THE TRADE DISTORTION EQUIVALENT (TDE): AN AGGREGATE INDICATOR OF ADVERSE TRADE EFFECTS OF MEASURES OF SUPPORT AND PROTECTION FOR AGRICULTURE

A Technical Discussion Paper By Canada

SUMMARY

The purpose of this paper is to put some meat on the bones of the concept of the TDE (Trade Distortion Equivalent) as a basis for its further consideration and discussion in the context of its possible use in the Uruguay Round of MTN's. It describes a general approach to the measurement of TDE's and provides illustrative examples of choices which might be made on some of the more negotiable aspects of this approach. In addition it identifies and discusses three alternative roles, - "monitoring", "target and evaluative" and "contractual commitment", - which such an aggregate measure might play in the overall process of the negotiations on agriculture. In all cases the TDE is seen as augmenting and complementing, rather than replacing, traditional GATT instruments and disciplines.

The paper describes a "modified PSE" approach to the calculation of TDE's. Two basic steps would be involved. The first would be to classify all agricultural programs into three groups: (1) non-distorting, (2) partially-distorting and (3) fully-distorting. The first group could include programs like research, extension, inspection, food aid, resource conservation and adjustment assistance, infrastructure development and disaster payments, and would be omitted completely from the TDE calculation. For the third group, which would include open-ended price support and direct payments, and all export subsidies, the TDE value would be the same as the PSE value. In the second group could be included programs incorporating some supply-constraining feature like supply management, set-aside, a frozen historical payment base, etc. and market-oriented stabilization and crop insurance programs. In the cases of such partially-distorting programs, the PSE value would be adjusted downwards, in some cases substantially, by a negotiated "credit" factor, to arrive at a TDE value lower than the corresponding PSE. The overall result would be aggregate TDE numbers considerably lower than aggregate PSE numbers in most cases, and much more accurately reflective of the actual trade effects of various types of support and protection measures.

It is presumed in the paper that the appropriate methodology for determining PSE values is already widely understood and accepted as practicable. The PSE approach is well documented elsewhere. Consequently this paper devotes most attention to how PSE values, once derived, would be adjusted to generate TDE values. This adjustment is only necessary for measures classified in the "partially-distorting" category.

Issues which would arise in the use of the TDE or any similar quantitative indicator, include the existence of cross-commodity distortions, the problem of external reference price fluctuations which are outside the control of individual governments, the range of commodities (and levels of processing) to be covered, and whether negative TDE's would be treated in the same way as positive TDE's. Some possible approaches to handling such issues are also discussed in the paper.

I. BACKGROUND AND INTRODUCTION

Canada has proposed the use in the current round of negotiations, of a concept called the TDE, which would be essentially a single summary indicator of the combined effects, on production and trade volumes, of the whole set of any given country's support and protection (hereafter "support") measures. The main purpose of this paper is to explain in more detail how the TDE could be calculated and applied.

A large number of countries have recognized the desirabliity of finding a negotiating approach which measures in an aggregate fashion the trade distorting effects of national agricultural policies. In short, a measurement which not only deals with tariffs, non-tariff import barriers and export subsidies but also includes the production and trade impact of domestic subsidy programs and support policies.

A major advantage of an aggregate measure such as the TDE is that it provides governments with the means to establish an agreed starting point and a specific and visible negotiating objective (i.e. reduce the TDE by X per cent over Y years) in a manner analogous to the targets for industrial tariff formulae in previous GATT rounds.

The case for an aggregate negotiating approach is compelling. Past negotiations conducted on a request and offer, item by item, instrument by instrument basis were not successful. Internal agricultural policies and frontier measures form an integral whole and cannot be discussed in isolation. Similarly, the existence of significant cross-commodity linkages suggest that an approach that results in a balanced reduction across commodities is necessary in order to avoid creatig additional distortions.

Like the Producer Subsidy Equivalent (PSE)[1], the TDE would take account of the effects of direct government payments, as well as those of administered pricing policies and border measures. Reductins in the level of a country's TDE could thus imply reductions in both subsidy levels and access barriers (protection).

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[1]
This is a technical discussion paper and not a Canadian position paper.

The calculation of the TDE would exclude programs and policies which could be agreed to be largely production-neutral (irrespective of how much income they transfer to farmers). It would also take account of the fact that even some types of support measures whose benefits to farmers are proportional to output volumes have features (e.g., production quotas, set-aside) which can dampen their production-stimulating effects below what would be expected from a simple, open-ended price subsidy. These important concepts can be incorporated as modifications to the calculation of the PSE, which is already widely tested, proven and understood: the proposed TDE is thus a modified PSE.

The two principal issues involved in the measurement of a TDE using a "modified PSE" approach[2] are:

(1) The classification of all agricultural support measures into three groups:

a) non-distorting (largely production neutral with little or no impact on production and trade) - not to be included in TDE calculation (TDE value zero);

b) partially-distorting (TDE value less than PSE value); and

c) fully-distorting (TDE value equal to PSE value);

(2) For the second group of partially distorting measures to specify the relationship between the PSE value and the TDE value[3].

Neither set of proposals is complete, in the sense of covering every type of support measure currently in existence in GATT member countries, but it is believed that most of the more important distorting measures in the more important agricultural trading countries are covered, and that such coverage may suffice as a starting point for further discussion.

It is recognized that, were such a TDE to be accepted for use in the negotiations, - either along the lines proposed here or in some other role, - both the classification of individual measures and the level of "credits" attributed to each measure included in the second, "partially distorting", group would be ultimately negotiable.

It must also be noted that an aggregate measure approach is not sufficient by itself to ensure a comprehensive reform of the agricultural trading system. A comprehensive approach must also deal with changes in GATT principles and rules; e.g. mandatory ceiling bindings on all tariffs lines, elimination of "grandfathered" exceptions and waivers, effective rules on all trade measures including variable import levies, minimum import price systems and voluntary export restraints. The use of the TDE could complement the more traditional GATT instruments.

In addition to outlining more precisely, in Sections II and III below, how the TDE might be calculated, this paper also discusses some practical problems in the application of TDE's and possible means to overcoming them in Section IV, as well as possible roles for the TDE in the negotiations, in Section V.

II. CLASSIFICATION OF SUPPORT MEASURES

As indicated above, the calculation of a TDE requires a three-way classification of all agricultural support measures. An illustrative classification follows:.

1) Non - Distorting Measures

1.1   Research;

1.2   Extension/Education;

1.3   Markets Information;

1.4   Inspection/Grading;

1.5   Non-commodity-specific Infrastructure Development;

1.6   Domestic Food Aid (e.g., food stamps, school lunches);

1.7   Unconditional Foreign Grant Food Aid;

1.8   Disaster Payments;

1.9   Generally-available (non-commodity-specific) Income Support Payments not based on commodity output or resource input levels;

1.10   Resource Adjustment Assistance (e.g., grants/subsidies for relocation, retraining, retirement, farm-based tourism development, etc., and job market information);

1.11   Conservation and Resource Retirement Payments, and Input Use (e.g., fertilizer) Taxes for Ecological and Environmental Purposes;

1.12   Transitional Compensation Payments for Wealth or Income Losses due to Policy Changes (only where production-neutral: e.g., commodity-specific payments based on an individual's recorded level of planting/production/marketing/quota in a period prior to the first announcement of the program);

1.13   Government-funded Stock-holding Activities.

1.14   Farm Development/Investment Grants, Subsidies (including
        interest rate subsidies) and Tax Incentives generally
        available to the whole farm sector (i.e.,
        non-commodity-specific: e.g., for all types of land
        drainage, irrigation, fencing, farm buildings, and for
        farm purchase);

1.15   Non-Commodity-Specific Purchased Input Subsidies and Tax
        Incentives (e.g., for fuel, non-specific fertilizers,
        hired labour, etc.);

        Some brief discussion of the reasons for the inclusion of the
last four items as "non-distorting" measures, may be appropriate. It is
well recognised that the benefits of many types of agricultural support
measures become largely capitalised into the value of scarce assets, like
farmland and production quota rights. To the extent that this is so,
then a reduction of such support could be expected to result in a decline
in the market value of such assets, and thus in a capital loss to asset
owners. Where it is not so, then a reduction in the support level would
have a proportionately larger impact on the current net incomes of
agricultural producers. In either event, and for various reasons, some
governments may decide that some payment of compensation for wealth or
income losses suffered as a result of policy changes which reduce support
levels are justified. While instances of such compensation have not been
common in the past, they may well become more important in the future if
GATT member countries agree, in the current MTN round, to substantial
multilateral reductions in production-distorting types of support.
Providing such compensation payments were clearly transitional
(non-permanent) in nature, and providing that they were linked to asset
holdings and income levels in a previous (pre-policy-change) period and
not the current period, then such payments could be reasonably argued to
be production neutral.

        Item 1.13 refers only to the pure activity of public
stockholding alone; i.e. to the purchase, holding and sale of stocks by a
government agency. The reader should note that the trade effects of
other, often-associated features of support packages which include public
stockholding, - such as export subsidies and domestic prices maintained
above world equivalent levels, - are included under "fully-distorted"
measures, and would be captured in the TDE calculation in the same way as
they are, for example, in the PSE calculations for many EEC commodities.
Thus the relevant question here is whether there is a significant trade
effect of public stockholding activities over and above any associated
price gap effect. This issue is discussed further in Annex B. It is
concluded that "pure" stockholding activities can not provide a feasible
means of sustained farm income support.

Generally-available programs, such as those included in items 1.14 and 1.15 above can distort resource allocation as between the agricultural and non-agricultural sectors. However, they are not believed to significantly influence the allocation of resources within agriculture (between agricultural commodities). Hence their inclusion as non-distorting measures here.

2) Partially-Distorting Measures

2.1 Government-Funded Stabilization and Crop Insurance Schemes;

2.2 Market Price Support associated with:

    a) Transferable and Negotiable Production Quotas held at the individual producer level and for which a marʰ̍ʳt-determined price can be readily observed.

    b) Effective over-quota penalty levies equal to at least the difference between the supported price and the equivalent world price;

2.3 Deficiency Payments Linked to or Conditional on:

    a) Resource Withdrawal with a demonstrable supply impact (e.g., set-aside requirements), and/or

    b) Historic (non-current) Yield Bases.

Implicit in the list of "partially-distorting" types of support measures are some tightly-constraining rules which would determine when some degree of "credit", in terms of a dilution of the PSE value, could be allowed. For example, it would not suffice that a measure be called a "stabilization" program. It would have to be predominantly stabilizing in nature, with a support level which was transparently determined by application of a pre-assigned formula, which was market-oriented (market price linked) and which was below 100 percent of historic levels in inflation-adjusted terms.

Similarly, there is a need to distinguish between production quotas which, in effect, are little more than targets, and those which are effectively binding. The key to this is significant penalties for over-quota production. This in turn implies that the quota must be held at the individual farm level, since, if penalties for over-quota production are "pooled", e.g. at the level of the dairy (processing plant), then the incentive for the individual producer not to over-produce can be negligable. A further requirement is that the production quota rights be legally negotiable between individual producers and that a freely determined market price for them be readily observable. This also provides an indication that the quota is effectively binding, as well as providing an economic indication of the

extent to which the supported price exceeds that market price which would be sufficient to induce production at the managed level. This, in turn, is the basis for estimating how much less production-distorting is a given level of market price support in the presence of such supply control, and thus for adjusting the PSE (which is the same with or without supply control) downward when supply control exists.

The details of the proposed downward adjustment of pre-determined PSE values, in the case of all types of measures included in this second, partially-distorting category are discussed in the next section.

3) Fully-Distorting Measures

3.1 Commodity-Specific Farm Development/Investment Grants, Subsidies (including interest rate subsidies) and Tax Incentives (e.g., available only for specialized crop harvesting machinery, livestock equipment, or storage facilities);

3.2 Commodity-Specific Purchased Input Subsidies and Tax Incentives (e.g., crop harvesting labour, crop-specific fertilizers or agricultural chemicals);

3.3 Open-ended Output-based Deficiency Payment or Fixed Subsidy Support;

3.4 Open-ended Market Price Support via some combination of:

   a) Quantitative or other import restrictions,

   b) Fixed or variable import levies/tariffs,

   c) Fixed or variable export restitutions/subsidies (including transport subsidies, concessional food aid, subsidized credit and targetted subsidies),

In the third "fully-distorting" group fall all measures which are essentially output-linked, in the sense that the degree to which an individual producer derives benefits increases proportionately with the level of his output, either because input price levels he faces are reduced by the measure or (more commonly) because output price levels are increased, - via market price support or direct (deficiency) payments based on records of farm production or sales. They are also "open-ended", in the sense that not only do farmers benefit according to the amount they produce, but also that they are free to produce as much as they want to. In the calculation of the TDE, it is assumed that all such measures distort production to the same extent as a simple subsidy of equivalent income value, and thus that the unadjusted PSE levels are also appropriate as a proxy indicator for the production distortion level.

III   CALCULATION OF TDE FOR PARTIALLY-DISTORTING MEASURES

        This Section outlines how PSE values could be adjusted to derive TDE values for several important types of "partially distorting" support measures.

(a)   Government-Funded Stabilization and Crop Insurance Schemes (2.1 in Section II):

        It should be recalled that, in the case of such schemes being cost-shared between governments and producers, the calculation of a PSE value should already have netted out the value of producer contributions to the fund[4]. For both cost-shared and fully-government-funded schemes, the question remaining, with respect to the conversion of the PSE value to a TDE value, is whether some discounting of the net fiscal cost of such a scheme is appropriate.

        Qualitative arguments in the affirmative tend to be based on two main considerations. One of these is that such schemes help to dampen short-term fluctuations in production and thus contribute some stability to the international market, - to the benefit of other countries. The other is that, by providing only a support floor based on a fraction of a moving average of historic prices, most such schemes are market-oriented and are not (and can not be) the source of perennial subsidization[5]. When farmers expect that future years payments under such a scheme must decline if market prices remain constant, then a given payment in the current year is likely to have less impact on their productive investment decisions in the current year than would the same payment as a simple "add-on" subsidy not linked to market prices and whose value in future years could reasonably be expected to be no different or even growing.

        The proposed adjustment (see Annex A.1 for detail) attempts to take explicit account of only the second of these qualitative arguments. It recognizes that the expected subsidy payment over the long term under a government-funded stabilization scheme providing a support floor depends, in particular, on two program design parameters. These are the percentage of historic market price levels at which support is provided and the number of past years' prices taken into consideration in calculating such an historic base price. These, together with the direction and the rate of trend in market prices determine the "richness" of the program over the long haul. A formula, for adjusting the PSE value to obtain the TDE value, which incorporates these three variables is thus proposed (Annex A.1).

        The philosophy underlying this proposal is that current levels of program payouts (and PSEs) will be discounted by farmers, in terms of affecting their next and subsequent years' production levels, to a greater or lesser extent depending on how "rich" the program is perceived to be over the longer term. In a sense this provides an alternative way

of replacing a, perhaps atypical, single year payment level with
something which is more representative of a long-term average payment
under the program in question, but which does not depend on the existence
of many years of observed payment levels. To the extent that there is
good reason for farmers to discount current payment levels in determining
their future expectations, then the formula would result in the TDE being
correspondingly lower than the PSE.

Adjustment would only be considered in the case of programs
where formulae for the calculation of support and payment levels were
fully transparent and predetermined. In other cases it would have to be
assumed that farmers would base their expectations about future payout
levels on recent past payments, which would not justify any downward
adjustment of PSE values.   •

(b)   Market Price Support with Production Quotas (2.2 in Section II)

The introduction of effective limits on the level of aggregate
production can serve to reduce the level of distortion which prices
administered at above-world-market levels engender on the supply side.
It does nothing, however, to diminish the distortion they cause on the
demand side. Such a policy, therefore, represents an exception to the
general premise underlying our proposed approach to TDE estimation, -
namely that, if steps are taken to reduce supply side distortions
(production stimulation), then a commensurate reduction in demand side
distortions (consumption depression) will automatically follow. For this
reason, it is also proposed to make an exception here to the general
attempt to make the calculated TDE proportional to supply side
distortions only.

It is quite conceivable that quotas could be set stringently
enough to completely offset any supply distortion which the higher prices
might otherwise induce (i.e. set at the level of production which would
occur if producers faced world-equivalent prices). It would not be
appropriate, however, for the TDE to be reduced to zero in such a
situation if significant demand side distortions still remained[6].

The key to the two alternative adjustment formulae proposed in
Annex A.2 is the use of the observed market value of per unit production
entitlements to determine what domestic market price would generate the
managed level of domestic supply in the absence of controls. The extent
to which production is distorted will be proportional to the degree to
which this latter price exceeds the world market equivalent price. The
PSE, on the other hand, is based on the extent to which the administered
price exceeds the world price, - a larger amount. Both proposed formulae
essentially adjust the PSE value downward by an amount equal to the ratio
of these two price differences, while explicitly recognizing the
continued existence of (supply-management-unaffected) demand side
distortions. The two formulae offered differ only in that in one case a
further adjustment is made for relative differences in levels of supply
and demand responsiveness. This further adjustment would be appropriate

if agreement could be reached on the values of such price response coefficients (elasticities) in the cases of the countries and commodities where supply management is practised.

(c) Deficiency Payments with Set-Aside and/or Historic Bases
     (2.3 in Section II)

        Set-aside is taken here to mean an obligation to remove farm land from the production of, at least, all cash crops. No credit would be given if the substitution of another crop was possible since such a requirement would only serve to divert the distortion from one commodity area to another. A supply impact of the conditionality feature of the support program would also have to be demonstrable.

        It is clear that resource retirement conditions, where they exist, do serve to reduce the production distortion which deficiency payments, or other types of direct payments, would otherwise induce. In the case of the U.S. crop programs, for example, producers are only entitled to receive deficiency payments if they have met certain "set aside" requirements for taking some of their land out of (crop) production. For the rest of their production they are guaranteed a given "target" price. The actual deficiency payment made is the difference between the (average) price actually received by farmers from the market (in many years this has been the "loan" price) and the target price. A reasonable argument can be made that the higher the percentage of participating farmers' base acreages required to be idled the lower will be the effect of any given level of deficiency payment in stimulating extra production. The PSE adjustment formula proposed in this case (Annex A.3) results in a lower TDE the higher the percentage set-aside requirement.

        Deficiency or other forms of direct payments may be made on the basis of some past, "historic" crop acreage base or yield base, or both, rather than on current production or sales records, and whether or not there is a set aside requirement. It can reasonably be argued that if farmers believe that current production and yields can in no way affect present or future payment entitlements then such payments will have no production distorting effect. However, even where current year payments are dependent only on historic production levels, current production can be stimulated to the extent that farmers believe that their future payment entitlements could depend on their production records for the current year. It is postulated here that the longer the base acreage and base yield has remained frozen then the more likely will farmers be to believe that their current production will not influence their future payment entitlements, and the lower will be the influence of current payment levels on current production. The proposed formula for TDE calculation in this case would result in a greater downward adjustment in PSE the longer farmers' acreage and yield bases have remained effectively frozen.

In cases where both a set aside requirement and a historic acreage/yield base system are in place the simple formulae proposed can be easily combined. Where producer participation was voluntary an adjustment would be made to allow for less than 100% participation rate in the calculation of the overall average TDE (a similar adjustment is made in the calculation of the PSE).

IV   SOME ISSUES IN THE CALCULATION AND APPLICATION OF TDE's

(a)   Cross-Commodity Policy Distortions: The Need for Balanced TDE Reductions

Evidence continues to accumulate about the importance of cross-commodity policy effects on production volumes and world prices. The TDE, like the PSE and other measures of support, is only an indicator of the effects on a given commodity of measures supporting the commodity itself. However, distorted production of a given commodity can also arise because of support policies in other commodity areas. A quantitative indicator which took account of distortions created in one commodity area by policies in all sectors is theoretically conceivable but too complex to be practicable in the MTN context.

A practical and effective way to take such cross-commodity distortions into some account in the GATT negotiations would be to impose constraints (balance) on the degree to which targetted TDE reductions in any one commodity area should be allowed to differ from those agreed for the average across all commodities. Canada has already proposed such a constraint in its opening negotiating position paper. Recent results from simulations with a multi-country multi-commodity world trade model suggest that concentrating support reductions in just one or a few commodity areas can aggravate problems in other commodity areas[7].

(b)   Issues Relating to External Reference Prices

There are several of these. Arguably the most important is the problem of exogenous changes in external reference prices, particularly as a result of exchange rate fluctuations, which result in corresponding fluctuations in calculated TDE levels, and, therefore, in the latter being somewhat outside the control of Governments. The importance of this problem depends on the precise role chosen for the TDE in the negotiations (see Section V). It is conceiveable that for the years covered by each negotiation tranche the TDE would always be calculated using external reference prices fixed at actual or forecasted levels as of the base period adopted for that tranche. In other words, progress would be judged in terms of base period conditions, in which case subsequent changes in external reference price levels would not be a problem. If TDEs were to be updated using actual (changing) external reference prices the problem would be more serious. In this case,

however, a mechanism could be devised by which TDE commitments of individual countries would be automatically adjusted in line with changes in each country's trade-weighted or SDR (IMF special drawing rights) exchange rate. This could reduce the problem to world price changes unrelated to exchange rate changes, which would impact evenly on all countries.

Another issue is the choice of which external prices to adopt in calculating base period or "starting point" TDEs. The existence of considerable fluctuations in world price levels ot many commodities in recent years may lead some to propose taking the average of several past years in order to obtain more "representative" values. However, the key relevant question is whether current support policies are appropriate to future world market and economic conditions rather than whether they were appropriate to past conditions. Today's exchange rates and commodity price levels may be more indicative of future conditions than the corresponding averages for several past years. Alternatively, long term forecasts of such factors by an independent agency, such as the World Bank, may provide an even more appropriate basis for TDE calculations. Unless there arises clear evidence that a longer historic period would be more reflective of the future, or clear agreement on the existence of appropriate long term forecasts, the most recent available estimates of actual exchange rates and commodity prices may be the most appropriate for use as the basis for TDE calculations.

A further issue relates to the appropriate external reference price being higher when a country is on an import basis than when it is on an export basis. This can result in anomalies such as two neighbouring countries having the same support price level but different TDE values simply because of one being a slight net exporter and the other a slight net importer. Similarly a country's TDE may suddenly rise from one period to the next without any change in support measures but simply because the country moved from a (slight) net import to a (slight) net export position. One suggestion made to address this issue in the PSE context may also constitute the best approach to overcoming such problems with the TDE. This would be to calculate a TDE on production up to domestic requirements based on the higher (import) external reference price, and a different TDE on any production in excess of domestic requirements based on the lower (export) external reference price. The overall TDE for exporting countries would then be the weighted average of the TDE on production for domestic requirements and the (higher) TDE on excess production.

(c)   Commodity Coverage Issues:

Quantitative indicators like the TDE are more appropriate the more homogeneous is the commodity being traded. In the absence of a single dominant reference point, for a quality or product type which represents an important part of the trade, and to which prices for other types/qualities can be reasonably assumed to be linked (e.g. cheddar as a

representative cheese price), TDE calculations would have to occur at a disaggregated level, thus increasing the logistical burden. For this reason the approach would be difficult to apply in the case of wine, for example. Similarly, the further the degree of processing, in general the more diverse the product range and the less appropriate the indicator.

Thus, at least during the first round of its use in the context of the GATT, the application of the TDE could be restricted to a limited range of the more important and more homogeneous traded commodities. The calculation could be confined to the earliest stage of processing at which substantial trade first occurs. This would be the raw farm product for many commodities like grains and oilseeds, whereas the calculation would have to implicitly cover the combination of both farm production and a first stage of processing in the cases of meats, dairy products, and sugar. As experience was gained, an extension to cover more stages of processing may be deemed appropriate for later rounds or tranches.

In principle, all primary agricultural commodities could be covered by the TDE approach. However, it is recognized that, in practice, data availability problems would likely constrain the application to the more important and more homogeneous commodities. Again, as experience was gained, the commodity coverage could later be extended.

It is important to remember that if some commodities were to be excluded initially from TDE calculations, they would still remain covered by and subject to all other GATT disciplines.

(d)   Country Coverage/Negative TDEs:

TDE values, like PSE values, can be both positive and negative. Negative TDE values are generally indicative of farmers being taxed rather than subsidized and of agricultural production being distorted downwards. Instances of this occurring are found among countries at all stages of economic development. While a negative TDE in an economic sense is still indicative of distorted resource allocation (and implicit subsidies in other economic sectors), and while we believe that the long-term development interests of the countries involved would best be served by reducing such distortions, it has to be acknowledged that the existence of such negative TDE's serves to dampen, to some extent, the adverse trade effects on a global scale of the much more dominant positive TDE's. Thus, at least until considerable progress is made towards reducing trade distorting support for agriculture generally, there is likely to be little interest in reducing negative TDE's. Consideration does need to be given, however, as to how negative TDEs would be handled. Conceptually and practically they could easily be made subject to reduction commitments in the same way as positive TDEs.

Similarly, the principle of equality-rights and of obligations among all countries is a key feature of the GATT. Pragmatically, however, there is considerable evidence that a large proportion of total world price distortion is contributed by the support policies of a relatively small number of major producers and traders. If some policy reform could be achieved in these countries, it may well be that resulting world price rises would eliminate a considerable part of the positive TDE's in the remaining smaller countries. By the, experience would have been gained in the calculation and application of TDE's as a means to agricultural policy reform, and a broader country coverage could be envisaged.

Once again, it would be important to recall that, regardless of the level of a country's TDE or the extent to which it would be affected by the use of TDE's as part of the negotiations, it would remain fully subject to all other rules and disciplines under the GATT.

V   POSSIBLE ROLES FOR THE TDE IN NEGOTIATIONS

How would a country's agreement to reduce its aggregate TDE by X per cent within a certain time-frame be incorporated in the GATT? Use of the TDE could be considered for various roles.

The first and simplest of these would be in a monitoring function. TDEs could be periodically calculated as an indication of the extent to which farm support policy changes, implemented in response to countries' obligations under various specific GATT rules and disciplines, were in fact resulting in a reduction in adverse trade effects, - both globally and at the individual country level. Since, as discussed in Section IV, changing exchange rates could have the effect of making some countries appear to be making more of a contribution to reduced global distortions than others, it may be appropriate to monitor TDE changes both on the basis of fixed and of varying external reference price levels. This would provide information on the relative impact of factors outside each government's control on the extent to which they were achieving progress in reducing the adverse trade effects of their policies.

A second option would involve the use of the TDE as a means to express, in summary fashion, countries' aggregate target commitments to trade-distorting support reduction, and as a basis for pre-evaluating each set of proposed specific commitments. Countries could reach agreement on the classification of programs, on the depth of an equal proportionate cut (first tranche) in their average (all commodities) TDE level, and on the number of years over which such a reduction would be phased in. Next, countries could agree on a target depth of TDE cut to be applied to each commodity area (which might well be the same for all commodities). Following such agreement, each country could develop implementation plans of specific verifiable program changes which it proposed to implement in order to bring about the planned TDE reduction.

These plans, which might include such details as specified
tariff rate reductions, import quota increases, target price
reductions, production quota reductions, set aside increases,
etc., could be subject to cross-verification and challenge by
other countries and possible further negotiation. The basis
of their assessment could be an assumption that world
reference prices and exchange rates would remain at current or
base period levels. Alternatively, forecasts of future values
of these prices and rates by an independent organization, such
as the World Bank, could be adopted by all countries as the
basis for assessment of the likely future TDE impact of
proposed program changes. Once agreement on the
implementation plans was reached, countries would enter into
contractual commitments to make specific program changes over
a period of years, subject to the possibility of these being
re-negotiated.

Most countries support their agriculture through a
variety of measures and several options would be open to them
with respect to how to achieve a given TDE reduction for a
given commodity. Under the second option, each country would
retain its sovereign right to choose the weight or relative
emphasis it wished to apply to particular policies in arriving
at an acceptable implementation plan. Further flexibility
could be achieved by giving countries the right to
subsequently substitute one commitment for another, subject to
agreement by a standing GATT review committee that the
proposed substitution would result in at least the same amount
of TDE reduction for the commodity and country in question as
the originally negotiated changes would have achieved.

Undertaking contractual commitments with respect to
implementation plan elements rather than the TDE reductions
themselves would have the advantage of protecting countries
from the vagaries of world price changes. A subsequent
appreciation of a country's currency (external reference price
fall) would often have the effect of increasing the TDE level,
but would not oblige the country to make greater cuts in, say,
its target support prices than had been previously agreed.
Similarly, a country whose currency was subsequently devalued
(which would result in a lower TDE even without any policy
change) would not be let "off the hook" of its support
reduction commitments.

On the other hand, long term re-alignments in
exchange rates will occur, which, over time, may make some
countries' support price levels more appropriate and those of
other countries less appropriate, relative to world market
price levels. Such problems may become more evident the
longer the length of the transition period. For this reason
it may be appropriate for implementation plans to be specified
in tranches of no more than, say, five years.

A third option could be to make the reduction of TDE's themselves the subject of contractual commitments. Given the key role played by external reference prices in the calculation of the TDE and other similar indicators, fluctuating world prices, resulting from factors unrelated to agricultural policies (e.g. exchange rate changes, weather patterns), could pose a more serious problem in this case, since there would be a need to regularly recalculate TDE levels in order to verify whether commitments were being met. On the other hand, as discussed in Section IV, a mechanism.for automatic adjustment downward (or upward) in this commitment proportionate to subsequent depreciation (appreciation) in the trade-weighted (or SDR) value of a country's currency is conceivable.

An advantage of this third alternative is that it would give more flexibility to countries and impose less on their sovereignty. For example, no specific commitments to changes to domestic program parameters would be needed.

With either the second or the third options, the traditional dispute settlement process may need to be bolstered by establishing a mechanism for ongoing monitoring of the agreed TDE reduction. A standing committee of senior policy representatives could be established to review progress towards country implementation plans and/or TDE reduction commitments on an annual or biannual basis. If a country was found to be in violation of its commitments, it could be given X months to make the necessary adjustments, failing which other countries could be authorized to make compensatory withdrawals on a discriminatory basis. Without special institutional arrangements, commitments expressed on the basis of or in terms of an aggregate measurement may lose their usefulness.

Clearly, the question of how the TDE was to be used in relation to contractual commitments by countries to reduce their trade-distorting support measures, - in a monitoring role, in a target and pre-evaluation role, or as the object of a contractual commitment or binding, - would have to be the subject of further international discussion and negotiation.

FOOTNOTES

1. The reader may wonder why an indicator of trade distortion would be based on the PSE alone, rather than one the PSE and the CSE (consumer subsidy equivalent). However, although supply side distortions are considered to be more important globally, the intention here is not to neglect demand side distortions. Rather, based on the observation that, where consumption distortions are also significant, it is almost always the same (market price support) measures which both depress demand and stimulate supply, the ommission of demand side distortions from formal inclusion in the TDE calculation is assumed to be justified in that a reform of such measures to reduce their production stimulation effects would simultaneously result in a reduction of their consumption depression effects. Governments might be inclined to offset reduced levels of market price support with higher fiscal payments to farmers, but they are very unlikely to also attempt to offset their demand side effects by introducing an equivalent consumption tax. Focussing mainly on production distortions simplifies the search for a practical solution to the problem of measuring trade distortion levels.

2. Such an approach to modifying the PSE to obtain a more trade-related indicator was first proposed by Tangermann, Josling and Pearson in an International Agricultural Trade Research Consortium Working Paper circulated in June 1987 and subsequently published after some revision, in The World Economy (Vol. 10.3) in September 1987.

   We have chosen to call the modified PSE thus obtained a "TDE", in order to clearly distinguish it from the PSE, which is an indicator of farm income support. In fact, as outlined in Annex C, several optional forms of the basic TDE can be defined.

3. More formally: Where $TDE = r.PSE$, and r is non-negative and (normally) less than 1.0, how is r to be defined?

4. Such a netting out will not be necessary if the PSE is attributed on the basis of (regular) government premium payments into the fund. If the PSE value is based on payments to producers from the fund, then it may be based on either gross payments net of producer premium contributions in that year or on gross payments multiplied by the fraction of total premium contributions paid by the Government.

5. Except where market prices decline over the longer term at a rate higher than the long term rate of decline in support allowed by the stabilization formula.

6. Both alternative formulae proposed (Annex A.2) could result in a TDE of zero when the PSE was significantly positive, but only where the quota was such as to reduce actual production sufficiently below that which would correspond to world market equivalent prices just

to counterbalance the demand depressing effect of the higher domestic market prices; i.e., with reference to Figures 4 and 5 in Annex A, for the TDE to be zero, $q2$ would have to lie to the left of $q1$ to the same extent that $q5$ exceeded $q4$.

7. See McClatchy, D. and Cahill, S., 1988, "Cross-Commodity Trade Effects of Agricultural Policies: Some Implications for the GATT", unpublished mimeo, 10 pp. (Copies available from the authors on request to International Trade Policy Directorate, Agriculture Canada, Ottawa, K1A 0C5).

ANNEX A:

Definition of PSE to TDE Adjustment Factors for some
Partially-Distorting Measures

A.1   Stabilization and Crop Insurance Schemes:

As illustrated in Figures 1, 2 and 3, the expected subsidy
payment over the long term under a government-funded stabilization scheme
providing a support floor depends in particular on two program design
parameters. The first is the percentage, s, of historic market price
level chosen for support. The second is the number, n, of past years
over which observed market prices are to be averaged in the computations
of support levels.

In Figure 1, where market prices show no long-term trend up or
down (long term average = $\bar{p}$) and n is very large relative to the
periodicity of short-term market fluctuations, the shaded areas represent
expected program payments over the long term. These are clearly higher
when s = 90% (area A) than when s = 80% (area B).

Figure 2 illustrates, for the same pattern of observed
fluctuation in market prices assumed in Figure 1, and assuming s = 90 %,
how the actual payment over time (shaded areas) from a stabilization
scheme can vary greatly depending on the value adopted for n. In this
example, two values of n are compared, n = 1 and n = 5, the total payment
being much less in the case of the former (area D) than that of the
latter (area C). It might also be noted that the payment where n = 5
(area C) also exceeds the payment where n = infinity (area A, Figure 1).
Where market prices fluctuate in a regular cyclical fashion it can be
shown mathematically that there exists a value of n, related to the
periodicity of the cycles, for which payments over time from a
stabilization fund would be maximized. Where price fluctuations are more
random the value of n probably has little impact on the total payment
over time, though higher values of n will generally result in total
producers' revenues being more stable.

Probably much more important to the interpretation of n is the
question of the direction of any long-term trend in market prices. If
prices are trending up, such as might occur, for example, in a country
with a high inflation rate, the higher the value of n, then the lower the
total payment over time (in the perhaps rather unlikely event that there
are any payments at all: i.e., when s exceeds 100% by more than the rate
of increase in market prices). On the other hand, if market prices are
trending downward (the more usual and normal situation), then higher
values of n will tend to increase payments over time, ceteris paribus
(Figure 3).

On the basis of the above considerations, the following formula is proposed as a basis for converting calculated PSE values into TDE values for such programs:

$$TDE = f \cdot PSE$$

<u>where</u> f = expected support price/expected market price

$$= \frac{z \left[\dfrac{P_0}{(1+r)} + \dfrac{P_0}{(1+r)^2} + \cdots\cdots\cdots + \dfrac{P_0}{(1+r)^n} \right]}{n} \Bigg/ P_0$$

$$= \frac{z}{n} \left[\frac{1}{(1+r)} + \frac{1}{(1+r)^2} \cdots\cdots\cdots + \frac{1}{(1+r)^n} \right]$$

<u>and where</u>: z = support level as a proportion of historic prices (e.g., $z = 0.9$ where $s = 90\%$)

r = average annual long-term (e.g., 20 year) rate of increase in observed market prices (usually r will be negative)

n = number of past years' prices used in calculation of support level

P_0 = any point on the price trend line

Figure 3 illustrates that the expected support price over time may lie either above or below the expected market price, and by varying degrees. Thus the PSE could be adjusted upwards or downwards by such a formula. In the "normal" stabilization situation, however, the expected support price over time will lie below the expected market price, and payouts will only occur in years when market prices fall significantly below the trend line.

The extension of such a formula to cover the cases where support and payment levels were based on gross margin calculations (taking into account purchased input costs as well as output prices) would be straightforward.

A.2   <u>Market Price Support with Production Quotas</u>

The theoretical arguments for the TDE value being less than the PSE value in this case are best explained with reference to Figures 4 and 5. Where SS' represents the supply response which farmers could be expected to exhibit in the absence of any production restraints imposed by government policy, then at world market prices, Pw, production would be q_1. Similarly, if supply were unconstrained, production at supported domestic price, Pd, would be q_3. Thus the production

distortion implied by the per unit PSE equal to $(P_d - P_w)$ would be $(q_3 - q_1)$. With supply control in place at output q_2, however, the production distortion is only $(q_2 - q_1)$ and the per unit dollar value corresponding to this actual distortion is $(P_e - P_w)$.

By contrast, on the demand side (Figure 5), the existence of managed supply makes no difference to the distortion of consumption, $(q_5 - q_4)$. As long as significant demand side distortions remained because of the market price support policy it would not make sense to equate the TDE to the difference between P_e and P_w (Figure 4), which might be termed the production distortion equivalent (PDE), and might well be zero. The relative importance of volume distortions, on the production side and on the consumption side, will depend on the relative slopes of the supply and demand curves respectively. Assuming that international agreement on the values of such parameters by country is not possible, a simplified ad hoc rule is proposed:

$$TDE = 0.5 \; (CTE + PDE)$$

where: CTE = consumer tax equivalent
           = -(consumer subsidy equivalent)
           = - (CSE)

In the event that agreement on the slopes of the supply and demand curves (dS and -dD, respectively) was possible, which would follow automatically if values of the particular supply and demand elasticities could be agreed, then the (prefered) formula would be:

$$TDE = 0.5 \; (dD.CTE.dS + PDE)$$

In either case, a commitment to reduce the value of the TDE could be achieved either by reducing the value of the CTE (by reducing supported market price) or by reducing the value of the PDE (by reducing the level of the aggregate supply quota) or by a combination of both. The relative scope for distortion reduction on the supply and the demand sides will depend on the initial values of PDE and CTE and, in the second formula, also on the ratio of dD/dS. It should be noted, however, that marginal reductions in the price support level will do nothing to reduce distortions on the production side. To the extent that these exist, under a supply-management scheme, they can only be affected by changes at the margin in the level of aggregate production quota.

In practice, there is a problem in measuring the PDE. It is useful, in the context of Figure 4, to introduce another concept, M, which may be thought of as the marginal economic rent accruing to producers at quantity q_2 and price P_d. Now:

$$PDE = PSE - M$$

The only guide to the value of M which we have in practice is its capitalized value, - namely the market price for production entitlements. This is the reason why an adjustment to PSE values is only proposed in situations where production quota is held at the individual farm level, is negotiable, and where a freely determined market price is observable. Such conditions are, in addition, an indication that the supply constraints are effectively binding.

Where W is the observed market-determined value of the entitlement to produce one unit per year, and where i is the prime interest rate (or equivalent) in the country in question, then a simple conversion from W to M is proposed:

$$M = W.i$$

It now follows that:

$$TDE = 0.5 \ (CTE + (PSE - W.i))$$

or, alternatively, that:

$$TDE = 0.5 \ (dD.CTE/dS + (PSE-W.i))$$

In the Canadian dairy case a small complication exists because the PSE exceeds the CTE due to some support being provided through direct payments. These payments, in addition to the market price support, also affect the market value of production quota. However, as long as the PSE and CTE have been measured correctly, the proposed formula for the calculation of a TDE remains valid without need for further modification.

A.3   Deficiency Payments with Set-Aside and/or Based on Past Crop Areas/Yields

For a simple deficiency payment scheme, when P_t = the target price, and P_m = the market price, the simple PSE per unit may be defined as:

$$PSE = P_t - P_m$$

Where x is the proportion of base land area required to be set-aside, it is proposed that an equivalent TDE be calculated as follows:

$$TDE = P_t/(1+x) - P_m$$

Such a formula would imply, for example, that there would be no estimated production distortion if 20 percent of the acreage base was required to be set aside and if P_t exceeded P_m by 20 percent. Such an adjustment would only be made to the calculated PSE value if the land was effectively diverted from all crop production.

The above simple case implies that deficiency payments are paid on the basis of actual farm production or sales from the non-idled land. In fact payments may be made on the basis of some past, "historic" crop acreage base or yield base, or both. Also, deficiency payments may be made on this basis whether or not there is a set aside requirement. It is postulated here that the longer the base acreage and base yield has remained frozen then the more likely will farmers be to believe that their current production will not influence their future payment entitlements, and the lower will be the influence of current payment levels on current production. A simple adjustment to the PSE is thus proposed:

Where y =   number of years since both base yield and base acreage have been frozen, •

then $TDE = PSE/y$

Where both set-aside and a historic payment base are relevant, the two above formulae can be combined into one:

$$TDE = ((P_t/(1+x)) - P_m)/y$$

The above formulae all represent a per unit TDE applying to participating farmers only. Where participation is voluntary, then, if Q_p represents the production by the participating farmers and Q_t represents total production (of both participants and non-participants):

Aggregate $TDE = TDE \cdot Q_p$
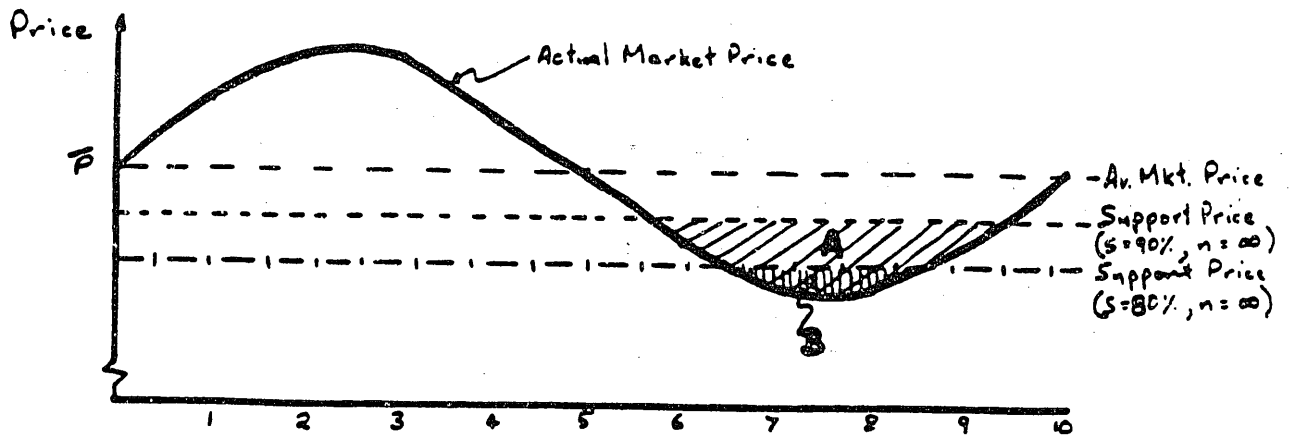
and

Per unit TDE across total production $= TDE^* = TDE \cdot Q_p/Q_t$
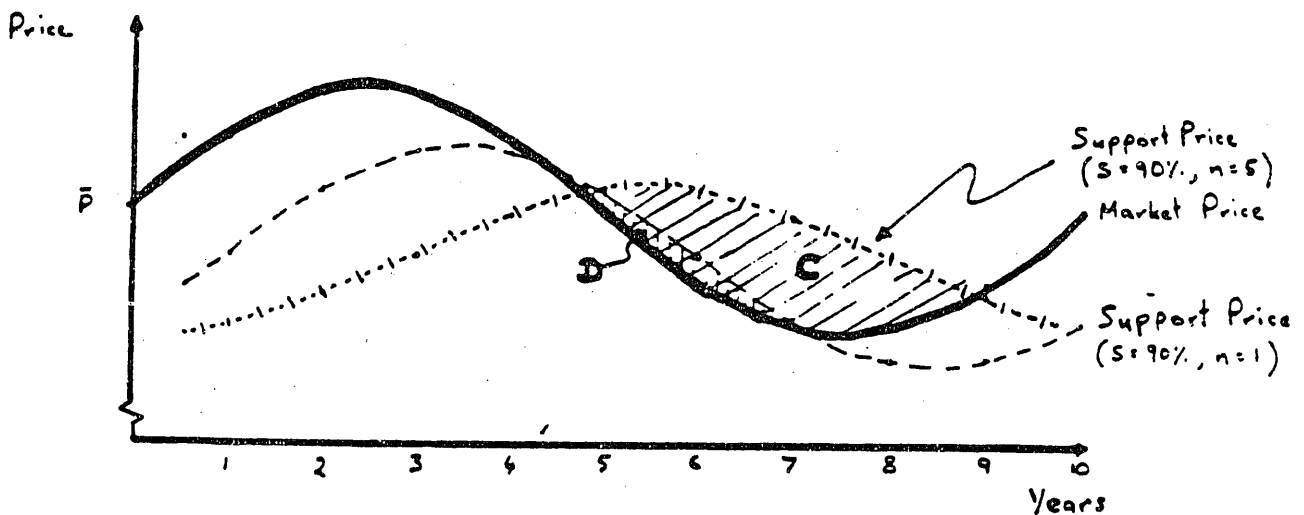
FIGURE 1 :
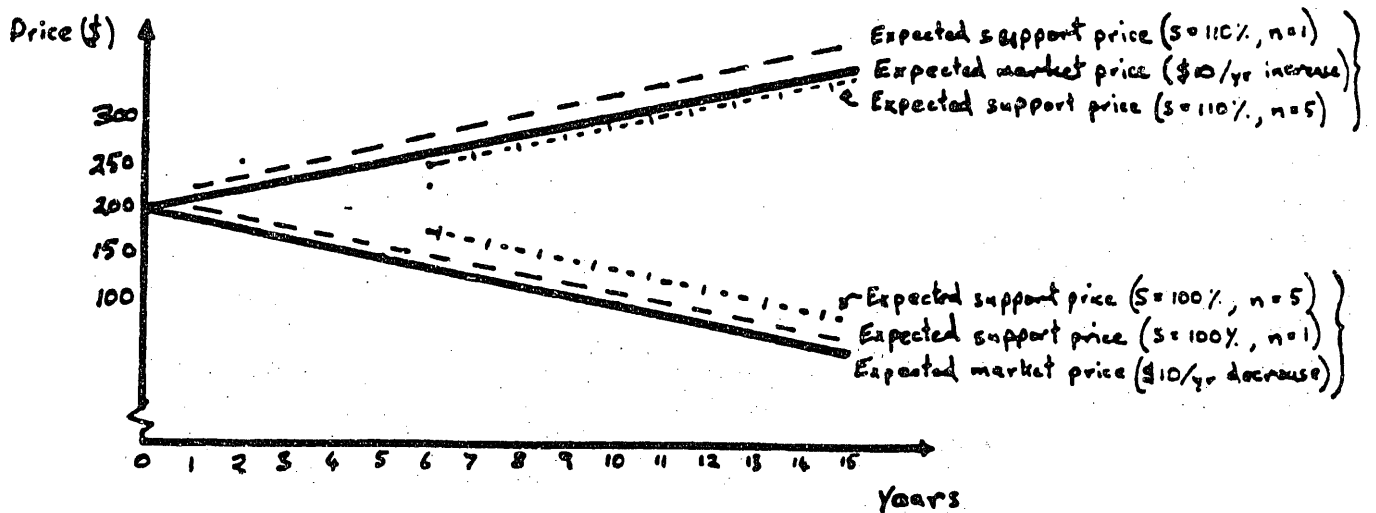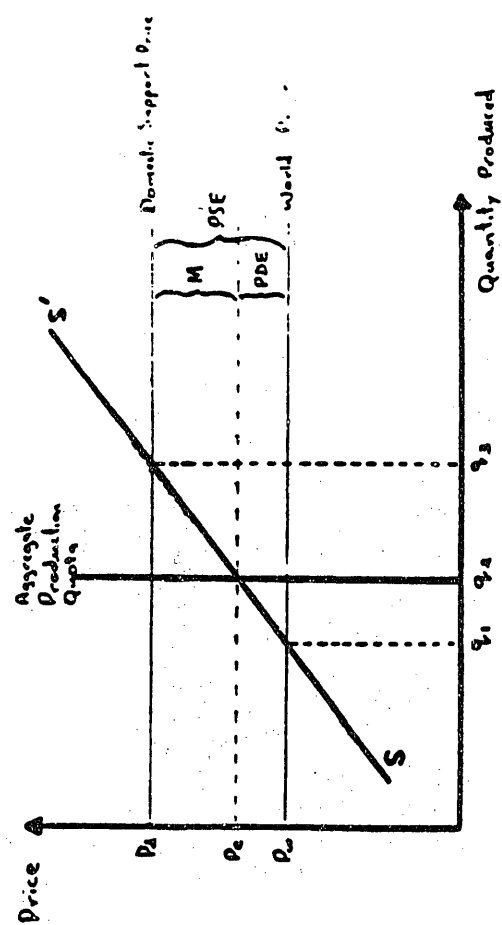

FIGURE 2:
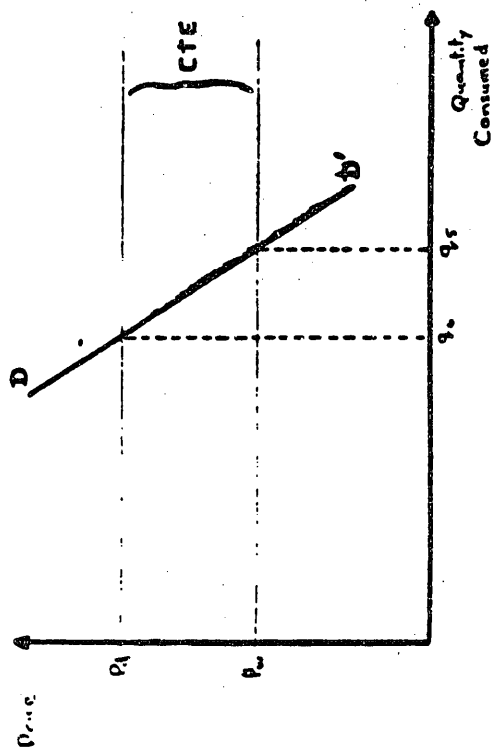

FIGURE 3:

FIGURE 5:

FIGURE 4:

ANNEX B:

The Trade Effects of Public Stockholding Activities

Publicly-owned stocks involve carrying charges for governments, and their existence is thought to have a depressing effect on market prices proportional to their size (though this effect has proved very difficult in practice to quantify). More clear is the market price enhancing effect when such stocks are being accumulated (supplies taken off the market), and the market price depressing effect when such stocks are being run down (supplies added to the market). Similarly, the fiscal costs to governments of stock accumulation or the fiscal revenues from stock decumulation, in many years dwarf the carrying costs. Thus, unlike most types of agricultural support measures, the relationship between net government expenditures in a given year and the world market price effect of such activities in the same year is quite variable, and is often positive. To the extent that stocks accumulation by a given country provides support to world market prices it will have a (small) production-increasing effect in all countries with world-market-linked prices, and not only in the country bearing the cost.

A further consideration is that market price support gained by stock accumulation is normally only temporary. Unless the stocks buildup is, in fact, part of a (disguised) supply destruction or diversion program, the price support effect will eventually become a price depressing effect as stock levels are stabilized and, in particular, later dispersed. Thus the income-support provided to farmers at times of accumulating stocks is in the nature of a loan rather than a gift: it must be repaid, perhaps with interest, at a later date when those same stocks overhang, and are eventually returned to, the market. Permanent accumulation of public stocks is thus not a long-term-viable means of farm income support. But GATT negotiations are about imposing new disciplines (on trade-distorting support measures) which will be in effect over a long period of time, and about making changes to existing measures so as to bring them in line with those disciplines. It must be asked how public stockholding activities should fit into a quantitative indicator designed to facilitate such negotiations.

The TDE is intended to be a proxy indicator of the adverse trade effects of any given country's support measures: reduced TDE levels should, therefore, imply reduced adverse trade effects. Implicit in this, however, is the notion of permanently reduced adverse trade effects, not the putting off of adverse trade effects till a later date. It would not make sense for other countries to give negotiating credit to a country, which claimed to offset its production stimulating support measures by stock accumulation activities which took some supplies off the market, if it was likely that at some later date those supplies were to be returned to the market. On the other hand, a decision by a country to phase out stockholding expenditures would imply a run-down in existing

stocks and, therefore, adverse world market price effects, at least in
the short-to-intermediate term, which, likewise, would have little
negotiation value with other countries.

It is thus concluded that stockholding activities should be omitted
altogether from the TDE indicator, on the grounds that their direct
influence is on market supplies rather than production levels (the latter
is the focus of the TDE and the agreed fundamental problem), and that
they are not long-term-sustainable farm income support measures. To the
extent, if any, that public stocks activities were argued to be disguised
supply removal programs, then they would be treated in the same way as
conservation and resource retirement measures, and likewise omitted from
the TDE calculation.

ANNEX C:

Optional Forms of the TDE

There are two main reasons why agricultural support measures which provide the same boost to farmers' incomes (PSE values equal) can have quite different trade effects.

The first is because of differences in the nature of the programs themselves. Depending, in particular, on the extent to which farmers can anticipate, at the times when they make their various production decisions, the program benefits to be later derived, and depending on the extent to which those benefits are perceived by farmers to be less than directly proportional to output, production response to a given income supplement can vary. The various downward adjustments in PSE values proposed in this paper in order to arrive at a "price TDE" are essentially to account for such differences between types of support measure. The term "price TDE" is used here because, like the PSE, its value would be expressed in currency units. While it is thus not a measure of trade volume distortion per se, it is designed to vary as closely as possible in proportion to the size of the actual trade volume distortion.

The second principal reason for different degrees of trade volume distortion arising from the same degree of price/income support is the existence of differences in the production environment between countries. Such differences are reflected conceptually in the different slopes of the supply curves (supply elasticities) in different countries. Where this curve is steeply sloped (often because there are few alternative uses for the land involved), a rise in producer price above world market levels may generate very little extra output. In another country where the supply curve is less steep (more "elastic") the same price rise could be expected to have much greater proportionate impact on the level of production. The further step, of dividing the "price TDE" by the slope of the supply curve (i.e. by the increase in price which would be needed in order to generate one more unit of production) in order to generate a "volume TDE", is conceptually and computationally very simple.

These two basic forms of the TDE could be thought of as alternative indicators for use in the GATT context. The "volume TDE" would be expressed in quantity units (e.g. tonnes), and would be a more direct measure of trade volume distortions. The conversion of a "price TDE" to a "volume TDE" would occur after the summation of all the "price TDEs" for each individual support measure to derive an aggregate "price TDE" covering all "partially distorting" and "fully distorting" measures; i.e. only one computation would be involved for each commodity and country. Whether it is practicable in the MTN context depends on whether countries could reach agreement on the

appropriate supply curve slopes (or elasticities) to use, by country and by commodity. If this proved feasible then the "volume TDE" would be a theoretically preferable indicator of adverse trade effects. If not, then inter-country differences would have to be ignored and the "price TDE" accepted as a second best (though still very superior to the PSE) alternative.

As used in the main body of this paper, "TDE" means "price TDE", as defined above, and would be calculated in terms of currency units per unit quantity (e.g. tonne).

Like the PSE, the TDE could also be expressed as a percentage, and, since this facilitates comparisons between commodities, it seems likely that a "TDE percent" would be a more suitable form of the concept for use in the negotiations. The "TDE percent" should be defined as 100 times the "price TDE" divided by the "world market equivalent price".

Valuing production at world prices is important in order to calculate "TDE percent" values, since, if production was to be valued at domestic prices, countries would be able to achieve some "TDE percent" reduction without any corresponding "TDE" reduction by transfering a portion of their support from input prices to output prices.

Similarly the "volume TDE percent" could be 100 times the "volume TDE" divided by the difference between actual domestic production and the "volume TDE" (i.e. divided by the estimated level of undistorted domestic production).

This paper has taken the approach throughout, for pragmatic reasons summarized in Footnote 1, that it would be sufficient for the TDE to focus on supply-side distortions and thus be based on the PSE. However, there is no theoretical or practical reason (other than a slight increase in complexity) why the TDE could not be based on both the PSE and the CSE. It would then be a more complete indicator of all trade distortions. Since typically all the CSE value is contributed by measures in the "market price support" category, there would be little need to adjust CSE's in the same way as there is to adjust PSE's. Hence the "price TDE" could be alternatively defined as the "adjusted PSE" plus the "absolute value of the CSE" ("absolute value" because the CSE is normally a negative number when the PSE is positive).

When both supply and demand side distortions are being formally considered, there may be more concern about the use of a "price TDE" thus defined, on the grounds that demand curves are generally steeper than supply curves, and hence the "price TDE" would bias upward the weight given to demand side distortions in the overall indicator. Thus, if it

was desired to formally address both production and consumption distortions, the theoretical case for using a "volume TDE" rather than a "price TDE" would be correspondingly stronger. In this case, the "volume TDE" would alternatively be defined as follows:

$$\text{vol TDE} = \text{adjusted PSE}/dS + \text{CSE}/dD$$

where   adjusted PSE = "price TDE" as first defined in this Annex
        dS = slope of supply curve
        dD = slope of demand curve (a negative)
        CSE = consumer subsidy equivalent (normally negative)

A corresponding change in the definition of the "volume TDE percent" would be straightforward.