represents a huge expansion of pork production and may be a little over-estimated due to restraining factors not included in the model, such as e.g. environmental regulation restricting the scale of pig production units in Denmark. Note that pork production is not adversely affected by increased competition from non-EU countries on EU markets because pork production is not highly protected in the EU.

Table 6. Change in Danish production, percent

			----- Tariff reductions -----	
	Production	Export Subsidies	DK increased Access to ROW	ROW increased Access to EU
Cereals	4.9	-1.9	6.9	-0.1
Other Crops.	-0.9	1.1	-2.1	0.0
Bovine animal products	-13.2	-7.3	0.6	-6.4
Other animal products	17.8	1.3	16.5	0.1
Dairy products	-10.1	-7.3	-0.9	-1.9
Other processed agriculture	-1.7	-0.6	-0.1	-0.9
Natural resources	0.0	0.0	0.0	0.0
Clothing	-6.5	0.2	-3.2	-3.5
Wood and Paper	-0.4	0.0	-0.5	0.2
Chemical industry	-0.8	0.1	-1.2	0.2
Metals	-0.6	0.1	-0.6	0.0
Transport equipment	-2.1	0.1	-1.4	-0.8
Electronics	-1.4	0.2	-1.9	0.3
Machinery	-1.0	0.2	-1.8	0.5
Other Manufacturing	-0.5	0.1	-0.7	0.1
Services	0.2	0.0	0.1	0.1

The opposite story unfolds within the Bovine and dairy sectors. Bovine animal products decline by 13 percent and dairy by 10 percent. These changes are caused by the elimination of export subsidies and by sharply increased competition from non-EU suppliers. Beef and dairy are some of the most protected industries in the EU – as note in Table 2 above more than 80-90 percent of Danish imports are sourced from within the EU - and liberalisation of agricultural trade will adversely affect these sectors across the EU. Note that Danish beef and dairy firms will not only be hurt by import penetration on Danish markets, but also by increased competition on other EU markets, to which Danish firms presently enjoy preferential access. Thus, multilateral trade liberalisation is also a story of preference erosion for Denmark and other EU members. In general the Doha agreement is redirecting Danish exports and imports away from the intra-EU market towards the rest of the world. In total, agricultural exports to the non-EU markets increase by 23 percent reducing exports to the intra EU market by 10 percent.

The structural changes in the manufacturing sectors are somewhat smaller than in the agricultural sector (in relative terms), and they are mostly negative. The scope for improved market access for Danish export firms is limited because trade in the most important Danish manufacturing industries is already highly liberalised (see Table 2). Thus exports to non-EU markets remain nearly unchanged, while total exports to other EU members decline by 2 percent due to increased competition. At the same

time, other sectors in the Danish economy, agriculture and services, expand due to opened market opportunities and pull away resources (capital and labour) from manufacture.

Discussion

Is a Doha agreement worth pursuing or a complete waste of political capital? This question has been asked repeatedly for the past few years. This paper joins most of the applied literature in producing positive, albeit small, welfare effects for the global economy as a whole and for all major regions as well. As a result, many economists are mostly in favour of free trade in general and the Doha agreement as a small step in the right direction. The major arguments against pushing further for a Doha agreement revolves around two issues, the lack of ambition and the potential adverse distributional consequences.

On the first issue, lack of ambition, the Doha agreement is often criticised for its many exceptions and the small size of its estimated economic effects. The 0.2 percent growth in global GDP due to the Doha agreement estimated in this paper will neither make nor break the world economy. On the other hand, the effect is likely to be underestimated for a number of reasons. The scenario analysed in this paper is designed to provide a conservative estimate and can therefore be taken as a lower bound of the likely outcome. In addition to Agriculture and NAMA, a Doha agreement will include other provisions, such as services liberalisation and trade facilitation. The outcome of these issues is highly uncertain (which is why they are not included here), but e.g. Decreux and Fontagné (2008) suggest that services liberalisation could add another 25 percent to their global welfare estimates.

More importantly, the model does not account for ‘productivity’ aspects of trade liberalisation. There is a widespread agreement in the literature that trade liberalisation is a cause of productivity growth for a number of reasons. Increased imports or Foreign Direct Investment may embed new technology and thus facilitate technology transfer across borders. Evidence suggest that exporting firms are generally more productive than firms concentrating on domestic markets – increased exports raises the weight of exporting firms in the economy and will therefore lead to an increase in average productivity (Bernard and Jensen, 1999). Industries are often characterised by increasing returns to scale and as lowering trade barriers expands the extent of the market, industries can raise output and move down their average cost curves. These

are some of the productivity gains from trade that are easy to identify but hard to quantify.

The second main argument against a Doha agreement, the adverse distributional consequences, is most often heard in political circles. Nevertheless, it is an argument that economists must take seriously. The simulation results for the Danish economy demonstrate that some sectors win, while others lose. Economists tend to dismiss the importance of distributional consequences, referring to some ideal mechanism that can compensate losers from trade liberalisation by lump sum transfer as long as the overall outcome is positive. Needless to say, such a mechanism is seldom in place. Denmark is actually one of the more advanced economies in this respect, due to its celebrated 'flexicurity' system, i.e. the welfare state that combines high levels of social security with great labour market flexibility. This is probably one of the major reasons why most Danes are in favour of free trade (another being the limited size of the Danish economy). In other countries, such systems are less developed, particularly in developing countries but also in some advanced countries such as the USA. For instance, the reliance of the US economy on the private market for health insurance makes structural change very costly. When people in declining industries are laid off they often lose not only their salaries, but also their health insurances. This may be one of the reasons why the USA is generally less than enthusiastic about Doha (another is of course the limited overall gains from the agreement). Generally, it is hard to divorce the discussion of international trade from the distributional aspects and social security.

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Appendix

The appendix provides more technical details on the Falconer and Stephenson drafts, and describes how the provisions are implemented in our Doha-scenario. The draft modalities in effect classify WTO-members into seven groups, based on objective criteria. Required tariff reductions are determined on the basis of these groups. The groups are:

- **Developed countries:** Following the UN definition
- **Developing countries:** Countries that are classified as developing according to the UN definition, and not belonging to any of the other groups
- **Small, Vulnerable Economies (SVEs):** Countries are designated as SVEs if their average share of a) world merchandise trade does not exceed 0.16 percent; b) world trade in non-agricultural products is no more than 0.1 percent; and c) world trade in agricultural products does not exceed 0.4 percent. In addition, a number of (African) countries that do not meet these criteria are considered SVE (the agricultural draft modalities provide a list)
- **Countries with a low binding coverage:** Some countries have only bound a small percentage of their tariffs (less than 35 percent). In return for lower tariff reduction commitments, they are required to bind a large proportion of their remaining unbound tariff lines. This category is only singled out in the NAMA modalities – in agriculture these countries are treated as SVEs
- **Recently-Acceded Members (RAMs):** A number of new WTO members (incl. China) face more lenient requirements, as considerable tariff reductions were part of their accession agreements
- **Very Recently-Acceded Members (VRAMs):** Countries that have become members within the last few years are not required to reduce their tariffs further, as tariff reductions were part of their accession agreements
- **Least Developed Countries (LDCs):** LDCs are not required to reduce their own tariffs – they do however receive tariff- and quota-free access to developing countries as a part of the agreement

Falconer draft

Domestic support

The Uruguay Round Agreement split domestic support into different categories; the Amber Box (highly trade-distorting domestic support), the Blue Box (trade-distorting domestic support combined with production limiting programmes) and Green Box (domestic support with little or no trade distortion). Support in the Amber Box, except

for a small share called *de minimis* (5 percent of product specific and 5 percent of non-product specific domestic support; double this for developing countries), was summarised as the Aggregate Measure of Support (AMS) and slated for reduction, whereas the Blue and Green boxes were exempt.

The Falconer draft stipulates reductions in final bound total AMS according to a tiered formula, summarised in table A1 below, as well as reductions in the shares of domestic support that are excluded from AMS under *de minimis* (by half for developed countries and one third by developing countries) and the Blue Box (to 2.5 percent of reference value of agricultural production). In addition, a cap on the sum of AMS, *de minimis* and Blue Box support, collectively known as Overall Trade-Distorting Domestic Support (OTDS), will be reduced by a tiered formula, as summarised in table A1.

Table A1. Reductions in AMS and OTDS				
	----- Developed countries -----		----- Developing countries -----	
	Pre-Doha level (US\$ billion)	Reduction (%)	Pre-Doha level (US\$ billion)	Reduction (%)
Tier 1	0 < AMS ≤ 15	45	0 < AMS ≤ 15	30
Tier 2	15 < AMS ≤ 40	60	15 < AMS ≤ 40	40
Tier 3	AMS > 40	70	AMS > 40	46.67

How we implemented this

Due to extensive ‘water’ in the domestic support, the reductions in bound domestic support will have little, if any, impact on the domestic support actually extended to farmers (REF). For instance, the current OTDS payments of the USA amount to roughly US\$ 9 billion, compared to a new bound OTDS-level of US\$ 14.5 billion implied by the Falconer draft. Also, with the mid-term review of the Common Agricultural Policy, large parts of EU domestic support was transferred from the Amber and Blue boxes to the Green box that is exempt from reduction commitments, thus reducing actual OTDS payments below the post-Doha bound level. Therefore, no reduction of domestic support is included in the Doha scenario.

Market access

The draft modalities stipulate that tariff reductions follow a general tiered formula as summarised in table A2.

Table A2. Agricultural tariff reductions

	Pre-Doha tariff	Developed countries Reduction (%)	Pre-Doha tariff	Developing countries Reduction (%)
Tier 1	$0 < t_0 \leq 20$	50	$0 < t_0 \leq 30$	33.33
Tier 2	$20 < t_0 \leq 50$	57	$30 < t_0 \leq 80$	38
Tier 3	$50 < t_0 \leq 75$	64	$80 < t_0 \leq 130$	42.67
Tier 4	$t_0 > 75$	70	$t_0 > 130$	46.67

Note: Tariff reductions for developing countries are 2/3 of the reduction made by developed countries in the same tier.

SVEs and countries with a low binding coverage use the tiered formula of developing countries, but are allowed to moderate the cuts by 10 *ad valorem* points. For instance, the developing country tiered formula requires a developing country to reduce a 50 percent tariff to 31 percent (a reduction of 38 percent or 19 points) – an SVE would only be required to reduce the 50 percent tariff to 41 percent (a 9 point reduction). Similarly, RAMs use the developing country tiered formula moderated by 8 *ad valorem* points and are in addition entitled to exempt all tariffs at or below 10 percent. Finally, VRAMs and LDCs are exempt from any tariff reduction commitments.

How we implemented this

The general tiered formula for agricultural tariff reduction is modeled as described.

Sensitive products

Countries may designate a number of sensitive products that are entitled to a more lenient treatment than the general tiered formula. Developed countries may designate up to 4 percent of agricultural tariff lines as sensitive. However, this number may be raised to 6 percent if members have more than 30 percent of their tariff lines in the top tier (i.e. 30 percent of the tariffs are higher than 75 percent) or if the 4 percent level imposes “... a disproportionate constraint in absolute number of tariff lines because tariff concessions are scheduled at the 6-digit level...” (WTO..., 2008, p. 14). Developing countries (including SVEs, countries with a lower bound coverage and RAMs) are entitled to designate as sensitive one third more tariff lines than developed countries.

WTO operates at the 6-digit level of the Harmonized System nomenclature, which is the same for all members. However, each member country is entitled to further disaggregate the tariff lines using idiosyncratic 8- or 10-digit codes. This is significant because a more disaggregated schedule provides a greater number of agricultural tariff

lines and hence a larger number of tariff lines that may be designated as sensitive. Members are thereby able to more accurately pinpoint the most sensitive tariff lines. This is why members with a tariff schedule at the 6-digit level are entitled to designate additional tariff lines as sensitive.

How we implemented this

We use tariff data at the 6-digit level and are therefore unable to designate sensitive products at a more disaggregated level. To compensate for this, we apply the exception provided by the Falconer draft and designate 6 percent of tariff lines as sensitive for developed countries and 8 percent for developing countries.

We have no prior information on which particular tariff lines are likely to be designated as sensitive by each country. We therefore have to estimate the schedule of sensitive tariffs based on some criteria. Different approaches have been suggested in the literature. For instance, Decreux and Fontagné (2008) designate as sensitive the tariff lines that have the highest applied tariff rate multiplied by imports. We use a slightly different criterion. We assume that the most sensitive products are primarily the ones most heavily protected, and secondarily the ones with the highest imports. In practice, we sort tariff lines in descending order according to applied tariffs, rounded to the nearest 25 percent, and within each tariff range according to imports. When choosing sensitive tariff lines, we start from the top and stop when the number of tariff lines corresponds to 6 percent/8 percent of all agricultural tariff lines. For instance, a tariff line with an applied tariff of 90 percent (rounded to a 100) without imports is assumed to be more sensitive than an applied tariff of 70 percent (rounded to 75) with some imports. In this way, we ensure that a tariff, which is set very high in order to discourage any imports (a prohibitive tariff), will likely be designated as sensitive. This is contrary to Decreux's and Fontagné's approach, which would value a tariff line with high tariff and no imports equal to a tariff line with zero tariff and high imports.

Tariff Rate Quota expansion

Member countries are entitled to reduce their sensitive product tariffs by a smaller proportion than the standard tiered formula in return for an expansion in tariff quotas for those sensitive products. The draft modalities allow members to choose between three different options with respect to sensitive product and tariff quota expansion. For the designated sensitive products, members may reduce the tariff cuts stipulated by the general tiered formula by one third, one half or two thirds in return for tariff

quota expansions of 3 percent, 3.5 percent and 4 percent of domestic consumption, respectively.

How we implemented this

Tariff quota expansion is not part of the Doha scenario analysed in this paper (just as they are not part of similar scenarios analysed in the literature, e.g. Decreux and Fontagné, 2008). To minimise the bias produced by this omission, we assume countries choose the first sensitive product option, i.e. sensitive product tariff cuts are reduced by one third relative to the standard tiered formula cut.

Special products

Developing countries are entitled to designate 12 percent of tariff lines as special products, based on objective criteria related to rural livelihood protection. Up to five of the 12 percent may be totally exempt from any tariff reduction and the only other requirement is that the average tariff cut of all special products (including the reduction-exempt ones) shall be at least 11 percent. SVEs may instead choose to designate all tariff lines as special products (and thereby bypass the standard tiered formula), provided that the average tariff reduction is no less than 24 percent. RAMs are entitled to 13 percent of tariff lines as special products with an average cut of 10 percent. Special products designation is in addition to entitlements for sensitive products.

How we implemented this

In principle, special products cannot be selected freely but must be identified according to a number of objective criteria listed in the Falconer draft. However, the criteria are so broadly defined that most products may be argued to fall under one or more of the criteria. We therefore assume that the criteria are not binding in practice, thus providing a conservative estimation of special product designation. We use the same criteria for special product selection by developing countries as the one used for sensitive products. We assume that the most sensitive products (by the criteria used here) will first be designated as special product exempt from tariff reduction (up to first five percent), then as special product with 11/10 percent average tariff cut (next seven/eight percent), and finally as sensitive product (next eight percent).

First, we calculate the average tariff reduction of the potential special products (the first 12/13 percent of tariff lines) implied by the standard tiered formula in order to test for the applicability of special products designation. In some cases (e.g. China), the standard tiered formula produced an average tariff reduction of less than the 11/10 percent required for special products, and no special products were designated. Then,

one by one we exempt the most sensitive products from tariff reduction and recalculate the average tariff cut implied by the standard tiered formula over the remaining special products. This continues until we have exempted up to five percent of tariff lines or the average cut of all special products reaches 11/10 percent, whichever comes first. If the average special-product cut still exceeds the required threshold after five percent of tariff lines have been exempted, we reduce the tariff cuts of the remaining special products proportionately to reach the required threshold.

Special Safeguard Mechanism

The Special Safeguard Mechanism allows developing countries to temporarily (one year at a time and a maximum of two consecutive years) raise tariffs in response to sudden surges in imports or drops in the price of imports. The volume-based imports trigger has three thresholds of 110, 115 and 135 percent of a reference level of imports calculated as the rolling average of import of the three preceding years. Each trigger allows developing countries to raise tariffs by 25, 40 and 50 percent respectively of bound tariffs or percentage points, whichever is greater. The price-based trigger is 85 percent of a rolling average of the MFN-sourced import price of the three most recent years, which allows an extra tariff corresponding to 85 percent of the difference between the import price and the trigger price. The disagreement that broke the deal at the mini-ministerial in July 2008 was the size of the volume-based trigger that would allow the temporary extra tariff to breach the current (i.e. pre-Doha) bound tariff ceiling. The USA insisted it should be in response to an import surge of at least 40 percent, whereas China and India wanted the threshold to be set at 10 or 15 percent (Bridges, vol. 12, 7 August 2008).

How we implemented this

The SSM is a temporary measure, the use of which is unpredictable. The SSM is therefore not implemented in the Doha scenario, which is standard practice in the literature (e.g. Decreux and Fontagné, 2008).

Tariff Escalation

The Falconer draft specifies a list of primary product – processed product linkages for which provisions on tariff escalation applies. Tariffs of any processed product that has a primary product link according to this table are subject to larger than standard reduction, unless the difference between primary product and processed product tariff after the application of the standard tiered formula is less than 5 ad valorem points. The processed product tariff shall be treated as if it falls within the next higher tier in the tiered formula, except for tariffs in the highest tier which will be reduced by a fur-

ther 6 ad valorem points. For instance, a 40 percent processed product tariff will be cut by 64 percent and not the 57 percent stipulated by the standard tiered formula. The extra tariff reduction applied shall not reduce processed product tariffs below the (post-Doha) tariff of the linked primary product. The tariff escalation provisions apply to developed countries and developing countries declaring themselves to be in a position to do so.

How we implement this

The tariff escalation provisions are implemented for developed countries largely as stipulated in the draft modalities (we assume that no developing countries volunteer to apply the provisions). First, we apply the standard tiered formula to test the applicability of the provisions. If a process product uses more than one primary product, we test against the simple average of primary product tariffs. Then we apply the relevant tariff reduction and test whether the resulting processed product tariff is smaller than the post-Doha primary product tariff, in which case the processed product tariff is set equal to the post-Doha primary product tariff.

Tropical products and diversification products

Tropical and diversification products (a list is provided in the Falconer draft) are subject to larger than standard tariff reduction by developed countries and developing countries declaring themselves in a position to do so. There are two specific options:

1. Tariffs below 25 percent shall be reduced to zero – tariffs above 25 percent shall be reduced by 85 percent with no allowance for sensitive product designation.
2. Tariffs below 10 percent shall be reduced to zero – tariffs above 10 percent shall be reduced by the percentage implied by the top-tier of the standard formula (i.e. 70 percent), or if the tariff already belongs to the top tier, by an additional 8 ad valorem points. The sensitive products provisions apply as normal.

How we implement this

The first option is by far the more far-reaching of the two and would result in dramatic reductions in some highly sensitive tariffs, such as Japanese rice tariffs. In line with the objective of this paper to provide a conservative estimate, we assume that the second option applies for all countries. The provision is implemented as described.

Minimum and maximum reductions

Developed countries shall reduce all tariffs by an overall average of at least 54 percent, when taking into account the standard tiered formula as well as all exceptions described above. Similarly, developing countries are required to reduce tariffs by an overall average of at most 36 percent, when accounting for all provisions.

How we implemented this

After calculating all cuts to tariffs resulting from the application of the standard tiered formula and subject to all exceptions, we derive the overall average tariff reduction. If the average cut is below 54 percent for developed countries or above 36 percent for developing countries, all tariffs are increased or reduced proportionately to reach the relevant thresholds.

Least developed countries (LDCs)

Least developed countries are not required to undertake any reductions in bound tariffs. In addition, developed countries are required to provide quota- and duty-free access to LDCs; 97 percent of tariff lines immediately and the rest after an implementation period.

How we implemented this

We exempt LDCs from making any reductions in tariffs and eliminate all developed country tariffs on imports from LDCs.

Other provisions

The Falconer draft contains a number of other provisions that are presented as encouragements, are still unspecified or have little actual implications for applied tariffs. Therefore, they are not specifically implemented in the scenario. These are:

- **Commodities:** Commodity-dependent developing countries are encouraged to help identify primary commodities affected by tariff escalation to be adopted as part of the modalities. In addition, provisions should be made to ensure the possibility that members may adopt "...intergovernmental commodity agreements for stabilization of prices for exports of agricultural commodities...". No specific details are provided in the present revision of the Falconer draft.
- **Special Agricultural Safeguard (SSG):** The SSG was introduced in the Uruguay Round Agreement and is similar to the SSM, except that it also applies to developed countries. Provisions are included in the Falconer draft to eliminate or reduce the SSG. Since the SSG a temporary measure and not

part of the baseline, its elimination/reduction will not affect the modeled economy and is therefore not included in the Doha-scenario.

- **Tariff simplification:** Measures designed to convert complex tariffs, such as specific tariffs (an absolute amount levied relative to a quantity measure, e.g. X\$ per tonnes) into simple ad valorem tariffs (tariffs measured as a percentage of import value). The conversion will take place on the basis of the ad valorem equivalent of complex tariffs and will therefore have no implications for actual tariffs.
- **Preference erosion:** Specific provisions cover products that are of particular interest to least developed countries enjoying preferential access to developed country markets. Tariffs on such products will be reduced over a longer implementation period. These provisions do not affect the end result of the Doha agreement – only the pace of implementation. As we use a static model, the provisions have no consequences for our Doha scenario.
- **Cotton market access:** Developed countries shall provide quota- and duty-free access on cotton to least developed countries from the first day of the implementation period. This provision is largely overlapped by the commitments by developed countries to provide free market access for all products from LDCs and is therefore already implemented in the Doha-scenario

Export subsidies

The Falconer draft requires all countries (developing and developed) to eliminate all export subsidies (following certain implementation periods). In a specific clause, members commit to eliminate export subsidies on cotton from the first day of the implementation period.

How we implement this

All export subsidies are eliminated in the Doha scenario.

Stephenson draft

Swiss formula

The general rule for tariff reduction in NAMA liberalisation is the so-called Swiss formula, defined as

$$t_1 = \frac{\alpha t_0}{\alpha + t_0}$$

where t_0 is the pre-Doha bound tariff, t_1 is the post-Doha bound tariff and α is the Swiss formula coefficient. If a tariff line is not bound, t_0 is defined as the Most-Favoured Nations tariff rate, plus a constant mark-up of 25 percentage points. The Swiss formula has two desirable properties: i) it is non-linear and reduces higher tariffs more and therefore serves to eliminate tariff peaks; and ii) tariffs are in effect capped at the level defined by the coefficient, i.e. $t_1 < \alpha$.

The Stephenson draft together with Lamy's compromise proposal stipulate different coefficients depending on how countries are classified. For developed countries, $\alpha = 8$, implying that post-Doha bound tariffs are at most 8 percent. Provisions for developing countries and other classifications are more complex.

How we implement this

The general Swiss formula is implemented as described. All developed country tariffs are reduced using a coefficient of 8.

Developing countries

Developing countries face higher Swiss formula coefficients than developed countries, and they are allowed certain flexibilities for more lenient treatment of some products. In effect, the draft modalities propose five options for combining different coefficients with varying degrees of flexibility:

- **Option 1:** $\alpha = 20$ together with one-half Swiss formula reduction for 14 percent of tariff lines covering no more than 16 percent of imports by value.
- **Option 2:** $\alpha = 20$ together with reduction exemption for 6.5 percent of tariff lines accounting for 7.5 percent of imports.
- **Option 3:** $\alpha = 22$ together with one-half Swiss formula reduction for 10 percent of tariff lines covering at most 10 percent of imports.
- **Option 4:** $\alpha = 22$ together with no cuts for 5 percent of tariff lines or imports (whichever comes first)
- **Option 5:** $\alpha = 25$ with no use of flexibilities

Anti-concentration

The Stephenson draft introduces the concept of anti-concentration to prevent developing countries in choosing to exert all their flexibility options in a small number of highly protected industries. The Lamy compromise proposal defines this to mean that at least 20 percent of tariff lines or 9 percent of import value in each HS chapter (i.e. product categories at 2-digit level) shall be subject to full tariff reduction.

How we implement this

We use the same criteria for determining tariff lines chosen for flexibility as for the sensitive product designation under agriculture. During the identification of flexibilities, we check for the anti-concentration requirement. In case the maximum number of tariff lines and imports covered by flexibility in a given chapter is reached, the flexibility designation jumps to the next most sensitive chapter. We calculate the tariff reductions implied by all five options and assume that each developing country chooses the option that requires the smallest overall average tariff cut.

Countries with low binding coverage

Instead of commitments to reduce bound tariffs, countries with less than 35 percent of non-agricultural tariff lines bound are required to bind most of their remaining tariff lines at a level of their own choosing, subject to a requirement that the overall average of bound tariffs does not exceed 28.5 percent.

How we implement this

We calculated the overall average of all MFN applied tariffs of countries with a low binding coverage, and none of them applied tariffs that exceeded 28.5 percent on average. They could bind tariffs at levels equal to or higher than their MFN applied tariffs, which would not result in any reduction of applied tariffs. Thus, in the Doha scenario countries with low binding coverage do not cut any applied tariffs.

Small, Vulnerable Economies

SVEs are exempt from making reductions through the Swiss formula. Instead, they are required to bind their tariffs at different overall average levels according to a tiered formula as summarised in table A3.

Table A3. SVE bound tariff commitments

Pre-Doha average bound tariff	Post-Doha average bound tariff
> 50	[28 – 32]
30 – 50	[24 – 28]
20 – 30	18
< 20	Average of 95 percent of Pre-Doha bound

How we implement this

We calculated the overall average of bound tariffs and deduced the post-Doha bound average from table A3. Then we calculated the overall average of MFN applied tariffs and compared with the Post-Doha bound average. In all cases the average MFN applied tariffs were lower than the reduced bound tariffs, and we concluded that SVEs could fulfil their Doha commitments without reducing their applied tariffs. Thus, in the Doha-scenario SVEs do not cut any applied tariffs.

Recently Acceded Members

RAMs are treated in the same way as developing countries, except that they are entitled to a longer implementation period.

How we implement this

As we use a static model, we do not explicitly model the implementation period. Thus RAMs are treated in exactly the same way as developing countries.

Very Recently Acceded Members and Least Developed Countries

VRAMs and LDCs are exempt from any tariff reduction commitments. In addition, LDCs receive quota- and duty-free access to developed country markets.

How we implement this

VRAMs and LDCs are implemented as described.

Other provisions

The Stephenson draft contains additional provisions that have not yet been negotiated in any detail or are not related to reduction of tariffs. These provisions are not included in the Doha-scenario:

- **Sectoral negotiations:** Negotiations on further liberalisation of specific sectors, such as the automotive sector, may take place after the establishment of the modalities on a non-mandatory basis. Such negotiations can facilitate compromise on the Doha agreement by focusing liberalisation efforts on sectors of key interest to members. However, it is still uncertain if and to which extent this provision will be utilised.
- **Non-Tariff Barriers (NTBs):** The further disciplining of the use of NTBs is part of the NAMA modalities, in the form of generic and sector-specific side-

agreements akin to the Sanitary and Phytosanitary (SPS) Agreement introduced in the Uruguay Round Agreement on Agriculture. As NTBs are not reflected in the GTAP model and database, the Doha scenario does not implement provisions on NTBs.

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