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Agricultural Trade Reform and the Doha Development Agenda

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This paper is based on a program of World Bank research on the implications of the Doha Agenda for developing countries. To access the chapters of the forthcoming book this paper summarizes, go to www.worldbank.org/trade/wto. The authors are grateful for the collaboration of all their co-contributors to that project, especially Dominique van der Mensbrugghe and Tom Hertel, and for funding from the UK's Department for International Development. The views expressed are the authors' alone. Forthcoming in *The World Economy*, Vol. 28(9), September 2005.

Abstract

This paper examines the extent to which various regions, and the world as a whole, could gain from multilateral trade reform over the next decade. The World Bank's LINKAGE model of the global economy is employed to examine the impact first of current trade barriers and agricultural subsidies, and then of possible outcomes from the WTO's Doha round. The results suggest moving to free global merchandise trade would boost real incomes in Sub-Saharan Africa and Southeast Asia (and in Cairns Group countries) proportionately more than in other developing countries or high-income countries. Real returns to farm land and unskilled labor, and real net farm incomes, would rise substantially in those developing country regions, thereby helping to reduce poverty. A Doha partial liberalization could take the world some way towards those desirable outcomes, but more so the more agricultural subsidies are disciplined and applied tariffs are cut, and the more not just high-income but also developing countries choose to engage in the process of reform.

JEL codes: C68, D58, F13, F17, O55, Q17

Key words: Trade policy, WTO, Doha Development Agenda, multilateral negotiations, computable general equilibrium modeling

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Why all the fuss over agriculture?

Agriculture is yet again causing contention in international trade negotiations. It caused long delays to the Uruguay Round in the late 1980s and 1990s, and it is again proving to be the major stumbling block in the World Trade Organization's Doha round of multilateral trade negotiations (formally known as the Doha Development Agenda, or DDA). For example, it contributed substantially to the failure of the September 2003 Trade Ministerial Meeting in Cancún to reach agreement on how to proceed with the DDA, after which it took another nine months before a consensus was reached on the Doha work program, otherwise referred to as the July Framework Agreement (WTO 2004).

It is ironic that agricultural policy is so contentious, given its small and declining importance in the global economy. The sector's share of global GDP has fallen from around one-tenth in the 1960s to little more than one-thirtieth today. In developed countries the sector accounts for only 1.8 percent of GDP and only a little more of full-time equivalent employment. Mirroring that decline, agriculture's share of global merchandise trade has more than halved over the past three decades, dropping from 22 percent to 9 percent. For developing countries its importance has fallen even more rapidly, from 42 to 11 percent (Figure 1).

Since policies affecting this declining sector are so politically sensitive, there are always self-interested groups suggesting it be sidelined in trade negotiations – as indeed it has in numerous sub-global preferential trading agreements, and was in the GATT prior to the Uruguay Round.¹ Today the groups with that inclination include not just farmers in the highly protecting countries and net food importing developing countries but also those food exporters receiving preferential access to those markets including holders of tariff rate quotas, members of regional trading agreements, and parties to non-reciprocal preference agreements including all least-developed countries. However, sidelining agriculture in the Doha round would do a major disservice to many of the world's poorest people, namely those in farm households in developing countries. It is precisely *because* agricultural earnings are so important to a large number of developing countries that the highly protective farm policies of a few wealthy countries are being targeted by them in the WTO negotiations. Better access to rich countries' markets for their farm produce is a high priority for them.²

Some developing countries have been granted greater access to developed-country markets for a selection of products under various preferential agreements. Examples are the EU's provisions for former colonies in the Africa, Caribbean and Pacific (ACP) program and more recently for Least Developed Countries under the Everything But Arms (EBA) agreement. Likewise, the United States has its Africa Growth and Opportunity Act (AGOA) and Caribbean Basin Initiative (CBI). These schemes reduce demands for developed-country farm policy reform from preference-receiving countries, but they exacerbate the concerns of other countries excluded from such programs and thereby made worse off through declining terms of trade – and they

¹ The rules of the GATT are intended, in principle, to cover all trade in goods. However, in practice, trade in agricultural products was largely excluded from their remit as a consequence of a number of exceptions. Details are to be found in Josling, Tangermann and Warley (1996) and in Anderson and Josling (2005).

² According to the UN's Food and Agriculture Organization, 54 percent of the economically active population is engaged in agriculture in developing countries, which is nearly five times larger than the sector's measured GDP share (FAO 2004, Table A4). While some of that difference in shares is due to under-reporting of subsistence consumption, it nonetheless implies that these people on average are considerably less productive and hence poorer than those employed outside agriculture.

may even be worsening rather than improving aggregate global and even developing country welfare.

Apart from that, many in developing countries feel they did not get a good deal out of the Uruguay Round. From a mercantilistic view, the evidence seems to support that claim: Finger and Winters (2002) report that the average depth of tariff cut by developing countries was substantially greater than that agreed to by high-income countries. As well, developing countries had to take on costly commitments such as those embodied in the SPS and TRIPS agreements (Finger and Schuler 2001). They therefore are determined in the Doha round that they get significantly more market access commitments from developed countries before they contemplate opening their own markets further.

Greater market access for developing countries' exporters, and especially for poor producers in those countries, is to be found in agriculture (and to a lesser extent in textiles and clothing). This can be seen from a glance at Table 1. It shows that developing country exporters face an average tariff (even after taking account of preferences) of 16 percent for agriculture and food, and 9 percent for textiles and clothing, compared with just 2.5 percent for other manufactures. The average tariff on agricultural goods is high not just in high-income countries but also in developing countries, suggesting even more reason why attention should focus on that sector (along with textiles) in the multilateral reform process embodied in the DDA.

If agriculture were to be ignored in the Doha negotiations, there is the risk that agricultural protection would start rising again. That is what happened throughout the course of industrial development in Europe and Northeast Asia (Anderson, Hayami and Others 1986, Lindert 1991). It was only with the establishment of the World Trade Organization, in 1995, that agricultural trade was brought under multilateral disciplines via the Uruguay Round Agreement on Agriculture (URAA).

That URAA was ambitious in scope, converting all agricultural protection to tariffs, and limiting increases in virtually all tariffs through tariff bindings. Unfortunately, the process of converting non-tariff barriers into tariffs (inelegantly termed "tariffication") provided numerous opportunities for backsliding that greatly reduced the effectiveness of the agreed disciplines (Hathaway and Ingco 1996). In developing countries, the option for "ceiling bindings" allowed countries to set their bindings at high

levels, frequently unrelated to the previously prevailing levels of protection. Hence agricultural import tariffs are still very high in both rich and poor countries, with bound rates half as high again as MFN applied rates (Table 2).

As well, agricultural producers in some countries are supported by export subsidies (still tolerated within the WTO only for agriculture) and by domestic support measures. Together with tariffs and other barriers to agricultural imports, these measures support farm incomes and encourage agricultural output to varying extents. The market price support component also typically raises domestic consumer prices of farm products. Figure 2 shows the value and the percentage of total farm receipts from these support policy measures, called the Producer Support Estimate or PSE by the OECD secretariat.³ For OECD members as a group, the PSE was almost the same in 2001-03 as in 1986-88, at about \$240 billion per year. But because of growth in the sector, as a percentage of total farm receipts (inclusive of support) that represents a fall from 37 to 31 percent. Figure 2 also shows that there has been a significant increase in the proportion of that support coming from programs that are somewhat “decoupled” from current output such as payments based on area cropped, number of livestock, or some historical reference period.

Agricultural protection levels remain very high in these developed countries, especially when bearing in mind that 1986-88 was a period of historically very low international food prices and hence above-trend PSEs. And, as Figure 3 shows, the PSEs have fallen least in the most-protective OECD countries. By contrast, tariff protection to OECD manufacturing has fallen over the past 60 years from a level similar to that for OECD agriculture today (above 30 per cent nominal rate of protection) to only one-tenth of that now. This means far more resources have been retained in agricultural production in developed countries – and hence fewer in developing countries – than would have been the case if protection had been phased down in both agriculture and manufacturing simultaneously.

Nonetheless, the achievements of the Uruguay Round Agreement on Agriculture provide some scope for optimism about what might be achieved via the WTO as part of

³ Until recently the PSE referred to the Producer Subsidy Equivalent. For more about the concept and its history, see Legg (2003).

the DDA and beyond. The current Doha round has the advantage over the Uruguay Round of beginning from the framework of rules and disciplines agreed in that previous Round. In particular, it has the three clearly identified “pillars” of market access, export subsidies, and domestic support on which to focus. True, it took more than three years to agree on a framework for the current negotiations, reached on at the end of July 2004 (WTO 2004), but now that July Framework Agreement is likely to guide the negotiations for some time. It therefore provides a strong basis for undertaking *ex ante* analysis of various options potentially available to WTO members during the Doha negotiations.

This paper summarizes a recent study (Anderson and Martin 2005) that builds on numerous analyses of the Doha Development Agenda and agricultural trade, including five very helpful books that appeared in 2004. One edited by Aksoy and Beghin (2004) provides details of trends in global agricultural markets and policies, especially as they affect nine commodities of interest to developing countries. Another, edited by Ingco and Winters (2004), includes a wide range of analyses based on papers revised following a conference held just prior to the aborted WTO Trade Ministerial meeting in Seattle in 1999. The third, edited by Ingco and Nash (2004), provides a follow-up to the broad global perspective of the Ingco and Winters volume: it explores a wide range of key issues and options in agricultural trade reform from a developing country perspective. The fourth, edited by Anania, Bohman, Carter and McCalla (2004), is a comprehensive tenth-anniversary retrospective on the Uruguay Round Agreement on Agriculture as well as a look ahead following also numerous unilateral trade and subsidy reforms in developed, transition and developing economies. And the fifth focuses on implications for Latin America (Jank 2004).

All of those 2004 studies were completed well before the July Framework Agreement was reached in the early hours of 1 August 2004, and before the public release in December 2004 of the new Version 6 database of the Global Trade Analysis Project (GTAP) at Purdue University. That Version 6 database is a major improvement over the previous version for several reasons. One is that it includes global trade and protection data as of 2001 (previously 1997). Another is that protection data are available, for the first time, on bound as well as applied tariffs, non-reciprocal as well as reciprocal tariff preferences, the *ad valorem* equivalents of specific tariffs (which are

plentiful in the agricultural tariff schedules of many high-income, high-protection countries), and the effects of agricultural tariff rate quotas. In addition, key trade policy changes to the start of 2005 have been added for our analysis, namely, the commitments associated with accession to WTO by such economies as China and Taiwan (China), the implementation of the last of the Uruguay Round commitments (most notably the abolition of quotas on trade in textiles and clothing at the end of 2004), and the eastward enlargement of the European Union from 15 to 25 members in April 2004.

Hence what distinguishes the present study from the above 2004 studies and other books with similar titles is that (a) its *ex ante* analysis focuses on the core aspects of the July Framework Agreement from the viewpoint of agriculture and developing countries, taking account also of what might happen to non-agricultural market access and the other negotiating areas, and (b) it does so in an integrated way by using the new GTAP Version 6 database (amended to account for key protection changes to early 2005) and the latest version of the World Bank's global, economy-wide Linkage model, details of which are documented in van der Mensbrugghe (2004).⁴

What questions are addressed in this study?

Among the core questions addressed in this study, following an intense program of integrated research during the latter half of 2004 by a complementary set of well-informed scholars from four continents, are the following:

- What is at stake in this Doha round, in terms of efficiency gains foregone by the various regions of the world because of current tariffs and agricultural subsidies?

⁴ This analysis is vastly more sophisticated than the *ex ante* analyses undertaken for the Uruguay Round. At that time there were very few economy-wide global models, so primary reliance was on partial equilibrium models of world food markets (see, e.g., World Bank 1986, Goldin and Knudsen 1990, Tyers and Anderson 1992); estimates of protection rates were somewhat cruder and less complete; and analysts grossly overestimated the gains because they did not anticipate that tariffication would be so "dirty" in the sense of creating large wedges between bound and MFN applied tariff rates, nor did they have reliable estimates of the tariff preferences enjoyed by developing countries or the ad valorem equivalent of specific tariffs. Some of these limitations also applied to *ex post* analyses of the Uruguay Round (see, e.g., Martin and Winters 1996).

- How much are each of the three “pillars” of agricultural distortions (market access, export subsidies and domestic support) contributing to those welfare losses, compared with non-agricultural trade barriers?
- How might the demands for Special and Differential Treatment for developing and least-developed countries be met without compromising the potential gains from trade expansion for those economies?
- What are the consequences, in terms of opening up to imports, of alternative formulas for cutting bound agricultural tariffs?
- In the case of products whose imports are subject to tariff rate quotas, what are the trade-offs between reducing in-quota or out-of-quota tariffs versus expanding the size of those quotas or the in-quota tariffs?
- To what extent would the erosion of tariff preferences, that necessarily accompanies MFN trade liberalization by developed countries, reduce the developing countries’ interest in agricultural and other trade reform?
- What should be done about agricultural export subsidies, including those implicit in export credits, food aid, and arrangements for state trading enterprises?
- Based on recent policy changes in key countries, how might domestic farm support measures be better disciplined in the WTO?
- What are the consequences of reducing the domestic support commitments made in the Uruguay Round, in terms of cuts to the actual domestic support levels currently provided to farmers?
- In particular, how might reductions in cotton subsidies help developing country farmers in West Africa and elsewhere?
- What difference does it make to expand market access for non-agricultural products at the same time as for farm goods under a Doha agreement?
- Which developing countries would have to reduce their farm output and employment as a result of such a Doha agreement?
- Taking a broad brush, and in the light of past experience and our understanding of the political economy of agricultural policies in rich and poor countries, how might reform of those policies best be progressed during the DDA negotiations?

- What would be the overall market and welfare consequences by 2015, for various countries and regions as well as globally, of the alternative Doha reform commitments considered in addressing each of the above questions?

What have we learned?

In addressing the above questions, the following are among the key messages that emerge from our study.

The potential gains from further global trade reform are huge. Global gains from trade reform post-2004 are estimated to be large even if dynamic gains and gains from economies of scale and increased competition are ignored. Freeing all merchandise trade and agricultural subsidies is estimated to boost global welfare by nearly \$300 billion per year by 2015 (Table 3), plus whatever productivity effects that reform would generate.⁵

Developing countries could gain disproportionately from further global trade reform. The developing countries (as defined the WTO) would enjoy 45 percent of the global gain from complete liberalization of all merchandise trade, well above their share of global GDP. Their welfare would increase by 1.2 percent, compared with an increase of just 0.6 percent for developed countries. The developing countries' higher share is partly because they have relatively high tariffs themselves (so they would reap substantial efficiency gains from reforming their own protection), and partly because their exports are more concentrated in farm and textile products whose tariffs in developed country markets are exceptionally high (Table 1) – notwithstanding non-reciprocal tariff preferences for many developing countries, which contribute to the losses associated with terms of trade deterioration shown in the middle column of Table 3.

Benefits could be as much from South-South as from South-North trade reform. Trade reform by developing countries is just as important economically to those countries as is reform by developed countries, including from agricultural liberalization

⁵ There is strong evidence that trade reform in general is also good for economic growth and, partly because of that, for poverty alleviation (Winters 2004, Dollar and Kraay 2004, Winters, McCulloch and McKay 2004).

(Table 4b). Hence choosing to delay their own reforms or reforming less than developed countries, and thereby holding back South-South trade growth, could reduce substantially the potential gains to developing countries.

Agriculture is where cuts are needed most. To realize that potential gain from opening up goods markets, it is in agriculture that by far the greatest cuts in bound tariffs and subsidies are required. This is because of the very high rates of assistance in that sector relative to other sectors. Food and agricultural policies are responsible for more than three-fifths of the global gain foregone because of merchandise trade distortions (column 1 of Table 4a) – despite the fact that agriculture and food processing account for less than 10 percent of world trade and less than 4 percent of global GDP. From the point of view of welfare of developing countries, agriculture is at least as important as it is for the world as a whole: their gains from global agricultural liberalization represent almost two-thirds of their total potential gains, which compares with just one-quarter from textiles and clothing and one-ninth from other merchandise liberalization (Table 4b).

Subsidy disciplines are important, but increased market access in agriculture is crucial. Extremely high applied tariffs on agricultural relative to non-farm products are the major reason for food and agricultural policies contributing 63 percent of the welfare cost of current merchandise trade distortions. Subsidies to farm production and exports are only minor additional contributors: 3 and 1 percentage points respectively, compared with 59 points due to agricultural tariffs.⁶ This is even truer for developing countries than for developed ones (compare columns 1 and 2 of Table 5). Disciplining those domestic subsidies and phasing out export subsidies is nonetheless very important, so as to prevent re-instrumentation of assistance from tariffs to domestic subsidies and to bring agriculture into line with non-farm trade in terms of not using export subsidies.

In developing countries the poor would gain most from multilateral trade reform. Full global merchandise trade liberalization would raise real factor returns for the poorest households most. This is implied in Table 6, where for developing countries the

⁶ This result is very similar to that reported from a partial equilibrium study by Hoekman, Ng and Olarreaga (2004). In our initial empirical analysis we also included crude estimates of implicit forms of farm export subsidization such as via food aid, export credits or state trading enterprises, but even that was not enough to raise that export subsidy share above 1 percent.

biggest factor price rise is for farm land, followed by unskilled labor. Since farmers and other low-skilled workers constitute the vast majority of the poor in developing countries, such reform would reduce both inequity and poverty.

Large cuts in domestic support commitments are needed to erase binding overhang. In turning from the potential gains from full liberalization to what might be achievable under a Doha partial reform package, the devil is going to be in the details. For example, commitments on domestic support for farmers are so much higher than actual support levels at present that the 20 percent cut in the total bound AMS promised in the July Framework Agreement as an early installment will require no actual support reductions for any WTO member. Indeed a cut as huge as 75 percent for those with most domestic support is needed to get some action, and even then it would only require cuts in 2001 levels of domestic support for four WTO actors: the US (by 28 percent), the EU (by 18 percent), Norway (by 16 percent) and Australia by 10 percent – and the EU and Australia have already introduced reforms of that order since 2001, so may need to do no further cutting under even that formula.

Large cuts in bound rates are needed also to erase binding overhang in agricultural tariffs. Table 2 shows there is substantial binding overhang in agricultural tariffs: the average bound rate in developed countries is almost twice as high as the average applied rate, and in developing countries the ratio is even greater. Thus large reductions in bound rates are needed before it is possible to bring about *any* improvements in market access. To bring the global average actual agricultural tariff down by one-third, bound rates would have to be reduced for developed countries by at least 45 percent, and up to 75 percent for the highest tariffs, under a tiered formula.

A complex tiered formula may be little better than a proportional tariff cut. It turns out that, because of the large binding overhang, a tiered formula for cutting agricultural tariffs would generate not much more global welfare – and no more welfare for developing countries as a group – than a proportional cut of the same average size (columns 1 and 2 of Tables 7, 8 and 9). This suggests there may be little value in arguing over the finer details of a complex tiered formula just for the sake of reducing tariff escalation. Instead, a simple tariff cap of, say, 100 or even 200 percent could achieve essentially the same outcome.

Even large cuts in bound tariffs do little if “Sensitive Products” are allowed, except if a cap applies. If members succumb to the political temptation to put limits on tariff cuts for the most sensitive farm products, much of the prospective gain from Doha could evaporate. Even if only 2 percent of HS6 agricultural tariff lines in developed countries are classified as sensitive (and 4 percent in developing countries, to incorporate also their “Special Products” request), and are thereby subject to just a 15 percent tariff cut (as a substitute for the TRQ expansion mentioned in the Framework Agreement), the welfare gains from global agricultural reform would shrink by three-quarters. However, if at the same time any product with a bound tariff in excess of 200 percent had to reduce it to that cap rate, the welfare gain would shrink by ‘only’ one-third (columns 3 and 4 of Tables 7, 8 and 9).

TRQ expansion could provide additional market access. Only a small number of farm products are subject to tariff rate quotas, but they protect over half of all developed countries’ production and 44 percent of their agricultural imports (de Gorter and Kliaugas 2005). Bringing down those products’ (out-of-quota) MFN bound tariff could be supplemented by lowering their in-quota tariff or expanding the size of the quota. While this may increase the aggregate rent attached to those quotas and hence resistance to eventually removing them, the extent of binding overhang is such that quota expansion may be the only way to get increased market access for TRQ products in the Doha round – especially if they are among the ones designated as ‘sensitive’ and hence subject to lesser cuts in their bound tariffs.

High binding overhang means most developing countries would have to make few cuts. Given the high binding overhang of developing countries, even with their high tariffs – and even if tiered formulae are used to cut highest bindings most – relatively few of them would have to cut their actual tariffs and subsidies at all (Jean, Laborde and Martin 2005). That is even truer if “Special Products” are subjected to smaller cuts and developing countries exercise their right – as laid out in the July Framework Agreement – to undertake lesser cuts (zero in the case of LDCs) than developed countries. Politically this makes it easier for developing and least developed countries to offer big cuts on bound rates – but it also means the benefits to them are smaller than if they had a smaller binding overhang.

Cotton subsidy cuts would help cotton-exporting developing countries. The removal of cotton subsidies (which have raised producer prices by well over 50 percent in the US and EU – see Sumner 2005) would raise the export price of cotton (although not equally across all exporters because of product differentiation). If those subsidies were removed as part of freeing all merchandise trade, that price rise is estimated to be 8 percent for Brazil but less for Sub-Saharan Africa on average. However, cotton exports from Sub-Saharan Africa would be a huge 75 percent larger, and the share of all developing countries in global exports would be 85 percent instead of 56 percent in 2015, vindicating those countries’ efforts to ensure cotton subsidies receive specific attention in the Doha negotiations.

Expanding non-agricultural market access would add substantially to the gains from agricultural reform. Adding a 50 percent cut to non-agricultural tariffs by developed countries (and 33 percent by developing countries and zero by LDCs) to the tiered formula cut to agricultural tariffs would double the gain from Doha for developing countries (compare Scenarios 1 and 5 in Tables 7, 8 and 9). That would bring the global gain to \$96 billion from Doha merchandise liberalization, which is a sizable one-third of the potential welfare gain from full liberalization of \$287 billion. Adding services reform would of course boost that welfare gain even more.

Adding non-agricultural tariff reform to agricultural reform helps to balance the exchange of “concessions”. The agricultural reforms would boost the annual value of world trade in 2015 by less than one-quarter what would happen if non-agricultural tariffs were also reduced. The latter’s inclusion also would help balance the exchange of “concessions” in terms of increases in bilateral trade values: in that case developing countries’ exports to high-income countries would then be \$62 billion, which is close to the \$55 billion increase in high-income countries’ exports to developing countries. With only agricultural reform, the latter’s bilateral trade growth would be little more than half the former’s (Table 10).

Most developing countries gain, and the rest could if they reform more. Even though much of the DC gains from that comprehensive Doha scenario go to numerous large developing countries, notably Brazil, Argentina and Other Latin America plus India, Thailand and South Africa, the rest of Sub-Saharan Africa gains too. This is

particularly so when developing countries participate as full partners in the negotiations. An important part of this result comes from the increases in market access – on a non-discriminatory basis – by other developing countries.

Preference erosion may be less of an issue than commonly assumed. Some least developed countries in Sub-Saharan Africa and elsewhere appear to be slight losers in our Doha simulations when developed countries cut their tariffs and those LDCs choose not to reform at all themselves.⁷ These simulations overstate the benefits of tariff preferences for LDCs, however, since they ignore the trade-dampening effect of complex rules of origin and the grabbing of much of the rents by developed-country importers. Even if they would lose after correcting for those realities, it remains true that preference-receiving countries could always be compensated for preference erosion via increased aid at relatively very small cost to current preference providers – and in the process other developing countries currently hurt by LCD preferences would enjoy greater access to the markets of reforming developed countries.

Farm output and employment would grow in developing countries under Doha. Despite a few low-income countries losing slightly under our Doha scenarios when they choose to reform little themselves, in all the developing countries and regions shown the levels of output and employment on farms expand. It is only in the most protected developed countries of Western Europe, Northeast Asia and the US that these levels would fall – and even there it is only by small amounts, contrary to the predictions of scaremongers who claim agriculture would be decimated in reforming countries (Table 11). Even if there was a move to completely free merchandise trade, the developed countries' share of the world's primary agricultural GDP by 2015 would be only slightly lower at 25 instead of 30 percent (but their share of global agricultural exports would be diminished considerably more: from 53 to 38 percent).

Poverty could be reduced under Doha. Under the full merchandise trade liberalization scenario, extreme poverty in developing countries (those earning no more than \$1/day) would drop by 32 million in 2015 relative to the baseline level of

⁷ As warned by Panagariya (2004) among others, some low-income countries' terms of trade could deteriorate either because they would lose tariff preferences on their exports or because they are net food importers and so would face higher prices for their imports of temperate foods.

622 million, a reduction of 5 percent. The majority of the poor by 2015 are projected to be in Sub-Saharan Africa, and there the reduction would be 6 percent.⁸ Under the Doha scenarios reported in Table 12, the poverty impacts are far more modest. The number of poor living on less than \$1/day would fall by 2.5 million in the case of the core Doha Scenario 5 (of which 0.5 million are in SSA) and by 6.3 million in the case of Doha Scenario 6 (of which 2.2 million are in SSA). This corresponds to the relatively modest ambitions of the merchandise trade reforms as captured in these Doha scenarios. If only agriculture was reformed (Doha Scenario 1) there would be much less poverty alleviation globally and none at all in SSA. This shows the importance for poverty of including manufactured products in the Doha negotiations.

Developing countries could trade off Special and Differential Treatment for more market access. If developing countries were to tone down their call for Special and Differential Treatment (see Josling 2005), in terms of wanting smaller cuts and longer phase-in periods, reciprocity means they could expect bigger tariff and subsidy cuts from developed countries. Similarly, if they were to forego their call for lesser cuts for “Special Products”, they could demand that developed countries forego their call for some “Sensitive Products” to be subject to smaller tariff cuts. A comparison of Scenarios 5 and 6 in Tables 7, 8 and 9 shows that the economic payoffs for low-income countries even if high-income countries do not reciprocate with larger offers is considerable. Moreover, by embracing those options to reform more in the context of the Doha round

⁸ The approach here has been to take the change in the average per capita consumption of the poor, apply an estimated income-to-poverty elasticity, and assess the impacts on the poverty headcount index. We have done this by calculating the change in the real wage of unskilled workers, deflating it by a food/clothing consumer price index which is more relevant for the poor than the total price index. That real wage grows, over all developing countries, by 3.6 percent, or more than four times greater than the overall average income increase. We are assuming that the change in unskilled wages is fully passed through to households. Also, while the model closure has the loss in tariff revenues replaced by a change in direct household taxation, the poverty calculation assumes – realistically for many developing countries -- that these tax increases only affect skilled workers and high-income households. While these simple calculations are not a substitute for more-detailed individual country case study analysis using detailed household surveys as in, for example, Hertel and Winters (2005), they are able to give a broad region-wide indication of the poverty impact.

would make it harder for high-income countries to resist the call to respond with larger reforms themselves.

Key policy implications

Among the numerous policy implications that can be drawn from the above findings, the following are worth highlighting.

Prospective gains are too large to not find the needed political will to make Doha a success. With gains of the order of \$300 billion per year at stake from implementing the July Framework Agreement (even if no reforms are forthcoming in services and if the counterfactual would be the status quo rather than protectionist backsliding), the political will needs to be found to bring the round to a successful conclusion, and the sooner the better. Multilateral cuts in MFN bindings are helpful also because they can lock in previous unilateral trade liberalizations that otherwise would remain unbound and hence be vulnerable to backsliding; and they can be used as an opportunity to multilateralize previously agreed preferential trade agreements and thereby reduce the risk of trade diversion from those bilateral or regional arrangements (as stressed in Sutherland 2004).

Since developed countries would gain most, and have the most capacity and influence, they need to show leadership at the WTO. The large developed countries cannot generate a successful agreement on their own, but nor can the Doha round succeed without a major push by those key traders. Their capacity to assist poorer economies could hardly manifest itself more clearly than in encouraging global economic integration via trade reform, and in particular in opening developed country markets to the items of greatest importance to poorer countries, namely farm (and textile) products. The more that is done, the more developing countries will be encouraged to reciprocate by opening their own markets more – accelerating South-South trade in addition to South-North trade.

Outlawing agricultural export subsidies is the obvious first step. That will bring agriculture into line with the basic GATT rule against such measures, and in the process help to limit the extent to which governments encourage agricultural production by other

means (since it would raise the cost of surplus disposal). China has already committed not to use them, and other developing countries too can find more-efficient ways of stabilizing their domestic food markets than by dumping surpluses abroad.

Even more importantly, agricultural tariff and domestic support bindings must be cut hugely to remove binding overhang and provide some genuine market opening.

Getting rid of the binding overhang that resulted from the Uruguay Round, particularly with ‘dirty tariffication’, must be a priority.⁹ The highest-subsidizing countries, namely the EU, US and Norway, need to reduce their domestic support not just for the sake of their own economies but also to encourage developing countries to reciprocate by opening their markets as a quid pro quo. But more than that is needed if market access is to expand. If a choice had to be made, reducing MFN bound tariffs in general would be preferable to raising tariff rate quotas, because the latter help only those lucky enough to obtain quotas and crowd out non-quota holders. (Being against the non-discrimination spirit of the GATT, they deserve the same fate as textile quotas which were abolished at the end of 2004.) Exempting even just a few Sensitive and Special Products is undesirable as it would reduce hugely the gains from reform and would tend to divert resources into, instead of away from, enterprises in which countries have their least comparative advantage. If it turns out to be politically impossible not to designate some Sensitive and Special Products, it would be crucial to impose a cap such that any product with a bound tariff in excess of, say, 100 percent had to reduce it to that cap rate.

Expanding non-agricultural market access at the same time as reforming agriculture is essential. A balanced exchange of concession is impossible without adding other sectors, and it needs to be more than just textiles and clothing (which also benefit developing countries disproportionately) even though they are the other highly distorted sector. With other merchandise included, the trade expansion would be four times greater for both rich and poor countries – and poverty in low-income countries would be reduced considerably more.

South-South “concessions” also are needed, especially for developing countries, which means reconsidering the opportunity for developing countries to liberalize less.

⁹ As Francois and Martin (2004) have shown, any binding cut is useful for the long run even if it brings no immediate cut in applied rates.

Since developing countries are trading so much more with each other now, they are the major beneficiaries of reforms within their own regions. Upper middle-income countries might consider giving least developed countries duty-free access to their markets (mirroring the recent initiatives of developed countries), but better than such discriminatory action would be MFN tariff reductions by them. Even least developed countries should consider reducing their tariff binding overhang at least, since doing that in the context of Doha gives them more scope to demand “concessions” (or compensation for preference erosion or other contributors to terms of trade deterioration) from richer countries – and yet would not require them to cut their own *applied* tariffs very much.

Conclusions

The good news in this paper is that there is a great deal to be gained from liberalizing merchandise – and especially agricultural – trade under Doha, with a disproportionately high share of that potential gain available for developing countries (relative to their share of the global economy). Moreover, it is the poorest people in developing countries that appear to be most likely to gain from global trade liberalization, namely farmers and unskilled laborers in developing countries. To realize that potential gain, it is in agriculture that by far the greatest cuts in bound tariffs and subsidies are required. However, the political sensitivity of farm support programs, coupled with the complexities of the measures introduced in the Uruguay Round Agreement on Agriculture and of the modalities set out in the Doha Framework Agreement of July 2004, ensure the devil will be in the details of the final Doha agreement. It is for that reason that ex ante empirical analysis of the sort provided in the study summarized above is a prerequisite for countries engaged in the Doha round of negotiations.

What emerges from our analysis is that developing countries would not *have* to reform very much under Doha, because of the large gaps between their tariff bindings and applied rates. That is even truer if they exercise their right (as laid out in the July Framework Agreement) to undertake lesser tariff cuts than developed countries. In that case, they gain little in terms of improved efficiency of national resource use. Yet, as Panagariya (2004) and others have warned, for a non-trivial number of low-income

countries their terms of trade could deteriorate, as shown in Table 3. For some that is because they would lose tariff preferences on their exports. For others it is because they are net food importers and so would face higher prices for their imports of temperate foods. To realize more of their potential gains from trade, developing and least developed countries would need to forego some of the Special and Differential Treatment they have previously demanded, and perhaps also commit to additional unilateral trade (and complementary domestic) reforms, and to invest more in trade facilitation. High-income countries could encourage them to do so by being willing to open up their own markets more to developing country exports,¹⁰ and by providing more targeted aid. To that end, a new proposal has been put forward to reward developing country commitments to greater trade reform with an expansion of trade-facilitating aid, to be provided by a major expansion of the current Integrated Framework which is operated by a consortium of international agencies for least developed countries (Hoekman 2005a,b). This may well provide an attractive path for developing countries seeking to trade their way out of poverty, not least because linking aid to greater trade reform would help offset the tendency for an expanded aid flow to cause a real exchange rate appreciation (see Commission for Africa 2005, pp. 296-97). As well, it is potentially a far more efficient way for developed countries to assist people in low-income countries than the current systems of tariff preferences.

In conclusion, the July Framework Agreement does not guarantee major gains from the Doha Development Agenda. On the one hand, even if an agreement is ultimately reached, it may be very modest. How modest depends on, among other things, the nature of the agricultural tariff-cutting formula, the size of the cuts, the extent to which exceptions for Sensitive and Special Products are allowed, whether a tariff cap is introduced, and the extent to which Special and Differential Treatment is invoked by developing countries in terms of their market access commitments. But what is equally

¹⁰ Limao and Olarreago (2005) suggest preference erosion could be addressed by replacing the current margin of preference with an equivalent import subsidy for products from preference-receiving countries, thereby retaining the preference status quo while taking away this reason not to undertake most-favored-nation tariff cuts.

clear, on the other hand, is that major gains are possible if only the political will to reform protectionist policies – especially in agriculture – can be mustered.

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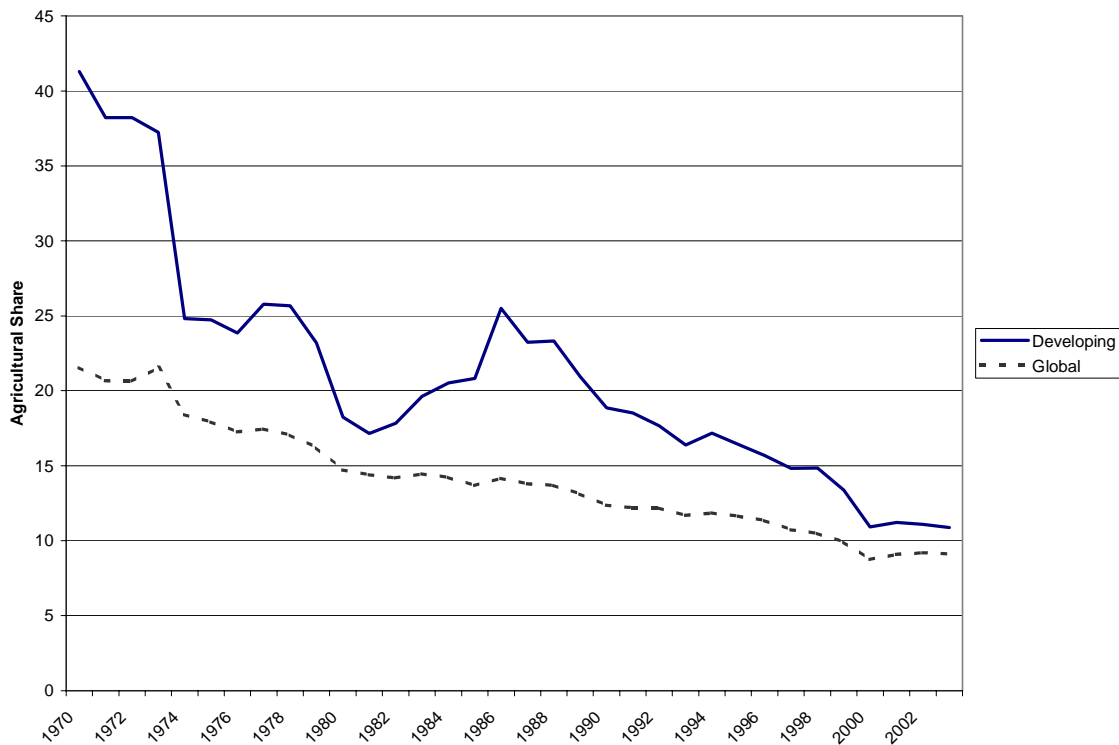
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Figure 1: The declining share of agriculture and food in world and developing^a countries' merchandise exports, 1970 to 2003
(percent)



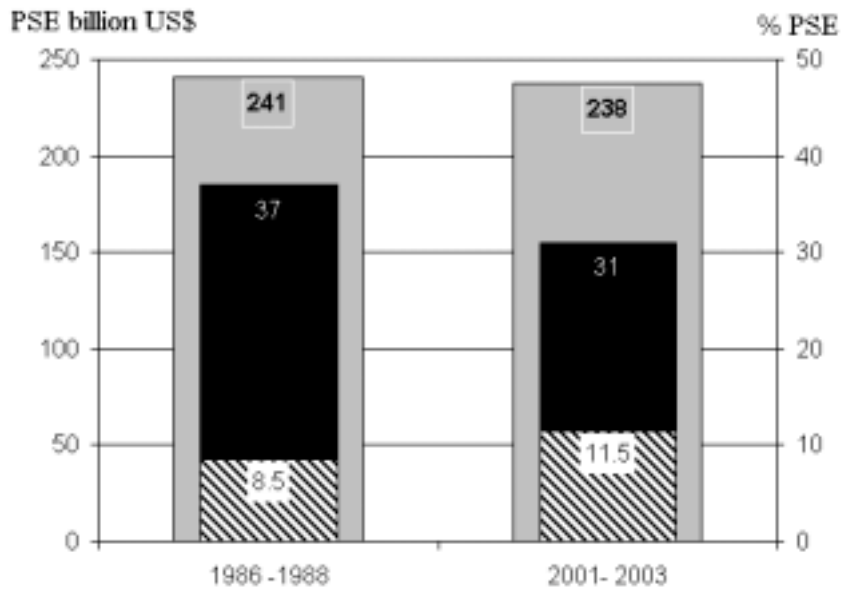
^a Developing countries here do not include East Asia's newly-industrialized economies of Hong Kong, Korea, Singapore and Taiwan.

Source: COMTRADE data in the WITS database (see www.wits.worldbank.org).

Figure 2: Agricultural producer support in high-income countries, by value, percent and type of support, 1986 to 2003

(\$ billion and percentage of total farm receipts from support policy measures)

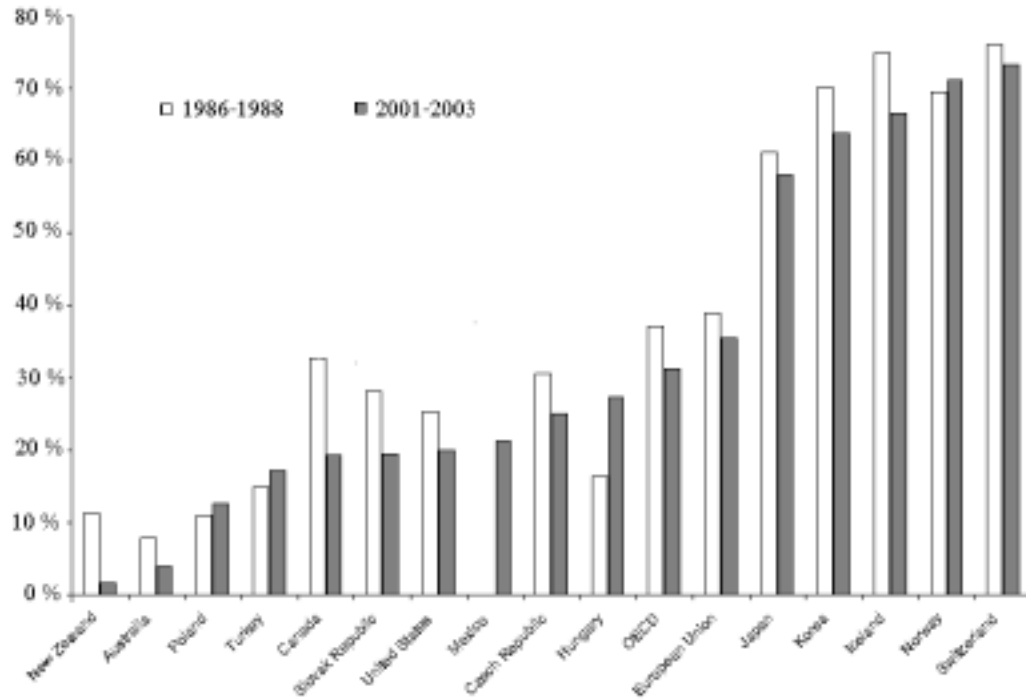
■ PSE billion US\$ ■ Total % PSE ▨ PSE due to "decoupled" payments



Source: PSE estimates from the OECD's database (see www.oecd.org)

Figure 3: Agricultural producer support in high-income countries, by country, 1986 to 2003

(percentage of total farm receipts from support policy measures)



¹ Czech Republic, Hungary, Poland and the Slovak Republic data are for 1991-93 in the first period.

² Austria, Finland and Sweden are included in the OECD average for both periods but also in the EU average for the latter period.

Source: PSE estimates from the OECD's database (see www.oecd.org)

Table 1: Average applied import tariffs, by sector and region, 2001(percent, *ad valorem* equivalent)

| <i>Exporting region:</i> | <i>Importing Region:</i> | High- income countries ^b | Developing countries ^a | WORLD |
|-------------------------------------|------------------------------|---|--------------------------------------|-------|
| Agriculture and food | | | | |
| | | 18 | 18 | 17.8 |
| | | 14 | 18 | 15.6 |
| | | 16 | 18 | 16.7 |
| Textiles and wearing apparel | | | | |
| | | 8 | 15 | 12.0 |
| | | 7 | 20 | 9.3 |
| | | 8 | 17 | 10.2 |
| Other manufactures | | | | |
| | | 2 | 9 | 4.1 |
| | | 1 | 7 | 2.5 |
| | | 1 | 8 | 3.5 |
| All merchandise | | | | |
| | | 3 | 10 | 5.4 |
| | | 3 | 10 | 4.9 |
| | | 3 | 10 | 5.2 |

^a These import-weighted averages incorporate tariff preferences provided to developing countries, unlike earlier versions of the GTAP database. They assume the EU is a single customs territory.

^b High-income countries include the newly industrialized East Asian customs territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Anderson, Martin and van der Mensbrugghe (2005a, Table 12.2)

Table 2: Agricultural weighted average import tariffs, by region, 2001
 (percent, *ad valorem* equivalent, weights based on imports)

| | Bound tariff | MFN applied tariff | Actual applied tariff ^a |
|-----------------------|--------------|--------------------|------------------------------------|
| Developed countries | 27 | 22 | 14 |
| Developing countries | 48 | 27 | 21 |
| <i>of which: LDCs</i> | 78 | 14 | 13 |
| WORLD | 37 | 24 | 17 |

^a Includes preferences and in-quota TRQ rates where relevant, as well as the *ad valorem* equivalent of specific tariffs. Developed countries include Europe's transition economies that joined the EU in April 2004. The 'developing countries' definition used here is that adopted by the WTO and so includes East Asia's four newly industrialized tiger economies, which is why the 21 percent shown in column 3 is above the 18 and 14 percent shown in the first column of Table 1.

Source: Jean, Laborde and Martin (2005, Table 4.2)

Table 3: Impacts on real income from full liberalization of global merchandise trade, by country/region, 2015

| <i>(Impacts in 2015 relative to the baseline, in 2001 dollars)</i> | Real income gain (\$billion) | Income changes due just to change in terms of trade (\$billion) | <i>as % of baseline income in 2015</i> |
|--|---|--|--|
| Australia and New Zealand | 6.1 | 3.5 | 1.0 |
| EU 25 plus EFTA | 65.2 | 0.5 | 0.6 |
| United States | 16.2 | 10.7 | 0.1 |
| Canada | 3.8 | -0.3 | 0.4 |
| Japan | 54.6 | 7.5 | 1.1 |
| Korea and Taiwan | 44.6 | 0.4 | 3.5 |
| Hong Kong and Singapore | 11.2 | 7.9 | 2.6 |
| Argentina | 4.9 | 1.2 | 1.2 |
| Bangladesh | 0.1 | -1.1 | 0.2 |
| Brazil | 9.9 | 4.6 | 1.5 |
| China | 5.6 | -8.3 | 0.2 |
| India | 3.4 | -9.4 | 0.4 |
| Indonesia | 1.9 | 0.2 | 0.7 |
| Thailand | 7.7 | 0.7 | 3.8 |
| Vietnam | 3.0 | -0.2 | 5.2 |
| Russia | 2.7 | -2.7 | 0.6 |
| Mexico | 3.6 | -3.6 | 0.4 |
| South Africa | 1.3 | 0.0 | 0.9 |
| Turkey | 3.3 | 0.2 | 1.3 |
| Rest of South Asia | 1.0 | -0.8 | 0.5 |
| Rest of East Asia | 5.3 | -0.9 | 1.9 |
| Rest of LAC | 10.3 | 0.0 | 1.2 |
| Rest of ECA | 1.0 | -1.6 | 0.3 |
| Middle East and North Africa | 14.0 | -6.4 | 1.2 |
| Selected SSA countries | 1.0 | 0.5 | 1.5 |
| Rest of Sub Saharan Africa | 2.5 | -2.3 | 1.1 |
| Rest of the World | 3.4 | 0.1 | 1.5 |
| High-income countries | 201.6 | 30.3 | 0.6 |
| Developing countries--WTO definition | 141.5 | -21.4 | 1.2 |
| Low- and middle-income countries | 85.7 | -29.7 | 0.8 |
| Middle-income countries | 69.5 | -16.7 | 0.8 |
| Low-income countries | 16.2 | -12.9 | 0.8 |
| East Asia and Pacific | 23.5 | -8.5 | 0.7 |
| South Asia | 4.5 | -11.2 | 0.4 |
| Europe and Central Asia | 7.0 | -4.0 | 0.7 |
| Middle East and North Africa | 14.0 | -6.4 | 1.2 |
| Sub-Saharan Africa | 4.8 | -1.8 | 1.1 |
| Latin America and the Caribbean | 28.7 | 2.2 | 1.0 |
| World total | 287.3 | 0.6 | 0.7 |

Source: Anderson, Martin and van der Mensbrugge (2005a, Table 12.4)

Table 4: Effects on economic welfare of full trade liberalization from different groups of countries and products, 2015

(percent)

(a) Distribution of effects on global welfare

| <i>From full lib'n of:</i> | Agriculture and food | Textiles and clothing | Other manufactures | ALL GOODS |
|---|----------------------|-----------------------|--------------------|------------|
| <i>Percentage due to:</i> | | | | |
| Developed ^a country policies | 46 | 6 | 3 | 55 |
| Developing countries' policies | 17 | 8 | 20 | 45 |
| ALL COUNTRIES' POLICIES | 63 | 14 | 23 | 100 |

(b) Distribution of effects on developing countries' welfare

| <i>From full lib'n of:</i> | Agriculture and food | Textiles and clothing | Other manufactures | ALL GOODS |
|---|----------------------|-----------------------|--------------------|------------|
| <i>Percentage due to:</i> | | | | |
| Developed ^a country policies | 30 | 17 | 3 | 50 |
| Developing countries' policies | 33 | 10 | 7 | 50 |
| ALL COUNTRIES' POLICIES | 63 | 27 | 10 | 100 |

^a Developed countries include the transition economies of Eastern Europe and the former Soviet Union.

Source: Anderson, Martin and van der Mensbrugge (2005a, Table 12.6).

Table 5: Distribution of global welfare impacts of fully removing agricultural tariffs and subsidies, 2001

(percent)

| Agricultural liberalization component: | Beneficiary region: | | |
|---|--|-----------------------------|--------------|
| | High-income^a countries | Developing countries | World |
| Import market access | 66 | 27 | 93 |
| Export subsidies | 5 | -3 | 2 |
| Domestic support | 4 | 1 | 5 |
| <i>All measures</i> | <i>75</i> | <i>25</i> | <i>100</i> |

^a High-income countries include the newly industrialized East Asian customs territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Summarized from Hertel and Keeney (2005a, Table 2.7)

Table 6: Impacts of full global merchandise trade liberalization on real factor prices, 2015^a*(Percent change relative to the baseline in 2015)*

| | Un- skilled wages | Skilled wages | Capital | Land owner rent | CPI |
|-----------------------------|----------------------------------|--------------------------|----------------|--------------------------------|------------|
| Australia and New Zealand | 3.1 | 1.1 | -0.3 | 17.2 | 1.2 |
| EU 25 plus EFTA | 0.0 | 1.3 | 0.7 | -51.0 | -1.3 |
| United States | 0.1 | 0.3 | 0.0 | -9.2 | -0.4 |
| Canada | 0.7 | 0.7 | 0.4 | 26.9 | -0.9 |
| Japan | 1.3 | 2.2 | 1.1 | -67.2 | -0.1 |
| Korea and Taiwan | 6.5 | 7.1 | 3.8 | -45.0 | -0.7 |
| Hong Kong and Singapore | 3.2 | 1.6 | 0.3 | 4.4 | 1.1 |
| Argentina | 2.9 | 0.5 | -0.7 | 21.3 | 0.3 |
| Bangladesh | 1.8 | 1.7 | -0.2 | 1.8 | -7.2 |
| Brazil | 2.7 | 1.4 | 1.6 | 32.4 | 2.2 |
| China | 2.2 | 2.2 | 2.8 | -0.9 | -0.4 |
| India | 2.8 | 4.6 | 1.8 | -2.6 | -6.0 |
| Indonesia | 3.3 | 1.5 | 0.9 | 1.0 | 0.5 |
| Thailand | 13.2 | 6.7 | 4.2 | 11.4 | -0.6 |
| Vietnam | 25.3 | 17.6 | 11.0 | 6.8 | -2.3 |
| Russia | 2.0 | 2.8 | 3.5 | -2.2 | -3.3 |
| Mexico | 2.0 | 1.6 | 0.5 | 0.6 | -1.4 |
| South Africa | 2.8 | 2.5 | 1.8 | 5.7 | -1.6 |
| Turkey | 1.3 | 3.4 | 1.1 | -8.1 | -0.3 |
| Rest of South Asia | 3.7 | 3.2 | 0.1 | 0.1 | -2.7 |
| Rest of East Asia | 5.8 | 4.2 | 5.2 | -0.9 | -1.6 |
| Rest of Latin America & Car | 5.7 | 1.4 | -0.4 | 17.8 | -1.2 |
| Rest of E. Europe & C. Asia | 2.3 | 4.2 | 2.1 | -0.3 | -2.6 |
| Middle East & North Africa | 4.1 | 4.1 | 2.6 | 2.4 | -3.1 |
| Other Southern Africa | 6.0 | 1.6 | 0.0 | 4.6 | 0.4 |
| Rest of Sub-Saharan Africa | 8.2 | 6.5 | 2.2 | 5.2 | -5.0 |
| Rest of the World | 4.4 | 2.7 | 1.1 | 6.3 | -1.4 |

Source: Anderson, Martin and van der Mensbrugge (2005a, Table 12.10)

Table 7: Welfare effects of possible Doha reform scenarios, 2015

(percent difference from baseline, and Equivalent Variation in income in 2001 \$billion)

| | Agricultural subsidy cuts ^a plus: | | | | | |
|---|--|--|------------------------------|--------------------------------|--|--|
| | Tiered agricultural tariff cuts ^b | Proportional agricultural tariff cuts ^b | Scenario 2 plus 2% SSP | Scenario 3 plus 200% cap | Scenario 1 plus 50% NAMA cut for HICs ^c | Scenario 1 plus 50% NAMA cut for HICs+DCs ^d |
| | <i>Scenario 1</i> | <i>Scenario 2</i> | <i>Scenario 3</i> | <i>Scenario 4</i> | <i>Scenario 5</i> | <i>Scenario 6</i> |
| High-income ^e countries | 0.20 | 0.18 | 0.05 | 0.13 | 0.25 | 0.30 |
| Middle-income countries <i>of which: China</i> | 0.10 <i>-0.02</i> | 0.10 <i>-0.01</i> | 0.00 <i>-0.05</i> | 0.01 <i>-0.04</i> | 0.15 <i>0.07</i> | 0.21 <i>0.06</i> |
| Low-income countries | 0.05 | 0.04 | 0.01 | 0.00 | 0.18 | 0.30 |
| TOTAL WORLD <i>(and in \$billion)</i> | 0.18 <i>74.5</i> | 0.16 <i>66.3</i> | 0.04 <i>17.9</i> | 0.10 <i>44.3</i> | 0.23 <i>96.1</i> | 0.28 <i>119.3</i> |

^a Elimination of agricultural export subsidies and cuts in actual domestic support as of 2001 of 28 percent in the US, 18 percent in the EU, and 16 percent in Norway.

^b In Scenarios 1 and 2 the applied global average tariff on agricultural products is cut by roughly one-third, with larger cuts in developed countries, smaller in developing countries, and zero in least developed countries. In Scenario 1 there are three tiers for developed countries and four for developing countries, following Harbinson (WTO 2003) but 10 percentage points higher.

^c Non-agricultural market access (NAMA) is expanded by a 50 percent tariff cut for developed countries, 33 percent for developing countries, and zero in least developed countries.

^d Developing and least developed countries cut all agricultural and non-agricultural tariffs as much as developed countries.

^e High-income countries (HICs) include the newly industrialized East Asian customs territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Anderson, Martin and van der Mensbrugge (2005a, Table 12.14)

Table 8: Dollar change in real income in alternative Doha scenarios, 2015*(change in real income in 2015 in 2001 \$billion compared to baseline scenario)*

| | Scen. 1 | Scen. 2 | Scen. 3 | Scen. 4 | Scen. 5 | Scen. 6 |
|------------------------------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Australia & New Zealand | 2.0 | 2.2 | 1.2 | 1.2 | 2.4 | 2.8 |
| EU 25 plus EFTA | 29.5 | 28.2 | 10.7 | 10.9 | 31.4 | 35.7 |
| United States | 3.0 | 3.4 | 2.5 | 2.1 | 4.9 | 6.6 |
| Canada | 1.4 | 1.2 | 0.4 | 0.4 | 0.9 | 1.0 |
| Japan | 18.9 | 15.1 | 1.4 | 12.9 | 23.7 | 25.4 |
| Korea and Taiwan | 10.9 | 7.3 | 1.7 | 15.9 | 15.0 | 22.6 |
| Hong Kong and Singapore | -0.1 | -0.1 | -0.2 | -0.2 | 1.5 | 2.2 |
| Argentina | 1.3 | 1.4 | 1.1 | 1.0 | 1.3 | 1.6 |
| Bangladesh | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 |
| Brazil | 3.3 | 3.2 | 1.1 | 1.1 | 3.6 | 3.9 |
| China | -0.5 | -0.4 | -1.4 | -1.1 | 1.7 | 1.6 |
| India | 0.2 | 0.1 | 0.2 | 0.2 | 2.2 | 3.5 |
| Indonesia | 0.1 | 0.2 | 0.2 | 0.0 | 1.0 | 1.2 |
| Thailand | 0.9 | 1.0 | 0.8 | 0.8 | 2.0 | 2.7 |
| Vietnam | -0.1 | -0.1 | -0.1 | -0.1 | -0.5 | -0.6 |
| Russia | -0.3 | -0.1 | -0.7 | -0.7 | 0.8 | 1.5 |
| Mexico | -0.2 | -0.2 | -0.3 | -0.3 | -0.9 | -0.2 |
| South Africa | 0.1 | 0.1 | 0.2 | 0.3 | 0.4 | 0.7 |
| Turkey | 0.6 | 0.5 | 0.1 | 0.0 | 0.7 | 1.4 |
| Rest of South Asia | 0.2 | 0.2 | 0.1 | 0.2 | 0.3 | 0.7 |
| Rest of East Asia | 0.1 | 0.1 | 0.1 | 1.0 | 0.3 | 0.6 |
| Rest of Latin America & the Carib. | 3.7 | 3.7 | 0.5 | 0.4 | 3.9 | 4.0 |
| Rest of E. Europe and Central Asia | -0.2 | -0.2 | -0.2 | -0.2 | -0.6 | -0.7 |
| Middle East and North Africa | -0.8 | -0.9 | -1.2 | -1.2 | -0.6 | 0.1 |
| Other Southern Africa | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.2 |
| Rest of Sub-Saharan Africa | 0.0 | 0.0 | -0.3 | -0.3 | -0.1 | 0.3 |
| Rest of the World | 0.4 | 0.3 | 0.0 | 0.0 | 0.6 | 0.6 |
| High-income countries | 65.6 | 57.2 | 17.8 | 43.2 | 79.9 | 96.4 |
| Developing countries | 9.0 | 9.1 | 0.1 | 1.1 | 16.1 | 22.9 |
| Middle-income countries | 8.0 | 8.3 | 0.0 | 1.0 | 12.5 | 17.1 |
| Low-income countries | 1.0 | 0.8 | 0.2 | 0.0 | 3.6 | 5.9 |
| East Asia and Pacific | 0.5 | 0.9 | -0.4 | 0.6 | 4.5 | 5.5 |
| South Asia | 0.4 | 0.3 | 0.3 | 0.4 | 2.5 | 4.2 |
| Eastern Europe and Central Asia | 0.1 | 0.2 | -0.9 | -0.9 | 0.8 | 2.1 |
| Middle East and North Africa | -0.8 | -0.9 | -1.2 | -1.2 | -0.6 | 0.1 |
| Sub-Saharan Africa | 0.3 | 0.3 | -0.2 | -0.1 | 0.4 | 1.2 |
| Latin America & the Caribbean | 8.1 | 8.0 | 2.5 | 2.1 | 7.9 | 9.2 |
| World total | 74.5 | 66.3 | 17.9 | 44.3 | 96.1 | 119.3 |

Anderson, Martin and van der Mensbrugge (2005a, Table 12.14)

Table 9: Percentage change in real income in alternative Doha scenarios, 2015*(change in real income in 2015 in percent compared to baseline scenario)*

| | Scen. 1 | Scen. 2 | Scen. 3 | Scen. 4 | Scen. 5 | Scen. 6 |
|------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Australia & New Zealand | 0.35 | 0.38 | 0.22 | 0.20 | 0.42 | 0.48 |
| EU 25 plus EFTA | 0.29 | 0.28 | 0.11 | 0.11 | 0.31 | 0.36 |
| United States | 0.02 | 0.02 | 0.02 | 0.01 | 0.03 | 0.05 |
| Canada | 0.15 | 0.13 | 0.05 | 0.05 | 0.10 | 0.11 |
| Japan | 0.38 | 0.30 | 0.03 | 0.26 | 0.48 | 0.51 |
| Korea and Taiwan | 0.86 | 0.58 | 0.14 | 1.26 | 1.19 | 1.79 |
| Hong Kong and Singapore | -0.02 | -0.02 | -0.04 | -0.04 | 0.35 | 0.52 |
| Argentina | 0.32 | 0.34 | 0.27 | 0.26 | 0.34 | 0.39 |
| Bangladesh | -0.06 | -0.06 | -0.03 | -0.04 | -0.10 | -0.09 |
| Brazil | 0.50 | 0.49 | 0.17 | 0.17 | 0.55 | 0.59 |
| China | -0.02 | -0.01 | -0.05 | -0.04 | 0.07 | 0.06 |
| India | 0.02 | 0.02 | 0.03 | 0.02 | 0.25 | 0.40 |
| Indonesia | 0.05 | 0.08 | 0.09 | 0.01 | 0.37 | 0.44 |
| Thailand | 0.43 | 0.49 | 0.38 | 0.38 | 0.99 | 1.33 |
| Vietnam | -0.20 | -0.22 | -0.11 | -0.16 | -0.83 | -0.97 |
| Russia | -0.06 | -0.03 | -0.15 | -0.15 | 0.16 | 0.31 |
| Mexico | -0.02 | -0.02 | -0.04 | -0.04 | -0.11 | -0.02 |
| South Africa | 0.06 | 0.09 | 0.11 | 0.17 | 0.25 | 0.49 |
| Turkey | 0.25 | 0.22 | 0.02 | 0.02 | 0.26 | 0.55 |
| Rest of South Asia | 0.13 | 0.11 | 0.06 | 0.14 | 0.17 | 0.39 |
| Rest of East Asia | 0.02 | 0.05 | 0.04 | 0.36 | 0.09 | 0.22 |
| Rest of Latin America & the Carib. | 0.44 | 0.43 | 0.06 | 0.04 | 0.46 | 0.47 |
| Rest of E. Europe and Central Asia | -0.06 | -0.06 | -0.09 | -0.08 | -0.22 | -0.26 |
| Middle East and North Africa | -0.07 | -0.07 | -0.10 | -0.10 | -0.05 | 0.01 |
| Other Southern Africa | 0.21 | 0.19 | -0.03 | -0.05 | 0.19 | 0.26 |
| Rest of Sub-Saharan Africa | 0.02 | 0.01 | -0.14 | -0.14 | -0.02 | 0.13 |
| Rest of the World | 0.19 | 0.14 | 0.00 | 0.02 | 0.26 | 0.28 |
| High-income countries | 0.20 | 0.18 | 0.05 | 0.13 | 0.25 | 0.30 |
| Developing countries | 0.09 | 0.09 | 0.00 | 0.01 | 0.16 | 0.22 |
| Middle-income countries | 0.10 | 0.10 | 0.00 | 0.01 | 0.15 | 0.21 |
| Low-income countries | 0.05 | 0.04 | 0.01 | 0.00 | 0.18 | 0.30 |
| East Asia and Pacific | 0.01 | 0.03 | -0.01 | 0.02 | 0.13 | 0.16 |
| South Asia | 0.03 | 0.02 | 0.03 | 0.03 | 0.21 | 0.36 |
| Eastern Europe and Central Asia | 0.01 | 0.02 | -0.09 | -0.09 | 0.08 | 0.21 |
| Middle East and North Africa | -0.07 | -0.07 | -0.10 | -0.10 | -0.05 | 0.01 |
| Sub-Saharan Africa | 0.06 | 0.06 | -0.04 | -0.02 | 0.10 | 0.27 |
| Latin America & the Caribbean | 0.29 | 0.29 | 0.09 | 0.08 | 0.29 | 0.33 |
| World total | 0.18 | 0.16 | 0.04 | 0.10 | 0.23 | 0.28 |

Anderson, Martin and van der Mensbrugge (2005a, Table 12.14)

Table 10: Effects on bilateral merchandise trade flows of adding non-agricultural tariff cuts to agricultural reform under Doha, 2015

(2001 \$billion increase over the baseline in 2015)

| <i>Exports to:</i> | Propn'l agric reform only ^a | | Agric plus non-agric reform ^b | |
|------------------------------------|--|----------------------|--|----------------------|
| | High-income ^c countries | Developing countries | High-income ^c countries | Developing countries |
| <i>Exports from :</i> | | | | |
| High-income ^c countries | 20 | 11 | 80 | 55 |
| Developing countries | 18 | 5 | 62 | 16 |
| TOTAL WORLD | 38 | 16 | 142 | 71 |

^a Scenario 2 in Table 7

^b Scenario 5 in Table 7

^c High-income countries include the newly industrialized East Asian customs territories of Hong Kong, Korea, Singapore and Taiwan as well as Europe's transition economies that joined the EU in April 2004.

Source: Anderson, Martin and van der Mensbrugge (2005a, Table 12.16)

Table 11: Effects of a comprehensive Doha reform on agricultural output and employment growth, by region, 2005 to 2015

(annual average growth rate, percent)

| | Output | | Employment | |
|-----------------------------|----------|-------------------------|------------|-------------------------|
| | Baseline | Scenario 5 ^b | Baseline | Scenario 5 ^b |
| Australia and New Zealand | 3.5 | 4.3 | 0.4 | 1.0 |
| Canada | 3.5 | 4.0 | 0.2 | 0.6 |
| United States | 2.2 | 1.9 | -0.8 | -1.4 |
| EU 25 plus EFTA | 1.0 | -0.3 | -1.8 | -2.8 |
| Japan | 0.5 | -1.4 | -2.7 | -4.1 |
| Korea and Taiwan | 2.2 | 1.5 | -1.3 | -2.1 |
| Argentina | 2.9 | 3.5 | 0.9 | 1.5 |
| Bangladesh | 4.2 | 4.2 | 1.1 | 1.2 |
| Brazil | 3.3 | 4.4 | 1.1 | 2.2 |
| China | 4.3 | 4.3 | 0.8 | 0.8 |
| India | 4.3 | 4.4 | 1.0 | 1.0 |
| Indonesia | 3.0 | 3.0 | -0.7 | -0.6 |
| Thailand | -0.1 | 0.4 | -4.6 | -4.3 |
| Vietnam | 5.8 | 5.9 | 3.9 | 4.0 |
| Russia | 1.5 | 1.4 | -2.3 | -2.4 |
| Mexico | 3.9 | 4.0 | 2.0 | 2.3 |
| South Africa | 2.5 | 2.6 | 0.0 | 0.1 |
| Turkey | 3.0 | 3.0 | -0.5 | -0.5 |
| Rest of South Asia | 4.8 | 4.9 | 2.0 | 2.1 |
| Rest of East Asia | 3.7 | 3.8 | 0.2 | 0.3 |
| Rest of Latin America & Ca | 4.4 | 5.3 | 1.9 | 2.6 |
| Rest of E. Europe & C. Asia | 3.3 | 3.3 | 0.0 | 0.0 |
| Middle East & North Africa | 4.0 | 4.0 | 1.5 | 1.5 |
| Other Southern Africa | 5.3 | 5.4 | 3.0 | 3.0 |
| Rest of Sub-Saharan Africa | 4.6 | 4.8 | 2.2 | 2.3 |
| Rest of the World | 5.0 | 5.5 | 2.4 | 2.7 |

Source: Anderson, Martin and van der Mensbrugge (2005a, Table 12.17)

Table 12: Changes in poverty (those earning <\$1/day) in alternative Doha scenarios compared with full liberalization, 2015

| | Base-line share | Full liberalization share | Shares under Doha alternatives | | |
|--------------------------------------|-------------------|---|---|-----------------|-----------------|
| | | | Doha Scenario 1 | Doha Scenario 5 | Doha Scenario 6 |
| <u>2015 Headcount (%)</u> | | | | | |
| East Asia & Pacific | 0.9 | 0.8 | 0.9 | 0.9 | 0.9 |
| Latin America & Carib. | 6.9 | 6.6 | 6.9 | 6.9 | 6.8 |
| South Asia | 12.8 | 12.5 | 12.8 | 12.7 | 12.6 |
| Sub-Saharan Africa | 38.4 | 36.0 | 38.4 | 38.3 | 38.1 |
| All developing countries | 10.2 | 9.7 | 10.2 | 10.2 | 10.1 |
| <u>2015 Headcount (mill.)</u> | 2015 level | Decrease from baseline (in millions) | Decrease from baseline (in millions) | | |
| East Asia & Pacific | 19 | 2.2 | 0.1 | 0.3 | 0.5 |
| Latin America & Carib. | 43 | 2.1 | 0.3 | 0.4 | 0.5 |
| South Asia | 216 | 5.6 | 0.2 | 1.4 | 3.0 |
| Sub-Saharan Africa | 340 | 21.1 | -0.1 | 0.5 | 2.2 |
| All developing countries | 622 | 31.9 | 0.5 | 2.5 | 6.3 |

Source: Authors' World Bank LINKAGE model simulations as reported in Anderson, Martin and van der Mensbrugge (2005c, Table 17.7).

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