Agriculture and Trade Liberalisation

EXTENDING THE URUGUAY ROUND AGREEMENT

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

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ÉLARGIR LA PORTÉE DES ACCORDS D'URUGUAY

FOREWORD

This report is one of several studies carried out under the *Agricultural Trade and Other Transboundary Issues* activity of the Programme of Work of the OECD's Committee for Agriculture. The three parts of the report provide information on the average tariff levels and on the use of tariff-rate quotas, export subsidies and export credits by selected OECD countries for temperate-zone agricultural products. The implications of further liberalisation of the various instruments over the medium term are examined.

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Preamble

Agriculture Ministers adopted a set of shared goals in March 1998, stressing that these goals should be seen as an integrated and complementary whole. Among the shared goals is the further integration of the agro-food sector into the multilateral trading system. In pursuit of that goal, Ministers mandated the OECD to examine ongoing and new agricultural trade and trans-boundary policy issues and their impacts, and to provide analytical support, as appropriate, to the process of agricultural trade liberalisation.

In response, the Committee for Agriculture adopted (and the Trade Committee endorsed) a comprehensive programme of work on agricultural trade policy issues, to be carried out throughout the period 1999-2000 and continuing during the period 2001-2002. The programme of work was carefully designed to incorporate specific agricultural trade policy issues that are of major interest to Member countries of the OECD, but which may also concern non-OECD countries. A wide range of issues arising at the interface of trade and domestic policy is also covered, such as the trade implications of different kinds of agricultural support measures, food safety, food security, rural development and environmental protection policies.

On-going core activities of the Committee for Agriculture such as the annual monitoring of agricultural policies and medium term outlook exercises provide an essential backdrop to the specific trade programme of work, which is being implemented on two broad fronts.

One **major element**, characterised as evaluating and strengthening trade liberalisation, aims to assist policy makers and negotiators as they enter the next round of multilateral trade negotiations on agriculture by:

- assessing in-depth the effects of the URAA on trade, on agricultural policy and on protection levels;
- identifying possible impacts on trade and markets of different scenarios for further trade liberalisation;
- analysing the effect of trade policy instruments such as export credits or export taxes and restrictions that have not, to date, been disciplined and the trade impacts of food aid and STEs.

The **second major** element of the agricultural trade policy work programme deals with a wide range of issues that arise increasingly at the interface of trade and domestic policy. The following issues will be examined:

- Production and trade impacts of different agricultural policy measures ranging from market price support to different kinds of direct payments and including agri-environmental measures.
- The concept of multifunctionality and in particular relationships between policies intended to ensure an adequate supply of agriculture's non-food outputs (such as possible contributions to environmental benefits and rural development) and existing or future international commitments with respect to trade.
- Policies that contribute to improving environmental performance in ways that are consistent with agricultural trade liberalisation.
- The implications of trade liberalisation for food security in OECD and selected non-OECD countries.
- Trade aspects of domestic policies in the area of food safety and quality with respect to topical issues such as biotechnology and animal welfare.
- Trade or trans-boundary aspects of competition policy with respect to geographical labels and state trading.

Reflecting the wide range of issues, different methodologies are employed in the implementation of the agricultural trade work programme – analytical, model-based tools are used alongside statistical and descriptive approaches while some issues receive a conceptual treatment. Choice of methodology is determined by data availability and by the nature and complexity of the issues being examined, leading to either quantitative or qualitative results. In a later phase, work will be undertaken to synthesise the main conclusions and policy implications for each of the main elements of the programme.

Part I

TARIFF-RATE QUOTAS AND TARIFFS IN OECD AGRICULTURAL MARKETS: A FORWARD-LOOKING ANALYSIS

Summary

The present purpose is to provide illustrative results of various liberalisation scenarios and a profile of the quotas and tariffs for commodities and countries in the OECD'S agricultural trade model, Aglink.[1] This model has been modified and is used in the empirical analysis to provide results that illustrate the outcomes that can be expected under alternative liberalisation scenarios, relative to the widely reviewed and approved baseline (that is, relative to the "status quo" scenario, where no further liberalisation occurs). It is not possible, nor is it intended, to predict how the negotiations currently underway will evolve and what the final negotiated outcome will be. Alternative modelling approaches are possible for this type of analysis. Aglink is chosen because it is a cost-effective approach for a forward-looking examination of the effects of liberalising global quotas and MFN tariffs in major OECD countries for a number of mostly homogenous goods.

Part I evaluates one aspect of market access; namely that of the system of tariff rate quotas (TRQs) and tariffs. It is not an exhaustive discussion of the topic as the commodity and country coverage is limited to that available in the Aglink model, which is a smaller set than that covered in WTO negotiations. The report abstracts from quota administration issues that also influence market access and from preferential agreements that affect access for specific countries. Consequently, the empirical results are not necessarily indicative of the potential impacts of expanded market access on a WTO-wide basis.

The analytical framework is described and is the starting point for the empirical implementation. Also discussed and illustrated are the modelling and data issues confronting the empirical analysis, while indicating the interrelationships between the TRQ regime and domestic policies in some countries for some commodities. This analysis has been carried out under the assumption of constant domestic policies. These policies may limit the transmission of world price changes to domestic markets and thus restrict the impacts on domestic demand of a decline in tariff rates.

The TRQ system introduced three instruments – in-quota tariffs, quota volume, and out-of-quota tariffs – and administrative procedures to allocate the quota volumes. The economics of the TRQ system are examined and in a forward-looking context, empirical results are provided on the effects of alternative liberalisation scenarios on the trade and markets of selected products and countries. These are illustrative of the type of changes that can be expected and indicative, within the confines of the Aglink model, of the relative importance of relaxing each of the instruments examined.

Data from the Agricultural Market Access Database (AMAD) are used to provide an overview of the TRQ system in OECD countries focusing on the commodities and countries modelled in Aglink. These data provide a snapshot of the quotas and tariffs as of the year 2000 – the end of the implementation period for developed countries and the beginning of new negotiations. These data also provide the quota volume as well as the relevant in-quota, out-of-quota, and non-quota tariffs used in the empirical model. These data, along with the analytical framework, enable us to draw certain conclusions about a TRQ regime's response as the various instruments are liberalised. The empirical analysis confirms the

analytical findings while providing an indication of the relative order of magnitude of each instrument in increasing market access within Aglink's country and commodity set.

Notification data indicate that many of the quotas in OECD countries are under-utilised. On the other hand, notifications indicate that about 30% of the TRQs are not enforced as their fill rate exceeds 100%. In the latter case, imports in excess of the quota are allowed entry at the lower in-quota tariff. Although the higher out-of-quota tariff rate is not applied, it could be in the future.

Average tariff rates were calculated for selected countries and commodities. These were based on Most Favoured Nation (MFN) bound-rates and do not include preferential tariffs. Reported tariff rates therefore, may overstate the average tariff level for some countries. In addition, the tariff schedule of many countries, included in this report contains specific tariffs. This implies that movements in world prices and exchange rates influence the calculated average *ad valorem* rates.[2] Given these qualifications, average tariffs for many commodities in many OECD countries remain high. In-quota tariff rates greater than 100% can still be found in the year 2000, the end of the current implementation period and average out-of-quota tariffs, at triple digit rates, are common. Calculated applied rates when available are lower than scheduled rates. This indicates better market access than suggested by the scheduled rates. It also implies that reductions in scheduled rates become effective and influence domestic prices only when these reductions are substantial. As with over-filled quotas, some countries retain the possibility to reduce market access in the future by raising tariffs to MFN bound rates without fearing reprisals from trading partners.

The analytical results indicate that only one instrument is binding at a time and that there can be regime switches as policy or market conditions change. The potential of each instrument to improve world prices and trade in the future depends on which instrument is binding and the share of world trade that will be affected by that instrument.

The analytical assessment initially assumes imports; thus quota under-fill or out-of-quota imports are only a function of the relative tariff rates. However, quota administration and allocation inefficiencies can also influence market access and may be an additional cause of quota under fill. One specific case where it is assumed that tariff quota administration leads to an effective rate of tariff protection greater than that provided by the in-quota rate is also examined analytically. Unless quota administration issues are properly addressed the potential gains from quota enlargement and from reductions in in-quota tariff rates may be diminished. In other words, simultaneous liberalisation of the three instruments, along with reforms to administrative procedures, will have the largest impact on expanding market access.

An empirical analysis of market access liberalisation was carried out to assess whether the conclusions from the analytical evaluation could be empirically confirmed – albeit for a limited number of commodities and countries – and to provide orders of magnitude of possible impacts. The forward-looking liberalisation scenarios examined in the empirical application were a 50% expansion of quotas and a 36% reduction in tariffs implemented over five years in major OECD countries. The empirical results confirm the analytical results – only one instrument is binding at any time. The binding instrument varies by commodity within any country and over time. Liberalisation policies that include changes in all instruments – quota expansion, in-quota tariff reduction, and out-of- and non-quota tariff reduction – maximise the number of markets that can be liberalised.

The empirical results assume no changes in administration inefficiencies, and as long as these continue they may limit the effects of liberalising the TRQ system. The empirical results for the scenarios examined suggest that quota expansion, with or without further reductions in the in-quota tariff rates, leads to generally minimal changes in traded volumes and world prices. This result may underestimate the impacts of quota expansion due to the complicated nature of TRQ administration and allocation mechanisms. These are lost in our empirical analysis due to aggregation of TRQs over end users and suppliers. The empirical results are also influenced by the fact that some of the TRQs used in the analysis have neither the in-quota tariff nor the quota as the binding instrument. For selected commodities and countries where the quota is the binding instrument, quota expansion leads to increased imports but benefits to consumers in lower prices are muted, principally because of

domestic policies. For many countries and commodities examined, domestic policies supporting producers are still prevalent. The TRQ system in the majority of these cases facilitates the operation of domestic price support policies as the quota and the relatively high out-of-quota tariff rates restrict market access. Significant reductions in the out-of-quota tariffs would facilitate transmission of world market prices to domestic markets and bring downward pressure on domestic support prices. In addition, a reduction of the out-of-quota tariff to the in-quota rate would mitigate the trade inhibiting effects of quota administration mechanisms.

The empirical results also suggest that larger effects on world and domestic markets occur when the out-of-quota and non-quota tariffs are reduced. Imports, especially for dairy products, expand and while world prices increase, domestic prices are lower. While consumers benefit from lower domestic prices these also improve resource allocation and imply the possibility of lower quota rents in markets where they continue to exist.

The simulated linear 36% tariff cut in this analysis may both overstate and understate the degree of tariff decrease that could result in practice if the tariff reduction formula that was used in negotiating the Uruguay Round Agreement were to be maintained. If the tariff cuts for some "sensitive" traded commodities are less than the average reduction, the 36% cut may be an overestimate. Even so, the empirical results indicate that even the simulated full 36% reduction in average tariffs, although larger compared to the other scenarios examined, leads to relatively small changes in the trade and price of most products examined. Data show that whenever out-of-quota tariff rates are prohibitive, significant market price and trade impacts are likely to materialise only with substantial tariff reductions.

The empirical results presented are conditional on the modelling framework and on the assumptions we made regarding the price transmission specification and how the data were aggregated. The model used, Aglink, does not represent all agricultural commodities or all OECD agricultural markets. The results may not necessarily be extrapolated to either a multilateral improvement in market access that might result from the WTO negotiations or to other products not considered in this analysis. Empirical results also depend on the baseline against which the scenarios are compared and alternative market conditions may lead to different results.

Introduction

In the URAA, countries agreed to open markets by prohibiting non-tariff barriers, converting existing non-tariff barriers to tariffs, and by reducing tariffs. Countries were obligated to provide a minimum level of import opportunities for *products* that were previously protected by non-tariff barriers by establishing tariff rate quotas (TRQs). This import system established a quota and a two-tier tariff regime for affected commodities. A lower tariff applies to imports within the quota while a higher tariff applies to imports exceeding the quota. The level of each quota was determined based on average imports during the base period, 1986 to 1988. If imports during this period were less than 3% of consumption, a minimum access TRQ should have been established at 3% of domestic consumption increasing to 5% by the end of the implementation period. If average imports during the base period were greater than 5% of domestic consumption, current access TRQs were established whereby countries agreed to maintain import opportunities so that imports would not fall below current access. Current access imports are also supposed to increase but specific numeric targets were not established. It should be noted that these conditions refer to the opportunity to import. Countries are not obligated to actually import the stated volumes. The implementation period for developed countries is six years ending in the year 2000, while developing countries have a longer implementation period that ends in 2004. According to WTO (G/ag/ng/s/7) a total of 37 member countries, with 1 371 individual TRQs, committed to this system.

Part I is organised as follows. The first section presents the analytical approach for modelling the economics of TRQs, laying the foundation for the empirical application that follows. Subsequently, an overview is provided of TRQs scheduled by OECD and selected other countries along with a discussion focusing on the countries and commodities that are endogenous in *Aglink*. Next, calculated average tariffs for these countries and commodities are presented. The empirical implementation is then

described, including the modifications to the analytical approach that are necessary in order to implement the methodology within the Aglink framework. Modifications to the data that were necessary in order to undertake the empirical analysis are also described. Preliminary results of various market access liberalisation scenarios are then presented. Part I ends with a summary and conclusion.

The economics of TRQs

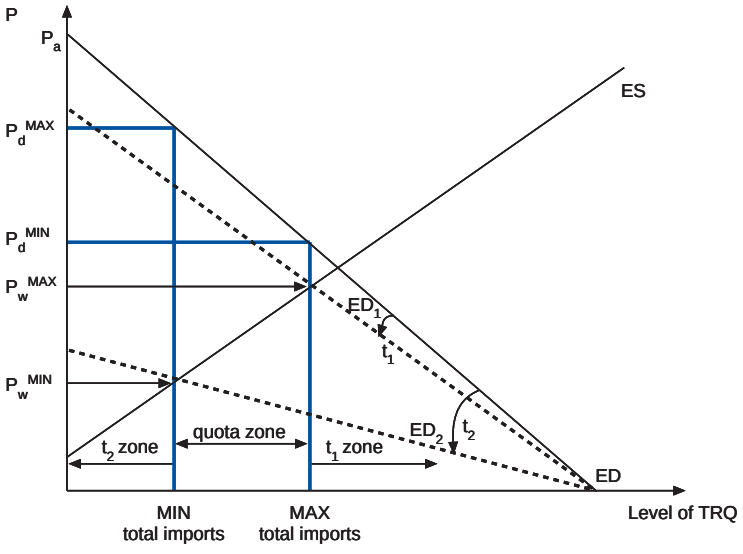
The economics of TRQs are presented in order to illustrate the key concepts that are used in the empirical analysis that follows. The framework presented is similar to one used by other economists (*e.g.* Abbott and Morse, Hertel and Martin, DeGorter and Sheldon).[3] The TRQ regime, by combining two policy instruments, tariffs and quotas, with two tariff levels operational at a time, provide some modelling challenges that must be resolved for the empirical implementation.

There are three policy levers associated with the TRQ regime that governments can use to influence imports quotas, within-quota tariffs, out-of-quota tariffs. However, only one policy instrument at a time is the binding instrument. For any importing country at any time, either the quota, the lower within-quota tariff, or the higher out-of-quota tariff determines domestic and world prices and import volume.

There are also four types of imports that can occur at any time. Imports can be less than or equal to the TRQ, entering the country at the lower within-quota tariff (in-quota); imports can also exceed the TRQ but still enter at the lower within-quota tariff by government decree (over-quota); imports can exceed the TRQ and enter at the higher, out-of-quota tariff (out-of-quota); and there can be non-quota imports. These latter occur because of the way the TRQ systems operate and the commodity aggregation level in models such as Aglink. For example, Aglink models production, consumption, and trade of cheese. Countries, however, did not necessarily specify a TRQ for all the cheese products they import; rather only subsets of these products (*i.e.* particular varieties of cheeses) may be included in the TRQ regime. Imports of these cheeses may take place under yet different tariffs than the TRQ products. A more complete discussion of this issue is presented below. All of the instruments and imports need to be incorporated into the empirical analysis to adequately reflect possible future developments following liberalisation.

Figure I.1 is a stylised representation of the economics of TRQs. It is a static representation of a single importing country facing an upward sloping excess supply curve (ES) from the rest of world

Figure I.1. **Three zones of effectiveness**



Source: OECD Secretariat.

(ROW). The country's free trade excess demand curve (ED) is derived conventionally. The intercept of ED with the price line, Pa, represents the importing country's autarky price. Imposing the lower within-quota tariff, t_1, causes ED to rotate to ED_1 while imposing the higher out-of-quota tariff, t_2, causes ED to rotate to ED_2. Had we assumed specific rather than ad valorem tariffs, parallel shifts rather than rotation of the curves would represent the effects on the excess demand curve.

The intersection of the ES curve with ED_1 and ED_2 determines the range or zone within which each of the three policy instruments is effective for a given level of t_1, and t_2. The intersection point of ES with ED_1 projected to the price axis generates maximum world price, and it determines the minimum domestic price and maximum total imports. TRQs to the right of this intersection point are in the t_1 zone (referred to as the T1 regime in the empirical section). The intersection of ES with ED_2 determines the minimum world price, the maximum domestic price and minimum total imports. TRQs to the left of this point are in the t_2 zone (T2 regime). Between these two points is the quota or TRQ zone (QUOTA regime).

The illustration of how the three zones operate is facilitated with the aid of an additional variable, the tariff equivalent of the TRQ. This is defined as the ratio of the difference between the domestic and world price, *i.e.*:

$$t_e = (P_d - P_w)/P_w.$$

Suppose that, given the assumed in-quota (t_1) and out-of-quota (t_2) tariff rates and the related maximum and minimum import points, a country establishes a TRQ to the left of minimum imports, *i.e.* in the t_2 zone. In this case, the TRQ is filled and there will be out-of-quota imports at the higher out-of-quota tariff rate. This occurs because in the t_2 zone, $t_e \geq t_2$ that is, the domestic price that would result if imports were only at the TRQ level is greater than the domestic price inclusive of t_2. It is profitable, therefore, to import additional quantities at the higher t_2 rate until the inequality vanishes and this occurs at minimum total imports.

Similarly, if the TRQ is established to the right of maximum imports, *i.e.* in the t_1 zone, imports will be less than the TRQ and there will be under-fill. In this case, $t_e \leq t_1$ makes it unprofitable to import the TRQ volume. Rather imports stop where the inequality vanishes, at maximum total imports. If the TRQ is established between these two points, *i.e.* in the quota zone, then $t_1 \leq t_e \leq t_2$ and the quota determines the import volume. This is because it is not profitable to import more than the quota with the higher over-quota tariff and it is not possible to import more than the quota at the lower within-quota tariff rate.

This analysis suggests that the TRQ or one of the two end points always determine imports. For empirical analysis, in order to determine imports and domestic price, we need to determine the relationship between t_1, t_2, and t_e. Given the way the TRQs were defined, we know that, $t_1 \leq t_2$. If $t_e \leq t_1$ then imports equal maximum total imports and domestic price equals $P_w(1 + t_1)$. If $t_e \geq t_2$ then imports equal minimum total imports and domestic price is $P_w(1 + t_2)$. Finally, imports are equal to the TRQ when $t_1 \leq t_e \leq t_2$ and domestic price is determined by the intersection of the TRQ with ED.

Tariffs and quotas generate tariff revenue accruing to the importing country's government and quota rents that may accrue to importers, exporters, or to the government depending upon how the quota is administered. The TRQ regime combines both tariffs and quotas, thus generating both quota rents and tariff revenues.

Quota rents are generated when a country is in the T2 regime (TRQ fill and out-of-quota imports) or the QUOTA regime leading to domestic price that is greater than the world price and the in-quota tariff. Rents can also accrue when the quota is under-filled depending on the demand conditions in a country and the administration method employed. The value of the tariff revenues and quota rents generated by the system can be measured using the framework in Figure I.1 and the empirical results presented below. In a follow-up report, we hope to measure the rents and tariff revenues generated in the system and how different liberalisation scenarios alter these.

This analysis assumes global quota allocations and tariff rates found in a country's schedule, not unlike previous analysis (see for example Abbott and Paarlberg, Abbott and Morse, DeGorter and Sheldon). The framework can also be used to analytically assess allocated quotas. In this instance, the

ES curve in Figure I.1 can be interpreted to represent the excess supply of the preferential partner while ED is the import demand for that partner's produce, while the interpretation of the world price changes so that it now represents the export price of the trading partner. Total quota and imports for the product can be obtained by summing across the various partners. The allocated quota for each partner can still operate in any one of the three zones shown in Figure I.1.

Although global and allocated quotas can be represented equivalently as in Figure I.1, the underlying assumptions necessary to generate the representation in Figure I.1 are different. The allocated quota case necessitates a modelling framework that tracks bilateral trade flows. Although there are different modelling approaches for this, a common approach used in partial and general equilibrium models is to assume that products are differentiated by origin, *i.e.* the Armington assumption. With this approach, an import demand function is specified for each partner and thus, bilateral quotas (and preferential tariffs when available) can be accommodated. Some have shown that the conditions required for the Armington assumptions to be valid do not hold (Alston *et al.*, Winters), but its popularity continues partly because of the relatively parsimonious use of parameters. In addition, unlike net trade models, imports and exports are endogenous.

Regarding preferential tariffs, to the extent that this information is available, it can be explicitly included. If the agreement does not place restrictions on imports from the trading partner, it can be treated as a tariff only regime, albeit at a lower tariff than the in-quota. If there are limits on the volume of imports that may enter under the preferential tariff, then it is a TRQ regime and the framework in Figure I.1 applies. In this case, the rotation of the excess demand curve (D_1) would be less than that indicated in the figure which will shift the point of maximum imports further to the right, *i.e.* potential imports would be greater than indicated in the figure. Since the preferential tariff does not affect the out-of-quota rate, the point of minimum imports is not affected and the range where the quota is effective is increased. The minimum domestic price would be lower than indicated in the figure while the maximum export price for this trading partner would be higher. This assumes that the preferential partner is as efficient producing this good as the most efficient producers in the rest of the world as shown by the excess supply curve. If this is not the case, if the preferential partner is a higher cost producer, then the excess supply curve in Figure I.1 will rotate up and to the left and the net effect on imports and price is ambiguous. It would depend on the cost structure of the exporter (how much does the excess supply curve shift up) and the relative difference between the in-quota and preferential tariff rate (*i.e.* how much ED_1 shifts back to the right).

Another difference in the interpretation of Figure I.1 between global compared to bilateral trade regards rents. As stated above, the quota component of the TRQ contains the potential to generate rents. In the global trade case, the potential rents that can be represented in Figure I.1 are global rents (available to all trading partners) whereas for the bilateral trade representation, the rents would be only for that flow. Total rents would be the sum of rents over all flows. In the later case, there is the potential for differential rents by trade flow, depending upon the quota level the cost structure of the trading partner, and the preferential tariff rate (in cases where these apply). However, neither in the global nor in the bilateral trade case can one determine who ultimately receives the rents, as this depends critically on the quota administration method and the relative bargaining power of the agents. In both cases, therefore, information external to the modelling framework is required to determine the recipient(s).

For the empirical analysis, whether one uses a net trade or bilateral trade specification will depend on factors other than fundamental differences in the analytical framework of the TRQ regime. Global and bilateral trade models provide similar insights as to the relevant instrument and on how relaxing an instrument is likely to affect market access. Whether Figure I.1 is interpreted as representing imports from all sources or imports from a particular trading partner, the analysis suggests that only one instrument is effective at a time and that instrument can vary over time, between countries and among commodities.

Independent from other considerations, whether to use a global or a bilateral trade model to examine TRQs, depends upon the focus of the analysis and the relative importance of global versus

allocated quotas. Are allocated quotas a significant proportion of the scheduled quotas? Will choosing one modelling framework provide insights not provided by the other? Preliminary evidence suggests that allocated quotas are a small share of scheduled quotas (see discussion below) and the framework above suggests that both approaches provide similar insights. Even if allocated quotas are important, incorporating them into a bilateral trade model is not straightforward since the notifications to the WTO do not indicate the sources of imports under a TRQ. If allocated quotas are not a significant share of scheduled quotas then incorporating global quotas provides a challenge to bilateral trade models. The data presented below indicate that allocated quotas do not represent a large portion of the scheduled quotas and for our particular set of commodities and countries, their share is even less important. Their importance diminishes further when one takes into account that many of the allocated quotas are not fully allocated but contain a global element that at times exceeds the allocated component.

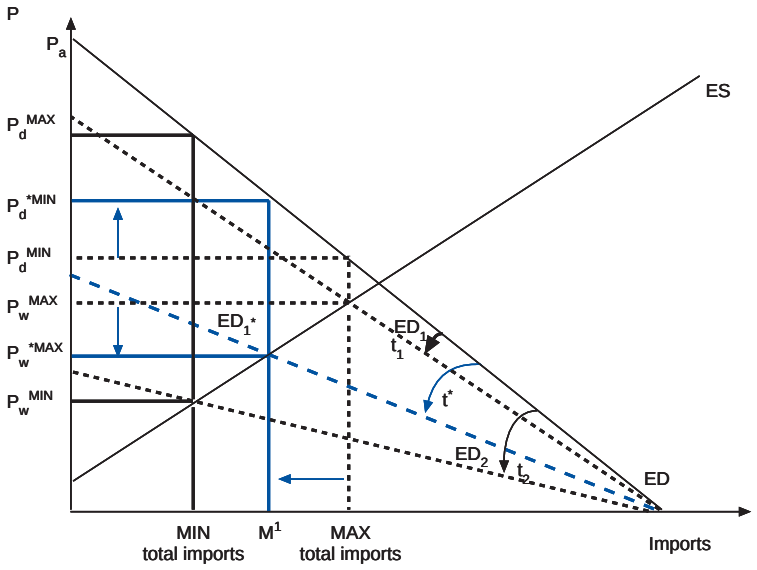
Preferential agreements are another factor to consider when deciding among alternative modelling frameworks. A net trade specification can not take these into account in contrast to bilateral trade models. According to WTO, a total of 172 regional trade agreements were in force as of July 2000, with the largest concentration in the Euro-Mediterranean region that suggests that they may be important. Information on tariff rates and on commodity and country coverage is not readily available, however, so it is not easy to incorporate these into any modelling framework. Independent from the number of preferential agreements, another factor is their commodity coverage, the proportion of trade they represent and whether parameters to represent the behavioural relationships are available. As the size of the model increases with the number of trade flows to represent, this could also be a constraint. In addition, Armington type models can not easily handle new trade flows, *i.e.* the possibility of new entrants. If a flow is zero in the base year, it is difficult to get endogenous positive flows.

Given that each modelling approach has its own unique strengths and limitations, the criteria in deciding on a modelling framework are the focus of the analysis and resource constraints. Are goods sufficiently heterogeneous so the focus of the analysis should be on tracking bilateral trade flows of differentiated products and assessing which specific country gains and looses from further market access liberalisation or is the focus of the analysis on assessing global trade flows of largely homogenous products? And, what are the instruments that will be changed in the scenarios? Will the focus be on changing MFN rates and global quotas or on changing preferential tariffs and allocated quotas? We focus on global quotas and MFN rates recognising that we are not capturing the entire complexity of the story. Rather, we focus on the general trends abstracting from specific trade flows. This focus also required fewer resources as a modelling framework, Aglink, already exists. The choice was to modify Aglink to inco rporate as many of the issues while still staying within the general model that generates a baseline, which is widely reviewed and accepted against which to compare scenario results. In competitive world markets, the global effects should not be materially different whether the analysis is based on global or bilateral trade models.

The analysis also assumes that, imports, and thus quota under fill or out-of-quota imports, are only a function of the relative tariff rates. Other factors can also influence imports and hence the fill rates. These include quota implementation and administration methods, and whether they are allocated to high cost producers. Additional factors that can complicate the analysis are imports under preferential tariff rates and special agreements that are not part of market access notifications to the WTO, such as between the EU and countries in Central and Eastern Europe.

Quota administration has become a contentious issue, and some have blamed the lack of quota fill on implicit or explicit costs associated with administrative requirements. An extensive discussion on quota administration costs is beyond the present scope. The analytical framework presented above can be used to assess the effects of quota administration costs on imports and fill-rates. Figure I.2 (which reproduces Figure I.1 with an additional excess demand (ED_1*) below illustrates the effects of administration costs on imports and prices. Assuming that one can quantify the administration costs, one can calculate the tariff equivalent of that cost. Since quota administration costs affect the in-quota tariff rate, it can be augmented so that ED_1* represents excess demand with the "effective" in-quota tariff that includes the tariff equivalent of the administration costs. As in Figure I.1, maximum and

Figure I.2. **Quota under-fill with administrative costs**



Source: OECD Secretariat.

minimum imports are determined by the intersection of the relevant tariff-induced excess demand with excess supply. Note that compared to the no quota administration cost case, (Figure I.1) the point of maximum imports is less, (at M^1) while the minimum domestic price is higher (P_d^{*MIN}) and maximum world price is lower (P_w^{*MAX}). The introductions of quota administrative inefficiencies, therefore, lead to an expanded T1 zone and a contracted QUOTA zone (compared to Figure I.1). Note further that the level of minimum total imports and maximum domestic price is not affected because if the effective in-quota tariff is higher than the out-of-quota rate, imports will take place at the out-of-quota rate.

As illustrated in Figure I.2, quota administration costs affect both import volume and prices. The fundamental propositions discussed above, however, have not changed. The relevant regime depends on where the quota is relative to Min and M^1 (the new Max imports). Quotas to the left of Min total imports are not affected by the inclusion of administrative costs. In such cases, the relevant regime is still T2, the fill rate is 100%, and total imports are greater than the quota. Similarly, quotas to the right of the original Max imports are in the T1 regime characterised by under-fill. When the quota is greater than Min imports but less than M^1 the relevant regime is the QUOTA and the fill-rate is 100%. Quota administration costs in this case dissipates quota rents. The situation where quota administration costs affect the volume of imports is the case when the quota is between M^1 and Max imports. When the quota is less than Max total imports but greater than M^1 the quota is in the T1 regime. In this case, the data from the WTO would indicate that the TRQ is under-filled when in fact it would have been in the QUOTA regime were it not for administration costs. Note further that in this case, the domestic price is not the world price and the in-quota rate (t_1) but the world price and the "effective" in-quota tariff (t^*). This is the situation that is legitimate cause for concern as administration costs lead to lower imports, higher domestic prices and lower world prices.

The effects discussed above regarding liberalising the various instruments are unaltered. When the quota is in the QUOTA regime, expanding the quota will increase imports and lower domestic prices up to the point where the regime switches, at the new maximum total imports (M^1). The point of regime switch to T1 occurs at lower import volume compared to the no-administrative cost case. When the quota is binding, lowering the in-quota rate or administration costs do not change imports, rather these lead to an increase in quota rents. Furthermore, when the quota is binding, lowering out-of-quota tariffs does not increase imports unless the out-of-quota rate is lowered sufficiently such that it is less than t^*

the tariff-equivalent of administration costs. In the presence of quota administration inefficiencies, smaller reductions in the out-of-quota tariffs are needed before they become the binding instrument.

Results from Figure I.2 are exactly the same as those from Figure I.1 when the quota is in the T2 regime. When the quota is in the T1 regime, the results are also similar to those discussed previously with one exception. Due to administrative costs, a reduction in t_2 (out-of-quota rate) can result in more imports even as it is greater than t_1 (in-quota rate), so long as t_2 is lower than t^* (effective in-quota rate). This case leads to the result that the binding instrument is the out-of-quota rate and there is under-fill. When the quota is in the T1 regime, quota expansion, unless accompanied by reductions in administrative costs leading to a reduction in the effective in-quota rate, will not result in additional imports. As in Figure I.1, when the quota is in the T1 regime, reducing the in-quota rate leads to an expansion in imports, regardless whether administration costs are also reduced (assuming these are not increased to compensate for the tariff reduction). If administration costs are also reduced when in-quota rates are lowered, import expansion can be greater than only in-quota rate reduction; in both cases, there can be a regime switch and the quota can become the binding instrument.

Incorporating quota administration cost in the analytical framework illustrates one of the weakness of the TRQ system compared to a tariff only regime (assuming tariffs are not prohibitive), namely the potential that these costs present non-tariff barriers that hinder trade. How relevant and by how much quota administration costs bias trade is an empirical question that is beyond the scope of this analysis. Since many TRQs are in the T1 zone however, it is a legitimate concern as to how many quotas are to the right of Max imports (where the in-quota tariff rate is binding), relative to the number of quotas between M^1 and Max imports (where administrative costs are binding). The complexity and data requirements are such that they have yet to be tackled by other researchers. Undoubtedly, the answer depends on individual country and commodity situations.

WTO data on quota administration methods provide information on how many TRQs are administered by the various methods and this information provides an indication of potential number of quotas where administration costs may be a concern. The WTO has derived ten principal categories of quota administration based on country notifications.[4] The principal administration method for most quotas is applied tariffs. This administration method is described by the WTO as basically a tariff-only regime at the in-quota rate or below. Imports are not allocated and an unlimited quantity can enter the country. Basically, these TRQs are not enforced, although countries retain the right to impose out-of-quota rates if they wish without fear of reprisals from trading partners. The WTO data indicate that the share of this administration method has gradually fallen from 52% in 1995 to 47% in 1999, but with 643 quotas in 1999, it is by far the most prevalent administration method. The second most frequently used administration method is license on demand, averaging about 25% of all quotas. In 1999, there were 337 quotas administered by this method, while first-come, first-serve is the third most frequently used method, with 11% or 147 quotas in 1999. Auctions, an administration tool popular with economists but which are not often used, represent about 4% of the quotas. Other factors that can influence administration costs are additional conditions that countries impose in conjunction with the principal administration methods. WTO data for 1999 indicate that 18 WTO members imposed such conditions, affecting 273, or about 20%, of all quotas. The most prevalent additional condition, affecting 119 quotas in 1999, is limits on TRQ shares per allocation.

The WTO also reports average fill rates for the various administration methods, but does not evaluate them nor does the WTO attempt to estimate costs associated with the various administration methods. One can safely assume, however, that there are no administration costs for those quotas administered as applied tariffs. This implies that almost half of the TRQs can be represented by Figure I.1. Of the TRQs that are enforced, Skully has analysed their economic implications. He concludes that auctions are the best administrative method, while first-come first-served and license-on-demand present a moderate risk to biased trade. His conclusion can be interpreted to imply that the implied administration costs of these methods is less severe than other methods. In terms of

Figure I.2, his results suggest that for the vast majority of the quotas, the "effective" in-quota tariff rate may be closer to t_1 than to t_2. This does not mean that administration costs are not a concern and do not bias trade for certain commodities in certain countries. However, since the three administration methods along with applied tariffs represent about 87% of all quotas, it seems that administration cost as a sole explanation for low fill rates may be problematic. The WTO reached a similar conclusion in a recent publication (WTO 2001). They state that quota administration methods have only a limited influence on the fill rates. They further conclude that since additional conditions represent only about 20% of the TRQs, they play a limited role in determining fill rates.

TRQs and fill rates

In order to make the analytical framework of Figure I.2 more concrete, information is needed on the in-quota and out-of-quota tariff rates, on excess demand and supply schedules, and on where the quota is relative to the Min and Max imports. When applied to specific commodities and countries, these provide information on which part of the TRQ system is the relevant regime and which instrument is more likely to result in an increase in market access.

Countries scheduled their TRQs based on the Harmonised Commodity Description and Coding System (HSC), but their schedules are not uniform. Some countries scheduled their TRQs at a very disaggregate level while the schedule of other countries is based on rather aggregate definitions. For example, the 40 TRQs scheduled by the US require 180 tariff lines, the 87 TRQs in EU's schedule include 366 lines, while Japan's 20 TRQs comprise 188 lines. However, Hungary's 75 TRQs consist of 86 lines while only 4 lines are used to describe New Zealand's 3 TRQs. The specification of a country's TRQ schedule compared to the specification of its MFN binding schedule, its trade data, and applied tariff rate schedule, determines the degree of concordance between them and the ability to match trade and tariff data for the calculations discussed below.

Countries with TRQ commitments are required to notify the WTO each year the scheduled TRQs for that year and actual in-quota imports. A brief overview of the TRQs scheduled by OECD countries presenting information based on their individual TRQs, as scheduled and notified to the WTO is presented. Similar information is then presented for selected OECD countries focusing on those that are endogenous in Aglink, while aggregating the TRQs to the products reported in the *Agricultural Outlook*.

The scheduled TRQs and notifications are used to calculate the average fill-rates, defined as the ratio of the imports notified under the TRQ to the reported TRQ volume. Simple average fill-rates are presented, along with the proportion of notified TRQs in different fill-rate ranges. By providing an overview of how the system has been implemented, this will give context to the analysis. Fill rates are also useful, albeit imperfect, indicators of progress in enlarging market access and have been widely cited. Fill rates (among other information) can also help to locate the quota relative to the two end-points (Min and Max imports) in Figure I.1. Data for this section are derived from the Agricultural Market Access Database (AMAD) and are obtained from countries' schedules and notifications submitted to the WTO.

TRQs *and fill rates for* OECD *Countries*

All OECD countries, except Turkey, scheduled TRQs. As indicated in Box I.1, OECD countries scheduled 833 TRQs (61% of all TRQs) and the countries included in the table account for 915 of the total. It can be ascertained from the table that some countries have not notified all of their TRQs. The table reports the number of TRQs that have been notified (as of May 2001), the number of TRQs with fill rate equal to or greater than 100%, and the average fill rate based on those notifications.

Although derived from the same data and computed in the same way, (that is, the ratio of the notified imports under the TRQ regime to the reported quota volume) the average fill rates calculated here are different from those reported by the WTO [G/AG/NG/S/7 and G/AG/NG/S/8] and the Secretariat's report "*The Uruguay Round Agreement on Agriculture: An Evaluation of its Implementation in* OECD *countries*" whose calculations truncate the fill rate distribution at 100%. The WTO does this to assure consistency between countries as some report imports only up to the quota level while others report all their in-quota imports. The calculations above do not ignore any of the notified information because the interest here is in total notified trade for a particular product and in preserving all relevant information, especially how countries implement the system and under which regime. As shown in Figure I.1, a quota with 100% fill rate may be in the quota or in the out-of-quota regime (depending on volume of total imports). If a country voluntarily expands the quota leading to more than 100% fill, the binding instrument may in fact be the in-quota tariff, a very different regime with different implications about quota rents and domestic prices. Truncating the fill rate at 100% may provide misleading information on the relevant regime, giving an upward bias to the number of quotas in the QUOTA or T2 regime, as shown by the data below. Based on the information from the WTO, one may be tempted to give undue weight to quota expansion when in fact quotas may not be the binding instrument.

Data in Box I.1 indicate that some TRQs have fill rates of over 100% while others are close to zero. Fill rates for individual TRQs (when countries notify all imports) provide information that is helpful in determining the relevant regime for the empirical analysis. Although the average fill rate for some OECD countries is well above 100%, as indicated in Box I.1, undue attention should not be given to this average fill rate as it is biased because in the calculation equal weight is given to all TRQs irrespective of volume or value.

Another indicator of developments in market access is the distribution of fill rates among different fill rate ranges. This provides information on the number of TRQs with particular fill rate and is not unduly influenced by the relatively high fill rates of a few TRQs. Figure I.3 shows the distribution of fill rates across various fill rate ranges. Fill rates exceeding 100%, formed the largest share of notified quotas (until 1999) – about 28% during the 5-year period. These data illustrate why truncating the fill rate at 100% may provide misleading information on the relevant regime, giving an upward bias to the number of quotas in the QUOTA or T_2 regime. Additionally, about 10% of the notified quotas have fill rates equal to 100%. However, as some countries do not report to the WTO, imports above the quota, it is not clear for how many of these the quota is the binding instrument. The number of TRQs with 100% fill rate reported by the WTO can be seen in Box I.1. By truncating the fill rates at 100%, the WTO combine what are the first two columns in each year, in Figure I.3, into one category. This can provide misleading information on the relevant regime. If the WTO fill rates are used to assess the relevant regime, it would be tempting to conclude that on average, about 38% of the TRQs could be in the QUOTA regime whereas the data in Figure I.3 indicate a smaller share. Based on the fill rate information from the WTO it may be tempting to give undue weight to quota expansion when in fact quotas may not be the binding instrument.

Interestingly, Figure I.3 suggests a bimodal distribution, as a relatively large number of quotas (about 25%) fall within the very low fill-rate range (less than 20%). Furthermore, whereas the share of quotas exceeding 100% decreased slightly during the 5-year period, the share of quotas in the less than 20% fill rate range has increased over the 5-year period and in 1999 this range contained more quotas than the others. The data suggest that a large number of quotas are severely under filled – 37% of the notified quotas in 1999 had a fill rate less than 40%. In terms of Figure I.1, the data suggest that a large number of TRQs are in the T1 regime, *i.e.* the quota is to the right of maximum total imports and will be under filled. On average, data notified to the WTO indicate that combining the quotas that are essentially not enforced, (those with fill rates exceeding 100%) with those that are severely under filled, that is with fill rates less than 40%, represent 60% of all quotas. For the majority of the TRQs, therefore, expanding quotas without also reducing tariffs, can not be expected to materially improve market access opportunities.

Box I.1. **Number of TRQs and average fill rates for OECD and other selected countries**

	Total TRQs	Number of notified TRQs					Number of 100% and over fill rate					Average fill rate (per cent)					Total average fill rate
		1995	1996	1997	1998	1999	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999	
Autralia	2	2	2	2	2	2	1	1	1	1	1	117	112	103	99	103	107
Canada	21	21	21	21	21	n.a.	10	9	12	15	n.a.	82	98	91	118	n.a.	97
Switzerland	28	28	26	28	28	n.a.	18	16	15	15	n.a.	338	413	364	420	n.a.	384
Czech Republic	24	24	24	24	24	24	5	7	4	5	8	50	55	60	69	46	56
European Union	87	54	83	82	83	82	18	31	35	32	35	75	71	72	69	70	71
Hungary	75	66	67	67	67	65	18	1	4	8	6	55	51	43	43	41	47
Japan	20	18	18	18	18	18	5	4	3	2	3	78	77	74	69	71	74
Korea	67	67	67	67	64	n.a.	36	31	34	30	n.a.	117	128	126	141	n.a.	128
Poland	109	17	22	28	28	32	6	4	3	1	3	45	45	39	31	30	38
Iceland	90	88	87	87	86	86	42	44	50	45	48	791	985	1 641	2 502	1 608	1 505
Mexico	11	1	1	1	1	1	1	1	1	1	1	112	131	143	122	132	128
Norway	232	221	221	221	221	220	114	98	96	100	104	372	823	275	616	485	514
New Zealand	3	3	3	3	3	3	1	1	0	0	1	69	50	34	27	82	53
Slovak Republic	24	24	24	24	24	24	3	5	2	3	4	77	47	46	43	n.a.	53
United States	40	26	38	39	39	39	0	3	4	4	4	51	62	60	62	69	61
TOTAL OECD	**833**	**660**	**704**	**712**	**709**	**596**	**278**	**256**	**264**	**262**	**218**	..	..	..	..	..	..
Indonesia	2	2	2	2	2	2	2	2	2	2	2	2 256	857	446	4 186	2 320	2013
Latvia	4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Malaysia	19	19	18	n.a.	n.a.	n.a.	3	9	n.a.	n.a.	n.a.	57	162	..	n.a.	n.a.	110
Philippines	14	14	14	14	14	n.a.	6	6	1	5	n.a.	265	57	44	50	n.a.	104
Slovenia	20	20	20	20	15	20	1	0	0	0	0	51	18	8	n.a.	n.a.	26
Thailand	23	14	23	23	23	n.a.	8	8	8	7	n.a.	349	318	513	n.a.	n.a.	393

n.a. Not available.

Source: WTO and AMAD (AMAD is a co-operative effort among Agriculture and Agri-food Canada, EU Commission – Agriculture Director-General, FAO, OECD, The World Bank, UNCTAD and the United States Department of Agriculture (Economic Research Service).

Notes to Box I.1

WTO and AMAD. AMAD is a co-operative effort among Agriculture and Agri-food Canada, EU Commission-Agriculture Director-General, FAO, OECD, The World Bank, UNCTAD, and the United States Department of Agriculture-Economic Research Service. AMAD includes data on bound tariff volumes, scheduled in-quota, out-of-quota and MFN tariff rates, applied MFN tariff rates, notified imports under the TRQ, TRQ country allocations, import volumes and values, supply and utilisation data, world reference prices, import unit values and primary product equivalent factors. The participating agencies, under the co-ordination of the OECD Secretariat, have agreed to continue maintenance and an annual update of the database. AMAD is available free of charge on *www.amad.org*

The reader is cautioned that the above data must be interpreted carefully for several reasons:

i) Notification procedures are not uniform across countries. Some countries only report imports up to the TRQ level, while others report all imports subject to the in-quota tariff rate. While this discrepancy is not a problem when there is quota under-fill, it does otherwise under-estimate market access. On the other hand, some countries like the EU notify imports based on licenses granted rather than on actual imports. This reporting method could over-estimate market access if importers do not fully utilise their licenses. This may not be a problem, however, because importers are required to place a deposit for each import license they request. Thus, the EU collaborators to the AMAD co-ordinating committee believe that the difference between imports and licenses issued is nil. However, attempts to reconcile notifications with trade data are filled with difficulties. For example, the EU trade data are difficult to decipher because the same trade codes appear in several TRQs.

ii) Average fill rate is a biased indicator of progress in market access. The above fill rates give equal weight to all TRQs, irrespective of trade volume. A fill rate calculated on a scheduled TRQ of 1 ton has the same weight as a fill rate based on 1 000 000 tons. Thus, a few large fill rates can dominate the results. However, weighting schemes are problematic because the units differ within and among countries, even within the same TRQ and the diversity of products that comprise any TRQ makes it difficult to weight them by value. The average fill rates are also misleading because some are equal to zero and others are equal to more than 100%.

iii) The URAA did not mandate that each quota be filled. In fact, a low quota fill rate does not necessarily imply inefficiency. For example, there may be insufficient demand or the in-quota tariff may be binding. A fill-rate of 100% or more does not necessarily imply efficiency. Filled quotas may occur even if suppliers are high cost importing firms or export countries/firms, or state-trading enterprises may have fulfilled WTO commitments but have imported low quality product or destroyed imports. Either way, inefficiencies in the administration of quotas can be associated with 100% fill rates.

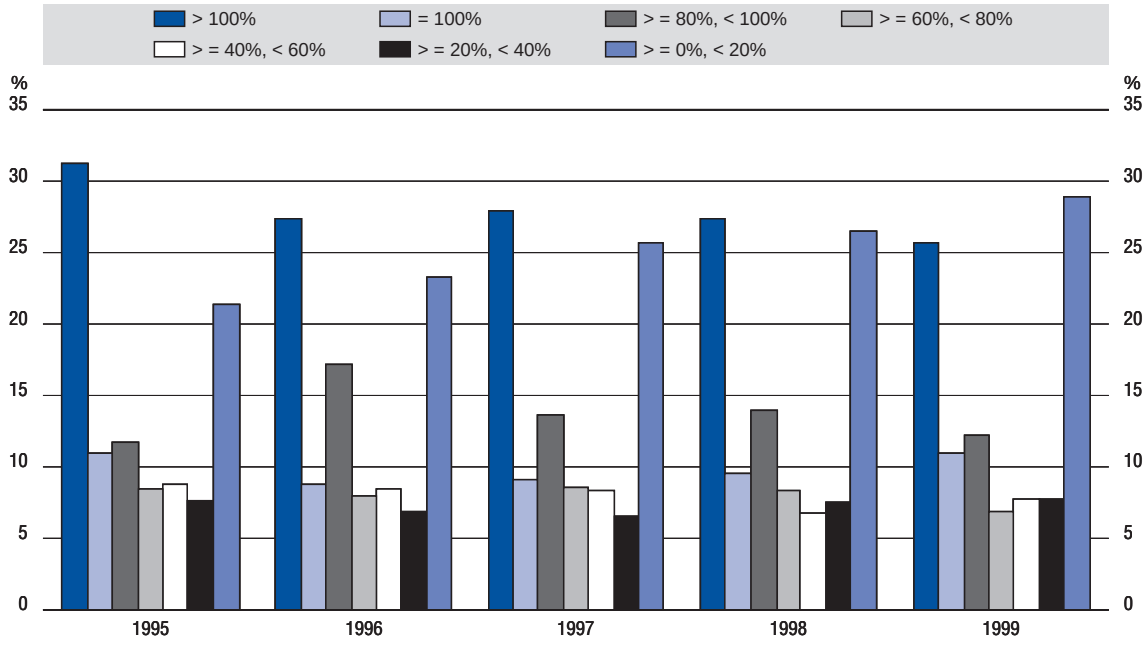
iv) Independent of export quotas or non-tradability of licenses, the method of allocation of the import license itself can have a direct impact on the quota fill rate and hence on economic efficiency. An important indicator of administrative inefficiency is when there is a fill rate of less than 100% and the existence of out-of-quota imports. Situations like this beg the question of whether imports will increase with an increase in the level of the quota. In other words, the issue is whether the fill-rate is proportionate to the quota, or in-quota imports are limited, independent of the quota level. This becomes an important issue when determining the effectiveness of alternative trade liberalisation scenarios.

TRQs *and fill rates for Aglink commodities and countries*

In shifting the analysis to more aggregate product levels found in Aglink, the Harmonised Commodity Description and Coding System (HSC) from the TRQ schedules need to be mapped to these more aggregate levels. This has necessarily included a certain amount of arbitrariness that is described in Box I.2. The OECD countries covered by this report scheduled 785 TRQs. However, after mapping and aggregating[5] as described in Box I.2, only 169 remain in our sample. So, how much does the picture for average fill rates change when we focus only on this set of countries and TRQs?

Shifting the focus to commodities reveals some interesting results. Of the countries and TRQs in the sample, oilseeds and their products are the least protected, in the sense that few countries include

Figure I.3. **Per cent of fill rates by fill-rate categories (1995-1999)**



Source: OECD calculations based on the AMAD database.

them in their TRQ schedule. In fact, of the 169 TRQs, there are only 3 for oilseed meals (OM), and only 7 for oilseeds (OS) 2 each for sunflower seed and rapeseed and 3 for soybeans, and 3 for vegetable oils (VL). Figure I.4 shows the average fill rate for products covered in Aglink.

The average fill rate for coarse grains, with an average fill rate over the five year period 346% is the highest, followed by sugar with an average fill rate of about 101%. Sheep meat, with an average fill rate of 60% is the lowest. When the three non-Aglink countries are excluded from the calculations, the average fill rate for some products changes significantly. For example, the average fill rate for coarse grains drops to 76% and wheat, with an average fill rate of 62%, has the lowest fill. Whether calculations are performed for all TRQs or for the sample here (as shown in Figures I.3 and I.4), most TRQs have an average fill rate which is less than 100%. An interesting topic for future investigation as more information becomes available, is what factors are underlying the different fill-rates. Are the low rates a function of low demand, quota administration method, or due to some other or a combination of factors?

Another potential indicator of developments in the TRQ system – and the relative importance of quotas in trade – is the ratio of total imports for a given product relative to the total quota scheduled for that product by the countries in this sample. Although quotas are operational for individual countries and may or may not be binding in a specific country, this does give an indication on a larger scale (*i.e.* within the commodity and country scope of Aglink)[6] of the extent to which quotas may be limiting trade. Because of data limitations and to reduce bias by using one year, we use average 1996-1998 data for total imports of a given commodity relative to its total scheduled quota. Since none of the countries in this sample scheduled quotas for oil meal products, all of the trade takes place outside the quota system. Imports of oilseeds are 29 times greater and vegetable oils 66 times greater than their respective scheduled quotas. A similar, though less dramatic, pattern is evident in trade for other products (Table I.1). Among cereals, imports of coarse grains (CG) are almost three times greater than scheduled quotas, wheat (WT) more than 2 times and rice almost 3.5 times larger than their quotas. Among livestock products, pigmeat (PK) imports are 11 times greater than the quota while beef imports

Box I.2. Aggregating quotas and tariffs into Aglink commodities

Although useful, calculations based on individual TRQs are not very meaningful for empirical analysis in models that are commodity based. In shifting the analysis to more aggregate, product level, a concordance table mapping the HSC codes from the TRQ schedules to commodities modelled in Aglink is needed. This has necessarily included a certain amount of arbitrariness as described below.

In many cases, individual TRQs were scheduled for a basket of commodities along the processing chain, not all of which may be included in the model's definition of the product. For example, Korea's schedule includes a TRQ which we attribute to Aglink's definition of rice (RI) (205 228 tons in 2004). The definition of this TRQ includes the following products: rice in the husk (paddy or rough), rice (hulled), milled or semi-milled, broken, flour, groats and meals, pellets rolled or flaked grains mixes and dough for the preparation of baker's wares, other food preparations, spanning four different headings at the 4-digit level. Imports of any one of these products (or combination of them) satisfy Korea's requirements for this TRQ.

Countries sometimes scheduled more than one TRQ for what is recognised only as a single product in the model. This was intended to differentiate in one of three ways: either between different items within the product group; between minimum and current access commitments; or among different end uses of the imported product. For example, the US scheduled a TRQ for blue cheese, a TRQ for cheddar cheese, etc. – in fact, a total of 9 different TRQs for different cheese (CH) varieties. The EU scheduled two TRQs for butter (BT) to distinguish between current and minimum access requirements and 8 TRQs for beef and veal (BF) to distinguish among different types of beef as well as between minimum and current access. Japan, on the other hand, scheduled two TRQs for skim milk powder (SMP) to distinguish between SMP imported for the school lunch program from that imported for other purposes.

In all these examples, the TRQs from the schedule are aggregated to fit the product description in Aglink – *i.e.* several TRQs are aggregated into one TRQ. There are instances, however, where the TRQ basket includes a variety of different products. Here we disaggregate one TRQ into a variety of products in Aglink. For example, Japan scheduled a TRQ defined as "*Designated dairy products for general use*" because this encompasses three different Aglink products: BT, whey powder (WYP), and SMP. In these situations, trade data from AMAD was consulted to allocate the TRQ among the Aglink products.

Commodity and country coverage for tariff profiles and commodity-based fill rates

The commodities included in this report are:

Cereals: *wheat* (WT); *coarse grains* (CG) (*barley, maize, oats, rye, sorghum, other cereals*), *rice* (RI), *sugar* (SU).

Oilseeds (OS); (*soybeans, rapeseed, sunflower seed*); Oilmeals (OM); (*soymeal, rapeseed meal, sunflower seed meal*); Vegetable Oils (VL); (*soy oil, rape oil, sun oil, palm oil*).

Meats: *beef and veal* (BF), *pigmeat* (PK), *poultry* (PT), *sheepmeat* (SH).

Dairy: *butter* (BT), *casein* (CA), *cheese* (CH), *milk*, (MK), *skim milk powder* (SMP), *whole milk powder* (WMP), *whey powder* (WYP), *eggs* (EG).

The countries included in this report are:

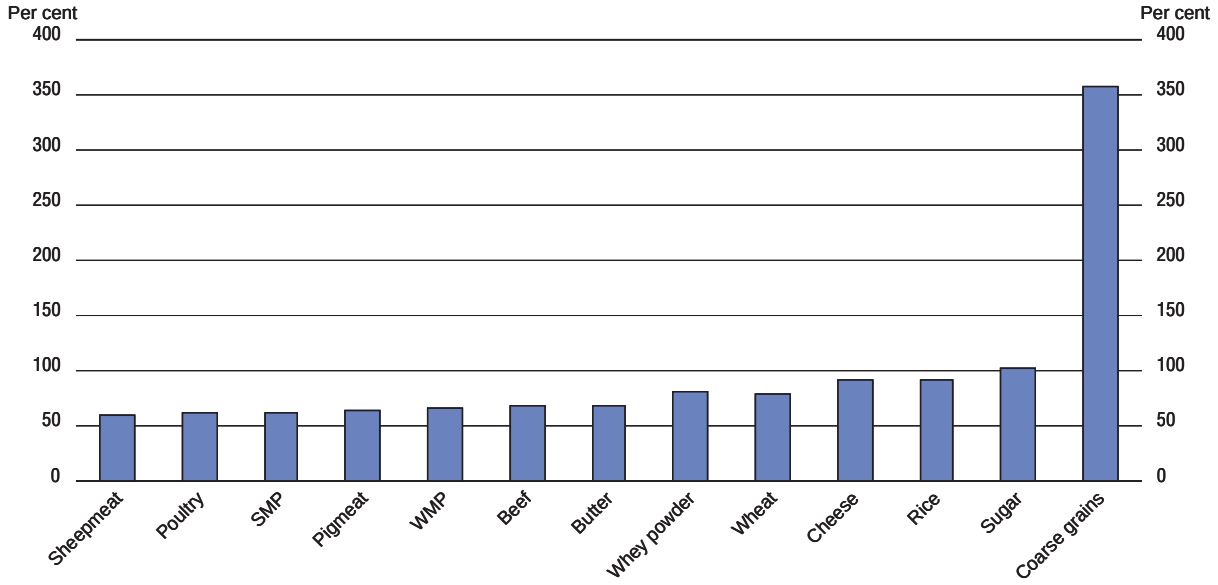
Endogenous Aglink countries – Argentina, Australia, Canada, the European Union, Hungary, Japan, Korea, Mexico, New Zealand, Poland, the United States of America – and 3 selected OECD Member countries – Iceland, Norway, Switzerland.

There are 3 152 tariff lines used to calculate the tariff information for the country and commodity combination reported in this study (Table I.5).

are almost double the quota. Commodities where the quota represents a relatively large share of trade include WMP, where trade is about 50% of quota, and sheepmeat (SH) at 93%.

Data in Box I.1 and Figure I.3 suggest that in many cases focusing on increasing the quota may not have significant payoffs in liberalising trade. The majority of the TRQs in OECD countries are currently not being filled. Hence, further increases in quotas may not increase market access without also lowering in-quota tariffs and/or changing quota administration methods. On the other hand, many TRQs (about 27% of those notified 1995-99) did not restrict trade to the quota level, and over quota imports either took place at in-quota tariffs or countries did not apply out-of-quota rates, implicitly expanding

Figure I.4. **Average fill rates (1995-1999)**



Source: OECD calculations based on the AMAD database.

Table I.1. **Tariff quotas, fill rates and imports of selected commodities**
Average 1996-1998

	Quotas tonnes	Fill rate %	Imports tonnes
Beef	1 199 112	71	2 057 651
Butter	108 011	79	151 450
Cheese	221 314	78	616 309
Coarse grain	13 497 160	81	38 434 332
Pigmeat	93 101	74	1 029 655
Poultry	154 384	87	782 011
Rice	830 765	95	2 762 168
Sheepmeat	284 677	92	265 228
Skim milk powder	225 469	70	276 012
Wheat	7 188 573	62	17 819 118
Whey powder	132 523	74	151 369
Whole milk powder	133 712	65	67 487
Sugar	2 973 490	116	9 060 967

Source: OECD calculations based on the AMAD database.

the TRQ to allow greater imports at the in-quota rate. Either by fiat or through administrative method, some TRQs were administered as if they were a tariff only regime as imports exceeded the TRQ but at the lower in-quota rate. Further expansion of these TRQs may not necessarily expand trade.

The data in Box I.1 also suggest that governments are rather innovative in their use of the TRQ system. An analogy with a drawbridge may be appropriate. Governments use the TRQs as they would a drawbridge over a moat. The drawbridge is down allowing imports at the low in-quota tariff until the TRQ is filled. At that point, the drawbridge is raised; additional imports can only enter by jumping a very high wall (the out-of-quota tariff). However, some governments, for some TRQs, when its convenient for domestic purposes, allow the drawbridge to remain open and imports above the TRQ level enter at the

in-quota rate. The TRQ system enables governments to accomplish this without dismantling their armour and ability to then raise the bridge and limit imports by imposing the higher out-of-quota rates subsequently as desired. Since the TRQs do not represent minimum imports, countries can use them to protect their industries as they wish, expanding them when it is politically convenient.

Most countries that scheduled TRQs, scheduled global quotas; that is, the quota is open to everyone. However, some countries allocated some or all of their quotas to specific countries. Empirical analysis of the allocated quotas may require a different modelling framework from the globally allocated ones. According to Elbehri *et al*, of the 1 371 quotas that were scheduled, about 200 are allocated to specific countries. Table I.2 shows the allocated quotas for the commodities and countries in our sample, the number of countries with rights to those quotas and the per cent of the total quota in the year 2000 that is allocated. As is evident, the number of allocated quotas in our sample is small, and of those that are allocated most contain a global component. As governments revisit the TRQ regime, in addition to examining the out-of-quota tariff rate levels and quota volumes, they may wish to also examine whether allocated quotas should continue. These may prevent new entrants from entering markets and more efficient producers from expanding their share. Skully in his analysis concludes that historical allocation is the quota administration method most likely to be discriminatory. There is also evidence that some quotas may have been allocated to high cost producers creating further inefficiencies in the system (DeGorter and Sheldon).

Table I.2. **Allocated quotas in 2000 for Aglink products**

	Commodity	Number of countries[1] allocated to	Per cent of quota allocated
Argentina	n.a.		
Australia	Cheese	0	0.0
Canada	Beef	2	84.5
	Butter	1	61.1
	Cheese	1	66.0
EU 15	Beef	5	55.3
	Butter	1	88.5
	Cheese	3	21.5
	Sheepmeat	15	99.6
	Sugar	2	93.9
Hungary[2]	Barley	1	27.5
	Beef	2	32.4
	Maize	1	1.0
	Milk	1	0.6
	Pigmeat	1	32.2
	Poultry meat	3	52.0
	Rice	1	32.8
	Rape and mustard oil	2	35.5
	Rye	2	38.4
	Soybean oil	1	46.7
Japan	No country specific quotas		
Korea	No country specific quotas		
Mexico	Barley	2	74.7
	Cheese	1	74.4
	Maize	2	100.0
	Poultry meat	1	97.5
	Skim milk powder	1	33.3
	Wheat	1	55.2
New Zealand	No country specific quotas		
Poland	No country specific quotas		
United States	Beef and veal	3	90.1
	Cheese	20	98.3
	Milk	1	84.8

n.a. not applicable.
1. The EU 15 is considered as one country.
2. 2000 data are assumed equal to 1995 data.
Source: OECD Secretariat.

Tariffs

Analysing and understanding the effects of the TRQ system also needs information on tariffs that have resulted following the Agreement. This information is useful for describing the level of protection following the Agreement and helps, in terms of Figure I.1 to determine the rotation of the excess demand curves. In this section we provide information on the general average tariff level for the countries and commodities in our sample to offer an overview of the average protection level among the countries and between products.[7] We also examine differences, if any, between the scheduled rates and applied rates to see for which countries and commodities the distinction is important.

How are average tariffs calculated?

A few words on how the average rates reported here were calculated is necessary so that the reader can put these in perspective with results presented elsewhere. Countries scheduled and bound their tariff rates using the HSC system with some countries using a rather broad product definition (HSC 4 digit level), while other countries used a very detail product description level (HSC 8 or 10 digit level). Meaningful comparisons of relative tariff levels between commodities and among countries, usually necessitate aggregation of the HSC lines.

For our purposes, the level of aggregation is the country and commodity level, but only those commodities included in Aglink. A large number of tariff lines in a schedule implies very specific product definitions. For example, the EU's tariff schedule for the Aglink commodities listed in Box I.2 contains 679 lines. On the other hand, Poland, by scheduling its tariffs on a more broadly based definition (mostly at the 4-digit level) only use 59 lines to describe their tariff schedule for the same set of commodities. In general, the schedules of the Quad is more detailed (contains more tariff lines) than the schedule of the other countries in the sample. The concordance table discussed in Box I.2 was used to map the HSC codes into Aglink products. The average tariff rates calculated here therefore do not include all agricultural commodities.

A decision is then required as to whether, and how, to aggregate the tariff lines into a meaningful average. Unfortunately, there is no consensus on a weighting scheme as each has its merits and weaknesses. Some advocate using trade as weights since this would indicate the relative importance of each traded product. But, this method probably underestimates the calculated average tariff since high tariffs with relatively little trade get small weights. Production or consumption weights have also been proposed but usually detailed data are not available. Most studies therefore revert to calculating a simple unweighted average based on each tariff line. The weakness of this approach is that each product, regardless of how valuable it is, gets the same weight. Advocates state that because no tariff lines are excluded, it better represents the true marginal cost of imports, especially when aggregating among fairly similar categories. For the calculations in this report, we use a simple unweighted average, which is the same approach adopted by the Secretariat in an earlier analysis and Gibson *et al.* in their recent report. Another reason for using the simple average method is that this is the method specified by the URAA for calculating the tariff reductions stipulated by the Agreement. For illustrative purposes we also present trade weighted average tariffs for those years with trade data in AMAD.

Calculating ad valorem equivalent

The agricultural tariff schedule of many countries includes specific tariff rates. The tariff schedules for the countries and commodities included in our sample for example, contain 3 152 tariff lines, of which 1 449 or 46% include a specific tariff. Specific rates are predominantly used for TRQ products although Switzerland's schedule is all in terms of specific rates. In any implementation year, 43% of all in-quota tariff lines have a specific component while 66% of the out-of-quota tariffs contain a specific element. In contrast 33% of the non-quota tariff lines contain a specific component.

The presence of specific tariffs makes it difficult to compare protection levels between countries and commodities. To compare relative rates of protection across sectors and countries, specific rates need to be converted to their *ad valorem* equivalent (AVE) by dividing the specific rate by a relevant

price.[8] For this step too, there is no consensus on the appropriate price to use. Given the prevalence of specific tariffs however, it is not prudent to ignore them, as this would imply a different type of arbitrariness. Since a relatively high proportion of the tariff lines in our sample are specific rates, however, the calculated average rates will be influenced by the price (and if necessary exchange rate) used to convert to AVE. The recent USDA publication uses a three-year average of world unit values (1995-97) and applies them to the specific bound rates at the end of the implementation period (in either 2000 or 2004 depending whether a country is developed or developing) to compute AVE. The Secretariat, in its earlier study, used 1996 import unit values calculated from each country's import data to convert specific rates in the year 2000 to AVE. data problems precluded the conversion of many specific rates to AVE and they were dropped from the calculations leading the author to conclude: "Thus, the analysis underestimates the remaining degree of tariff protection in the agricultural sector". (OECD, 1999, p. 13), pointing out the problem of ignoring specific rates.

Two different sources were used to convert specific to AVE. We primarily rely on world prices (and exchange rates) from Aglink[9] as these are available to the year 2000, the last year of our calculations. The results reported in the tables and graphs are based on these prices. We also report a few calculations based on world unit values where these are available in AMAD (1995-97) to illustrate the degree to which the choice affects the calculations.

We should also say that the reported calculations do not include mark-ups or other fees countries may impose. As in the case of the other two studies mentioned above, preferential tariffs are excluded (due to data limitations). As mentioned above, a total of 172 regional trade agreements were in force as of July 2000, with the largest concentration in the Euro-Mediterranean region. Information on tariff rates and on commodity and country coverage of these agreements is not readily available and these rates are not included in AMAD. Exclusion of preferential tariffs from the calculations below may overstate the overall calculated average tariff for certain countries with extensive preferential and free trade agreements, but their exclusion does not alter the calculated average MFN rates, the rates that are negotiated at the WTO.

Average tariffs for Aglink countries are high

The protection level that emerges from these calculations is very high. The calculated average tariff (in-quota, out-of-quota, and non-quota) for the countries and commodities in the sample was 114% in 1995, falling to 97% in 2000 (Table I.3). The average, although still quite high, is lower for the countries that are endogenous in Aglink, with an average in 2000 of about 64%. This is based on calculations using Aglink world prices to convert specific tariffs to *ad valorem* equivalents. The average is slightly lower when the calculations are based on world unit values. In 1995, the average tariff based on this calculation was 111%, falling to 79% in 1997 (67% falling to 58% for the endogenous Aglink countries over the same time span). Some countries are more affected by the choice of the price used to convert to AVE than others. For example, for the EU, the average tariff in 1997 with specific rates converted using world unit values is 59% compared to 79% when Aglink prices are used, Japan's is 136% compared to 160%, and Switzerland's is 148% compared to 196%. For Hungary, the choice is irrelevant since its schedule does not contain specific rates. The results imply that, on average, world unit values are slightly higher than prices in Aglink.

The URAA stipulated that developed countries should reduce their simple, unweighted average tariff 36% by the end of the implementation period (2000). Interestingly the results indicate that for the selected commodities and countries in Table I.3, average reduction rates varied. New Zealand's tariffs fell the most during this time with an average tariff rate in 2000 some 42% below 1995 level. Average tariff rates also fell significantly in the EU (37% below 1995 levels) and Hungary (30%) and Iceland where average tariff rate in 2000 is some 26% below the 1995 level. Overall, the average tariff for the countries and commodities in this report fell during the implementation period with the average tariff in 2000 some 15% below the 1995 level.

Table I.3 shows that in 2000, Norway had the highest average tariff rate while Australia, whose average tariff rate was about 5% of the overall average, had the lowest. Among the Quad, the US has the

Table I.3. **Average and standard deviation of tariffs for commodities in Aglink in selected countries**

	1995		1996		1997		199		1999		2000	
	Average	std	Average	std	Average	std	Average	std	Average	std	Average	std
Argentina	33.62	5.18	33.62	5.18	33.62	5.18	33.62	5.18	33.62	5.18	33.62	5.18
Australia	5.36	11.43	5.49	11.88	5.18	11.49	4.92	11.19	4.84	11.48	4.45	10.66
Canada	74.38	115.46	72.45	112.68	72.33	112.38	69.65	108.35	67.58	105.54	65.61	103.07
European Union	95.30	119.72	88.20	109.45	74.96	83.02	72.75	75.90	75.73	78.20	60.20	60.38
Hungary	50.43	29.92	47.45	27.77	44.46	25.67	41.47	23.66	38.48	21.74	35.50	19.94
Japan	188.02	324.01	173.75	294.55	160.07	269.84	158.72	257.17	189.19	312.18	190.96	317.91
Korea	70.87	148.25	70.43	147.82	69.34	145.99	68.26	144.06	67.66	143.07	66.82	141.54
Mexico	79.34	70.41	78.51	69.72	77.67	69.03	76.84	68.35	76.01	67.66	75.17	66.99
New Zealand	9.01	10.21	8.26	9.41	7.51	8.65	6.76	7.95	6.01	7.32	5.26	6.78
Poland	83.72	76.60	81.58	75.59	76.61	69.19	75.94	72.70	76.46	72.73	66.10	58.46
United States	26.15	35.93	25.97	36.12	26.63	37.32	28.90	42.74	29.68	44.25	28.41	42.23
Average for Aglink endogenous countries[1]	76.37	144.31	72.06	133.25	66.44	120.19	65.35	115.46	68.93	131.32	63.65	129.59
Iceland	202.30	239.53	186.09	209.38	175.36	198.90	173.78	222.84	165.86	224.32	149.63	194.64
Norway	288.55	218.72	277.03	201.27	268.87	196.27	269.59	202.38	260.07	196.11	240.39	169.11
Switzerland	218.62	279.82	230.68	275.91	195.91	249.23	220.30	262.49	218.66	252.77	218.25	256.62
Average all above[2]	114.07	189.21	109.81	178.10	100.77	163.23	102.24	167.27	103.56	172.74	96.96	166.76

1. Average tariff is calculated as an unweighted average of each tariff line, *i.e.* EQUAT where t_i = tariff for HSC line i and n = total number of tariff lines.
2. Commodities included in this average are listed in Box I.2.

Source: OECD calculation based on 3 152 tariff lines from the AMAD database.

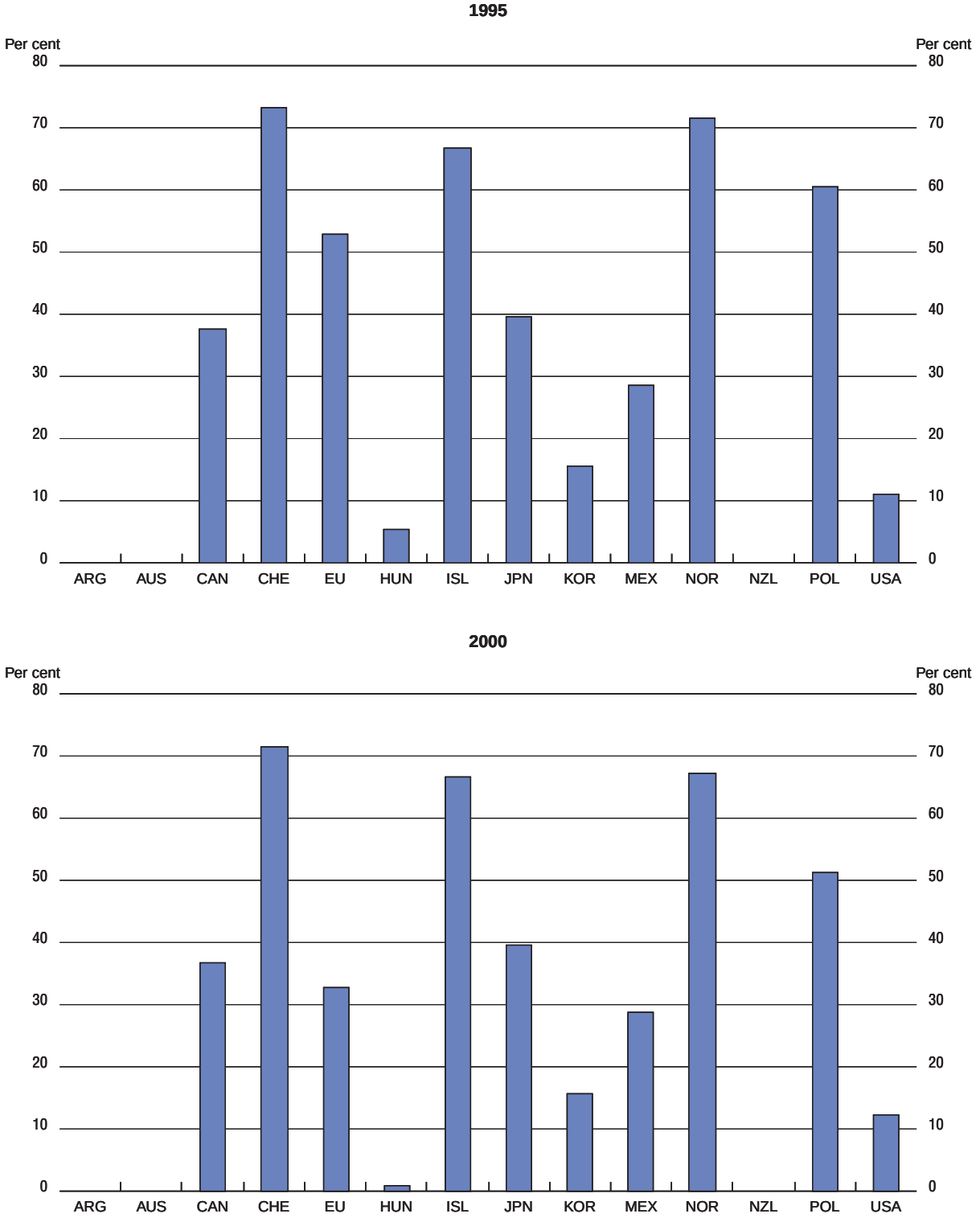
lowest although, as shown in the table, the average US tariff at the end of the implementation period was greater than at the start. This was probably due to the presence of specific tariffs in a context of declining world prices.

Although not directly comparable, the results reported here are different from those reported by Gibson *et al.* and the OECD 1999 study. While we focus on the commodities in Aglink and selected countries, Parts II and III report results for all agricultural products and a larger set of countries. For most countries, they find average tariffs that are lower than those reported here. This suggests that the countries covered in Part III tend to protect the Aglink commodities relatively more than the other agricultural products and the results reported here should not be extrapolated to other agricultural products. For example, the USDA reports an average tariff rate for Japan of 58% whereas the 1999 OECD study reports an average of 12%. Another difference with our study is the conversion of specific to AVE. Similar differences as indicated for Japan can be found for other countries whose tariff schedule contains a large number of specific tariffs such as Canada, the EU and the US.

Tariffs are very disperse

Another interesting result is the level of dispersion in average tariffs. Calculations of the standard deviation of the tariffs indicate that its value is almost double the mean, regardless of the price used to convert specific tariffs into AVE. Such high standard deviations are indicative of tariff schedules in which there are large differences in tariff rates of various items. Another way to view the dispersion of the tariff structures is to compare the mean to the median (the rate that splits the tariff distribution in half, that is, half of the tariffs are below this level and half are above). Calculations of the mean and median tariff rate (excluding in-quota rates) for the Quad in the year 2000 illustrates the difference between the two. The biggest difference is Japan for which the median tariff rate is 25% compared to an average rate of 244%, while for Canada the median rate is 11% compared to an average rate of 91%. The US schedule is also fairly dispersed with a median tariff rate of 10% compared to an average of 35%, while the EU's schedule has the smallest difference between mean and median rates (76% compared to 78%).

Figure I.5. **Percentage of mega-tariffs by country**



Source: OECD calculations based on 3 152 tariff lines from the AMAD database.

Fewer but still significant number of mega-tariffs

Another indication of the prevalence of large tariffs is suggested by the percentage of each country's tariff lines, (excluding in-quota rates), that are mega-tariffs or tariff peaks. There is not an accepted definition of what is a tariff peak or a mega-tariff. The 1999 OECD study defined international tariff peaks as rates greater than 15%. Given the much higher average tariffs calculated in this study, this definition would include most of the tariff lines. For this study we define mega-tariffs as those rates equal to or exceeding 100% (as does the Gibson *et al.* study). The share of each country's tariff lines that are mega-tariffs is shown in Figure I.5. The top panel shows the share in 1995 and the bottom the share in 2000. Mega-tariffs are not a problem in three countries – Argentina, Australia, and New Zealand, whose schedules do not include any tariffs above 100%. In 1995, more than 70% of the tariff lines in three countries – Iceland, Norway and Switzerland – were mega-tariffs. Furthermore, even with the tariff reductions prescribed in the URAA, more than 60% of their tariff lines remained mega-tariffs. As shown in the graph, the tariff reductions prescribed in the Agreement have not led to significant reductions in the share of mega-tariffs for most countries. The exception is the EU's schedule where the share of mega-tariffs fell from 53% to 33% and Hungary's schedule where the share of mega-tariffs fell to 1% from 5%.

Trade-weighted average tariffs much lower for most countries

To examine the effects on the calculated average tariff rates when trade is used to weight the tariffs, we computed the trade-weighted average tariff rates for the countries and commodities in our sample for 1995 to 1997. Due to differences in the trade and tariff schedules for many countries, a single approach was not possible. For Canada, Japan, and US, the trade and tariff schedules were such that a one to one concordance between trade and tariffs was possible along with the identification of in-, out-of- and no-quota products. The EU schedule also allows a one to one concordance between the tariff and trade schedules. For the EU, it is not possible to identify trade at the in- and out-of-quota tariff rates, hence we calculate a simple average of the in and out-of-quota rates prior to weighting. Additional difficulties appeared in applying the trade-weighting scheme for other countries. In most cases, a one to one concordance between trade and tariff information is not possible, even within the schedule of an individual country. Therefore, we either had to first aggregate the trade data or the tariff data before weighting. For example, some trade data for some countries are more aggregated than tariff schedules. In these cases, we first compute a simple average of the tariff lines to get an average rate at the same HSC code level as the trade data in order to use trade as a weight. This was the case in Korea for example. This procedure pointed out a problem with this approach in cases where quotas are in place. We had to compute a simple average of the in and out-of-quota tariff rates prior to weighting by trade. As will be described below, this led to some unexpected results for Korea. In other cases, however, the opposite occurred: countries trade data were more disaggregated than a country's tariff schedule. In such cases, the trade data was aggregated to the same HSC code level as the tariff information and then the tariff was weighted by trade. The potential for counter-intuitive results is reduced since the tariff lines receive the appropriate weight.

As mentioned above, using trade to weight tariffs is expected to lead to lower average tariff levels as high tariffs receive little or no weight. The results shown in Table I.4 indicate that weighting tariffs by trade does lead to lower average tariffs (for most countries). The difference between the results in Table I.3 and Table I.4 is significant. The largest difference is found in Canada and the US where the trade weighted average tariff rate is almost 90% lower than the simple average.

The extent that using trade to weight tariffs eliminates many high tariffs is also illustrated in Table I.4. The calculated standard deviation for each country is substantially lower from that reported in Table I.3. The relatively small dispersion in the trade-weighted average rate suggests that trade occurs among a narrow set of tariff lines that have about the same tariff level.

A problem with using trade weights when trade data is more aggregated than the tariff schedule and there is a TRQ system in place, is illustrated by the results for Korea which indicate that the trade-weighted average rate is greater than the simple average rate. This counter-intuitive result stems from the trade and tariff data for two TRQ products, maize and soybeans. These two products represent

Table I.4. **Average and standard deviation of trade weighted tariffs for countries and commodities in Aglink**

	1995		1996		1997	
	Average	std	Average	std	Average	std
Argentina	31.75	1.51	–	–	31.51	2.00
Australia	6.79	0.48	7.82	0.63	7.57	0.59
Canada	9.34	0.46	8.71	0.41	7.60	0.34
European Union	38.74	0.84	37.00	0.61	31.43	0.47
Hungary	20.74	1.54	17.78	1.03	20.33	1.22
Iceland	117.57	7.66	–	–	104.27	5.53
Japan	88.8	4.0	76.1	2.9	73.4	2.4
Korea	120.61	10.22	118.80	9.89	119.65	9.79
Mexico	60.84	2.96	70.28	3.91	58.93	2.03
New Zealand	3.76	0.15	3.39	0.15	3.98	0.18
Norway	215.53	10.33	224.49	11.85	179.21	10.47
Poland	67.34	4.26	65.18	4.48	60.56	3.94
Switzerland	180.66	4.23	145.58	3.60	119.22	2.92
USA	3.42	0.05	3.67	0.06	3.59	0.06
Korea[1]	19.67	0.69	20.41	0.73	16.74	0.57

1. Value following adjustments described in the text.
Source: OECD calculation based on AMAD database.

about 42% of Korea's import bill (of products in our sample). The trade data is at the 6-digit level whereas the tariff data for these products is at the 8-digit level and it is not possible to distinguish between the in- and out-of-quota lines. In order to use trade to weight the tariffs, it was necessary to aggregate the tariffs to the 6-digit level using a simple average. This meant averaging in and out-of-quota rates, which are very different and led to the results reported in Table I.4. But, we know from the TRQ schedule and notification information that the quota for these two products is very large and there are substantial over-quota imports (that is, fill-rates greater than 100% and almost equal to the volume reported in the trade data). This suggests that the trade is occurring at in-quota rates. When this is taken into account and the trade weights are applied to the in-quota rates for these two products, the trade-weighted average tariff for Korea drops from around 120% reported in the table to 17% in 1997.

Average tariff by in- out-of- and non-quota

The results reported in Tables I.3 and I.4 mask the fact that there are different types of tariffs, *i.e.* in-quota, out-of-quota, and non-quota tariffs. Out of almost 3 200 tariff lines used for this report, more that half are for TRQ products (25% are in-quota rates and 32% are out-of-quota rates). Figure I.6 illustrates the evolution of the tariff rates for the selected countries and commodities during the implementation period. The average in-quota tariff rate has changed very little over this time period as few countries scheduled reductions in these rates whereas the non-quota and out-of-quota rates fell with the out-of-quota rate, at 184%, some 18% below the 1995 rate. It can be seen in this graph that average in-quota tariff rates are substantially lower than the out-of-quota rates and lower than the average tariff on products outside the TRQ regime. With an average more than 50%, in-quota tariff rates are not trivial. Rather, they represent a significant hurdle, which may be one of the reasons for the relatively low fill rates discussed above. Average tariff on non-quota products is also substantial, averaging 58% at the end of the period. The tariff on potential imports outside the quota is extremely high, averaging 184% at the end of the implementation period.

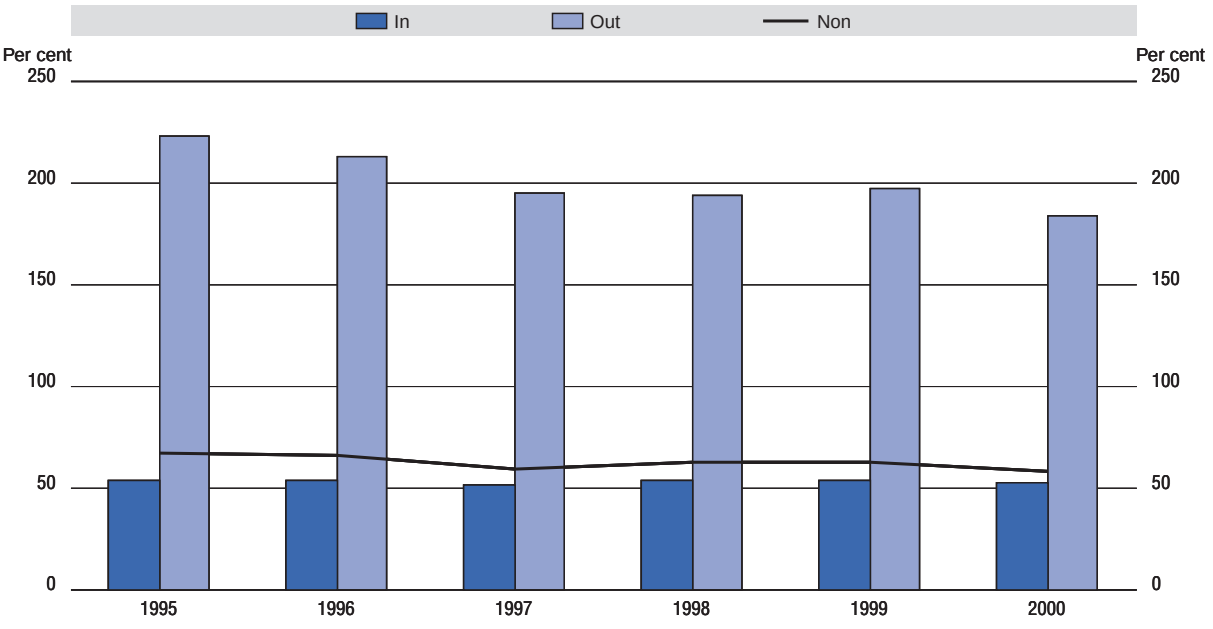
Average tariff rates are lower when the focus is on the countries that are endogenous in Aglink. For those countries, the average in-quota tariff rate, although still relatively high at 20% at the end of the period, is substantially lower than the rate reported above. Similarly, the average non-quota tariff rate for the countries that are endogenous in Aglink is 25% while the out-of-quota average tariff rate is 132%.

Table I.5. **Average[1] tariff rates for countries and commodities in Aglink**

	Average tariff				Number of lines			
	All[2]	In-quota	Out-of-quota	Non-quota	Total	In-quota	Out-of-quota	Non-quota
	Percentage				Number			
Argentina	33.62	n.a.	n.a.	33.62	138	n.a.	n.a.	138
Australia	4.45	3.46	43.93	2.73	98	5	4	89
Canada	65.61	2.64	201.52	3.67	213	61	67	85
European Union	60.20	23.99	97.33	59.44	679	227	226	226
Hungary	35.50	19.84	43.86	20.63	149	19	96	34
Japan	190.96	18.83	657.79	58.01	245	58	58	129
Korea	66.82	18.78	203.35	25.34	186	45	45	96
Mexico	75.17	46.15	184.06	40.57	168	39	39	90
New Zealand	5.26	n.a.	n.a.	5.26	107	n.a.	n.a.	107
Poland	66.10	30.05	105.53	6.13	79	36	39	4
United States	28.41	10.56	90.82	10.16	329	84	74	171
Average for Aglink endogenous countries[1]	63.65	20.40	162.35	30.18	2 391	574	648	1 169
Iceland	149.63	58.92	189.76	247.08	250	85	146	19
Norway	240.39	245.65	234.69	244.11	203	66	90	47
Switzerland	218.25	128.82	255.13	232.15	308	69	124	115
Average all above[2]	96.96	52.67	184.18	57.89	3 152	794	1 008	1 350

n.a. not applicable.
1. For a definition of average tariff, see Table I.3.
2. Commodities included in this average are listed in Box I.2.
Source: OECD calculation based on the AMAD.

Figure I.6. **Average[1] tariff for Aglink commodities and selected countries**



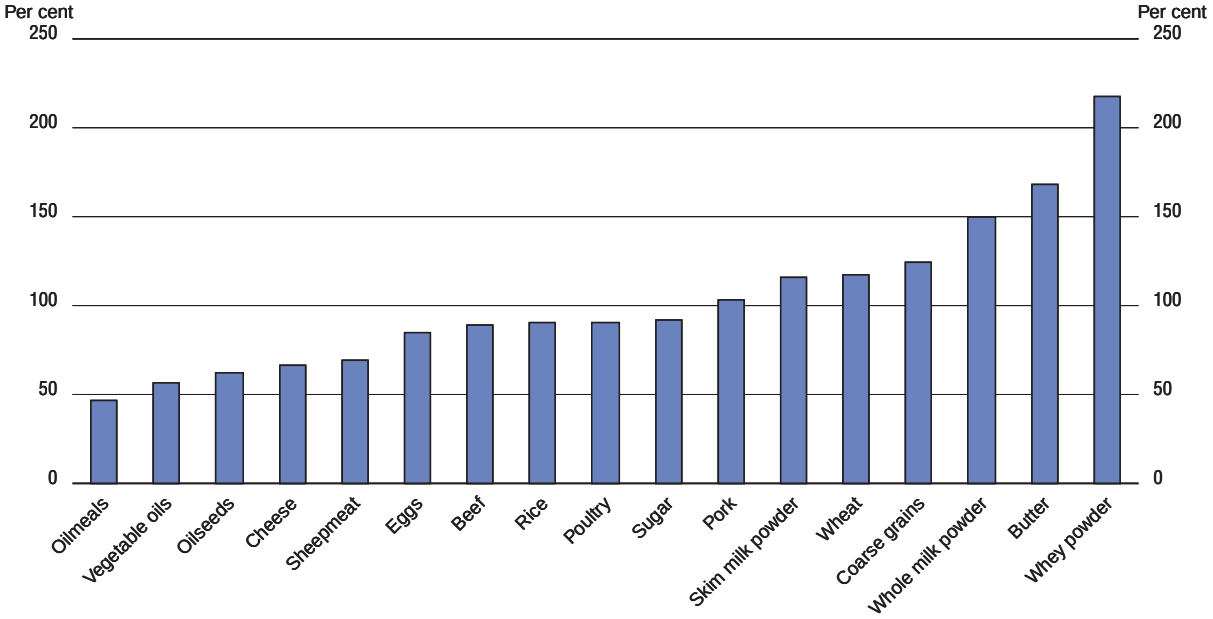
1. For a definition of average tariff, see Table I.3.
Source: OECD calculations based on 3 152 tariff lines from the AMAD database.

Similar information for the year 2000, broken out by country, is reported in Table I.5. This table also contains information on the total number of tariff lines included for each country and their distribution by the different tariff-types. This latter information is an indication of the degree of specificity in each country's tariff schedule as these lines represent the tariff structure for the same set of commodities for each country (Box I.2). As indicated in the information in this table, the tariff structure for these countries is very different and they protect these products differently as shown by the fact that different countries have the highest average rate, depending upon which type of tariff is examined. The three non-Aglink countries for example have the highest average in-quota rates, and these rates are higher than average out-of-quota rates of several countries. Among countries in Aglink, Mexico has the highest average in-quota rate for 39 TRQ lines, Japan has the highest average out-of-quota rate while the EU has the highest average non-quota rate. It is also evident in this table that the protection given to quota products is very high as illustrated by the fact that the average out-of-quota rate is more than 200% in five countries. As shown by the data in this table and Figure I.6, the gap between the in-quota and out-of quota tariffs is tremendous, greatly reducing the possibility of out-of-quota imports.

Dairy products among most protected

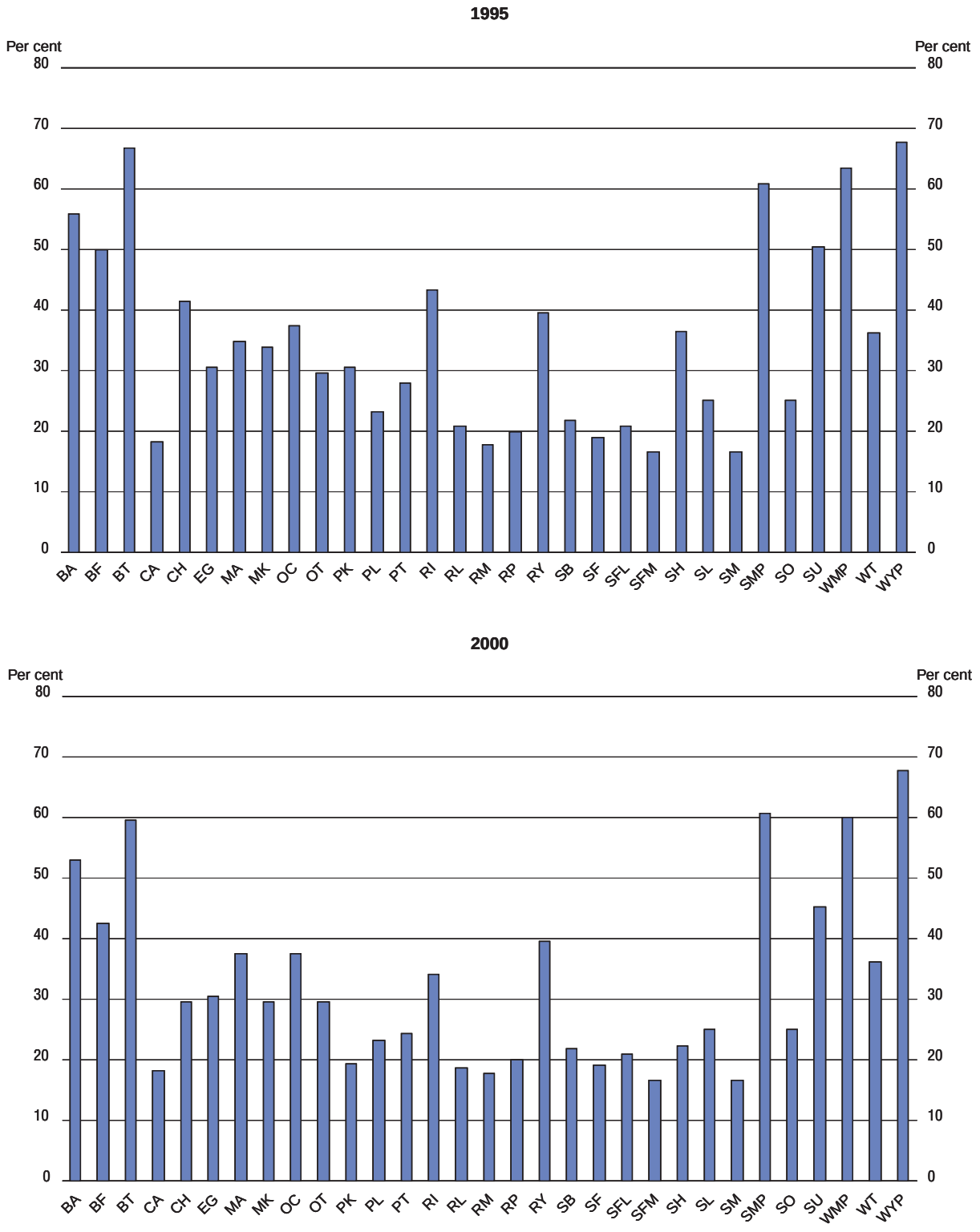
When this same information is looked at from a commodity rather than from a country angle, what jumps out is the relatively large diversity in the protection provided to the various commodities (Figure I.7). Countries in this sample appear to provide the highest tariffs and thus the largest protection, to the dairy products. Other highly protected commodities, with average tariff rates exceeding 100% include wheat, coarse grains, and pork. The average tariff for whey powder at 217% is the highest among the sampled products, followed by butter at 167% and whole milk powder at 150%. In contrast, oilseeds and their products appear to receive the least protection from tariffs. Average tariffs for these products, however, are still very high. Tariff rates on oilmeals, with an average of 47%, are the lowest, followed by vegetable oils. The relatively low tariff rates for oilseeds and their products are consistent with the data from the TRQs. These show that these products receive very little protection as only a few countries scheduled only a handful of TRQs.

Figure I.7. **Average[1] tariffs in 2000**



1. For a definition of average tariff, see Table I.3.
Source: OECD calculation based on the AMAD.

Figure I.8. **Percentage of mega-tariffs[1] by agricultural commodity**



1. Mega-tariff is defined as those tariffs equal or greater to 100%.
Source: OECD calculation based on the AMAD.

The results illustrated in Figure I.7 change somewhat when the non-Aglink countries are excluded from the sample, further illustrating that different levels of protection are provided to different agricultural commodities by the various countries. However, dairy products continue to be the most protected. The average tariff rate on whey powder (218%) is the highest, followed by whole milk powder (150%) and butter (146%). For the Aglink countries, sugar (110%) and rice (95%) replace coarse grains and wheat as commodities with the next highest average rates. At the other end of the spectrum, oilseed products remain as the least protected. The average tariff rate on oilmeals remains the lowest but at 11% rather than the 50% reported above.

Although not reported, the dispersion of the tariffs around the mean measured by the standard deviation is very high illustrating the high dispersion in tariff levels charged by various countries on a given commodity. The share of tariff lines that are mega-tariffs is another illustration of the relatively high dispersion of the tariffs of the various commodities. This also illustrates the relatively high protection rates given to dairy, sugar, and rice. As shown in Figure I.8, the "rice-pudding" products contain a high proportion of very high tariffs, dominated by dairy products. More than 60% of the tariff lines for whey powder, whole milk powder, skim milk powder and butter were mega-tariffs in 1995. Even though the proportion of mega-tariffs for most products declined during the 1995-2000 period as scheduled reductions were phased in, many tariffs were so large that a significant share of mega-tariffs remained. More than 60% of the tariffs for skim milk powder, whole milk powder and whey powder, and 59% of butter tariffs are equal to or greater than 100% in 2000.

Relative ranking of tariffs across commodities differs somewhat when the calculated average tariff distinguishes between "in", "out-of" and "non-quota" tariffs. This is presented in Table I.6. Whereas average tariffs are highest on most dairy products, average in-quota rates, other than on whole milk powder, are not dissimilar from most other products. The highest in-quota tariff rates are on coarse grains with an average of 100%. Most dairy products on the other hand, jump out with the highest out-of-quota tariffs, all (except cheese) being above the average of all products. Whey powder is in a league by itself, with an average out of quota tariff at 546% while butter is 370%. Table I.6 also shows that on average, the difference between in-quota and out-of-quota rates is 132%, with the largest gap (508%) for whey powder and the smallest (89%) for cheese. Again, when the three non-Aglink countries are excluded, the picture changes considerably. Average in-quota tariff rates on coarse grains fall to 16% and those on wheat fall to 13%, for example.

Table I.6. **Average tariff in 2000 by in-out and non-quota products**

Per cent

	In-quota	Out-of-quota	Non-quota
Coarse grains	100.0	217.8	76.1
Wheat	73.2	184.4	83.6
Rice	15.0	197.5	53.7
Sugar	15.8	126.7	110.7
Beef	36.3	166.9	54.2
Pig meat	55.5	180.2	69.0
Poultry	39.0	171.7	49.2
Sheep	30.9	153.3	13.7
Butter	48.3	369.5	50.4
Cheese	31.8	121.1	26.2
Skim milk powder	48.1	191.6	92.2
Whole milk powder	79.5	260.7	112.0
Whey powder	37.8	545.7	129.0
All*	**52.67**	**184.18**	**57.89**

* For a definition of average tariff, see Table I.3.
Source: OECD calculations based on the AMAD.

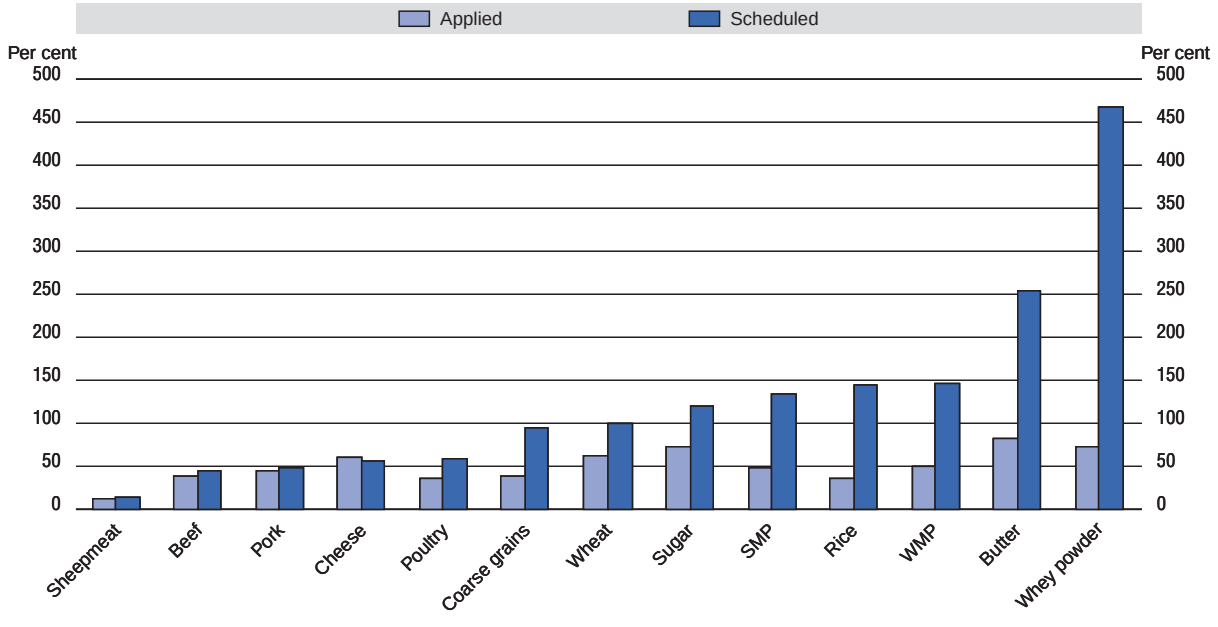
Applied rates are also substantial

The tariff profile for the selected countries and commodities described above focused on the MFN rates found in each country's schedule (excluding mark-ups or other fees). These rates may overstate the extent of protection provided, as these rates do not include tariff rates from any preferential agreements countries may have, such as between NAFTA, the European Agreements, nor the Generalised System of Preferences some developed countries have with developing countries. The rates above might also overstate the protection level offered by the various countries, some of which apply rates different to those reported in their MFN schedules. So, what do the applied MFN rates look like and how different are they from the scheduled MFN rates? Using data for 1997, this is explored in Figure I.9.

Figure I.9 is based on applied tariff data from only some of the Aglink endogenous countries in our sample as AMAD only contain information for some of the countries in some of the years. For example, data for Korea and Poland are not available for 1997. In addition, applied rates for Canada, the EU (except for grains as a result of the Blair House Agreement) and the US are not included as these countries do not apply tariffs different from their schedule. Japan is the only Quad country with applied tariff rates that are significantly different from her MFN bound rates. Interestingly, some countries define their applied tariff schedule at a more detailed level than their MFN schedule and this can affect the calculated average tariff rate. For example, Hungary's applied tariff schedule contains 397 lines whereas her MFN bindings schedule for the same set of commodities contains 145 lines.

Figure I.9 reveals that the average applied rate for the products in Aglink is substantial, albeit less than scheduled rates. For all commodities, the average applied rate in 1997 based on 1 040 tariff lines was 41% compared to scheduled average tariff (excluding in-quota rates) based on 1 819 lines of 80%. Examining individual commodities, the average applied rate on butter, at 81% is the highest followed

Figure I.9. **Applied and scheduled tariffs for selected commodities: 1997**



Notes: Data for Iceland, Korea, Norway, Poland, Switzerland, and the United States are not included.
Data for the European Union are included only for wheat and coarse grains.
Source: OECD calculations based on the AMAD database.

by the 72% average applied rate on whey powder. The largest difference between applied and scheduled rates is in dairy particularly butter and whey powder, and rice. Interestingly, the data reveal that the applied rate on wheat is substantial, at 63% the fourth highest of all commodities just behind the 71% average applied rate on sugar. The lowest applied rate is on sheep meat with an average of around 13% followed by rice with an average applied rate of almost 36%.

Looking at the average applied rate for individual countries, New Zealand, with an average applied rate of around 2% in 1997 has the lowest rates, followed by Australia with an average rate of 4.5%. The biggest absolute difference between schedule rates and applied rates is found in Japan where the average applied rate is 68% compared to an average MFN bound rate of 198%.

These data suggest that for some countries and for most commodities, there are significant differences between scheduled and applied rates. Lower applied rates, when these determine domestic prices, imply greater access. They also increase uncertainty as these can be increased without penalties from trading partners. As with not enforced TRQs, countries retain these in their policy arsenal possibly for future use as domestic conditions warrant.

Generalised system of preferences

As stated above, many countries provide additional import concessions through bilateral and regional trade agreements. For the Quad countries, UNCTAD's TRAINS dataset was consulted to provide information on the various agreements. Annex Table I.A.1 provides a list of many of these preferential agreements for the Quad, excluding the EU's recent Everything but Arms (EBA) initiative. For the commodities included in this study, EBA stipulates tariff-free and quota free access for 48 least developed countries for all commodities except rice and sugar. These two commodities will be gradually liberalised starting in 2006. In the meantime, duty free access is provided within an expanding quota. As indicated in Annex Table I.A.1, the Quad countries, other than Japan, have many preferential agreements involving different countries making comparisons difficult. These four countries have two preferential tariff schemes in common, they each provide preferential tariffs to developing countries and Transition Economies, under the Generalised System of Preferences (GSP) and to the least developed countries (GSP-LDC). As a first glance, we limit the analysis to six agricultural products; beef, butter, cheese, skim milk powder, rice, and wheat[10] as these are products with relatively high average MFN rates.

More detailed discussion of the GSP schemes for these countries is provided in Annex I.A. The table below illustrates that for these six selected commodities, the GSP scheme does not provide significant reductions compared to the MFN rates. The table shows the MFN rate (these are from TRAINS rather than AMAD database in order to be consistent with the GSP rates found in the same database), along with the tariff rates for the broad GSP schemes and the tariff rates for the GSP_LDC. Canada only provides a discount on its in-quota tariff rate on butter to LDC, the other rates for the other commodities are the same as the MFN rates.[11] The EU provided discounts to LDC on beef, non-quota rice, and non-quota wheat; Japan does not provide discounts on any of the selected commodities, while the US provides discounts on its in- and non-quota rates but does not discount its out-of-quota rates (except for cheese). The reader is reminded however that Japan, unlike the other Quad countries, generally applies tariffs below MFN rates.

The bottom line that emerges when examining tariffs resulting from the Agreement is that the average on agricultural products in this sample remains very high and their dispersion is also very high. In terms of Figure I.1, we find that the rotation of excess demand due to the in-quota and out-of-quota rates is very substantial. We also found that many of the quotas are in the T1 zone, characterised by under fill. Preferential tariffs, if included in the calculations, could lead to lower average rates for some countries with preferential agreements. These are not included because of data limitations. Furthermore, since preferential tariffs are only available to selected countries or commodities, it is not clear that they represent the marginal cost of imports. The brief examination of the GSP scheme indicates that for the selected commodities, preferences to developing countries depend on the country granting the preference and on the commodity.

Table I.7. **Effects on selected commodities of various preferential agreements (2000)**
Average calculated *ad valorem* in per cent

Commodity	Inover	Canada			European Union			Japan			United States		
		MFN	GSP	LDC	MFN	GSP	LDC	MFN	GSP	LDC	MFN	GSP	LDC
Beef	i	0	0	0	34	34	**32**	n.a.	n.a.	n.a.	5	**4**	**0**
	o	27	27	27	135	135	**131**	n.a.	n.a.	n.a.	26	26	26
	n	n.a.	n.a.	n.a.	128	128	**124**	50	50	50	5	**4**	**0**
Butter	i	7	7	**2**	66	66	66	35	35	35	9	9	**0**
	o	302	302	302	143	143	**122**	690	690	690	117	117	117
	n	n.a.	n.a.	n.a.	34	**32**	**23**	n.a.	n.a.	n.a.	26	26	**19**
Cheese	i	1	1	1	45	45	45	n.a.	n.a.	n.a.	12	12	**1**
	o	246	246	246	96	96	96	n.a.	n.a.	n.a.	84	84	**83**
	n	n.a.	n.a.	n.a.	55	55	55	31	31	31	19	19	**9**
Rice	i	n.a.	n.a.	n.a.	16	16	16	5	5	5	n.a.	n.a.	n.a.
	o	n.a.	n.a.	n.a.	136	136	136	1 291	1 291	1 291	n.a.	n.a.	n.a.
	n	0	0	0	77	77	**77**	n.a.	n.a.	n.a.	5	**4**	**0**
SMP	i	2	2	2	35	35	35	24	24	24	2	2	**0**
	o	202	202	202	88	88	88	287	287	287	60	60	60
	n	n.a.	n.a.	n.a.	101	101	101	n.a.	n.a.	n.a.	2	2	**0**
Wheat	i	2	2	2	0	0	0	10	10	10	n.a.	n.a.	n.a.
	o	72	72	72	6	6	6	574	574	574	n.a.	n.a.	n.a.
	n	n.a.	n.a.	n.a.	58	58	**51**	n.a.	n.a.	n.a.	4	4	**0**

n.a. Not applicable; i = in-quota; o = out of quota; n = non-quota.
Source: OECD calculations from the UNCTAD TRAINS data base.

Empirical implementation

A major challenge to empirical analysis of TRQs is the non-linearities and kinks introduced by the simultaneous presence of two different tariff levels and a quota in any market. Market and policy changes can result in regime switches in which different instruments are binding at any time. The computational problems have been such that empirical analyses with endogenous regime switches are scant. Below, we describe modelling modifications to Aglink that enabled us to provide results and demonstrate endogenous regime switches.

The Secretariat's Aglink model is used to implement the stylised analytical model presented above. Aglink, as most other models, either ignored the presence of TRQs or assumed that imports are equal to the TRQ level. This section describes the modelling framework and the data, along with the modifications that were necessary for our purposes. The result is a baseline which is called TRQBASE to distinguish it with the baseline as reported in "OECD *Agricultural Outlook* 2000-200", referred to as BASELINE. Our point of departure is a comparison of the results in the TRQBASE with the BASELINE. This provides an indication of how the changes we have introduced alter the baseline results. Consequently, we tried to minimise the changes introduced into Aglink, focusing on import and price linkage specifications, in order to maintain as much of the original model as possible so that comparisons with the BASELINE as reported in the *Outlook* would be valid. Scenarios are of course compared to the TRQBASE. Input data on tariffs and TRQs needed for the empirical analysis are computed from AMAD.

Aglink model

The stylised model is based on several assumptions that have important implications in the empirical application. These assumptions can be distinguished between those dealing with the

modelling aspects from those dealing with data aspects. Below we describe the modifications that were adopted to deal with each aspect of these assumptions.

Modelling aspects

The agricultural products modelled in Aglink are mostly temperate-zone products. These include livestock products, (beef, pig meat, poultry, eggs), dairy (butter, cheese, skim milk powder, whole milk powder, casein) cereals (wheat, rice) coarse grains (barley, maize, oats, sorghum, rye other cereals), oilseeds and their products (soybeans, rapeseed, sunflower seed).

The most thoroughly modelled countries or regions are: Argentina, Australia, Canada, China, the EU, Hungary, Japan, Korea, Mexico, New Zealand, Poland, the United States, and a Rest-of-World region. Additional countries are included to satisfy special needs. For example, for the beef market, additional countries are: Brazil, Chile, Uruguay, and Paraguay, to represent the Atlantic beef market, while China Hong Kong, Chinese Taipei and Singapore are added to the Pacific beef market. For rice, additional countries include Indonesia, India, and Thailand.

Although the Aglink model contains over 1 500 equations, not all commodities listed above are endogenous in all the modelled countries/regions. This implies that even in cases where domestic policies are not a barrier, domestic prices are not always linked to world prices. Thus, it was not always possible to model the TRQ system for all countries/regions in Aglink. Furthermore, in Aglink the beef and pig meat markets are modelled as segmented markets. Thus the beef market is segmented into the Atlantic and Pacific markets. Each segmented market is modelled as perfectly competitive and homogeneous, but there is no scope for trade between the two markets. The elasticity of substitution between them is zero. The South American countries listed above participate in the Atlantic market, while the other countries participate in the Pacific market. The EU is assumed to participate only in the Atlantic market, but only about a third of EU beef trade has an impact on the market-clearing price for this market. The other two-thirds of the EU's beef trade (exports and imports), along with beef trade from/to Poland and Hungary, play no role in either world beef markets.

The pig meat market is also segmented into an Oceania market of Australia and New Zealand, and a Pacific market for everyone else. Again, only a certain share of pig meat exports from the EU play a role in the Pacific market, while pig meat trade from/to Poland and Hungary are not a part of either markets. Thus it is not possible with the current Aglink framework to model the beef and pig meat TRQs scheduled by Hungary and Poland.

The stylised model represented in Figure I.1 is based on the assumption that the country is a net importer, that products are homogeneous, that markets are perfectly competitive, that the law of one price prevails, and that the price transmission between the world and domestic price is perfect. Implicitly it is assumed that domestic policies are not in place to prevent the full transmission of the world price to the domestic market. The only border measures are the tariffs and the TRQs that in turn determine the domestic price.

The Aglink model is predicated on many of these assumptions. It is an econometric model of world agricultural markets. These markets are fundamentally competitive and represent production, consumption, stocks and trade of homogeneous products. A single world price for each modelled commodity clears the relevant market and is then fed back to domestic markets. Often the transmission is perfect, but in certain cases fixed margins are added to the world price and or a price transmission equation is specified that alters the price transmission when determining domestic price. These are added to represent quality, transportation, policies or other factors that prevent full transmission of the world price to the domestic market. In addition, in some markets for certain countries, there is no transmission from the world to the domestic price.

For the projections where necessary, we modified the price linkage equation to reflect the effects of the world price and the relevant (the lower of the MFN scheduled or applied rate) tariff. In the majority of cases where price transmission equations existed in the BASELINE model and the specification included a tariff variable, the specification was maintained and the tariff information was

updated. If the price transmission equation did not include a tariff variable, the equation was generally replaced by the specification that the domestic price is equal to the world price and the relevant tariff. This is predicated on the assumption that the coefficient on the price transmission equation reflects the effects of excluded tariffs. In a few cases where there is zero price transmission because of domestic support policies, that assumption was retained.

Aglink distinguishes between imports and exports. The presence of two-way trade can be explained by a variety of factors, including economies of scale, product differentiation, or locational and spatial considerations. Although trade reported is distinguished between imports and exports, Aglink is fundamentally a net trade model. In any one country module for any one market, either imports or exports (and sometimes both) are exogenous, and sometimes an explicit net trade representation is used. For this analysis whenever possible, we made exports the exogenous variable and in the net trade specifications, we switched the relationships so that imports are positive, to focus on the effects of the TRQ system on imports. Consequently, the reader is cautioned that changes in imports reported in the results section should be interpreted as changes in the net trade position of a country, with the exception of the EU, discussed later. Although it is recognised that this analysis may benefit from a fuller examination of two-way trade, changing Aglink's specification would have eliminated the possibility of and comparability among the results from this exercise with the BASELINE and was beyond the scope of this analysis.

Given that Aglink distinguishes between exports and imports, and given that many countries scheduled TRQs for products that they also export in sizeable volume, an additional modification to the price transmission relationship as suggested by Figure I.1, was specified. In these cases we assumed that the full effect of the tariff was not felt in the domestic market because of the presence of large volumes of exports. Thus we introduced a "tariff dampening factor", *t_damp* in the equations which reduces the effect of the tariff, depending on the ratio of imports to total trade, *i.e.*:

$$t\_damp = \text{imports}/(\text{imports} + \text{exports}).$$

This ratio is between 0 (when imports are nil) and 1 (when exports are nil). In cases with significant exports, therefore, rather than assume that the domestic price is the world price plus the relevant tariff, the impact of the tariff is reduced. When exports are zero or negligible, the full effect of the tariff is transmitted to the domestic market whereas when exports are very large, the tariff has little or no effect on the domestic market.

In the general TRQ case just described therefore, the specification determining domestic price while allowing regime switches, is:

P_d = IF [P_trq < = P_w(1 + *t_damp**T_iq)]
THEN [P_w*(1 + *T_iq)]
ELSE IF [P_trq = P_w*(1 + *t_damp**T_oq)]
THEN [P_w*(1 + *t_damp**T_oq)]
ELSE (P_trq).

Where; P_d = domestic price, P_trq = the domestic price assuming that imports are equal to the quota, P_w = world price, T_iq = in-quota tariff rate, T_oq = out-of-quota tariff rate, and *t_damp* is defined above.

Cases where countries have domestic policies that prevent the transmission of the world price to the domestic price also necessitate modification of the general price linkage equation. Examples include supply management programs such as for dairy products in Canada and the EU, and products that have domestic support prices that basically serve as floor prices for producers such as for wheat and butter in Japan, and/or where the product is exported with export subsidies. In these circumstances, we have assumed that countries will continue to support their domestic producers at the support price.

For countries with price supports and in the absence of significant exports, the TRQ system is used to assure that support prices are not affected by changes in the world price. Support prices are higher

than the world price and the in-quota tariff rate. The quota and the out-of-quota tariff are used to restrict imports and assure that high support prices are maintained. The quota is set at relatively low level while the out-of-quota rate is usually very high so that it and the world price is higher than the support price assuring out-of quota imports are kept out, preventing any downward pressures on the support price. The in-quota rate in these cases serves to allocate quota rents between the government, in the form of tariff revenue, and private traders. In these markets the lower the in-quota rate, the larger the share of rents accruing to private traders.

For example, in the case of butter in Canada, butter imports in BASELINE are exogenous while production adjusts to balance the domestic butter market at the support price. For this analysis, the exogenous support price from BASELINE, which is higher than the world price and in-quota rate, is retained. Canada's notifications indicate that the butter TRQ fill-rate each year is 100%. We have assumed that imports will continue at the TRQ rate so long as the support price is less than the world price and the out-of-quota rate. Under the URAA, however, countries cannot intervene for any length of time to prevent imports at the out-of-quota rate.[12] Imports above the TRQ will occur if the world price and the out-of-quota rate fall below the support price. If this happens, we have assumed that producers will continue to receive the exogenous support price hence production will not respond while imports adjust to meet the demand generated by a consumer price below the support price. Obviously, this implies a transfer from taxpayers to producers equalled to the difference between the consumer and support price. A similar specification was utilised in other countries and commodities under similar circumstances.

In the case of the EU where TRQs are scheduled for products that are also exported with subsidies a modified version of the approach described above is utilised. Whereas imports are exogenous in BASELINE, we have endogenised them while maintaining the export specification. Thus, the EU module allows both imports and exports of the same product (with or without subsidies). Subsidised exports continue to depend on the relationship between the producer price and the support price in an attempt to represent decision-makers' use of this policy lever, and remain subject to WTO limits.

Endogenous imports are those under the TRQ regime. We developed a simple (but *ad hoc*) method to capture them. We assume that imports are an exponential function of the ratio of domestic to the tariff-inclusive world price. We centre the ratio so that when it equals one, imports equal the TRQ volume. If the domestic price rises above the world price and the out-of-quota tariff, then imports enter at an exponential rate, putting downward pressure on the domestic price. On the other hand, if the domestic price falls below the world price and the in-quota rate, then imports decline below the TRQ level, putting an upward pressure on domestic price.

For EU products with TRQ regimes therefore, imports are calculated as:

$$\begin{aligned} M\_trq = {} & IF \quad [P_p > P_w*(1 + T\_oq)] \text{ THEN } IM\_trq*[P_p/(P_w*(1 + T\_oq))]^n \\ & ELSE \ IF \ [P_P < P_w*(1 + T\_iq)] \text{ THEN } IM\_trq*[P_P/(P_w*(1 + T\_iq))]^n \\ & ELSE \quad IM\_trq \end{aligned}$$

Where, IM_trq = imports under the TRQ regime, P_p= domestic price, P_w = world price, T_oq and T_iq are defined above.

Data issues

As stated previously, a total of 37 countries, including all OECD countries except Turkey, scheduled 1 371 TRQs spanning the whole spectrum of agricultural products. Data on tariffs and TRQs used in this analysis are derived from AMAD. Given the commodity, country, and modelling framework in Aglink, we can only address a subset of those countries and commodities. The data used as input into our analysis and the modifications undertaken for incorporation into Aglink is described.

The analysis presented in the stylised analytical model assumes that the good and the associated TRQ is well defined, that all the trade in the product occurs within the TRQ system, and that out-of-quota imports occur after the quota is filled. The discussion below indicates why these assumptions do not necessarily hold in all cases and the adjustments that were necessary for the empirical implementation.

Tariff rate quotas (TRQs)

The fill rate information reported earlier in Figure I.4 is useful in the empirical analysis that follows because fill rates are among several variables used to determine the relevant regime for any TRQ in a specific country during the implementation period.[13] Additional variables include total imports of the commodity and quota administration methods. This information was used to determine whether to model a particular commodity using our TRQ methodology and the quota volume relative to imports reported in Aglink. During the projections, the model endogenously determines the relevant regime. For example, many countries, for a variety of TRQs, allowed over-quota imports to occur at the lower in-quota tariff rate. In these cases, although a TRQ is scheduled it has not operated as a TRQ but rather as a tariff-only regime at the lower in-quota rate. Since we can not predict when a country could choose to administer these TRQs as true TRQs, in the empirical analysis below, we have assumed that a tariff only regime operates at the lower in-quota rate. Tariff-only regimes, at the in-quota rate, were also assumed in cases where the administration method was applied tariffs, regardless of the calculated fill rate. Examples include the butter and cheese TRQ in Poland, which are administered as applied tariffs, and Korea's coarse grains TRQs with fill rates significantly above 100%. The assumption is that in these cases, countries will not become less open in the future. Similarly, for those TRQs with low fill rates due to administration inefficiencies, we assume that those inefficiencies remain in place.

Countries that scheduled TRQs for coarse grains did so on an individual grain basis *i.e.* a TRQ for barley another one for maize etc. Although the different coarse grains in Aglink are differentiated on the production side, they are assumed to be perfect substitutes in consumption. Consumption and trade occur at the aggregate coarse grains rather than at the individual grain level. This is probably not an unrealistic assumption as the elasticity of substitution, for feeding purposes, among the various coarse grains is probably very high. Many countries recognised this inter-dependence among the various coarse grains and scheduled individual TRQs with fairly comparable tariff rates. Consequently, individual TRQs are aggregated into a single coarse grain TRQ. In some cases however, a country scheduled a TRQ for only one or two coarse grains while allowing the importation of other coarse grains without quota restrictions but at tariff rates comparable to the in-quota rate of the TRQ product. An example is the barley TRQ in Japan. In those cases, especially when the trade data suggest that significant imports are taking place for the product without the TRQ, the TRQ is not implemented; rather we assume a tariff only regime for aggregate coarse grains. Similarly, Aglink distinguishes the production of individual oil seeds, oil meals and vegetable oils, but on the consumption side they are again assumed to be perfect substitutes. As in the case for coarse grains, the TRQs for various oilseeds and products are either aggregated into a single TRQ for oils, seeds, or meals or a tariff only regime is implemented as warranted.

Given the commodity and country specifications in Aglink, the universe of scheduled TRQs shown in Box I.1 is considerably reduced as explained in Box I.2. Aggregating from the individual TRQs to Aglink's commodity level reduces the number of observations to 104 for the endogenous Aglink countries. For the empirical analysis, the sample size falls further, to 76 as coarse grains, oilseeds, oilmeals, and vegetable oil aggregates are formed from the individual commodities. Table I.8 reports for the endogenous countries considered, the total number of scheduled TRQs and the number of in-quota tariff lines. Column 3 reports the number of TRQs from the first column that is Aglink products while column 4 reports how many of the Aglink products are incorporated in the model. Column 5 indicates the number of commodities for which a tariff-only regime exists that are also included in the analysis while the last column lists these commodities. The fourth column includes TRQs for poultry, eggs, sheep meat, milk, and whey powder, products that do not have a full-fledged world market in Aglink and therefore can not be implemented given the current specification.

The number of TRQs actually implemented is less than the number of scheduled TRQs for the countries under consideration because: 1) aggregation of many TRQs into a single product category whether because the product is an aggregate in Aglink (for example one coarse grain TRQ made up of individual TRQs for barley, maize, oats, and rye) or because a single Aglink product consists of several TRQs (for example the nine cheese TRQs in the US schedule or the eight beef and veal TRQs in EU's

schedule); 2) absence of domestic equations in Aglink for the relevant TRQ such as Japan's whey powder TRQ; 3) absence of relevant world price in Aglink, such as poultry and eggs; 4) the country is a large net exporter of the TRQ commodity and the historical fill-rate is very low, for example coarse grains in Hungary; 5) the TRQ is administered by a country as a tariff-only regime, at the in-quota rate (butter in Poland) and country voluntarily phasing out quotas (Korea's beef and pig meat TRQs).

In addition to identifying the commodities and countries where we could employ the analytic approach, we also have to determine the appropriate TRQ volume for calibration. To do this, the import data in Aglink and the notification data need to be reconciled. This is accomplished with the aid of the trade data in AMAD. The process, however, posed two problems. The first is the product definition in Aglink compared to the notifications and trade data in AMAD. The concordance table mapping the HSC codes into Aglink product definition solved this. A second complication is the differences in units used in the notifications and the trade data in AMAD with some products in Aglink. For example, production, consumption and trade in Aglink are usually defined at the primary product equivalent basis whereas trade and notification data are usually on a product weight basis. Beef is an example, with supply and use data in Aglink on a carcass weight equivalent while trade data in AMAD are on a product weight basis. One can not then simply use the scheduled TRQ from a country's schedule to the WTO as input into Aglink. Consequently, adjustments to the TRQ scheduled volumes were necessary before they could be used.

Table I.8. **Endogenous countries in Aglink, number of TRQs and tariff-only regimes implemented**

	Scheduled TRQs	In-quota tariff lines	TRQs that are Aglink products	TRQs implemented	Tariff implemented	List of products
	Number					
Australia	2	11	1	0	2	OM,VL
Canada	21	123	9	2	0	BT, CH
European Union	87	366	11	7	1	BF,BT, CG, CH, SMP, VL, WMP
Hungary	75	86	10	0	0	
Japan	20	188	8	4	5	BF, BT, CG, CH, PK, RI, SMP, WT, VL
Korea	67	195	9	0	7	BF, CG, OM,OS,PK, VL,WT
Mexico	11	74	7	0	0	
New Zealand	3	4	0	0	0	
Poland	109	169	14	0	7	BT, CG, CH, OM,OS,VL,WT
United States	40	180	7	4	0	BF, BT, CH, SMP

Note: BF: beef; BT: butter, CG: coarse grains; CH: cheese; OM: oilmeal; PK: pork; RI: Rice, SMP: skim mil powder; WT: wheat; VL: vegetable oil; WMP: whole milk powder.
Source: OECD Secretariat.

In addition to reconciling product definition and units, differences between the trade data, the notifications and the scheduled TRQs with the import data in Aglink also had to be reconciled. For example, import data in Aglink may be inconsistent with notification and trade data from AMAD. We did not want to change the import data in Aglink because that data balances world markets in the BASELINE. Consequently, we scaled the TRQ volume and calibrated to the trade data in Aglink. The TRQ volumes therefore do not necessarily correspond to the volumes in AMAD or those reported to the WTO.

Whether a TRQ needed to be scaled in Aglink dependent on the relationship between the volume of notified imports relative to the scheduled quota (*i.e.* the fill rate), total imports from AMAD (preferably distinguishing among in- out-of- and non-quota imports where possible), and total imports in Aglink. Annex B describes the methodology used and provides examples to illustrate how we used this information to scale the TRQs and make them consistent with the data in Aglink.

In certain cases, we were able to identify significant trade for a TRQ product say cheese, which occurs outside the TRQ system, *i.e.* non-quota trade. Rather than ignoring this trade, imports of non-quota part of a product with a TRQ are modelled by assuming that imports are a fixed proportion of domestic consumption. The remaining component of imports was modelled using our TRQ methodology.

The TRQ must be modified for this study when the quota is not filled completely and trade data indicate out-of-quota imports. Quotas may be under-filled for a variety of reasons. One reason is insufficient import demand at the given in-quota rate. This is the starting point of our empirical analysis. However, there may be cases where the quotas are not filled because of inefficiencies in the TRQ system. These inefficiencies can be due to: imperfect competition, presence of state trading enterprises, the allocation method used to distribute import licenses, the administration cost of the licenses, the size of the licenses and preferential agreements. In certain cases, trade data indicate substantial out-of-quota imports, even though the TRQ is not filled.[14] This is a case for example for butter and cheese in the US where there is under-fill and out-of-quota imports. In such situations, in order to reconcile the Aglink trade data with the fact of out-of-quota imports, we have assumed that imperfect administrative mechanisms essentially reduce the scheduled TRQ to an effective volume below the schedule. The TRQ used in the empirical analysis therefore is lower than scheduled in order to reflect the presence of out-of-quota imports. In terms of Figure I.1, this means that we assume that the quota is to the left of Min imports and that T2 is the relevant regime. An example for this calculation is also shown in Annex I.B.

In-quota and Out-of-quota tariff rates.

In addition to determining which quota to model and the volume of the quota relative to imports in Aglink, we also need the in-quota and out-of-quota rates associated with each quota. In terms of Figure I.1 these determine the rotation of the excess demand curve and the points of minimum and maximum imports. These, along with tariff information for non-quota products, derived from the information presented earlier, and information on quota administration method are used to calibrate the model. For selected countries and commodities, these rates are reported in Table I.9. Although these rates are expressed as *ad valorem* to facilitate comparisons, in the model, specific rates as scheduled are used. Furthermore, in cases where a country's schedule includes complex tariffs as indicated by statements such as "not less than" "minimum" or "maximum" of different rates, these statements are included and the appropriate rate is selected endogenously. The table also reports applied rates where available and relevant. In the model, these rates are held constant at the last observation value since we do not want to predict how these may change. The implication for this is that the model uses applied rates when these are below MFN bound rates in determining domestic prices. This takes into account the problem of "water"[15] in the tariffs in the projections as MFN reductions affect domestic prices only after they fall below applied rates. In the scenarios presented below, MFN tariff reductions, therefore, only have a direct affect on domestic prices when (or if) the MFN rate drops below the applied rate.

Scenarios

It is not possible nor is it our intention to predict how the negotiations currently underway will evolve and what the final negotiated outcome will be. For our scenarios, we analysed the impacts of further agricultural liberalisation – expansion of the TRQs, and reductions in tariffs. We examine four scenarios implemented over the 2001-2005 period:

1. gradual 50% expansion of the quotas (at the Aglink commodity aggregation level) in equal annual instalments from 2001 to 2005 (TRQEXP50);
2. gradual 50% expansion of the TRQs plus a gradual 36% reduction in the in-quota tariff rates in equal annual instalments (TRQEXPt1);

Table I.9. **Average tariff rates for selected OECD countries and commodities**

	Commodity	1995	1996	1997	1998	1999	2000	Per cent reduction
		Per cent						
Australia	Cheese_in[1]	3.2	3.3	3.4	3.2	3.5	3.5	9.3
	Cheese_out[2]	46.2	47.7	46.8	43.7	46.3	43.9	–5.0
	Cheese_apl[3]		34.0	33.4	31.2	n.a.	n.a.	
	Oilseed oil_non[4]	9.7	9.3	9.0	8.7	8.3	8.0	–17.2
	Oilseed oil_apl		5.0	5.0	5.0	n.a.	n.a.	
	Oilmeals_non	0.5	0.4	0.4	0.3	0.3	0.3	–45.5
	Coarse grains_non	2.5	2.6	2.2	1.7	1.2	0.8	–65.8
	Wheat_non	1.6	1.5	1.4	0.9	0.5	0.3	–78.8
Canada	Beef and veal_in	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Beef and veal_out	30.3	29.5	28.8	28.0	27.2	26.4	–12.9
	Butter_in	11.8	11.4	9.9	8.3	7.8	6.4	–45.9
	Butter_out	351.2	342.2	333.2	324.2	315.2	306.2	–12.8
	Cheese_in	2.2	2.0	1.9	1.7	1.5	1.3	–43.9
	Cheese_out	281.8	274.5	267.3	260.1	252.8	245.6	–12.8
	Skim milk powder_in	2.4	2.3	2.3	2.2	2.1	1.6	–32.8
	Skim milk powder_out	231.3	225.3	219.4	213.5	207.5	201.6	–12.8
	Whole milk powder_in	8.0	7.3	6.4	5.6	4.9	4.0	–50.0
	Whole milk powder_out	309.2	301.3	293.3	285.4	277.5	269.6	–12.8
	Coarse grains_non	14.3	16.1	16.1	16.3	16.1	15.2	6.4
	Wheat_in	1.52	1.55	1.74	1.70	1.57	1.25	–17.5
	Wheat_out	67.38	68.09	71.61	72.63	73.01	69.98	3.9
European Union	Beef and veal_in	40.0	38.4	33.1	31.0	32.8	29.2	–27.0
	Beef and veal_out	433.3	375.0	253.3	200.0	211.6	142.8	–67.0
	Pigmeat_in	30.2	22.3	20.7	32.0	37.3	28.2	–6.8
	Pigmeat_out	106.2	73.3	63.5	90.9	95.3	67.3	–36.6
	Butter_in	54.0	64.3	56.7	54.6	74.2	66.0	22.1
	Butter_out	173.6	193.3	158.8	141.8	177.6	144.3	–16.9
	Cheese_in	41.6	40.4	38.4	43.0	48.0	42.2	1.6
	Cheese_out	139.5	126.9	112.5	116.8	119.9	96.5	–30.8
	Skim milk powder_in	29.0	30.5	31.0	36.9	42.5	35.1	21.0
	Skim milk powder_out	87.6	88.9	87.2	100.1	110.6	87.7	0.2
	Whole milk powder_non	139.6	139.0	118.0	123.8	130.9	106.9	–23.4
	Coarse grains_in	22.6	30.7	30.2	35.3	38.3	33.9	50.2
	Coarse grains_out	96.8	123.3	113.3	122.7	122.6	99.1	2.3
	Wheat_in	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Wheat_out	119.7	123.4	132.4	146.0	154.3	121.0	1.1
	Oil meals_non	1.6	1.5	1.4	1.3	1.1	1.0	–38.5
	Vegetable oils_non	10.7	10.0	9.3	8.6	7.9	7.2	–32.6
Hungary	Beef and veal_in	15.0	15.0	15.0	15.0	15.0	15.0	0.0
	Beef and veal_out	105.3	98.6	91.9	85.1	78.4	71.7	–31.9
	Pigmeat_in	15.0	15.0	15.0	15.0	15.0	15.0	0.0
	Pigmeat_out	59.5	58.0	56.5	54.9	53.4	51.9	–12.7
	Butter_in	60.0	60.0	60.0	60.0	60.0	60.0	0.0
	Butter_out	149.5	139.9	130.4	120.9	111.3	101.8	–31.9
	Cheese_in	50.0	50.0	50.0	50.0	50.0	50.0	0.0
	Cheese_out	97.1	89.3	81.4	73.6	65.7	57.8	–40.5
	Skim milk powder_in	30.0	30.0	30.0	30.0	30.0	30.0	0.0
	Skim milk powder_out	75.2	70.4	65.6	60.8	56.0	51.2	–31.9
	Whole milk powder_in	30.0	30.0	30.0	30.0	30.0	30.0	
	Whole milk powder_out	75.2	70.4	65.6	60.8	56.0	51.2	–31.9
	Coarse grains_in	2.7	2.7	2.7	2.7	2.7	2.7	0.0
	Coarse grains_out	43.5	40.1	36.6	33.1	29.7	26.2	–39.8
	Wheat_in	10.0	10.0	10.0	10.0	10.0	10.0	0.0
	Wheat_out	49.5	45.6	41.7	37.9	34.0	30.1	–39.1
Japan	Beef and veal_non	85.8	78.7	71.5	64.3	57.2	50.0	–41.7
	Beef and veal_apl	48.0	46.0	44.0	n.a.	n.a.	n.a.	
	Pigmeat_non	140.3	90.6	82.4	114.4	136.9	121.9	–13.1
	Butter_in	35.0	35.0	35.0	35.0	35.0	35.0	0.0
	Butter_out	595.9	612.9	533.3	470.7	663.0	679.2	14.0
	Butter_apl	82.7	141.6	126.1	n.a.	n.a.	n.a.	
	Butter_mark up	514.3	530.8	458.8	402.4	592.4	593.5	15.4
	Cheese_non	45.0	42.2	39.5	36.7	33.9	31.2	–30.8

Table I.9. **Average tariff rates for selected OECD countries and commodities** (*cont.*)

	Commodity	1995	1996	1997	1998	1999	2000	Per cent reduction
		Per cent						
Japan (*cont.*)	Cheese_apl	24.9	30.9	23.7	n.a.	n.a.	n.a.	
	Skim milk powder_in	19.3	18.6	17.9	17.2	16.5	15.8	–18.0
	Skim milk powder_out	244.8	224.4	223.3	240.2	288.0	275.1	12.4
	Skim milk powder_apl	71.8	77.8	66.1	n.a.	n.a.	n.a.	
	Skim milk powder_mark up	348.7	317.9	316.8	343.7	407.9	391.7	12.3
	Whole milk powder_in	24.0	24.0	24.0	24.0	24.0	24.0	0.0
	Whole milk powder_out	358.1	331.6	298.1	305.7	366.2	376.5	5.1
	Whole milk powder_apl	92.9	87.0	79.7	n.a.	n.a.	n.a.	
	Whole milk powder_mark up	390.4	361.3	324.0	334.8	398.6	413.3	5.9
	Coarse grains_non	75.5	88.0	85.1	90.0	102.2	104.1	37.7
	Coarse grains_apl	24.6	57.8	26.2	n.a.	n.a.	n.a.	
	Wheat_in	9.5	9.5	9.5	9.5	9.5	9.5	0.0
	Wheat_out	389.8	372.2	420.3	454.8	552.0	546.9	40.3
	Wheat_mark up	314.7	300.6	339.5	367.5	447.9	440.3	39.9
	Rice_in	5.0	5.0	5.0	5.0	5.0	5.0	0.0
	Rice_out	1 173.6	1 058.4	1 036.9	991.4	1 301.8	1 291.0	10.0
	Rice_mark up	467.2	432.5	435.4	428.0	579.4	588.8	26.0
	Oil meals_no	1.6	1.5	1.4	1.3	1.2	1.0	–35.7
	Vegetable oils_non	25.3	20.7	14.2	14.5	17.8	15.0	–40.8
	Vegetable oils_apl	26.5	21.8	14.9	n.a.	n.a.	n.a.	
Korea	Beef and veal_in	43.3	42.9	42.6	42.3	41.9	41.6	–3.9
	Beef and veal_out	43.4	42.9	42.3	41.7	41.1	40.6	–6.6
	Pigmeat_in	25.0	25.0	25.0	25.0	25.0	25.0	0.0
	Pigmeat_out	33.0	29.0	25.0	25.0	25.0	25.0	–24.2
	Butter_in	40.0	40.0	40.0	40.0	40.0	40.0	0.0
	Butter_out	94.0	89.0	89.0	89.0	89.0	89.0	–5.3
	Cheese-non	37.7	37.5	37.3	37.1	36.9	36.7	–2.4
	Skim milk powder_in	20.0	20.0	20.0	20.0	20.0	20.0	0.0
	Skim milk powder_out	176.0	176.0	176.0	176.0	176.0	176.0	0.0
	Whole milk powder_in	40.0	40.0	40.0	40.0	40.0	40.0	0.0
	Whole milk powder_out	176.0	176.0	176.0	176.0	176.0	176.0	0.0
	Coarse grains_in	8.9	8.8	8.8	8.8	8.8	8.8	–0.8
	Coarse grains_out	455.7	456.7	449.7	441.9	439.8	434.4	–4.7
	Wheat_non	13.4	12.5	11.6	10.7	9.8	8.9	–33.2
	Rice_in	5.0	5.0	5.0	5.0	5.0	5.0	0.0
	Oil seeds_in	5.0	5.0	5.0	5.0	5.0	5.0	0.0
	Oil seeds_out	535.6	530.2	524.8	519.4	514.0	508.6	–5.0
	Oil seeds_non	40.2	38.8	37.5	36.1	34.8	33.4	–16.8
	Oil seeds_apl	20.0	17.5	n.a.	n.a.	n.a.	n.a.	
	Oil meals_non	20.3	19.0	17.8	16.5	15.3	14.0	–30.9
	Oil meals_apl	4.7	4.3	n.a.	n.a.	n.a.	n.a.	
	Vegetable oils_non	33.5	32.5	31.4	30.4	29.4	28.3	–15.4
	Vegetable oils_apl	15.1	15.1	n.a.	n.a.	n.a.	n.a.	
Poland	Beef and veal_in	30.0	30.0	30.0	30.0	30.0	30.0	0.0
	Beef and veal_out	156.2	150.6	139.3	128.1	118.0	103.1	–34.0
	Pigmeat_in	30.0	30.0	30.0	30.0	30.0	30.0	0.0
	Pigmeat_out	70.4	58.3	51.4	56.7	52.1	47.5	–32.5
	Butter_in	40.0	40.0	40.0	40.0	40.0	40.0	0.0
	Butter_out	150.3	140.7	131.0	121.3	111.7	102.0	–32.2
	Cheese-in	35.0	35.0	35.0	35.0	35.0	35.0	0.0
	Cheese-out	235.0	220.0	205.0	190.0	175.0	160.0	–31.9
	Coarse grains_in	21.9	21.9	21.9	21.9	21.9	21.9	0.0
	Coarse grains_out	153.6	182.5	168.6	180.2	176.6	144.6	90.0
	Wheat_in	23.3	23.3	23.3	23.3	23.3	23.3	0.0
	Wheat_out	88.8	87.3	91.0	62.9	68.5	53.8	–39.4
	Oil meals_non	9.2	8.3	7.5	6.7	5.8	5.0	–45.5
	Vegetable oils_in	41.7	41.7	41.7	41.7	41.7	41.7	0.0
	Vegetable oils_out	92.4	86.4	80.5	74.6	68.6	62.7	–32.2
United States	Beef and veal_in	4.8	4.8	4.8	4.9	4.8	4.7	–1.2
	Beef and veal_out	30.3	29.5	28.8	28.0	27.2	26.4	–12.9
	Pigmeat_non	0.6	0.4	0.4	0.6	0.6	0.5	–23.4
	Butter_in	7.7	8.3	8.3	8.2	9.2	9.1	17.5

Table I.9. **Average tariff rates for selected OECD countries and commodities** (*cont.*)

	Commodity	1995	1996	1997	1998	1999	2000	Per cent reduction
		Per cent						
United States (*cont.*)	Butter_out	91.7	108.3	104.2	99.0	123.2	117.4	28.0
	Butter_out	91.7	108.3	104.2	99.0	123.2	117.4	28.0
	Cheese-in	12.3	12.3	12.3	12.3	12.3	12.3	0.0
	Cheese-out	74.7	75.5	78.2	86.1	88.6	83.6	11.9
	Cheese-no	19.1	18.8	18.8	19.4	19.5	18.8	–1.7
	Skim milk powder_in	1.5	1.7	1.9	2.3	2.5	2.3	48.3
	Skim milk powder_out	46.3	48.9	54.2	63.6	67.5	59.8	29.3
	Whole milk powder_in	7.2	7.4	7.5	8.0	8.3	8.2	14.7
	Whole milk powder_out	66.7	70.8	70.3	77.8	82.1	78.7	17.9
	Coarse grains_non	3.8	3.9	3.7	3.5	3.0	2.5	–35.2
	Wheat_non	4.4	4.5	4.9	5.2	5.2	4.4	1.0

n.a. Not available.
1. Average in-quota tariff rate.
2. Average out-of-quota tariff rate.
3. Average applied tariff rate for out-of-quota and non-quota products.
4. Average non-quota tariff rate.
Source: OECD Secretariat.

3. gradual 36% reduction in the out-of and non-quota tariff rates while holding constant TRQs and in-quota rates at their year 2000 values (TRQt2);

4. combine two and three above, *i.e.* simultaneously expand the quotas while reducing all tariff rates, in- out-of- and non-quota by 36% in equal annual instalments (ALL).

For the empirical analysis, average tariff rates in the year 2000 were held fixed for the 2001 to 2005 outlook period and inputted into the model along with the TRQ information. In cases where the applied rates were below the scheduled rates, we assumed that they are held constant at the level that prevailed at the last observation year and held them fixed at that level from 2001-2005. The model then chooses which tariff to use in determining domestic price by selecting the lowest of the applied or the scheduled rates. Any "water" under the tariff is taken into account, and this way, we hope to avoid some of the problems in earlier analysis that assumed that the full reductions in MFN rates were transmitted to domestic markets. The results of this exercise, TRQBASE, serve as the baseline against which the various trade liberalisation scenarios are compared. First we compare the results from this baseline with TRQs to BASELINE as reported in the *Outlook*. Results from BASELINE have been examined and accepted. Comparing the results from this exercise to the results from BASELINE provides a measure of how different the results are due to the modelling and data changes, independent from changes as a result of a scenario. One objective was to minimise the differences between the two models (TRQBASE and BASELINE) without necessarily replicating the BASELINE.

Differences between TRQBASE and BASELINE

The results of the comparison between the changes introduced for this analysis, TRQBASE and the BASELINE as reported in the *Outlook* report, are now presented. We focus on a selected number of commodities and countries in order to highlight the areas where the majority of the changes occurred. The results are derived from responses in all markets and countries to changes in relative prices. The modules of non-OECD countries, OECD countries without TRQs listed in Table I.8 and ROW were not changed for this exercise. Nor were any changes made to production or consumption specifications within any country. While the adjustments to the model changed many trade equations, internal policies such as price supports and production controls remain as in BASELINE. We examine the effects of the changes we have introduced on the world price of selected commodities and then highlight

changes in relevant domestic markets. This provides an indication of how different the *Outlook* would be had it included these changes and provides context for the subsequent scenarios.

Changes in world prices

Economic theory suggests that the introduction of a tariff, holding everything else constant, will result in a higher domestic price in the country that introduced the tariff, and in the large country case, also lead to a lower world price. This is analogous to what we have done for this analysis and along with modification of the price linkage relationship and endogeneity of imports, is the basic difference in many commodities and countries between the BASELINE and TRQBASE. In certain instances, tariffs existed in the BASELINE. These were usually modified to reflect data from AMAD. We also introduced certain TRQ regimes for some commodities and these can either restrict or expand imports relative to those reported in the BASELINE. In a dynamic model such as Aglink, it is not clear *a priori* what the net effect of these changes will be neither on world prices nor on domestic markets. In this exercise, all of these changes are introduced simultaneously and the tariff levels are different across countries and commodities, changing relative prices in ways that are not obvious. In contrast to what might have been expected *a priori*, some world prices in TRQBASE may be higher than in BASELINE if the changes to the trade policy settings in TRQBASE actually lead to an increase in demand.

Table I.10 reports the relative difference in world price for each year 2001 to 2005 between the two baselines. The reported number represents the relative difference for a given year between the two baselines, not the relative difference between years. For any given year, a negative number suggests that the projected world price with TRQBASE is lower relative to BASELINE.

Table I.10. **Per cent change in world prices: TRQBASE relative to BASELINE**

Per cent

	2001	2002	2003	2004	2005
Beef and veal (Pacific market)	–1.1	–1.6	–1.7	–1.7	–1.6
Beef and veal (Mercosur market)	0.2	–0.4	0.2	–0.3	–0.3
Pigmeat (Pacific market)	1.0	–0.2	–0.8	–0.5	–0.2
Butter	–1.9	–3.8	–2.1	–3.9	–3.8
Cheese	3.0	3.7	2.1	0.8	1.4
Skim milk powder	2.4	3.7	3.6	2.6	2.7
Oilseeds	1.3	0.6	0.7	0.3	0.9
Oilmeals	2.4	1.2	1.2	0.6	1.5
Vegetable oils	–1.3	–1.3	–1.2	–1.2	–1.2
Coarse grains	–1.6	–0.5	–1.3	–1.3	–1.6
Rice	–0.2	0.0	–0.1	0.0	–0.1
Wheat	0.8	1.6	1.4	0.4	0.3

Source: OECD Secretariat.

The changes in world prices are relatively small. By the end of the period, one-third of the reported prices are basically the same in the two baselines, another one-third are slightly lower in TRQBASE, while the remaining one-third are slightly higher. The relatively small magnitude of world price changes is encouraging. The results suggest that the changes are not substantially different from the BASELINE. Since those results have been accepted, it enhances the confidence we may have in the scenario results that follow.

Changes in domestic markets tend to be somewhat larger however. It appears that at the world level, relative changes in different countries may cancel each other out resulting in relatively small changes. However, the changes introduced for this analysis lead to different outcomes from the BASELINE in certain countries for some commodities. Table I.11 reports the results for selected commodities in selected countries. Again, the reader is reminded that all the markets and countries are

Table I.11. **Effects in selected domestic markets**

	Commodity		2001	2002	2003	2004	2005
Canada	Butter	TRQ (000 tons)	3.3	3.3	3.3	3.3	3.3
		Imports_bln[1] (000 tons)	3.0	3.2	3.2	3.2	3.2
		Imports_trq[2] (000 tons)	3.3	3.3	3.3	3.3	3.3
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	20.4	20.4	20.4	20.4	20.4
		Imports_bln (000 tons)	22.6	22.6	22.6	22.6	22.6
		Imports_trq (000 tons)	20.4	20.4	20.4	20.4	20.4
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
European Union	Beef and veal	TRQ (000 tons)	245.4	245.4	245.4	245.4	245.4
		Imports_bln (000 tons)	380.0	380.0	380.0	380.0	380.0
		Imports_trq (000 tons)	245.4	245.4	245.4	245.4	245.4
		Total[4] (trqbase)	374.0	374.3	374.1	372.7	368.6
		Change in domestic price (%)	0.6	0.6	0.6	1.0	5.2
	Butter	TRQ (000 tons)	86.7	86.7	86.7	86.7	86.7
		Imports_bln (000 tons)	110.0	110.0	110.0	110.0	110.0
		Imports_trq (000 tons)	100.6	101.6	93.7	88.0	86.7
		Total (trqbase)	123.4	124.3	116.3	110.6	109.2
		Change in domestic price (%)	–1.0	–0.9	–0.4	–0.2	0.0
	Cheese	TRQ (000 tons)	102.2	102.2	102.2	102.2	102.2
		Imports_bln (000 tons)	176.0	182.0	185.0	188.0	191.0
		Imports_trq (000 tons)	225.5	213.4	205.8	196.2	192.6
		Total (trqbase)	291.6	280.1	273.1	264.1	261.1
		Change in domestic price (%)	–1.2	–1.0	–1.0	–0.8	0.0
	SMP	TRQ (000 tons)	68.0	68.0	68.0	68.0	68.0
		Imports_bln (000 tons)	84.0	86.0	56.0	55.0	55.0
		Imports_trq (000 tons)	68.0	68.0	68.0	62.5	53.0
		Total (trqbase)	81.8	81.6	81.2	75.5	65.8
		Change in domestic price (%)	–0.5	–0.3	–1.3	–1.1	–0.4
	Coarse grains	TRQ (000 tons)	2 822.3	2 822.3	2 822.3	2 822.3	2 822.3
		Imports_bln (000 tons)	3 369.0	3 369.0	3 369.0	3 369.0	3 369.0
		Imports_trq (000 tons)	1 416.0	1 102.6	863.3	760.8	747.4
		Total (trqbase)	1 972.7	1 661.6	1 423.9	1 325.4	1 316.7
		Change in domestic price (%)	0.3	1.2	2.1	2.8	3.2
	Wheat	TRQ (000 tons)	350.0	350.0	350.0	350.0	350.0
		Imports_bln (000 tons)	2 350.0	2 350.0	2 350.0	2 350.0	2 350.0
		Imports_trq (000 tons)	332.8	241.1	211.5	166.4	124.4
		Total (trqbase)	2 414.2	2 373.4	2 379.3	2 338.6	2 290.7
		Change in domestic price (%)	–2.3	–1.5	–0.5	1.6	–1.3
Japan	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	973.0	981.7	1 012.6	1 018.0	1 042.3
		Imports_trq (000 tons)	993.6	1 000.5	1 030.5	1 041.3	1 065.3
		Change in domestic price (%)	2.1	2.2	2.4	1.7	1.6
	Butter	TRQ (000 tons)	0.5	0.5	0.5	0.5	0.5
		Imports_bln (000 tons)	0.1	0.1	0.1	0.1	0.1
		Imports_trq (000 tons)	0.0	0.0	0.0	0.0	0.0
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	187.9	193.7	199.7	205.7	211.7
		Imports_trq (000 tons)	194.5	200.2	206.3	212.4	219.0
		Change in domestic price (%)	–21.9	–19.9	–19.5	–18.8	–20.6
	SMP	TRQ (000 tons)	96.0	96.0	96.0	96.0	96.0
		Imports_bln (000 tons)	54.9	53.0	53.1	51.6	51.3
		Imports_trq (000 tons)	54.4	51.9	51.9	50.4	50.1
		Change in domestic price (%)	12.5	14.2	14.3	13.6	13.9
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	21 630.2	21 807.4	21 599.1	21 841.4	21 853.9
		Imports_trq (000 tons)	19 944.0	20 163.4	19 891.7	20 206.2	20 165.8
		Change in domestic price (%)	128.6	121.7	118.8	112.9	111.1
	Wheat	TRQ (000 tons)	5 740.0	5 740.0	5 740.0	5 740.0	5 740.0
		Imports_bln (000 tons)	5 850.0	5 897.4	5 925.9	5 957.5	6 005.1
		Imports_trq (000 tons)	5 824.2	5 869.3	5 898.5	5 931.4	5 977.4
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0

Table I.11. **Effects in selected domestic markets** (*cont.*)

	Commodity		2001	2002	2003	2004	2005
Korea	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	214.1	230.4	280.2	323.5	378.2
		Imports_trq (000 tons)	217.3	234.2	284.2	327.5	382.1
		Change in domestic price (%)	–1.4	–1.4	–1.3	–1.1	–1.0
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	8 281.5	8 483.8	8 290.8	8 386.0	8 462.9
		Imports_trq (000 tons)	8 413.6	8 581.7	8 374.0	8 378.7	8 449.9
		Change in domestic price (%)	4.0	4.9	4.3	4.4	4.1
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	4 399.3	4 419.3	5 071.6	4 932.7	4 330.9
		Imports_trq (000 tons)	3 506.8	3 598.3	4 235.0	4 417.3	3 890.2
		Change in domestic price (%)	11.0	10.9	9.7	7.5	7.2
Poland	Butter	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	0.0	0.0	0.0	0.0	0.0
		Net trade_trq (000 tons)	–9.7	–11.6	–8.3	–6.1	–2.2
		Change in domestic price (%)	–3.1	–4.8	–1.0	1.5	6.0
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	35.5	39.3	44.1	49.0	49.0
		Net trade_trq (000 tons)	36.9	45.5	54.3	64.6	65.0
		Change in domestic price (%)	1.3	5.9	9.6	14.7	14.7
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	40.8	102.7	99.9	84.0	161.8
		Net trade_trq (000 tons)	–70.9	–44.5	–65.7	–132.6	–122.3
		Change in domestic price (%)	–1.8	–0.6	–1.6	–1.7	–2.2
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–236.6	–180.3	–50.5	100.7	92.5
		Net trade_trq (000 tons)	–118.2	–14.0	154.2	286.9	228.2
		Change in domestic price (%)	3.2	4.5	4.3	3.1	3.1
United States	Beef and veal	TRQ (000 tons)	1 691.0	1 691.0	1 691.0	1 691.0	1 691.0
		Imports_bln (000 tons)	1 379.1	1 288.4	1 233.8	1 271.5	1 368.2
		Imports_trq (000 tons)	1 283.0	1 189.3	1 125.2	1 149.1	1 230.9
		Change in domestic price (%)	1.6	1.3	1.1	1.2	1.3
	Butter	TRQ (000 tons)	9.2	9.2	9.2	9.2	9.2
		Imports_bln (000 tons)	20.6	30.0	35.0	20.0	15.0
		Imports_trq (000 tons)	9.2	17.8	32.9	12.7	9.2
		Change in domestic price (%)	5.5	8.9	4.8	8.1	5.4
	Cheese	TRQ (000 tons)	110.0	110.0	110.0	110.0	110.0
		Imports_bln (000 tons)	154.7	154.7	154.7	154.7	154.7
		Imports_trq (000 tons)	110.0	146.4	157.5	122.6	172.4
		Total (trqbase)	148.6	186.6	198.4	164.1	214.8
		Change in domestic price (%)	1.0	–1.7	–1.8	0.6	–1.8
	SMP	TRQ (000 tons)	2.0	2.0	2.0	2.0	2.0
		Imports_bln (000 tons)	2.0	2.0	2.0	2.0	2.0
		Imports_trq (000 tons)	13.2	33.7	25.9	20.9	13.9
		Change in domestic price (%)	–5.3	–12.3	–7.8	–4.9	–2.1

1. TRQ volume calculated.
2. Total imports from BASELINE.
3. Imports of TRQ component from TRQBASE.
4. Total imports from TRQBASE.

Source: OECD Secretariat.

part of the analysis and there are changes throughout other markets through price effects. In the interest of time and space, we focus on the results for selected commodities and countries where the majority of the modelling changes discussed above are introduced.

Introducing the TRQs and tariffs while allowing imports to respond to changes in relative prices (rather than being exogenous) causes substantial changes in some markets. Some of the changes are also a reflection of changes we have introduced on how the domestic markets respond to the tariffs that have been introduced.

Domestic policies still play a very important role in many markets. For example, in Canada, the butter and cheese markets are not materially different because in both cases, the relevant price is the support price, which is substantially above the world price plus the in-quota tariff but less than the world price plus the out-of-quota tariff. Consequently, as shown in Table I.11, there is no difference in the domestic price for those products between the two baselines. Imports are at the TRQ level reflecting the fact that the domestic price is in the QUOTA regime, *i.e.* greater than the world price and in-quota tariff but less than the world price and the out-of-quota tariff.

In Japan, beef and veal imports and domestic price are slightly higher relative to the BASELINE. The apparent contradiction of higher prices and imports is a reflection of changes in the relative price of substitute products, primarily pig meat. BASELINE included a tariff on beef imports, which was replaced with a higher value based on the applied rate. This helps explain the higher domestic price. Higher imports result from the introduction of the pig meat tariff that leads to higher pig meat prices and substitution in consumption for beef. In the wheat and butter markets, there is little difference between the two baselines reflecting the dominant role that domestic policies play in these markets. The biggest changes occurred in the cheese, SMP and coarse grain markets. In cheese, the new specification leads to higher imports and lower domestic price while the opposite occurs in the cases of SMP and coarse grains. The Japanese domestic policy protects SMP for food use; imports and the TRQ are aimed primarily at the feed market. The change in price reflected in Table I.11 is for feed use as that is the only category that responds to changes in world prices. The butter and SMP TRQs were under-filled in the historical period and are projected to remain so. Imports of SMP are projected to be slightly below those of the BASELINE resulting in higher domestic price.

The change in coarse grains is much more dramatic. Projected imports average about 8% below those projected by the BASELINE while domestic prices are significantly higher. The relative magnitude of the changes reflects a fairly inelastic demand for coarse grains and perfectly inelastic (with respect to changes in world price) supply. While consumption responds to world prices, production is a function of domestically determined prices that are exogenously determined (in both baselines). The response again reflects assumptions we have made about domestic policies and illustrates once again that domestic policies continue to play significant role in agricultural markets. In many cases the quota component of the TRQ system, along with the out-of-quota tariff continue to protect those policies.

Implications of the changes in EU markets also vary and also depend on our assumptions regarding domestic policies. As was mentioned above, for most of the EU products where we introduced TRQs, the trade data and notification data were inconsistent. For the EU, we cannot distinguish from the trade data imports that take place under the QUOTA regime from imports that take place under other regimes. However, as the beef example in the Annex demonstrates, total imports for most products substantially exceed the reported in-quota imports, which are again different from imports in Aglink. It is not clear to us that the additional imports reported in Aglink occur at the out-of-quota rate for several reasons. One is the prevalence of preferential agreements that the EU has with many countries that allow imports to enter at the in-quota (or better) rate. Another is the fact that the EU exports many of the same products with subsidies. Given the relatively high out-of-quota tariffs, it seems improbable that substantial imports occur at those rates. Consequently, as shown in the Annex, we distinguish between imports under the QUOTA regime from the rest. We assume the later are exogenous, but rather than holding them constant, we assume that they are a fixed share of domestic consumption. Thus, the distinction for the EU between TRQ imports and total imports shown in Table I.11.

In the EU's beef and veal market, the introduced changes result in total imports that are slightly lower than in the BASELINE, while domestic price is somewhat higher. Imports under the QUOTA regime always fill the TRQ. In contrast, imports of dairy products (especially during the first three years) are higher and prices are slightly lower. Cheese imports are projected to be significantly above the TRQ level throughout the period, and butter imports are also above the TRQ level until the last year when they are equal to the TRQ level. In contrast, SMP imports start out at the TRQ level but fall below it during the last two years. The reader is reminded that much of the change in the EU's domestic dairy market is conditioned on the fact that the dairy production quota is in place during the projection period.

More substantial changes relative to the BASELINE occur in the EU's coarse grain markets where imports are substantially lower. The results in Table I.11 suggest that the exogenous imports assumed in the BASELINE may be inconsistent with world and domestic price of the same projection. Imports under the TRQ (as well as total imports) fall throughout the period and are substantially lower than the BASELINE. Falling support prices within the EU (as mandated by recently announced reforms) are a contributing factor to decreasing the incentive to import. As we assumed that EU policy makers will try to maintain the producer price close to the support price, imports are shed in an attempt to bolster the domestic price. Lower imports lead to slightly higher prices relative to the BASELINE. Similarly, the wheat TRQ is also under-filled throughout the projections period, and the under-fill rate increases. Total imports are slightly greater than BASELINE at the beginning of the period, leading to a domestic price that is also lower.

The changes introduced have relatively big effects in US dairy markets since in the model price transmission from world markets is not hampered by domestic policies. In contrast to the BASELINE, introducing tariffs and the TRQ in the butter market, lead to substantially lower imports and higher domestic price. In contrast, cheese and SMP imports are much higher leading to lower prices. In the US beef market, imports are about 8% below BASELINE but domestic price is little changed.

Relative to BASELINE, beef imports expand somewhat in Korea, leading to slightly lower prices whereas coarse grains and wheat imports are less, leading to higher prices. In Poland, butter imports decline over time leading to higher domestic price (6% greater than BASELINE in 2005) while higher domestic price lead to expanding cheese exports. Both BASELINE and TRQBASE project that Poland will become a net exporter of wheat, but TRQBASE projects larger exports and that the switch will occur one year earlier.

The results shown in Table I.11 illustrate one of the strengths of the empirical analysis; endogenous regime switches. It was mentioned previously that policy changes, market developments or both, can lead to a regime switch, that is, a different instrument determining domestic price in different times. Even though policies are not changed in TRQBASE, the results indicate that dynamic evolution of markets can led to regime switches. This is illustrated in some EU and US markets. Most products, in most countries, stay within a regime for the duration of the projection period. The SMP market in the EU, however, switches from the QUOTA regime to the T1 regime at the end of the period. In the US, there are two regime switches in the butter market, from the QUOTA regime to the T2 regime and back. The US cheese market also undergoes a regime switch from QUOTA to T2.

To summarise, the results from comparing the two baselines indicate that the changes we have introduced have not materially altered the results from the BASELINE at the world level but individual markets in certain countries are different. The results also illustrate that market forces causing changes in demand and supply can and do lead to regime switches even as policies affecting the TRQ instruments are not altered. The introduction of the quotas and tariffs have necessitated the need to make assumptions about how domestic policies may respond to pressures from world markets which resulted in some differences between the two baselines in specific markets of certain countries.

The two baselines do not produce materially different results especially at the world level. This was the outcome hoped for at the outset of the analysis. The introduction of TRQ regimes and an updated and fuller set of tariff data makes the baseline richer and allows the examination of alternative market liberalisation scenarios along the lines of quota expansion and/or tariff reduction. The fact that the model can pick up regime switches is also something that enhances the usefulness of the model. The results from this section also indicate that domestic policies continue to wield a strong influence in the transmission of world prices.

Scenario results

Based on our discussion of the analytical framework, only one instrument is binding at any time for any commodity in any country. Furthermore, from the analytical framework, we surmised the effects of liberalising the different policy instruments such as the effects, on various TRQs in different regimes as quotas are expanded for example. With the data from Figure I.3 and the analytical framework, one can

anticipate which policy instrument will influence the most TRQs. The data from Figure I.3 indicate that the majority of TRQs are under-filled and that a significant share of others are not enforced as they are either over-filled by government decree, or they are administered by applied tariffs. In terms of Figure I.1, the data suggest that most TRQs are equal to or to the right of MAX total imports. Quota expansion or reduction in out-of-quota tariff rates (unless these are reduced below in-quota rates) will not significantly improve market access for the TRQ in the T1 regime. Reducing in-quota rates, on the other hand, should improve market access. For the empirical application, each of the possible regimes identified is represented by the TRQs introduced into Aglink, providing examples of the operation of each of the three instruments. Hence, we can test the analytical framework. Furthermore, with the empirical model, we can ascertain the relative performance of each of the three instruments in improving market access within the confines of Aglink's commodity and country coverage. Results presented below are illustrative and focus on changes in world prices and changes in selected domestic markets.

The results of the scenarios described previously are presented below. In this case, the scenario results are compared not to the original BASELINE, but to the baseline produced for this exercise, TRQBASE. The results therefore for any year are the relative changes between the scenario and TRQBASE and not changes from year to year.

Gradual quota expansion

The TRQ scenario is an expansion in global quotas. Some countries scheduled TRQs and allocated portions to specific countries. Given the current framework, TRQs are modelled as global (by far more prevalent than allocated) so in-quota imports can originate in any country.

As stated earlier, many of the TRQs are under-filled, others are administered by applied tariffs, *i.e.* as if they are tariff-only regimes (at the in-quota or even more preferential rate) while others are over-filled by government decree. In terms of Figure I.1, most TRQs are effectively equal to, or to the right of, MAX total imports. For these TRQs, expanding the quota implies that the quota is shifted even further to the right of MAX total imports, which is equivalent to relaxing a non-binding constraint. Quota expansion should affect those TRQs in the QUOTA regime and maybe those in the T2 regime, depending on the relationship between the MIN import point and the quota. The empirical results confirm that this is indeed the case.[16]

The gradual 50% quota expansion scenario leads to quota volumes at the end of the period (2005) which are 50% greater than the volumes in 2000. This expansion in volume is insufficient to generate very large changes in world markets. As reported in Table I.12 changes in world prices of each commodity for each year relative to TRQBASE, are almost nil.

Since quotas and tariffs are commodity and country specific, examining the various liberalisation results on their effects on specific markets is more illuminating. The magnitude of changes for any liberalisation scenario for any commodity in any country depends on domestic factors too. These pivot around what internal market regime is in operation, accompanying policies, the extent to which these allow world price signals to transmit to the domestic market, and the elasticity of demand and supply.

Table I.13 reports the results of the 50% quota expansion on the domestic markets of select commodities and countries. Beef imports in the EU were constrained by the quota and expanding the quota results in increased imports and lower domestic price. In Canada, butter and cheese imports were also constrained by the quota and expanding the quota leads to a one-for-one expansion in imports but no change in domestic prices since these continue to be determined by domestic policies. A similar pattern appears in the imports of the other commodities in the Quad, which were restrained by quotas. In those years where the quota is binding, expanding the quota leads to an expansion in imports, but the general effects on domestic prices are relatively small. In cases where the quota is not binding, either because imports are greater than the quota (for dairy products in the US for most years, butter and cheese in the EU for most years), or imports are below the quota (butter and skim milk powder in Japan or beef in the US for example), this mechanism has limited effects in increasing market

Table I.12. **Relative change in world price of selected commodities: TRQBASE relative to alternative scenarios**

Per cent

	2001	2002	2003	2005	2005
Gradual 50% TRQ expansion					
Beef and veal (Pacific market)	0.0	0.0	0.0	0.0	0.0
Beef and veal (Mercosur market)	0.2	0.3	0.3	0.4	0.4
Pigmeat (Pacific market)	0.0	0.0	0.1	0.1	0.0
Butter	0.5	0.3	0.1	0.9	1.4
Cheese	1.5	0.7	1.3	0.7	0.3
Skim milk powder	0.3	0.7	1.0	0.8	0.7
Oilseeds	0.0	0.1	0.1	0.1	–0.1
Oilmeals	0.0	0.1	0.2	0.1	–0.1
Vegetable oils	0.0	0.0	0.0	0.0	0.1
Coarse grains	0.1	0.1	0.2	0.1	0.1
Rice	0.2	0.3	0.3	0.6	0.6
Wheat	0.0	0.0	0.0	0.0	–0.1
Gradual 50% TRQ expansion and 36% reduction in-quota tariffs					
Beef and veal (Pacific market)	0.1	0.3	0.5	0.6	0.6
Beef and veal (Mercosur market)	0.2	0.3	0.4	0.4	0.4
Pigmeat (Pacific market)	0.0	0.0	0.1	0.0	–0.1
Butter	0.8	0.8	0.8	2.0	2.3
Cheese	1.6	0.8	1.5	0.7	0.4
Skim milk powder	0.2	0.6	0.7	0.6	0.8
Oilseeds	0.0	0.1	0.1	0.0	–0.2
Oilmeals	0.0	0.2	0.1	0.0	–0.4
Vegetable oils	0.0	0.0	0.0	0.1	0.1
Coarse grains	0.2	0.2	0.2	0.1	0.2
Rice	0.2	0.3	0.4	0.6	0.6
Wheat	0.0	0.0	0.0	–0.1	–0.2
Gradual 36% reduction; out-of and non-quota tariffs					
Beef and veal (Pacific market)	0.0	0.1	0.2	0.4	0.6
Beef and veal (Mercosur market)	0.0	0.0	0.0	0.0	0.0
Pigmeat (Pacific market)	0.2	0.3	0.5	0.6	0.7
Butter	0.4	4.4	6.7	8.3	8.6
Cheese	2.4	3.7	4.1	3.2	4.7
Skim milk powder	0.7	0.3	0.2	0.5	0.8
Oilseeds	0.0	0.0	0.0	0.1	0.0
Oilmeals	0.0	0.0	0.0	0.0	0.0
Vegetable oils	0.1	0.3	0.6	0.8	0.9
Coarse grains	0.0	0.1	0.1	0.1	0.1
Rice	0.0	0.0	0.0	0.1	0.1
Wheat	0.1	0.1	0.2	0.2	0.3
Gradual 36% reduction; in- out-of and non-quota tariffs and 50% TRQ expansion					
Beef and veal (Pacific market)	0.2	0.4	0.6	0.9	1.2
Beef and veal (Mercosur market)	0.2	0.4	0.4	0.4	0.4
Pigmeat (Pacific market)	0.2	0.4	0.6	0.9	1.2
Butter	0.9	5.1	7.6	9.5	9.6
Cheese	3.2	4.7	4.2	3.5	5.0
Skim milk powder	0.9	0.8	1.0	1.1	1.9
Oilseeds	0.0	0.1	0.2	0.1	–0.2
Oilmeals	0.0	0.1	0.1	0.0	–0.4
Vegetable oils	0.1	0.4	0.6	0.8	0.9
Coarse grains	0.2	0.3	0.3	0.2	0.3
Rice	0.2	0.3	0.4	0.6	0.7
Wheat	0.1	0.2	0.2	0.2	0.1

Source: OECD Secretariat.

access. Furthermore, for commodities without a TRQ regime in Korea or Poland for example, expanding quota volumes has minimal effects. The primary avenue for changes in markets without a TRQ regime when quotas expand is through changes in relative prices. Since world prices were little affected, the products shown for Korea and Poland are little changed.

Regime switches can occur with or without policy changes, as a result of changing market conditions. That is, given tariff levels, the MAX and MIN import points shown in Figure I.1 will shift in response to changes in demand and supply. Where quotas are in the T2 regime and assuming everything else constant, quota expansion contains the possibility of a regime switch to either the QUOTA or the T1 regime, depending on the level of quota expansion. In our case, there were several regime switches when quotas expanded. In the EU, the butter TRQ switched from the T2 regime to the QUOTA regime, as quota expansion resulted in the quota increasing beyond the MIN import point. The larger quota volume enabled greater butter imports compared to the quota-constrained imports in TRQBASE. The skim milk powder TRQ on the other hand switched from the QUOTA to the T1 regime as the quota expanded beyond the MAX import point. In the US, the butter and cheese TRQs switched regimes during the projections period. The butter TRQ switched from the QUOTA to the T2 regime and back to the QUOTA regime. The cheese TRQ exhibited more frequent regime switches switched from the QUOTA to the T2 to the QUOTA and T2 again, as changing demand and supply conditions resulted in shifting MIN and MAX points relative to the expanding quota.

Changing the quota volume where it does constrain imports (that is where it is the binding instrument) has implications on the value of the rents that are available in the system. The added volume implies that rents could increase, but added imports (in cases where domestic policies do not hinder such increases) also put downward pressure on the price pulling the rents in the opposite direction. The net effect depends on the elasticities and whether there have been regime switches. In cases where domestic prices do not fall and there is not a regime switch, the result is unequivocal. Quota expansion results in larger rents. Examination of these issues will be undertaken in subsequent analysis.

TRQ *expansion and in-quota tariff reduction*

In this scenario, we are simultaneously relaxing two instruments, the quota and the in-quota rate. We expect, in addition to the TRQs that responded to the previous scenario, the TRQs that are under-filled, *i.e.* in the T1 regime, to also respond. Referring to Figure I.1, this scenario, in addition to shifting the quota out to the right also shifts ED_1 to the right These movements should lead to more imports, lower domestic prices and higher world prices. The empirical question is "by how much"? The results, reported in Table I.12, suggest that the answer is "not much". By the end of the period, when the full effect of the two instruments occurs, only the world price for butter, at 2% is slightly higher, with world prices of SMP, beef, and rice almost 1% greater than TRQBASE.

Effects on the domestic prices of the most commodities in the selected countries are also muted. As shown in Table I.14, the only non-zero price change greater than 1% in the Quad, is in the EU's beef and butter market at the end of the period, Japan's SMP market and US butter market. Response in the markets for products where the quotas constrain trade is similar as reported above – imports expand as quotas expand with minimal effects on domestic prices, principally because of domestic policies. Imports of products with under-fill, (for example Japanese SMP) expand and domestic price falls, however. In this scenario, Poland's markets also respond. Poland uses applied tariffs to administer the TRQs reported in the table. These respond to lower in-quota tariffs leading to higher imports and lower domestic prices relative to TRQBASE.

In the EU, lowering the in-quota rate and expanding the beef TRQ in the model leads to higher imports (20% higher by the end of the period) and a domestic price that is 6% lower. The EU's imports of SMP are also higher. Whereas simply expanding the TRQ resulted in under-fill in the last two years (T1 regime), reducing the in-quota rate at the same time leads to the quota being filled throughout the period (QUOTA regime). Domestic price is little affected because of our assumption regarding domestic price response and the fact that the quota, and not the in-quota rate, determines domestic price.

The effects of our assumptions on EU's domestic market can be demonstrated in the case of coarse grains. Where the TRQ is under-filled, expanding the quota has no effect as demonstrated with the previous scenario. Reducing the in-quota rates should solicit some response. Imports are substantially above TRQBASE, about 66% higher at the end of the period. Relative to TRQBASE, lower in-quota rate

Table I.13. **Effects in selected domestic markets TRQBASE relative to TRQEXP50**

	Commodity		2001	2002	2003	2004	2005
Canada	Butter	TRQ (000 tons)	3.6	3.9	4.3	4.6	4.9
		Imports_bln[1] (000 tons)	3.3	3.3	3.3	3.3	3.3
		Imports_trq[2] (000 tons)	3.6	3.9	4.3	4.6	4.9
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	22.4	24.5	26.5	28.6	30.6
		Imports_bln (000 tons)	20.4	20.4	20.4	20.4	20.4
		Imports_trq (000 tons)	22.4	24.5	26.5	28.6	30.6
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
European Union	Beef and veal	TRQ (000 tons)	269.9	294.4	319.0	343.5	368.0
		Imports_bln (000 tons)	374.0	374.3	374.1	372.7	368.6
		Imports_trq (000 tons)	269.9	294.4	319.0	343.5	368.0
		Total[3]	398.6	423.6	448.1	471.5	493.1
		Change in domestic price (%)	–0.3	–0.9	–1.5	–2.2	–6.3
	Butter	TRQ (000 tons)	95.3	104.0	112.7	121.3	130.0
		Imports_bln (000 tons)	123.4	124.3	116.3	110.6	109.2
		Imports_trq (000 tons)	108.2	117.7	116.6	121.3	130.0
		Total	131.0	140.4	139.2	143.9	152.5
		Change in domestic price (%)	–0.3	–0.6	–0.8	–1.0	–1.3
	Cheese	TRQ (000 tons)	112.4	122.6	132.9	143.1	153.3
		Imports_bln (000 tons)	291.6	280.1	273.1	264.1	261.1
		Imports_trq (000 tons)	240.7	248.9	255.5	269.2	281.9
		Total	306.9	315.9	323.2	337.3	350.7
		Change in domestic price (%)	–0.2	–0.6	–0.8	–0.3	–0.7
	SMP	TRQ (000 tons)	74.8	81.6	88.4	95.2	102.0
		Imports_bln (000 tons)	81.8	81.6	81.2	75.5	65.8
		Imports_trq (000 tons)	74.8	81.6	88.4	84.3	76.9
		Total	88.6	95.2	101.7	97.3	89.6
		Change in domestic price (%)	–0.2	–0.4	–0.6	–0.2	–0.1
	Coarse grains	TRQ (000 tons)	3 104.5	3 386.8	3 669.0	3 951.2	4 233.5
		Imports_bln (000 tons)	1 972.7	1 661.6	1 423.9	1 325.4	1 316.7
		Imports_trq (000 tons)	1 546.2	1 306.5	1 100.6	1 043.9	1 091.9
		Total	2 102.9	1 865.5	1 661.1	1 608.3	1 660.2
		Change in domestic price (%)	–0.1	–0.2	–0.3	–0.3	–0.4
	Wheat	TRQ (000 tons)	385.0	420.0	455.0	490.0	525.0
		Imports_bln (000 tons)	2 414.2	2 373.4	2 379.3	2 338.6	2 290.7
		Imports_trq (000 tons)	365.1	288.1	273.4	231.6	185.9
		Total	2 446.2	2 419.2	2 439.0	2 400.8	2 347.3
		Change in domestic price (%)	0.0	–0.1	–0.1	–0.1	–0.2
Japan	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	993.6	1 000.5	1 030.5	1 041.3	1 065.3
		Imports_trq (000 tons)	993.6	1 000.6	1 030.5	1 041.4	1 065.3
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Butter	TRQ (000 tons)	0.5	0.6	0.6	0.7	0.7
		Imports_bln (000 tons)	0.0	0.0	0.0	0.0	0.0
		Imports_trq (000 tons)	0.0	0.0	0.0	0.0	0.0
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	194.5	200.2	206.3	212.4	219.0
		Imports_trq (000 tons)	194.3	200.1	206.1	212.3	218.9
		Change in domestic price (%)	1.5	0.7	1.3	0.7	0.3
	SMP	TRQ (000 tons)	105.6	115.2	124.8	134.4	144.0
		Imports_bln (000 tons)	54.4	51.9	51.9	50.4	50.1
		Imports_trq (000 tons)	54.3	51.8	51.9	50.3	50.0
		Change in domestic price (%)	0.2	0.6	0.7	0.6	0.5
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	19 944.0	20 163.4	19 891.7	20 206.2	20 165.8
		Imports_trq (000 tons)	19 942.3	20 163.0	19 891.7	20 207.3	20 164.2
		Change in domestic price (%)	0.0	0.0	0.1	0.0	0.0
	Wheat	TRQ (000 tons)	6 314.0	6 888.0	7 462.0	8 036.0	8 610.0
		Imports_bln (000 tons)	5 824.2	5 869.3	5 898.5	5 931.4	5 977.4
		Imports_trq (000 tons)	5 824.2	5 869.3	5 898.6	5 931.4	5 977.1
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0

Table I.13. **Effects in selected domestic markets TRQBASE relative to TRQEXP50** (*cont.*)

	Commodity		2001	2002	2003	2004	2005
Korea	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	217.3	234.2	284.2	327.5	382.1
		Imports_trq (000 tons)	217.3	234.2	284.2	327.5	382.0
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	64.6	n.a.
		Imports_bln (000 tons)	8 413.6	8 581.7	8 374.0	65.3	8 449.9
		Imports_trq (000 tons)	8 410.5	8 576.9	8 366.7	8 369.8	8 434.1
		Change in domestic price (%)	0.1	0.1	0.1	0.1	0.1
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	3 506.8	3 598.3	4 235.0	4 417.3	3 890.2
		Imports_trq (000 tons)	3 512.1	3 608.4	4 255.3	4 434.7	3 915.5
		Change in domestic price (%)	0.0	0.0	0.0	0.0	–0.1
Poland	Butter	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–9.7	–11.6	–8.3	–6.1	–2.2
		Net trade_trq (000 tons)	–9.3	–11.3	–8.2	–5.2	–0.9
		Change in domestic price (%)	0.5	0.3	0.1	0.9	1.4
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	36.9	45.5	54.3	64.6	65.0
		Net trade_trq (000 tons)	38.4	46.3	55.8	50.7	50.7
		Change in domestic price (%)	1.5	0.7	1.3	0.7	0.3
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–70.9	–44.5	–65.7	–132.6	–122.3
		Net trade_trq (000 tons)	–73.3	–48.0	–73.2	–148.3	–148.9
		Change in domestic price (%)	0.1	0.2	0.2	0.1	0.1
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–118.2	–14.0	154.2	286.9	228.2
		Net trade_trq (000 tons)	–120.0	–17.6	147.6	276.0	211.3
		Change in domestic price (%)	0.0	0.0	0.0	0.0	–0.2
United States	Beef and veal	TRQ (000 tons)	1 860.1	2 029.2	2 198.3	2 367.4	2 536.5
		Imports_bln (000 tons)	1 283.0	1 189.3	1 125.2	1 149.1	1 230.9
		Imports_trq (000 tons)	1 283.0	1 189.4	1 125.4	1 149.0	1 230.5
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Butter	TRQ (000 tons)	10.1	11.1	12.0	12.9	13.8
		Imports_bln (000 tons)	9.2	17.8	32.9	12.7	9.2
		Imports_trq (000 tons)	10.1	17.3	32.7	12.9	13.8
		Change in domestic price (%)	–0.7	0.1	0.0	–0.9	–2.3
	Cheese	TRQ (000 tons)	121.0	132.0	143.0	154.0	165.0
		Imports_bln (000 tons)	148.6	186.6	198.4	164.1	214.8
		Imports_trq (000 tons)	121.0	143.4	143.6	154.0	176.5
		Total	159.7	183.5	184.5	195.7	218.8
		Change in domestic price (%)	–0.5	0.4	0.8	–1.6	0.2
	SMP	TRQ (000 tons)	2.2	2.4	2.6	2.8	3.0
		Imports_bln (000 tons)	13.2	33.7	25.9	20.9	13.9
		Imports_trq (000 tons)	12.5	32.3	24.1	18.7	12.3
		Change in domestic price (%)	0.2	0.5	0.7	0.5	0.5

1. Imports from TRQBASE.
2. Imports of TRQ component from scenario.
3. Total imports from scenario.

Source: OECD Secretariat.

and an expanded TRQ allow for increased imports. However, because of our assumptions on price determination in the EU markets, there is little change in the domestic price. There is no reaction in EU's wheat market to the lower in-quota tariffs even though the quota is under-filled because the in-quota rate is at zero.

In Japan's SMP market, expanding the quota has no effect since it is under-filled, but lowering in-quota tariffs, by the end of the period when the full effects are in place, results in about a 1% increase in imports and a 3% reduction in price.

Table I.14. **Changes in selected domestic markets: TRQEXPT1 relative to TRQBASE**

	Commodity		2001	2002	2003	2004	2005
Canada	Butter	TRQ (000 tons)	3.6	3.9	4.3	4.6	4.9
		Imports_bln[1] (000 tons)	3.3	3.3	3.3	3.3	3.3
		Imports_trq[2] (000 tons)	3.6	3.9	4.3	4.6	4.9
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	22.4	24.5	26.5	28.6	30.6
		Imports_bln (000 tons)	3.3	3.3	3.3	3.3	3.3
		Imports_trq (000 tons)	22.4	24.5	26.5	28.6	30.6
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
European Union	Beef and veal	TRQ (000 tons)	269.9	294.4	319.0	343.5	368.0
		Imports_bln (000 tons)	374.0	374.3	374.1	372.7	368.6
		Imports_trq (000 tons)	269.9	294.4	319.0	343.5	368.0
		Total[3]	398.6	423.6	448.1	471.5	493.1
		Change in domestic price (%)	–0.3	–0.9	–1.5	–2.3	–6.5
	Butter	TRQ (000 tons)	95.3	104.0	112.7	121.3	130.0
		Imports_bln (000 tons)	123.4	124.3	116.3	110.6	109.2
		Imports_trq (000 tons)	107.7	116.7	115.1	121.3	130.0
		Total	130.4	139.4	137.7	143.9	152.5
		Change in domestic price (%)	–0.2	–0.6	–0.8	–0.9	–1.1
	Butter	TRQ (000 tons)	112.4	122.6	132.9	143.1	153.3
		Imports_bln (000 tons)	291.6	280.1	273.1	264.1	261.1
		Imports_trq (000 tons)	240.4	248.6	255.0	269.1	281.3
		Total	306.7	315.7	322.6	337.1	350.1
		Change in domestic price (%)	–0.2	–0.6	–0.8	–0.3	–0.7
	SMP	TRQ (000 tons)	74.8	81.6	88.4	95.2	102.0
		Imports_bln (000 tons)	81.8	81.6	81.2	75.5	65.8
		Imports_trq (000 tons)	74.8	81.6	88.4	95.2	102.0
		Total	88.6	95.2	101.7	108.2	114.8
		Change in domestic price (%)	–0.2	–0.4	–0.6	–0.5	–0.8
	Coarse grains	TRQ (000 tons)	3 104.5	3 386.8	3 669.0	3 951.2	4 233.5
		Imports_bln (000 tons)	1 972.7	1 661.6	1 423.9	1 325.4	1 316.7
		Imports_trq (000 tons)	1 680.8	1 540.0	1 397.8	1 433.8	1 612.6
		Total	2 237.6	2 099.2	1 958.6	1 998.5	2 181.2
		Change in domestic price (%)	–0.1	–0.3	–0.5	–0.6	–0.8
	Wheat	TRQ (000 tons)	385.0	420.0	455.0	490.0	525.0
		Imports_bln (000 tons)	2 414.2	2 373.4	2 379.3	2 338.6	2 290.7
		Imports_trq (000 tons)	364.9	287.9	273.2	231.8	186.3
		Total	2 445.6	2 418.1	2 437.6	2 399.7	2 346.2
		Change in domestic price (%)	0.0	–0.1	–0.1	–0.2	–0.3
Japan	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	993.6	1 000.5	1 030.5	1 041.3	1 065.3
		Imports_trq (000 tons)	993.2	999.8	1 029.4	1 039.8	1 063.2
		Change in domestic price (%)	0.1	0.1	0.2	0.2	0.2
	Butter	TRQ (000 tons)	0.5	0.6	0.6	0.7	0.7
		Imports_bln (000 tons)	0.0	0.0	0.0	0.0	0.0
		Imports_trq (000 tons)	0.0	0.0	0.0	0.0	0.0
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	194.5	200.2	206.3	212.4	219.0
		Imports_trq (000 tons)	194.3	200.1	206.1	212.3	218.9
		Change in domestic price (%)	1.6	0.8	1.5	0.7	0.4
	SMP	TRQ (000 tons)	105.6	115.2	124.8	134.4	144.0
		Imports_bln (000 tons)	54.4	51.9	51.9	50.4	50.1
		Imports_trq (000 tons)	54.4	52.1	52.2	50.7	50.5
		Change in domestic price (%)	–0.5	–1.0	–1.7	–2.5	–3.2
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	19 944.0	20 163.4	19 891.7	20 206.2	20 165.8
		Imports_trq (000 tons)	19 941.1	20 162.9	19 891.3	20 207.2	20 161.5
		Change in domestic price (%)	0.1	0.1	0.1	0.0	0.1
	Wheat	TRQ (000 tons)	6 314.0	6 888.0	7 462.0	8 036.0	8 610.0
		Imports_bln (000 tons)	5 824.2	5 869.3	5 898.5	5 931.4	5 977.4
		Imports_trq (000 tons)	5 824.2	5 869.4	5 898.6	5 931.3	5 976.9
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0

Table I.14. **Changes in selected domestic markets: TRQEXPT1 relative to TRQBASE** (*cont.*)

	Commodity		2001	2002	2003	2004	2005
Korea	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	217.3	234.2	284.2	327.5	382.1
		Imports_trq (000 tons)	217.2	235.5	288.2	335.2	394.1
		Change in domestic price (%)	–0.6	–2.1	–3.6	–5.1	–6.7
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	8 413.6	8 581.7	8 374.0	8 378.7	8 449.9
		Imports_trq (000 tons)	8 407.1	8 567.0	8 345.6	8 337.5	8 382.9
		Change in domestic price (%)	0.2	0.2	0.2	0.1	0.1
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	3 506.8	3 598.3	4 235.0	4 417.3	3 890.2
		Imports_trq (000 tons)	3 518.0	3 611.7	4 251.5	4 412.2	3 883.6
		Change in domestic price (%)	0.0	0.0	0.0	–0.1	–0.2
Poland	Butter	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–9.7	–11.6	–8.3	–6.1	–2.2
		Net trade_trq (000 tons)	–10.9	–14.8	–13.6	–12.6	–10.6
		Change in domestic price (%)	–1.3	–3.4	–5.4	–6.4	–8.2
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	36.9	45.5	54.3	64.6	65.0
		Net trade_trq (000 tons)	36.5	42.2	49.6	56.7	54.1
		Change in domestic price (%)	–0.3	–3.0	–4.2	–6.8	–9.0
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–70.9	–44.5	–65.7	–132.6	–122.3
		Net trade_trq (000 tons)	–58.5	–8.1	–1.3	–43.2	–0.3
		Change in domestic price (%)	0.2	0.2	0.3	0.1	0.2
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–118.2	–14.0	154.2	286.9	228.2
		Net trade_trq (000 tons)	–116.5	–8.2	165.2	302.7	249.1
		Change in domestic price (%)	0.0	0.0	0.0	–0.1	–0.3
United States	Beef and veal	TRQ (000 tons)	1 860.1	2 029.2	2 198.3	2 367.4	2 536.5
		Imports_bln (000 tons)	1 283.0	1 189.3	1 125.2	1 149.1	1 230.9
		Imports_trq (000 tons)	1 286.6	1 197.4	1 138.4	1 167.8	1 256.4
		Change in domestic price (%)	–0.1	–0.1	–0.1	–0.2	–0.4
	Butter	TRQ (000 tons)	10.1	11.1	12.0	12.9	13.8
		Imports_bln (000 tons)	9.2	17.8	32.9	12.7	9.2
		Imports_trq (000 tons)	10.1	16.9	32.0	12.9	13.8
		Change in domestic price (%)	–0.6	0.4	0.4	–0.9	–2.3
	Cheese	TRQ (000 tons)	121.0	132.0	143.0	154.0	165.0
		Imports_bln (000 tons)	148.6	186.6	198.4	164.1	214.8
		Imports_trq (000 tons)	121.0	142.4	143.0	154.0	175.4
		Total	159.7	182.6	183.8	195.7	217.8
		Change in domestic price (%)	–0.6	0.4	0.8	–1.6	0.2
	SMP	TRQ (000 tons)	2.2	2.4	2.6	2.8	3.0
		Imports_bln (000 tons)	13.2	33.7	25.9	20.9	13.9
		Imports_trq (000 tons)	12.7	32.7	24.6	18.9	12.2
		Change in domestic price (%)	0.1	0.4	0.5	0.4	0.5

1. Imports from TRQBASE.
2. Imports of TRQ component from scenario.
3. Total imports from scenario.

Source: OECD Secretariat.

The results from these scenarios suggest that for the Aglink products examined, reducing the in-quota rate and expanding the quota at the prescribed levels do not materially change price, many of which are fixed by domestic policies, while increasing imports in a few markets. Lowering in-quota tariffs expands imports in cases of under-fill and in other markets as relative prices change. The magnitude of the expansion depends upon the price elasticity of demand. For many products, these elasticities are relatively low, limiting the trade impacts. In some cases, lowering the in-quota tariff expands imports but the magnitude is constrained by the fact that the quota becomes binding. In these

cases, the positive effect of increased access and better utilisation of resources may be offset by a potentially negative effect of introducing quota rents and rent-seeking behaviour. Reducing in-quota rates can lead to lower tariff revenues from in-quota imports if imports do not respond sufficiently and may lead to higher rents in cases where the quotas continue to bind imports. The quota expansion results can be considered as representing the "best" outcome because the analysis does not assume quota administration inefficiencies; exporters respond to market signals and the lowest cost exporters always have access to the import markets. Quota rents are potentially available. In this analysis, the quota rents do not cause inefficiencies, rather, it is implicitly assumed that they are auctioned.

Although more complete analysis of the issue of market access and quota rents is planned, an illustration may be helpful to highlight some of the factors and the interplay among them. Any country and commodity where the quota is the binding instrument can be used to illustrate the points. Calculating quota rents and tariff revenues is not the focus of this exercise, but a simple illustration is used to point out the potential shortcoming of quota expansion and in-quota tariff reduction. For our example, we use the Canadian butter TRQ. As shown above, quota expansion results in an equivalent increase in Canadian butter imports. Lowering in-quota tariff rates has no additional influence on this TRQ since it is in the QUOTA regime. However, lowering the in-quota rate converts tariff revenue into quota rents and potentially redistributes the proceeds from the Canadian government to domestic or foreign entities, depending upon the quota administration method.

In TRQBASE, Canada's butter quota at the end of the period generates tariff revenues (from in-quota tariffs) equal to about CAD 591 000 and quota rents of CAD 9 901 000. When the quota is increased 50% and as it is the binding instrument, the end period tariff revenue increases 52% to CAD 898 000 while quota rents increase 48% to CAD 14 680 000. When the quota expansion also includes in-quota rate reduction, imports do not change relative to TRQBASE, but some of the tariff revenue is converted into quota rents. Reducing in-quota tariff rates by 36% leads to a reduction in the tariff revenue from CAD 898 000 to CAD 580 000 while quota rents increase to CAD 14 880 000. In general, the relative increase in tariff revenue and quota rents will depend on the tariff level, the demand and supply elasticities and to the extent that increased imports lead to lower domestic prices. In Canada's case, the domestic price does not fall due to domestic policies. Other quotas in other countries may behave differently to lower in-quota tariffs. The example illustrates that there are potential pitfalls when quotas are expanded even as they increase imports. Reasons for market liberalisation include more efficient allocation of resources and increase in consumer welfare. Increased imports, when supplied by the lowest cost exporters, contribute to this. The example illustrates that some instruments that can generate additional market access may not necessarily also provide these benefits. Consumers do not necessarily benefit while potentially inefficient rent seeking behaviour may be encouraged when only quotas are expanded and domestic prices do not adjust.

Out-of-quota and non-quota tariff reduction

The next scenario examined is the effect from a gradual and uniform 36% reduction in the out-of-quota and non-quota rate. This is implemented, as in the in-quota reduction case at the aggregation level for Aglink products. This implies a uniform reduction of 36% for all the tariff lines that are included in Aglink product definition. We do not examine the scope of strategic tariff reductions at the tariff line to minimise the implied reduction. In terms of Figure I.1, this is a rotation of ED_2 to the right. Expectations are that for non-quota products and those in the T2, or QUOTA regime, lower out-of-quota and non-quota tariffs, (once these fall below applied rates where applicable) should lead to increased imports, lower domestic prices in import markets and higher world prices.

Results of this scenario on world prices are reported in Table I.12. In contrast to the quota and in-quota tariff reduction scenarios, the results indicate somewhat larger changes in world prices as more products are affected. The largest change relative to TRQBASE is in dairy products. World demand for butter imports is 5% above TRQBASE while total import demand for cheese is 29% higher at the end of the period when the full tariff reductions are in place. The world price for butter at the end of the

period is 8.6% above the level in TRQBASE while the cheese price is almost 5% higher. Prices for beef, pork, and vegetable oils are about 1% higher, but cereal prices are little changed.

Table I.15 presents the results of the scenario on the selected domestic markets. The effects of domestic policies are once again evident in that several countries' support for producers prevents full price transmission. In markets where domestic policies are not preventing transmission of lower tariffs, the results are substantial and conform to expectations. In markets where support prices or domestic policies are operating, the results indicate that the response is muted.

For example, the 36% reduction in the out-of-quota tariff in Canada's butter and cheese markets is insufficient to make the support price redundant. It is still the relevant price that producers receive and consumers pay and imports are constrained by the quota. Results in the EU markets are mixed and are also influenced by domestic policies and our assumption on how they operate in the model. Reducing tariffs by 36% is insufficient to allow out-of-quota beef imports, the quota is still the binding instrument and the domestic price and imports are little changed from TRQBASE. Similarly, lower out-of- and non-quota tariffs have very little effect on EU's wheat and coarse grain markets. The quota in both of these markets was under-filled; hence lowering out-of-quota tariffs has no direct effect on imports.

Reduced tariffs have larger effects on EU's dairy markets but not necessarily in ways anticipated, because of the confluence of border and domestic policies. In the butter market, lower out-of-quota tariffs make the quota redundant and lead to larger imports and a lower domestic price. The butter TRQ in the previous scenarios was initially in the T2 regime and as the quota expanded, the regime switched to the QUOTA regime in the later years. This is not the case for this scenario. Out-of-quota imports occur throughout the projection period (there is no switch out of the T2 regime) increasing each year. By the end of the period, imports are 69% higher while the domestic price is only 1.5% lower, which is consistent with the assumption that the EU will maintain support prices.

Results in the cheese market are interesting because they are contrary to expectations and point to a possible weakness of the modelling approach. The cheese producer price in the EU is above the tariff-inclusive world price in both BASELINE and TRQBASE, hence, there are out-of-quota cheese imports in all scenarios, *i.e.* EU's cheese market is in the T2 regime. Given our assumption on domestic price determination, imports increase exponentially under this condition. With the lower out-of-quota rate in this scenario, the tariff-inclusive world price falls relative to the domestic price and imports are significantly higher. Exports are not exogenous but respond to prices. The EU's cheese exports, in response to higher tariff-excluding world price, expand relative to TRQBASE and are some 62% higher at the end of the period.[17] The net effect of these opposite reactions is to increase the EU's net trade position (exports minus imports) by almost 80% at the end of the period. Lower availability in the domestic market results in slightly higher cheese price relative to TRQBASE.

Our *ad hoc* representation of EU's two-way trade may not be satisfactory. Given Aglink's structure and the constraints mentioned previously, it is not clear that alternative specifications, short of significant modifications to the entire model, are available. As stated earlier, Aglink is fundamentally a net-trade model. We introduced endogenous imports because many of the products with TRQ regimes are also products that are exported with subsidies. Rather than ignoring the TRQ issue or assuming that exports are exogenous, we used this approach in order to say something about how changes in relative prices affect EU markets.

The results presented here depend on the relative responsiveness of imports and exports to changes in prices. Information is not currently available to determine the appropriate parameter values, hence, they are assumed. We assumed that the responsiveness should be relatively large in order to maintain producer price within a "reasonable" range of the support price. Export responsiveness in the BASELINE for most commodities is very large and usually has not been modified. The assumed import responsiveness is also large. The apparent contradiction between imports and export responses was not obvious in the results from previous scenarios as prices changed little.

The sensitivity of the results to the assumed import response parameter was tested. We increased the cheese import response parameter making imports even more responsive to changes in relative prices. The results were significantly different. At the end of the period, EU exports are three times

Table I.15. **Changes in selected domestic markets: TRQT2 relative to TRQBASE**

	Commodity		2001	2002	2003	2004	2005
Canada	Butter	TRQ (000 tons)	3.3	3.3	3.3	3.3	3.3
		Imports_bln[1] (000 tons)	3.3	3.3	3.3	3.3	3.3
		Imports_trq[2] (000 tons)	3.3	3.3	3.3	3.3	3.3
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	20.4	20.4	20.4	20.4	20.4
		Imports_bln (000 tons)	20.4	20.4	20.4	20.4	20.4
		Imports_trq (000 tons)	20.4	20.4	20.4	20.4	20.4
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
European Union	Beef and veal	TRQ (000 tons)	245.4	245.4	245.4	245.4	245.4
		Imports_bln (000 tons)	374.0	374.3	374.1	372.7	368.6
		Imports_trq (000 tons)	245.4	245.4	245.4	245.4	245.4
		Total[3]	374.0	374.3	374.1	372.7	368.6
		Change in domestic price (%)	0.0	0.0	0.0	0.0	–0.2
	Butter	TRQ (000 tons)	86.7	86.7	86.7	86.7	86.7
		Imports_bln (000 tons)	123.4	124.3	116.3	110.6	109.2
		Imports_trq (000 tons)	119.6	134.9	143.0	158.3	162.2
		Total	142.3	157.6	165.7	181.0	184.7
		Change in domestic price (%)	–0.7	–1.2	–1.6	–1.8	–1.5
	Cheese	TRQ (000 tons)	102.2	102.2	102.2	102.2	102.2
		Imports_bln (000 tons)	291.6	280.1	273.1	264.1	261.1
		Imports_trq (000 tons)	239.0	243.3	259.8	286.3	311.6
		Total	305.2	310.3	327.1	353.8	379.2
		Change in domestic price (%)	–0.2	–0.4	–0.1	1.0	1.8
	SMP	TRQ (000 tons)	68.0	68.0	68.0	68.0	68.0
		Imports_bln (000 tons)	81.8	81.6	81.2	75.5	65.8
		Imports_trq (000 tons)	68.0	68.0	68.0	68.0	59.8
		Total	81.8	81.5	81.2	80.8	72.3
		Change in domestic price (%)	0.3	0.6	1.1	2.2	3.0
	Coarse grains	TRQ (000 tons)	2 822.3	2 822.3	2 822.3	2 822.3	2 822.3
		Imports_bln (000 tons)	1 972.7	1 661.6	1 423.9	1 325.4	1 316.7
		Imports_trq (000 tons)	1 414.8	1 100.3	859.4	758.0	744.7
		Total	1 971.5	1 659.3	1 420.0	1 322.7	1 313.9
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Wheat	TRQ (000 tons)	350.0	350.0	350.0	350.0	350.0
		Imports_bln (000 tons)	2 414.2	2 373.4	2 379.3	2 338.6	2 290.7
		Imports_trq (000 tons)	331.8	239.7	209.6	164.5	122.9
		Total	2 413.2	2 372.1	2 377.5	2 336.9	2 289.3
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.1
Japan	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	993.6	1 000.5	1 030.5	1 041.3	1 065.3
		Imports_trq (000 tons)	992.2	999.8	1 035.0	1 051.5	1 081.7
		Change in domestic price (%)	0.0	–0.3	–1.1	–1.9	–2.8
	Butter	TRQ (000 tons)	0.5	0.5	0.5	0.5	0.5
		Imports_bln (000 tons)	0.0	0.0	0.0	0.0	0.0
		Imports_trq (000 tons)	0.0	0.0	0.0	0.0	2.4
		Change in domestic price (%)	0.0	0.0	0.0	0.0	–5.8
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	194.5	200.2	206.3	212.4	219.0
		Imports_trq (000 tons)	194.3	200.0	206.3	212.7	219.3
		Change in domestic price (%)	1.4	1.2	0.2	–2.2	–2.2
	SMP	TRQ (000 tons)	96.0	96.0	96.0	96.0	96.0
		Imports_bln (000 tons)	54.4	51.9	51.9	50.4	50.1
		Imports_trq (000 tons)	54.3	51.8	51.9	50.2	49.9
		Change in domestic price (%)	0.5	0.2	0.2	0.4	0.6
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	19 944.0	20 163.4	19 891.7	20 206.2	20 165.8
		Imports_trq (000 tons)	19 943.4	20 156.2	19 872.0	20 172.1	20 112.7
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Wheat	TRQ (000 tons)	5 740.0	5 740.0	5 740.0	5 740.0	5 740.0
		Imports_bln (000 tons)	5 824.2	5 869.3	5 898.5	5 931.4	5 977.4
		Imports_trq (000 tons)	5 824.1	5 868.9	5 897.8	5 930.2	5 975.6
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0

Table I.15. **Changes in selected domestic markets: TRQT2 relative to TRQBASE** (*cont.*)

	Commodity		2001	2002	2003	2004	2005
Korea	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	217.3	234.2	284.2	327.5	382.1
		Imports_trq (000 tons)	218.1	237.3	290.5	337.8	396.6
		Change in domestic price (%)	–1.5	–2.9	–4.4	–5.8	–7.2
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	8 413.6	8 581.7	8 374.0	8 378.7	8 449.9
		Imports_trq (000 tons)	8 385.9	8 527.9	8 297.0	8 283.3	8 323.0
		Change in domestic price (%)	0.0	0.0	0.1	0.1	0.1
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	3 506.8	3 598.3	4 235.0	4 417.3	3 890.2
		Imports_trq (000 tons)	3 592.9	3 746.2	4 464.5	4 696.0	4 213.0
		Change in domestic price (%)	–0.6	–1.0	–1.4	–1.6	–2.0
Poland	Butter	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–9.7	–11.6	–8.3	–6.1	–2.2
		Net trade_trq (000 tons)	–9.4	–7.7	–2.4	1.1	5.3
		Change in domestic price (%)	0.4	4.4	6.7	8.3	8.6
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	36.9	45.5	54.3	64.6	65.0
		Net trade_trq (000 tons)	39.4	49.4	58.7	68.0	70.2
		Change in domestic price (%)	2.4	3.7	4.1	3.2	4.7
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–70.9	–44.5	–65.7	–132.6	–122.3
		Net trade_trq (000 tons)	–79.4	–79.9	–136.0	–241.8	–273.2
		Change in domestic price (%)	0.0	0.1	0.1	0.1	0.1
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–118.2	–14.0	154.2	286.9	228.2
		Net trade_trq (000 tons)	–119.8	–20.1	141.1	265.9	199.1
		Change in domestic price (%)	0.1	0.2	0.3	0.3	0.5
United States	Beef and veal	TRQ (000 tons)	1 691.0	1 691.0	1 691.0	1 691.0	1 691.0
		Imports_bln (000 tons)	1 283.0	1 189.3	1 125.2	1 149.1	1 230.9
		Imports_trq (000 tons)	1 283.1	1 187.4	1 118.2	1 136.9	1 213.7
		Change in domestic price (%)	0.0	0.1	0.2	0.4	0.6
	Butter	TRQ (000 tons)	9.2	9.2	9.2	9.2	9.2
		Imports_bln (000 tons)	9.2	17.8	32.9	12.7	9.2
		Imports_trq (000 tons)	9.2	32.8	58.4	50.4	51.9
		Change in domestic price (%)	0.1	–5.6	–8.0	–10.6	–9.6
	Cheese	TRQ (000 tons)	110.0	110.0	110.0	110.0	110.0
		Imports_bln (000 tons)	148.6	186.6	198.4	164.1	214.8
		Imports_trq (000 tons)	143.5	228.2	310.0	378.0	528.2
		Total	182.3	269.0	352.0	421.0	572.5
		Change in domestic price (%)	–1.8	–4.1	–6.6	–9.8	–11.8
	SMP	TRQ (000 tons)	2.0	2.0	2.0	2.0	2.0
		Imports_bln (000 tons)	13.2	33.7	25.9	20.9	13.9
		Imports_trq (000 tons)	18.8	48.9	51.4	56.9	61.0
		Change in domestic price (%)	–2.2	–4.8	–7.1	–9.0	–10.7

1. Imports from TRQBASE.
2. Imports of TRQ component from scenario.
3. Total imports from scenario.

Source: OECD Secretariat.

larger and imports are almost seven times larger. The net trade position relative to the results above was halved, resulting in a domestic price that is about 3% lower. The large changes in the EU market lead to the doubling in world imports and a 3% increase in world price. Clearly this is an area that warrants further examination.

Japan's markets, as reported in Table I.15, are somewhat influenced by lower tariff rates. Reducing tariffs by 36% lead to the scheduled tariffs for beef and cheese to fall below the applied rates which leads to moderate declines in their domestic price, but imports are basically unaffected. Lower out-of-

quota tariffs however, by the end of the period have an impact on the butter market. Butter imports occur for the first time and they are above the quota level, which leads to almost a 6% reduction in price. This result assumes that the butter mark-up will not be altered to offset the changes in the out-of-quota tariff.

Data in Table I.9 show that the US out-of-quota tariff rates on dairy products are lower than the rates found in the other Quad countries. However, because in the model non-trade policies in US dairy markets are not inhibiting price transmission from world markets, lowering out-of-quota tariffs leads to significant increases in imports of dairy products. Since the beef market is in the T1 regime, lowering out-of-quota tariffs should have minimal effects. The results suggest that with the slightly higher world price, imports fall slightly causing larger under-fill. This reduces domestic availability leading to slightly higher domestic price.

Butter and SMP markets in previous scenarios were either in the QUOTA regime or the T2 regime. Expectations in these situations are that reducing out-of-quota tariffs should lead to increased imports and lower domestic prices. The results reported in Table I.15 bear this out. The tariff cut in the first projection year is insufficient to lead to out-of-quota imports and butter imports remain at the QUOTA regime. Subsequently, however, butter imports increase and at the end of the period are more than 450% higher, reducing domestic price by almost 10%. Domestic prices are also significantly lower and imports higher for cheese and SMP.

In Korea, import demand responds to the lower tariff rates as beef and wheat imports expand leading to lower prices. Lower out-of- and non-quota tariff rates do not directly affect the prices of Poland's commodities shown in Table I.15, as these depend on in-quota rates. However, Poland's dairy markets respond to the higher world butter and cheese price. The higher prices lead to lower import demand, changing Poland's butter net trade position.

Quota expansion and reduction of all tariffs

The final scenario examined is a combination of the previous three simultaneous expansion in quotas and reduction in the in-, out-of-, and non-quota tariffs, at the same rates as above. Results of this scenario on world prices are also reported in Table I.12. Price changes for most commodities are slightly amplified with the effects of lower out-of-quota and non-quota tariffs dominating the results.

The effects on the domestic markets are reported in Table I.16. In the domestic markets as in the world market, the results are not significantly different from the previous scenarios. Consequently, a detailed discussion of the results for this scenario is not presented. The results however indicate that for the countries and markets studied, there do not seem to be cumulative effects from liberalising all instruments. This result is consistent with the findings from the analytical model when it was stated that only one instrument at any time determines the relevant regime.

The empirical results reported here are illustrative of the type of changes that can be expected under alternative liberalisation scenarios. Although indicative of the relative importance of relaxing each of the instruments examined, they do not represent the full effects on global agricultural markets. The Aglink model covers only a portion of agricultural production and trade and we represent only a portion of the commodities with TRQs. The modelling framework itself precludes including all of the quotas and tariffs that were identified as Aglink products. The empirical results are also conditioned by the assumptions we made regarding the modelling framework, the price transmission specification, and how the data were aggregated. We have also implicitly assumed that during the projections period quotas administration mechanisms are not altered. Differences in any of those may lead to different results, especially in the magnitude of import and price changes.

TRQs are more complex and obtuse than we have assumed, by necessity, in our empirical analysis. For example, as described above, different TRQs may be scheduled for a given product, and each of these can be allocated to specific suppliers or to specific end-users. Each of the individual TRQs can be in any of the three regimes. It may be the case, for example, that one TRQ is completely filled while another is under filled due to the variety of reasons presented above. Under these circumstances,

Table I.16. **Changes in selected domestic markets: ALL relative to TRQBASE**

	Commodity		2001	2002	2003	2004	2005
Canada	Butter	TRQ (000 tons)	3.6	3.9	4.3	4.6	4.9
		Imports_bln[1] (000 tons)	3.3	3.3	3.3	3.3	3.3
		Imports_trq[2] (000 tons)	3.6	3.9	4.3	4.6	4.9
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
	Cheese	TRQ (000 tons)	22.4	24.5	26.5	28.6	30.6
		Imports_bln (000 tons)	20.4	20.4	20.4	20.4	20.4
		Imports_trq (000 tons)	22.4	24.5	26.5	28.6	30.6
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0
European Union	Beef and veal	TRQ (000 tons)	269.9	294.4	319.0	343.5	368.0
		Imports_bln (000 tons)	374.0	374.3	374.1	372.7	368.6
		Imports_trq (000 tons)	269.9	294.4	319.0	343.5	368.0
		Total[3]	398.6	423.6	448.1	471.4	493.1
		Change in domestic price (%)	–0.3	–0.9	–1.6	–2.4	–6.5
	Butter	TRQ (000 tons)	95.3	104.0	112.7	121.3	130.0
		Imports_bln (000 tons)	123.4	124.3	116.3	110.6	109.2
		Imports_trq (000 tons)	128.2	153.7	173.3	201.6	218.4
		Total	150.9	176.5	196.0	224.2	241.0
		Change in domestic price (%)	–1.0	–1.9	–2.6	–3.1	–3.1
	Cheese	TRQ (000 tons)	112.4	122.6	132.9	143.1	153.3
		Imports_bln (000 tons)	291.6	280.1	273.1	264.1	261.1
		Imports_trq (000 tons)	257.5	281.5	331.8	391.7	455.2
		Total	323.9	348.8	399.3	459.4	523.2
		Change in domestic price (%)	–0.5	–1.1	–0.6	0.4	1.1
	SMP	TRQ (000 tons)	74.8	81.6	88.4	95.2	102.0
		Imports_bln (000 tons)	81.8	81.6	81.2	75.5	65.8
		Imports_trq (000 tons)	74.8	81.6	88.4	95.2	102.0
		Total	88.6	95.2	101.6	108.0	114.5
		Change in domestic price (%)	0.1	0.2	0.9	2.1	2.6
	Coarse grains	TRQ (000 tons)	3 104.5	3 386.8	3 669.0	3 951.2	4 233.5
		Imports_bln (000 tons)	1 972.7	1 661.6	1 423.9	1 325.4	1 316.7
		Imports_trq (000 tons)	1 679.8	1 535.5	1 391.1	1 428.2	1 605.8
		Total	2 236.6	2 094.7	1 951.9	1 993.0	2 174.5
		Change in domestic price (%)	–0.1	–0.3	–0.5	–0.6	–0.8
	Wheat	TRQ (000 tons)	385.0	420.0	455.0	490.0	525.0
		Imports_bln (000 tons)	2 414.2	2 373.4	2 379.3	2 338.6	2 290.7
		Imports_trq (000 tons)	363.9	286.1	270.5	229.1	183.8
		Total	2 444.6	2 416.4	2 434.9	2 397.0	2 343.7
		Change in domestic price (%)	0.0	–0.1	–0.1	–0.2	–0.2
Japan	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	993.6	1 000.5	1 030.5	1 041.3	1 065.3
		Imports_trq (000 tons)	991.9	999.2	1 034.2	1 050.3	1 080.1
		Change in domestic price (%)	0.1	–0.2	–1.0	–1.8	–2.6
	Butter	TRQ (000 tons)	0.5	0.6	0.6	0.7	0.7
		Imports_bln (000 tons)	0.0	0.0	0.0	0.0	0.0
		Imports_trq (000 tons)	0.0	0.0	0.0	0.0	2.3
		Change in domestic price (%)	0.0	0.0	0.0	0.0	–5.6
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	194.5	200.2	206.3	212.4	219.0
		Imports_trq (000 tons)	194.3	199.9	206.3	212.7	219.2
		Change in domestic price (%)	2.1	2.2	0.3	–1.9	–2.0
	SMP	TRQ (000 tons)	105.6	115.2	124.8	134.4	144.0
		Imports_bln (000 tons)	54.4	51.9	51.9	50.4	50.1
		Imports_trq (000 tons)	54.4	52.0	52.1	50.6	50.3
		Change in domestic price (%)	0.0	–0.9	–1.5	–2.2	–2.4
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	19 944.0	20 163.4	19 891.7	20 206.2	20 165.8
		Imports_trq (000 tons)	19 940.7	20 155.4	19 871.9	20 173.3	20 108.5
		Change in domestic price (%)	0.1	0.1	0.1	0.1	0.1
	Wheat	TRQ (000 tons)	6 314.0	6 888.0	7 462.0	8 036.0	8 610.0
		Imports_bln (000 tons)	5 824.2	5 869.3	5 898.5	5 931.4	5 977.4
		Imports_trq (000 tons)	5 824.0	5 869.0	5 897.9	5 930.1	5 975.1
		Change in domestic price (%)	0.0	0.0	0.0	0.0	0.0

Table I.16. **Changes in selected domestic markets: ALL relative to TRQBASE** (*cont.*)

	Commodity		2001	2002	2003	2004	2005
Korea	Beef and veal	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	217.3	234.2	284.2	327.5	382.1
		Imports_trq (000 tons)	218.0	237.0	290.1	337.1	395.7
		Change in domestic price (%)	–1.4	–2.8	–4.1	–5.5	–6.9
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	8 413.6	8 581.7	8 374.0	8 378.7	8 449.9
		Imports_trq (000 tons)	8 380.0	8 519.7	8 286.2	8 273.5	8 304.6
		Change in domestic price (%)	0.2	0.2	0.3	0.1	0.2
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Imports_bln (000 tons)	3 506.8	3 598.3	4 235.0	4 417.3	3 890.2
		Imports_trq (000 tons)	3 604.0	3 765.4	4 498.0	4 721.9	4 251.8
		Change in domestic price (%)	–0.5	–1.0	–1.4	–1.7	–2.2
Poland	Butter	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–9.7	–11.6	–8.3	–6.1	–2.2
		Net trade_trq (000 tons)	–10.9	–11.0	–7.6	–5.9	–4.1
		Change in domestic price (%)	–1.2	0.8	1.0	0.5	–1.7
	Cheese	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	36.9	45.5	54.3	64.6	65.0
		Net trade_trq (000 tons)	38.2	46.4	52.6	59.7	59.3
		Change in domestic price (%)	1.2	0.8	–1.6	–4.2	–4.8
	Coarse grains	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–70.9	–44.5	–65.7	–132.6	–122.3
		Net trade_trq (000 tons)	–65.6	–40.0	–67.6	–140.9	–133.6
		Change in domestic price (%)	0.2	0.3	0.4	0.2	0.4
	Wheat	TRQ (000 tons)	n.a.	n.a.	n.a.	n.a.	n.a.
		Net trade_bln (000 tons)	–118.2	–14.0	154.2	286.9	228.2
		Net trade_trq (000 tons)	–117.6	–13.3	153.3	285.6	226.6
		Change in domestic price (%)	0.1	0.2	0.3	0.2	0.2
United States	Beef and veal	TRQ (000 tons)	1 860.1	2 029.2	2 198.3	2 367.4	2 536.5
		Imports_bln (000 tons)	1 283.0	1 189.3	1 125.2	1 149.1	1 230.9
		Imports_trq (000 tons)	1 286.8	1 196.6	1 134.0	1 161.3	1 248.1
		Change in domestic price (%)	0.0	0.0	0.0	0.1	0.1
	Butter	TRQ (000 tons)	10.1	11.1	12.0	12.9	13.8
		Imports_bln (000 tons)	9.2	17.8	32.9	12.7	9.2
		Imports_trq (000 tons)	10.1	32.5	57.2	48.4	49.2
		Change in domestic price (%)	–0.2	–5.3	–7.6	–10.0	–9.0
	Cheese	TRQ (000 tons)	121.0	132.0	143.0	154.0	165.0
		Imports_bln (000 tons)	148.6	186.6	198.4	164.1	214.8
		Imports_trq (000 tons)	134.8	212.5	302.7	369.4	520.9
		Total	173.6	253.2	344.7	412.4	565.2
		Change in domestic price (%)	–1.4	–3.5	–6.5	–9.6	–11.6
	SMP	TRQ (000 tons)	2.2	2.4	2.6	2.8	3.0
		Imports_bln (000 tons)	13.2	33.7	25.9	20.9	13.9
		Imports_trq (000 tons)	18.7	48.4	50.0	55.3	57.7
		Change in domestic price (%)	–2.0	–4.5	–6.6	–8.6	–9.9

1. Imports from TRQBASE.
2. Imports of TRQ component from scenario.
3. Total imports from scenario.

Source: OECD Secretariat.

expanding quotas can lead to increased imports of the one TRQ but not the other. When we aggregate the individual TRQs into a single quota for our empirical analysis, we lose the details of the components. If the aggregate TRQ is in the T1 regime, for example, quota expansion in our empirical analysis would not lead to an increase in imports, whereas we would expect an increase in the imports of the component that was filled. To the extent that this happens, our empirical results are biased downwards.

Since Aglink is a net trade model, we do not model allocated quotas. Behaviour of allocated quotas (when this is of interest) can be better assessed with bilateral trade models or other frameworks that are not net-trade. Such frameworks for example can identify the potential trading partner(s) that may gain quota rents (when available). However, data to calibrate such models may not be readily available as notifications to the WTO on in-quota imports do not distinguish sources. If a quota is allocated to more than one trading partner, it may be difficult to determine relative shares. Data suggest that allocated quotas are a small share of all quotas and most of the allocated quotas contain a global element, which is often large. Furthermore, in competitive world markets, the global effects should not be materially different, especially when allocated quotas represent a small share of total trade.

Comparing the results from this study with others is hampered because not many studies have explicitly modelled TRQs with endogenous regime switches as in this study. Of the few that have explicitly addressed the TRQ issue, results are not directly comparable because either the modelling frameworks and/or the scenarios examined differ. Abbott and Paarlberg using a net-trade model examined the Philippine pork TRQ. They found that the relevant instrument to liberalise is the out-of-quota tariff rate. Larivière and Meilke, also using a net-trade model, examined the implications of alternative liberalisation scenarios (including quota expansion and tariff reduction) on dairy markets. They report changes in world prices comparable to those reported in this study. Furthermore, their results indicate that compared to quota expansion, tariff reduction leads to larger changes in world prices, a finding similar to that reported in this study. Tsigas and Elbehri *et al.* use a general equilibrium framework to examine the TRQ issue. The trade component of their model is based on Armington specification and thus they are able to track bilateral flows but they are restricted to dealing with allocated quotas only. Tsigas found that reducing tariffs (and export subsidies) lead to greater welfare gains in most regions than expanding the quota. Elbehri *et al.*, although using a CGE model only examined the sugar TRQ in the EU and the US. They focus their analysis on the welfare effects for the two importing countries and their developing country trading partners through changes in bilateral trade and changes in quota rents. They found that reducing out-of-quota tariff rates led to larger welfare gains for the importing countries (the US and the EU) while reducing the welfare of their exporting partners through lower quota rents. They also found that expanding the quota while reducing the out-of-quota tariff results in larger gains for the exporters as quota rents fall less. Interestingly, Elbehri *et al.* state: "Obviously, many TRQs are also implemented on a global bases as well. In that case, modelling TRQs with bilateral quotas may understate the extent of liberalisation gains" (p. 13). Each of these studies (the CGE models with allocated quotas and the partial equilibrium net trade models with global quotas) use a similar analytical framework as employed here, suggesting that even though the empirical implementation differs, the analytical foundation is the same.

Another study, closer in spirit to what is done here, is by Shaw and Love (ABARE) where they use a version of Aglink to look at the TRQ issue in the dairy sector. They extensively modify the Aglink model by changing supply equations in two large dairy exporters (Australia and New Zealand), change the trade equations for all participants, and they increase the country coverage considerably. In general, although the two studies are not strictly comparable, the results are similar and they reach similar conclusions regarding the market access affects of the different TRQ instruments. For example, as concluded in this study, ABARE also concludes that: "… any expansion of quota access arising from the next WTO round by itself will not be sufficient to ensure a real increase in market access" (ABARE p. 21).

Summary and conclusions

The TRQ system that emerged from the URAA was a useful first step to increasing market access by converting non-tariff barriers to tariffs and opening market opportunities for "sensitive" products by establishing quotas. Minimum access quotas were supposed to increase during the implementation period and out-of-quota tariffs were to be reduced, while imports within the quota were to be facilitated by relatively "low" in-quota tariffs.

This report examines only one aspect of market access, the TRQ system and the associated tariff structure, while abstracting from quota administration issues that also influence market access. Market

access, or lack there of, also depends on factors such as domestic policies, non-tariff barriers, such as sanitary and phyto-sanitary standards and the possible anti-competitive behaviour of some state trading enterprises, among others. Effects of these on market access are addressed in other reports.

The economics of the TRQ regime were examined and an analytical model describing the economics of the TRQ regime was presented and served as the model for the empirical implementation. Empirical results were provided on the effects of alternative liberalisation scenarios on trade and markets of selected products and countries. These are illustrative of the type of changes that can be expected and indicative of the relative importance of relaxing each of the instruments examined within Aglink's commodity and country set.

The analytical framework shows that only one instrument is binding at any time, that the binding instrument may change over time and that it can change for different commodities within a country and among commodities between countries. When the in-quota rate is the binding instrument, then reducing out-of-quota rates has no effect on further market access (unless they are reduced below the in-quota rate). Neither does expanding the quota. Lowering the in-quota rate however, can increase imports and lower domestic prices – though there is then the potential of a regime switch with the quota becoming the binding instrument.

On the other hand, when the quota is the binding instrument, reducing the in-quota rates has no effect other than to convert tariff revenues into quota rents. Quota expansion in this case can increase market access, but there is the potential for a regime switch, as the in-quota tariff becomes the binding instrument. Reducing out-of-quota rates when the quota is binding can also increase imports and lead to lower domestic prices, but only if the out-of-quota rate is lower than the tariff-equivalent of the quota. When out-of-quota rates are binding, lowering these expands market access.

The analytical assessment initially assumes that imports under the TRQ regime are only a function of the relative tariff rates. However, quota administration costs and allocation inefficiencies can also influence market access and may be an additional cause of quota under fill. One case where it is assumed that tariff quota administration leads to an effective rate of tariff protection that is greater than that provided by the in-quota rate is also examined analytically. The effect of these costs was to contract the area where the quota is the binding instrument and expand the area where the in-quota tariff is the binding instrument, but these costs did not materially alter the analytical findings. The issue of quota administration and their potential to obstruct market access can be mitigated if out-of-quota tariff rates are sufficiently reduced and quotas become redundant. Additional factors that can complicate the analysis but not fundamentally alter the qualitative conclusions are imports under preferential tariff rates and special agreements that are not part of market access notifications to the WTO.

Data from AMAD were used to provide an overview of the tariffs and tariff rate quotas in OECD countries. These data were used to provide tariff and tariff rate quota profiles for selected countries and commodities, while also providing information on the quota volumes, in-quota, out-of-quota, non-quota and applied tariffs that were inputted into the Secretariat's Aglink model for the empirical application.

For the quota component of the TRQ system, available information from the implementation period indicates that although many in OECD countries are under-filled, about 30% of the quotas in OECD countries have fill rates that exceed 100%. In many cases it seems that countries are allowing greater access than they initially scheduled, but continue to hold on to the TRQ regime in their armoury of policy tools, keeping it in reserve, perhaps for future use.

Tariff information from AMAD was used to generate simple averages for countries and commodities aggregated to match the commodity definition in Aglink. Specific tariffs were converted to *ad valorem* to facilitate comparisons. This implies that movements in world prices and exchange rates influence the calculated average *ad valorem* rates. Conversions to AVE were based on world prices in Aglink and simple averages of in-quota, out-of-quota, and non-quota tariffs, were computed. These calculations were based on Most Favoured Nation (MFN) rates and do not include preferential tariffs. Based on these computations, for many countries, and commodities, tariffs remain high. In-quota rates greater than 100% can still be found in some countries at the end of the implementation period. Undoubtedly, such

high in-quota rates contribute to low fill rates. Out-of-quota tariffs at triple digit rates are common, even at the end of the implementation period when the full scheduled reductions (for most OECD countries) are in place. With such high out-of-quota rates, quotas may be the only possibility of market access in many markets. Although the average tariff rates calculated here do not include all agricultural commodities and should not be extrapolated to the entire sector, they indicate that the countries in our sample provide substantial tariff protection to cereals, meat, dairy products, and, to a lesser extent, oilseeds and oilseed products.

There are many instances reported here where average tariff reductions, for these commodities, exceed the 36% reduction committed to by developed countries. There are also many instances where the average reduction is less than 36%. This illustrates that some countries took advantage of the flexibility provided by the Agreement and reduced tariff rates for some "sensitive" commodities, less than the average. Interestingly, the prevalence of specific tariffs in the schedule of many countries leads to the unexpected result for some commodities that the average tariff at the end of the implementation period is greater than at the beginning. Although specific tariffs are reduced according to the Agreement, movements in world prices and exchange rates led to such results.

Applied tariff rates were also calculated. Although relatively high, for most commodities and countries, these are lower than scheduled MFN rates. Applying rates below those scheduled has the beneficial effect of lowering trade barriers. Big gaps between applied and scheduled tariff rates may increase uncertainty since countries retain the potential to increase the former to facilitate domestic concerns without breaking their WTO commitments. Also, additional market access may not be gained when scheduled rates are further reduced but remain higher than the applied rates.

The effects on world and selected country markets of further trade liberalisation were investigated with the aid of the analytical framework, the data discussed above and modifications to the Aglink model. In the empirical analysis, specific tariffs were inputted directly in the model. For the empirical application, each of the possible regimes identified by the analytical framework is represented by the TRQs introduced into Aglink, providing examples of the operation of each of the instruments. The empirical model shows the relative performance of each of the three instruments in improving market access within the confines of Aglink's commodity and country coverage. It is important to understand that in the empirical analyses, administration procedures remain unchanged. To the degree that these are barriers to trade, this creates a downward bias to the results.

The analytical framework indicates that expanding the quota when the quota is under-filled, *i.e.* in the T1 regime, has minimal direct effects on imports; this comes down to relaxing a non-binding constraint. From the data in AMAD we know that is often the case and most TRQs are under-filled. Under these conditions, quota expansion should not materially alter market access. The empirical results confirm this finding; quota expansion led to relatively small changes in world trade and prices, everything else remaining equal. This result may underestimate the impacts of quota expansion due to the complicated nature of TRQ administration and allocation mechanisms. These are lost in our empirical analysis due to aggregation of TRQs over end users and suppliers.

For selected commodities and countries where the quota was the binding instrument, quota expansion resulted in increased imports, but the effects on world prices were minimal. In most cases, the additional imports had minimal impact on domestic prices either because domestic policies prevent price drops or because the simulated quota expansion was not large enough. The size of the quota expansion is not relevant when the quota is not binding, *i.e.* in cases where the quotas were under-filled, in cases where quotas were not used to constrain imports, and tariffs in cases where the quota administration method is applied.

The analytical framework suggests that expanding the quota while also reducing in-quota tariffs should lead to greater market access than expanding only the quota. The empirical results indicate that for the modelled commodities, the effects on world markets are not materially different from just the quota expansion scenario. This is a surprising result. The relatively small effects on world markets of lowering the in-quota tariffs may be due to relatively inelastic demand and supply of the relevant commodities or that the modelled commodities are not a representative sample. For example, some of

the cases examined such as beef in the US and wheat in the EU, the in-quota rate is very low or zero, minimising the effect of lowering in-quota rates. As expected, lower in-quota rates led to increased imports and lower domestic prices in other markets where these were the binding instrument, such as Poland's butter and cheese markets. An additional factor that may limit the magnitude of import expansion for products in the T1 regime to lower in-quota tariffs, is the quota. In some cases, imports increased as in-quota tariffs were lowered, but the magnitude was limited because the quota became the binding instrument. Significant quota expansion reduces the probability that the quota becomes the binding instrument. More transparent quota administration methods reduce the risk that these implied costs rather than in-quota tariffs become binding as quotas expand. When the quota is the binding instrument, a role that in-quota rates seem to play is to allocate quota rents between the government and private traders. Lowering in-quota tariff rates reallocates rents to private traders while reducing governments' tariff revenue when products are in the QUOTA regime (the quota is, and remains, the binding instrument following liberalisation), and in cases where liberalisation leads to a regime switch from the T1 regime to the QUOTA regime.

Results from reducing out-of- and non-quota tariffs indicate larger changes in world and domestic markets. Imports, especially of dairy products expand, leading to higher world prices, but lower prices in domestic markets. The empirical results confirm the analytical results; only one instrument is binding at any time.

In many of the countries and commodities examined, domestic market price support policies affecting market access are still present. The TRQ system in the majority of these cases facilitates the continuation of domestic support policies. Under these conditions, the quota restricts market access. High out-of-quota tariffs also prevent imports at the out-of-quota rate, isolating the domestic market, enabling support prices to be significantly higher than world prices. In these cases, a role of the in-quota tariff is to allocate the quota rents between government and private traders. Significant and meaningful reductions in out-of-quota tariffs could bring downward pressure on domestic support prices and facilitate transmission of world prices to domestic markets, benefiting consumers and improving resource allocation.

The empirical results reported here are conditioned by the assumptions we made regarding the modelling framework, the price transmission specification, and how the data were aggregated. The results also depend on the baseline against which the scenarios are compared. We have also implicitly assumed that during the projections period quota administration practices are not altered. Differences in any of those may lead to different results, especially in the magnitude of import and price changes. Furthermore, the results may not necessarily be extrapolated to any multilateral improvement in market access that may result from the WTO negotiations or to other products not considered in this analysis. Results from other studies support the general conclusions of this study. The supporting theory and the scenario results reported here indicate that any one of the three instruments can be binding. The binding instrument differs between countries, among commodities within a country, and over time. This is illustrated by the number of regime switches exhibited by some commodities in certain countries. Hence, liberalising all three instruments and improving administrative procedures would be expected to facilitate market access for more products in more countries, benefit consumers through lower domestic prices, and improve resource allocation.

The TRQ system was a useful first step to increase market access by converting non-tariff barriers to tariffs. Focusing future efforts on quota expansion without also tackling the issues of in-quota and out-of-quota tariff rates along with quota administration methods may not provide the anticipated import opportunities. Quota expansion can improve market access in protected markets as long as they are administered efficiently. Data suggest that the fill rate for most quotas is 80% or less. Furthermore, about 30% of the quotas in OECD countries are filled at more than 100%. In both of these cases quotas are not binding and further expansion of the quota will have minimal effects on increasing market access. Under these conditions increasing market access might be more successful if the focus is on further tariff reductions to commercially relevant tariff rates. The data suggest that there is considerable scope for further improvements in all areas of market access.

Annex I.A

In addition to the Most Favoured Nation tariff (MFN) scheme available to all WTO signatories, many countries provide additional import concessions through bilateral and regional preferential trade agreements. Incorporating tariff rates from these agreements may provide tariff profiles that are different from those reported here which are based solely on MFN rates. Table I.A.1 provides a list of these agreements for the Quad countries as reported in UNCTAD's TRAINS database. It is difficult to provide an overall assessment because of the heterogeneity of these agreements among the various countries and sparsity of data. as Table I.A.1 shows, however, the Quad countries

Table I.A.1. **Quad countries preferential trade agreement**

Canada	GSP rate
	GSP for LDC
	United States tariff
	Australia tariff
	New-Zealand tariff
	Preference for Mexico
	Canada-Israel free trade Agreement
	Preference for Chile
	Commonwealth Caribbean countries tariff
European Union	MFN rates
	GSP rate
	GSP for LDC
	Preference for ACP countries
	Preference for South Africa
	Preference for Czech Republic
	Preference for Hungary
	Preference for Poland
	Preference for Egypt
	Preference for Jordan
	Preference for Morocco
	Preference for Syria
	Preference for Tunisia
	Preference for Algeria
	Preference for Israel
Japan	General rate
	MFN rates
	Temporary rate
	GSP rate
	GSP for LDC
United States	MFN rates
	GSP rate
	GSP for LDC
	Caribbean Basin economic recovery act
	Civil aircraft trade agreement
	US-Canada free trade area
	US-Israel free trade area
	Rates for ANDEAN trade preference act
	US-Mexico free trade area
	Rates for pharmaceutical products
	Tariff concession for dyes
	APTA (auto product agreement) preference

Source: UNCTAD TRAINS database Version 8.0, spring 2001.

provide preferential tariffs to many developing countries and Economies in Transition under Generalised System of Preferences (GSP) schemes. Our initial examination of the effects of preferences on tariff schedules is limited to examining the GSP schemes of the Quad countries, focusing on six Aglink commodities, beef, butter, cheese, skim milk powder, rice and wheat. The schemes that are examined are the GSP scheme for developing countries and Economies in Transition and the GSP-LDC, for least developed countries (LDC).

The GSP scheme was adopted in New Delhi in 1968. Participating countries started implementation in the early 1970s. The GSP scheme was envisioned to provide preferential access on a temporary basis with the provision that is should not be considered as a binding instrument (UNCTAD). Each of the Quad countries has its own GSP scheme and they have been passing enabling legislation since the 1970s to perpetuate the system. The Quad countries provide preferential access to many developing and LDC, however, each country reserves the right to choose which developing countries to include in its scheme, and which commodities or sectors.[18] Preferences provided under these schemes range from duty-free access to discounts from MFN rates. Each granting country also has its own requirements regarding rules of origin, special safeguard provisions and other conditions.

The Quad countries provide GSP access to agricultural and industrial products. Table I.A.2 shows the total number of tariff lines for agricultural and industrial products in 1999 for the Quad, along with the share of those lines that provide preferences to developing countries. The table shows that for the GSP scheme, a larger share of industrial tariff lines provide preferences to developing countries. This is another indication that agricultural commodities are relatively more protected. The EU's schedule contains a larger share of lines with preferences, both for industrial and agricultural products. More agricultural tariff lines contain preferences for LDCs under the GSP-LDC scheme, in the EU and US schedules. It should be kept in mind that benefits under the GSP-LDC scheme are additional to the benefits from the general GSP scheme, as all countries under the GSP-LDC scheme are also participants in the GSP scheme.

Table I.A.2. **Distribution of reduced tariffs among agricultural and industrial products**

		Number of MFN lines	Percentage of MFN lines with tariff reductions	
			GSP	GSP-LDC
Canada	Agricultural	1 397	23	26
	Industrial	6 778	36	38
European Union	Agricultural	3 389	44	64
	Industrial	10 184	80	41
Japan	Agricultural	1 932	15	11
	Industrial	7 087	54	15
United States	Agricultural	1 785	29	34
	Industrial	8 391	36	13

Note: Agriculture = HS chapters 1-24; Industrial = HS chapters 25-97.
Source: OECD calculations from the UNCTAD TRAINS database.

Another indication of the importance of preferences provided by the Quad countries under their GSP schemes is provided in Table I.A.3. This shows the number of countries that have preferential access to the markets of the Quad countries under the two GSP schemes, the per cent of all tariff lines (not just agriculture) that fall under the two schemes and the share of imports. The share of tariff lines with preferential access is greater for the EU, while US and Canada provide preferential access on about ⅓ of their tariff lines.[19] The data also suggest that all countries provide additional preferential access to LDCs. Interestingly, the data indicate that Quad country imports under the GSP schemes are not inconsequential. In 1999, for example, more than ½ of Japan's imports came from developing countries under the GSP scheme. Even though the Quad countries provide additional preferences to LDCs, very little trade is generated from those countries.

The data presented above, although indicative of the relative importance of the GSP schemes in terms of use, do not provide an indication of the magnitude of the discounts or preferences provided. As stated previously, this is a daunting task. An indication of discounts (or not) provided by the Quad for the six commodities in our sample is shown in Table I.A.6. Table I.A.4 shows the HSC codes that were used to identify the tariff lines in the TRAINS database and Table I.A.5 shows the percentage of tariff lines receiving preferences under the two GSP schemes. This shows that for this set of commodities, the GSP scheme for developing countries affects very few tariff lines. The Quad countries provide more favourable treatment to LDCs as their share is larger, especially in the case of the US where 90% of the tariff lines of these products provide preferential access to LDCs.

Table I.A.3. **Share of tariff lines under GSP schemes, number of beneficiary countries, and their share of imports**

	Per cent of all products that have reduced tariffs (2000)		Approximate number of countries (latest year)		Per cent of total imports (1999)*	
	GSP	LDC	GSP	LDC	GSP	LDC
Canada	34	36	182	47	14	0.10
European Union	71	47	169	49	17	0.46
Japan	45	14	179	41	49	0.25
United States	34	16	150	41	14	0.68

* Percentage of total value for all importers.
Sources: OECD Foreign Trade Statistics database; UNCTAD; CCRA-ADRC; Europa.

Table I.A.4. **Products included in analysis**

Beef	0201
	0202
Butter	040510
	040520
	040500
	040590
Cheese	0406
Rice	1006
	110230
Skim milk powder	04021
Wheat	1001
	1101

Table I.A.5. **Percentage of relevant tariff lines affected by GSP and LDC**

	GSP	LDC
Canada	4	7
European Union	1	20
Japan	0	0
United States	4	90

Note: See Table I.A.4 for HSC headings included.
Source: OECD calculations from the UNCTAD TRAINS.

Another indication of the importance of the GSP scheme to the trade regime of the Quad countries is provided in Annex Table I.A.6. This shows the value of imports of the six products by each of the Quad countries, in 1999, along with the share of imports from developing countries under the two GSP schemes. The data suggest that for each of the Quad countries, the relative importance varies by commodity, but in general, developing countries share of trade, even though not benefiting from substantial tariff discounts, is substantial. A sizeable portion of rice is imported from developing countries by each of the Quad countries. Less encouraging is the data showing that imports from LDCs are not existent, even though their share of concessions is larger compared to developing countries. It is not the purpose of this paper to examine the reasons, but it may reflect the commodity set examined. Other thanperhapsrice, the selected commodities are probably not produced in quantities that enable exports.

Table I.A.6. **GSP and LDC share of imports for selected products (1999)**

	Canada			European Union			Japan			United States		
	Total imports	Share GSP	Share LDC	Total imports	Share GSP	Share LDC	Total imports	Share GSP	Share LDC	Total imports	Share GSP	Share LDC
	1 000 USD	Per cent		1 000 USD	Per cent		1 000 USD	Per cent		1 000 USD	Per cent	
Beef	418 802	10.70	0.00	937 021	84.76	0.02	2 447 857	0.23	0.07	2 024 956	6.60	0.00
Skim milk powder	1 417	0.00	0.00	88 764	12.01	0.00	80 110	38.40	0.68	14 801	0.74	0.00
Butter	10 284	8.70	0.00	238 309	13.22	0.00	1 694	0.00	0.00	36 505	4.55	0.00
Cheese	123 538	1.96	0.06	533 219	1.80	0.00	542 364	1.30	0.10	753 903	10.31	0.00
Wheat	11 655	0.10	0.00	565 912	5.46	0.00	1 075 180	0.00	0.00	334 339	0.00	0.03
Rice	117 408	35.18	0.03	446 796	65.10	0.10	315 273	29.90	0.00	221 846	44.44	0.14

Source: OECD calculations from the UNCTAD TRAINS database.

Annex I.B

The purpose of this Annex is to illustrate with a couple of examples how different data and assumptions were combined to generate the TRQ volume used in the model. The product concordance table used to identify the TRQs was also used to calculate the average tariffs computed at the Aglink product level.

As stated in the main body of the text, quota, trade and tariff data were obtained from AMAD. These data had to be consolidated, reconciled and calibrated with the import data in Aglink. Our starting point was to create a concordance between the various TRQs and Aglink products. Countries scheduled and notify their TRQs based on the Harmonised System Codes (HSC). The codes can span up to ten digits with the first six harmonised internationally. Imports and exports in Aglink on the other hand are not from a uniform source. Rather, Aglink co-operators provide data directly for their country, or they are obtained from a variety of sources for modules without co-operators. Hence, the exact definition for each product and country is not known. For certain products such as cheese, this uncertainty may not be a problem because we assume that the product definition for cheese in Aglink is at the 4-digit level. For other products, *e.g.* wheat, it is not know for any country module in Aglink whether reported imports and exports include, in addition to wheat, wheat flour, wheat bran, wheat gluten, etc. Nor is it known, if these products are included, whether or how they were converted to wheat equivalent.

To calculate the average tariffs reported in the main text, the conservative approach was taken and it was assumed that trade in Aglink includes primary products only, while in the case of cereals, it was assumed that flour was also included. The HSC codes for these products were then used to compute the simple average tariff used in the empirical analysis. This implies that products in a country's tariff schedule such as say wheat bran, are excluded from the calculations for the average wheat tariff.

The same concordance table was also used to identify the TRQs to include in the empirical analysis. When a HSC code that has been identified as belonging to an Aglink product is detected in a TRQ, that TRQ is included in the analysis (subsequently some TRQs were dropped from the analysis because of modelling or other considerations).

After identifying the various TRQs to include, they were aggregated by summing individual TRQs, (as long as they were scheduled in the same units). Sometimes the units differ, for example in addition to the two explicit SMP TRQs in Japan's schedule, SMP product codes are part of another TRQ that is expressed in whole milk equivalent. For such cases, a conversion factor (from a country's schedule if possible) was used to convert to the same units.

Generally, the various TRQs were expressed in the same units and they were simply added together. For example the nine cheese TRQs in the US schedule were summed to provide a single cheese TRQ. This value represents the scheduled TRQ as reported in row E of Table I.B.1.[20] Similarly, for the TRQs identified as Aglink products, the notification data were used to compute a simple average fill rate reported in row A. This fill rate is then used to determine the in-quota imports based on the summation of scheduled TRQs that correspond to the Aglink product definition. This value in row B is analogous to the notified imports under the TRQ that a country would report to the WTO.

The volume of the TRQ as calculated is only one part of the information that is needed for determining what value to use in Aglink. We need to put the TRQ in context of the total trade for the products that comprise the TRQ. The United States is only one of three countries (Canada and Japan are the others) whose schedule, notifications, and trade are such that we can identify trade that occurs in-quota, out-of-quota, and for non-quota products that are part of the Aglink definition. The US schedule and notifications were used to map a concordance between in-quota and out-of-quota codes with the trade data codes. The result of such a concordance is shown in rows B-D.

It is obvious that imports identified as in-quota that are part of the Aglink definition, row B, differ from the value that the US notified, row F. This difference is about 5% in each of the three years (row G). The first adjustment to the scheduled and notified TRQ therefore is to reconcile this difference. Since trade data in AMAD is different from the notified valued; we adjust the schedule TRQ by this factor as shown in row H.

Total trade from AMAD is reported in row I while import data from Aglink are reported in row J. In 1996 and 1997, imports are fairly similar, but Aglink imports in 1998 are about 10% lower. The second adjustment is to reconcile and calibrate the trade data from AMAD to that in Aglink. The ratio used for this second scaling is reported in row K.

Since the trade data in Aglink can not be changed without throwing the cheese market out of balance, we need to change the data in the notifications and schedule but retain the same proportions between in-quota, out-of-quota,

Table I.B.1. **Example of calculations to derive TRQ volume for use in Aglink: US cheese**

			1996	1997	1998	1999	2000
A.	Fill rate based on notification to the WTO		0.89	0.77	0.85		
	Trade data from AMAD						
B.	In-quota imports based on AGLINK definition (tons)		111 207	99 746	113 799		
C.	Non-quota imports from AGLINK definition (tons)		37 562	38 340	37 411		
D.	Out-of-quota imports from AGLINK definition (tons)		4 501	3 399	19 347		
E.	Sum of schedule quota (tons)		119 000	123 001	127 003	131 004	135 005
F.	Notified quantity to the WTO (tons)	(E*A)	105 750	95 179	107 964		
G.	Scaler that capture the difference between AGLINK and TRQ product definition (%)	(B/F)	1.05	1.05	1.05		
H.	Quota scaled (tons)	(E*G)	125 141	128 903	133 866		
I.	Total trade (tons)	(B + C + D)	153 270	141 485	170 557		
J.	Product trade from AGLINK database (tons)		151 953	140 614	155 582	154 675	154 675
K.	Scaler that capture the difference between AMAD and AGLINK trade (%)	(J/I)	99%	99%	91%		
L.	Product consumption from AGLINK database (tons)		3 340 485	3 412 153	3 480 418	3 706 272	3 845 537
1.	Quota model (tons)		124 065	128 110	103 807	107 078	110 348
2.	In-quota model (tons)	(B*K)	110 251	99 132	103 807		
3.	Out-of-quota model (tons)	(D*K)	4 462	3 378	17 648		
4.	Non-quota model (tons)	(C*K)	37 239	38 104	34 126		
5.	Non-quota as a percentage of consumption (%)		1.11	1.12	0.98		

Source: OECD Secretariat.

and non-quota imports as identified in AMAD. The calculations used to determine the US cheese TRQ volume to input in Aglink are shown in row lines 1-5.

Interestingly, the results of this exercise indicate one of the problems with the TRQ system. Even though the fill rate was 85% in 1998, about 11% of imports came in at the higher out-of-quota rate, presumably due to administrative or other constraints. As stated above, having an endogenous fill-rate was beyond the scope of this analysis. We need the data in Aglink to reflect the fact that there were out-of-quota and non-quota imports. We reduce the TRQ therefore so that the sum of the three types of imports equals imports in Aglink. For 1998, for example, rather than using the scheduled TRQ of 127 000 tons, we use a TRQ of 103 800 tons thus preserving in the model the relationship between in-quota, out-of-quota, and non-quota imports found in AMAD trade data. As shown in row E, the TRQ is scheduled to increase over the last two years of the implementation. We build the same rate of increase to the TRQ value that we have calculated.

In Aglink, there are only imports without any distinction on the import regime under which they enter. Our interest is in the imports that occur under the TRQ system. Rather than ignoring the significant non-quota imports, however, we assume that they are a function of domestic consumption. As demand for cheese changes imports of these cheeses change by a fixed proportion of consumption. The ratio used for the projection period is the one calculated for 1998, reported on line 5.

For most countries in the database, it is not possible to discern from the data what is in-quota, out-of-quota, or non-quota imports. To calculate the TRQ volume to use in Aglink, we modified the procedure illustrated above. We use the case of the EU's beef TRQ to illustrate the calculations used in such cases.

The product definition of beef (meat only) in Aglink is assumed to consist of HSC code 0201 defined as "Meat of Bovine Animals, Fresh or Chilled", and HSC code 0202 defined as "Meat of Bovine Animals, Frozen". The beef TRQs (and beef codes used to compute average tariffs reported in the main body of the text) are derived from this definition.

This concordance identified eight beef TRQs for the EU. These were aggregated into a single beef TRQ reported in row E of Table I.B.2. From the notification data for these eight TRQs, we calculated a simple average fill rate reported in row A.

From AMAD's trade data, we calculated beef imports based on the Aglink product definition, reported in row B. In 1999, for example, trade data in AMAD indicate beef imports of 235 000 tons. We do not know what is in-, out-of, or non-quota imports. The calculated quota reported in row E, is 220 521 tons. EU's schedule indicates that these quotas do not increase during the implementation period. Using the average fill rate, we calculate the imports that are consistent with Aglink product definition that can be considered as in-quota. As indicated in the US example above, the value reported in row F is analogous to the notification that the EU would report to the WTO, but for beef as defined in Aglink.

Table I.B.2. **Example of calculations to derive TRQ volume for use in Aglink: EU beef**

			1996	1997	1998	1999	2000
A.	Fill rate based on notification to the WTO		0.87	0.96	0.96	0.96	
	Trade data from AMAD						
B.	In-quota imports based on AGLINK definition (tons)		228 000	256 000	223 000	235 000	
C.	Non-quota imports from AGLINK definition (tons)		0	0	0	0	
D.	Out-of-quota imports from AGLINK definition (tons)		0	0	0	0	
E.	Sum of schedule quota (tons)		220 521	220 521	220 521	220 521	220 521
F.	Notified quantity to the WTO (tons)	(E*A)	190 890	211 221	211 221	211 221	
G.	Scaler that capture the difference between AGLINK and TRQ product definition (%)	(B/F)	1.19	1.21	1.06	1.11	
H.	Quota scaled (tons)	(E*G)	263 391	267 272	232 819	245 347	
I.	Total trade (tons)	(B + C + D)	228 000	256 000	223 000	235 000	
J.	Beef trade from AGLINK database (tons)		228 000	256 000	223 000	235 000	
K.	Scaler that capture the difference between AMAD and AGLINK trade (%)	(J/I)	100%	100%	100%	100%	
L.	Beef Consumption from AGLINK database (tons)		6 929 000	7 109 000	7 395 000	7 554 512	
	BEEF trade to be exogenise-prepared meat (tons)		130 000	131 000	124 000	130 000	
1.	Quota model (tons)	(H*K)	263 391	267 272	232 819	245 347	245 347
2.	In-quota model (tons)	(B*K)	228 000	256 000	223 000	235 000	
3.	Out-of-quota model (tons)	(D*K)	0	0	0	–	
4.	Non-quota model (tons)	(C*K)	0	0	0	–	
5.	Prepared meat as a percentage of consumption (%)		0.02	0.02	0.02	0.02	

Source: OECD Secretariat.

The EU exports beef with subsidies and the EU has many preferential trade agreements that allow imports at the in-quota (or better) rate but are not necessarily reported to the WTO as part of the TRQ system. Since there is under-fill (albeit not large), and because of the relatively big jump between in-quota and out-of-quota tariffs, we assume that out-of-quota imports, if any are negligible. That is, we do not assume that the difference between trade data and notified imports represent the T2 regime. As in the previous example, we scale the TRQ. The scalar is reported in row G.

The EU's beef imports (meat only) in Aglink for 1999 is 365 000 tons in carcass weight compared to 235 000 tons in AMAD. The discrepancy between the two trade data sources posed a dilemma that was solved when we discovered that for the EU, beef imports in Aglink include trade in prepared meats. In 1999, the carcass weight equivalent of these imports was 130 000 tons. In the HSC system, the codes associated with prepared meats are in Chapter 16, "Preparations of Meat, Fish, Crustaceans, Molluscs or other Aquatic Invertebrates".

We subtract the value of prepared meat imports from total meat imports in Aglink and obtain the value reported in row J, which is consistent with the beef, HSC codes identified previously. Interestingly, the resulting import data in Aglink, which is in carcass weight equivalent, is surprisingly similar to the product weight trade data in AMAD.

The results of the calculations and the TRQ value used in the model are shown in rows labelled lines 1 and 2. The TRQ is scaled to be consistent with the import data in Aglink and the average fill rate. Imports of prepared meats are retained but made exogenous. We assume prepared meat imports are a fixed share of consumption and the constant used in the model is reported in line 5 for 1999.

NOTES

1. For details on commodity and country coverage, see the section on the Aglink model.
2. The number of tariff lines used to calculate each country's average tariff rate, for the same set of commodities varied widely (Table I.5). For details on how the average tariff rates were calculated, see section on tariffs.
3. Full citation is provided in the References section.
4. A description of the different administration methods can be found in WTO, 26 May 2000.
5. By aggregating at the product level, the details of individual TRQs (as shown in Box I.1 and Figure I.3) are lost. For example, in some cases a TRQ at the product level consists of several TRQs and each can have a different fill rate. The average fill rate at the product level is calculated by taking the ratio of the sum of notified imports to the sum of the scheduled quota for each component of the aggregate TRQ. The fill rate at the aggregate product level therefore is a weighted average of the components of the aggregate TRQ and the details of the individual fill rates are lost.
6. These calculations exclude the three countries – Iceland, Norway, and Switzerland – which are not endogenous in *Aglink*.
7. These are based on each country's Most Favoured Nation (MFN) bound rates.
8. For the empirical implementation discussed later, the specific rates are not converted to AVE.
9. For poultry, eggs, sheepmeat, milk and whey powder, we use world unit values as a world reference price for these are not available in Aglink.
10. All data are derived from the UNCTAD's TRAINS Database Version 8.0, spring 2001.
11. On 1 September 2000, Canada added 570 tariff lines to the list of duty-free tariff items for LDCs. These additional lines include items from the products listed in Table I.7 but may not be reflected in the data from TRAINS used for these calculations. Canada now provides duty-free access to imports from LDCs on about 90% of its tariff lines (WTO, WT/COMTD/N/15).
12. Countries can intervene for commodities with special safeguards but only for a limited period of time. These are not included in the present study.
13. These are average fill rates at the aggregate product level.
14. This procedure was only possible for Canada, Japan, and the US where we were able to identify trade data with HS codes that were classified as out-of-quota and non-quota. For other countries when fill rates were low but trade data indicate imports greater than the quota, we consulted other sources to determine the relevant regime.
15. Water in the tariff may be defined as the difference between a domestic price and the tariff-inclusive world price. When this difference is positive, it implies that a country may have market price supports or other non-tariff barriers that hinder price transmission. In the empirical analysis, a domestic price is generally determined by the world price and the lower of the applied rate or the scheduled MFN rate, *i.e* non-tariff barriers are assumed away. In cases where market price supports exist, such as butter in Japan or butter and cheese in Canada, the domestic price is the support price unless it is greater than the out-of-quota tariff rate and the world price.
16. By necessity, some of the subtleties of the TRQ system can not be handled in the empirical analysis. For example, an aggregate TRQ at the product level may consist of several TRQs and each can be in a different regime. Quota expansion therefore may lead to greater imports of some of these TRQs and not for others. When we aggregate the individual TRQs into a single TRQ at the product level for our empirical analysis, we lose the details of the components.
17. The reader is reminded that the export equations were generally not modified for this exercise. Export subsidy limits are still in place and they are not violated.

18. The list of countries under the GSP schemes for each country can be consulted at the following sites. Canada: Source: *www.ccra-adrc.gc.ca/E/pub/ct/loceq/loc-e.pdf*; the EU Source: *http://europa.eu.int/eur-lex/en/lif/dat/*1994/*en*_394R3281.*html* or Source: *http://europa.eu.int/comm/trade/miti/devel/eba*2.*htm*; Japan Source: *www.unctad.org/gsp/Japan/Jpdfs/japwhole.pdf*; and US Source: *www.unctad.org/gsp/usa/usapdf/usa*Appen1.*pdf*
19. On 1 September 2000, Canada added 570 tariff lines to the list of duty-free tariff items available to LDCs. The additional items include both agricultural and non-agricultural tariff lines. In March 2001, the EU signed the Everything But Arms agreement that provides duty-free access to almost all goods from LDCs.
20. Data for 1995 are not reported due to difficulties reconciling the trade data with the notifications. 1995 was the first year of implementation. Different countries started the process at different times during the year and data are not consistent.

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Part II

A FORWARD-LOOKING ANALYSIS OF EXPORT SUBSIDIES IN AGRICULTURE

The following analysis focuses on a policy that distorts export competition in agricultural commodity trade: export subsidies as defined in Article 9 of the Uruguay Round Agreement on Agriculture (URAA) and notified to the WTO. Export subsidies meeting this definition (henceforth referred to as export subsidies) are subject to limits agreed upon in the context of the URAA. As other work by the OECD shows, many countries have reduced export subsidies well below these limits or even unilaterally suspended their use. Moreover, with reforms in the European Union, the largest user of export subsidies, and in the context of rising world prices as projected in the OECD *Agricultural Outlook* 2000-2005 (hereafter, *Outlook*), future use of export subsidies is likely to decrease further. Against this background, it is estimated that the results of export subsidy elimination are fairly modest. The biggest impacts would be on selected internal and world dairy markets, where the *Outlook* projections suggest that a large portion of exports will remain subsidised in the medium-term future. If countries, however, were to reverse unilateral decisions to reduce export subsidies, then elimination would have significantly greater effects than estimated in this study. Under the conditions projected in the *Outlook*, the importance of a multilateral agreement to reduce or eliminate export subsidies is that it would ensure that current suspensions or reductions in the use of export subsidies below WTO limits become permanent, that their future use would be disassociated from market conditions or unilateral policy changes, and that further potential distortions in export competition would thereby be reduced.

The implications and results as presented in Part II are contingent upon certain key assumptions. The first set of assumptions are implicit in the model, Aglink, used for the analysis and the point of departure, or basis of comparison, which is the *Outlook*. Aglink is a partial equilibrium model based on the assumption of perfect competition in world commodity markets, except where quality differences are considered to prevent strong competition across suppliers. Aglink, which is maintained by the OECD Secretariat and co-operating OECD countries, is used for the *Outlook* and forward-looking policy analysis. The present focus is limited to the commodity market effects of export subsidies in the context of these underlying assumptions. Relaxing these assumptions could affect the results. For example, if world meat markets were considered to be more competitive than currently modelled, the hypothetical elimination of export subsidies could have different implications on meat markets. Regarding the basis of comparison, the *Outlook* projects a medium-term future of rising world prices for most commodities and exchange rates at fairly similar levels to those prevailing at the start of 2000. Export subsidies are of decreasing importance for most OECD commodity markets under these conditions. Should world prices be lower than expected or exchange rates prove stronger, particularly those of countries with internal support prices, then some countries could react by re-introducing or increasing export subsidies, within URAA limits. In this case, the effects of eliminating these greater export subsidies would be correspondingly higher.

The second key assumption made throughout Part II regards the policy response of decision-makers to the elimination of export subsidies. As export subsidies are eliminated, pressure is applied on domestic price support programmes. In the scenario, internal policies are assumed to be adjusted to allow domestic prices to fall, even though other options are available to maintain support price levels. Instead of allowing internal prices to fall, governments may introduce other distorting policies that can

also maintain internal prices. These could include the introduction or strengthening of other market distorting measures such as supply control, public storage or alternative export competition policies, within multilateral limits.

There are many mechanisms that governments can use to affect the competitiveness of their agricultural commodities in world markets. Export competition policies may influence importers' decisions by artificially lowering the price of the exporting country's goods as compared to those of its competitors (after adjusting for any differences such as in quality or transportation costs). The OECD is currently engaged in a broad ranging analysis of such measures. While the present study focuses on export subsidies, this policy does not operate in isolation of other competition distorting policies. Limits on one policy option could conceivably be offset through increased use by governments of some other policy instrument, within the limits of existing or new multilateral agreements. As such, an agreement to eliminate export subsidies would represent an important step towards reducing distortions in export competition. However, such an agreement alone would be insufficient. Other export competition policies that may serve to perpetuate market distortions and inefficiencies would also need to be disciplined.

Introduction

Export subsidies as defined in Article 9 of the URAA and notified to the WTO lower world prices and distort trade flows as importers no longer buy the least costly goods of the most efficient exporter, but instead purchase from whatever source can offer the lowest price net of the government subsidy. Hence, the quantity delivered to foreign markets does not depend upon the prices of the exporter and the prices of competitors in these markets, but rather on the government's decision of how much quantity to remove from the domestic market. In addition, countries can use export subsidies to limit internal market fluctuations by forcing more into export markets during years of high production and fewer exports during years of low production. Employing export subsidies to stabilise internal markets increases world market volatility as the trade flows depend less upon world market conditions and more upon the subsidising country's internal policies. Hence, the subsidised exports are a market distortion which bloat the country's trade, leading to lower world prices, and reduce or eliminate price transmission from the world market to the domestic market.

As a result of the URAA, export subsidies were capped and subject to annual reduction commitments throughout the implementation period. By the end of 2000, subsidised exports of developed countries are to reach expenditure levels and quantity levels that are 36% and 21%, respectively, below those of the base period (1986-88). *The Uruguay Round Agreement on Agriculture: an evaluation of its implementation in* OECD *countries* (further referred to as the OECD report on URAA implementation) focused on the implementation period. That report collects and evaluates data from country notifications to the WTO and schedules. Part II of the present publication reports on an analysis of the effects of an elimination of export subsidies based on the Aglink model. It will compare the baseline market projections as published in the *Outlook* (with an alternative scenario in which the export subsidy limits are steadily reduced and eliminated in equal steps from 2001 to 2005.

Data from country notifications to the WTO

As noted in OECD report on URAA implementation, many countries have eliminated or suspended subsidies of some or even all commodity exports beyond the URAA requirements. This unilateral action can in part be due to high world prices in the early years of implementation that allowed more countries to export without subsidy. This reduction can be in part be attributed to policy changes. In recent notification data, many countries continue to abstain from export subsidies for at least some commodities despite falling world prices. Consequently, use of export subsidies is no longer widespread among OECD countries. Approximately 90% of the use of export subsidy expenditures are attributable to the European Union. This general finding foreshadows the *Outlook*, in which export subsidy use remains low and narrowly applied relative to URAA limits.

A second important result from the Secretariat's review of export subsidy use during the implementation period is the relatively greater importance of volume limits as opposed to value limits. Tables in the OECD report on URAA implementation show that volume limits are exceeded almost twice as often as value limits. It should be noted that the use of export subsidies during any given year of the implementation period to date may exceed the corresponding commitment level due to the application of the roll-over provision, but that this is not possible in the relevant period. Focusing on the largest user of export subsidies, a 50-80% share of EU volume commitments are used as opposed to 40-60% share of value limits. The greater relevance of volume limits holds true when focusing on those commodities and countries which are incorporated in Aglink. The Annex reports a comparison of *Outlook* results with export subsidy value limits to show that, in general, value limits are not likely to become more binding in the projection period. The consequence of this finding is important for the present analysis in that it has led to the decision to focus on volume limits without regard to value limits.

Summary of Aglink and the *Outlook*

The projections of the *Outlook* are used as a basis of comparison in this study. The assumptions as regards export subsidies are changed to implement an elimination and the results are compared against the *Outlook* in order to estimate the impacts of export subsidies over the projection period. As such, it is important that the reader understand the Aglink model and the assumptions and results of the preliminary *Outlook* itself.

Aglink is a structural econometric model designed to simulate major OECD and world commodity markets. The commodities in the model upon which this study focuses are wheat, coarse grains, oilseeds, rice, beef, pork, poultry, milk, butter, cheese, skim milk powder (SMP), whole milk powder (WMP) and some other dairy products. Certain other commodities are included in the model to varying degrees, but will not be addressed directly either in terms of export subsidies or in terms of results, although they will respond to changes in related commodity markets. In this framework, the present analysis omits cross-commodity effects between the Aglink commodities and non-modelled commodities. Where these interactions are significant, the results may be altered if the model were expanded to be more inclusive. For example, the omission of non-grain feeds may cause the present analysis to under-estimate the price effects of an export subsidy elimination. Changes to the model specific to this analysis are described in the Annex. The model focuses on a medium-term horizon, with the current *Outlook* projections ending in 2005.

Subsidised exports in the Outlook *are low for crops, but higher for livestock products*

As reported in the Annex to Part II, projected subsidised export levels are based upon the notification data, final limits and the export levels in the *Outlook*. Rulings at the WTO regarding the Canadian dairy regime are included in that most Canadian dairy exports are considered to be subsidised, but the *Outlook* has not been adjusted to reflect subsequent changes in Canadian dairy policy nor the recent WTO ruling on USA FSCs. Given the rising world prices of the *Outlook* and the unilateral elimination or suspension of export subsidies by many countries already, the role of export subsidies in the *Outlook* is important, but they do not directly affect all commodity markets. Export quantities, both with and without subsidies, are summarised in Table II.1. The last columns show the average annual total exports and subsidised exports for the 2001-05 *Outlook* period. The quantity limits of the *Outlook* (which equal the final limit of the URAA) are also presented. This table shows only those countries and commodities which are represented in Aglink and are actively subsidising exports in the *Outlook*. Other countries' subsidised exports are summed in the last rows of Table II.1, under the heading "Total of Others", along with certain commodities in the listed countries for which Aglink does not have a corresponding series.

Table II.1 emphasises the relative importance of the European Union as regards export subsidy use. In the case of cereals, the European Union is the only source of subsidised exports in the Outlook. In recent notification data, Hungary also has used grain export subsidies, but this is not forecast to continue in the Outlook as there is no price differential between Hungarian and world markets. The

Table II.1. **Export subsidies in the *Outlook***
Thousand tonnes

	Commodity	2000/01 limit	Exports: Oulook averages from 2001-05	
			Total	Subsidised
Canada	Butter	4	3	3
	SMP	45	28	28
	Cheese	9	27	9
Czech Republic	Dairy (excl. powder)	63	n.a.	41
	Butter	n.a.	4	34
	Cheese	n.a.	16	16
European Union	Wheat	14 439	17 067	14 295
	Coarse grains	10 400	10 400	10 400
	Rice (incl. intra-EU)	145	1 129	144
	Butter	399	197	197
	SMP	273	222	222
	Cheese	321	463	321
	WMP	489	489	489
	Beef meat	822	822	822
	Pigmeat	402	1 067	402
	Poultry meat	290	718	290
Norway	Butter	6	3	3
	Cheese	16	24	16
United States	Butter	21	2	2
	SMP	68	142	68
	Cheese	3	62	3
Total of others	Coarse grains	n.a.	n.a.	164.
	Other dairy	n.a.	n.a.	652
	Sheepmeat	n.a.	n.a.	1
	Beef	n.a.	n.a.	7
	Pigs and pork	n.a.	n.a.	5
	Poultry	n.a.	n.a.	27

Sources: OECD, *The Uruguay Round Agreement on Agriculture: An evaluation of its implementation* OECD *countries*; OECD, OECD *Agricultural Outlook* 2000-2005.

European Union's dependence upon wheat export subsidies decreases during the course of the Outlook period as a consequence of policy changes, rising world prices and a weak Euro. In contrast, European Union export subsidies for coarse grains and livestock and dairy products are projected to remain at or near the volume limits. The scenario therefore requires large export reductions in the case that export subsidies would be eliminated, unless some portion of the exports can occur without support under the changing prices of the scenario. Outside of the European Union, dairy product export subsidy reductions are required in Canada, the Czech Republic, Norway and the United States, as well as additional amounts from various other countries, as shown in the "Other" composite. Other countries also provide some small meat export subsidies, but these are ignored in the scenario.

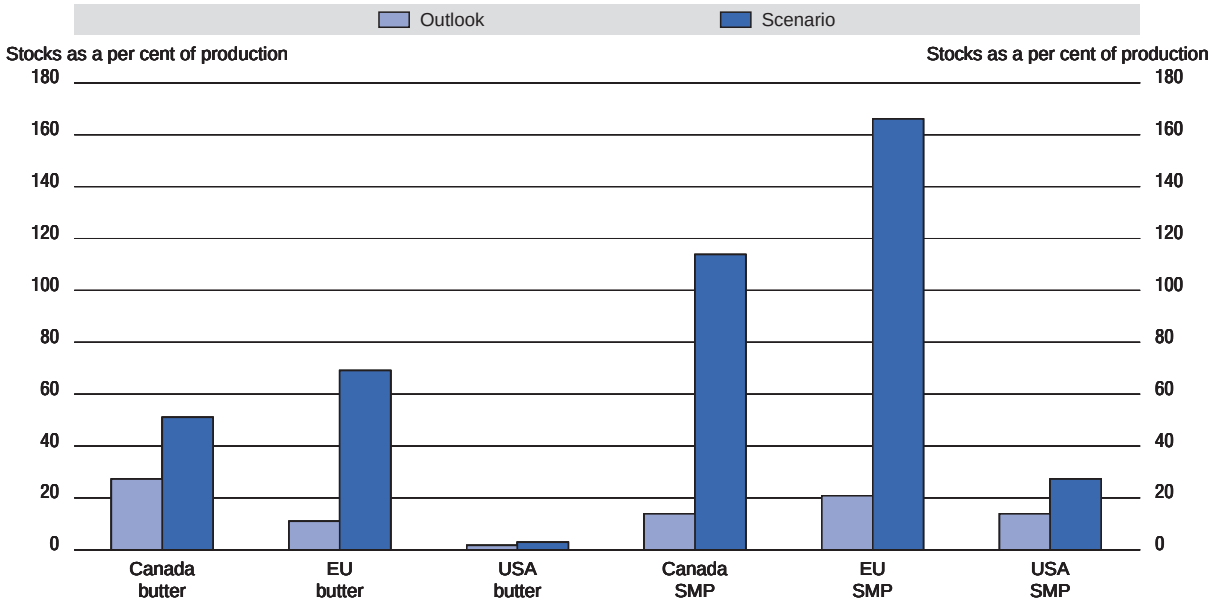
Quantity controls or support prices

Export subsidies serve as policy instruments by which countries can maintain producer prices at support levels above world prices. There are additional instruments available, such as public stocks or supply controls. In the face of an export subsidy elimination schedule, policy-makers must choose whether to allow prices to fall below support levels or whether to control quantities (increase stocks or reduce production) to maintain prices at support levels. Often, quantity controls are in fact stated or implied by the policies in some countries, which may specify supply management schemes or trigger prices for purchasing public stocks, but applying such policies in the scenario produces results that are less comparable across countries and may not represent long-term solutions.

For example, the option to hold public stocks requires the government to purchase and store those quantities which would have been exported with subsidy. Stocks have the potential to build each year by the size of the reduction in export subsidies. If stock-holding would be used to maintain the market price which producers receive and consumers pay at existing support price levels, then there would be no reduction in the production or increase in consumption possible as the level of price distortion in the internal market would be unchanged; only the mechanism of achieving this result would change. The scenario of export subsidy elimination was simulated allowing public stocks to offset the reduction in export subsidies each year. The stocks of certain dairy products in Canada, the European Union, and the United States demonstrate the consequences of this policy option. These are shown in Figure II.1 relative to internal production as of 2005. Stocks increase from relatively low values of the *Outlook* (relying on subsidised exports), to substantial levels in the export subsidy elimination scenario. For SMP in Canada, the European Union and the United States, stocks rise to 114, 166 and 27% of production, respectively, to hold prices unchanged at *Outlook* levels. These magnitudes relative to production reflect the importance of subsidised exports in these markets. Likewise, substantial stocks would be required in other commodity markets where countries are actively subsidising exports. These results suggest the pressure to reform domestic policies or to find alternative, but WTO consistent, measures of support for producers as the accumulation of stocks required to maintain support prices in the face of the elimination of export subsidies would likely be unsustainable.

Alternative policy measures, such as production controls could be applied instead of greater stock-holding. In this case, existing production limits would have to be reduced or new ones imposed to eliminate the gap between internal production and consumption at existing support price levels. In this case, again, the level of price distortion would be unchanged, so consumption would be unaffected by the export subsidy elimination. Producers would receive the same output price for a smaller quantity of production quota. This would only encourage them to bid quota rents higher rather than making supply more price responsive.

Figure II.1. **Public stocks relative to production in 2005**
(if used to offset subsidised export reductions)



Source: OECD Secretariat.

Another option, would be to reform policies by reducing support and by allowing internal prices to fall below support prices. In this study we assume this will be the policy response to the export subsidy elimination, without assuming that direct payments or alternative mechanisms of producer support will be applied to offset the consequently lower producer prices. This policy change is imposed on all countries where such policy prices exist. The implied assumption where milk production quotas are in place is that the fall in output price would be reflected by a decrease in the rent prices of quota rights, so that supply production constraints remain binding even as prices fall. Corresponding to this assumption of allowing internal price response, Canadian dairy policy, which sets production based on consumption estimates at given support prices, is changed to allow internal prices to fall, as explained in the Annex to Part II. By allowing prices to respond rather than quantities, effects across countries ar e more comparable.

Results of the scenario

The following results are presented as a comparison against the 2000 *Outlook* in Table II.2, at the end of this section. Where the *Outlook* continues current policies, the scenario imposes an elimination of subsidised export limits remaining following UR implementation from 2001 to 2005 in equal steps. Hence, changes cited are to be interpreted as the change relative to the *Outlook* in a given year which would result from a scheduled elimination of export subsidies, not as the change from any preceding year.

Table II.2*a*. **Export subsidy elimination scenario – European Union market consequences**

		2001	2002	2003	2004	2005
Livestock products – meats						
Beef exports	Scenario	657	517	329	343	231
(thousand tonnes)	Change	–20%	–37%	–60%	–58%	–72%
Beef price	Scenario	247	179	240	201	236
(Euro/100 kg)	Change	–16%	–32%	–9%	–25%	–14%
Pork exports	Scenario	935	953	862	798	762
(thousand tonnes)	Change	–6%	–9%	–20%	–27%	–32%
Pork price	Scenario	88	79	116	84	117
(Euro/100 kg)	Change	–15%	–23%	10%	–23%	2%
Livestock products – dairy						
Butter exports	Scenario	193	173	149	80	7
(thousand tonnes)	Change	–3%	–14%	–27%	–59%	–96%
Butter Price	Scenario	354	347	333	312	266
(Euro/100 kg)	Change	–2%	–4%	–8%	–14%	–25%
SMP exports	Scenario	218	164	109	53	2
(thousand tonnes)	Change	–12%	–33%	–52%	–75%	–99%
SMP Price	Scenario	199	189	193	207	232
(Euro/100 kg)	Change	–5%	–10%	–9%	–3%	8%
Cheese Exports	Scenario	402	456	549	650	712
(thousand tonnes)	Change	–9%	1%	19%	35%	48%
Milk Price	Scenario	29	27	27	27	26
(Euro/100 kg)	Change	–4%	–9%	–10%	–11%	–10%
Crops						
Wheat exports	Scenario	12.5	12.9	14.3	14.1	27.4
(million tonnes)	Change	–18%	–15%	–7%	–9%	14%
Wheat price	Scenario	100	105	106	112	114
(Euro/tonne)	Change	–15%	–11%	–9%	–1%	–3%
Coarse grain exports	Scenario	8.3	6.2	4.2	2.1	4.2
(million tonnes)	Change	–20%	–40%	–60%	–80%	–59%
Coarse grain price	Scenario	92	89	85	93	87
(Euro/tonne)	Change	–13%	–14%	–15%	–7%	–14%
Oilseed imports	Scenario	20.9	20.0	18.0	16.8	17.2
(million tonnes)	Change	0%	–7%	–15%	–21%	–17%
Oilseed price	Scenario	177	175	182	191	209
(Euro/tonne)	Change	0%	0%	–2%	–4%	–4%

Source: OECD Aglink model results of the scenario in comparison to *Outlook* data.

Table II.2*b*. **Export subsidy elimination scenario – Canada, United States and world market consequences**

		2001	2002	2003	2004	2005
Canada – dairy products						
Butter exports	Scenario	3	2	1	1	0
(thousand tonnes)	Change	–20%	–41%	–61%	–82%	–100%
SMP exports	Scenario	28	27	18	9	0
(thousand tonnes)	Change	0%	–3%	–37%	–66%	–100%
Cheese exports	Scenario	24	24	23	22	20
(thousand tonnes)	Change	–7%	–8%	–16%	–19%	–26%
Milk price (Ind.)	Scenario	57	58	55	54	51
(CAN/hltr)	Change	0%	–1%	–8%	–12%	–18%
US – dairy products						
Butter exports	Scenario	1	1	2	2	0
(thousand tonnes)	Change	0%	0%	0%	0%	–100%
SMP exports	Scenario	125	112	100	90	79
(thousand tonnes)	Change	–10%	–20%	–29%	–38%	–46%
Cheese exports	Scenario	61	60	60	59	59
(thousand tonnes)	Change	–1%	–2%	–3%	–4%	–5%
Milk price	Scenario	34	35	35	36	37
(USD/100 kg)	Change	0%	–1%	–1%	–1%	–1%
World market indicators – livestock products						
Butter price	Scenario	160	168	176	201	232
(USD/100 kg)	Change	3%	6%	7%	15%	26%
SMP price	Scenario	157	173	187	200	203
(USD/100 kg)	Change	6%	12%	14%	14%	9%
WMP price	Scenario	180	187	210	216	227
(USD/100 kg)	Change	15%	15%	18%	17%	15%
Beef price, Argentina	Scenario	210	218	214	217	219
(USD/100 kg)	Change	1%	3%	3%	1%	1%
Beef price, USA	Scenario	253	247	253	252	258
(USD/100 kg)	Change	0%	0%	1%	–1%	–1%
Pork price, USA	Scenario	125	121	119	118	121
(USD/100 kg)	Change	1%	1%	2%	1%	0%
World market indicators – crops						
Wheat price	Scenario	126	135	138	147	152
(USD/tonne)	Change	2%	3%	2%	3%	–1%
Maize price	Scenario	102	106	114	119	119
(USD/tonne)	Change	3%	3%	4%	4%	1%
Oilseed price	Scenario	190	200	204	223	242
(USD/tonne)	Change	1%	–1%	–4%	–4%	–4%

Source: OECD Aglink model results of the scenario in comparison to *Outlook* data.

Eliminating subsidised exports lowers internal market prices

The implications of an export subsidy elimination for dairy markets in the United States and Canada are shown in Table II.2. Exports of all these commodities are lower under the export subsidy elimination scenario in both countries. In the case of Canadian cheese, subsidy reductions are partially offset by unsubsidised exports due to falling internal prices and rising world prices. Canadian dairy exports are of greater size relative to the internal market, so the consequence on prices is larger than in the United States. Elimination of subsidised exports results in the Canadian industrial milk price 18% lower in 2005 as compared to only a 1% decrease in the US milk price relative to the *Outlook* level. It should be noted that in the case of Canada, this price reduction is not assumed to be sufficient to induce producers to fall short of milk production quotas, but rather only serves to reduce the quota rent value. Moreover, regarding Canada, dairy policy changes intended to bring the dairy pricing arrangement into compliance with WTO rulings were not incorporated in the Aglink model at the time of

the *Outlook* nor in Part II. Recent revisions to allocate milk in excess of domestic requirements and URAA limits on subsidised exports into feed use are not addressed in this study. The consequence of this policy would be that the elimination of export subsidies could result in greater quantities of milk going into feed uses rather than lower domestic dairy product consumer prices. This would depend on the ability of the feed demand to absorb the increasing quantities of production in excess of consumption at support prices.

The elimination of export subsidies has large consequences for many EU dairy and livestock product markets. Decreasing exports that are uncompensated by higher stocks lead to falling internal prices and, consequently, lower production and higher consumption of these commodities. Moreover, the falling internal prices increase the possibility for unsubsidised exports of livestock commodities, whereas the *Outlook* foresees few such opportunities. In fact, unsubsidised exports of cheese increase substantially – more than replacing the subsidised exports – as the EU internal price falls by 5% and the world cheese price rises 10% on average. Unsubsidised beef exports may also be possible given the average 19% decrease in EU beef prices, although there are difficulties comparing EU and world prices as discussed in the annex to Part II. Not shown in the tables, the reductions in prices lead to a drop in EU production in 2005 by 6.5% for beef, 5.4% for pork and 4.0% for poultry. Dairy production is fixed by the quota and consequently does not respond, although the share allocated to manufacturing use does decrease as dairy product prices fall and the quota rents will fall. As in the case of Canada, the EU milk price changes are not anticipated to be sufficiently large to cause EU milk producers to underfill their quotas, so the EU milk production quota is assumed to remain binding. Thus, while the use of milk does change as a consequence of the subsidy elimination, favouring liquid milk and fresh product use over other manufacturing uses, the total amount of milk remains predetermined by the quota on total milk production and the price decreases will reduce the value of the quota.

The export subsidy elimination has consequences for EU cereal markets. While in the first several years of the *Outlook* the European Union relied heavily upon cereal export subsidies (until 2004 in the case of wheat), European Union agricultural policy adjustments under the Berlin Agreement lowered support prices from 2000, reducing this dependency. In the context of rising world prices and a weak Euro, the lower prices resulting from these policy changes will allow the start of unsubsidised exports of wheat in 2004. Consequently, the greatest impacts are during the initial years of the reduction in subsidised export limits, as it is during these years that EU cereal markets are most dependent upon subsidised exports. Wheat exports (setting aside a fixed amount of food aid) do not fall by the full reduction in commitments required in 2002 in order to achieve the elimination of subsidised exports. Instead, unsubsidised exports begin because internal prices fall by 8% on average for wheat, which is sufficient to allow competitive EU exports. Export subsidies remain significant for coarse grains during the projection period of the *Outlook*. Moreover, due to a relatively larger price gap between internal EU and world coarse grain prices, unsubsidised exports only begin in 2005 in the elimination scenario. Thus, the hypothetical export subsidy elimination has greater impacts on EU coarse grain exports.

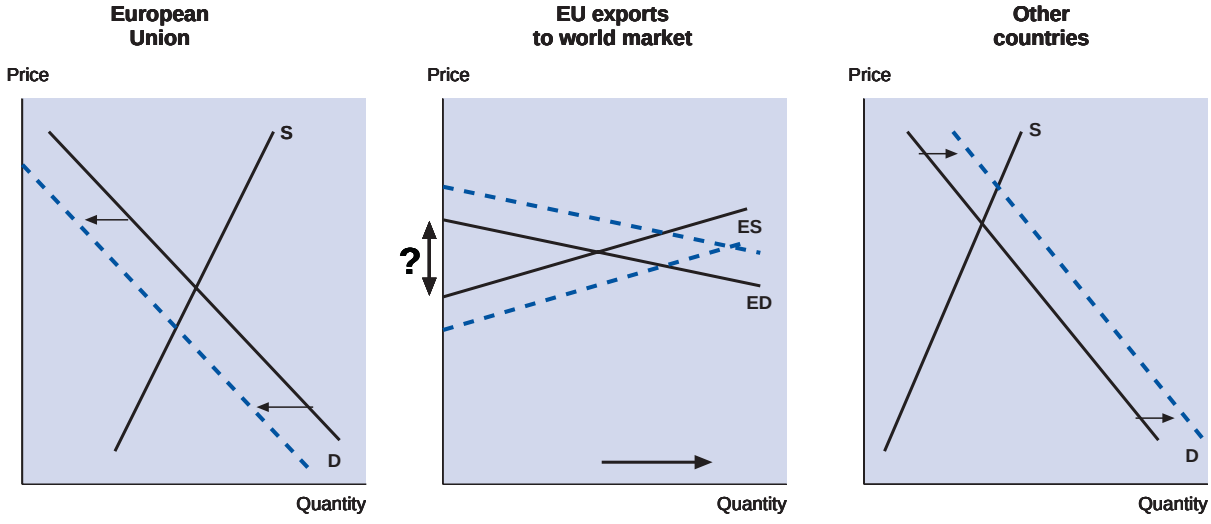
The crop and livestock markets are not driven solely by the direct effects of the export subsidy elimination in the scenario. Livestock and crop markets are linked through feed demand, and these cross-commodity effects are incorporated in Aglink. An indirect effect of the lower livestock production which results from dwindling export subsidies is less feed demand. (Although the incentive to reduce livestock production is moderated, in turn, by lower feed grain prices.) Thus, apart from the direct changes on EU crop markets as subsidised cereal exports are eliminated, there are indirect effects as EU internal cereal and oilseed meal demand for feed use is decreasing. The implications are most apparent in the case of wheat, which is more likely to be competitive at world prices and, hence, is less affected than coarse grains by the export subsidy elimination. In fact, this is furthered by substitution within the EU across crops, from wheat to coarse grains. The end result is an increase in the gap between internal wheat production and consumption at world – not support – prices. Eliminating export subsidies has little direct effect on wheat by 2005, but the indirect effect of decreasing internal demand and decreasing competing cereal prices throughout the period allows for greater unsubsidised exports.

The lower feed demand is also apparent in EU oilseed meal use. To some extent, the lower feed demand and the consequent effects on cereals and oilseeds could be offset if the analysis included non-grain feeds, which are used for a relatively small share of feeding. It should also be noted that another indirect effect of the elimination of export subsidies within the European Union is a shift in crop area. As internal cereal prices decrease, producers switch to competing uses, resulting in oilseed area 27% higher than in the *Outlook* in 2005. The greater oilseed supply from internal production decreases EU oilseed and oilseed product imports.

Eliminating subsidised exports increases world dairy prices, but has less effect on world crop prices

The consequence of export subsidy elimination for a commodity is to increase the world price of that commodity. However, the magnitude depends upon the importance of subsidised exports relative to the total volume of trade and may be offset by cross-commodity effects. World crop markets in the *Outlook* are directly affected by subsidies only to a small extent (relative to total world markets) by 2005. As seen above, indirect impacts through feed markets are also important. The lower EU meat production reduces feed demand in the European Union, leaving more cereals available for export and less demand for oilseed and oilseed product imports. At the same time, other countries react to higher world prices for meat and dairy by increasing production of livestock products to offset some portion of the EU livestock product export reduction, even though this will be mitigated as the costs of feed grain prices at world market prices also rise. Thus, some portion of the reduction in feed demand in the European Union shifts to other countries. The net effect of lower demand in the European Union and higher demand in other countries on EU net crop exports is unambiguously positive. This is illustrated in Figure II.2, setting aside EU coarse grain export subsidies for simplicity. The leftward shift in crop demand in the European Union reflects the lower EU feed use and the rightward shift in world demand reflects the higher world feed use. However, the implications for world crop prices cannot be determined *a priori*, as denoted by the question mark in the figure. The results will depend upon the relative size of EU crop exports as compared to the world market and the degree to which the reduction in EU feed demand will be replaced by increased feed demand in other countries, which depends in turn upon meat market elasticities, production methods and feed conversion efficiencies. EU cereal export subsidies also complicate the situation, but are less important by the end of the *Outlook* period

Figure II.2. **World crop markets – Indirect effects of export subsidy elimination**



Source: OECD Secretariat.

(*e.g.* 2005). Table II.2 shows that the final net results are very small. World cereal prices increase slightly with the initial, significant reductions in EU subsidised exports, but subsequently fall to O*utlook* levels, while world oilseed prices are below the O*utlook* levels.

The decrease in EU livestock product export subsidies, as well as those of Canadian and the United States' dairy products and the other countries listed in Table II.1 and the Annex, does have a positive effect on world livestock market prices. The magnitude of this effect varies by commodity, but the meat market prices of the scenario as reported in the tables are not significantly different from those of the O*utlook*. One reason is the relatively smaller share of subsidised EU meat exports relative to world markets. A second cause of the relatively small meat market effects is the weak relationship between EU exports and indicator world prices. The world beef and pork markets are defined in Aglink as regional or quality-based markets with little interaction. For example, EU subsidised beef exports have in the past been of a nature, in terms of quality and price, or sent to destinations where beef from most other OECD suppliers is not a substitute. Another factor is the Andriessen Agreement under which the European Union pledged not to use subsidies on beef exports into Pacific markets. Finally, supply-inducing effects of higher livestock prices in world markets will to some degree be offset by the fact that world feed grain prices also increase slightly. In short, the role of EU subsidised meat exports in world meat markets as represented in Aglink is small and potentially even offset by higher unsubsidised meat exports in the elimination scenario as EU prices fall to levels which may allow competition against other exporters.

While EU meat exports are small relative to world totals or not integrated in world markets and not all of its exports are subsidised, the EU dairy product exports comprise a larger share of world markets and most of these exports are subsidised. In addition, other countries such as Canada and the United States must eliminate subsidised dairy exports, which account for a large segment of their total exports. Hence, the largest world price increases in the scenarios are in dairy markets. World dairy prices increase as subsidised exports are eliminated. These price changes lead to supply response in those countries which respond to world market conditions and which do not use export subsidies in the O*utlook*, such as Australia and New Zealand.

Key assumptions

The effects of eliminating export subsidies depends upon the extent to which they are used. In the O*utlook* projections, use is limited because of unilateral policy decisions, rising world prices and exchange rate assumptions. Country notifications to the WTO reveal a great amount of unused potential which, given the basic O*utlook* assumption of current policy, is irrelevant in this analysis. Obviously, if the assumption proves false and some countries which are currently unilaterally abstaining from export subsidy use change policies in favour of these trade distorting policies, then the effects of an elimination would be consequently more significant.

The importance of export subsidies in any given market also depends on their magnitude relative to the total size of the relevant market. As such, the construction of the model regarding market structure embodies important assumptions. The crop and dairy markets are considered to be global markets in which all subsidised and unsubsidised exports from all sources compete in all liberalised markets. The results of the scenario for world dairy markets demonstrate the consequences of this assumption as the elimination of export subsidies raises prices paid by all importers and prices received by all exporters. On the other hand, beef and pork markets are considered to be separated by region and by significant differences in quality, and are considered as being imperfect substitutes or not substitutes at all across certain markets. The EU subsidised exports of beef, for example, compete only to a limited extent with exports of other OECD countries in the model. Continuing this example, when EU beef subsidised expo rts are eliminated, the importers of two-thirds of this beef are assumed not to enter the market to buy from other exporters. This reduces the price increase these exporters experience following an export subsidy elimination relative to the case in which beef markets are fully integrated. More competitive meat markets could also result, however, in greater potential for unsubsidised EU exports of beef, pork and poultry as feed prices fall, resulting in smaller decreases in

EU meat production and feed demand, as well as reducing the increase in world meat prices caused by an export subsidy elimination.

In addition to recognising the importance of assumptions regarding the degree of competition across markets, the relevant commodities must also be considered. In co-operation with OECD countries, Aglink has been developed in part to estimate the market effects of policies as regards certain commodity markets. This list of commodities is not intended to be complete, but rather to focus on certain commodities important to a majority of OECD countries and for which their policies are perceived to affect the trade of other OECD countries. If commodities not included in this analysis were also considered, the results could be changed depending on the degree to which they substitute or complement those commodities included in the study.

The need for export subsidies also depends upon the size of gaps, if any, between support prices and world prices. The *Outlook* projects rising world prices based upon a recovery in world demand and adjustments to world supply from 2000 to 2005. Similarly, exchange rate assumptions help determine the gaps between internal and world prices. Indeed, stronger world prices or weakness in key exchange rates could remove dependence on subsidised exports, if the gap between internal support prices and world prices were eliminated. On the other hand, should world prices fall short of those projected in the *Outlook* or exchange rates in exporting countries be stronger than expected, then the consequence may be greater quantities of export subsidies than in the *Outlook*. If gaps between internal support prices and world prices persist, then there would be more pressure on internal policies. In this case, unsubsidised exports would be less likely and domestic support schemes would be more dependent upon subsidised exports. Also, if world prices were lower than projected, countries may be more tempted to apply unused export subsidy limits. In this case, the elimination of export subsidies would have correspondingly greater and more widespread impacts.

Sensitivity of results: the consequences of alternate assumptions regarding the Euro

As the European Union is responsible for the largest share of export subsidies in the *Outlook*, the value of the Euro represents an extremely important assumption in the context of the present study. The consequences of an elimination of export subsidies under alternative assumptions regarding the Euro are investigated in Table II.3, immediately following the results of the export subsidy elimination using the baseline exchange rate. The export subsidy elimination scenario is repeated two times, each predicated upon a different exchange rate assumption. The "weak Euro" alternative scenario employs the 1.133 Euro/USD rate of 27 September 2000 for the *Outlook* period. This rate is approximately 22% weaker than the baseline level. The "strong Euro" alternative scenario assumes 0.80 Euro/USD, which represents a return to the levels of the ECU prevailing in the middle 1990s and is approximately 14% stronger than the Euro value in the *Outlook*. The base case results, which employ the *Outlook* value of about 0.93 Euro/USD, are also summarised in Table II.3 for convenience. The results are presented by showing the per cent change of EU and world prices following a hypothetical elimination of export subsidies. Each pair of columns corresponds to the given exchange rate and the per cent changes are relative to a baseline with export subsidies and the same exchange rate. Thus, the per cent changes can be interpreted as the estimated consequences of an elimination of export subsidies in the medium term, given a certain value of the Euro.

If the Euro proves weaker than assumed in the *Outlook*, then the world prices will be higher when converted into Euro or, alternatively, the EU export prices will be lower when converted into other currencies. As the difference between EU and world prices is reduced or even eliminated by a weaker Euro, the European Union is less dependent upon subsidised exports. Thus, the effects of the export subsidy elimination scenario are correspondingly smaller. As shown in Table II.3, the per cent change of the EU milk price following the export subsidy elimination is about half of the effects reported in the base case. The weak Euro allows unsubsidised exports to replace existing subsidised exports more rapidly, particularly for cheese, reducing the negative consequences on EU prices. Similarly, the effects for EU coarse grains are substantially different as the weaker Euro allows unsubsidised exports to replace most of the subsidised exports in the elimination scenario following only a small reduction in

Table II.3. **Export subsidy elimination results under different assumptions regarding the value of the Euro**

Per cent change due to the export subsidy elimination

	Weak Euro		Base case		Strong Euro	
	Average 2001-05	2005 result	Average 2001-05	2005 result	Average 2001-05	2005 result
European Union prices						
Beef	–15	–18	–19	–14	–23	–25
Pork	–8	–9	–10	2	–13	–14
Butter	–9	–19	–10	–25	–12	–27
SMP	0	10	–4	8	–5	6
Milk	–6	–5	–9	–10	–11	–13
Wheat	–2	–2	–8	–3	–12	–2
Coarse grains	–6	–4	–13	–14	–15	–20
World market prices						
Beef (Pacific)	1	–1	2	1	2	1
Beef (Mercosur)	–1	–2	0	–1	0	–1
Butter	11	22	11	26	13	30
SMP	8	6	11	9	12	11
WMP	11	9	16	15	20	21
Wheat	–1	–2	2	–1	5	2
Coarse grains	1	0	3	1	4	2
Oilseeds	–1	–2	–2	–2	–2	–4

Source: OECD Aglink model results of each export subsidy elimination scenario are in comparison to a baseline with the same assumption regarding exchange rate.

internal prices. The consequences for world prices are also smaller in the weak Euro scenario. The positive impact on world dairy product prices caused by the export subsidy elimination are lower in the case of a weaker Euro. Thus, the effects in the scenario are smaller for all markets in the event of a weaker Euro as EU internal prices are much closer to world price levels even before the elimination of export subsidies.

A stronger Euro than used in the *Outlook* would widen the gaps between EU and world prices, thus increasing the dependence of the European Union on export subsidies. In this setting, the reduction of export subsidies would have correspondingly greater effects, as shown in Table II.3. The effects of the scenario are greater for all commodities. Internal prices must fall to a much lower world price when denominated in Euro before unsubsidised exports would be possible. Only in the cases of wheat and cheese do unsubsidised exports fully replace subsidised exports following the hypothetical elimination at this value of the Euro. However, the unsubsidised wheat exports match the subsidised levels only in the last year of the projection period, so price decreases are greater relative to the base case in the early years of the scenario. For coarse grains, meat and dairy products, the results of an export subsidy elimination have greater impacts on the EU market in the event that the Euro is stronger than assumed in the *Outlook*. Prices of these commodities fall significantly as unsubsidised exports generally remain quite small or do not occur at all following the elimination of export subsidies as world prices in Euro terms remain low relative to internal prices. Again, cheese is an exception in that the likelihood of greater unsubsidised exports remains strong as prices fall (always in comparison to the baseline which uses the same exchange rate assumption), but this relative strength is offset by the expectation that a large quantity of milk used in other dairy products would be shifted into cheese production. The world crop prices are more likely to increase in this case, but the changes remain small. On the other hand, world dairy market prices clearly rise more following an elimination of export subsidies in the context of a strong Euro as opposed to the case when the *Outlook* exchange rate is used.

Conclusions

Using Aglink as the model underlying the analysis and the *Outlook* as the basis of comparison, this study examines the role of export subsidies as defined under Article 9 of the URAA and notified to the

WTO in certain world commodity markets over the medium-term time horizon in the context of perfect competition across homogeneous goods. The estimates show that eliminating export subsidies results in small changes to world crop and meat markets and increases in world dairy product prices. These results differ from *a priori* expectations that terminating subsidised exports cause strong world price increases (particularly for cereals) because subsidised exports are not widely used either in recent country notifications to the WTO or in the *Outlook* projections to 2005. Hence, the impact of eliminating subsidised exports falls mainly on those markets where a substantial share of trade occurs with subsidy, namely world dairy markets and the internal European Union market.

The *Outlook* projections of declining export subsidies depend upon rising world prices relative to 1999 levels, key policy changes in the European Union and a certain set of exchange rate assumptions. If world prices prove stronger than expected or key exchange rates weaker, then the role of export subsidies in world markets would be smaller. In this context, an elimination of export subsidies would have smaller effects on world and internal markets. Alternatively, should world prices decrease or exchange rates prove stronger for countries with price supports, then there will be more pressure to subsidise exports. Consequently, countries currently using export subsidies may increase their application and the many countries that have unilaterally suspended subsidised exports may return to these measures as well. Hence, in the context of weaker world prices or stronger exchange rates for countries using export subsidies, the implications of an export subsidy elimination may be more substantial for world markets and more countries' internal markets may be directly affected. This highlights the advantage of a multilateral elimination of export subsidies as opposed to the current unilateral elimination or suspension in several countries: even if under current market conditions the effects of elimination of export subsidies would be small, the multilateral agreement would preclude a resumption of export subsidies, which is now legal up to the URAA limits.

Subsidised exports are one of several instruments policy-makers may use to maintain internal prices above world prices, given some limits to imports. Setting aside the possibility that countries will devise non-traditional means of facilitating exports (such as abuse of export credits, food aid, or monopolistic trading arrangements) within the limits of existing or new multilateral agreements, the elimination of subsidised exports places pressure on internal policy, which must either allow support levels to decline through a drop in prices or turn to alternate instruments. Countries can choose to perpetuate internal market distortions by controlling supplies or purchasing product off the domestic market at a fixed price. In either case, the country would terminate the dependence on export subsidies without abandoning support prices. World markets would still benefit from the elimination of subsidised exports, and importers would turn to those sources which are most efficient rather than those with the most gove rnment assistance. However, supply control or government stock-holding would continue to insulate internal markets, thus prohibiting price transmission between producers and consumers internally and abroad. These policies would thus go on providing incentives to encourage supply and disincentives to discourage consumption. In addition, stock-holding is unlikely to be a sustainable policy due to the potential for large stock accumulation in every year. Clearly, either of these policy responses aimed at keeping support price levels unchanged results in a continuation in market distortions. Support prices, even with strong supply controls, attract resources in the industry, as well as create economic rent and vested interests, and discourage consumption. But the distortion would be focusing on the internal market with fewer consequences for world markets than export subsidies.

The policy response to an export subsidy elimination with the fewest market distorting consequences is to abandon price supports altogether. If countries were to use export subsidy elimination as an opportunity to end price supports as a means of internal support, without replacing these measures by alternative market-distorting policies, then market signals would be transmitted unimpeded by government intervention. In short, producers and consumers, internally and abroad, would interact through liberalised markets to decide whether the best uses of each country's goods were to be found internally or in export markets.

Annex

IMPLEMENTATION OF THE EXPORT SUBSIDY SCENARIO IN AGLINK

Export subsidies in the *Outlook*

In projecting export subsidy levels, the key data available are the WTO notifications and the *Outlook* itself. The following text will present the data from these sources to which the main text refers. The notification data are directly from the WTO *Export Subsidies: Background Paper by the Secretariat* [G/AG/NG/S/5], which summarises members' notification data or drawn from *The Uruguay Round Agreement on Agriculture: an evaluation of its implementaiton in OECD countries* (OECD, 2000) (hereafter referred to as the OECD Report on URAA Implementation). In general, the most recent notifications on export subsidy use available are the 1998/99 GATT year or the 1998 calendar year.

Perhaps the most interesting aspect of the export subsidies reported in notifications is how few they are relative to the URAA limits. Many countries have the right to subsidise many agricultural commodities within the limits established in the URAA. Some, however, have chosen to unilaterally eliminate them. For this analysis, we only include those country and commodity combinations which are explicitly included in the Aglink modelling framework and have not been unilaterally eliminated. To assume otherwise would make these results incomparable to the *Outlook*. If countries subsequently change their policies and exercise their right to once again use export subsidisation, then both the *Outlook* and this analysis will need to be re-examined to include this change.

For those commodities which are incorporated in the Aglink framework, OECD Member notification information is summarised in Table II.A.1. Although there are other commodities and countries with unused export subsidy potential, they are not reported here. In the case of Canada, recent notification of dairy product exports for each dairy product line is zero. However, following the WTO appellate body report of November 1999 and corresponding to the assumption made by the Aglink co-operators at Agriculture and Agri Food Canada and by the Secretariat that these subsidies continue in the *Outlook*, the total exports recorded in the panel report are used here. The United States' FSC ruling is not incorporated in the *Outlook*, nor is it addressed in the present study. While changes to comply with the Report of the Appellate Body [WT/DS108/AB/R] are likely to have some market impacts, there is no information presently available regarding future policy and it is not an element of the *Outlook*. Commodities which are incorporated in this study are wheat, coarse grains, rice, oilseeds, beef, pork, poultry, milk, butter, cheese, skim milk powder (SMP) and whole milk powder (WMP). In addition, the analysis partially accounts for other dairy products. The Aglink model focus is OECD countries, so a non-member country is considered for inclusion only where its trade has a marked impact on world markets.

The above table emphasises some critical results of the OECD report on URAA implementation from which much of the data is drawn. Export subsidy use in the implementation period has been dominated by the European Union. Where other countries export thousands of tonnes with subsidies, the European Union exports millions. Although not a critical result, the list of commodities contains more entries for livestock and dairy products than crops. Indeed, apart from the European Union and Hungarian grain exports, the incidence (in number if not quantity) of export subsidies falls on livestock products, when considering Aglink commodities and OECD countries. The general bias of export subsidies in Table AII.1 towards livestock products relative to crop products supports the results of the scenario, namely that export subsidies have greater impacts in the world dairy markets in particular as compared to world crop markets.

Greater relevance of Uruguay Round volume limits as opposed to value limits

A second point demonstrated in the OECD report on URAA implementation is the relatively greater importance of quantity limits over expenditure limits. That document shows that the volume limits are exceeded about twice as often as limits regarding value. This result holds when focusing on Aglink commodities. In the case of the European Union, the largest user of export subsidies, the report compiles 1995-97 notification data to show that 50-80% of volume commitments are used as opposed to 40-60% of value commitments.

Value limits have not been very important in the past, but they may become important in the future. For this forward-looking analysis, the expenditure levels of the projection period must be considered. The *Outlook* projects commodity prices in several countries which indicate whether value limits could become an impediment to subsidised exports. By taking the *Outlook* export levels multiplied to the *Outlook* price gap, an expenditure equivalent

Table II.A.1. **WTO notification quantity data for Aglink commodities**

Thousand tonnes

	Commodity	WTO notification – quantities		
		GATT year 1998 Data		Final limit in 2000
		Applied	Limit	
Australia	Other milk products			
	Fats	1	16	13
	Non fat solids	1	66	51
Canada	Butter	11	7	4
	Skim milk powder	30	51	45
	Cheese	27	11	9
	Other milk products	71	34	30
Czech Republic	Milk powder	19	73	67
	All dairy products (ex.: powder)	40	68	63
	Butter	24	(part of aggregate above)	
	Cheeses	14	(part of aggregate above)	
	Other dairy products	2	(part of aggregate above)	
European Union	Wheat and wheat flour	14 017	16 825	14 439
	Coarse grains	14 775	11 982	10 843
	Rice	144	145	145
	Butter and butter oil	165	435	399
	Skim milk powder	222	298	273
	Cheese	226	363	321
	Other milk products	951	1 049	958
	Beef meat	722	947	822
	Pigmeat	743	483	402
	Poultry meat	343	345	290
Hungary	Wheat	1	1 242	1 141
	Coarse grains	481	592	164
	White cream cheese	0	2	2
	Slaughter pigs	5	38	35
	Pork	4	99	91
	Broiler chicken	20	121	111
Iceland	Sheepmeat	0	2	2
Norway	Bovine meat	2	2	1
	Swine meat	1	4	4
	Sheep and lamb meat	1	1	1
	Butter	2	6	6
	Cheese	23	19	16
Switzerland	Dairy products	54	68	62
	Cattle for breeding (thou head)	0	12	11
Turkey	Meat of poultry	2	2	2
	Creams	0	0	0
United States	Butter and butter oil	0	30	21
	Skim milk powder	130	84	68
	Cheese	3	3	3
	Other milk products	5	5	0
	Poultry	4	30	28

Sources: Columns 1 and 2 – WTO *Export Subsidies: Background Paper by the Secretariat*, Canada from *Canada – Measures Affecting the Importation of Milk and the Exportation of Dairy Products, Report of the Panel* [WT/DS113R]; Column 3 – OECD, *The Uruguay Round Agreement on agriculture: An evaluation of its implementation in* OECD *countries.*

can be calculated for each year of the projection period. This calculation is inaccurate where prices are not directly comparable or some portion of exports occurs without subsidy, as is often the case for less homogeneous animal products. Nevertheless, these calculations are compared to the final value limits in Table II.A.2.

The table shows only those lines for which Aglink includes a domestic price and, hence, for which an expenditure level can be computed. The first column of numbers shows the value limit at the end of implementation converted into US dollars using the exchange rates assumptions of the *Outlook*. The second column of data shows the average gap between internal and world prices using Aglink data, without any adjustments for quality, transportation or level (*e.g.* farm, wholesale or retail). Quality differences may be particularly important for less homogeneous products, such

Table II.A.2. **Lesser importance of value limits in the *Outlook***

	Commodity	Final value limits under URAA (million USD)	Outlook averages of 2001-05	
			Price margin (if positive) (USD/tonne)	Implied value (margin* total exports) (million USD)
Canada	Butter	16	2 373	8
	Skim milk powder	44	2 127	62
	Cheese	23	4 034	109
European Union	Wheat and wheat flour	1 218	n.a.	n.a.
	Coarse grains	942	19	194
	Rice	43	n.a.	n.a.
	Butter and butteroil	905	2 183	428
	Skim milk powder	253	615	141
	Cheese	300	2 851	1 311
	Other milk products	688	989	475
	Beef meat	1 344	398	325
	Pigmeat	125	n.a.	n.a.
	Poultry meat	98	n.a.	n.a.
Hungary	Wheat	5	n.a.	n.a.
	Coarse grains	1	0	n.a.
	Pork	12	212	45
	Broiler chicken	14	n.a.	n.a.
United States	Butter and butter oil	30	1 443	3
	Skim milk powder	82	1 093	156
	Cheese	4	1 591	98
	Poultry	14.6	n.a.	n.a.

Sources: Column 1 in OECD, *The Uruguay Round Agreement on agriculture: An evaluation of its implementation in* OECD *countries*; Columns 2 and 3 and OECD *Agricultural Outlook*.

as meats and cheese. Hence, these margins are sometimes imprecise estimates of the gap between internal and world prices. In those cases where this gap is not positive, an "n.a." is entered in the table. The EU other dairy product expenditures calculated in the table reflect only WMP exports and so do not accurately reflect the total expenditure on the wider array of products which fall under this limit. Importantly, the gaps between internal and world prices in 2005 are lower than those of 1998, the last year of notification data available, with the exception of Canadian dairy products, Hungarian pork and SMP in the US. Declining domestic to world price gaps in the *Outlook* are certainly the case in the European Union, the largest user of subsidised exports, due to the incorporation of recently announced reforms to agricultural policy which will lower internal support prices.

The third column of data in the table shows the product of the *Outlook* price gap and exports averaged over the projection period. The comparison of the first and last columns of the table show that the implied expenditures of the *Outlook* usually fall short of the levels required to meet the value limits. The exceptions are cheese and SMP for Canada, cheese for the European Union, pork for Hungary and cheese and SMP for the US. In most of these cases, however, recent exports subsidies are not bound by limits on value, although Aglink prices indicate a positive price gap. This implies that the price comparison used above may not represent the actual subsidy expenditure per unit or, alternatively, that not all exports are subsidised. For example, the diversity of the cheese implies that the price comparisons are suspect and value limits may be avoided by carefully selecting which types benefit from subsidies. For certain entries in the table, such as cheese and Hungarian pork, trade occurs both with and without subsidy in the historic data and is expected to do so in the *Outlook*. Thus, the URAA restrictions on the degree to which these exports can be subsidised are not as likely to be as binding as the calculations on the table would otherwise indicate. A similar assumption is implicit in the *Outlook* numbers for United States' SMP exports, which exceed volume limits despite a US price remaining above world price levels. In this case, location advantages may play a part as the world price is measured in North Europe while Mexico is a major importer of SMP. Canadian dairy products pose more difficulty as there is neither notification data nor data in the Report of the Panel which can serve as a guide to determine if the expenditure limits have been binding in the past.

As has been the case thus far in the implementation period, the *Outlook* envisions that the expenditure limits will be less important than the quantity limits. Moreover, in the context of the export subsidy elimination scenario value limits are expected to be less binding than volume limits. Reducing export subsidies of a country results in falling internal prices and rising world prices reducing the margins between the two even as quantities decline. With expenditures equal to the margin multiplied by the quantity, it is unlikely that value limits which are unbinding in most notification data and the *Outlook* will become binding more rapidly than volume limits in an export subsidy

elimination scenario. In conclusion, the notification data, as available from the WTO and as summarised in the OECD report on URAA implementation, the *Outlook* results and the scenario in question allow Part II to focus on the volume limits that are more likely to be binding. In the end, the results of export subsidy elimination are precisely the same whether value or volume limits are reduced to zero, in that there would then be no export subsidies.

Export subsidy quantities in the *Outlook* are low, especially for crops

Given the focus on volume rather than value limits, the next step in this analysis is to identify the export subsidies in the *Outlook* and compare these to the reduction schedule. The reduction schedule is an assumption of the scenario. From the final URAA limits in 2000, the elimination scenario is implemented by reducing this limit to zero in five equal steps from 2001 to 2005. The effects will depend on the role of export subsidies in the *Outlook*.

Subsidised exports of wheat, coarse grains, beef and dairy products in the EU are endogenous variables in Aglink. These are included in Aglink as policy levers which are used by the decision-makers to maintain internal prices above support price levels. As regards the aggregate other dairy products, the *Outlook* focuses on WMP by assuming a certain share of the total is allocated to WMP and then this allowance is used to whatever extent is needed to maintain the milk price at or above the target price. Hence, for most of these EU commodities, Aglink has separate variables and equations for subsidised exports, which are applied according to internal policy requirements.

For other EU commodities in Aglink, such as rice and poultry, as well as for other country modules, total exports are identified rather than subsidised exports. In some cases, the two are equal and no unsubsidised exports are expected in the projection period of the *Outlook*. For other commodities only a portion of exports are subsidised. Table II.A.3 presents quantities reported in the recent notifications, the final quantity limit and *Outlook* data. The *Outlook* data of the last two columns are the annual average from 2001 to 2005 of total exports (subsidised or unsubsidised) and subsidised exports. The data listed are only those which correspond to Aglink commodities and countries. In instances where Aglink data already include a variable representing the URAA export subsidy limits and

Table II.A.3. **Quantities of export subsidies in the *Outlook***

Thousand tonnes

	Commodity	GATT 98 subsidy quantity	Final quantity limit	Outlook averages 2001-05	
				Outlook exports	Subsidised quantity
Canada	Butter	11	4	3	3
	Skim milk powder	30	45	28	28
	Cheese	27	9	27	9
	Other milk products	71	30	n.a.	30
Czech Republic	Milk powder	19	67	0	0
	All dairy products (ex.: powder)	40	63	n.a.	41
	Butter	24	n.a.	34	34
	Cheeses	14	n.a.	16	16
	Other dairy products	2	n.a.	n.a.	2
European Union	Wheat and wheat flour	14 017	14 439	17 067	14 295
	Coarse grains	14 775	10 843	10 400	10 400
	Rice (incl. intra-EU trade)	144	145	1 129	144
	Butter and butteroil	165	399	197	197
	Skim milk powder	222	273	222	222
	Cheese	226	321	463	321
	Other milk products (WMP)	951	958	489	489
	Beef meat	722	822	822	822
	Pigmeat	743	402	1 067	402
	Poultry meat	343	290	718	290
Norway	Butter	2	6	3	3
	Cheese	23	16	24	16
United States	Butter and butter oil	0	21	2	2
	Skim milk powder	130	68	142	68
	Cheese	3	3	62	3
	Other milk products (WMP)	5	0	13	0

Sources: Column 1: WTO *Export Subsidies: Background Paper by the Secretariat*, Canadian dairy data from *Canada – Measures Affecting the Importation of Milk and the Exportation of Dairy Products, Report of the Panel* [WT/DS113R]; Column 2: OE CD, *The Uruguay Round Agreement on agriculture: An evaluation of its implementation in* OECD *countries*; Columns 3 and 4: OECD *Agricultural Outlook* and assumptions of the present study.

these differ at all from those of the schedule, the Aglink data are shown in the table on the assumption that it better matches the commodity definitions of the model.

In the third column of data in Table II.A.3, an "n.a." indicates that there is no matching export data in Aglink. Also important, WMP exports are sometimes applied for other milk product aggregates, so the first two columns and third column may not match in definition. There are some questions regarding units for certain lines in that, as mentioned above, the Aglink definitions do not always precisely match those of the notification data. Dairy product units are also uncertain, as some of these may in fact be in milk equivalent for some countries whereas the table above applies all such entries as though a product weight. Some subsidised exports are very small as compared to either the final limit or the total exports. For example, subsidies given to Australian dairy product exports, Hungarian wheat and livestock products and US poultry are relatively small. These are assumed to be zero in the projection period of the *Outlook* and are not included in Table II.A.3. In the case of Australia, the assumption that there will be no subsidised dairy exports in the *Outlook* is supported by the changes in domestic support policies from July 2000. Although large in notification data, Hungary coarse grain export subsidies are also excluded as the *Outlook* projects no gap between internal and world prices. Canadian subsidised exports of dairy products are drawn from the WTO panel report rather than the notification data.

Table II.A.3 does not present export subsidy levels even for commodity and country combinations where there is not a representative trade flow in Aglink. In other words, Table II.A.3 omits data for OECD countries if there is no corresponding export variable in Aglink. However, these subsidised exports are expected to have an effect on markets where they are substantial relative to world trade. These export subsidy quantities, which cannot be directly linked to individual variables in Aglink, are summed in Table II.A.4. The first columns of Table II.A.4 are drawn directly from columns 1 and 2 of the 1998 data in Table 3 of the WTO *Export Subsidies: Background Paper by the Secretariat* (p. 5). These data are the totals of volume commitments and notifications for GATT year 1998. As the WTO states, these aggregates "can only be considered to be indicative" as the units may not be comparable across countries (p. 4). Nevertheless, these aggregate export subsidy volumes across all countries are compared with those included in the

Table II.A.4. **Export subsidies included in the present study**

Product code and commodities	WTO Notification		Present analysis		Omitted		Share Included	
	Commit	Notify	Commit	Notify	Commit	Notify	Commit	Notify
	[G/AG/NG/S/5]						(relative)	
	(thousand tonnes)						(per cent)	
1. Wheat and wheat flour	48 277	14 023	411 439	14 017	33 838	6	30	100
2. Coarse grains	21 129	15 311	10 843	14 775	10,286	536	51	96
3. Rice	628	144	145	144	483	0	23	100
4. Oilseeds	2 491	0	0	0	2 491	0	0	n.a.
5. Vegetable oils	1 529	10	0	0	1 529	10	0	0
6. Oilcakes	308	0	0	0	308	0	0	n.a.
7. Sugar	4 243	1 884	0	0	4 243	1 884	0	0
8. Butter and butter oil	529	167	426	167	103	0	81	100
Incl. Canada	529	178	430	178	99	0	81	100
9. Skim milk powder	646	380	341	351	305	29	53	92
Incl. Canada	646	410	386	381	260	29	60	93
10. Cheese	460	253	341	252	119	1	74	100
Incl. Canada	460	280	350	280	110	1	76	100
11 Other milk products	1 342	1 060	557	512	785	548	41	48
Incl. Canada	1 342	1 131	1	557	512	785	619	41
12. Bovine meat	1 258	729	822	722	436	7	65	99
13. Pigmeat	605	748	444	743	162	5	73	99
14.. Poultry meat	644	370	290	343	354	27	45	93
15. Sheepmeat	26	1	0	0	26	1	0	0
16. Live animals	123	5	0	0	123	5	0	0
17. Eggs	114	116	0	0	114	116	0	0
18. Wine	485	7	0	0	485	7	0	0
20. Fruit and vegetables	6 904	2 407	0	0	6 904	2 407	0	0
21. Tobacco	222	7	0	0	222	7	0	0
22. Coton	89	0	0	0	89	0	0	n.a.

Sources: Columns 1 and 2: *Export Subsidies: Background Paper by the Secretariat*, Canadian dairy data from *Canada – Measures affecting the importation of milk and the exportation of dairy products, Report of the Panel* (WT/DS113R); Column 2: OECD, *The Uruguay Round Agreement on agriculture: An evaluation of its implementation in* OECD *Countries*; Columns 3 and 4: OECD *Agricultural Outlook and assumptions of the present study.*

present analysis (as shown in third and fourth columns of data of Table II.A.4), by showing both the amount omitted in absolute terms (fifth and sixth columns) and the share of the total export subsidies which are included in the present study (seventh and eighth columns). In other words, we can test the degree to which export subsidies are incorporated in this analysis by identifying the countries and commodities included in the model relative to historic notification data in the final columns of Table II.A.4. For example, the present analysis explicitly incorporates export subsidy variables which account for only 30% of the total wheat commitments, but practically 100% of the actual use. On the other hand, none of the oilseed product commitments or applications are included, as is justified by the very small amount used. Table II.A.4 also reproduces WTO data for commodities not covered by Aglink and so not included in this analysis. For the Aglink commodities the share of export subsidies use which is omitted tends to be very small.

Table II.A.4 shows that other dairy product export subsidies are difficult to include in the Aglink framework. The model would exclude 619 000 tonnes of other dairy product export subsidies unless some further steps are taken for the purposes of this study. The reason for adding the Canadian dairy products separately in Table II.A.4 is found in the WTO ruling that some portion of these exports must be deemed to have been subsidised. The original Canadian notification reported no dairy export subsidies in 1998, which corresponds to Canada's understanding at the time of notification. Consequently, the WTO background paper which sums notification data does not report any Canadian dairy export subsidies in 1998. Thus, to be complete as regards 1998 export subsidies, the Canadian dairy product export quantities of the Report of the Panel (Table 2, p. 10) are added to Table II.A.4, although it should be stressed that the WTO rulings are relevant to only certain classes of milk used for exports. In a similar manner, following the FSC ruling US export subsidies in Table II.A.4 would be amended if these quantities could be identified. This is not possible at present. Given these data for other dairy product export subsidies, if this method had been used to evaluate the time period covered by the 1998 GATT year, half of the other dairy products aggregate would be omitted (including Canadian other dairy products). The other dairy product aggregate is large, primarily due to the European Union. As regards traded dairy products, this study focuses on butter, cheese, SMP and WMP, which have all been accounted for already in the case of the European Union. Another difficulty are countries which subsidise dairy product exports, yet are not modelled in Aglink, such as Switzerland. These other dairy product export subsidies would also be reduced in the scenario, with consequences for world markets. Hence, the effects of the dairy product trade which are not explicitly in the model are relatively large. To approximate the effects on markets the world demand for butter, cheese, SMP and WMP are each increased by a quarter of the reduction in other dairy product export subsidies, although in fact the effects may be distributed unequally. This method is discussed in the next section.

Implementation in Aglink

In co-operation with participating OECD countries, the Secretariat maintains Aglink, a structural econometric model representing selected OECD Members, non-member and world markets for certain traded agricultural commodities. The export subsidy scenario reported in the first section of Part II is created using the Aglink model, by imposing an alternative set of assumptions regarding export subsidies in place of those used in the *Outlook* of 2000. The scenario solution is then compared against the *Outlook* to determine the implications of an export subsidy elimination. The following text explains the Secretariat's methods in implementing the policy change in a large and complex system.

The following text assumes that the reader is familiar with structural models in general and Aglink in particular. Background documentation on the model is available to OECD Members on the Secretariat's web site. This explanatory text is intended for readers who are interested in reproducing or at least understanding the methods of this analysis, and is consistent with the Secretariat's goal of improving interaction among Aglink users. Explanations may not be sufficiently general to be accessible to readers less familiar with the model.

Implementing the export subsidy scenario required more than simply changing exogenous assumptions. Aglink is designed with dual goals of policy analysis and outlook generation. As such, some policy levers are included in modelled countries, although the method of inclusion is not solely with the intention of future policy analysis. For some commodities in some countries, the model must be shifted away from an *Outlook*-oriented structure into one more appropriate to the policy simulation at hand, all the while preserving the fundamental relationships and the *Outlook* solution. In general, the implementation as regards Aglink can be separated into three types: model changes, exogenous assumption changes and exogenous shifts in the estimated values. The scenario requires consideration of the EU module across several commodities and the dairy markets in Canada and the US, with smaller changes in several other country modules.

Letting Canadian dairy support prices fall, while holding supply constant

As already noted, some part of Canadian dairy exports are assumed to be subsidised following the WTO panel ruling and co-operators' input into the *Outlook* process. In the *Outlook* model used for the 2000 edition, however, butter exports are exogenous and skim milk powder exports are the residual of the market-clearing identity, with prices set by policy parameters. Cheese exports are estimated as a function of both the GATT limit and relative Canadian and world cheese prices. Moreover, as the Canadian milk production quota is in practice based on estimates of the

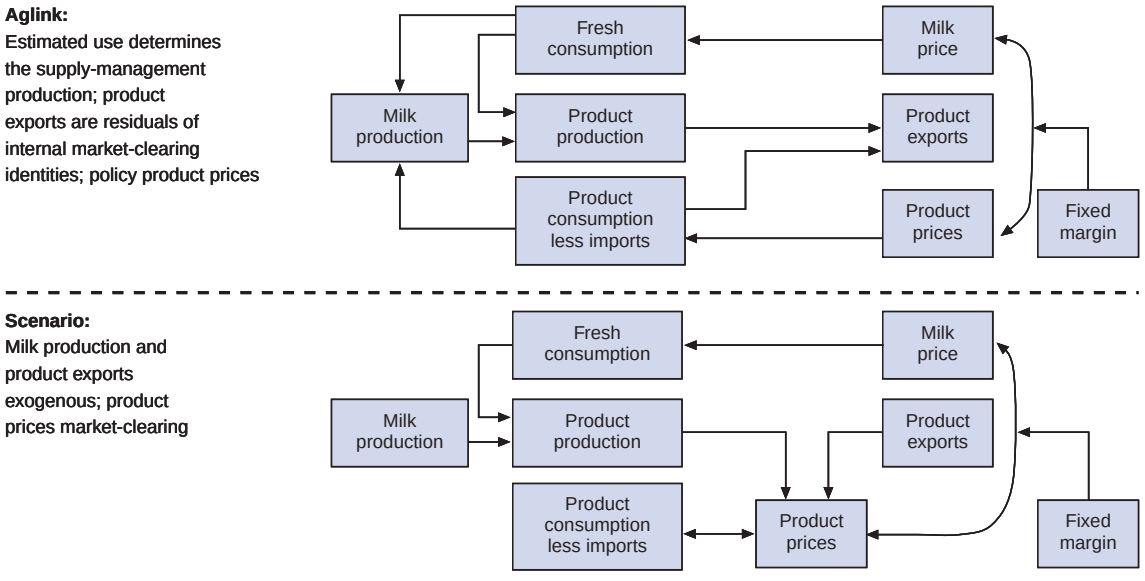
expected use, so it is in Aglink. The underlying assumption of this structure is that any amount of dairy products produced which exceeds the amount consumed is exported onto world markets. It should be understood that this structure is not consistent with the recent changes in Canadian dairy policy following the WTO rulings. The present analysis is based on the *Outlook* and starts from the *Outlook* policy setting.

To decrease exports according to an export subsidy reduction schedule, Canadian dairy policy cannot continue to use exports to release that portion of production which is not consumed at support prices. To reduce export subsidies, Canada could either decrease production quota to decrease dairy product exports without changing support prices or reduce support prices to raise consumption without changing production – or some combination of these options. To be consistent across countries, as discussed in the main text, the policy rule of allowing lower prices is imposed.

From the fundamental assumption of the present study, the model changes begin by shifting the butter and skim milk powder prices from policy parameters to market-clearing prices. Hence, exports of SMP become exogenous and consequently easily manipulated according to the export subsidy reduction scenario. In other words, the relative prices indicate that unsubsidised SMP exports from Canada are unlikely, so the SMP exports must be subsidised and can be treated as exogenous and reduced in the scenario, while the internal price can be determined as the market-clearing price. Unsubsidised cheese exports exist in the preliminary *Outlook* and may increase or decrease as a consequence of relative prices, so this equation is not removed. Instead, since some part is assumed to be exported with subsidy, the exogenous GATT limit is shifted lower by the amount of the export subsidy limit reduction. Whereas Canadian milk production in Aglink at the time of the 2000 *Outlook* is determined by domestic use less WTO imports, following the rules underlying the supply management, the scenario production is given as exogenous at the *Outlook* level and maintained at the *Outlook* level. Supply control levels are assumed to remain unaltered even as prices fall. In practice, equations on price determination and milk production had to be reversed or replaced by exogenous *Outlook* levels in order to maintain this assumption.

The end result is that the Canadian milk supply is exogenous and unchanged, while support prices are changed to market-clearing prices and allowed to fall as subsidised exports are eliminated. The original and scenario versions are presented in Figure II.A.1. In this figure, the dairy product markets are not individually shown and the diagram does not accurately reflect the cheese market in particular. It is important to note that the model has been preserved in that no new equations have been estimated nor existing equations re-estimated. The structure has been changed to set some dairy product exports at the levels required for the elimination scenario, fix the milk supply at *Outlook* levels and make the prices market-clearing.

Figure II.A.1. **Canadian dairy component**



Source: OECD Secretariat.

Setting European Union stocks at Outlook levels and changing exports where needed

The EU module already contains many of the URAA export subsidy quantity constraints. For wheat, coarse grains, beef and dairy products, export subsidies are modelled as a policy rule based on the internal market price relative to the support price. As a commodity's market price falls to or below the support price, export subsidies of that commodity are increased to the maximum allowed under the URAA. Conversely, if prices rise well above support levels, then export subsidy quantities are decreased towards zero. As already discussed, export subsidy expenditure limits are not included as these have not been and are considered unlikely to become as important as quantity limits. The policy rule makes subsidised exports of these commodities endogenous and constrains them to range from zero to the URAA limit based upon the EU's efforts to hold prices at support levels. In the scenario, these exogenous URAA limits are decreased according to an assumed schedule. Similar policy rules for intervention stocks of wheat, coarse grain and beef are eliminated from the model in the scenario and replaced with *Outlook* stock levels, although temporary beef stock changes relative to the *Outlook* are introduced to smooth out what would otherwise be a response in the form of a dampening beef cycle. This follows from the assumption that the policy response to the hypothetical elimination of export subsidies is to allow internal prices to fall rather than use alternative policy instruments to maintain internal prices at support levels.

It should be noted that existing Aglink equations for unsubsidised exports of wheat, coarse grains, butter, cheese, SMP and WMP are maintained for this scenario. In fact, as lower EU export subsidies lower internal prices and raise world prices, as discussed in the main text, these equations become more important. In the case of cereals, which are considered homogeneous, a margin between world and EU prices is calculated. Unsubsidised exports increase exponentially if this margin is positive. This specification is the same for both the *Outlook* and the scenario as it is used to represent the switch in circumstances from one in which EU market prices are greater than world prices (and exports are subsidised) and the case in which world prices rise to or above EU market prices. Aglink currently allows the possibility of unsubsidised exports of EU dairy products, which are particularly important in the case of cheese. These equations are calibrated on notification data. Dairy products are modelled as having less than perfect substitution between domestic and foreign sources, although the elasticities remain at very high levels. The consequence of either formulation is a rapid increase in unsubsidised exports as soon as EU prices are competitive as compared to world prices.

As stated earlier, a large portion of the EU other dairy product export subsidy limits are not directly modelled in Aglink. However, because these are large they can be expected to have strong effects on the commodities included directly. Hence, to estimate the implications on the internal EU market, the concentrated milk production equation is exogenously decreased by the amount of the export subsidy reduction. The *Outlook* model (as of the 2000 *Outlook*) estimates concentrated milk production, but not consumption or exports. The implicit assumption of this method of incorporating export subsidies in the scenario is that the full effect of the export subsidy reduction is passed on to production. There is no allowance for unsubsidised exports nor for higher consumption, which are likely at lower internal prices. Although this over-states the effects, the consequences for total EU dairy markets is fairly small since this product accounts for only a small share of total EU milk use. To capture the world market impacts of lower EU other dairy product exports, the share of the reduction not accounted for by WMP is added to rest of world dairy product demands, as discussed below.

EU rice, pork and poultry exports in Aglink do not explicitly include export subsidies. For rice (which includes intra-European Union trade) and poultry, exports and imports are exogenous and exports exceed URAA limits in the Outlook. In both cases, the exogenous exports are reduced by the amount of the export subsidy reduction. For pork, exports are divided into two parts, one part which competes in the Pacific market and depends upon relative EU and US prices and a second, "other" part which is exogenous. Without having data readily available which indicates the destination of subsidised exports, the share of each market in total exports are assumed to apply to subsidised quantities as well. Thus, the endogenous exports to Pacific markets is shifted lower by the total subsidised quantity reduction times that market share while the "other" market exports are exogenously lowered by the remainder of the export subsidy reduction. It must be recognised that the "other" market exports have no direct impact on world market prices, although the reduction in EU exports is somewhat accounted for by increasing certain East European countries' exports (described below), and this helps explain the relatively small world pork market effects.

Examining the links between European Union exports and other OECD meat markets

While world markets for crops and dairy products encompass all exporters and importers, including the European Union, world markets for meats do not include all of EU exports. In the case of beef, only approximately a third of EU exports is found to replace competing suppliers in the Mercosur market, while the other two-thirds are not in direct competition with other modelled suppliers. The model does not include any mechanism whereby unsubsidised EU beef exports could begin in either the Mercosur or the Pacific beef markets. To capture this possibility, the model was changed to include simple price margins and unsubsidised export equations analogous to those of the EU dairy product exports, though with less export responsiveness to the relative prices. Thus, an unsubsidised export equation based on notification data like those of EU dairy exports is used despite difficulty matching subsidised and total beef export quantities in the notification data and difficulty comparing EU and world prices. The quantity of unsubsidised beef exports in this scenario only inaccurately reflects how much unsubsidised

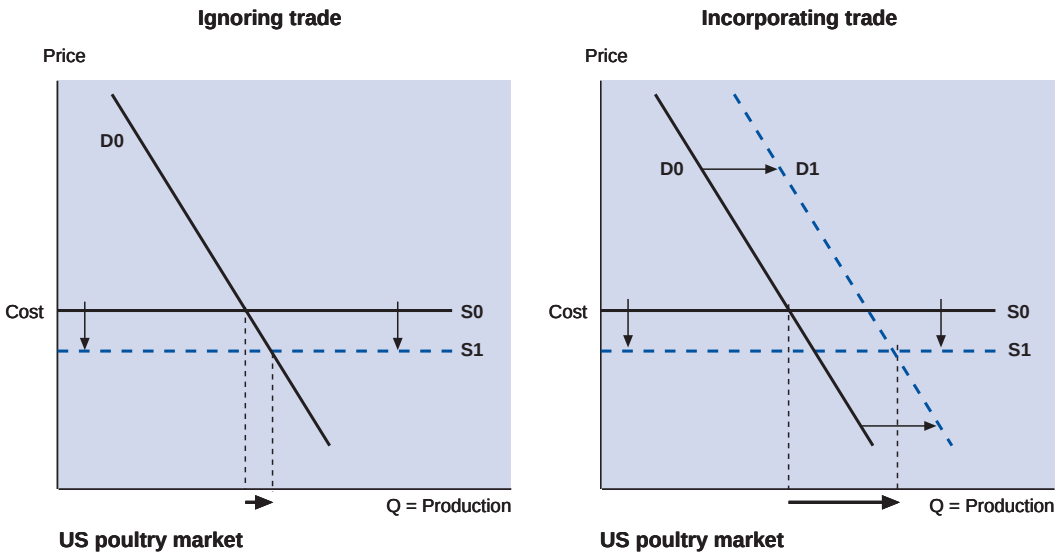
exports would occur in the event of positive margins between world and EU markets, but do serve to introduce an important factor in the market given the relative movements in different market prices. By assumption, unsubsidised beef exports are divided equally across Atlantic and Pacific markets. On the other hand, the importers who once received EU beef with subsidy are not assumed to purchase from either Pacific or Mercosur beef markets. The implications of this method are important, as two-thirds of the decrease in subsidised EU beef exports do not benefit any of the modelled countries whereas sufficiently lower EU beef prices allow unsubsidised exports to compete directly in Pacific and Mercosur markets. Although complex, the consequence for world prices can be summarised as a small potential for increase as EU subsidised exports end, but a stronger downward pressure should relative EU to world beef prices allow unsubsidised exports to begin.

As already discussed, EU pork exports are divided into two parts, with the endogenous exports to the Pacific market shifted down by the amount of the total subsidised quantity reduction times that destination's share in total exports, and exogenous other exports decreased by the remainder of the quantity reduction. The former will have a direct effect on competing countries since the Pacific market solves for the US pork price. However, the other exports do not affect any other countries' pork trade or prices. Since the lower EU pork exports do not cause any increase in demand for exports from Hungary and Poland, countries likely to be affected, there is no reason in Aglink for pork exports from these countries to increase. In order to provide some connection between other EU exports and Poland and Hungary exports, the decrease in exogenous other exports is artificially inserted in the exports of these two competitors by shifting the endogenous exports of each of these Eastern European countries by a share of the reduction in EU other exports. A market-clearing price for the pork trade in this region might be preferable for this scenario, but inserting and testing such an addition to the system exceeds the goals of this study.

In Aglink, most countries' poultry supply is modelled as perfectly elastic at a price equal to the marginal cost, which depends upon feed costs and other costs (represented by a general price index). Hence, input costs determine the poultry price, which determines consumption as a function of the own-price. Poultry consumption and exogenous trade are summed to give total use. The market-clearing identity determines production rather than a price, and this production will then appear as one argument in feed demand equations. Thus, for policy simulations which do not affect poultry trade, this structure will capture the poultry consumption and production results, with the former consistent with poultry and competing meat prices and the latter consistent with the feed complex and aggregated demand.

The structure is insufficient for a policy simulation which focuses on trade, so some assumptions are made to show the potential effects of lower EU export subsidies. The elimination of EU subsidised poultry exports is expected to lead to some increase in exports from competing suppliers. As shown in Figure II.A.2, ignoring trade can bias the results in other markets. Here, the US market is represented, assuming that US exports will be a beneficiary of lower EU exports. If the policy experiment reduces feed costs, then the consequence will be a lower poultry price, which

Figure II.A.2. **Poultry trade effects**



Source: OECD Secretariat.

will lead to higher consumption and, consequently higher production, as shown on the left-hand side of the figure. However, as the right-hand side of the figure shows for the same change in supply (*e.g.* caused by lower feed costs), the increased exports act to increase total demand. The change in production is then likely to be larger when including both feed cost effects and trade effects, with implications for feed demand.

Additional steps are taken in order to account for the consequences for competing suppliers of lower subsidised EU poultry exports. Trade data on EU poultry exports shows that approximately 60% is in cuts and the remainder is in whole birds. The trade in whole birds is assumed to compete less directly than the cuts trade, so no substitute is purchased to replace decreasing EU exports. There remains 60% of exports which is likely to be replaced in part or in whole by poultry from other countries. To carry out the scenario in a manner which incorporates the trade effect, US's exports are exogenously increased by an amount equal to the reduction in the quantity of EU subsidised export multiplied by 60%. The market chosen to be the source of this trade in this scenario is the United States, as this is a major poultry producer and exporter as well as a large and open market for feed inputs. In reality, more than one competitor would benefit from the reduction in EU subsidised exports. However, the US is sufficiently large in poultry and feed markets to provide a convenient substitute to replace all of the EU export reduction to represent the effect. A broader dispersion of the trade effect would have some impact on the location of poultry production and feed demand.

Lowering US *dairy exports*

The US dairy export subsidies are not explicitly included in Aglink. Butter and skim milk powder exports are functions of the US price relative to world price and stocks. The latter explanatory variable is intended to capture the amount of subsidised exports. These functions are appropriate for *Outlook*, but present difficulties in the current analysis. Given positive margins between US and world prices, the butter and SMP export equations are eliminated and the quantities switched into exogenous variables which are then lowered according to an export subsidy reduction schedule. For SMP, the gap between US and world prices is smaller and more likely to be eliminated in the context of the rising world SMP prices in this scenario. Indeed, the *Outlook* implicitly assumes that the US is exporting SMP both with and without subsidy, presumably due to location advantages in that an important market (Mexico) is closer to US markets than to the benchmark market where world prices used in Aglink (FOB North Europe) are determined. In the scenario, the gap between US and world prices remains positive, although smaller than in the *Outlook*. Thus, there is the possibility that some portion of the reduction in subsidised exports could be replaced by unsubsidised exports, in the context of an *Outlook* in which both already exist. In both cases, the export quantity can then be decreased by the amount of the reduction in export subsidies.

Other modules require similar changes to exports

As shown by the notification data, other countries use export subsidies. For Czech and Norwegian dairy trade, which are included as exogenous variables, these can be reduced directly. In addition to specific country modules, as already shown there remain some amount of 97/98 notification of export subsidies which is not attributable to any particular module of Aglink. Of the sums of unallocated subsidy use, the most important is that of dairy products. This quantity is divided equally into four parts and added to EU other dairy export subsidy reductions (excluding WMP). This sum is applied against the four major dairy products of Aglink, namely butter, cheese, SMP and WMP, in the module representing the "rest of the world" (those countries not explicitly modelled in Aglink). Net trade of these commodities are each modelled as a residual of the internal market-clearing identity. The method to introduce the export subsidy reductions is to increase "Rest of World" consumption of each dairy product by that amount.

Limitations of the method

The export subsidy data used for some projections in this study are based on the country notifications to the WTO as given in the WTO background paper. As already stated, these data narrow the scope of the study to quantity limits which are more important and to only those countries and commodities in Aglink. Moreover, as discussed, the choice of Aglink as the tool and the *Outlook* as the basis of comparison narrow the study to the world market effects of an export subsidy elimination in the context of perfect assumption and largely homogeneous goods.

Part III

AN ANALYSIS OF OFFICIALLY SUPPORTED EXPORT CREDITS IN AGRICULTURE

This part focuses on a policy that may distort export competition: officially supported export credits in agriculture. Officially supported export credits can take a variety of forms and may offer an importer financial terms such that the total cost of acquiring the commodity is reduced below alternative, private market costs. As these policies may serve to effectively subsidise exports, they were at issue in the negotiations leading up to the conclusion of the URAA, but signatory countries undertook to continue negotiations towards an agreement which would govern their use. Such an agreement has not been reached as of October 2000.

In this context, the present study undertakes an evaluation of the degree to which officially supported export credits distort world markets. This analysis benefits from a unique data source: Participants to the Export Credit Arrangement at the OECD provided access to survey data in order to complete this analysis, under certain conditions to protect the confidentially of bilateral trade data. Review of past research and consideration of the data available suggests that present value calculations are most appropriate from an economic perspective for examining how officially supported export credits may influence importers' decision-making when buying agricultural commodities. The method chosen incorporates important characteristics of the programme, such as the length, the level of guarantee and the fees. Thus, the potential for an officially supported export credit to distort trade depends on variation in these parameters. For instance, trade distortion will increase with the length of the officially supported export credit, all else equal. The issue of length is explored in section 3 of the main text, while section 3 of the Annex provides information on programme characteristics. The Annex reports the details of the method. Experiments to test the sensitivity of the results to certain supporting data validate the conclusions under alternative assumptions.

This empirical study finds that some countries' officially supported export credits do offer benefits to importers beyond what private arrangements can provide based on present value calculations using 1998 data (more recent data are not available). While the estimated subsidy equivalents overall are found to be relatively low, certain countries' programmes are nevertheless trade distorting. The US export credits are calculated to be the almost twice as distorting on a per unit basis as any other countries' and, given the US's relatively large programme, account for the majority of the distortions in world markets caused by officially supported export credits.

Use of officially supported export credits by the Participants to the Export Credit Arrangement as a group increased over the survey period, both in absolute terms and relative to trade. Yet, as of 1998, the level of export credits relative to world trade as well as the per unit subsidy element estimated in this report are small. Thus, while individual transactions targeted under certain export credit programmes are distorted, the estimated impact on aggregate world markets is small. For example, a preliminary analysis of officially supported export credits in the context of the world wheat market is explored based on beginning 1998 officially supported export credit data. The wheat market is selected as the subsidy element of officially supported export credits applied in world cereal markets are estimated to be account for almost half of the total subsidy element and also are large relative to the total market for cereals. According to the preliminary analysis, US domestic wheat prices are slightly higher and wheat prices in Canada and the European Union (in aggregate) are little changed, while

those of Australia and world wheat prices are slightly lower than would be the case without these countries' export credits. However, in the absence of an Agreement governing the use of officially supported export credits, countries can increase the degree to which their programmes reduce importer costs or the amount of export credits, with the resulting distortions on export competition.

A frequent justification for officially supported export credit programmes is that they may help developing countries overcome liquidity constraints in order to purchase necessary food where otherwise they would not be able to import. Indeed, to the extent that the credit conditions eliminate liquidity constraints in importing countries and in effect generate additional trade, the distortions of other countries' trade would be less, provided there was no displacement of privately financed trade. This is unlikely to be of great importance as the bulk of officially supported export credits is provided for trade between OECD countries, where binding liquidity constraints are unlikely. The very small share of officially supported export credits given to developing countries is one of two facts which calls into question the very purpose of these programmes. The second fact which undermines the justification that officially supported export credits may help developing importers is that the benefits to importers, as estimated in this study, are very small – perhaps only sufficient to gain a competitive advantage for the exporter – and unlikely to be of much help to countries which are truly in need of financial assistance and food. These two facts are empirical in nature and cannot be considered to be conclusive evidence that these programmes never help importers in need of food to overcome liquidity constraints. However, they make it more difficult to support this justification for officially supported export credits.

There are many mechanisms that governments can use to affect the competitiveness of their agricultural commodities in world markets. Export competition policies, such as export subsidies, certain behaviour by state-trading organisations or food aid used to raise domestic prices rather than exclusively to benefit the recipient, influence importers' decisions by artificially lowering the price or cost of the exporting country's goods as compared to what the private market would offer. The OECD is currently engaged in a broad ranging analysis of such measures. While the present study focuses on officially supported export credits, these programmes do not operate in isolation of other competition distorting policies. Limits on one policy option can be offset through increased use by governments of some other policy instrument within Uruguay Round constraints. An arrangement which limits or eliminates officially supported export credits in agriculture would represent an important step towards reducing distortions in export competition. However, such an agreement alone would be insufficient. Other export competition policies that may serve to perpetuate market distortions and inefficiencies would also need to be disciplined.

Introduction

Officially supported export credits may span direct credits or financing, guarantees or insurance for loans, or interest rate support by governments. The consequence may be that an importer receives a loan at an interest rate below the normal market rate, for a length of time which exceeds what the market would offer or a repayment schedule which is abnormal in timing, yet not face a fee which is adequate to offset these special conditions. In this case, the total costs for financing the purchase of that exporter's goods would be lower than would otherwise occur, so the programme would effectively subsidise the importer. In addition, officially supported export credits may incur losses over time, if operators do not repay their debts (referred to as defaults).

In view of this potential to distort trade, officially supported export credits for agricultural products were at issue during the URAA. Under the WTO Agreement on Agriculture, signatory countries undertook to "work towards the development of internationally agreed disciplines to govern the provision of export credits, export credit guarantees or insurance programmes". An Arrangement on Guidelines for Officially Supported Export Credits has existed in the context of the OECD for over 20 years. This Arrangement is generally considered very successful in its aim to eliminate subsidies and trade distortions so that exporters compete on the price and quality of their goods and services rather than on which of these goods and services receives the most favourable officially supported terms.

However, agricultural products are specifically excluded from the scope of the Export Credit Arrangement. In a meeting in July 1994, negotiators agreed to begin to consider a sector Understanding for agriculture products, taking into account earlier work including a survey on practices in this sector. Negotiations in the OECD on an export credit Understanding covering agricultural products are continuing, yet there remain differences between the negotiating parties. Indeed, the OECD Ministerial Meeting Communiqué of 2000 expressed that the Ministers "regretted the failure of the Participants to the Export Credit Arrangement to reach an agreement on an Understanding covering agriculture as mandated in the Uruguay Round" and went on to state a need "for negotiations to be resumed and successfully completed by the end of July 2000 if possible and by the end of 2000 at the latest" (para. 21), yet no agreement has been reached as of October 2000. Hence, governments are currently free to provide credits to importers at any terms, no matter the degree to which they effectively subsidise the importer, as long as there is no protocol governing or limiting their use in agriculture.

Part III considers only officially supported export credits. Henceforth these will be referred to as export credits, without specifying that they are officially supported. Thus, the evaluations in are not intended to include private export credits. Export credits arranged among exporters, importers and financial institutions without government influence (*e.g.* guarantees or insurance) or direct support are not a subject of the present study of export credits. Such private export credits entirely on commercial terms without direct or indirect government involvement are part of normal transactions and do not distort markets, but on the contrary facilitate trade.

Part III is structured as follows. Following the introduction, the use of export credits in absolute terms and relative to trade of exporting countries is described. The third section provides estimates of subsidy rates for export credits by exporter and by commodity. The fourth section discusses the effects of defaults. The next section shows different aggregations of these results to reflect whether there is a potential for export credits to create demand by overcoming liquidity constraints, or whether they simply distort markets. The sixth section of the paper introduces other export credit uses which are excluded from the present study, such as organisations with legislative authority to engage in export credits on behalf of the government and food aid. Export credits are then placed in the context of world markets as projected by the *Outlook*, using a single example. The final section suggests some policy conclusions. The Annex provides details on the method and data employed to calculate the subsidy rates.

Use of export credits

A survey of export credit use from 1995 to 1998 by the Participants to the Export Credit Arrangement (hereafter, the Participants), the negotiators at the OECD, shows that the amount of export credits given has increased during this period. The use of export credits by exporting country and by year are shown in Table III.1 and include the values of loans guaranteed, direct financing given or other forms of export credit provided. In practice, the survey data shows that export credits given by the Participants generally take the form of pure cover (*e.g.* guarantees or insurance), rather than direct financing or subsidised interest rates. Export credits and trade data concerning transactions among EU members (intra-EU trade) are excluded from Table III.1.[1] These data are converted into US dollars for all countries to facilitate comparisons across countries and in view of the common use of US dollars for agricultural commodity prices.

Total export credit use rose over the survey period (1995 *to* 1998), *in absolute terms…*

Export credits by these fifteen OECD countries increased from 1995 to 1998 by USD 2.4 billion, or 44%. The largest increases in absolute terms are those of the US, Canada, Australia and France. France and Hungary gave no export credits in 1995, but do provide export credits by the end of the survey period. Other countries report substantial increases in the absolute level of export credits from 1995 to 1998 in relative terms, such as Korea, Greece, Canada, Finland and Belgium. On the other hand, the increases from 1997 to 1998 may have been motivated in part by the financial crisis, which may have made existing export credit programmes more appealing and may also have encouraged exporters to provide more resources to export credit programmes. Three countries, Germany, Portugal and Spain,

Table III.1. **Export credits and the value of exports**

	1995	1996	1997	1998	Total
	(million USD)				
Export credits					
Australia	1 106	2 014	2 130	1 553	6 803
Canada	570	697	1 239	1 108	3 613
European Union	985	989	1 151	1 254	4 379
Austria	10	9	11	11	40
Belgium	83	121	133	153	491
Finland	6	5	11	11	32
France	0	153	293	330	776
Germany	21	2	1	0	25
Greece	1	1	3	4	8
Netherlands	392	341	361	411	1 506
Portugal	6	4	0	0	10
Spain	467	353	338	334	1 491
Hungary	0	38	12	19	68
Korea	0	33	46	46	126
Norway	0	0	0	0	0
United States	2 843	3 188	2 845	3 929	12 806
Total	5 504	6 959	7 423	7 910	27 796
	(million USD)				
Total exports					
Australia	10 526	11 325	12 583	10 501	44 936
Canada	14 866	16 664	18 153	17 555	67 237
European Union	57 272	58 348	59 934	57 028	232 582
Hungary	2 922	2 768	2 881	2 788	11 359
Korea	3 198	3 268	3 179	2 875	12 519
Norway	3 544	3 875	3 857	4 086	15 361
United States	60 996	65 531	61 413	57 395	245 334
Total	153 323	161 778	161 999	152 228	629 329
	(per cent)				
Share with credits					
Australia	10.5	17.8	16.9	14.8	15.1
Canada	3.8	4.2	6.8	6.3	5.4
European Union	1.7	1.7	1.9	2.2	1.9
Hungary	0.0	1.4	0.4	0.7	0.6
Korea	0.0	1.0	1.5	1.6	1.0
Norway	0.0	0.0	0.0	0.0	0.0
United States	4.7	4.9	4.6	6.8	5.2
Total	3.6	4.3	4.6	5.2	4.4

Sources: Export credit data are from confidential survey by the Participants to the Arrangement. Total export values are from Foreign Trade Statistics. Intra-European Union export credits and trade are excluded for all EU members.

report a decrease in the level of export credits from 1995 to 1998. Germany and Portugal state that their programmes are still offered, but there is no demand by exporters.

Many OECD countries replied in the Participants' survey that they provided no export credits (as regards agriculture) in the 1995 to 1998 survey which fall under the definition of "officially supported". These countries are Denmark, Ireland, Italy, Japan, Luxembourg, New Zealand, Sweden, Switzerland, and United Kingdom. Several responses specify that there is no programme, such as Japan or New Zealand, or that they have such programmes, but withdrew from providing such export credits (*e.g.* that they are not used). The latter case applies to Ireland, Italy, Sweden and the UK. Some countries, including Denmark from the list above but also some countries which reported some amount of officially supported export credits, indicate that certain of their export credit programmes are exempt

as these programmes or portions of the programmes operate on commercial terms. Poland indicated the presence of an insurance programme, but did not provide data on the amounts. The survey response of the Czech Republic indicate that a small per cent of total trade was covered by export credits, but does not provide information on absolute levels.

The largest users of export credits among the Participants in the survey period are the US, averaging 46% of the total, followed by Australia at 25%. The EU accounts for 16% and Canada for 13% of the total export credit use. These four together account for 99% of the total. This does vary by year, of course. However, even as the US share ranges from 38% in 1997 to a high of 52% in 1995, the total of the US, Australia, Canada and the European Union continue to account for almost all export credit use among the Participants. Within the European Union, still excluding intra-EU trade, shares are more volatile. On average, the largest users are the Netherlands and Spain, each accounting for over a third of the total EU export credits to third countries over the entire period. Spain's share has decreased from almost half of the EU total in 1995 to only a quarter in 1998, whereas France's share has risen to 26% in 1998.

... and also rose relative to trade

A measure of the relative importance of export credits in trade can be obtained by comparing the amount of export credit to the amount of trade, as shown in the lower half of Table III.1. The export credit data is from the survey, while the export trade data are from OECD statistics (*Foreign Trade Statistics*, HS1 Chapters 1-24, 41.01-41.03 and 51.01-51.05). This comparison is not precise. First, the definitions of the two sources may not be entirely comparable. For example, cotton is not stated as a commodity in the survey and is therefore not included in the value of agricultural trade, but some survey respondents include cotton export credit data. Also, the basis of export credit data (*e.g.* CIF or FOB) is not specified in the survey, although it should be clear that these data do refer to the size of the transaction. Another problem is that much of the survey data are on a basis other than calendar year, and so may not precisely overlap trade data drawn from other sources (such as FTS) or other countries' survey data.

Nevertheless, Table III.1 indicates that, while total export credits have risen by almost one half from 1995 to 1998, the total value of these countries' agricultural exports has been stagnant. Hence, a growing portion of trade falls under export credits. In 1995, 3.6% of trade was facilitated by export credits. This share rose to 5.2% in 1998. Even if the financial crisis of 1997-1998 is taken to be sufficient justification for considering these as atypical years, the role of export credits relative to trade shows its largest increase in 1996. The relative importance varies across countries. The largest share of trade covered by export credits is that of Australia, at 15% on average. On the other hand, Australia and Canada are the only countries which report a decreasing share, at least in the final year of the survey. Other countries shown report an increase in the share of exports which receive export credits. The shares of trade facilitated by export credits from Hungary and Korea remain relatively low in 1998, but began from zero. The share of US trade facilitated by export credits has risen from 4.7% in 1995 to 6.8% in 1998, but held relatively constant at about 4.7-4.9% in the two years of the survey preceding the financial crisis of 1997-1998. In the case of the European Union, the magnitude of export credits relative to trade (both to third countries) has risen from 1.7% to 2.2%. This still remains lower than the average of these countries, which increased from 3.6% to 5.2%.

Table III.1 demonstrates the relative and growing importance of export credits in agriculture commodity trade, at least among the Participants to the Arrangement on Export Credits which provide export credits. It is clear that even though several countries have unilaterally suspended export subsidy activities, few have withdrawn export credit programmes and many report growing use. Again, the final years of the survey may be questioned as the financial crisis may have caused a response in export credits which does not represents the trend. Regardless of their magnitude, these credits may or may not serve to subsidise exports, depending upon how the programmes operate. Hence, the next step in the present study is to evaluate whether or not export credit programmes do in fact offer a subsidy element and, if so, how large a subsidy is provided.

Subsidy rate of export credits

Evidence of the existence and even size of export credits is not sufficient to draw conclusions about their impacts on trade. What determines the impact on markets is not only the existence, but their effects on decision-making. If the government export credit programmes offer the same terms as the private sector, then these officially supported export credits would have no distorting effects on world markets at all. In this case, the importer's decision-making would not be altered by the export credit, because the effective total cost of the transaction would be the same. The subsidy rate,[2] as calculated in this report, is an indicator of the effects on decision-making based on present value calculations (as described in the Annex to Part III).

To determine the effect of export credits on commodity markets, the present study estimates the implications for each importers' total costs. The terms and fees of each exporter's programme are evaluated for each importer receiving an export credits. These terms and fees determine the future payment stream which the importer perceives in using the particular export credit, which is then converted into present value using that importer's discount rate.

The results of these calculations are the subsidy rates of the export credits. This is the per cent by which the export credit reduces the present value cost of the traded commodity. For example, an export credit programme which guarantees 80% of a six month commercial loan for a high fee – for even a fairly safe importer – might not lower the present value cost at all and, thus, offer a subsidy rate of zero. On the other hand, if an export credit programme would guarantee almost 100% of a longer loan at almost no fees regardless of risk, it would probably decrease the present value of the importer's total costs and have a correspondingly larger subsidy rate. In the Annex, we discuss the factors of the loan which are relevant and the parameter values.

Assumptions behind these computations are given in the Annex. One which bears attention is the assumption regarding observations for which data would otherwise be insufficient to conduct the analysis. In total, 11% of export credits in 1998, or USD 930 million, could not be analysed without the assumption that the importers receiving these credits have a certain credit rating. The data may be insufficient in one of four ways: first, the survey does not provide information regarding the importer (80% of the missing observations at the end of 1998); second, the survey data might not provide the length of the export credit (0.5%); third, the importer is specified, but no credit rating for the importer is available (18%); or, fourth, there is insufficient information regarding the programme (1.5%). Where possible, such omissions are overcome by assuming that the importer has a fairly low credit rating (Caa2 according to Moody's scale). This assumption allows the estimates to include all export credits which would otherwise be omitted from the study, save Hungary's export credits of USD 18.6 million. However, it should be recognised that the assumption is arbitrary and the actual interest rates of these importers is unknown and, moreover, is impossible to know in the majority of these cases because the importer is not specified.

Another important set of assumptions underlying subsidy rate estimates relate to the development of the interest rate data required for the present value calculations. For example, the sovereign credit ratings and corresponding interest rates, as estimated by a separate study, are used to represent interest rates particularly in the case of high-risk importers. Although there are no data in the survey to indicate how frequently the actual importer may be a private agent without ties to the government, the sovereign credit rating is assumed to be representative and is used in the present value calculations underlying the subsidy rate estimates. The study does not assume that there are any additional transaction costs above normal costs, apart from the fee of the programme itself which is an element of the analysis. Moreover, the study assumes that all net benefits of the export credits are passed on to the importers. However, evidence suggests that financial institutions in at least one country do charge a higher interest rate on export credits than the present study would indicate. Thus, some part of the benefits may be lost to additional costs of the transaction or to financial institutions. No such loss is assumed in the results reported in the main text of the paper. Instead, importers receiving an export credit are assumed to gain access to the risk-free rate, which is the US treasury rate

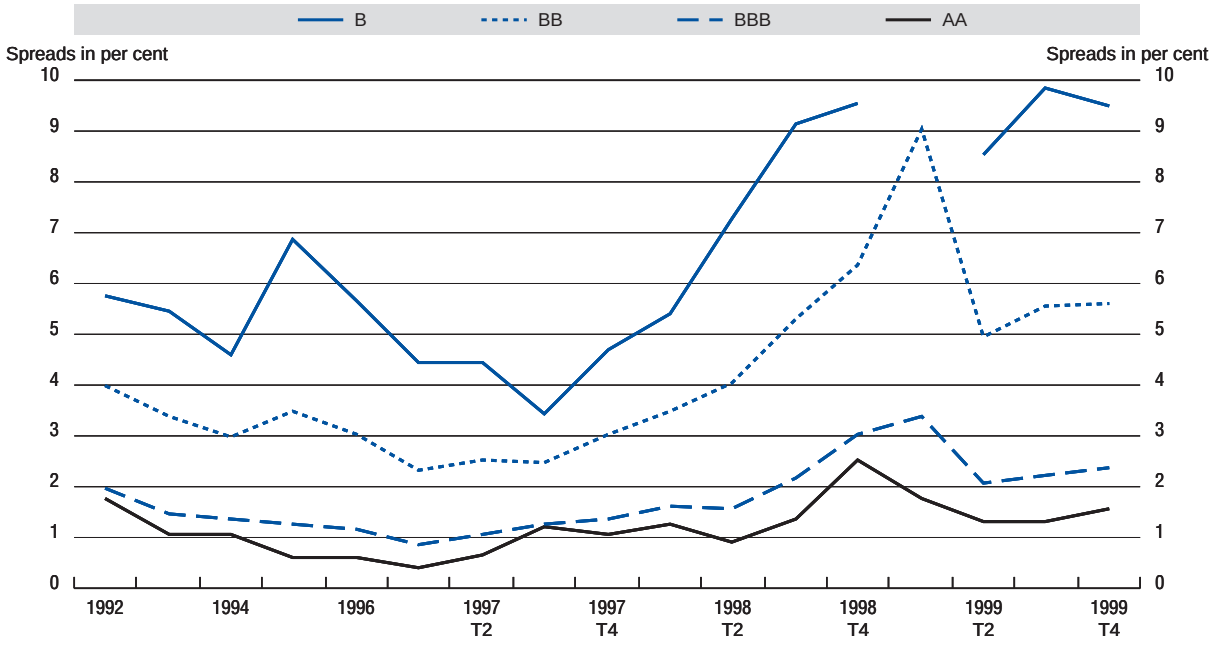
in the present study in order to be consistent with the method underlying the other interest rate data. Tests of the effects of different assumptions on the results are presented in the Annex.

This study focuses on subsidy rate estimates for 1998, the final year of the Participants' survey data. The estimation will be made twice for this one year: once for the beginning and once for the end of the year. The interest rates are an important input in determining how importers perceive export credits. The interest rate database (whose derivation is described in the Annex) gives interest rate estimates at the start and the end of 1998.

It must be emphasised that there is no representative year. Each year represents a different constellation of credit and commodity markets. Thus, due care should be exercised before generalising the results of 1998 to other periods. During the 1995-1998 survey period, there were a series of local and global disruptions in credit markets. The Mexican peso devaluation in 1995 and the so-called Tequila effect on other Latin American economies affected credit markets. The devaluation in mid-1997 of Thailand signalled the start of the Asian financial crisis. As the effects of the Asian financial crisis spread through the global economy in late 1997 and 1998, interest rate spreads between medium and low-risk debt widened. The instability in credit markets was extended by the Russian government default in September 1998. A highly-leveraged hedge fund became insolvent due to ensuing relative asset price changes. The result was a strong substitution away from high-risk investments and towards low-risk investments, causing the interest rates of the former assets to rise and those of the latter assets to fall. The evolution of interest rate spreads over the period are shown in Figure III.1, which is reproduced from Kamin and von Kleist (1999:2), whose work also provides the basis of the interest rate estimates used in the present study.

The financial market situation in 1998 was atypical, which has some impact on export credits. Without addressing the characteristics of the demand for or the supply of export credit programmes, which may be related to commodity markets as well as financial markets, subsequent text presents the subsidy rate estimates based on 1998 data. The computations are performed twice: once using interest rates prevailing at the start of 1998 and the second time using interest rates prevailing at the end of

Figure III.1. **Spreads on emerging market bonds by credit rating**



Source: Reproduced from Kamin and von Kleist (1999:2).

1998. Subsequent text focuses on the beginning 1998 estimates, as these appear to be less affected by financial crisis than the ending 1998 rates. Using an example from Figure III.1, the spread on rating "B" remained comparable to levels of 1992-96 in the first quarter of 1998 before rising to almost 10% by the last quarter of 1998. However, it should be noted that the fees of some export credit programmes may also have been adjusted to reflect the changing risk of importers, so the actual subsidy rates for 1998 may be higher than the beginning 1998 rate estimates. For example, if fees were increased during 1998 to offset increasing risk, then the beginning 1998 subsidy rate estimates would be biased downward. The bias would result from combining the survey data, which provide only the total fees for the year, with alternative estimates of interest rate spreads for the year, even though the fee of any single transaction may correspond specifically to the interest rate spreads at the time of that transaction. It must be stressed that no single year can be called typical, so caution must be exercised when extrapolating the results to other years. As a last point, while the subsidy rate estimates change under different interest rate assumptions, the general conclusions remain valid in sensitivity tests of the subsidy rate estimates with respect to the interest rate data (reported in the Annex).

Subsidy rate estimates for 1998 *show that some export credits distort trade*

The subsidy rates for 1998 are reported in Table III.2. It should be noted that intra-EU trade is included for most EU member countries in these estimates because subsidy rate calculations are based on parameters which are relevant for the entire programme, rather than only a portion. For example, a key parameter is the fee rate, for which the survey provides an average across all export credit recipients. If subsidy rate calculations did not also cover the complete list of recipients, then the results may be inaccurate. In fact, excluding low-risk importers while using the average fee would tend to create a bias for higher subsidy rate estimates. In the case of Hungary, insufficient data are available to calculate the subsidy rate of programmes of either of the two organisations responsible for export credits.

The first two columns of Table III.2 show the beginning 1998 subsidy element estimates of export credits expressed as both an amount in millions of US dollars and as a per cent of the export credits. Calculations based on estimates of the interest rates at the end of 1998 are also shown. The last two columns of Table III.2 show the simple averages of beginning and ending 1998 subsidy elements, again

Table III.2. **Subsidy element estimates in 1998**

	Subsidy element estimates					
	Start 1998		End 1998		Average 1998	
	Amount (mil. USD)	Rate (per cent)	Amount (mil. USD)	Rate (per cent)	Amount (mil. USD)	Rate (per cent)
Australia	1.6	0.1	8.7	0.6	5.1	0.3
Austria*	0.0	0.0	0.1	1.2	0.1	0.6
Belgium*	0.2	0.1	1.5	1.0	0.9	0.6
Canada	8.3	0.7	19.0	1.7	13.6	1.2
Finland* †	0.1	0.3	0.2	0.9	0.2	0.6
France	8.2	2.5	16.7	5.1	12.4	3.8
Germany*	0.0	0.7	0.0	1.3	0.0	1.0
Greece*	0.0	–0.4	0.0	0.4	0.0	0.0
Korea	0.1	0.1	0.2	0.3	0.1	0.2
Netherlands	2.2	0.5	4.8	1.2	3.5	0.8
Norway †	0.0	2.8	0.0	4.7	0.0	3.8
Spain*	4.6	0.6	8.8	1.1	6.7	0.8
United States	191.2	4.9	324.9	8.3	258.0	6.6
Total	216.3	2.6	384.8	4.6	300.5	3.6

* To prevent a likely upward bias, calculations of certain EU members include intra-EU export credits.
† Fee data missing. Thus, the estimates should be interpreted as a maximum, before subtracting the fees.
Sources: Subsidy amounts and rates are calculated as described. Calculations for Hungary are not possible due to insufficient information.

as an amount (in millions of US dollars) and as a rate (a per cent of the export credit value). The provision of estimates for both the start and end of 1998 reflects data limitations, as discussed above.

Where the evaluation of export credits results in a positive subsidy rate, the export credit programme is lowering the effective purchase price paid by importers and will consequently distort trade in favour of the particular exporting country. In Table III.2, therefore, the countries can be ranked from highest to lowest subsidy rate as an indication of the degree to which their export credit programme subsidises importers per unit of expenditure. Such a ranking would put the US first, with a 4.9% subsidy rate based on interest rates at the beginning of 1998 – recognising that this provides only a single observation. Subsidy rates of Norway and France are 2.8 and 2.5%, respectively. In the case of Norway, as well as that of Finland, fees were not provided or were not comparable to other data (see description of survey data in the Annex to Part III). Thus, for these two countries the subsidy rate estimates should be viewed as a maximum, since there are likely to be fees which would decrease the benefits to importers. Most of the other countries have much lower subsidy rate estimates. The finding that the US export credit programme is the most distorting follows from Table III.3, which shows that the US offers a large share of long-term export credits, and the summary statistics of the survey reported in the Annex: The US does not require a sufficiently high fee or reduce the level of guarantee to offset its relatively long-term export credits. In other words, it is the long-term export credits which are most valuable to importers, particularly those facing high interest rates. From an analytical perspective, higher fees would offset this result and limit market distortion.

Table III.3. **Export credits by length**
Million USD

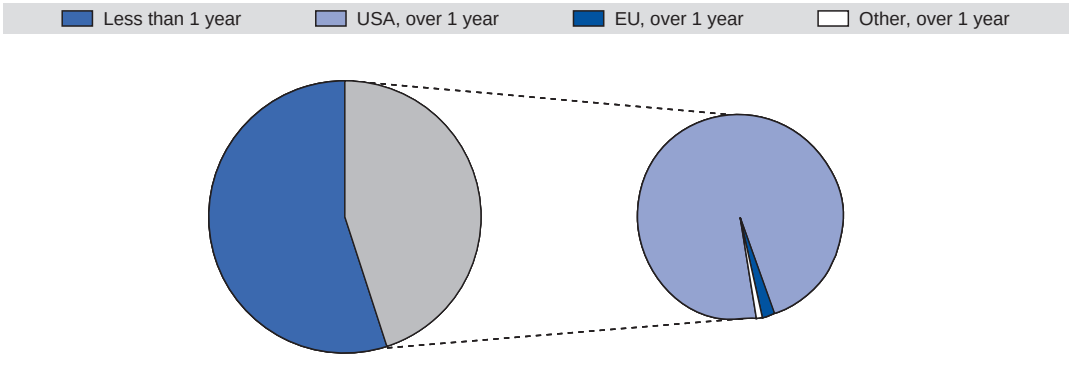
	1995	1996	1997	1998	Total
Less than one year					
Australia	1 106	2014	2 130	1 553	6 803
Canada	546	697	1 199	1 071	3 513
European Union	946	974	1 033	1 142	4 094
Austria	9	7	10	11	37
Belgium	83	121	133	153	491
Finland	6	5	11	11	32
France	0	153	189	226	568
Germany	2	2	1	0	5
Greece	1	1	3	4	8
Netherlands	392	341	361	411	1 506
Spain	453	344	325	325	1 447
Hungary	0	0	7	6	12
Korea	0	33	46	46	126
Norway	0	0	0	0	0
United States	356	123	87	144	710
Total	2 954	3 840	4 503	3 961	15 257
One year or more					
Canada	23	0	39	37	100
European Union	40	15	118	113	285
Austria	0	2	2	0	4
France	0	0	104	104	208
Germany	19	1	0	0	19
Portugal	6	4	0	0	10
Spain	14	9	13	9	44
Hungary	0	0	3	8	11
United States	2 487	3 066	2 758	3 785	12 097
Total	2 550	3 081	2 919	3 944	12 494
Duration not provided					
Hungary	0	38	2	5	45
Total	0	38	2	5	45

Source: Export credit data are from a confidential survey by the Participants to the Arrangement.

One result of the present value calculations is that the longer the export credit, the greater the likelihood of an increasing subsidy element, all other things equal (Table III.A.1). Thus, the subsidy element increases unless offset by other conditions, such as greater fees or a lower level of guarantee. Table III.3 shows the use of total export credits over the survey period by length. Data from the Participants' survey allows examination of data which are less than one year as compared to those which are on terms of one year or more. In reality, a span of even less than one year may be more appropriate when dividing export credits by length of the term due to the short life of many agricultural products, but the survey data increments do not allow such disaggregation. Based on the total export credits of the sample period, as shown in Figure III.2, 55% of export credits are on terms of less than one year and the remaining 45% are on terms of on year or more. Again, referring to Figure III.2, the US accounts for 97% of export credits with a term of one year or more, with the EU, Canada and Hungary also supplying small amounts of export credits on such long terms. It should be noted that some of these long term export credit arrangements may be due to matching (*e.g.* offering matching terms to compete against the financing terms offered by other exporters). This is provided for in the wider Arrangement, which is a "gentleman's agreement" governing export credits, in the context of matching both member or non-member export credits with repayment terms of two or more years with the exception of agriculture and military aircraft. In the subsidy rate calculations, the amount of each exporter's credits on longer terms relative to that exporter's total credits is important. Portugal reports that all of its export credits during the survey period had a length of at least one year and the US reports the second largest share of export credits at one year or more in length, at 94%. The implication of the present value calculations is that these longer lengths do not create market distortions if the greater length is offset by higher fees or a lower level of guarantee, for example. The subsidy estimates reported in Table III.2 imply to what extent that has been the case in different countries.

The negative values for some subsidy rate estimates at the beginning of 1998, may be from any of several factors, but should not be interpreted as a type of tax or a programme which increases total costs. Obviously, this could simply reflect the effects of calculating subsidy rates for export credits given at the end of 1998, when interest rates were rising and any risk-based fees for export credits would have been rising as well, but using the lower interest rates of the beginning of 1998. Again, the survey data do not indicate when during the year the export credits were given, so the two sets of calculations should be interpreted as bounds on the actual subsidy rate of 1998. In addition, as reported in the annex to Part III, subsidy rate estimates are based on data which is imperfect, implying some margin of error in the estimate for each exporter. For example, Participants' survey data are sometimes on a fiscal year basis rather than calendar year, whereas this report assumes the latter basis. Moreover, the interest rate database is a construction of estimates, as actual data are not available. Indeed, there are no data indicating when during the year the export credits may occur, nor what interest rates may have

Figure III.2. **Terms of export credits**



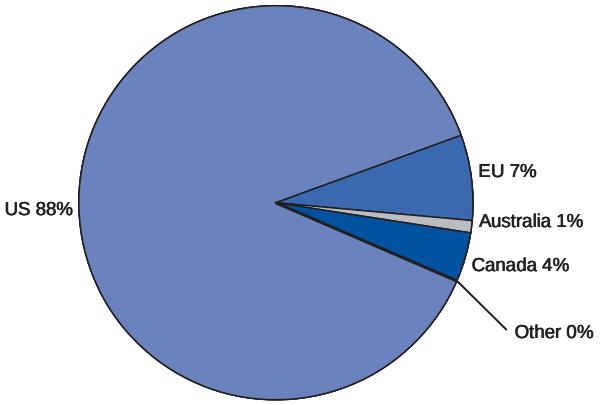
Source: OECD Secretariat.

prevailed at that time. Thus, one cannot safely conclude from this study that programmes distort markets for subsidy rate estimates which are positive, but very close to zero.

The amount of subsidy element could be ranked to take into account the varying levels of magnitudes of export credits across exporters as well as the rate of subsidy per unit of export credit given. Thus, Table III.2 offers two measures of the subsidy element, a rate which shows the level of distortion per unit of export credit and an amount which is the product of this rate and the total export credits to estimate an absolute level of distortion.

Focusing again on the beginning 1998 estimates at the left of Table III.2, yet recognising that these are not necessarily representative of other years, the total subsidy element of these countries' export credit programmes is USD 216 million. By this measure, as shown in Figure III.3, the US is responsible for 88% of the estimated subsidy element resulting from export credits as reported by the Participants. Canada and France each account for 3.8% of the total, whereas Spain accounts for 2.1%. However, none of the other Participants give as large a volume of export credits at terms so favourable for the importers as the US.

Figure III.3. **Subsidy amount estimates for beginning 1998**



Source: OECD Secretariat.

Over a third of the export credits of the survey target bulk cereals, yet these account for almost half of the subsidy element of export credits

The export credits and subsidy equivalent amounts are reported by commodity grouping to show the incidence of export credits both in absolute terms and relative to trade in Table III.4. The column listing the commodity groups, at left, provides only terse descriptions of what each group includes. The seven commodity groupings of the survey are described more thoroughly in the annex to Part III (Section 3). The first four columns of data at the top of Table III.4 show the survey data on export credits disaggregated across these groupings. The largest share of export credits cover bulk cereal products, which includes wheat, rice and other grains. This category alone accounts for just over a third of export credits over the four years of the survey. Vegetable products, which includes oilseeds, barley malt and wheat flour, is second largest followed closely by the growing share given to facilitate trade in livestock products such as cattle, meat and dairy products. The final line of data before the total in Table III.4 shows the amount of export credits for which no commodity group is specified in the survey data, either because the response did not state the commodity or else was related to a commodity which is not covered by any of these groups. These average 14% of the total export credits.

Table III.4. **Export credits and subsidy element by commodity group**

Commodity Group	Year of the survey				1998 subsidy amount	
	1995	1996	1997	1998	Beginning	Ending
	Million USD					
Export credits						
Group 1-livestock	728	778	1 057	1 260	14.0	27.4
Group 2-vegetable	867	962	944	1 299	28.1	57.6
Group 3-cereal	2 063	2 838	2 753	2 222	98.4	169.7
Group 4-oils and fats	186	139	197	253	10.0	18.5
Group 5-processed	528	638	734	793	13.0	23.1
Group 6-skins and hides	213	313	300	241	4.6	6.1
Group 7-wool and hair	47	552	477	538	0.6	3.0
Unknown/other	872	739	961	1 305	47.6	79.4
Total	5 504	6 959	7 423	7 910	216.3	384.8
	Million USD					
Total exports						
Group 1-livestock	37 553	38 330	38 918	36 682		
Group 2-vegetable	26 569	29 057	29 572	27 974		
Group 3-cereal	21 407	24 312	18 984	16 094		
Group 4-oils and fats	7 013	6 184	7 216	8 150		
Group 5-processed	54 782	58 122	61 346	59 217		
Group 6-skins and hides	2 694	2 607	2 599	1 932		
Group 7-wool and hair	3 306	3 167	3 364	2 181		
Unknown/other	n.a.	n.a.	n.a.	n.a.		
Total	153 323	161 778	161 999	152 228		
	Per cent					
Relative to total exports						
Group 1-livestock	1.9	2.0	2.7	3.4	0.0	0.1
Group 2-vegetable	3.3	3.3	3.2	4.6	0.1	0.2
Group 3-cereal	9.6	11.7	14.5	13.8	0.6	1.1
Group 4-oils and fats	2.6	2.2	2.7	3.1	0.1	0.2
Group 5-processed	1.0	1.1	1.2	1.3	0.0	0.0
Group 6-skins and hides	7.9	12.0	11.5	12.5	0.2	0.3
Group 7-wool and hair	1.4	17.4	14.2	24.7	0.0	0.1
Unknown/other	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total	3.6	4.3	4.6	5.2	0.1	0.3

Sources: Export credit data are from a confidential survey by the Participants to the Arrangement. The two columns to the far right reproduce the subsidy amount estimates of the present study, both in absolute terms and relative to total exports. Total export values are Foreign Trade Statistics. Intra-European Union export credits and trade are excludeed for all EU members.

Disaggregating the subsidy amount estimates across commodity groups shows different weightings, although difficulties applying the survey data may bias the results for any single commodity. Subsidy equivalent amounts reported in Table III.4 indicate that even though bulk cereals represents only a third of export credits, these commodities absorb the highest share of the beginning 1998 subsidy equivalent estimates with almost half of the total. The share of distorting export credits facilitating trade in other or unknown commodities (the final line of data before the total) is a distant second with about 22% of the total. Commodity groups covering oils, fats, skins, hides, wool and hair receive both the least export credits and the smallest share of the subsidy equivalents estimated in the present study. The difference between the incidence of export credits and the incidence of the subsidy element is related to the use of export credits by different exporters across commodity groups. The largest share of the more distortionary programmes was provided to facilitate trade in bulk cereals, perhaps to importers with high interest rates and/or on long terms without offsetting fees, whereas livestock product export credits are generally offered by countries with less distorting or non-distorting programmes.

The use and subsidy amount estimates of export credits by commodity are compared to the total exports of these countries by the same commodity groups in Table III.4. The caveats of Table III.1 continue to apply: The Participants' survey data and FTS data may not match on the commodities included, basis (FOB or CIF) or year (calendar or other). Nevertheless, Table 4 gives some indication of the incidence of export credits in terms of totals and subsidy amounts by commodity relative to total exports by these countries. Over the survey period, on average, trade from these countries in the wool and hair group products was most often facilitated by export credits (14% of exports), followed by the cereal group (12%) and the hides and skins group (11%). The comparison of the total value of export credits (as opposed to the subsidy element of export credits) to trade is not meaningful, in the sense that these transactions may or may not be distorted depending on the conditions of the export credits by way of the length, the level of guarantee, fees and other characteristics. That is to say, the level of trade facilitated by export credits alone does not indicate the relative level of the subsidy amount these programmes cause. Instead, the level of the subsidy element from export credits is compared to the total world trade at bottom right of Table III.4 to represent the importance of export credits in a global context. In terms of the actual subsidy element caused by export credits in comparison to total trade, the greatest incidence falls on exports of the cereal group, with the subsidy amount relative to total exports estimated to be 0.6% (using beginning 1998 estimates). This is almost three times greater than in the market which is second most affected by subsidising export credits in relative terms, that of the skins and hides group, in which the subsidy element of export credits accounts for about 0.2% of these countries' total exports. Using the beginning 1998 estimates, although these represent only a single observation, these results as regards the cereal markets can be interpreted thus: the estimated reduction in costs for importers of cereals due to export credits of these countries was equal to 0.6% of the total value of the exports.

In summary, where the estimated subsidy rate is positive, export credits distort importer's decision-making in favour of the export credit granting country. For both estimates, covering the start and end of 1998, the largest subsidy rate is estimated for the US, which also reports the highest level of export credit use. The financial crisis of 1998 does not limit this result, because the beginning 1998 interest rates reflect more normal interest rate spreads and the corresponding estimates are very similar to the results of previous research where comparable. Results for other countries are smaller, but subsidy rates are positive in several cases, albeit at lower levels than that of the US. In testing the sensitivity of these results with respect to the interest rate data, the specific magnitudes of the estimates change, but the general conclusions remain valid (Annex to Part III). The US export credit programme is estimated to be the most distorting, whether measured using the rate or the amount, for all variations of the interest rate data explored. In terms of subsidy rates, estimates for the programmes of France and Norway are also consistently and significantly positive. (Norway's subsidy rate is overestimated in that the fee cannot be subtracted from the estimate.) Export credits of France and Canada are estimated to have the highest subsidy amounts after the US in the sensitivity analysis experiments. The consequences impact world cereal markets more than those of other commodities. Moreover, export credits are shown to be available for a small, albeit growing, share of agricultural commodity trade. The effects of export credits on world markets in aggregate, as shown later, depends upon the degree to which these programmes distort trade and the magnitude of export credits relative to world markets.

How defaults can affect the subsidy rate

There is a possibility that export credit programmes might be operated in such a way that defaults on payments contribute to the subsidy element. In the context of present value calculations, however, this possibility is restricted. For example, whether or not net defaults associated with export credit programmes are offset by the fee income of the programme are not relevant to present value calculations. The calculations represent the importer's evaluation of the export credit, taking into account the lower guaranteed rate over the lifetime of the financing converted into present value at that importer's discount rate and adjusted for fees paid. In considering the value of a stream of future payments there is no room for *ex post* defaults.

In the context of the importer's evaluation of future payments, the only way a default will have an effect is if it is planned in advance. It is impossible to know from the survey data if this situation ever occurs. If the importer enters into the transaction planning to default on payments, then the perceived cost to the importer of buying the commodity is limited to the fees and down payment paid, if any. On the other hand, because unintended defaults do not affect the importer's purchasing decision, they are appropriately evaluated in the standard method applied in the previous section (*e.g.* the present value calculations are not changed). Thus, if the importer does not plan to repay and the export credit programme is operated knowing that importers enter into transactions without intention to repay, then, in those cases only, the subsidy rate calculations should be substantially modified to incorporate such defaults.

Exporters' defaults net of recoveries for export credits are reported in the survey. The default net of recoveries is the share of obligations which come due to the government and which reflect loans which are not repaid. For a guarantee, for example, it is the portion of the total export credits for which the government had to pay the loan, less the portion which was repaid. As shown in the Annex (Table AIII.6), the relative appearance of defaults net recoveries appears to be quite low, with a simple average magnitude in 1998 of 0.3% of the export credit value. Although comparing defaults based on past transactions with contemporaneous export credits is not entirely accurate, this does indicate the relatively small size of defaults in 1998 as reported in the survey.

The relatively low default rates reported for 1998 limit the magnitude of the increase in subsidy rate even if an implausibly large share of the defaults were assumed to be planned. However, the default rates reported in the survey may be misleading. There is no way to know what portion of those loans repaid were actually repaid by the importer. For example, if the exporting country's government decides to forgive, refinance and delay or repay (*e.g.* by other agencies) some importer's debt, does this exporting country count the credit in the survey as a default or as a repayment?

Importers and liquidity constraints

A justification given for government involvement in export credits has been the ability of the export credit to overcome liquidity constraints of certain importers. In effect, rather than compete with private market trade, the export credit is believed to enable a transaction which would not otherwise occur. This justification, if true, has the additional implications that export credits could help countries which cannot afford to purchase food sufficient to feed their populations, albeit at very low levels of concessionality, if any. The validity of this argument is examined in light of the survey data in the following paragraphs.

Can export credits create demand?

"Additionality" is defined as the ability of a policy to expand demand. Any attempt to use additionality as a justification for export credits in a multilateral context must limit the definition to only those cases where the expansion in demand is global, with no reallocation in favour of one country. This definition omits those programmes which benefit a particular exporter partly at the expense of other countries' exports. Thus, programmes which simply lower the import price cause an increase in total world import quantities, but also cause a reallocation among exporters and has a negative impact on producers in the importing country. In considering additionality under this definition, it matters whether a country's exports rise because it applies a policy which lowers its effective price (*e.g.* a move down along the world demand curve) or whether they grow because of stronger demand for imports (*e.g.* an outward shift in the world demand curve). In the former case, an increase in a countries' exports may be due to an increase in world import quantities, as importers buy more at a lower price, but it may also be due to a displacement in the supplies from competing exporters. This study does not consider as additionality those increases in a country's exports where the reasons for these increases remain ambiguous. The definition of additionality in a multilateral context should be restricted to only those cases where an export policy causes an increase in importer demand at any price and is therefore not at the expense of other exporters nor of producers in the importing country.

Export credits have the potential to create additional demand under this definition, although even this case can be ambiguous. Export credits may increase demand if, like an increase in income, they increase demand at any price. If there is additionality, then the effects of export credits on world markets would be indirect, as the export credit would not replace competitors' exports. Instead, those export credits which provide additionality would create demand which would not otherwise exist, then remove from a specific country's normal exports the quantity required to satisfy this new demand. However, additionality is unlikely in cases where export credits lower the effective price but offer only limited improvement in financing terms. While some part of this increase may be caused by a global, price-induced increase in imports, it also reflects displacement of exports by competitors. Export credit programmes may only create additionality in cases where they reduce or eliminate liquidity constraints in importing countries, thereby allowing these countries to make purchases which they otherwise would not have done at any price. For example, if an export credit allows a country to overcome systematic liquidity constraints and if food imports are a priority for the country, then additionality in a multilateral context is possible. However, ambiguity remains because such programmes might replace (*i.e.* crowding out) domestic production, private market loans or future imports. If liquidity constraints are not systematic, then assisting a particular firm in financial difficulty is unlikely to affect significantly total demand for the agricultural product. Alternatively, if food imports are not a priority, then the export credit is likely to replace commercial imports of food or domestic production, since additional food is not required. The fact that export credits are targeted at specific importers does not imply that these recipients are necessarily selected according to these criteria in order to expand global demand, as the import markets may be chosen instead to expand the country's own exports by displacing competitors. Nor should the absence of commercial trade necessarily be taken as an indication that private financing cannot operate in a market, as private agents may instead be unable to compete with government financing (Eaton). In short, these criteria for testing for additionality in a multilateral context are difficult to test in practice.

One approach to establish an upper bound on additionality, setting aside the caveats above, is to examine net-food importing developing countries (NFIDCs) or less developed countries (LLDCs) separately. These are groups of countries as defined at the United Nations and given special consideration due to their food needs and/or relatively lower level of economic activity. It is largely for these countries where liquidity constraints might be a universal factor for all of the countries' importing agents and where food imports are a priority if financial constraints are alleviated.

Recipients of export credits are mostly OECD *Members, not developing countries*

Table III.5 shows the shares of export credits by different groupings of countries. Export credits for which the importer is not specified in the survey are not assumed to be in any particular classification. The top half of Table III.5 shows the amount of export credits of each country which is identified as going to a LLDC importer. The sum of export credits to these countries over the four years of the survey is indicated, then the sum of all export credits by the country in question. At the far right, in the top half of the table is the ratio of these two totals (*e.g.* the export credits going to LLDCs divided by the total export credits to all recipients). The lower half reports the same statistics for NFIDCs. It should be noted that intra-EU export credits are included in Table III.5 for all EU countries except France (in which case no such data are provided). The reason is to show a complete accounting for export credit use, to test the argument that export credits can be justified on the grounds of either additionality or assisting relatively poorer countries to import food. In this light, it is relevant to note what share of export credits of EU states is applied to OECD countries, both within and external to the common market.

Table III.5 highlights the relatively small role of net food importing and developing countries in export credits. The data show only 9% of export credits are given to NFIDCs in the survey period (10% if intra-EU transactions are excluded). NFIDC 's share has fallen from 10% in 1995 to 7% in 1998. Similarly, LLDCs represent only 0.2% of export credits during the survey (0.3% if intra-EU transactions are excluded). Adding all data for which no importer is specified would add only 0.6% in 1995, but a more sizeable 8.2% in 1996 and 1997 and 9.4% in 1998. This would assume that all export credits without

Table III.5. **Recipients of officially supported export credits**

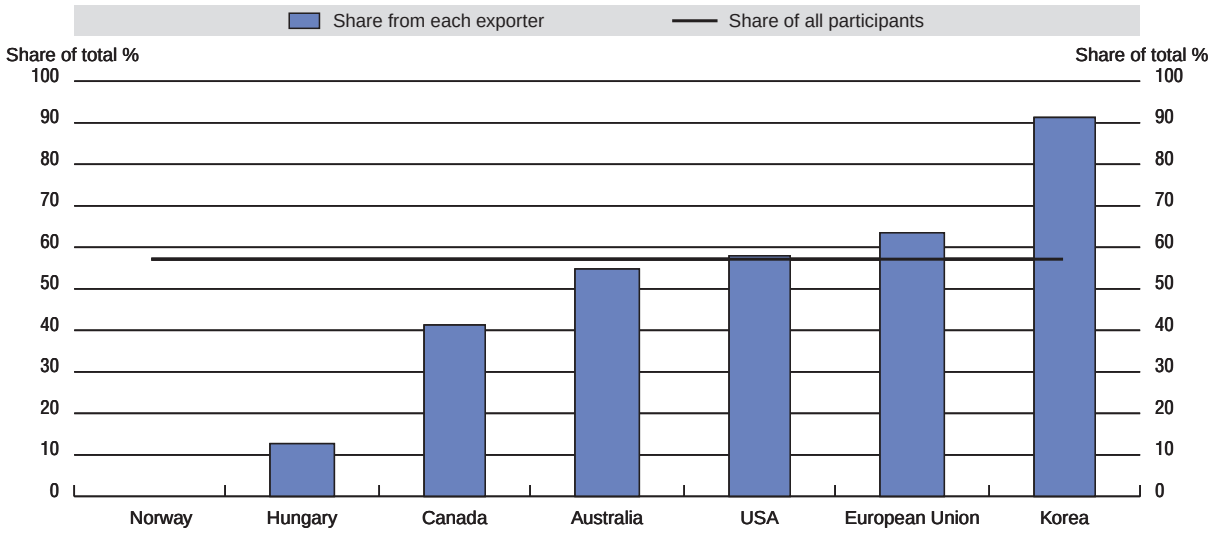
	Export credits to recipient type					Total export credits	Share of total
	1995	1996	1997	1998	4-year total		
	Millions of USD					Per cent	
To developing countries (LLDCs)							
European Union*	7.4	4.0	13.1	8.7	33.2	8 740.5	0.4
Austria	3.0	0.0	0.1	0.1	3.2	42.5	7.5
Belgium	2.5	3.2	5.3	4.2	15.1	501.9	3.0
Finland	0.0	0.0	0.0	0.1	0.1	70.7	0.2
France*	0.0	0.0	0.0	0.0	0.0	776.0	0.0
Germany	0.0	0.0	0.4	0.0	0.4	25.1	1.7
Greece	0.0	0.0	0.0	0.0	0.0	22.1	0.0
Netherlands	1.6	0.5	7.0	4.0	13.2	4 259.8	0.3
Portugal	0.0	0.0	0.0	0.0	0.0	9.9	0.0
Spain	0.3	0.3	0.3	0.3	1.2	3 032.3	0.0
Australia	7.3	12.6	7.6	6.7	34.3	6 802.6	0.5
Canada	0.0	0.0	0.0	2.8	2.8	3 613.3	0.1
Hungary	0.0	0.0	0.0	0.0	0.0	68.5	0.0
Korea	0.0	0.0	0.0	0.0	0.0	125.8	0.0
Norway	0.0	0.0	0.0	0.0	0.0	0.1	0.0
United States	0.0	0.0	0.0	0.0	0.0	12 806.4	0.0
Total*	14.7	16.6	20.7	18.2	70.2	32 157.3	0.2
To net food importing developing countries (NFIDCs)							
European Union*	41.0	35.8	137.1	165.5	379.3	8 740.5	4.3
Austria	0.0	0.1	0.0	0.1	0.2	42.5	0.5
Belgium	7.5	9.5	8.9	12.1	38.0	501.9	7.6
Finland	0.0	0.0	0.0	0.0	0.0	70.7	0.0
France*	0.0	0.0	78.0	104.0	182.0	776.0	23.5
Germany	0.0	0.0	0.0	0.1	0.1	25.1	0.6
Greece	0.0	0.0	0.0	0.0	0.1	22.1	0.5
Netherlands	18.2	12.3	11.0	31.1	72.6	4 259.8	1.7
Portugal	0.0	0.0	0.0	0.0	0.0	9.9	0.0
Spain	15.4	13.9	39.1	18.0	86.4	3 032.3	2.8
Australia	23.8	33.9	52.7	46.2	156.6	6 802.6	2.3
Canada	26.1	1.3	39.7	34.7	101.9	3 613.3	2.8
Hungary	0.0	0.0	0.0	0.0	0.0	68.5	0.0
Korea	0.0	0.0	0.0	0.0	0.0	125.8	0.0
Norway	0.0	0.0	0.0	0.0	0.0	0.1	0.0
United States	633.1	666.0	560.7	361.1	2 220.9	12 806.4	17.3
Total*	724.0	736.9	790.2	607.5	2 858.6	32 157.3	8.9

* France does not report intra-EU trade. For other EU members, intra-EU trade is included.
Source: Export credit data are from a confidential survey by the Participants to the Arrangement.

corresponding information about the importer are received by importers who are both net food importing developing countries and less developed countries.

On the other hand, Figure III.4 shows that most recipients of export credits in the 1995 to 1998 survey period were OECD countries. OECD importers received over half of the export credits in each year, ranging from 50% in 1997 to 63% of export credits in 1998. This decreases the likelihood of demand creation. OECD countries are less likely than the other groupings shown to face liquidity constraints and, hence, to increase demand when receiving export credits. The OECD countries which may have faced liquidity constraints are significant, however, as Mexico received USD 1 667 million export credits in 1996 and Korea received USD 1 441 million export credits in 1998. The potential for these two countries to have imported without export credits might be questioned due to the financial difficulties each suffered in these two years. In the case of Korea, at least, it should be recalled that its own export credit programme was maintained in 1997 and 1998 based on the annual data of the survey (Table III.1), implying that systematic liquidity constraints may not have been present at all times of these years.

Figure III.4. **Countries' export credits to OECD importers, 1995-98**



Source: OECD Secretariat.

In conclusion, there is no clear evidence of whether or not export credits do provide any additionality in a multilateral context. Export credits may help importers which are liquidity constrained to buy commodities where they otherwise would not be able to do so at any price. To the extent that export credits do increase demand by overcoming liquidity constraint, they may increase world demand. Thus, while the benefit would accrue to a particular exporter, the additional trade would not be at the expense of competitors in terms of their existing sales. The competitors would not be able to compete for this new demand, unless the export credit were not tied to a specific country's exports. They could still indirectly benefit nonetheless as the new demand would remove from the competitive markets that portion of the sales under export credits which satisfy the new demand. However, it is possible for export credits to countries in need of food imports, but facing financing constraints to replace or to prevent privately financed trade, past, present or future. Given the relatively small amount of export credits given to the countries most likely to suffer such financing constraints, the potential that they have increased demand during the survey period appears limited.

In fact, the very low shares of export credits which are given to developing countries or net food importers calls into question the justification for export credits that these assist countries facing liquidity constraints to purchase food where they otherwise could not. Even adding all data for which no importer is specified, the shares going to countries who might be most in need of financial assistance in the face of liquidity constraints is much smaller than the more than half of export credits which go to OECD countries, for whom the such arguments are not as plausible. As a consequence of these data, at least during the survey period, the primary motivation of export credit programmes is unlikely to be assisting developing countries to purchase food.

Other uses of export credits excluded from this study

Export credits offered by organisations acting under government authority, other than export credit agencies, and under certain food aid programmes were not included in this study. The survey data do not include export credits provided by such organisations nor do these data include food aid where it is provided using export credits. Nevertheless, as is true of other export credit programmes, these may contribute to the distortion of commodity markets. Other researchers who study the effects of export credits raise the questions about exchange rate guarantees or assistance with transportation costs, but

these are not included in the survey and there is no reason from the survey to expect that they are used. These instances or issues regarding export credits are partly addressed below.

As a last point, the Participants represent only a certain number of countries, not even the entire OECD. The Participants (as of October 2000) are Australia, Canada, Hungary, Korea, Norway, the US, and the EU and all its members. Argentina attends meetings related to export credits in agriculture and did respond to the Participants' survey, but these data are not included in the present paper.

Organisations with legislative authority

The existence of organisations operating under special government legislation is not in doubt. Several state trading enterprises have been subject to WTO notifications. State trading enterprises are addressed in a separate report by the OECD, which highlights the heterogeneity of such organisations, in terms of both goals and powers, and cautions against broad statements regarding state trading organisations [COM/AGR/TD/WP(2000)3/FINAL]. At issue in the present study on export credits is whether the government also provides an organisation with funding, directly or indirectly, which enables that organisation to operate an export credit programme on terms which are better than private market alternatives without offsetting fees. Irrespective of the question whether this would constitute official support, the result would be a distortion of trade in favour of that organisation's exports relative to competitors who have access only to private market financing.

The survey data do not extend to cover organisations with legislative authority to engage in export credits, other than export credit agencies, frequently on the grounds that no government support is provided to the organisation so they operate on commercial terms. There are several methods by which a government can supply funding to organisations with export credit programmes. The most obvious is direct budgetary support, of course. Less obvious would be tax breaks, a reduced regulatory burden or guaranteeing the organisation's debt (thus allowing the organisation to borrow at the government's costs of capital). Perhaps the least transparent mechanism for funding such organisations is where legislative authority grants the organisation with special privileges or mechanisms for raising money which are not available to private firms. For example, revenues from government-enforced levies on producers or processors of agricultural commodities could be applied to export credit programmes such that they are offered on conditions more favourable than those of private firms without offsetting fees. Alternatively, the government could grant the organisation legislative control over certain markets so that it may behave as a monopolist or monopsonist, thereby raising non-competitive economic profits which might then be diverted into export credits. In these cases, some part of the levy or profits could be used to lower the total effective costs to importers. Thus, organisations with government authority to engage in export credits could employ these programmes as mechanisms of export distortion either with direct government funding or by way of cross-subsidisation.

The overlap between export credits and food aid

Similarly, food aid was recognised in the Uruguay Round Agreement on Agriculture, which refers to the Food Aid Convention (FAC) as regards the level of concessionality. The concessionality level is the degree to which the donor reduces the total costs of the assistance. For example, a grant corresponds to 100% concessionality, as the donor nation provides the food aid without any repayment by the recipient. It can be argued that a greater level of concessionality makes food aid more effective in providing assistance to a developing country in need of food and also in limiting the possibility that these be used as an export competition policy by increasing the cost of doing so to prohibitive levels.

The provisions of the URAA and the FAC do not preclude the possibility that some food aid is supplied on less favourable terms for the importer than grant terms. Immediately relevant to the present study, the Development Assistance Committee Statistical Reporting System does indicate that food aid loans occur. Such schemes would be uses of export credits to facilitate food aid which are not included in the present study, because they are not reported in the Participants' survey data. While the concessionality level may be high for such arrangements, they are not on fully grant terms as the importer is expected to repay the loan. The less than grant terms of export credits, where used as a

mechanism of delivering food aid, may lead some observers to conclude that these are not sufficiently expensive to be self-limiting. In addition, if food aid delivered via export credits is not carefully targeted to prevent offsetting private trade, it may distort trade flows. In fact, the FAC does address the potential for food aid to replace the recipient's production or commercial trade. However, this requirement corresponds to the discussion of additionality in the previous section and is difficult to measure and to achieve. For example, the food aid delivered by export credits implies that it is going to a country with some ability to repay, yet should not offset any commercial sales in the present or future, nor the recipient's own production. Thus, while the present study does not address export credits where used to facilitate food aid, it is possible that these arrangements could distort trade.

Exchange rate guarantees and other possible programme benefits or effects

Previous research on export credits has included evaluations of the value of exchange rate guarantees or assistance with transportation costs (Dahl, Wilson and Gustafson, 1995). These are not included in the Participants' survey data and are not an element of the current report. If it is the case that an export credit programme pays some part of the transportation costs, the effect will be that each unit of expenditure results in a decrease in transportation costs. The importer's total costs for buying goods from that exporter will then likely decrease by the same amount, encouraging the importer to buy under the programme instead of under private arrangements from a competitor. Thus, if a programme offers assistance covering some part of the transportation costs, trade is likely to be distorted.

There are no data in the survey to indicate the currencies of the export credits and the study assumes that importers' interest rates for debt denominated in USD are appropriate in evaluating the present value of the total costs. This assumption would be appropriate if most trade in these commodities is conducted in USD and if, where exceptions do exist, these are transactions which are denominated in relatively stable currencies. Credit ratings should take account of the possibility that a sudden change in the importer's currency will make that importer default on its debt. For example, the possibility that a sudden devaluation would occur and force a given country into default should be captured by the credit ratings. Thus, this element of exchange rate risk is incorporated. On the other hand, if a country's export credit programme provides guarantees against exchange rate risk without offsetting fees, this could provide a subsidy element not included in the present study. The change in the expected payment of a loan in that currency is not captured in this study. As an example, if an importer's currency depreciates against the exporter's, this would decrease the value in the exporter's currency of any loan denominated in that importer's currency. Setting aside the question of possible default, which should be addressed by the credit ratings, there would be a loss in the expected payment if measured in the exporter's currency. This loss would be compensated by a payment to the bank or exporter in the case of an exchange rate guarantee. If a country offered an exchange rate guarantee without sufficient fees to offset the benefits, this would introduce a further subsidy element.

Export credits in world agricultural product markets

The purpose of Part III is to identify the effects of export credits in world agricultural markets. To accomplish this, the survey data were presented in absolute terms and relative to trade. It was shown that, while export credit use is increasing, it is still small relative to total trade for most countries in the survey. The present value calculations show that some of these programmes do distort markets by decreasing importers' costs. The magnitude of the decrease using beginning 1998 estimates averages 2.6% across the commodities of the survey, which is not large but is likely to be sufficient in competitive world markets for agricultural products to bias the decision-making of those importers receiving the distorting export credits. The survey data only extend to 1998 and the beginning 1998 estimates refer to only a single observation. Extrapolating past conditions into an evaluation of the effects of export credits on present or future world markets may introduce an error. Export credit use may have risen or fallen relative to trade since 1998 and some countries may have altered their programmes, which may increase or decrease the level of distortion, in the absence of any Arrangement governing their use.

The importance of export credits in total trade of agriculture products is not great, although certain export credit programmes do bias targeted importers' purchasing decisions and do distort markets. However, total export credits facilitated 5.2% of world trade in 1998 (Table III.1) and, of these, only a portion are estimated to have distortionary market effects in this study based on present value calculations which account for programme characteristics such as term, guarantee level and fees. Moreover, the subsidy rate estimates serve as an indication of the size of the discount which results from distorting export credits on each transaction. Thus, if the distorting element of a country 's export credits were removed, a small rise in that country's export prices would result in the same level of exports as had occurred with the export credits (if nothing else changes). Altogether, export credits are not large relative to world markets either in comparison to the total value of world markets nor relative to the prices at which goods are transacted.

Preliminary analysis of the world market effects of distorting export credits

This result can be illustrated using Aglink, the partial equilibrium model of world markets for certain commodities which is maintained by the Secretariat and co-operators in certain OECD countries. This analysis is based on the assumption that perfect competition is a useful representation of the world wheat market. Survey data, as discussed above, suggest that transactions facilitated by export credits, although targeted, do enter into direct competition with other exports. The *Outlook* provides a projection of world markets in the near future under certain assumptions. The *Outlook* does not include export credits, but one example of export credits can be added to examine what impact export credits may have on world commodity markets. Wheat, which can be identified as Group 3A of the survey commodity groupings and adding Group 2A, wheat flour, is chosen for this example. The subsidy rate estimates of the beginning of 1998 are used here although, of course, these are not necessarily representative of rates at other times.

The US accounts for the largest share of estimated distortions from export credits in the present study. The European Union export credits also distort wheat trade, with the subsidy amount estimated at USD 2.3 million. However, two-thirds of the distortion of agriculture trade caused by EU export credits reflects transactions for which no commodity group was supplied in the survey data. To incorporate some portion of this large amount, the same share of wheat in the subsidy amount related to export credits for which a commodity was designated is also assumed to be applied to wheat from the amount without a commodity group specified. Thus, 49% of the USD 10 million subsidy amount without corresponding commodity given is assumed to apply to wheat, in addition to the USD 2.3 million subsidy amount which is known to go to wheat exports. The survey data of Canada do provide more details on the commodity groups, so the subsidy amount calculations related to wheat export credits are used directly. Australia, however, only provides a totals for each group, as opposed to providing data specific to Group 3A, for example, so half of the Group 3 total subsidy amount estimate is assumed to apply to wheat. No assumption is made regarding Group 2 export credits from Australia. The scenario compares the results with and without wheat export credits (using Group 2A and Group 3A). This analysis will show a potentially atypical example rather than the average effects of export credits, because wheat receives a larger share of the subsidy element of export credit programmes (Table III.4).

In order to perform this preliminary experiment, the beginning 1998 subsidy element of wheat is introduced as an export subsidy in each year of the *Outlook* from 2000 to 2005. The total subsidy amounts are USD 42.7 million or about USD 1.30 per tonne on average for the US, USD 4.8 million or USD 0.30 per tonne on average for the European Union, USD 2.3 million or USD 0.12 per tonne on average for Canada and, finally, USD 0.04 million which is almost zero on a per tonne basis in the case of Australia. This method is appropriate in the context of world markets, as the subsidy element is the decrease in each importer's present value total costs, which should be equivalent to an export subsidy's effect on the purchase price. It should be noted that incorporating the subsidy element of export credits in this manner rules out any possibility of additionality (by the definition used above), even

though the evidence against additionality is empirical and not conclusive. In other words, there will be no shift in world demand from these export credits by assumption, although a price effect is expected.

The consequence of introducing the estimated subsidy element of US, European Union, Canada and Australia wheat export credits in the *Outlook* can be presented by comparing the results of the experiment with the *Outlook* in the final year of the projection period. By assuming the beginning 1998 subsidy element is constant in all years of the *Outlook*, a wedge or a gap is created between the exporters' domestic prices and the world prices which is equal to the average per unit subsidy element on a per tonne basis. When the preliminary analysis is viewed in comparison to the *Outlook*, US wheat exports are almost 1% higher and the US wheat producer price is raised by half a per cent. (These per cent changes indicate the change caused by introducing the estimated subsidy element of the wheat export credits relative to the case if there were no subsidy element due to export credits.) Focusing first on the effects on world markets from US export credits, competitors' wheat prices are lower in the case that US wheat export credits are introduced in the *Outlook*, as they attempt to compete directly with artificially lower effective US export prices (including financing) or as more costs are incurred by these exporters in finding alternative markets. It should be noted that, if additionality were present, then that portion of the total export credits which did create new demand which would not otherwise have been present at any price should be considered differently. Rather than restricting the effects of export credits to be analogous to an export subsidy, if additionality were present there would be some outward shift in world import demand.

Other wheat exporters that apply export credits may or may not lose in import markets, as their own export credit programmes offset some portion of the distorting effect of the US export credits. The wheat prices of Canada and the EU are largely unchanged in the preliminary analysis. The Canadian wheat price benefits from its own export credits and from direct access to the higher priced US internal market. The EU is largely unaffected in aggregate as the world price remains below the intervention price for most years of the *Outlook*. However, some reallocation across EU members' exports would be expected in favour of those countries which use distorting export credit programmes. The net effects on Australia are of a slightly lower producer price (0.3% lower) as Australia's own export credits are insufficiently distorting to offset the negative effects of its competitors' programmes. In preliminary analysis, the net effect on world prices as perceived by exporters who are not using export credits and by importers is a reduction of about 0.3% as compared to the case in which no countries use wheat export credits. These results would be greater if the ending 1998 subsidy element estimates were used, but would remain relatively small. However, these results are not the full effects of export credits, as no export credits were introduced for any other commodity save wheat in this scenario, even though cross-commodity effects are significant.

The subsidy element estimates of this study show that export credits are fairly small relative to world agricultural product markets in terms of both total trade and in terms of the per unit costs. Thus, the effects of export credits on world markets are not very large, in aggregate, according to these preliminary estimates. However, the small effects on the aggregate level should not be taken to mean that export credits are at all unimportant at the individual level. In other words, each individual transaction which receives an export credit on conditions which are better than those of the private market is distorted, yet these transactions in 1998 were few and the per unit level of distortion was small. Since there is no Arrangement disciplining the use of export credits in agriculture, their use in total or the degree of distortion may have increased since 1998 or may be increased in the future.

Export credits and export subsidies on world markets

The subsidy element of export credits can facilitate comparison between these export competition policies and export subsidies. The two operate in different manners. Yet the subsidy elements presented in this study are estimates of the effect of export credits on current total costs of importers, which should set the two policies on a more comparable basis. Except in cases where the importer has no access to financial markets, which have been shown to be rare in the survey period, the consequence of export credits for importers is very similar to what would be the case if they received an export

subsidy which reduced the import price by this amount, and then sought financing through private markets without any government intervention. The resulting private financing conditions may be different from the officially supported export credit as regards length, up-front fees, down payment and guaranteed versus market interest rates, for example, but the present value of either arrangement should be directly comparable.

Table III.6 presents data regarding the use of export credits and export subsidies during the sample period. The export credits reported here represent the total amount provided, but exclude intra-EU export credits in order to be consistent with the previous statement that these are unlikely to affect world markets. On the other hand, the average 1998 subsidy element estimates include the portion resulting from intra-EU export credits in all cases except for France and the Netherlands, as is required in these calculations in order to use parameters which are consistent (as described in the Annex, omitting these data would bias EU subsidy rate estimates). These export credit data and subsidy rate estimates are reported in the first half of Table III.6. The lower half of Table III.6 reports export subsidies. These are drawn from the *The Uruguay Round Agreement on agriculture: An evaluation of its implementation in* OECD *countries* and, thus, indirectly from WTO notifications. The original data on export subsidy use are usually in the reporting country's own currency and on a basis other than a calendar year, yet the conversion into USD rests on simple average calendar year exchange rates and these are added, without an adjustment to account for the varying yearly basis. It should be noted that in some cases recent WTO cases have clarified the interpretation of export subsidies. For example, Canada's dairy pricing scheme and the US Foreign Sales Corporations have been found to provide export subsidies, yet Table III.6 does not include any adjustment to notification data to reflect these clarifications. Thus, while these data are not exact, Table III.6 provides an indication of the levels of export subsidies.

Table III.6. **Export credits and export subsidies**
Million USD

	Export credits:				Subsidy amount estimates Beg. 1998
	Total amount provided				
	1995	1996	1997	1998	
Australia	1 106	2 014	2 130	1 553	2
Canada	570	697	1 239	1 108	8
European Union*	985	989	1 151	1 254	15
Hungary	0	38	12	19	n.a.
Korea	0	33	46	46	0
Norway	0	0	0	0	0
United States	2 843	3 188	2 845	3 929	191
Total*	5 504	6 959	7 423	7 910	216
	Export subsidies				
Australia	0	0	0	1	
Canada	37	4	0	0	
European Union	6 386	7 064	4 943	5 968	
Hungary	41	18	10	12	
Korea	0	0	0	0	
Norway	83	78	102	77	
United States	26	121	112	147	
Total	6 573	7 286	5 167	6 205	

* Intra-EU trade excluded for data on export credits given, but only subsidy amount estimates for France and the Netherlands exclude intra-EU trade.

Sources: Export credit data from confidential survey by the Participants; subsidy amount estimates are from the Secretariat's calculations, as described in this report; and export subsidies are drawn from the Secretariat's *Market access, domestic support and export subsidy aspects of the Uruguay Round Agreement on Agriculture: implementation in the* OECD *countries*, as derived from WTO notifications. Original data regarding export credits and export subsidies are on varying 12-month intervals. The conversions into USD and the aggregation ignore this by calendar year average exchange rates and adding across countries without any weighting or adjustment.

There are two comparisons which might be made in Table III.6. The first comparison is between the absolute levels of export credits and export subsidies. However, this comparison is deceiving. The level of export credits in and of itself does not indicate the magnitude of market distortion they cause, if any. For the second, more meaningful comparison, the subsidy amount estimates shown at the extreme right of the top half of Table III.6 are to be compared to the export subsidies of 1998. It is only in the cases of the US, Australia and Canada that the amount of subsidy element provided by export credits is estimated to exceed the amount of export subsidies given (as notified to the WTO). In the case of the US, for example, export credits create a subsidy element about 30% greater than the US's export subsidies. However, in total for all the countries of Table III.6, export subsidies are far more significant than export credits in terms of the degree to which they distort world markets

These results, of course, are derived from 1998 data provided by the survey of the Participants and WTO notification data, through the subsidy rate estimates of the present study. More recent use of export credits may differ from those of the survey period either in magnitude of use or conditions, which could either lower or, in the absence of any disciplines on export credits, raise the level of distortion caused by export credits.

Conclusions

Export credits (with official support) can take any of several forms. These can be direct credits or financing, guarantees or insurance for loans, or interest rate support to facilitate exports to targeted importers. The terms may or may not be better than alternatives available through private financing and, where they are favourable, may or may not be entirely offset by an up-front fee. The present study finds small, but generally positive subsidy rates for most of the Participants to the Arrangement on Export Credits who have export credit programmes. The results hold when using interest rate data restricted to the start of 1998, which mostly precedes the rapid increase in interest rate spreads caused by the financial crisis and may be more consistent with the rates prevailing in other years, although these interest rates may not be consistent with the fees from all of 1998. Caution should be exercised if the results of a single year are extended to other years. On the other hand, variations in supporting data (as presented in the annex to Part III) do not undermine the validity of these general results. This finding, which is contingent upon the method and assumptions described in the following annex, indicates that these programmes often do serve as an effective subsidy on exports for some countries more so than others. Moreover, data show that export credits are being applied to a small but growing portion of agricultural trade, although 1997 and 1998 are atypical due to the financial crisis. Hence, this study concludes that the market distorting potential of export credits, though small in the survey period, is being realised and is becoming more important.

A justification given for the use of export credits is that these programmes may help countries with financial constraints purchase required food in world markets where otherwise they could not. This study questions this justification in two ways. First, the subsidy rate estimates are generally very low, implying that there are no great financial benefits from export credits even for those countries with very high interest rates. Thus, food aid is better delivered following the guidelines of the Food Aid Convention rather than on terms which may be sufficient to allow slightly more imports from a particular exporter, but do little if anything to help any country already in a poor financial situation. Second, the survey data provided by the Participants show that more than half of export credit recipients are OECD countries and only a very small share of export credits are given to those countries which might benefit from lower financing costs. Officially supported export credits in agriculture among OECD countries has no role if the justification for these programmes is to help relatively poor countries in financial difficulties to import necessary food. While these results as regards the targets of export credits and the subsidy rate estimates are not conclusive in that they are based on only four years of survey data and estimates of a single year, these empirical findings do raise questions about the role of export credits in agriculture commodity markets.

In the preliminary analysis of wheat exports, which are in the commodity group which suffers the greatest incidence of distortion due to export credits in absolute and relative levels, the likely effects if

export credits continue to distort trade at beginning 1998 levels is to raise US wheat prices slightly in comparison to the *Outlook*, which projects world market conditions but does not assume any export credits are provided. The aggregate exports from the EU are not substantially affected as the world prices remain below internal prices even taking the export credit into account, although some redistribution across EU members' exports could be expected as certain countries' export credits are more distorting and several members report no export credits (in the survey period). The net effects of the US and Canadian wheat export credit programmes on Canada are very small, whereas the wheat exports and prices in Australia are both reduced slightly as its own export credit programmes are less distorting than those of its competitors. According to the preliminary analysis, the consequence of continued wheat export credits under conditions such that the level of distortion is the same as estimated for the beginning 1998 is to reduce importers' and other competitors' wheat prices slightly. The relatively minor consequences of this example highlight the small size of export credits relative to aggregate world markets and to per unit prices. These results do not alter the conclusion that any individual transaction which receives an (officially supported) export credit offered by a government on terms better than private financing is distorted, forcing competitors to lower prices or find alternative markets.

Realising an Arrangement putting disciplines on the use of officially supported export credits would help to eliminate associated subsidies and restrict such programmes to market-based principles. For example, such an Arrangement could prevent greater use by exporters of distorting programmes which already exist or other countries adjusting their programmes to make them distorting. This alone, however, is insufficient if the goal is to end trade distorting policies. In the event of limits on their ability to use export credits to distort trade in their favour, countries can choose other policy options to artificially increase exports. For example, many countries retain substantial potential to directly subsidise exports within their URAA limits. Apart from export credits and export subsidies, there may be other policy options which are not inconsistent with the URAA. Pricing schemes, food aid programmes or special authorities that may be granted by governments to organisations, such as state-trading enterprises, have the potential to distort trade. An Arrangement governing export credits in agriculture would restrict one among the menu of export competition policies. However, further disciplines on all other export enhancing policies would be required to effectively eliminate trade distorting export support.

NOTES

1. Export credits between European Union members are excluded where possible from this report. Internal rules of the European Union are assumed to prevent distortions from export credits on the common market. See section 3 of the Annex for details regarding the survey data.
2. To calculate the present value effect on the importer's cost of receiving a loan at a rate below the market rate, present value computations are made to compare the reduced interest rate the importer receives because of the export credit with the importer's market rate (see Annex). The variables or parameters of these calculations are reproduced here:

Subsidy rate	Annual subsidised or guaranteed interest rate with the export credit.
Term of loan	Annual discount rate (market rate without the export credit).
Grace period	Payments per year.
Down payment	Fee, expressed a per cent of value.

Glossary

Arrangement The Arrangement on Guidelines for Officially Supported Export Credits (sometimes referred to in this text as the Export Credit Arrangement) is a "Gentlemen's Agreement" among participating countries to discipline export credits. Although the OECD Secretariat provides administrative support, it is not an OECD Act. The Arrangement provides an institutional framework which helps to limit the extent to which officially supported export credits distort trade, by encouraging competition based on price and quality rather than based on government support. An Arrangement exists which covers most sectors, although agriculture has yet to be included (as of October 2000).

Credit rating An evaluation of a borrower in terms of its credit-worthiness, which is a measure of the probability that the entity will repay its debts, with interest, on schedule.

Down payment A portion of the total value of the transaction which must be paid before or on the starting point of the export credit.

Export credit A guarantee, insurance, financing, refinancing or interest rate support arrangement provided by a government which allows a foreign buyer of exported goods and/or services to defer payments over a period of time. The present study deals exclusively with officially supported export credits for agricultural commodities and generally refers to these simply as export credits.

Fee A cost which must be paid for the export credit. The fee must be paid in addition to value of the export credit, not a portion of the total value as in the case of the down payment.

Grace period The delay before the first payment, less the normal interval between payments.

Length The length of time before the final payment of the export credit. Also called the duration, maturity or term in the text, although the latter is sometimes used more broadly to describe the conditions (as regards fees and repayment) of the export credit in general.

Negotiations The process through which participating countries are attempting to agree to a set of disciplines governing the use of officially supported export credits in agriculture. The Uruguay Round required such negotiations towards an agreement. These negotiations are facilitated by the OECD.

Net defaults The amount of loans and interest due which remains unpaid. There is no required distinction in the survey based on whether the importer has paid or some other agent.

Participants The Participants to the Arrangement on Guidelines for Officially Supported Export Credits are the countries which have chosen to attempt to abide by the existing Arrangement and which are negotiating an Arrangement which disciplines officially supported export credits in agriculture. The Participants are Australia, Canada, the European Community (which includes 15 member states), Japan, Korea, Norway, New Zealand and the United States. Delegations from these countries to meetings of the Participants are sometimes referred to in the text as the negotiators.

Survey The Participants re-issued a confidential survey in 1999, co-ordinated by the OECD, to collect information on officially supported export credit use from 1995 to 1998. In April 1999, the Participants agreed to allow OECD Directorate for Food, Agriculture and Fisheries to use these confidential data for the present study, provided bilateral trade flows are not reported.

Annex

METHOD AND DATA USED TO EVALUATE EXPORT CREDITS

Methods of evaluating export credits

The effect of officially supported export credits (henceforth simply "export credits") on world markets is difficult to estimate. Fortunately, this is not a new subject of research and published studies offer alternative methods to evaluate the effects. To circumvent difficulties accumulating data, existing studies on export credits generally provide a case study of a single exporter, a single importer, or a single commodity. Useful summaries are available (see Dahl, Johnson, Wilson and Gustafson or Dahl, Wilson and Gustafson). In broad terms, recent research has followed one of two methods for estimating the effect on markets: present value calculations or option-pricing. Between these two methods and an alternative method based on the budget of the export credit granting agency, the Secretariat has chosen to apply present value calculations.

The present value method discounts the future payment stream at a higher discount rate

Computing the present value of the future payment stream of an officially supported export credit programme offers intuitive appeal. Whether the programme provides a guarantee, insurance or a direct loan, the consequence may be a lower interest rate for the importer relative to the interest rate charged in the market. The difference, or the "spread", between the lower rate of the credit programme and the full-risk alternative is calculated at the time of the purchase. A present value calculation using this spread over the life of the loan is computed and adjusted for any fees to provide a subsidy rate estimate, expressed as a per cent of the face value of the loan. The spread between guaranteed and market rates may be entirely offset by a large initial fee, in which case there would be no subsidy on the effective cost to the importer, so the calculation must take into account such up-front costs.

One formula used is a version of the Ohlin formula. The formula accounts for many of the potential policy parameters of an export credit program, such as the grace period and the payment schedule, by computing the payment stream of the guaranteed loan and discounting using the market interest rate as the discount rate. The formula simply approximates with a single equation the two step process of first expanding the loan schedule into a stream of future payments and then discounting each payment into the present value. The Ohlin formula used to produce the estimates reported in the main text as follows:

$$S = 100 * (1 - D) * (1 - \frac{g}{r}) * \left\{ 1 - \frac{\frac{1}{(1 + r/a)^{aG}} - \frac{1}{(1 + r/a)^{aT}}}{r(T - G)} \right\} - f$$

where:

S = subsidy rate
T = term of loan
G = grace period
D = down payment
g = annual subsidised or guaranteed interest rate with the export credit
r = annual discount rate (market rate without the export credit)
a = payments per year
f = fee rate, expressed a per cent of value.

This annex makes a distinction between the gross subsidy rate and the net subsidy rate. The latter rate is the result of applying the above formula. The gross subsidy rate is also from the formula above, but the gross subsidy rate is the estimate before the fee rate (f) is subtracted. In the main text we only report the net subsidy rates.

Present value calculations based on the Ohlin formula are employed in assessing export credits for other than agricultural commodities. For example, the Ohlin formula is applied by the OECD Development Assistance Committee (DAC), albeit with greater consideration of the more complex repayment schedules which accompany long-term credits more common in official development assistance. Reynauld (1992) uses this formula to evaluate official financing across donors. FAO reviews of such assistance in relation to agriculture have applied this formula and, on at least one occasion, gave particular attention to how the formula determines the grant element based on

the loan conditions, such as the loan's interest rate, grace period and maturity (1990). Although relying on different equations, other studies support the use of present value calculations to evaluate the effects of export credits outside of agriculture. For example, Baron applies such measures to the case of the US Export-Import Bank. In his study of export credits by European Community members, Abraham recommends the present value approach as the "most appropriate when analysing the effects of export support on competitiveness" (p. 4). Present value calculations for agricultural commodities based on different calculations are published by Skully and Hyberg *et al.* A summary of previous research as well as original calculations based on the Ohlin formula are provided in Johnson Dahl *et. al.* (1995). Similarly the Ohlin formula is applied to the case of a specific commodity of a single exporter in Diersen *et al.* These studies focus on either a single exporter or a few importers, likely due to data limitations.

While the logic behind the formula is clear, the formula itself is less intuitive. A more accessible present value calculation is derived from Hyberg *et al.* This is applied to short-term export credits in this study and can be represented as follows:

$$SubsidyRate = 100 * \left(1 - \frac{(1+g)^T}{(1+r)^T}\right)$$

where:

T = term of loan

g = annual subsidised or guaranteed interest rate with export credit

r = annual discount rate (market rate without the export credit)

Here, the intuition is clear as the numerator reflects the payment stream under the export credit while the denominator is the discount rate particular to that importer. For example, if the guaranteed rate was 5% and the risk-bearing market rate was 10% on a one year loan, then the subsidy rate would be 4.6%. If the length of the loan was three years, the subsidy rate would be 13%. Alternatively, if the importer's market rate was 12%, then the subsidy rate would be calculated as 6.3% for the one year loan and 17.6% for the three year loan. This formula is calculated for a single unit of the loan and the result is interpreted as a rate which would then be multiplied by the actual loan amount to give the subsidy element in absolute terms.

The full Ohlin formula, although more complex, results in similar relationships between the conditions of the loan and the subsidy rate. The intuitively appealing formula of Hyberg *et al.* places the full repayment at the end of the loan (at the maturity data), although the authors adjusted this formula in practice to represent a declining balance, while the Ohlin formula allows a repayment schedule. Consequently, the subsidy rates above are higher than those calculated using the Ohlin formula in the case where repayment does not occur in one time at the end of the loan. However, in principle, the same factors increase the subsidy rate: a longer repayment period, a lower guaranteed interest rate or a higher discount rate.

Present value calculations provide a subsidy rate estimate specific to an importer, based on the operation of the government's programme and the credit rating of the particular importer. The guaranteed interest rate is actually the weighted average of the risk-free interest rate and the importer's market interest rate. The relative weights are determined by the share of the loan which is covered by the export credit guarantee. (An example appears later in the following Annex.) In the case where the export credit provides a loan to the importer at a subsidised interest rate, the interest rate charged can be used directly. The discount rate is the risk-bearing interest rate or market rate of the importer, reflecting the alternative cost of capital for that importer. This is the factor by which a present value is placed on the stream of payments under the guaranteed loan. The maturity or term of the loan is the length. Where the export credit covers a loan of some length, there may be a grace period or multiple payments per year. The grace period is the delay, if any, prior to the beginning of the repayments (less the normal period), although this is uncommon for export credits on agricultural commodity trade.

For short-term export credits, the formula recommended by Hyberg is sufficient (once adjusted for fees). These export credits are under less complex arrangements, and so the additional complexity of the Ohlin formula is not required. The Ohlin formula is used in this study for export credits over one year due to its ability to capture the different factors which affect the evaluation. The formula alone as it is usually cited is insufficient and must be adjusted by fees and down payments, as shown above. Clearly, the benefits of a lower interest rate will not be of any benefit for any part of the transaction which must be paid in advance as a down payment. The gross subsidy rate must be reduced by fees, relative to the total export credits, to give a net subsidy rate. The evaluation of export credits' effects on an importer's costs is undertaken by selecting values for these parameters which correspond to each exporting country's export credit programme and the market interest rate of the importer in question.

The present value method of estimating the subsidy rate need not result in a positive value and, in fact, should estimate a subsidy rate equal to or less than zero in the case where terms are equivalent to those provided by the market. If it is positive, the subsidy rate can be multiplied by the amount of export credits given to each importer for

How do parameters of the Ohlin formula affect the subsidy rate estimates?

Each parameter of the Ohlin formula has its own effect on the subsidy rate estimate. The complexity of the formula can prevent quick interpretation of what these effects are. In Table III.A.1, examples of subsidy rate estimates are shown for different parameter combinations. The column at left lists the different parameters which are then varied across the seven examples of the table. At the bottom of each example are the gross (before fees) and net (after fees) subsidy rate estimates. Net subsidy rates only are reported in the main text.

Table III.A.1. **How parameters of the Ohlin formula affect estimates**

Parameters	Example number						
	1	2	3	4	5	6	7
g Guaranteed rate	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
r Market rate	5.0%	7.5%	15.0%	7.5%	7.5%	7.5%	7.5%
T Term of the loan	2	2	2	2	2	4	2
a Payments per year	2	2	2	2	2	2	2
G Grace period	0	0	0	1	0	0	0
D Down payment	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%
Gross subsidy rate	2.9%	0.0%	10.8%	4.0%	2.6%	5.0%	2.9%
F Fee rate	2.0%	0.0%	2.0%	2.0%	2.0%	2.0%	2.5%
Net subsidy rate	0.9%	0.0%	8.8%	2.0%	0.6%	3.0%	0.4%

The first example is a two-year export credit with guaranteed rate 5% and a market rate of 5%. Clearly, there is no benefit as the guaranteed rate is not lower than the market rate, so the gross subsidy rate is equal to zero. Moving to the second example, the market rate is raised to 7.5%. Other characteristics of the export credit are a two years term , two payments per year and the fee equal to 2% of the value. The net subsidy rate of the second example is 0.9%. Using the second example as the basis of comparison, the reader can see the effects of a higher market rate relative to the guaranteed rate in the third example. The next example allows a grace period of one year, which raises the subsidy rate relative to that of the second example, whereas the fifth example introduces a down payment, reducing the subsidy rate as compared to the second example. The sixth example is identical to the second example except that the term is doubled, leading to a higher net subsidy rate estimate of 3.0%. The final example shows the effects of a higher fee (expressed as a per cent of the export credit value) on the net subsidy rate in comparison to the second example. Raising the fee by 0.5% lowers the net subsidy rate by 0.5%, but does not affect the gross subsidy rate estimate by definition (e.g. gross is before fees).

each commodity to give the subsidy element of export credits. The result is an estimate of the subsidy in relative or absolute terms, which can be aggregated for an exporter, an importer or an individual commodity.

The present value method has an intuitive appeal. Focusing on export credits in the form of guarantees and insurance, which account for the vast majority of export credits reported in the survey, the present value calculations indicate whether or not the importer's benefits from the favourable financing available with the guarantee is worth the fee. In other words, the fee is compared to the value of the financing conditions to determine if the guarantee is a "good buy" for the importer. The important elements of the financing are the spread in interest rates between the guaranteed rate and the importer's own, risk-bearing rate, as well as the length of the credit and other characteristics of the credit as shown in the formula above. An alternative method which is closely related to this method would be to compare the fee charged for the exporting government's guarantee with the fee charged for a commercial guarantee with the same financing conditions. In this approach, the commercial fee for the same guarantee could be directly compared to the fee charged by the government for its guarantee. This approach would replace the interest rate comparison, since the financing conditions must be identical to make the fees comparable. However, there are no data regarding commercial fees for a comparable guarantee. Moreover, since the commercial fee should be one that corresponds to a subsidy rate of zero, the alternative of using a comparison of commercial and government fees should produce the same results as a comparison of interest rates adjusted for fees (assuming that the data on

interest rates and fees correspond). As a last point, to take into account both the spread between the guaranteed and risk-bearing interest rates and the commercial fee would not be appropriate. The importer's financing costs due to its riskiness should not be counted twice in the calculation, so the choice must be made to either focus on the interest rate spread or the commercial fee. In the present study, the guaranteed rate is compared to the importer's discount rate, rather than comparing the government fee to a commercial fee for a guarantee on the same terms, due to data availability.

While intuitively appealing, present value calculations require data on the export credits by commodity and importer and details of programme operation. Most of the studies using present value calculations focus on the US' export credit programmes for which data on operation and allocation is readily available. For example, Hyberg *et al.* find that the subsidy element of US programmes for cereals, expressed in per cent of the loan value, averaged about 4% for wheat, maize and sorghum, 6% for barley and 7% for flour over 1979 to 1992, with wheat and corn receiving the majority of credits. Calculations by Johnson Dahl *et al.* (1995) give subsidy rates of US programmes for six wheat importers during the late 1980s and early 1990s in a range from 0.9% to 12.4%.

Alternative methods of evaluating export credits are available, but not useful for this study

Estimating the subsidy element of officially supported export credits for agriculture by option pricing is more recent and these efforts are more focused case studies. The calculation is more complex and is used to study variations in programmes to identify the impacts of various alterations or amendments. The basic formula follows (Dahl, Wilson and Gustafson, p. 9, 1995:2 or p. 7, forthcoming):

$$G(T) = B*e^{-rT}*\phi(x_2) - V*\phi(x_1),$$

where:

G	= market value of the guarantee	T	= the term
ϕ	= cumulative normal density function	V	= current asset value
B	= Strike or guarantee price	x1	= $\{\log(B/V) - (r + \sigma^2/2)*T\}/\sigma(T^{1/2})$
x_2	= $x1 + \sigma(T^{1/2})$	σ^2	is defined as the volatility of the asset

The authors describe this result as "the actuarially fair' premium an insured (importer/US bank) would pay for the insurance/guarantee" (Dahl, Wilson and Gustafson, p. 9, 1995). In other words, this formula calculates the export credit as valued in the market, from a crediting agency's perspective. This is not a calculation of an importers' benefit, which the authors state would require a different valuation. To this formula is added a similar formula to reflect any exchange rate guarantee. Additional elements, such as freight or insurance grants, can be added. In practice, some parameters are specific to the export credit programme and others are specific to the importer and data available, yet the authors lacked historic data from which to estimate some parameters, such as the volatility. The authors apply this formula to a single importer as a base study, selecting Pakistan. From the base case, they vary assumed market parameters and programme parameters to measure the sensitivity of the subsidy rate. More recent work extends this to examine the portfolio of US export credits (Dierson and Sherrick). In general, such research has focused on the exporting country government's perspective and do not often extend across more than one or a few importers due to difficulties evaluating parameters.

A third method which can be used to estimate the effects of officially supported export credit programmes for agriculture commodities is oriented to budget planning, but this is not employed in previous research for estimating the market effects. The US Office of Management and Budget (OMB) estimates a "subsidy rate" from the exporting organisation's perspective. The expected default rate, net recoveries, is combined with interest, fees and other characteristics to predict the costs of the programme to the government. For example, the fiscal year (FY) 1999 analysis of the budget reported a subsidy rate of 9.26% for FY 1998. This rate reflects the US government costs of operating the export credit programme, setting aside administrative costs.

This method cannot be used for estimating the market effects of export credits in the present study. The final OMB result published is an aggregate and may not be applicable for any given importer, as importers' particular credit-worthiness varies, nor for any particular commodity, as use across importers may differ from commodity to commodity. The budget based computation method rests in part on estimates of default likelihood for each importer, which should be related to the market risk spread. Hence there is some similarity to the present value calculations above as the spread is the difference between the market rate and the cost of capital. However, the degree to which the two methods will produce similar results depends on the degree to which the spreads of this study are related to the default likelihood estimates of the US government. In addition, differences may arise from the difference in perspective, in that the present study focuses on the importer whereas the US government calculations reflect the exporter's perspective. In short, the importers' present value evaluations of a future payment streams at a reduced interest rates may not match the US government's budgeted cost for the defaults on these credits based on its expectations of default discounted at the US government discount rate. In this case, the OMB budget-based computations are predictive, reflecting expected costs at the time of the transaction. This is fundamentally different from a backward-looking calculation from actual defaults.

It might be expected that the degree to which an export credit programme subsidises trade could be estimated based on historic performance (*e.g.* covering costs). Yet, in the context of the present study, this method is not useful. The actual default rate of loans after the transaction has no bearing on exporters or importers at the time the goods are sold and purchased. Also, the computation using defaults focuses on the budgetary implications to the exporting government which may or may not reflect the effect on importers' costs of acquiring officially supported export credits rather than private market arrangements. Moreover, such a measurement would require a long-term examination of export credit programmes. Analysis based on covering costs over a four-year sample, such as is available at present, would not be appropriate as it would not offer enough samples (even private institutions may face losses over a short time period) and the defaults would not be matched with the credits. As a last point, such budget-based evaluation would require careful consideration of how organisations granting export credits define costs. For example, do these organisations report costs of capital at government costs or at an interest rate which reflects the particular organisation's portfolio and consequent risk? In summary, the budget based method of evaluating export credits is not appropriate for this analysis given the present goal of evaluating market effects, nor is it even likely to be successful given the survey data upon which this study rests.

The present value method is the best choice in this case, but there remain difficulties

The Secretariat uses the present value approach in this empirical work. This approach has been frequently applied before across importing countries, unlike either of the other two approaches. Hence, it is a tested means of estimating the effect on many importers' costs. The other two methods presented both focus more on the credit granting organisation's costs. However, this is not the agent which either buys or sells the commodity. In order to determine the effects on world agricultural commodity markets, the present value calculations offer a better method to calculate how export credits affect the effective price the importer pays for buying a given agricultural commodity from the specific exporter at the time of sale.

Present value calculations rely on certain assumptions or simplifications. For example, banks may capture some portion of the calculated subsidy amount where any exists. Strong competition among financial institutions would justify the Secretariat's use of the subsidy rate in full. In this case, the banks would continue acting as intermediaries to the transaction without expecting higher fees or interest rates than normal. Indeed, it is expected that organisations operating export credit programmes will attempt to ensure that none of the subsidy element (if any exists) is captured by banks – the purpose of these programmes is to facilitate trade, not to subsidise banks. Also, the presumption underlying the method is that the importer plans to pay for the commodities at the time of import. For example, if the importer enters into the transaction with no intention of ever repaying the loan, then the effective price for that importer would be the up-front fees and down payment, if any. On the other hand, if an importer plans to repay but then defaults, then the importer's perceived cost at the time of the transaction is calculated by the present value method as described above. Whether such planned defaults occur and what proportion of total defaults are they represent is unknown. Still, if this is a real occurrence, then those export credits covering loans on which importers plan to default affect the market far more than those loans which the importer plans to repay. It is important to stress the requirement that the defaults be planned or intentional to merit special consideration, as it is only the planned defaults which can affect the importer's perceived costs. The conclusion is that the only instances in which defaults are expected directly to affect the decisions of agents in the markets are when they are planned by the importer at the time of the transaction.

Interest rate data

Guaranteed interest rates – what interest rate does the importer pay?

Present value calculations require a discount rate and a programme rate, the rate which results from having the credit, for every importer. The survey data report a large number of importing countries in each year. As described above, the discount rate is the market interest rate. In the case of export credits which operate as guarantees or insurance of private loans ("pure cover", which is the dominant case), the second rate required is the guaranteed rate. For this variable, past studies on US export credits in agriculture have generally used the London Inter-bank Offered Rate (LIBOR) plus 0.25%. The guaranteed rate in the present study is a weighted average of the risk-free interest rate and the market rate of the importer, with the weights determined by the level of guarantee offered by the specific exporter's programme. Here, the risk-free rate used is the US treasury rate in order to be consistent with the derivation of the interest rates (described below). Moreover, this choice is consistent with the usual assumption that the sovereign interest rates are used to represent the importers' interest rates. There is evidence that an additional mark-up above the risk-free rate for at least one export credit programme which implies that the guaranteed rate could better be represented by the costs of commercial financing from private banks. This may be due to mark-ups, perhaps to cover additional collection costs of the export credit programme, or due to financial institutions' ability to capture some part of the benefit, which cannot be observed in most cases and, therefore, cannot be represented in the data available at present. Rather than attempting to determine if it is appropriate to adjust the risk-free rate upward for all countries and then the amount of this mark-up, the assumption in the main calculations is that the

guaranteed rate is best estimated as the weighted average of risk-free and importer rates. A later section of the Annex explores the implications of using banks' costs of capital as a best possible guaranteed rate.

The decision to use the risk-free interest rate in the weighted average should be emphasised. This highlights the arguments of the recent WTO case, "Brazil – Export Financing Programme for Aircraft". One question raised therein is whether an exporter can offer pure cover (the form of export credits used by the Participants), such as guarantees, which competes against other countries with better credit ratings. The guarantee effectively moves a portion of the risk from the importer and onto the exporting country. Hence, if the exporting country has a low credit rating, then the guarantee may not reduce the interest costs of the importer by as much as if the exporting country had a very high credit rating. As argued by Brazil in the WTO case, not all countries have such low interest rates and an export credit in the form of a guarantee from a country with a lower interest rate will offer less benefits to the importer, all else equal. On the other hand, Mody and Patro suggest that, "mechanisms such as escrow accounts can be used to bolster the credibility of a guarantee, but they add to the cost of financing" (p. 121). There are no survey questions that would indicate whether or not such mechanisms are employed and the costs are not known. Nevertheless, the present study combines the risk-free interest rate with each importer's interest rate using weights determined by the level of the guarantee to estimate the guaranteed interest rate in the present value computations. Using the exporters' interest rates instead of the risk-free rate would result in higher guaranteed interest rates, particularly for those exporters with interest rates substantially higher than the risk-free rate, which would make export credits from these exporters less attractive to importers. The consequences for Korea and Hungary, in particular, are to decrease the subsidy rate estimates in 1998 if the exporter's interest rate (as estimated below) is used rather than the risk-free rate.

An example of calculating the guaranteed rate

One of the parameters of the calculation, the guaranteed rate, is computed from the market interest rates. For export credits which offer pure cover (guarantee or insurance), this is accomplished by taking the weighted average of the risk-free and importer's interest rates. The computation reflects the fact that the loan is backed by the government to the level of the guarantee and, therefore, is charged a lower interest rate for that portion. While this will not reflect the precise rates banks charge to importers, it serves as an approximation in the absence of exact data on the interest rates charged on each transaction. To supplement the description in the text, examples are given in the following table.

Table III.A.2. **Examples of the guaranteed rate calculation**

Per cent

	Example number						
	1	2	3	4	5	6	7
Risk-free interest rate	5.0	5.0	5.0	5.0	5.0	5.0	7.5
Importer's interest rate	10.0	10.0	10.0	10.%	15.0	7.5	10.0
Guarantee level (as a per cent of the loan)	98.0	95.0	90.0	85.0	90.0	90.0	90.0
Guaranteed interest rate	5.1	5.3	5.5	5.8	6.0	5.3	7.8

The first example is a guarantee of an importer with a 10% interest rate, where the level of guarantee is 98%. Given a 5% risk-free interest rate, this results in a guaranteed rate of 5.1% (*e.g.* 98%*5% + (100% – 98%)*10%). The second, third and fourth examples highlight the role of the guarantee level. As the exporter's government guarantees less of the total loan, the guaranteed interest rate increases, reflecting that a greater portion of the loan is priced at the importer's risk level rather than the exporter's. Examples five and six show the importance of the importer's market interest rate for a given guarantee level and should be compared to the third example. The final example shows the consequences of a higher risk-free interest rate. Note that the guaranteed rate is higher in this example as compared to example three.

Sources for market interest rates – past studies

The DAC calculates the grant element of official development assistance using an assumed discount rate of 10% or the concessionality level using a variable default rate based on a variable market rate. The 10% discount rate is found to be appropriate for the long-term loans which are common in development assistance and for DAC calculations which focus on the exporting countries' perspective. The FAO reviews of assistance specific to agriculture use the same discount rate. For the present study which is from the importers' perspective and addresses export credits on agricultural commodities, which are on shorter terms, the assumption of 10% is not deemed appropriate.

Studies more specific to agricultural commodities have generally focused on evaluating the US export credit programmes due to the greater availability of export credit data. Where these studies have been inclusive of all recipients of US export credits, the authors have faced the same difficulty of finding discount rates for loans of shorter length than those of official development assistance across many different countries. In general, these efforts can be separated into two parts: finding a credit rating of importers and mapping these ratings to market interest rates.

Different authors have met these data requirements differently. Skully uses two sources of ratings, Standard and Poor's Corporate Bond Yield Index and World Bank reports on the value of country debt in secondary markets. Skully directly applies unguaranteed credit ratings and extends these as ordinal measures to other countries. The mapping from credit ratings to interest rates is an amalgamation of three alternatives reported in *Euromoney Trade Finance Report*: Jardine Insurance Brokers' Financial and Political Risk, United Kingdom's Export Credit Guarantee Department premiums and Export Credits Clearing House Ltd.

Hyberg *et al.* use credit ratings for importers from *Institutional Investor* for most of the sample period, although Moody's, Standard and Poor's and Drexel Burnham Lambert ratings of sovereign debt in secondary markets are used for the final 1989-92 period. These are mapped to interest rates using relationships estimated from the US corporate debt credit ratings and interest rates. The data for this step are from Moody's, Standard and Poor's and Drexel Burnham Lambert, as these provide listings of credit ratings and corresponding interest rate indices. From this data, a risk premium based on the credit rating is estimated and adjusted for the shorter length of US export credits in agriculture, which are the subjects of the study.

Johnson Dahl *et al.* (1995) use interest rates from International Monetary Fund reports available at the time. As these interest rate data are not as broad as the list of importers receiving US export credits, they narrow their study down to only a select list of markets for US wheat exports. Diersen *et al.* consider using the same sources, but instead choose to use the data of Hyberg *et al.* which offer a more complete list of importers.

Studies using option-pricing evaluations must overcome or circumvent a different set of data problems, and so are excluded from the preceding review. Among those present value studies which span a range of importers, it is clear that there is no generally applied source of market interest rate data in these studies regarding construction of a mapping from credit ratings to interest rates. Several studies do use credit ratings from Moody 's, Standard and Poor's and *Institutional Investors*. Clearly, the goals to produce a database of prevailing interest rates should be the following:

- interest rate data which are as accurate as possible;
- interest rate data covering the different terms of the export credits in question;
- interest rate data for as many of the importers receiving export credits as possible.

No interest rate database listed above can claim to succeed in meeting all these points with perfection. Each study reports its methods, as described above. The present study benefits from access to studies and data to which none of the referenced studies had access. The result is a database which provides interest rate estimates for a long list of importers and terms, with the accuracy resting on the quality of the sources described below.

Similar credit rating information is used in the present study

The present study will use the same credit rating services as previous studies, drawn from *World Development Indicators*. That document provides credit ratings of several services, from which this study combines those of Standard and Poor's, Moody's, *Institutional Investor* and *Euromoney*. These credit ratings are first converted into an ordinal measure, then combined giving preference to Moody's and Standard and Poor's, then *Institutional Investor* and *Euromoney*. This method borrows from the method used by Kamin and von Kleist, extended to include the last two sources. The additional sources are required because the list of countries in the present study is greater than the list covered by Moody's and Standard and Poor's credit rating services. As *Institutional Investor* and *Euromoney* are set on a different scale than those of Moody's and Standard and Poor's, in each year a simple double-logarithm regression is estimated to build a link over those observations where they overlap, and this relationship is then applied to other observations. The preference given to *Institutional Investor* over *Euromoney* is arbitrary. The statistics of fit of the estimated linking equations are similar so there is no clear reason to favour one over the other.

There are several problems in this process to be noted. First, this relationship between credit ratings services may be imprecise because the observations reported do not quite match in dates, with the ratings of *Institutional Investor* and *Euromoney* reported preceding those of Standard and Poor's and Moody's by two to four months in the

secondary source. A related difficulty is that there are only three printings of *World Development Indicators*, so this can supply data only at certain points in time. The three data points are the end of 1996 in the first report, the end of 1997 and start of 1998 in the second and the end of 1998 in the third. The survey data begins in 1995, before the first edition of *World Development Indicators*. No other source of 1995 credit rating information is readily available for this list of importers. Another point to be noted is the application of an estimated relationship when combining credit rating services. This method provides a reasonable link which is independent of scale, but is not tested against alternative specifications. A final difficulty regarding the credit ratings is the small number of importers for which no credit rating is available in World Development Indicators. This is addressed by imposing a rating of Caa2 by Moody's nomenclature (CCC by Standard and Poor's ranking) on these observations as well as on export credits where the recipient is ambiguous (*e.g.* not specified or reported only as a regional aggregate), which is a more frequent difficulty than the preceding case yet continues to account for a relatively small share of the total.

A table at the end of this annex reproduces the importer list given in *World Development Indicators* and gives the composite credit ratings for the beginning and ending of 1998. These data are in the column labelled "base". The next column in each year shows the consequences of imposing a "best" credit rating of A2. The reason for placing a limit is found in the purpose of this study, not in any characteristic of the source material. In reality, of course, some of these importing countries in the data set are not the actual importer at all. Instead, private companies within the

An example of developing the composite credit ratings

World Development Indicators provides a list of countries which almost matches the list of export credit recipients. Thus, this source meets the requirement for this study that the interest rate database be complete in terms of the importers receiving export credits. However, none of the credit ratings services, as reproduced in the *World Development Indicators*, cover the full list of countries. As described in the text, this study combines the credit rating services giving preference to Moody's and Standard and Poor's rankings, then using *Institutional Investors* (II) and *Euromoney* (EM) rankings.

To combine the different credit rating services' evaluations, this study must overcome scaling problems. Moody's and Standard and Poor's are converted directly into a numeric scale on a one-to-one basis (*e.g.* AAA = 1, A2 = 6, B2 = 15; AAA = 1, A = 6, B = 15). This simple conversion is used in other work (Kamin and von Kleist; Cantor and Packer). The original scales of II and EM are on a scale with 100 being best. This scale is reversed (*e.g.* 100 – rating) so that zero is best. A double-logarithm equation linking these scales and Moody's are estimated for each year over those countries for which both gave a rating (Diersen and Sherrick).

The equations are shown below.

Table III.A.3. **Estimate link between credit rating services to increase coverage**

Tax		Credit rating source	
		Institutional investors	Euromoney
Beginning 1998	Equation	–3.62 + 1.473*LN(100-II)	–0.92 + 0.893*LN(100-EM)
	R-Squared	0.94	0.92
Ending 1998	Equation	–3.19 + 1.372*LN(100-II)	–1.01 + 0.846*LN(100-EM)
	R-Squared	0.84	0.88

Thus, for example, the World Development Indicators reports credit ratings at the end of 1998 for Albania (12.0 II and 13.8 EM), Argentina (Ba3 Moody's, BB Standard and Poor's, 41.8 II and 45 EM) Armenia (15.9 EM). Of these, Argentina's composite credit rating for this study is most straightforward: Moody's is used (*e.g.* Ba3). In the case of Albania, the II rating is used before the EM rating by assumption. The composite rating of Albania is computed by the following formula: EXP[–3.19 + 1.372*LN(100 – 12.0)] = 19.16. This rounds to 19 which is equivalent to a Caa3 on Moody's scale. For Armenia, the estimated equation relating Euromoney to Moody's is applied: EXP[–1.01 + 0.846*LN(100 – 15.9)] = 15.48. The rounded value is 15 which corresponds to B2 on Moody's scale. These results are reported along with the other countries listed in the *World Development Indicators* in a table at the end of the Annex.

country are importing under the export credit programme. However there is no distinction between country and private activity in the export credit data on a country-by-country basis. In other words, the total export credits to each importing country is listed without separately giving the amount going to private firms as opposed to organisations representing the country. For most importers, it is assumed that the country interest rate represents the average interest rate of importers in that country, including any imports on the country government's own account. Some countries possess a high credit rating, such as many OECD members. For these countries, it seems less likely that the credit rating of the country reflects the ratings of the importing agents, which are likely to be private firms. A limit on the credit rating of "average" (A2 by Moody's ranking or A by Standard and Poor's ranking) is assigned. In other words, rather than continuing to assume the importing country's credit rating is representative of the importing agents' credit ratings, a limit on the credit rating (or "best" rating) is imposed where the country's own ratings are extremely high. This is relevant due to the large share of export credits from one OECD country to another when most of these countries have extremely favourable credit ratings.

The table of composite credit ratings shows a third column for each of the two periods. This reflects the results of assuming a certain, relatively low credit rating (Caa2 in Moody's nomenclature) for countries for which no credit rating is found. This same assumption is applied to any country not found in *World Development Indicators* and also to any export credits for which no country is specified in exporters' survey data. The third column of this table is the input for the subsequent step of mapping credit ratings to interest rates, which are used in the subsidy rate estimates of the main text of this study.

A *new source provides a mapping from credit ratings to market interest rates*

Regarding the mapping from credit ratings to interest rates, a recent study (unavailable to the authors above) specifically estimates this relationship. Kamin and von Kleist (1999:1) begin their mapping with new bond and loan issues, arguing that these are more representative of a country's credit rating and interest rate than government bonds on secondary markets. The authors first convert credit ratings of Moody's and Standard and Poor's into ordinal rankings on a matching scale. These alternative sources are combined, giving preference to Moody's where there is overlap and the two services differ. The compiled ranking is used as one explanatory variable among several in then estimating the interest rate spread for each observation. The authors use annual dummies on both intercept and on the coefficient for the rating, the term and the term multiplied to the credit rating, currency dummies (*e.g.* yen, DM or other as opposed to USD), a bond versus loan dummy and a dummy if the credit rating is speculative (BB or lower in Standard and Poor's ranking). In short, the authors use the credit ratings and other available data to derive the relationship between credit ratings and contemporaneous interest rates.

Applying the regression results of Kamin and von Kleist poses difficulties, even though it provides precisely the mapping which is required. First is the difference in the dates of the data covered by each study. Kamin and von Kleist's sample ends in mid-1997, whereas the present study extends to 1998. In order to calculate the interest rates, the equation is extended to include all of 1997 and 1998. This is accomplished by means of updated parameters obtained by direct contact with the authors. The implications of these estimates, if not the values of the parameters, are reported in a second article (1999:2).

A second difficulty is in extending the original regression equation to cover a broader list of importers. The original work of Kamin and von Kleist did not include countries with credit rating below B- (by Standard and Poor's ranking). However, there are some countries with lower credit ratings. The regression equation is based on an ordinal ranking of credit ratings, so the computation is extended to include these countries with greater risk. For example, where the original work only extended to a ranking of 16 for a B-, this study simply continues by using a 17 for a CCC + and so on. The results are generally acceptable in that a worse credit rating continues to result in a higher interest rate. However, this does create one suspect pattern in the interest rates. The original study found that the length of the loan is less important for countries with worse credit ratings. In other words, as the number of years to maturity increases, the increase in the annual interest rate for a country with a bad credit rating is smaller than the change in the interest rate of a country with a good credit rating. When the regression equation is extended beyond Ca3 (ranking number 22), the result is that the difference in the annual interest rate no longer increases with the length of the loan for extremely risky importer. However, these importers are very uncommon recipients and this is only relevant for export credits of longer length.

Kamin and von Kleist include several dummies in their regression model which must be given a value in the present study. The currency dummies are set aside and export credits are assumed instead to operate on a US dollar basis. While switching to the currency of the exporter in each case might be preferred, the authors only provide information on three currencies directly. Also, the focus of the present study is on agricultural commodities, which are often quoted in US dollar prices. The Secretariat chooses to employ Kamin and von Kleist 's estimates for bond interest rates as opposed to those of loans. At first examination, switching to loans may seem more appropriate since export credits may be direct financing or guarantees on private financing. However, when presented with these results, an author of a previous study on export credits (Skully) observes that there is no way to know how many loans in Kamin and von Kleist's original data set are guaranteed or supported loans. When contacted, Kamin acknowledged that they did not control for loans provided under such conditions. In order to find the discount rate appropriate for

Applying the updated parameters to estimate the interest rate spreads

In order to estimate the 1998 interest rate spreads, the Kamin and von Kleist study estimates are updated through direct contact with the authors. The equations used to generate the mapping are best described in the original paper; this report cannot reproduce their description of the data and logic supporting their study. However, using the parameter definitions of the original work, the updated parameters are reproduced here with permission from the author. The equation to estimate the logarithm of the annual spreads, in basis points, takes the following form in the relevant periods:

1998Q1: $+ 1.9228 + 0.222*\text{Rating} + 0.0419*\text{Rating}*D_{\text{Spec}} + 0.7692*\text{LN(Term)} - 0.2486*\text{LN(Term)}*\text{LN(Rating)} + 1.3142*D_{98Q1} - 0.075*D_{98Q1}*\text{Rating}$

1998Q4: $+ 1.9228 + 0.222*\text{Rating} + 0.0419*\text{Rating}*D_{\text{Spec}} + 0.7692*\text{LN(Term)} - 0.2486*\text{LN(Term)}*\text{LN(Rating)} + 2.0485*D_{98Q4} - 0.086*D_{98Q4}*\text{Rating}$

As examples of applying these mappings, first consider an importing country with a rating of A2 in 1998Q1 over a 2.5 years term. Thus, the numeric rating (6) and the term (2.5) are substituted into the first equation. Note, that the speculative dummy takes a value of zero as a ranking of A2 is better than Ba1. The logarithm of the spread in basis points will be:

Spread 1: $+ 1.9228 + 0.222*6 + 0.0419*6*0 + 0.7692*\text{LN}(2.5) - 0.2486*\text{LN}(2.5)*\text{LN}(6) + 1.3142*1 - 0.075*1*6 = 4.416$

Taking the exponent and converting into per cent terms gives a spread estimate of 0.83%. This spread is added to the risk-free (US treasury) rate for the same term to give an annual interest rate on USD-denominated debt of 6.28%. The second example provided here is an importer with a credit rating of Caa2 (numeric rating 18), which is speculative, and a term of 1.5 years. Applying this to the second formula above gives the following value:

Spread 2: $+ 1.9228 + 0.222*18 + 0.0419*18*1 + 0.7692*\text{LN}(1.5) - 0.2486*\text{LN}(1.5)*\text{LN}(18) + 2.0485*1 - 0.086*1*18 = 7.194$

To find the value of the spread in per cent terms, the exponent of the value is taken and divided by 100. The result is a spread of 13.3% in this example spread. Again, adding the risk-free rate for 1.5 years gives an estimated annual interest rate for USD-denominated debt of 17.7% for this Caa2 rated importer in the final quarter of 1998.

each importer, the bond rate is chosen in this study. In the updated work, the authors supply only the bond rate parameters.

The formula for calculating the interest rate spread is applied to each importer's credit rating for maturities of 0.5, 1.5, 2.5 and 3.5 years. These correspond to the categories of the data of less than 1 year, 1 to 2 years, 2 to 3 years, and over three years, respectively. This will tend to over-estimate the value of export credits on terms of less than the midpoint of their category (*e.g.* it will overstate the subsidy rate estimate of an export credit of three months by evaluating it as though it were of a 6 month term). On the other hand, using the midpoint will tend to under-estimate the value of export credits of term greater than the midpoint. Since this provides only the interest rate spread due to risk, the spread is added to the risk-free rate used in the Kamin and von Kleist study, which is the annual US treasury rate (as drawn from the US Federal Reserve web site). The relevant US treasury rate data are for 6 month, one year, two year, three year and five year terms, all annualised. The six month rate is used for the 0.5 year term in this study, obviously, and the simple average of the two nearby rates for each of the other terms. For example, the 1 year and 2 year are averaged to give the 1.5 year rate, the 2 and 3 year for the 2.5 year rate and the 3 year and 5 year to give the 3.5 year term risk-free rate. Better accounting of the yield curve would not change these approximations very much, as the annual rates are quite similar for nearby terms, at least in the periods used in this study.

The interest rate database is constructed as described above to produce annual interest rates for importers' USD-denominated financing. This is an extremely important element of the study since it is the difference between these rates and the guaranteed interest rate which is required in estimating the subsidy rate. The complete set of data is extremely large, covering a long list of importers and several alternative lengths. However, given the importance of these data, the mapping is presented in Table III.4. This shows explicitly the results of adding Kamin and von Kleist's estimated spreads to the risk-free rate. Moreover, the interest rate of this study for any importer can be found using this table and the table of composite credit ratings at the end of the annex. For example, the estimated interest rate of Zimbabwe in 1998Q1 for a 1.5 year term is found by taking its credit rating of 1998Q1 from

Table III.A.3, which is Ba3, and then mapping that rating to the interest rate of a 1.5 year term in Table III.A.4 to get 8.5%. By the same logic, the estimated interest rate for an importer in Australia in 1998Q4 with a term of 0.5 year can be found. (*Note*: by assumption this is not equal to the government's interest rate.) The composite credit rating at far right in Table III.A.8, which is A2, is mapped to the interest rate below, which is 5.4%.

Table III.A.4. **Estimated mapping from credit ratings to interest rates**

Composite credit rating	Estimates of 1998, Q1				Estimates of 1998, Q4			
	Term of the financing, in years				Term of the financing, in years			
	0.5	1.5	2.5	3.5	0.5	1.5	2.5	3.5
(*Moody's scale*)	(Annual interest rates in per cent)							
A2	5.7	6.1	6.3	6.4	5.4	5.8	6.0	6.2
A3	5.8	6.2	6.4	6.5	5.6	5.9	6.2	6.4
Baa1	5.9	6.3	6.5	6.6	5.8	6.1	6.4	6.6
Baa2	6.1	6.4	6.6	6.7	6.0	6.4	6.6	6.8
Baa3	6.2	6.6	6.8	6.9	6.3	6.6	6.9	7.0
Ba1	7.1	7.6	7.8	8.0	7.8	8.4	8.8	9.1
Ba2	7.5	8.0	8.3	8.5	8.5	9.2	9.5	9.8
Ba3	8.0	8.5	8.8	9.0	9.3	10.0	10.4	10.7
B1	8.6	9.1	9.4	9.6	10.4	11.1	11.5	11.8
B2	9.3	9.9	10.2	10.4	11.6	12.3	12.7	13.0
B3	10.2	10.8	11.1	11.3	13.1	13.8	14.2	14.5
Caa1	11.3	11.9	12.2	12.3	14.9	15.6	16.0	16.2
Caa2	12.6	13.2	13.4	13.6	17.0	17.7	18.1	18.3
Caa3	14.2	14.7	15.0	15.1	19.6	20.2	20.5	20.7
Ca1	16.2	16.6	16.8	17.0	22.8	23.2	23.4	23.6
Ca2	18.6	18.9	19.1	19.1	26.5	26.7	26.9	27.0
Ca3	21.5	21.6	21.7	21.7	31.0	31.0	31.0	31.0
US *Treasury Rate*	5.3	5.3	5.4	5.5	5.5	4.5	4.4	4.4

Note: Importer interest rates are estimates – not observed interest rates. Spreads are estimated based on Kamin and von Kleist, using the appropriate credit rating and term for each entry. The base interest rate to which spreads are added is the US Treasury rate, which are simple averages of rates from the US Federal Reserve web site.
Source: OECD Secretariat.

This interest rate database is used in this study and is an important element in determining the subsidy rate estimates. The database is a compromise across the three goals shared by this and previous studies of the same nature. Regarding accuracy, this method depends on the link between contemporaneous credit ratings and interest rates. It is important to note that this does not depend on the predictive ability of credit rating services, but only on the fact that they tend to move with contemporaneous interest rates. While credit ratings may or may not reliably predict changes in interest rates, the only question for this work is whether credit ratings and market interest rates move alike over quarterly or even annual data. The original Kamin and von Kleist study reports an adjusted R-squared of 0.82 (for the corresponding equation). Work by Cantor and Packer also report strong correlation between ratings and market rates. Thus, while there will be an element of error introduced by this step, the estimates are likely to be fairly accurate and there should be no bias.

The other criteria of the interest rate database are wide coverage across both terms and importers. By using the estimated equation of Kamin and von Kleist, the rate for any term (*e.g.* 0.5, 1.5, 2.5 and 3.5 years) can be estimated in a manner which should be consistent with the credit rating of the importer and the yield curve prevailing during the sample period, tailored to the time period in question using the appropriate dummy variables. The coverage over importers offered by this method is quite good and superior to most preceding studies of this type. The *World Development Indicators* presents a long list of countries' credit ratings whose interest rates can then be extrapolated based on Kamin and von Kleist's equation estimates. At least at present, an alternative database of interest rates which can provide such wide coverage across both terms and importers is not available.

Testing the sensitivity of subsidy rate estimates to the interest rate data

The interest rate estimates are intended to be as accurate as possible and as complete as required for the purposes of the present study. However, there are legitimate arguments that the interest rates allow an additional

element of error beyond the survey data (discussed below). First, they are derived from an estimated contemporaneous relationship between credit ratings and interest rates. The original credit ratings may contain errors and the estimated link also has statistical errors although, as already discussed, the original study reports good statistics of fit. Nor is there reason to expect a bias in these errors. No less serious are questions about certain assumptions required to apply these interest rate data in the context of the present study. The survey data are not always reported on a calendar year basis and the export credits are given at a particular point in time during a given year, so the interest rate link selected may allow some additional error to the extent that the interest rates change between the time of the transaction and the timing of the interest rates of this study. In addition, some Participants did not report the recipients of all their export credits in the survey, thus requiring some assumption regarding the credit rating of these importers, as well as the smaller amount of export credits going to importers for whom no credit rating is available, in order for the study to be inclusive and so that the fee data and export credits are consistent. In other words, there are reasons to expect an element of unbiased error in the supporting data used in the present value calculations.

There are arguments that the error may contain a bias which would then cause a bias in the subsidy element calculations. Calculated interest rates based on sovereign credit ratings are used to represent importers' interest rates and the risk-free rate. This assumes that the importing agent is the sovereign state. (The exceptions are importers which have very good credit ratings, in which case it is assumed that the actual importer is not likely to be the government and is not likely to be well represented by the government 's credit rating.) In applying this assumption in cases where the importer's credit rating is relatively poor, accuracy will not be diminished as long as the sovereign is the actual importer or, alternatively, that the sovereign interest rates closely approximate those of any private importers. If the importer is in fact not the importing country government but rather a firm and, furthermore, the actual risk of the importer is not well represented by the sovereign country's credit rating, then additional error will be introduced. Moreover, if it is the case that the importing agents in high-risk countries generally are not the country government and if these agents tend to be more risky than the government, then this would introduce a biased error and the estimates reported in the main text could tend to understate the actual subsidy element. However, it should also be recognised that if the importing agent is in fact a private agent, then there may also be competition among multiple private importers. In this case, if competition is as intense in the import market as in the export and banking markets, then a substantial portion of any benefits to be gained by the programme may be lost as importers bid the benefits away. Thus, it is not altogether clear whether allowing for private importers would bias the results of this study, even if data were available to indicate the extent to which this does occur. In practice, the survey data do not provide any information about the importing agent and, even if this information were known, the interest rates of private agents may not be available.

On the other hand, there is evidence that some portion of the calculated benefits are not received by importers as banks are able to charge a higher than expected rate. If banks' opportunity costs of capital are considered to be the best rate that importers can achieve even with a government guarantee, then it might be argued that the minimum rate at which they would loan money is correspondingly higher than the guaranteed rate calculated in this study. If true for all countries and incorporated as an element of this analysis, this would require that the opportunity cost of capital for banks serve as the lowest possible guaranteed rate. Thus, following the method of past researchers who have focused on the US export credit programmes, the current study could apply LIBOR plus 0.25% as the best possible guaranteed rate for all exporters. The impact of this possibility is explored in the sensitivity analysis below.

It is accurate to state that the subsidy rates of the main text are empirical estimates based on imprecise survey and interest rate data. While efforts are made to prevent errors and especially biases, the subsidy rate estimates are not and cannot be exact. This raises the question of how sensitive the results are to the interest rates, which is examined in Table III.A.5 and discussed below.

The base case reported in Table III.2, which represents the results using interest rate estimates following the methods of Kamin and von Kleist as evaluated for the beginning of 1998, are reproduced in Table III.A.5. The first experiment is to use the banks' costs of capital, assumed to be LIBOR plus 0.25%, as the best possible guaranteed rate. In this case, the degree to which the net benefits of the export credit programmes are passed on is reduced. The benefits to importers would be reduced by new processing or collection costs specific to the export credit or by banks capturing part of the subsidy element. The results show the average reduction in importers' costs falls to about 2% and the rates of many exporters become negative. However, the general conclusions hold as the subsidy rates of several countries remain positive and the US continues to account for the majority of the distortion.

The effect on the subsidy rate estimates of a different spread as measured by the Ohlin formula has been noted (*e.g.* compare examples 2 and 3 of Table III.A.1). On the other hand, the implications of a systematic bias on the calculations over all exporters, all importers and all lengths of export credits is less clear. To investigate the sensitivity of the subsidy rate estimates to the spreads over the risk-free interest rate, the subsidy rate estimates have been repeated for different interest rate spreads in Table III.A.5. For example, the effects of narrower spreads (*e.g.* less of an increase in interest rates as risk increases) are reported. The results show that the subsidy rate estimates for every export credit programme would be lower, as expected if the interest rate spreads are reduced. This experiment is performed first by reducing the interest rate spreads by a fixed one per cent and then by reducing them proportionally by 10% – in that the spread itself is multiplied by 0.9. In the case of the fixed change, the average

Table III.A.5. **Sensitivity of subsidy amount and rate estimates to interest rates**

	Base case		Limit guaranteed rate	
	(Start 98)		(LIBOR + 25)	
	Amount	Rate	Amount	Rate
Australia	1.6	0.1	–3.7	–0.2
Austria	0.0	0.0	0.0	–0.3
Belgium	0.2	0.1	–0.2	–0.2
Canada	8.3	0.7	4.6	0.4
Finland	0.1	0.3	0.0	0.0
France	8.2	2.5	6.5	2.0
Germany	0.0	0.7	0.0	0.5
Greece	0.0	–0.4	–0.1	–0.7
Korea	0.1	0.1	–0.1	–0.2
Netherlands	2.2	0.5	1.2	0.3
Norway	0.0	2.8	0.0	2.8
Spain	4.6	0.6	1.6	0.2
United States	191.2	4.9	152.0	3.9
Total	216.3	2.6	161.8	1.9

	Base case		Narrower spreads				Wider Spreads			
	(Start 98)		Fixed		Proportional		Fixed		Proportional	
	Amount	Rate	Amount	Rate	Amount	Rate	Amount	Rate	Amount	Rate
Australia	1.6	0.1	–5.3	–0.3	0.9	0.1	8.5	0.5	2.4	0.2
Austria	0.0	0.0	–0.1	–0.5	0.0	–0.1	0.0	0.4	0.0	0.0
Belgium	0.2	0.1	–0.4	–0.3	0.1	0.0	0.9	0.6	0.4	0.2
Canada	8.3	0.7	3.1	0.3	7.0	0.6	13.3	1.2	9.5	0.9
Finland	0.1	0.3	0.0	–0.1	0.1	0.3	0.2	0.8	0.1	0.4
France	8.2	2.5	5.5	1.7	7.1	2.2	10.8	3.3	9.2	2.8
Germany	0.0	0.7	0.0	0.3	0.0	0.6	0.0	1.1	0.0	0.8
Greece	0.0	–0.4	–0.1	–0.8	0.0	–0.4	0.0	0.0	0.0	–0.3
Korea	0.1	0.1	–0.2	–0.3	0.0	0.1	0.3	0.6	0.1	0.1
Netherlands	2.2	0.5	0.6	0.1	1.8	0.4	3.7	0.9	2.5	0.6
Norway	0.0	2.8	0.0	2.5	0.0	2.6	0.0	3.2	0.0	3.1
Spain	4.6	0.6	0.7	0.1	4.0	0.5	8.4	1.1	5.1	0.6
United States	191.2	4.9	138.3	3.5	171.2	4.4	242.8	6.2	210.9	5.4
Total	216.3	2.6	142.2	1.7	192.2	2.3	288.8	3.5	240.1	2.9

Note: Subsidy amounts are in millions of USD. Subsidy rates are in per cent terms.
Source: Calculations are by the Secretariat. The base case corresponds to the interest rate estimates at the start of 1998. The subsidy rate estimates are recalculated with a minimum guaranteed rate of LIBOR + 25 basis points imposed. These rates are then recalculated to test the sensitivity with respect to the interest rate spreads.

subsidy rate of all these exporters falls to 1.7% and many are negative. Again, subsidy rate of the US remains positive, but falls below the levels of past studies. Similar results follow in the case that interest rate spreads do not increase as quickly as estimated by Kamin and von Kleist. In the case of a proportional decrease in interest rate spreads, the average subsidy rate estimate falls to 2.3% and subsidy rate estimates of more countries remain positive.

The case in which the risk-related interest rate spreads are wider than estimated using the method of Kamin and von Kleist is reported at the right side of Table III.A.5. Again, the first method is a fixed 1% decrease. As expected, all export credits are estimated to have a greater subsidy rate. In fact, with the slightly wider spreads, no negative subsidy rates are estimated and the average is 3.5% across all these exporters. The US subsidy rate estimate of 6.2% is higher than comparable studies would indicate, but is closer to the rates estimates which correspond to the interest rate estimates of the end of 1998, as reported in the main text (Table III.2). The proportional increase in interest rate spreads shows the consequences of a proportional increase (in which the spread is multiplied by 1.1). In the final experiment, the average subsidy rate estimate is 2.9% and, the US subsidy element estimate continues to account for the majority.

In conclusion, the interest rate database is an extremely important element underlying the subsidy rate estimates of this study. Table III.A.5 shows the sensitivity of the subsidy rate estimates to the interest rates. The main results of the main text remain valid even under these conditions. Namely, several countries continue to have a

positive subsidy rate estimate and the US continues to account for the majority of the distortion caused by export credits, followed by France and Canada. That said, the estimates of Table III.A.5 should not be considered to be more reliable than those of the main text. As this study is empirical, it does contain an element of error due to data limitations in the original survey and in the construction of interest rate data, as well as in the assumptions required to complete this study. However, efforts have been made to minimise these errors and to avoid any bias in the subsidy rate estimates of the main text.

Details of the survey by the Participants to the export credit arrangement

In April 1999, the Agriculture Directorate of the OECD presented the goals of the present study to the Participants to the Export Credit Arrangement (the Participants), who are undertaking the negotiations for an Arrangement governing the use of officially supported export credits, at the OECD. At that time, the Participants agreed to reissue a survey to update confidential data on the application of export credits [Annex 1, TD/CONSENSUS(99)AGRQUEST]. Additional, optional questions were included with the goal of aiding the empirical analysis [Annex 2, TD/CONSENSUS(99)AGRQUEST]. Most responses were received prior to a delayed deadline of August 1999. The Agriculture Directorate and Trade Directorate of the OECD offered updates of the process and added subsequent questions to clarify the initial response. Most of these questions focused on details of the data or apparent omissions in the text. Some questions were still outstanding at the time of the first draft of this study. Subsequent to that draft many Participants issued clarifications or revisions to their data, as well as corrections regarding the entry of the data in the database or the draft report. The revisions have sometimes lead to further questions to clarify the new data, which are later answered. The data, having evolved over the course of more than one year through such an iterative process, is described below.

The survey data are confidential, although Participants in April 1999 allowed the present study to use these data. The justification for confidentiality is that even past export credits are commercial secrets. As such, discretion is used in the present study to avoid reporting any specific transaction from a given exporter to a particular importer. Instead, aggregated or processed data are reported.

Commodity groups of the survey

The commodity group definitions are defined with detail in the note to Annex 3 of the questionnaire. These are "based on Chapters 1 to 24 of the customs co-operation Council's Harmonised Commodity Description and Coding System ('The Harmonised System')". The commodity groups of the survey are given as follows:

Group 1 Live animals: animals products (not including breeding cattle). Chapter 1 to 5.
Group 1 (a) – Breeding cattle
Group 1 (b) – Fresh, chilled or frozen meat
Group 1 (c) – Dairy products
Group 1 (d) – All other products in Group 1

Group 2 Vegetable products (not including cereals). Chapters 6 to 9 and 11 to 14.
Group 2 (a) – Wheat flour
Group 2 (b) – Barley malt
Group 2 (c) – Oilseeds
Group 2 (d) – All other products in Group 2

Group 3 Cereals. Chapters 10.
Group 3 (a) – Wheat
Group 3 (b) – Rice
Group 3 (c) – All other products in Group 3

Group 4 Animal or vegetable fats and oils and their cleavage products; prepared edible fats, animal or vegetable waxes. Chapters 15.
Group 4 (a) – Vegetable oils
Group 4 (b) – All other products in Group 4

Group 5 Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes. Chapter 16 to 24.
Group 5 (a) – Protein meals
Group 5 (b) – All other products in Group 5

Group 6 Rawhides and skins. Chapter 41, items 41.01 to 41.03.

Group 7 Wool, fine and coarse animal hair.
Chapter 51, items 51.01 to 51.02 or 51.01 to 51.05;
a decision will need to be made at which point this commodity group ceases.

The commodity groupings are important in understanding the results and in understanding the present study's limitations. The commodity groupings correspond to the aggregates chosen in reporting the results of the analysis in the main text. In addition, the commodity groupings make a subsequent incorporation of the calculated subsidy rates

or amounts in Aglink, the Secretariat's partial equilibrium model representing OECD agricultural commodity markets, difficult. The analysis of export credits' subsidy rates (if any) allows comparison against traditional export subsidies, but do not directly provide measures of the extent to which world markets are distorted (if at all). However, the commodity groups of the survey do not correspond to the aggregates used in the Aglink model. Hence, a second step of investigating the effects of export credits on world markets cannot be undertaken across a broad listing of products, without applying miss-matched commodity definitions. Nevertheless, an example regarding world wheat market effects is presented in the main text.

Difficulties experienced in compiling the survey responses

The survey process is not without difficulties. First, not all countries replied in a manner consistent with the questions due to difficulties compiling the data. For example, Spain's data did not specify both importer and length together. Instead, totals by length are supplied separately from individual importer transactions. For this study, the share of each length is applied to each importer. In 1998 data, Spain reports that 97.39% of export credits are for less than one year, a very small amount are of term from 1 to 2 years and the remaining 2.60% are from 2 to 3 years. Hence, for every importer, 97.39% of the export credits is placed in the less than one year category, 0.01% in the 1 to 2 year category and the remaining 2.60% in the 2 to 3 year category. Similarly, Australia reported the commodity groups and importers separately, so the average distribution across groupings is applied to each importer. While not satisfactory, these steps do enable us to evaluate Spain's export credits and to attribute Australia's subsidy equivalent (if greater than zero) by commodity.

Participants may not share a uniform definition of export credits in their survey responses. For example, it is not specified whether data are on CIF or FOB basis. Perhaps of greater significance, accounting practices may differ as, for example, some countries report negative export credits. The Netherlands and Belgium responded to follow-up questions regarding these negative values to indicate that these are caused by revisions to early estimates. No such follow-up question has been presented to Australia, but the negative value is small and isolated. Nevertheless, this highlights the fact that the responses of the Participants to this survey differ in that they may not all use the same method of counting export credits.

It should also be noted that some countries report more data than is used in the present study. Belgium provided excellent detail on export credits with defaults and fees listed by importer. The US provided a more detailed description of commodities receiving guarantees. However, while such detailed information is valuable, it is ignored in the current study. Instead, an effort is made to standardise the data to facilitate the analysis, even at the expense of some information which may increase accuracy regarding certain countries' programmes.

It should be noted that internal rules of the EU are designed to prevent distortions from export credits on the common market. Thus, in the context of global commodity markets, these are unlikely to have an effect even taking into account competition between EU members and non-members within the EU common market (*e.g.* competing exporters, one being a EU member and the other a third country, to an importer which is a EU member). In the present report, EU competition rules are assumed to succeed in prohibiting subsidy elements in export credits among members, so these data are excluded where possible. However, few EU members provided fee data which exclude intra-EU trade. Thus, to prevent a bias in the estimates, in many cases intra-EU trade must be applied to the subsidy rate calculations.

The data of Hungary presented unusual problems. First, two organisations in Hungary reported export credits, whereas all other countries provided a single response. While this is not a problem, it does explain the two entries for Hungary in subsequent tables, where "Hungary (E)" refers to the Hungarian Eximbank and "Hungary (M)" refers to MEHIB. The totals of the main text represent the sum over both organisations' export credits. A second, more substantial problem prevented analysis of the export credits provided by MEHIB. The reply from this organisation did not provide lengths of the export credits. Thus, these cannot be evaluated in the context of this report, as it is unclear what interest rate should be applied. The third problem prevented analysis of the export credits from the Hungarian Eximbank and reflects a peculiarity of this export credit programme. Whereas all other export credit programmes offer guarantees or insurance, the Hungarian Eximbank provides export credits in the form of official financing support. The relevant survey question does not provide enough information regarding what interest rates are charged on for official financing support to allow this programme to be evaluated. Thus, the subsidy rates of the export credit programmes operated by Hungary are not estimated in this report.

Summary of the characteristics of officially supported export credit programmes

Key information necessary for this empirical work is drawn from the survey of export credit use undertaken by the Participants to the Export Credit Arrangement. Again, of course, the focus is on officially supported export credits. This information includes the use of export credits, as summarised in the main text, and details on how these programmes are operated. Table III.A.6 and Table III.A.7 report the values used for parameters of the calculation formula. These are the average guarantee rate (the share of the loan which is covered), fee, grace period, down payment requirement (if any) and the number of payments per year. The rate of net claims is also included in the table. However, it should be noted that the net claims (or defaults less repayments) may or may not include whatever

Table III.A.6. **Parameters from survey data: fees and net defaults in 1998**

	Absolute amounts reported			As rates	
	Fees	Net defaults	Export credits	Fees	Default
	Millions of the specified currency			Per cent	
Australia	10.40 AUD	6.80 AUD	2 467.3 AUD	0.4	0.3
Austria	0.07 Euro	0.00 Euro	10.758 Euro	0.7	0.0
Belgium	47.35 BEF	26.28 BEF	5 606 BEF	0.8	0.5
Canada	5.90 CAN	8.70 CAN	1 643.5 CAN	0.4	0.5
Finland	No data	0.13 FIM	144.67 FIM	n.a.	0.1
France	2.78 USD	0.00 USD	330 USD	0.8	0.0
Germany	0.00 DEM	0.00 DEM	0.678 DEM	0.3	0.0
Greece	19.09 GRD	0.00 GRD	2 409.3 GRD	0.8	0.0
Hungary (E)	0.00 SDR	Rate provided	10.03 SDR	0.0	2.0
Hungary (M)	0.23 USD	0.00 USD	4.99 USD	4.6	0.0
Korea	82.00 KRW	17.00 KRW	64 915 KRW	0.1	0.0
Netherlands	2.10 NLG	2.56 NLG	815.95 NLG	0.3	0.3
Norway	Definitions do not match		4.1473 NOK	n.a.	n.a.
Spain	107.07 ESP	No data	117 409 ESP	0.1	n.a.
United States	18.80 USD	4.70 USD	3 929.3 USD	0.5	0.1

Source: Survey data from the Participants to the Arrangement. Rates are calculated as the ration of fees and net defaults to total export credits.

Table III.A.7. **Other parameters from survey data in 1998**

	Level of guarantee (per cent)	Grace period[1] (years)	Down payment[2] (per cent)	Payments per year[1] (number)
Australia	95	0	0	1
Austria	90	0	15	2
Belgium	92.5	0	0	1
Canada	95	0	0	2
Finland	90	0	0	2
France	95	0	0	2
Germany	87.5	0	15	2
Greece	85	0	0	1
Hungary (E)[3]	n.a.	0	15	2
Hungary (M)	90	0	0	2
Korea	95	0	0	1
Netherlands	82.5	0	0	2
Norway	85	0	0	1
Spain	99	0	0	1
United States	98	0	0	1.5

1. Only applied where the term of the credit is at least one year.
2. Only applied where the term of the credit is at two years in the case of Austria and Germany.
3. The Hungarian Eximbank reports official financing support, thus the question relating to the level of guarantee is not applicable to their programme.

Source: Survey data from the Participants to the Arrangement.

portion of the claims are forgiven or repaid by other government agencies of the exporting country rather than the importing agent.

The fees and net claims are expressed as rates, with derivations for 1998 data shown in Table III.A.6. The total level of each is taken from the survey responses and then divided by the total export credits in the given year. In the case of fees, the fee rate has direct implications for the results. As noted in the discussion of the present value calculation method, the fee must be subtracted from the gross subsidy rate to estimate the net subsidy rate, as this is a cost incurred in making the transaction. The implicit assumption is that the fees associated with the export credit are paid by the importer, just as the importer benefits from the favourable financing rather than the exporter. This is consistent with the assumption of competitive world markets in that, if the importer attempted to push these fees on the exporter, the exporter would not view the transaction favourably as compared to a sale without these fees.

Similarly, a bank is considered unlikely to pay such fees given that alternative uses of capital at similar risk but without such fees are likely. On the other hand, if the fees could be delayed as part of the export credit, then the full fee should not be subtracted, but rather the present value of the fee should be subtracted (discounted at the importers' rate). However, the survey data do not indicate whether or not fees may be deferred. The present study applies the annual average fee across all importers rather than a fee specific to the importer. Consequently, the fees assumed are not correlated to the risk. Thus, a low-risk importer's subsidy rate net fees may be estimated lower than would be the case if that importer paid a lower than average fee. A high-risk importer's subsidy rate is likely, however, to be over-estimated in the present study if the export credit programme charges high-risk importers a higher than average fee. This may bias the rate following an attempt to disaggregate the results, but does not affect the subsidy rate estimate across all importers (*e.g.* there is no bias created in the total programme subsidy rate estimates reported in the main text).

Country responses to the survey did not always provide the information required for this empirical study. For example, Finland did not report any fees. Spain did not supply net claims. Norway reports total fees and net defaults for its entire programme, rather than only the fees and net defaults associated with the commodities of the survey, so comparisons would bias the rates substantially. Austria's response similarly reported fees covering a broader definition of activities than the export credits, but an alternative was later offered for 1998 which better matches the export credits reported in the survey. Indeed, the same concern of unmatched data may apply to other responses, although the fee rates are reassuringly similar across countries. Where a country did not provide information, the empirical work proceeds based on the assumption of a zero value for the parameter in question. Ignoring these missing data, the simple average fee rate in 1998 across these countries is 0.8% and the simple average net default rate is 0.3%.

Table III.A.7 shows other parameters drawn from the survey for use as parameters in estimating the subsidy rate. This table shows data only for those countries which had active export credit programmes during 1998. The level of guarantee, at left, is the average per cent of the value which is guaranteed or insured by the government. In some cases, Participants indicated in their response that their level of guarantee may vary. In particular, some state that they are willing to guarantee a greater share of the political risk, as opposed to the commercial risk. This study does not differentiate the sources of risk either in terms of the level of guarantee, nor in the interest rate database (*e.g.* spreads are not disaggregated into different components of risk). While a more precise disaggregation may improve the results, the levels of guarantee of those few countries which stated the rates for political and commercial risk are not far apart. Another potential form of guarantee which is not included here is insurance against exchange rate risk. The credit ratings should account for the possibility that a currency change may affect the probability of an importer to meet its dollar-denominated obligations. However, there is no provision in this study for export credits which are denominated in a volatile currency of a particular importers and which, consequently would have very uncertain expected payouts. An export credit offering insurance against exchange rate risk in this case would offer an added benefit which is not included in the survey data nor in the present study. Finally, export credits provided by the Hungarian Eximbank take the form of officially financing supported, explaining the entry of "n.a." for the guarantee level.

The other columns of Table III.A.7 show other parameters drawn from the survey. The second column of data shows the grace period for export credits over one year in length. No Participant reports a grace period. The third column of data shows the down payment. The survey response of Austria indicates that this is applied only to export credits of over two years and the same is indicated by Germany in direct communication. The last column of data shows the payments per year. This is also only applied on export credits of length greater than one year. The values shown in Table III.A.7 are only those of 1998 and, in some cases, the survey data in previous years may be slightly different.

The simple averages of the parameters Table III.A.7 offer some indication of the level of these programme parameters across countries. The simple averages of these countries' level of guarantee is 91% and the average payment per period for export credits over one year is 1.6. The average grace period is zero and the average down payment would be small. Yet the reader should be cautioned against assuming that the parameters of Table III.A.7 alone are entirely representative of export credit programmes' effects on world trade. It must be remembered that these may be offset by fees, such as those shown in Table III.A.6. Moreover, the value of these guarantees will depend upon the degree to which they reduce importers' total costs of importing, if at all. The better indications of the effects on world markets are those reported in the main text.

Limitations of the study

The Secretariat's evaluation of export credits has limitations as discussed in preceding paragraphs. There are some limitations in the method, although this study follows directly from previous authors' work. The second source of difficulties is the accumulation and construction of the data needed. The two components to this step, the survey and the interest rates, are required for the study, but each presents obstacles, often in the form of missing information. The analysis is based on data of a single year, so caution should be exercised in extrapolating the results to other years. We state in the text and annex what these limitations are and how we address them in order to complete this empirical evaluation of export credits.

Table III.A.8. **Composite credit ratings**
Using Moody's classifications

Country list reproduced from WDI	Beginning 1998			Ending 1998		
	Base	Max of A	Missing = Caa2	Base	Max of A	Missing = Caa2
Albania	Ca1	Ca1	Ca1	Caa3	Caa3	Caa3
Algeria	B3	B3	B3	B2	B2	B2
Angola	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3
Argentina	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3
Armenia	Caa3	Caa3	Caa3	B2	B2	B2
Australia	Aa2	A2	A2	Aa2	A2	A2
Austria	Aaa	A2	A2	Aaa	A2	A2
Azerbaijan	Caa3	Caa3	Caa3	B2	B2	B2
Bangladesh	B1	B1	B1	B2	B2	B2
Belarus	Caa3	Caa3	Caa3	Caa2	Caa2	Caa2
Belgium	Aa1	A2	A2	Aa1	A2	A2
Benin	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2
Bolivia	B2	B2	B2	B1	B1	B1
Bosnia and Herzegovina	..	..	Caa2	..	..	Caa2
Botswana	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1
Brazil	B1	B1	B1	B2	B2	B2
Bulgaria	B3	B3	B3	B2	B2	B2
Burkina Faso	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1
Burundi	..	..	Caa2	..	..	Caa2
Cambodia	Ca1	Ca1	Ca1	Caa1	Caa1	Caa1
Cameroon	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1
Canada	Aa2	A2	A2	Aa2	A2	A2
Central African Republic	Ca2	Ca2	Ca2	Caa1	Caa1	Caa1
Chad	Caa3	Caa3	Caa3	Caa1	Caa1	Caa1
Chile	A3	A3	A3	A2	A2	A2
China	A3	A3	A3	A3	A3	A3
Hong Kong, China	A1	A2	A2	A1	A2	A2
Colombia	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
Congo, Dem. Rep.	..	..	Caa2	Caa1	Caa1	Caa1
Congo, Rep.	Ca2	Ca2	Ca2	Caa3	Caa3	Caa3
Costa Rica	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1
Croatia	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
Cuba	Ca1	Ca1	Ca1	Caa3	Caa3	Caa3
Czech Republic	Baa1	Baa1	Baa1	A3	A3	A3
Denmark	Aa1	A2	A2	Aa1	A2	A2
Dominican Republic	B1	B1	B1	B1	B1	B1
Ecuador	B1	B1	B1	B3	B3	B3
Egypt, Arab Rep.	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
El Salvador	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2
Eritrea	..	..	Caa2	..	..	Caa2
Estonia	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1
Ethiopia	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2
Finland	Aa1	A2	A2	Aaa	A2	A2
France	Aaa	A2	A2	Aaa	A2	A2
Gabon	B3	B3	B3	B3	B3	B3
Gambia, The	Caa3	Caa3	Caa3	Caa1	Caa1	Caa1
Georgia	Ca1	Ca1	Ca1	Caa3	Caa3	Caa3
Germany	Aaa	A2	A2	Aaa	A2	A2
Ghana	B1	B1	B1	B1	B1	B1
Greece	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1
Guatemala	B2	B2	B2	Ba2	Ba2	Ba2
Guinea	Caa3	Caa3	Caa3	Caa2	Caa2	Caa2
Guinea-Bissau	Ca2	Ca2	Ca2	B3	B3	B3
Haiti	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3
Honduras	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1
Hungary	Baa3	Baa3	Baa3	Baa2	Baa2	Baa2
India	Ba1	Ba1	Ba1	Ba2	Ba2	Ba2
Indonesia	Baa3	Baa3	Baa3	B3	B3	B3
Iran, Islamic Rep.	B2	B2	B2	B1	B1	B1
Iraq	Ca2	Ca2	Ca2	Ca2	Ca2	Ca2
Ireland	Aa1	A2	A2	Aaa	A2	A2
Israel	A3	A3	A3	Aaa	A2	A2
Italy	Aa3	A2	A2	Aa3	A2	A2

Table III.A.8. **Composite credit ratings** (*cont.*)
Using Moody's classifications

Country list reproduced from WDI	Beginning 1998			Ending 1998		
	Base	Max of A	Missing = Caa2	Base	Max of A	Missing = Caa2
Ivory Coast	Caa1	Caa1	Caa1	B3	B3	B3
Jamaica	B1	B1	B1	Ba3	Ba3	Ba3
Japan	Aaa	A2	A2	Aa1	A2	A2
Jordan	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3
Kazakhstan	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3
Kenya	B1	B1	B1	B2	B2	B2
Korea, Dem. Rep.	Ca3	Ca3	Ca3	Ca2	Ca2	Ca2
Korea, Rep.	B1	B1	B1	Ba1	Ba1	Ba1
Kuwait	A2	A2	A2	A2	A2	A2
Kyrgyz Republic	Ca1	Ca1	Ca1	B1	B1	B1
Lao PDR	Caa3	Caa3	Caa3	..	..	Caa2
Latvia	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2
Lebanon	B1	B1	B1	B1	B1	B1
Lesotho	Caa1	Caa1	Caa1	B3	B3	B3
Libya	B2	B2	B2	B1	B1	B1
Lithuania	Ba2	Ba2	Ba2	Ba1	Ba1	Ba1
Macedonia, FYR	Caa3	Caa3	Caa3	B3	B3	B3
Madagascar	Caa2	Caa2	Caa2	B2	B2	B2
Malawi	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1
Malaysia	A1	A2	A2	Baa3	Baa3	Baa3
Mali	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2
Mauritania	Ca1	Ca1	Ca1	Caa1	Caa1	Caa1
Mauritius	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2
Mexico	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2
Moldova	Ba2	Ba2	Ba2	B2	B2	B2
Mongolia	B3	B3	B3	B2	B2	B2
Morocco	Ba1	Ba1	Ba1	Ba2	Ba2	Ba2
Mozambique	Caa3	Caa3	Caa3	Caa1	Caa1	Caa1
Myanmar	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1
Namibia	Caa1	Caa1	Caa1	Ba2	Ba2	Ba2
Nepal	B2	B2	B2	B2	B2	B2
Netherlands	Aaa	A2	A2	Aaa	A2	A2
New Zealand	Aa1	A2	A2	Aa2	A2	A2
Nicaragua	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3
Niger	Caa2	Caa2	Caa2	B3	B3	B3
Nigeria	Caa3	Caa3	Caa3	Caa2	Caa2	Caa2
Norway	Aaa	A2	A2	Aaa	A2	A2
Oman	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
Pakistan	B2	B2	B2	Caa1	Caa1	Caa1
Panama	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1
Papua New Guinea	Ba3	Ba3	Ba3	B1	B1	B1
Paraguay	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3
Peru	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2
Philippines	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1
Poland	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
Portugal	Aa3	A2	A2	Aa2	A2	A2
Puerto Rico	..	..	Caa2	..	..	Caa2
Romania	Ba3	Ba3	Ba3	B3	B3	B3
Russian Federation	Ba2	Ba2	Ba2	B3	B3	B3
Rwanda	Ca1	Ca1	Ca1	..	..	Caa2
Saudi Arabia	A3	A3	A3	A3	A3	A3
Senegal	Caa1	Caa1	Caa1	B3	B3	B3
Sierra Leone	Ca2	Ca2	Ca2	Ca2	Ca2	Ca2
Singapore	Aaa	A2	A2	Aaa	A2	A2
Slovak Republic	Baa3	Baa3	Baa3	Ba1	Ba1	Ba1
Slovenia	A3	A3	A3	A3	A3	A3
South Africa	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
Spain	Aa2	A2	A2	Aa2	A2	A2
Sri Lanka	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3
Sudan	Ca2	Ca2	Ca2	Ca2	Ca2	Ca2
Sweden	Aa3	A2	A2	Aa2	A2	A2
Switzerland	Aaa	A2	A2	Aaa	A2	A2
Syrian Arab Republic	B3	B3	B3	B2	B2	B2

Table III.A.8. **Composite credit ratings** (*cont.*)
Using Moody's classifications

Country list reproduced from WDI	Beginning 1998			Ending 1998		
	Base	Max of A	Missing = Caa2	Base	Max of A	Missing = Caa2
Tajikistan	Caa3	Caa3	Caa3	B2	B2	B2
Tanzania	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1
Thailand	Baa3	Baa3	Baa3	Ba1	Ba1	Ba1
Togo	Caa2	Caa2	Caa2	Caa1	Caa1	Caa1
Trinidad and Tobago	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1
Tunisia	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
Turkey	B1	B1	B1	B1	B1	B1
Turkmenistan	Caa3	Caa3	Caa3	B3	B3	B3
Uganda	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1
Ukraine	Caa1	Caa1	Caa1	B3	B3	B3
United Arab Emirates	A2	A2	A2	A2	A2	A2
United Kingdom	Aaa	A2	A2	Aaa	A2	A2
United States	Aaa	A2	A2	Aaa	A2	A2
Uruguay	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3
Uzbekistan	Caa1	Caa1	Caa1	B2	B2	B2
Venezuela	Ba2	Ba2	Ba2	B2	B2	B2
Vietnam	Ba3	Ba3	Ba3	B1	B1	B1
West Bank and Gaza	..	..	Caa2	..	..	Caa2
Yemen, Rep.	..	..	Caa2	..	..	Caa2
Yugoslavia, FR (Serb./Mont.)	Ca1	Ca1	Ca1	B3	B3	B3
Zambia	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2
Zimbabwe	Ba3	Ba3	Ba3	B1	B1	B1

Sources: Credit ratings are a composite of Moody's, Standard and Poor's, Institutional Investors, and Euromoney rankings, as reported in *World Development Indicators* (WDI), following the method described in the text. Moody's nomenclature is used, but only some portion of the composite credit ratings reported here are Moody's own rankings. The second column of credit ratings demonstrates the assumption that importer credit ratings is not allowed to be better than "A2" (under the assumption that the sovereign credit rating does not reflect the average importer's). The third column of credit ratings demonstrates the assumption that a "Caa2" is used in cases of missing observations.

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