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Measuring Agricultural Trade Distortion

A Simple Approach

Vernon O. Roningen
Praveen M. Dixit

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Abstract

A simple measure is proposed that estimates the volume of trade distortion caused by the agricultural policies of trading countries. The index, called a TDS (trade distorted by support), would be useful for trade analysts to compare the trade impact of agricultural support policies across countries and commodities. The TDS index can be calculated largely from existing information on agricultural support.

Keywords: indicators, producer subsidy equivalent, trade distortion, trade models, trade policy.

Acknowledgments

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Introduction

This report presents a relatively simple, but practical measure of agricultural trade distortion.[1] The measure, called a TDS (trade distorted by support), would be useful for trade analysts to compare the trade impact of agricultural support policies across countries and commodities. Based largely on published producer and consumer subsidy equivalent (PSE and CSE) information, the measure is designed to foster a better understanding of the trade distortionary implications of the complex mix of domestic and trade policies affecting agriculture.[2] The proposed measure clearly labels and weights component policies as adding to, or detracting from, the existing net trade position compared with a policy-free net trade position and refocuses attention from agricultural support in a country to the trade effects of that support.[3]

The paper begins by explaining the differences between measures of support and trade distortion from an economic point of view. It then develops a simple algebraic expression to measure the trade distortion created by agricultural support policies. Empirical estimates for a few select commodities and countries are presented next. The paper concludes with advantages and limitations of the measure, and suggestions for its use.

The Economics of Trade Distortion

To see the difference between measures of support and of trade distortion, consider figure 1 which depicts a stylized situation for a small-country importer of an agricultural product.

P is the (free-trade) world price while P' is the internal market price with a tariff T (T = P'-P). At internal price P', supply is S', demand is D', and quantity (D'-S') is imported. The PSE, defined as the payment required to compensate farmers for the loss of income resulting from the removal of a given policy measure (Josling, 1981), is area (T*S') in value and T/P' in percent. The extent of trade distortion, measured as the change in the volume of external trade vis-a-vis a free-trade environment, is (S'-S)+(D-D').

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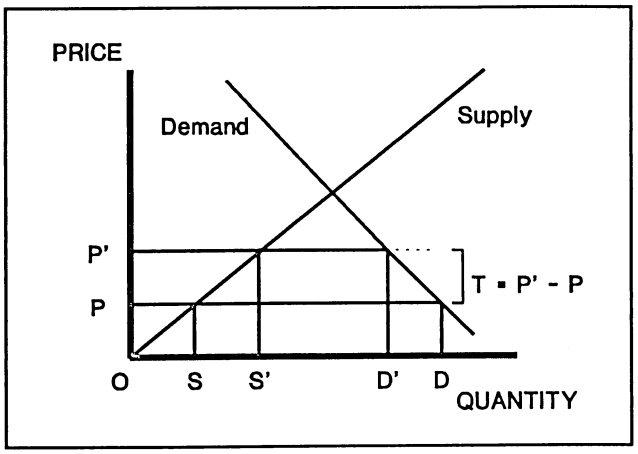
[1]A more detailed version of this staff report is available as a working paper published by the International Agricultural Trade Research Consortium (Roningen and Dixit, 1991).

[2]For details on the use of aggregate measures of support (AMSs) such as the PSE, see IATRC (1990) and USDA (1990).

[3]The operational definition of trade distortion is existing trade compared with what would occur if support policies were removed (a free trade policy regime).

Figure 1—Comparing measures of support and trade distortion



Now consider a second PSE alternative in which producers receive a direct per unit subsidy of T, while consumers face the world price P. Here the PSE would still be T*S', but because consumption is at D, D-S' would be imported and the amount of trade distortion would be only S'-S. Even though the amount of support to producers is the same in both cases, trade distortion is very different.

What is the source of difference between the two alternatives? The type of support characterized by T (tariffs, quotas, or export subsidies) in our first example can be labeled "market price support." T supports the domestic market by driving a wedge between the domestic and world prices. Trade distortion resulting from market support policy has both a production (S'-S) and a consumption (D-D') effect. Direct (income) support in our second example, on the other hand, affects only the producer side of the domestic market (S'-S), and therefore distorts trade less.

Trade distortion would not exist at all if producers were to receive a direct subsidy (PSE) of T*S' but are not permitted to produce more than S because of supply control restrictions (the per unit subsidy to producers would be greater than T). Now, even though the PSE is still equal to T*S', trade distortion is zero because the country is importing the free-trade quantity D-S. Here, a direct payment program is accompanied by an offsetting policy that restricts production enough to ensure that trade occurs at the subsidy-free level. Trading partners are directly unaffected by this policy mix of a PSE and supply controls (their exports are at free trade levels).[4]

These examples illustrate that identical measures of support (for example, the PSE) do not necessarily yield identical measures of trade distortion. This is important for the trade negotiations and in evaluating economic policy because important cases exist in agricultural policies where the linkages between support and trade distortion are weak. Furthermore, if negotiations are done solely on the basis of support measures such as the PSE, countries could undertake "policy switching" to ensure that support commitments are met without lowering levels of trade distortion (Hertel, 1987). Conversely, a TDS focus could encourage the redesign of support policies that maintained a given level of support with minimal trade distortion.

A Measure of Trade Distortion: The TDS (Trade Distorted by Support)

Because a PSE may not provide an accurate representation of the trade distortionary implications of agricultural policies, we propose a direct "**trade distorted by support**" (**TDS**) measure.[5] The TDS would measure changes in the volume of net trade from existing levels if a country completely eliminates all support to the commodity. The TDS measure would force a clear accounting of the trade distortion caused by policies in effect. Trade-offs could be measured not only in terms of policy levels, but also in terms of their contribution to the removal of trade distortion.

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[4]Indirect effects on consumers from taxes paid to provide the support may still exist.

[5]McClatchy (1987) discusses a similar measure.

The TDS measure is (S'-S)+(D-D') if only a tariff (T) existed (refer to fig. 1). In most instances, however, a tariff is only one of many instruments in use.[6] Hence, the TDS in volume terms can be expressed more generally as:

$$TDS_i == \underbrace{q_s*e_s*s_m - q_d*e_d*s_m}_{\text{Domestic market support}} + \underbrace{q_s*e_s*s_p - q_d*e_d*s_c}_{\text{Direct payments to producers/consumers}} + \underbrace{q_s*e_s*s_i}_{\text{Other producer support}} - \underbrace{sso}_{\text{Offsets to support}}$$

where for each commodity i, e_s and e_d are own-price supply and demand (negative) elasticities, q_s and q_d are observed production and consumption quantities, s_m is market support ratio (applies to supply and demand), s_p and s_c are direct (income) support rates for producers and consumers, s_i is the support ratio for all other types of assistance to producers, and sso is the set-aside offset, usually resulting from direct payments to producers.[7] The support ratios represent support levels per unit of commodity compared with domestic prices.

The first two terms in the equation, $(q_s*e_s*s_m)$ and $(q_d*e_d*s_m)$, define distortions resulting from domestic market support policies. These refer to border policies that typically tax consumers to pay for producer support. This type of support has two similar effects on a country's net trade: (1) a production effect under which higher producer prices and more production imply more exports and/or less imports, leading to more net exports (exports-imports) and greater trade distortions (S'-S in fig. 1), and (2) a consumption effect under which higher consumer prices and less consumption lead to more net exports and larger trade distortions (D'-D in fig. 1). Hence, if tariff T (or the equivalent quota of T = D'-S') were the only operative policy instrument, then the trade distortion would be represented by (S'-S)+(D-D').

The third $(q_s*e_s*s_p)$ and fourth $(q_d*e_d*s_c)$ terms define distortions created by direct payments to producers and consumers, respectively, by the government (taxpayer). This type of payment has different net trade effects depending upon whether and how much the producer or consumer benefits from the policy. Payments to producers raise incentive prices, encouraging production and generating more exports and/or less imports (increasing net exports). Payments to consumers, on the other hand, raise consumption and discourage exports and/or encourage imports (decreasing net exports).

The fifth term in the equation, $(q_s*e_s*s_i)$, defines distortions created by all other types of support to producers. This includes policies such as input subsidies, infrastructural investments, and research and development expenditures. Such policies normally encourage production and generate more exports and less imports. Our approach assumes that the incidence of intervention for (producer) income support and input assistance are the same, implying that equivalent levels of support for s_i and s_p result in identical production effects.[8]

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[6]The earlier examples of different trade distortion with the same PSE measurement (fig. 1) show why it is difficult to capture a trade distortion effect in price, rather than volume terms.

[7]PSE's and CSE's published by the USDA (1990) and the OECD (country studies and monitoring reports) are disaggregated into various policy components. Market support (price intervention) and direct income support are two such elements. Others include input assistance, economywide policies, and regional policies.

[8]If policies relating to input subsidies, infrastructural investments, and research and development were to be excluded from negotiations, this term in the equation could be dropped.

The final term (sso) refers to policies which offset trade distortions. These are policies that require production or consumption disciplines in order for producers and/or consumers to be eligible to receive direct payments.[9] Offsetting policies discourage production and exports or encourage imports. The result is less net exports.

The TDS defined above is a volume measure of trade distortion created by specific forms of government intervention for a given year, country, and commodity. Josling (1991) points out that for a measure to be "desirable," it should, among other things, be comparable over time, commodities, policies, and countries. The TDS as defined above facilitates comparisons over policies and countries but not necessarily over commodities. One simple means of making the TDS a more appealing instrument for making comparisons across commodities is to express it in percentage form. An index that measures the relative trade distorted by support (RTDS) for commodity i may be expressed:

$$RTDS_i = TDS_i/\{[(\text{Subsidy-free production})_i + (\text{Subsidy free consumption})_i]/2\}$$

where, TDS is the volume of trade distorted by support, subsidy-free production is the production that would exist if the country did not have any support and is defined as $(q_s + q_s*e_s*s_m + q_s*e_s*s_p - q_s*e_s*s_i - sso)$, and subsidy-free consumption is similarly defined as $(q_d + q_d*e_d*s_m - q_d*e_d*s_c)$.[10] The RTDS index measures the distortion in a country's trade relative to its subsidy-free domestic market.[11] It does not tell us the country's contribution to global trade distortion. In other words, identical RTDSs across countries suggest that each country's trade is equi-proportionately distorted, not that they contribute equally to global distortion.

Another way to compare distortion across commodities is to convert the volume measure of TDS to a common currency. This value of trade distorted by support (VTDS) is obtained by multiplying the TDS by the world (border) price. The VTDS measure, as will be shown later, can also be used to assess damages to the rest-of-the-world resulting from a country's domestic and trade policies. Constant currency conversion rates could be used to make comparisons across time in "real" terms. Exchange rate conversion to dollars would facilitate comparisons across countries.

The TDS measures the first round effects on world markets from a removal of support for a single commodity. It does not reflect cross-commodity effects nor the feedback world price effects. A more complete means of calculating the trade distortions caused by policies would be to use the PSE and set-aside measures in a multicountry, multicommodity world agricultural trade model with the appropriate parameters.[12] This has in fact been done in a number of studies, including Tyers and Anderson (1986), OECD (1987a), and Roningen and Dixit (1989).

While these empirical studies may have used a conceptually superior approach to calculating the trade distortion arising from support, such model-based results are complex and time consuming. Under these circumstances, it is judicious to devise a measurement system that is simple to use and yet

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[9]There are many approaches one could take to calculate production/consumption offsets. Haley, Herlihy, and Johnston (1991) illustrate one method to obtain estimates for U.S. land set-aside programs.

[10]Choice of the normalization factor is based on the need to account for the size of a country/sector as well as the need to prevent the index from collapsing to zero or becoming undefined as trade volumes approach zero.

[11]In terms of figure 1, RTDS = [(S'-S) + (D-D')]/[(S+D)/2].

[12]A PSE, in contrast to a TDS, does not contain an estimate of the subsidy equivalent of production control measures. In terms of the analytical framework in figure 1, the TDS accounts for this additional (domestic) policy-based shift in the supply schedule.

reasonably accurate. The TDS meets these criteria, thus making it a useful tool to help policymakers gauge the distortionary implications of policies with existing data without resorting to a large economic model.[13]

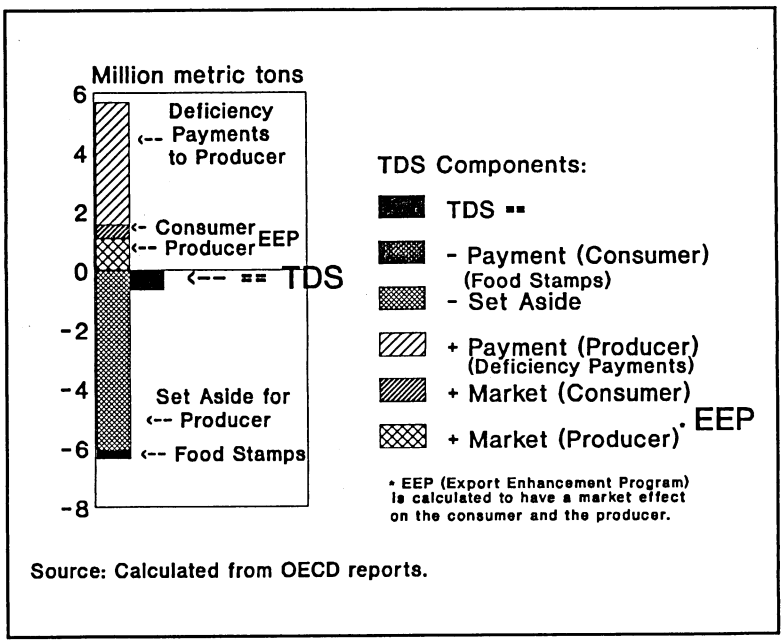
Empirical Examples of TDS Estimates

Several types of data are needed to calculate the TDS measure: production and consumption data, PSE and CSE information disaggregated into market support policies and direct payments, information on policies that offset trade distortions such as supply or consumption control schemes, and own-price elasticities of supply and demand. Policy support and quantity data are published in various OECD country and monitoring reports (OECD, 1990; OECD, 1987a; OECD, 1987b). Elasticity estimates and supply control information match those used in USDA's SWOPSIM model (Sullivan, Wainio, and Roningen, 1989). The same own-price elasticity estimate--the production or consumption weighted average of own-price elasticities for OECD countries--was used across countries for each commodity.[14]

TDS measures were calculated for the 13-commodity, 11-country PSE data set published by the OECD (OECD, 1990). For illustrative purposes, however, we focused only on wheat and sugar estimates for 1989/90, the last year for which published data were available. Empirical estimates for other commodities in the OECD data set are provided in Appendix 1.

Figure 2 shows how the components of U.S. programs affect the production and consumption, and therefore the net trade distortion of wheat. In this example, the net TDS (a negative number that shows quantity of trade distorted by support) is a sum of the positive and negative components. For wheat, U.S. set-asides offset other parts of the programs such as direct deficiency payments to producers and market support via the export enhancement program (EEP).

Figure 2—Program components of the U.S. TDS for wheat, 1989/90



Source: Calculated from OECD reports.

TDS Estimates for Wheat

Figure 3 shows TDS estimates for the United States and other OECD countries. The estimates indicate that U.S. policies distort the world wheat market very little, if any, compared

[13]That is not to say a model is not useful for the calculation of full economic effects resulting from a trade negotiation. Even if a TDS measure is calculated, a full modeling of the information will be useful. But there are many cases where it is practical to do simple calculations with existing data, particularly at a detailed commodity level. The performance of the simple TDS measure is gauged by comparing TDS estimates with more complex model results later in this report.

[14]Supply and demand elasticities tend to be similar for models of major trade countries. Since the elasticities serve as weights for adding up the trade effects from "supply" and "demand" changes, the assumption of identical weights greatly simplifies the calculation process. Then, differences in TDS measures do not derive from elasticity assumptions.

with other countries.[15] EC policies, on the other hand, distort wheat trade (16 million metric tons) more than the combined effects of all other countries shown in figure 3. This large difference between U.S. and EC wheat trade distortion occurs because of the different structure of support policies in the two countries. A market support policy that affects both consumption and production by reducing net imports is a major element of EC policies, while direct income support policy, which distorts only production, is the mainstay of U.S. policies. U.S. programs also include set-asides which offset trade distortion, but no such provision exists for EC wheat programs. Almost the entire trade-distorting effect from U.S. price and income support policies are offset by set-aside requirements, making the U.S. wheat program trade-neutral in 1989/90.

Figure 3—Policy contributions to the TDS for wheat, 1989/90

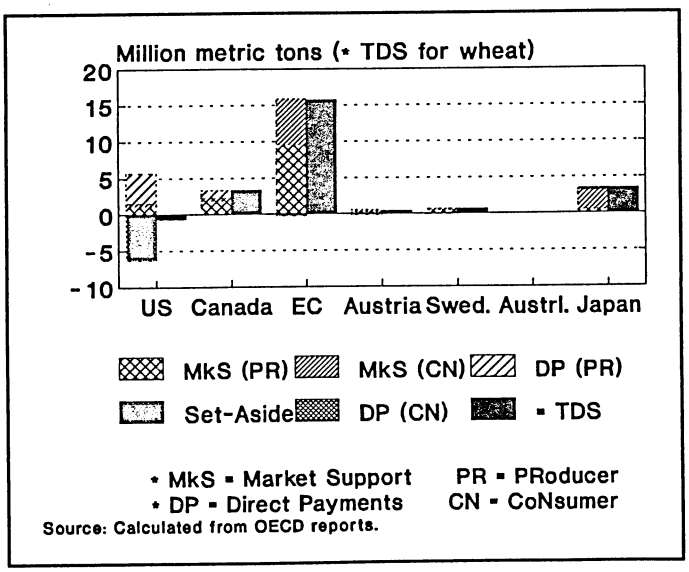
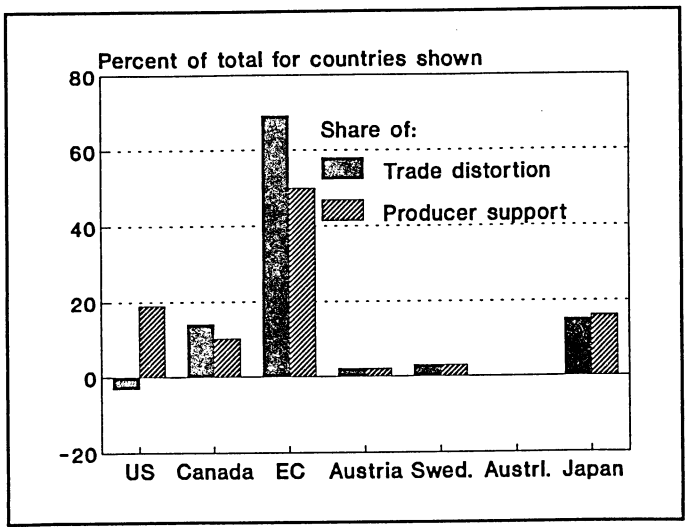


Figure 4—Share of trade distortion and producer support for wheat, 1989/90



These results also show the importance of distinguishing between measures of support and distortion. Figure 4 shows the distribution of the total TDS for wheat trade in 1989/90 among several OECD countries. While the United States accounts for 20 percent of wheat support, it contributed none of the trade distortion created by these OECD countries. In fact, U.S. programs offset the trade distortion caused by other OECD countries. The EC, on the other hand, accounted for nearly 60 percent of total support, but generated nearly 75 percent of the total trade distortion.

That the PSE might not be a good approximation for the levels of trade distortion is also apparent from the RTDS index (fig. 5). The RTDS index, as mentioned earlier, normalizes the volume of a country's trade distortion by the size of the subsidy-free domestic market. A comparison of the RTDS wheat index for the United States and the EC with the corresponding PSE measure shows large discrepancies between the two measures. The RTDS index indicates that EC wheat policies were much more distortionary (25.6 percent) in 1989/90 than U.S. policies (-1.8 percent), even though the wheat PSE rates for both economies are roughly similar (15-20 percent).

[15]A negative TDS indicates that the country's policies help offset the trade distortion created by policies of other countries. Put differently, the country's policies raise rather than depress world prices because the country contracts trade (net exports) below its free-trade level.

TDS Estimates for Sugar

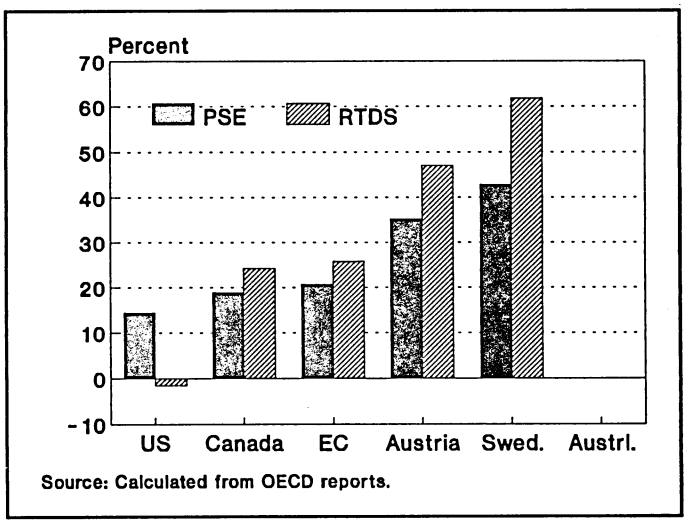
PSE's provide a reasonable measure of a country's trade distortion when that country's contributions to trade distortion are very similar to its shares of support (fig. 6). To see this, consider the case of sugar.

Both the United States and the EC use market support policies to assist producers, and neither use direct income support or other policies that offset trade distortion (fig. 7). Trading units like the EC and the United States provide the largest share of support to their sugar producers and distort world trade the most. On the other hand, countries like Sweden and Austria account for a small share of total support and distort the market the least. In the case of some commodities such as sugar where only market support policies exist, the PSE's appear to provide a reasonably accurate ranking of the degree of trade distortion. However, the TDS is generally a better measure of distortion for all commodities since it consistently accounts for all policies affecting trade.

Some of this same information is also reflected in summary form in the RTDS index for sugar (fig. 8). The RTDS sugar indices for the United States and the EC are broadly comparable to the corresponding PSE's. This holds for most other countries as well. Remember, however, that the RTDS measures only the relative distortion in a country's trade, and not its contribution to global trade distortion. Consequently, high levels of the RTDS index for small countries such as Sweden and Austria do not mean that they distort world sugar trade as much as the EC and the United States, just that the distortion in trade relative to their domestic markets are equi-proportionate.

What can be concluded from these comparisons? PSE's, while a reasonable measure of agricultural support to producers, are not necessarily appropriate as a measure of trade distortion. Their use to measure trade distortions is highly questionable in situations where countries pursue a wide variety of policies, particularly those

Figure 5—Comparison of PSE's and RTDS for wheat, 1989/90



Source: Calculated from OECD reports.

Figure 6—Share of trade distortion and producer support for sugar, 1989/90

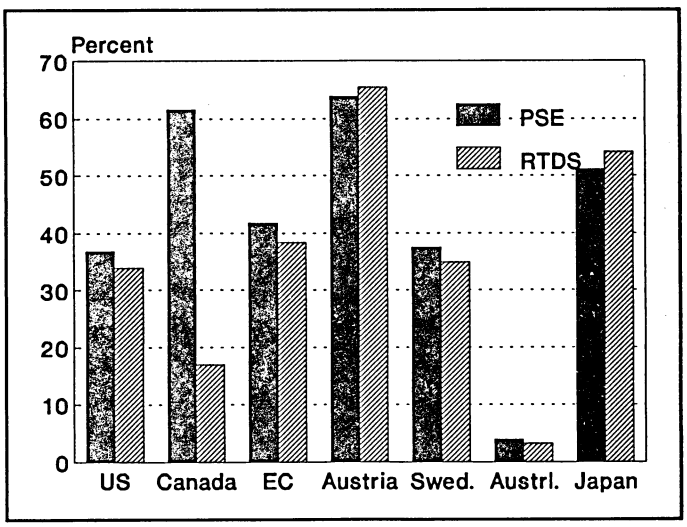
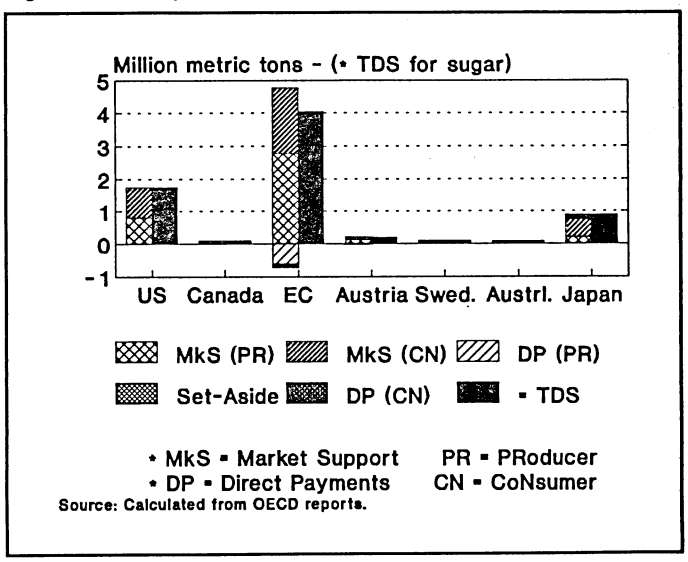


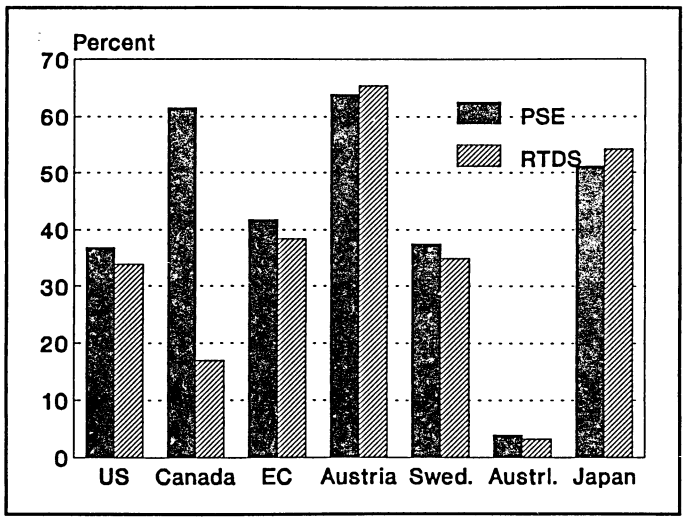
Figure 7—Policy contributions to the TDS for sugar, 1989/90



Source: Calculated from OECD reports.

involving direct payments and supply controls.

Figure 8—Comparison of PSE's and RTDS for sugar, 1989/90



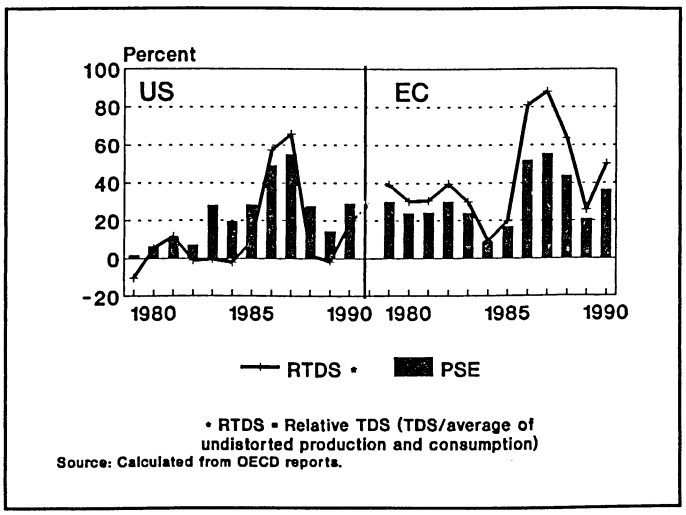
The TDS as a Trade Distortion Monitoring Device

Since the TDS is a volume measure of trade distortion, it can measure distortion over time and countries for a commodity but not across commodities. The RTDS measure, on the other hand, is a unit-free measure of distortion and lends itself to cross-commodity and intertemporal comparisons. It also takes into account the size of the domestic market and could be especially appealing to countries seeking an equitable burden-sharing scheme to reduce trade distortion. Finally, the RTDS takes into account the uncertainties in agricultural production by normalizing trade distortion by the size of the domestic sector.

To use the RTDS measure as a distortion monitoring instrument over time for a given commodity, calculate the RTDS for each year assuming that the supply and demand parameters remain the same. This isolates the trade effects of the levels and/or types of policies, and also isolates trade differences resulting from changes in supply and demand parameters. Using U.S. wheat as an example, while levels of PSE's rose during 1980-87, the RTDS index was actually negative in 4 of the 8 years (fig. 9). Even though total support to wheat producers rose as measured by the PSE, the policy mix was altered to produce a much lower distortionary effect than implied by the PSE's. For the EC, the increases in the RTDS index between 1980 and 1987 were relatively larger than the corresponding increases in PSE's, indicating that changes in EC policies during this time period led to greater distortionary effect than suggested by the PSE's.

Another advantage of the RTDS is that it allows the extent of trade distortion to be monitored across different sectors within the agricultural economy. This information could be useful for countries seeking to harmonize distortions across products.[16] Our analysis indicates that distortionary implications of U.S. policies vary widely across commodity groups, being low for crops and high for livestock products (table 1). The distortionary implications for the EC are much more uniform, with less distinction between crops and livestock.

Figure 9—Wheat PSE and RTDS for the United States and the EC, 1980/90



Limitations of the TDS Measure

The TDS measure shares two principal limitations with the PSE when compared with

[16]Harmonization of support has been a goal of the EC and was a driving force behind the 1990 U.S. farm legislation.

Table 1—Relative trade distorting support (RTDS), by sectors, 1989/90

Commodities	United States	EC	Canada	Japan	Australia
			Percent		
Wheat	-1.8	25.8	24.2	159.2	NC
Coarse grains	5.3	53.9	24.5	411.5	NC
Rice	12.1	76.3	NC	228.2	7.2
Soybeans	.6	9.6	.2	15.3	NC
Other oilseeds	NC	43.0	13.0	NC	NC
Sugar	33.9	38.4	16.9	54.2	3.2
Milk	53.0	61.2	69.7	104.7	20.8
Beef and veal	37.5	91.6	47.1	111.9	NC
Pork	-1.0	22.6	21.5	170.3	NC
Poultry	1.1	54.1	26.3	17.1	NC

NC = Not calculated.

a more elaborate modeling approach: (1) changes in world prices that result from removal of policies are ignored, and (2) cross-commodity effects of policy elimination are not included.

To evaluate the importance of these limitations, the SWOPSIM (ST89 version) modeling framework calculated RTDS indices using both a single-commodity world model (SRTDS) and a multicommodity world model (MRTDS). The SRTDS measure takes into account the world price feedback effects while the MRTDS index incorporates both the world price feedback and the cross-commodity implications. Comparison of the indices then allows the respective effects to be isolated.

World Price Feedback Effects

To examine the effects that world price changes could have on the TDS, single-commodity world models were constructed for each commodity. Then, the PSE and CSE were unilaterally removed in each country, holding policies for all other countries constant. The ratio of the absolute change in net trade to the average of subsidy-free production and consumption from the modeling exercise (SRTDS) was then compared with the calculated RTDS index, and their difference is attributed to changes in world price.

The results indicate that the RTDS indices for the United States and the EC are generally higher than the corresponding SRTDS indices estimated from the modeling framework (table 2). This is because elimination of support in the United States and the EC raises world prices and increases production (denominator term in SRTDS) above levels that would have prevailed with fixed world prices. In the case of sugar, the percentage declines in distortion in each region as a result of world price changes are approximately the same (6 percent). This pattern holds for wheat, but not quite as strongly.

Not surprisingly, the differences between the RTDS and the SRTDS indices are very small for both sugar and wheat for most other countries. This is because these other countries are small actors in global sugar and wheat markets and their policies minimally affect world prices. Hence, ignoring changes in world price may not bias a small country's measure of distortion but may overestimate the extent of distortion attributable to large countries.

Table 2—Comparing measures of distortion for wheat and sugar, 1989/90

Region/commodity	PSE[1]	RTDS[2]	SRTDS[3]	MRTDS[4]
		Percent		
United States:				
Wheat	29.8	23.3	17.9	13.0
Sugar	14.9	3.4	2.2	1.0
European Community:				
Wheat	11.9	11.9	6.0	6.0
Sugar	15.1	18.5	13.3	13.5

[1]PSE's as reported by the USDA.
[2]RTDS using USDA's PSE's.
[3]RTDS using USDA's PSE's and single commodity version of SWOPSIM ST89.
[4]RTDS using USDA's PSE's and 22-commodity version of SWOPSIM ST89.

Cross-Commodity Effects

To study the effect that cross-commodity effects may have on the TDS measure, we used the full 22-commodity version of ST89 with support unilaterally eliminated for each commodity in each country. The results indicate that the consequences of introducing cross-commodity effects are minimal: the RTDS indices with cross-commodity effects (MRTDS) are no different than the corresponding indices without cross-price effects (SRTDS) (table 2). This is true for the EC and the U.S.

The similarity occurs for a number of reasons. One is the use of an intermediate-run model in which the substitution relationships are not very large. Another reason is that for a price change to have a meaningful impact, it must be large enough to affect the global market and feed back into the domestic market. Third, the economic structure of the farm sectors within the OECD countries are broadly similar, and equivalent changes in price can be expected to have similar effects across countries. Finally, to the extent that a group of products with many substitutes such as cereals tend to have comparable support for all products in the group, the absence of specific attention to substitution will not cause a significant bias because reducing support from a particular AMS formula should equally affect substitutes (Cline, Kawanabe, Kronsjo, and Williams, 1978).

Conclusions

This paper points out the possible dangers in interpreting PSE's as indices of trade distortion. As the analysis indicates, using PSE's as indicators of trade distortions can be especially misleading when countries pursue policies that offset trade-distortion effects of producer support. On the other hand, if support across countries is confined to market support policies, then a PSE can provide a comparable indication of the extent of trade distortion.

The TDS holds promise as an additional instrument of evaluating economic policy: it is a simple, volume-based method of measuring agricultural trade distortion. Moreover, unlike more elaborate modeling and trend analysis, it provides analysts with quick and easy access to the trade volume and trade balance effects of liberalization.

There are problems with the TDS: the information requirements are greater than for the PSE, and there may be controversy about the use of elasticity parameters. In our opinion, the additional information needed is minimal and is already used in much country policy analysis.[17]

The advantages of the TDS over the PSE should not mean that the PSE be ignored as a tool of economic analysis. We believe, however, that measures like the PSE provide one viewpoint of agricultural support, and they should be used in conjunction with a trade-distortion measure like the TDS. This way, the focus of policy analysis is not only on the extent of support provided to producers within countries, but also on the effects that such support has on producers, consumers, and traders in other countries.

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[17]Information on the supply and demand elasticities may be the most problematic data requirement. As a practical approximation, standard elasticities (interpreted as weights) could be agreed upon and used by everyone in negotiations. Some might object to the use of an elasticity in a TDS measure since such numbers are considered the habitat of economists. However, to the layman, these can be considered "agreed upon" weights that are used to add up the likely impact of a set of policies. One could easily imagine negotiators and lawyers agreeing upon a set of weights for different policy components of the PSE. For example, there currently seems to be agreement on a weight of 1 for "included policies" (the red list), 0 for excluded policies (the green list), and something that must be between 1 and 0 for other policies.

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Appendix 1: TDS Estimates for Selected Products and Countries

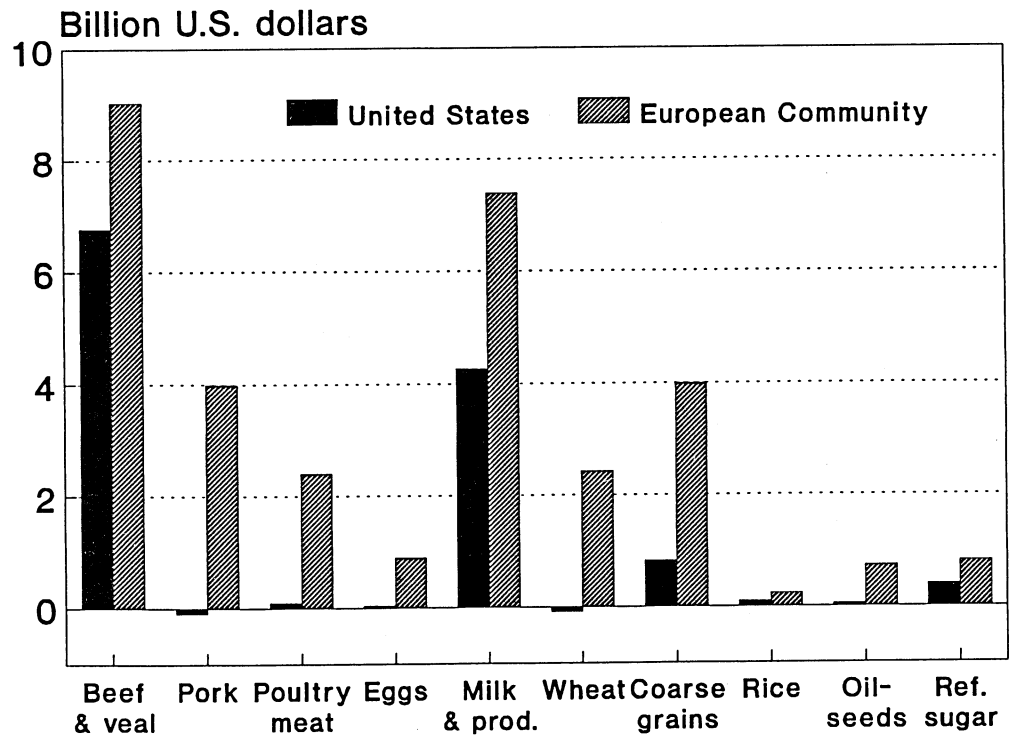
This appendix presents TDS estimates for several products and countries (in graphical and numerical form) made from OECD data on support. Figure A1 shows the VTDS measures implicit in the OECD support data for the United States and the European Community.

The following pages present graphs and data for a series of products over time. The graphs are stacked bar graphs with the components representing the estimated trade distortion contributed by each country. The height of all of the contributions is the total distortion for a year. The upper graph on each page is in quantity units and gives a sense of movement of trade distortion (or the lack of it) over time. The quantity axis is kept the same for product groups meat and eggs, grains, and oilseeds to facilitate comparisons across products within these groups.

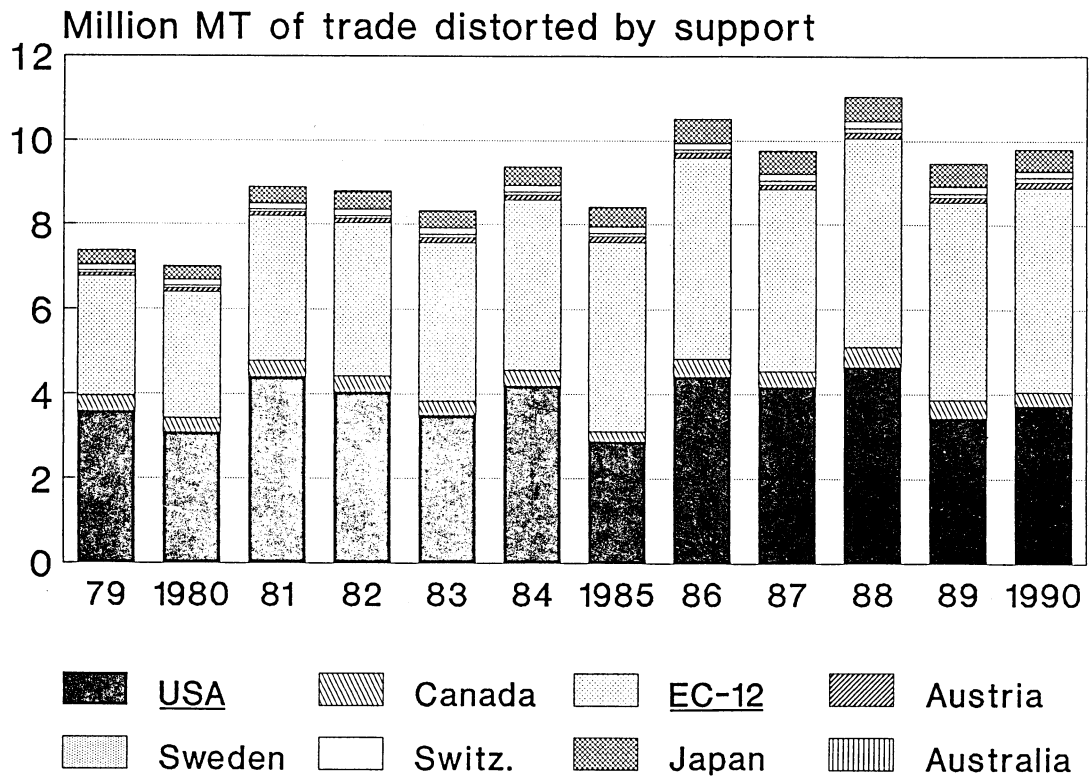
When policy support levels, such as those for cereals for the EC and United States, depend on world market prices, the graphs show changes in trade distortion over time. As world prices drop, as they did in 1986/87, trade distortion increases.

The bottom graph on each page (data are shown below the graph) shows the share of trade distortion (from the top graph) contributed by each country (the totals equal 100 percent).

Appendix figure 1—Estimated value of trade distorted by support (VTDS), 1989/90

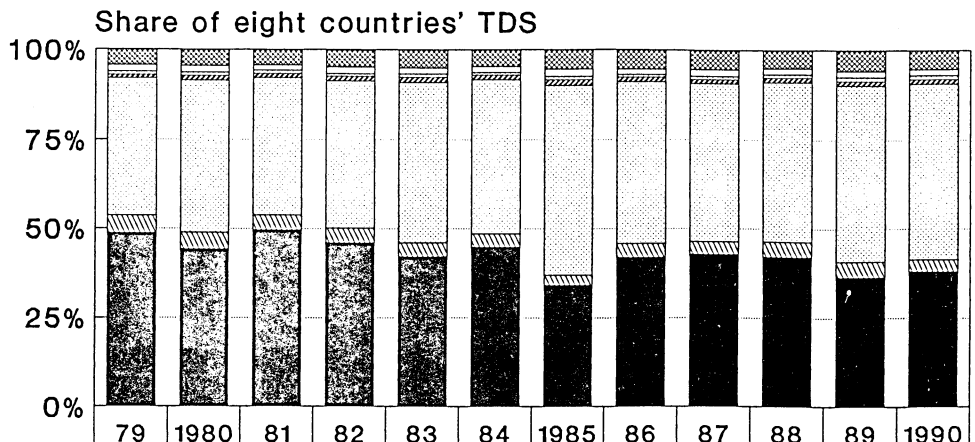


Source: Calculated from OECD reports



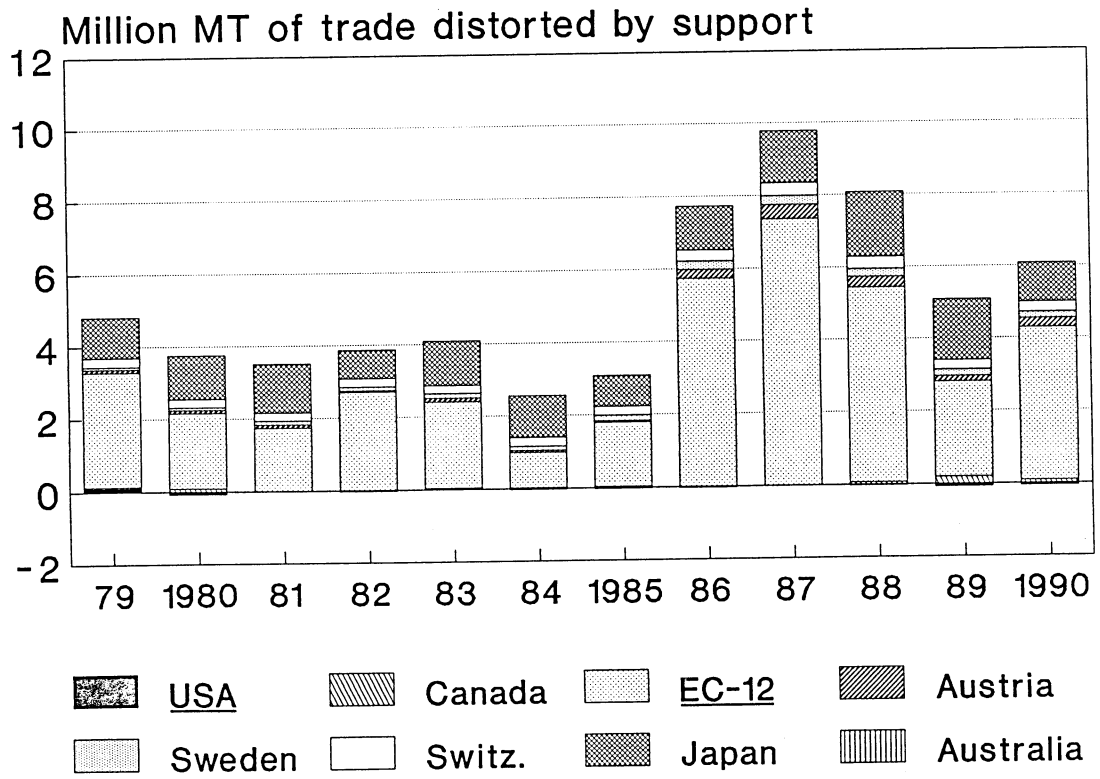
Source: Calculated from OECD reports.

BEEF and VEAL



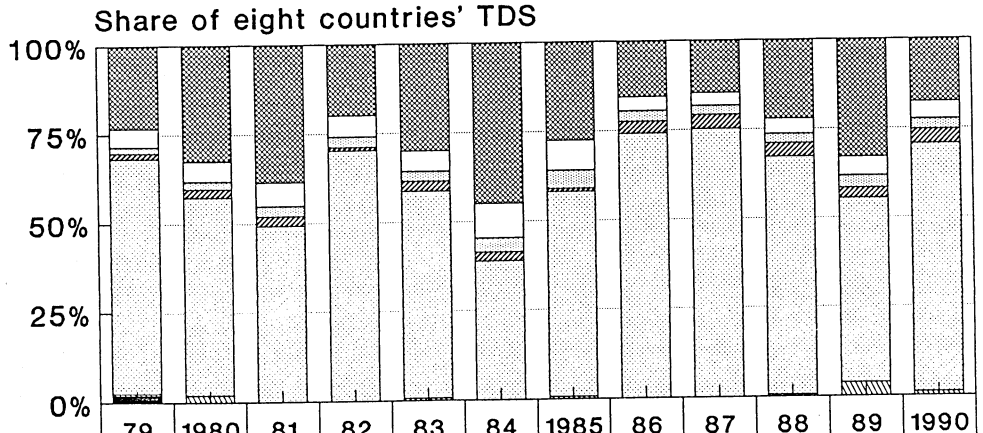
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	1	6	5	31	15	6	5	0	0	0	0	0
Japan	331	314	389	413	406	436	463	577	544	578	551	516
Switz.	129	127	135	145	147	153	164	159	164	168	162	163
Sweden	63	65	68	71	74	78	77	76	88	100	97	102
Austria	74	86	95	106	118	117	132	123	114	133	125	140
EEC-12	2813	2979	3407	3610	3732	4025	4464	4752	4312	4950	4669	4841
Canada	362	325	382	367	340	365	238	424	350	471	420	313
USA	3590	3097	4407	4053	3498	4193	2877	4405	4175	4641	3443	3729

TDS data in table in 1,000 metric tons.



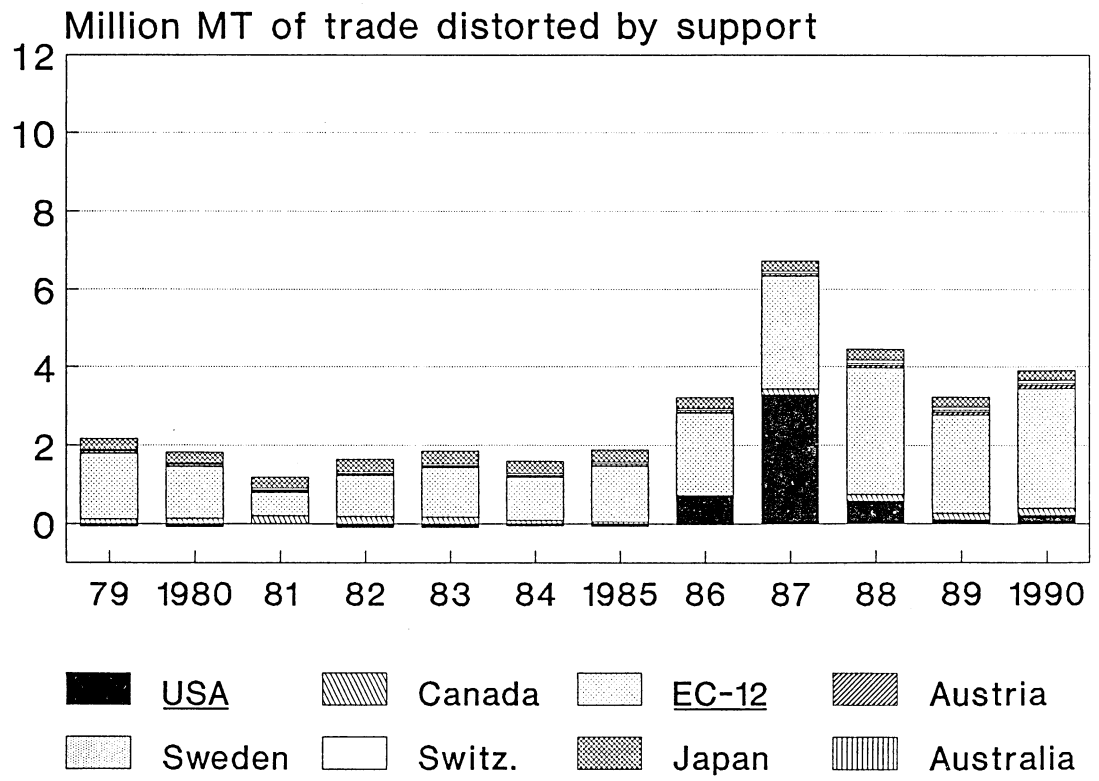
Source: Calculated from OECD reports.

PORK



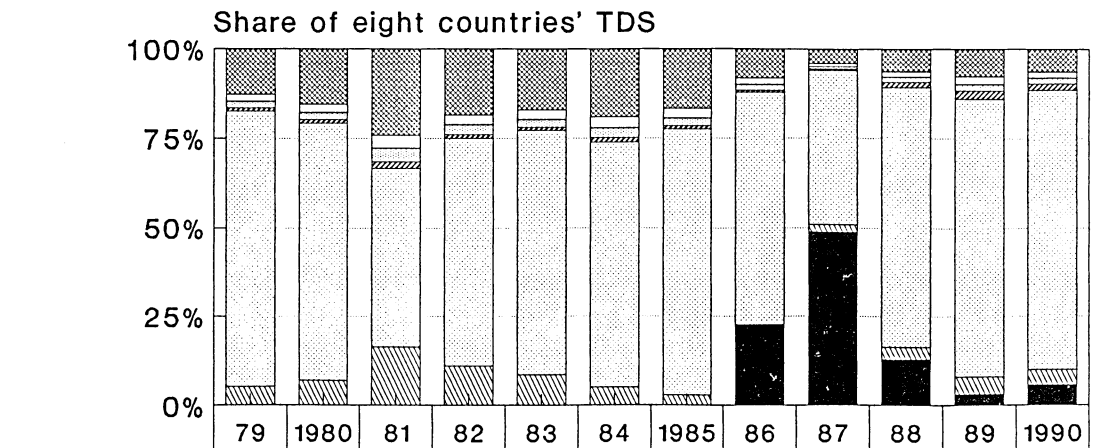
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	1118	1215	1347	772	1223	1140	848	1208	1432	1792	1678	1074
Switz.	253	216	231	229	233	248	255	304	359	339	261	289
Sweden	77	79	102	109	115	103	156	227	249	204	174	179
Austria	81	87	92	36	115	63	25	258	389	308	148	242
EEC-12	3160	2080	1727	2703	2367	980	1764	5723	7335	5370	2614	4208
Canada	28	74	0	0	33	4	23	0	0	57	196	75
USA	99	-82	0	-17	-3	-29	-20	-15	-7	-17	-77	-62

TDS data in table in 1,000 metric tons.



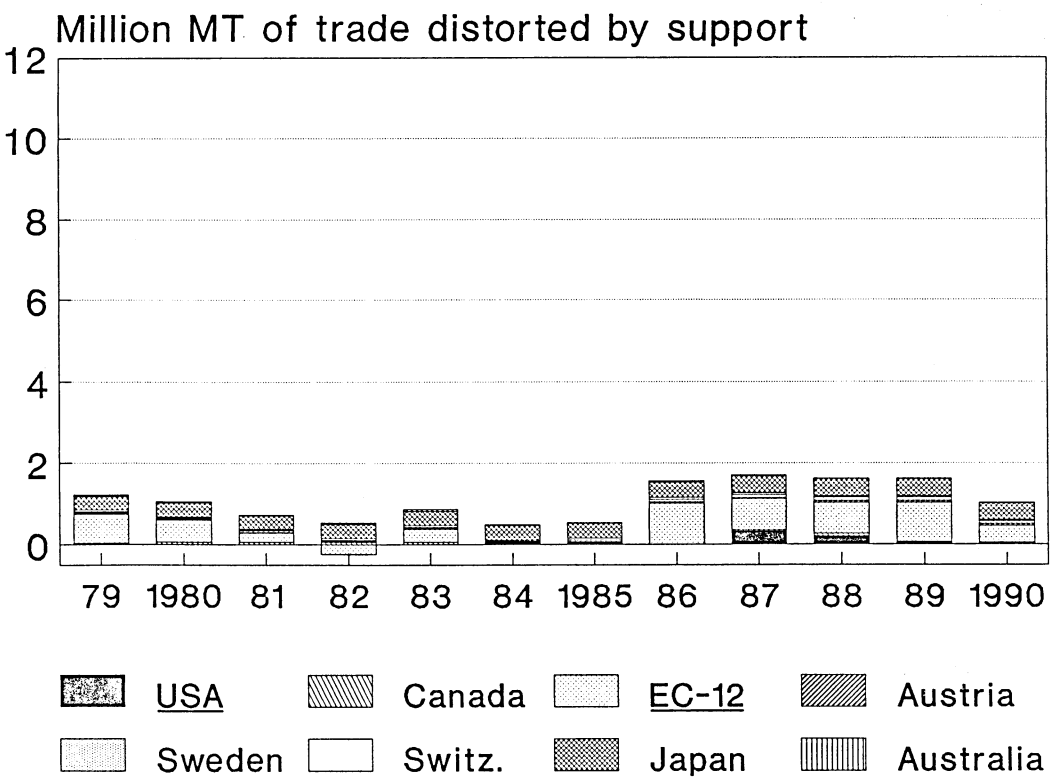
Source: Calculated from OECD reports.

POULTRY MEAT



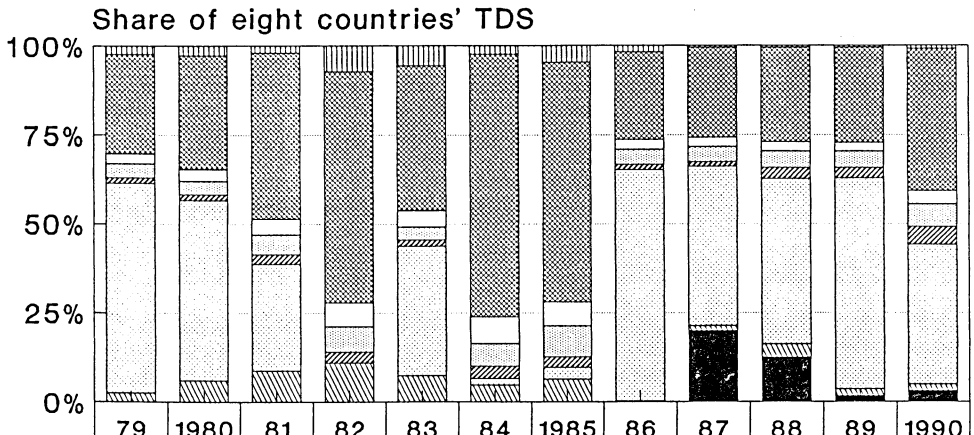
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	276	284	287	302	316	304	315	264	275	284	249	249
Switz.	43	42	42	45	48	49	52	56	62	69	67	67
Sweden	41	36	45	44	43	41	41	52	51	59	58	59
Austria	19	20	21	19	16	20	17	20	17	64	80	76
EEC-12	1673	1320	596	1043	1265	1094	1410	2092	2896	3245	2518	3064
Canada	115	127	195	180	158	81	55	-23	142	154	154	170
USA	-73	-78	0	-95	-104	-45	-69	728	3283	575	104	219

TDS data in table in 1,000 metric tons.



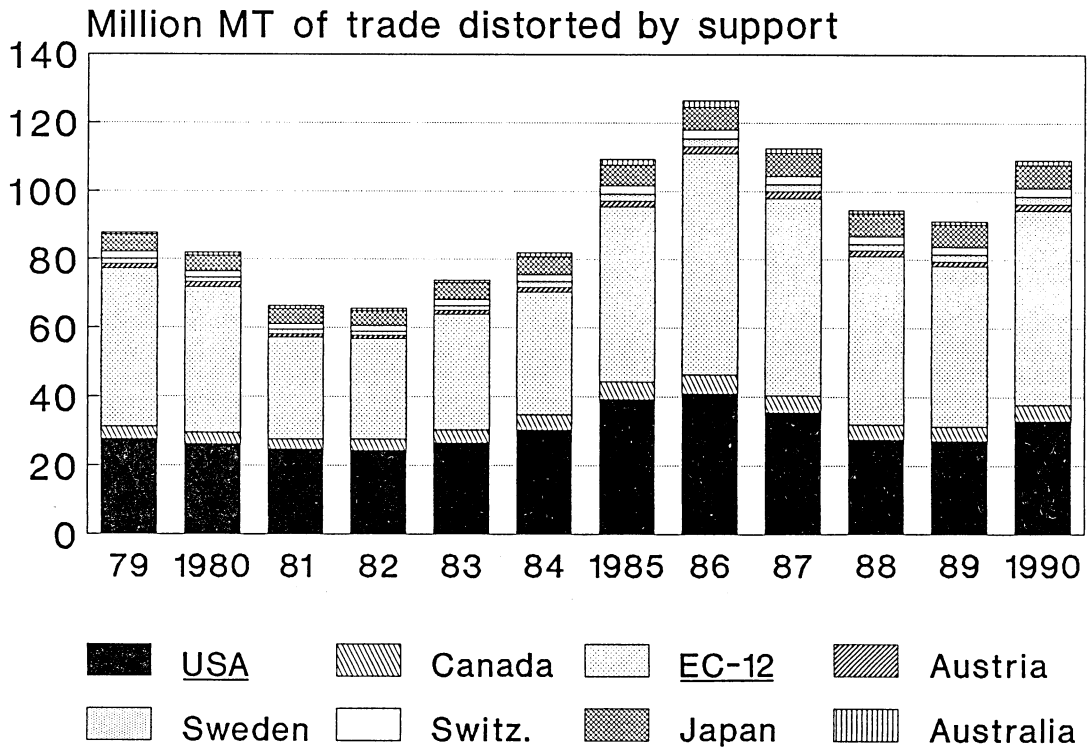
Source: Calculated from OECD reports.

EGGS



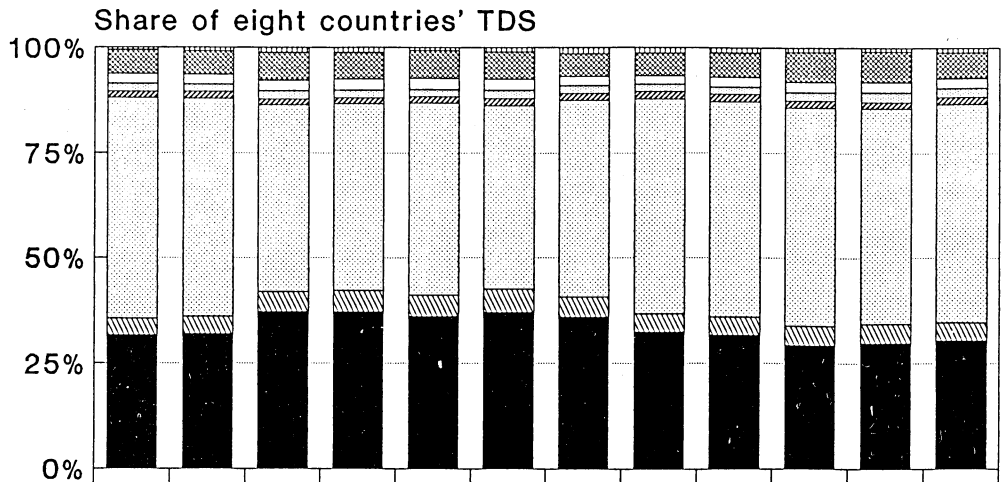
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	29	29	15	40	49	12	26	30	12	11	11	11
Japan	339	336	338	352	352	360	364	380	427	430	432	406
Switz.	37	34	32	36	39	36	37	43	42	42	40	37
Sweden	46	40	40	39	32	31	47	69	74	77	75	65
Austria	19	17	20	17	15	18	16	23	20	50	49	51
EEC-12	717	533	217	-232	316	9	18	1015	761	757	965	403
Canada	31	63	65	60	65	23	35	3	25	61	30	17
USA	-3	-3	0	0	-5	-1	-5	-2	339	206	29	33

TDS data in table in 1,000 metric tons.



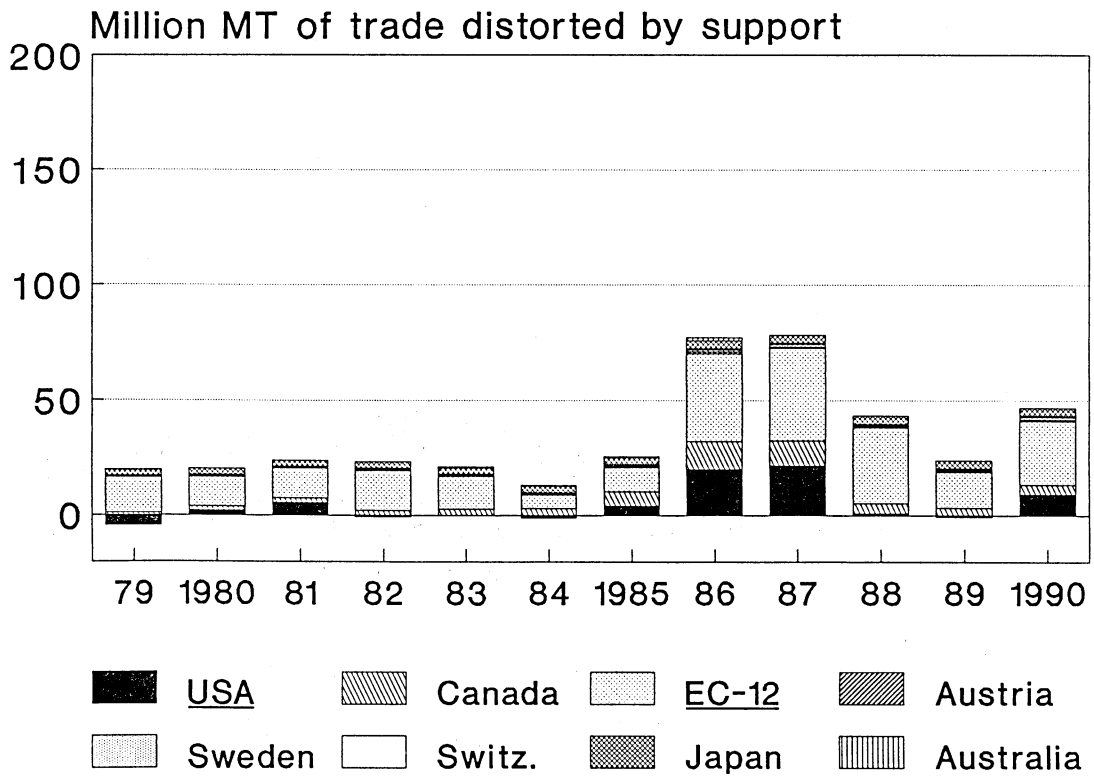
Source: Calculated from OECD reports in fluid milk equivalents).

MILK PRODUCTS



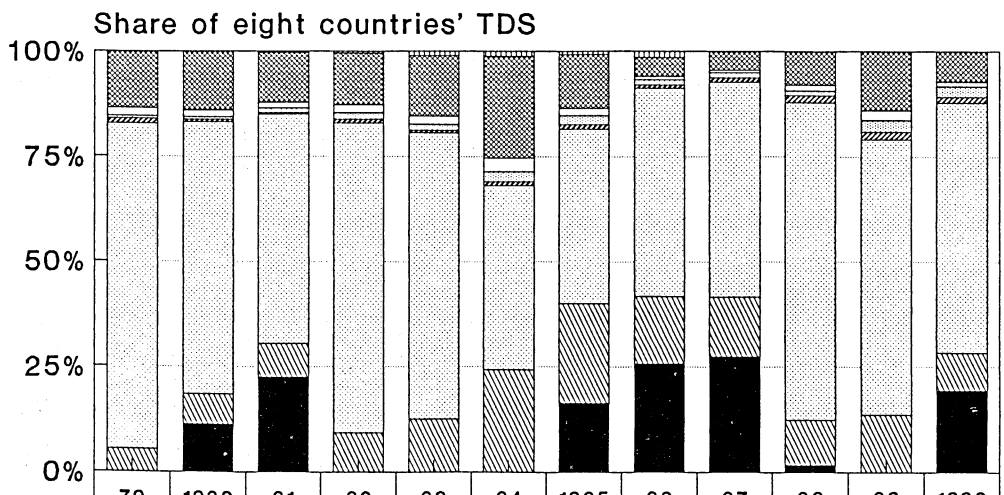
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	611	827	879	842	657	990	1716	1891	1382	1044	973	1232
Japan	4971	4489	4331	4160	4858	5265	5911	6708	6668	6627	6551	6739
Switz.	2061	1929	1698	1712	1925	2042	2350	2622	2552	2344	2233	2478
Sweden	1526	1360	1237	1145	1263	1690	2062	2098	1963	1865	2017	2249
Austria	1391	1380	947	928	1119	1316	1837	2187	2023	1632	1488	1883
EEC-12	45905	42400	29545	29173	33705	35856	51045	64572	57537	48958	46661	56616
Canada	3515	3359	3159	3345	3725	4437	5121	5383	4906	4365	4224	4725
USA	27771	26151	24606	24390	26644	30293	39187	40957	35455	27665	27223	33126

TDS data in table in 1,000 metric tons.



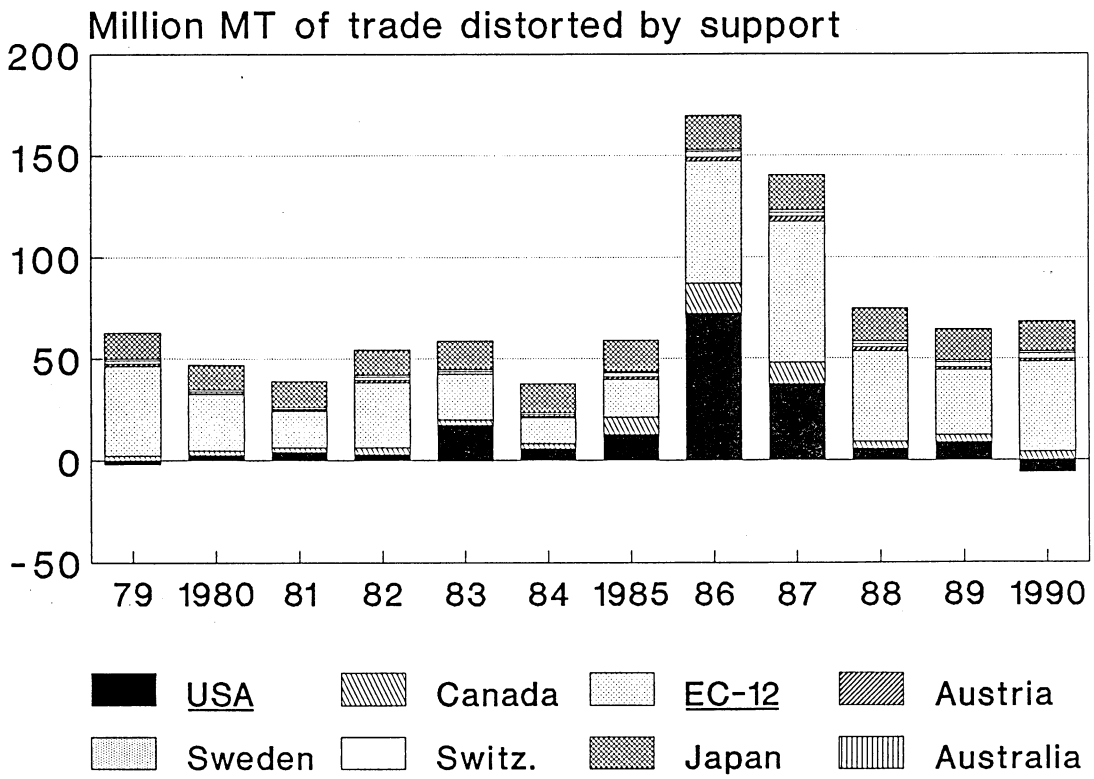
Source: Calculated from OECD reports.

WHEAT



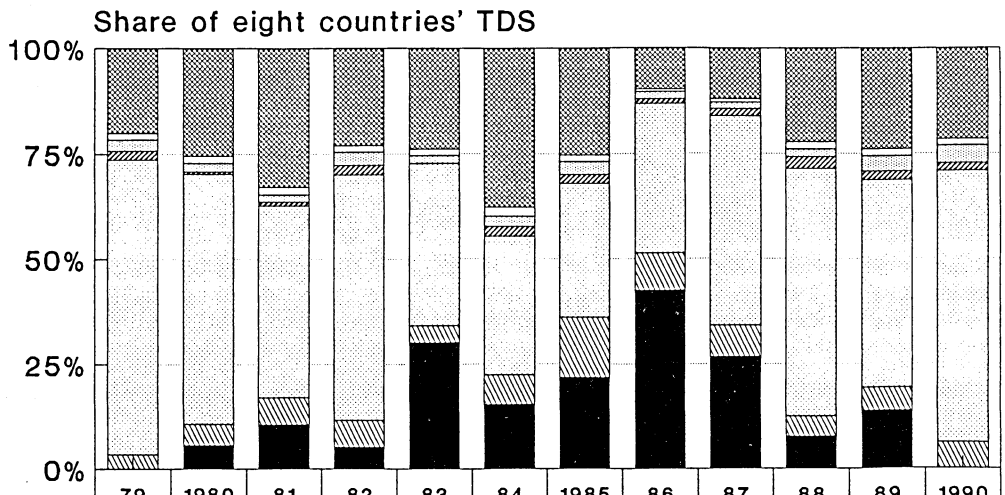
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	-325	-5	99	121	254	162	201	1201	19	2	0	0
Japan	2672	2818	2839	2879	2971	3091	3244	3517	3502	3493	3374	3399
Switz.	338	306	306	409	405	426	429	496	512	566	540	480
Sweden	139	143	272	371	300	303	557	948	941	502	663	1124
Austria	240	124	85	210	134	131	272	574	822	719	436	636
EEC-12	15156	13002	13080	17227	14249	5641	10616	38231	40082	32602	15671	27744
Canada	1064	1471	1913	2187	2645	3111	6032	12385	11103	4596	3271	4149
USA	-4267	2280	5403	-574	-188	-1106	4191	19834	21496	750	-678	9081

TDS data in table in 1,000 metric tons.



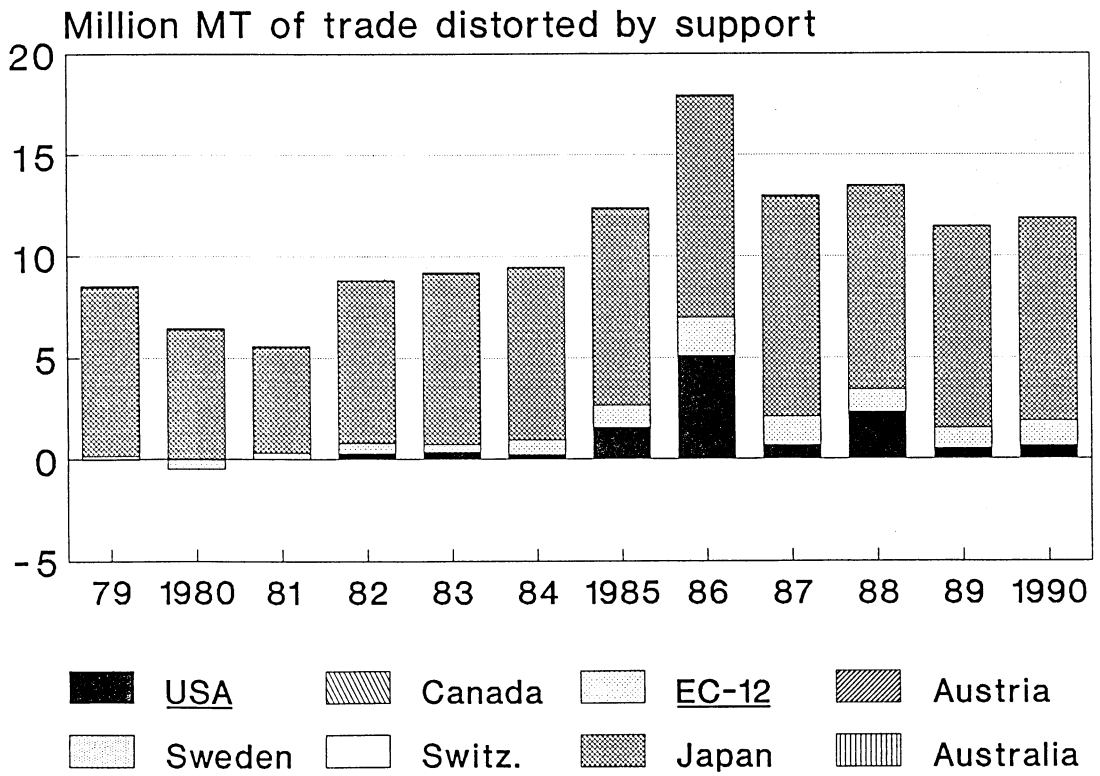
Source: Calculated from OECD reports.

COARSE GRAINS



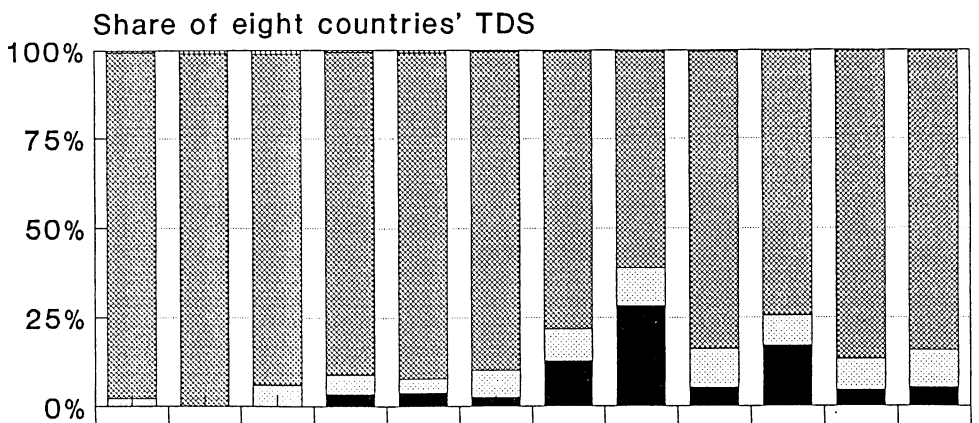
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	3	4	4	8	10	6	6	0	0	0	0	0
Japan	12683	11962	12856	12605	14100	14280	14943	16860	17124	16667	15540	14801
Switz.	904	795	712	857	894	807	872	1007	1060	1228	1084	1081
Sweden	1641	919	666	1683	1075	914	1822	2822	2143	1485	2295	2871
Austria	1328	284	334	1250	-166	898	1282	1723	2401	2066	1381	1235
EEC-12	44022	27818	17924	31847	22663	12405	18752	60202	69676	43951	31888	44154
Canada	2209	2340	2474	3578	2337	2675	8410	14929	10291	3557	3582	4269
USA	-1770	2696	4170	2841	17620	5823	12787	72081	37454	5921	8929	-5841

TDS data in table in 1,000 metric tons.



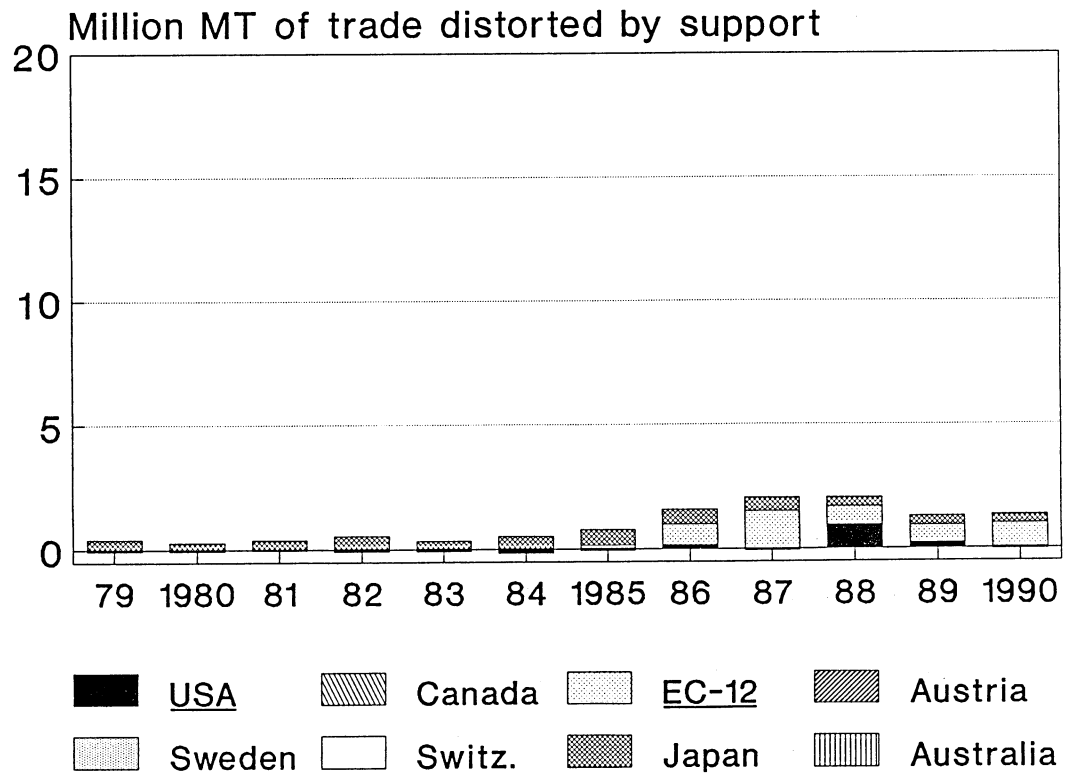
Source: Calculated from OECD reports.

RICE



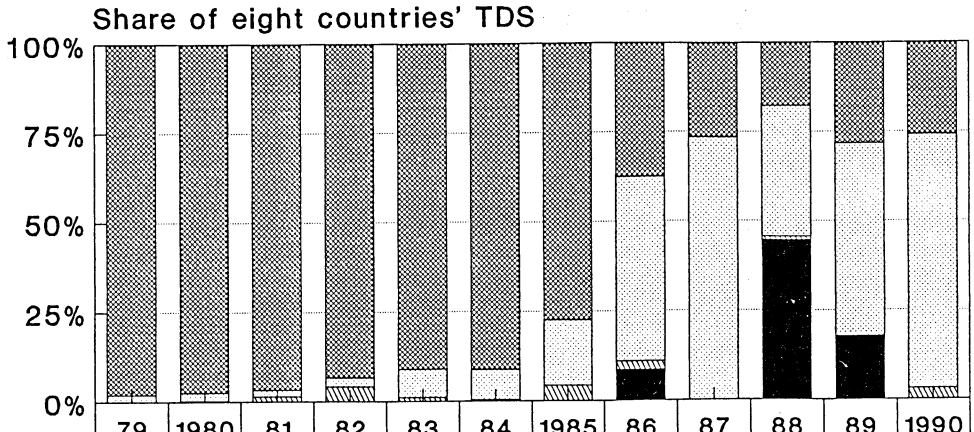
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	48	61	65	60	72	42	51	67	66	33	34	26
Japan	8313	6403	5171	7996	8417	8461	9635	10891	10824	10007	9896	9965
Switz.	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0	0	0	0	0
Austria	0	0	0	0	0	0	0	0	0	0	0	0
EEC-12	188	-446	333	482	377	709	1109	1896	1400	1127	994	1228
Canada	0	0	0	0	0	0	0	0	0	0	0	0
USA	-25	-20	9	313	352	252	1576	5089	690	2308	533	640

TDS data in table in 1,000 metric tons.



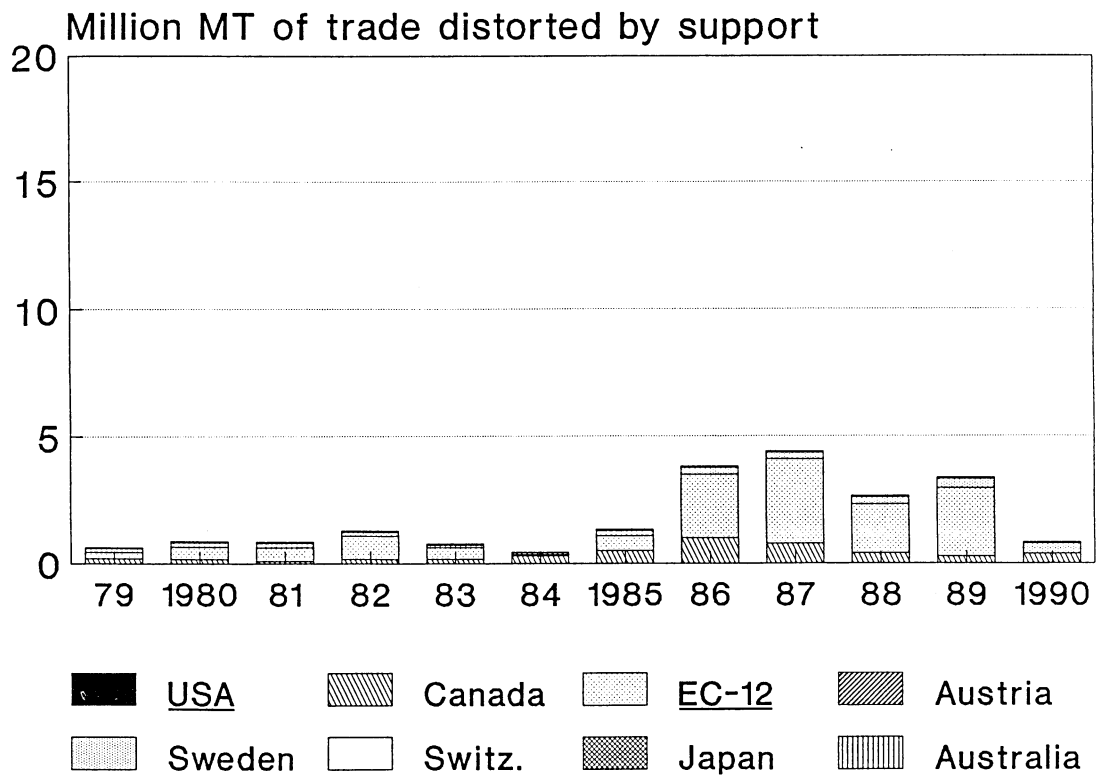
Source: Calculated from OECD reports.

SOYBEANS



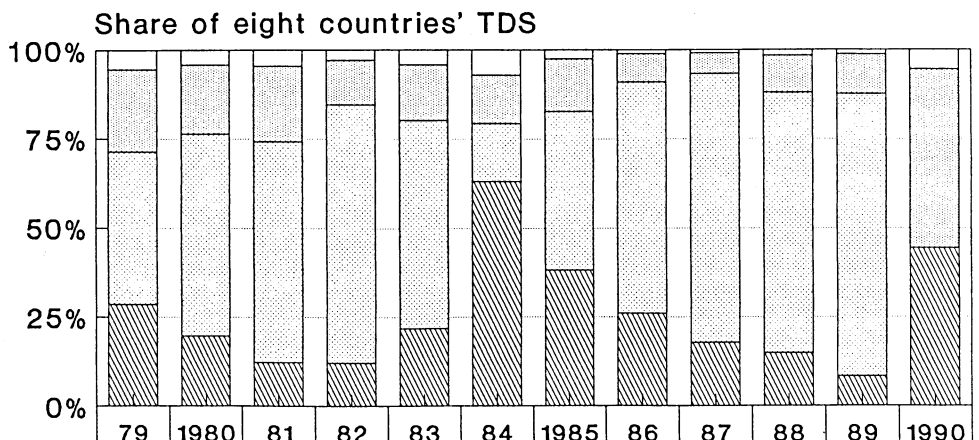
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	422	296	379	517	312	473	602	601	550	365	362	346
Switz.	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0	0	0	0	0
Austria	0	0	0	0	0	0	0	0	0	0	0	0
EEC-12	9	7	7	14	27	44	143	824	1512	750	688	942
Canada	0	1	6	23	4	2	34	37	2	19	2	42
USA	-50	-49	-7	-64	-59	-143	-47	140	-39	918	226	-11

TDS data in table in 1,000 metric tons.



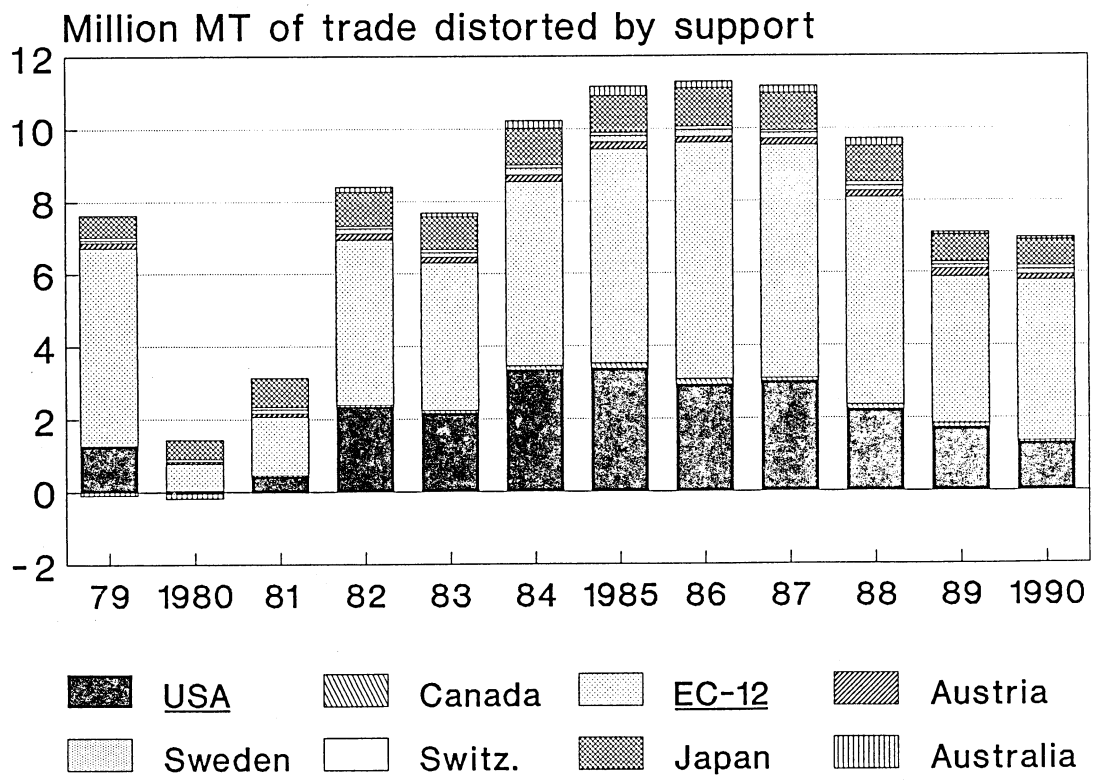
Source: Calculated from OECD reports.

RAPESEED



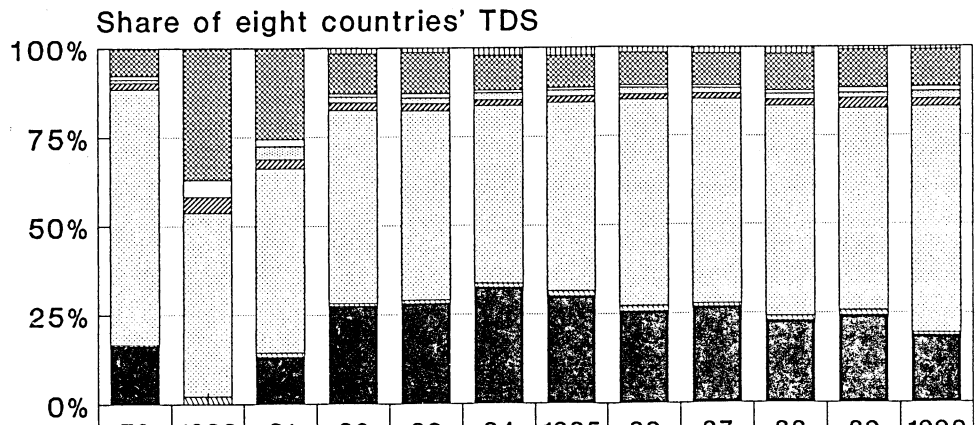
	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0	0	0	0	0
Switz.	35	36	38	38	32	32	35	44	47	45	48	45
Sweden	147	169	178	160	120	62	194	302	249	274	370	408
Austria	0	0	0	0	0	0	0	0	0	0	0	0
EEC-12	272	489	519	924	447	72	586	2473	3316	1930	2661	0
Canada	182	172	103	156	168	286	505	996	783	393	281	361
USA	0	0	0	0	0	0	0	0	0	0	0	0

TDS data in table in 1,000 metric tons.



Source: Calculated from OECD reports.

REFINED SUGAR



	79	1980	81	82	83	84	1985	86	87	88	89	1990
Australia	-86	-149	-19	149	101	222	270	185	211	200	70	69
Japan	601	526	803	934	896	1004	1008	1055	1013	994	766	725
Switz.	82	68	63	73	89	84	83	85	81	101	94	96
Sweden	71	-7	111	147	133	190	178	195	157	149	106	144
Austria	137	63	81	179	152	179	202	160	179	178	204	152
EEC-12	5453	735	1621	4542	4072	5104	5897	6543	6432	5736	4045	4417
Canada	26	31	38	60	65	100	155	155	102	119	95	51
USA	1248	-26	414	2325	2161	3344	3369	2916	2997	2228	1736	1308

TDS data in table in 1,000 metric tons.

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