

PSE AS AN AGGREGATE MEASURE OF SUPPORT IN THE URUGUAY ROUND

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ABSTRACT

PSE AS AN AGGREGATE MEASURE OF SUPPORT IN THE URUGUAY ROUND

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This research report analyses the suitability of the concept of Producer Subsidy Equivalents (*PSEs*) to serve as an Aggregate Measure of Support (*AMS*) in the GATT Uruguay Round, on the basis of which binding commitments can be made.

At the start of the Uruguay Round in 1986 the Contracting Parties expressed their intention to develop an *AMS* which would be able to bring the wide range of existing agricultural support policies under one denominator. When agreement could be reached on an *AMS*, it might be used as the basis for binding commitments, since the traditional request and offer method was not sufficient any more. The *PSE* was chosen as the starting point for discussion.

A scientific analysis of the *PSE* concept reveals that it is not suitable as a basis for binding commitments in the negotiations. The *PSE* is only partly controlled by a country and it does not adequately reflect trade distortions.

Although the Contracting Parties in the GATT arrived at the same conclusion, the *PSE/AMS* was used in the final GATT agreement as a basis for binding commitments in the internal support area. The practical use of the *PSE/AMS* in the internal support area is however limited, because many policies may be exempt from the *AMS* calculation.

Policy measures in the field of market access and export competition are subject to reduction commitments established on rules outside the *AMS*.

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PREFACE

This study aims to analyse the suitability of the concept of Producer Subsidy Equivalents (*PSEs*) to serve as an Aggregate Measure of Support (*AMS*) in the Uruguay Round on the basis of which binding commitments can be made. The study is special in that it first describes both the scientific discussion of the concept and the political discussion by the Contracting Parties in the Uruguay Round (ending up in the final GATT agreement of December 1993). Subsequently it also confronts the scientific conclusion with the agreed use of the *AMS* in the final GATT agreement in order to see to what extent they coincide or differ.

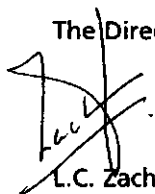
The main data sources that have been used are scientific articles, internal documents of the commission of the European Communities, GATT documents, and the publications of the OECD, USDA and the FAO.

The study was originally carried out in 1992, after the appearance of the GATT Dunkel paper. However as the Dunkel paper was rejected, and thus the negotiations had to continue, there was no final statement in the negotiations about the *AMS*. Therefore also the publication of this study was postponed. When the GATT agreement was finally reached in December 1993, the study was picked up again and updated for the period since 1992.

Both the first draft in 1992 and the updating have been carried out by Ir. C.P.C.M. van der Hamsvoort from the Socio-Economics division of the Agricultural Economics Research Institute (LEI-DLO).

The author would like to thank Dr. E. Guth (at the time of the original draft head of the division GATT Agriculture and Fisheries of the Commission of the European Communities) for the opportunity to gather the necessary information for the first draft. Drs. F.J. van der Valk (Dutch Ministry of Agriculture, Nature Management and Fisheries) for providing the information necessary for the updating and for comments on an earlier draft. Ir. H.J. Silvis and Ir. F. van der Zee (Wageningen Agricultural University) and Drs. S. van Berkum (Agricultural Economics Research Institute (LEI-DLO)) are thanked for giving comments on the draft in 1992. Finally the author wishes to thank Drs. C.M. Rodenburg for correction of the English language.

The Director,



L.C. Zachariasse

The Hague, June 1994

SUMMARY

At the start of the Uruguay Round in 1986 the Contracting Parties suggested the development of an Aggregate Measure of Support (*AMS*). Due to the wide range of policies that the separate Contracting Parties of the GATT used to support agriculture, the old negotiating method of request and offer was considered to be no longer sufficient. An *AMS* might heap together this wide range of policies and should accordingly be used as a basis for binding commitments for all three target areas of the Uruguay Round. These are improvement of market access, export competition and reduction of internal support. Instead of taking a well-known measure like the Nominal or Effective Rate of Protection or the Nominal or Effective Rate of Assistance, the Producer Subsidy Equivalent (*PSE*) was chosen as a basis for discussion. The reason for choosing the *PSE* was the combination of being able to cover almost all existing policies, its easy measurement and the fact that the OECD had already made calculations on the basis of the *PSE* concept. The other measures did not incorporate this combination. The nominal support measures, like the *NRPP* and the *NRA* had a too small policy coverage and the effective support measures, like the *ERP* and the *ERA* were too difficult to measure.

The *PSE* was originally developed by Josling for the FAO (FAO, 1973; FAO, 1975) already more than fifteen years ago in order to measure the overall protection in agriculture. No attention however was paid to the *PSE* until it was chosen as a basis for discussion in the Uruguay Round. Since then the *PSE* has been broadly discussed in all its issues.

The *PSE* for a product is measured by the difference between the domestic price and the external reference price for border measures and some internal support measures and by budgetary outlays for other measures. As the *PSE* was chosen as a basis for the discussion about the *AMS* in the Uruguay Round, the question is whether the *PSE* is also suitable to serve as an *AMS* in the Uruguay Round on the basis of which binding commitments can be made.

When the *PSE* concept is analysed in a technical and economic way in order to answer this question, it reveals several problems when used in the negotiations. When related to the negotiations, all conceptual problems of the *PSE* can be summarized in the following:

1. *PSE* levels are only partly controlled by a country;
2. *PSEs* do not adequately reflect trade distortions.

- Sub1: Due to exogenous changes, like world price fluctuations, fluctuating exchange rates, large countries changing their policies etc., the *PSE* of a country can change without changing its policies;
- Sub2: For example, an assumption of the *PSE* concept is that each dollar of assistance has the same trade effect. This is however an oversimplification. An output subsidy for example has a larger trade effect than government expenditures for research and training have.

Due to the above-mentioned reasons, from a scientific point of view, it must be concluded that the *PSE* is not suitable to serve as an *AMS* on the basis of which binding commitments can be made. The same conclusion can be drawn when the *PSE* is tested by five criteria that an *AMS*, according to Schwartz and Parker (1988), must meet when used as a negotiating measure. These criteria are transparency, simplicity and comprehensibility, flexibility, consistency and reliability. The *PSE* faces most problems with the criteria transparency, consistency and reliability.

The fact that the *PSE/AMS* was not suitable as a basis for binding commitments was also recognized quite early by the Technical Group and the Negotiating Group on Agriculture in the GATT. Therefore three alternative optional uses for the *AMS* were put forward. The first one (option II, as the *PSE* as a basis for binding commitments is option I) is the 'target' option. Here the *PSE* serves as a basis for an agreed target, which should be achieved by commitments on policy measures. The second alternative (option III) is the *PSE* in a monitoring role in order to control whether progress in the reduction commitments has or has not been made. In this case the *PSE* will not serve as a target nor as a basis for binding commitments. The third alternative (option IV) is to use the *PSE* to strengthen and clarify current GATT rules.

The Contracting Parties also discussed the *PSE*, but in comparison with the scientific analysis they focused more on diplomatic/political issues. The most important issues for discussion were optional use, policy coverage, product coverage, country coverage, reference or base period (which would serve as a basis for reduction commitments), reference prices, monetary fluctuations and whether in case of supply control policy credits on the *PSE* should be given, as the positive trade effect of those policies is not fully reflected in the traditional *PSE*. Several Contracting Parties put forward their points of view on the above-mentioned issues and also proposed derivatives of the *PSE* in order to solve some of the problems of the traditional *PSE*. For example the EC proposed the Support Measurement Unit (*SMU*) which differs from the *PSE* in its use of fixed external reference prices (to solve the problem of fluctuating world prices and exchange rates). Canada proposed the Trade Distortion Equivalent (*TDE*), which should solve the problem of the *PSE* of not adequately reflecting trade distortions. It divides all policy measures in three groups, the fully distorting (all incorporated in the *TDE*), the partially

distorting (incorporated with some corrections) and the non-distorting measures (excluded from the *TDE*).

In fact there were as many different proposals as there are Contracting Parties. A compromise of all the proposals was reflected in the final, however preliminary, Dunkel paper, which appeared in December 1991. In this paper many problems of the *PSE* were solved by excluding the target areas of market access and export competition from the *AMS* and applying them only to the area of internal support measures. (Although the Dunkel paper speaks of the *AMS*, this is the aggregate *PSE* concept, on various points adapted to the wishes of the negotiations). Both the targets of improvement of market access and export competition were realized by separate commitments on the traditional offer and request basis. Within the internal support area a reduction commitment was proposed on the basis of the *AMS* of 20%. This reduction commitment was intended to apply to the *AMS* of each individual basic product. In order to distinguish which policies would be exempted from the *AMS* calculation and thus the reduction commitment, two general criteria and specific criteria per policy measure were developed. The measures should meet these criteria in order to be exempted from *AMS* commitments.

The Dunkel paper was however rejected by the Contracting Parties. One of the problems with the proposed use of the *AMS* was that the *AMS* of each individual product would have to be reduced with 20%. This largely restricted the ability of the Contracting Parties in deciding how to realize the reduction commitment as a whole. Therefore, on the basis of the Dunkel paper, the EC and the US agreed upon a bilateral agreement in December 1992, called the Blair House agreement. With respect to the *AMS* these two big trade blocks decided to use the *AMS* in a different way than what had been proposed in the Dunkel paper. The reduction commitment of 20% would not apply to the *AMS* of each individual product but to the *Total AMS* of all products together. This would give the Contracting Parties the opportunity to reduce the *AMS* of one product with more than 20%, without changing the *AMS* of another product. Moreover it was agreed by the EC and the US to exempt the direct income support, implemented in the EC in the view of the EC Common Agricultural Policy, from the internal support reduction.

The Blair House agreement was consequently introduced in the negotiations with the other Contracting Parties, on the basis of which a final GATT agreement could be reached. This final agreement was reached in December 1993. With respect to the *AMS* the point of view as laid down in the Blair House agreement was adopted in the final agreement. Moreover clear conditions were developed and described to exempt direct payments under production-limiting programmes from the *AMS* calculations. A major change in the area of export competition was that the reduction of export quantities of 24% that had been proposed in the Dunkel paper was reduced in the final agreement to 21%. In the area of market access, the final agreement differs from the Dunkel paper

in that it describes conditions for a so-called 'special treatment'. That is conditions are given in order to exempt policies from tariffication.

In theory the *AMS* is used in the final GATT agreement in option I and option III, namely as a basis on which binding commitments are made and for the monitoring role thereafter. However due to the fact that the *AMS* is only applied to the internal support area and due to the fact that within this area so many exemption possibilities have been provided, the use of the *AMS* in practice is minimal. Therefore it can be concluded that in the GATT basically the same conclusion is drawn as in the scientific analysis, namely that the *PSE/AMS* cannot be used as a basis for binding commitments, although in the GATT it is reflected in another way. One must therefore conclude that the economic science has, by way of the *PSE*, not been able to provide the GATT with an *AMS* that could meet all needs. For the moment it is impossible to find an *AMS* that meets all criteria and can therefore be used as a basis for binding commitments. The expectation therefore is that also in the Rounds to come, the discussion will to a large extent still take place on the basis of the traditional offer and request method.

1. INTRODUCTION

1.1 Background and definition of the problem

Previous GATT negotiating Rounds were conducted on a request and offer, item by item, instrument basis (GATT, 1988a). The Contracting Parties of the GATT however regarded this traditional negotiating procedure as unsuccessful. At the start of the Uruguay Round in 1986 they therefore expressed the desirability of finding an Aggregate Measure of Support (AMS), which could compare the widely different policies protecting agriculture and distorting trade and bring them under one denominator (GATT, 1987d). Then they would negotiate and make binding commitments on the basis of the AMS, in order to achieve the targets of the Uruguay Round as agreed upon by the Contracting Parties in Punta del Este in 1986 (GATT, 1990):

1. improvement of market access;
2. reduction of internal support;
3. improvement of export competition.

The Contracting Parties chose the Producer Subsidy Equivalent (*PSE*) as a basis for the discussion about the AMS. In doing so, the following questions were raised from a scientific point of view.

1. Why has the *PSE* been chosen as a possible AMS in trade negotiations instead of another measure of support?
2. Is the *PSE* concept, from a technical and economic point of view, suitable to serve as an AMS in trade negotiations on the basis of which binding commitments can be made?
3. How is the *PSE* or a derivative finally used as an AMS in the Uruguay Round?

1.2 Aim of the study, methodology and outline of the report

The aim of the study is to find an answer to the above-mentioned questions, or summarizing:

the aim of the study is to analyse whether the PSE concept is suitable to serve as an Aggregate Measure of Support (AMS) in the Uruguay Round on the basis of which binding commitments can be made.

In order to meet the aim of this report a detailed study of both scientific and political documents has been made. The sources of information used are scientific publications, internal documents from the Commission of the European Communities, documents of the GATT and publications of the OECD, USDA and the FAO.

The questions raised in section 1.1 are subsequently dealt with in the following chapters. Chapter two starts with a brief overview of the most important current measures of support and a comparison with regard to policy coverage and data requirement. The purpose of this chapter is to analyse why the *PSE* has been chosen as a basis for discussion in the Uruguay Round instead of another measure of support. In chapter three the *PSE* concept is analysed in detail from an economic and technical point of view to see whether the *PSE* as a concept is suitable to serve as an *AMS* in the Uruguay Round. In this chapter not only purely economic problems will be dealt with but also practical problems that the *PSE* may face once it is used in the negotiations.

Chapter four gives a brief overview of the discussion as pursued by the Contracting Parties in the Uruguay Round with respect to the *AMS*, ending up with the final GATT agreement as achieved in December 1993. The aim of this chapter is to demonstrate the more diplomatic issues related to the *AMS/PSE* discussed in the Uruguay Round as opposed to the purely technical and economic analysis of chapter four. Chapter five finally presents the conclusion in which answers to the aforementioned questions are summed up, based on the analysis in the previous chapters. Moreover the scientific point of view on the *PSE* concept as described in chapter three will be contrasted to the view on the concept in the Uruguay Round as reflected in chapter four, on the basis of which some conclusions will be drawn.

Finally it is mentioned that the analysis followed in this report contains interesting information for both scientists and policy makers, for whom measures of support, and especially the *PSE*, is a field of expertise. Besides the report is interesting for people who just want to know more about the concept and its possible uses.

First of all the scientific analysis of the *PSE* concept in all its elements as pursued in chapter three, surveys all aspects related to the *PSE* in view of its possible use as an *AMS* in the Uruguay Round.

Secondly, the scientific analysis is followed by an outline of the discussion on the *PSE* concept by the Contracting Parties in the Uruguay Round. Policy makers and civil servants who work in this area are probably familiar with the information in this chapter, but since it is based on GATT documents that are not freely published it is unlikely that it is known to all scientists involved in this area.

Thirdly, the outcome of the scientific analysis of the *PSE* concept is confronted with and compared to its use finally agreed upon in the Uruguay Round. At the same time it is analysed whether the final proposal in the Uruguay Round is in accordance with the conclusion drawn

from the technical and economic analysis. This confrontation or combination of the scientific view with the political view as laid down in the GATT agreement is new and has, as far as the author knows, not been done before. This will therefore probably be the most interesting part of the report for both scientists and policy makers.

2. WHY THE *PSE* IS CHOSEN AS BASIS FOR THE *AMS* DISCUSSION IN THE URUGUAY ROUND

2.1 Introduction

The Producer Subsidy Equivalent (*PSE*), which was introduced by Josling (FAO, 1973; FAO, 1975), is a prominent aggregate measure proposed for use in the negotiations. The concept has been popularized by the work of the OECD (1987) and the USDA (1987) by giving calculations for some products and some countries. This increased both its political visibility and the comprehensibility with respect to the resources used for its calculation (Josling and Tangermann, 1987).

Besides the *PSE* there are however other, more traditional measures of support, like the *NRP*, *ERP* etc. The target of this chapter therefore is to analyse why the *PSE* is chosen as a basis for the *AMS* discussion in the Uruguay Round and not one of the other alternatives. For this purpose section 2.2 of this chapter briefly outlines five of the best-known measures of government intervention:

1. Nominal Rate of Protection to producers (*NRPP*);
2. Nominal Rate of Assistance or Price Adjustment Gap (*NRA* or *PAG*);
3. Effective Rate of Protection (*ERP*);
4. Producer Subsidy Equivalent (*PSE*);
5. Effective Rate of Assistance (*ERA*).

These five measures of support are described both in words and in mathematical terms and compared with respect to the range of policies included and the amount of data required. Of course there are other points of comparison. However a completely elaborated comparison of the five above-mentioned measures of support is very difficult and would require a separate study. This is not the aim of the analysis and would therefore go beyond the scope of this chapter and this study.

Section 2.3 contains the conclusion and tries, on the basis of section 2.2, to answer the question why the *PSE* has been chosen as a basis for discussion in the Uruguay Round instead of another measure of support.

2.2 Five measures of government intervention briefly compared

2.2.1 Introduction

In this section five measures of government intervention will be explained and compared with regard to policy coverage and the amount of data required for their calculation. Except the *PSE* the other four

measures can be classified by distinguishing between the terms 'protection' and 'assistance' and between 'nominal' and 'effective', as shown in figure 2.1.

	Protection	Assistance
Nominal	<i>Nominal Rate of Protection (NRP)</i>	<i>Nominal Rate of Assistance (NRA or PAG)</i>
Effective	<i>Effective Rate of Protection (ERP)</i>	<i>Effective Rate of Assistance (ERA)</i>

Figure 2.1 Classification of four measures of government intervention

The word 'protection' is used here to refer to intervention designed to protect domestic producers from foreign competition. Such intervention methods influence domestic market prices for domestically produced goods and for inputs used in their production. Such policy measures are said to provide border protection and include ad valorem tariffs, which are applied as a charge in terms of percentage on the value of imports. They also include specific tariffs (levied as a given amount per unit) and import controls (Haszler and Parsons, 1987).

The word 'assistance' has a broader definition. Assistance includes all the intervention captured in the definition of protection and many other forms of intervention by governments, such as input subsidies and farm reconstruction assistance (Haszler and Parsons, 1987).

The word 'nominal' is used to cover policy measures that have their impact on the unit returns received by producers for their output. That is, measures that affect market prices and the administered returns to producers. The effect of import tariffs on the prices received by producers is included, as are direct production subsidies. However import tariffs on production inputs are not included under the heading nominal (Haszler and Parsons, 1987).

The word 'effective' covers measures of intervention that include both assistance to the outputs of an industry and measures that influence prices of the industry's inputs, through assistance designed to support its inputs supplying industries (Haszler and Parsons, 1987).

2.2.2 The Nominal Rate of Protection for Producers ($NRPP$)

The Nominal Rate of Protection for Producers ($NRPP$) for any given commodity i in a particular country is defined as the relative difference between the domestic price (PD_i) and the world price (PW_i) of that commodity. Such a difference may be due to intervention at the border by means of tariffs or other means of driving a wedge between domestic

and world market prices (Haszler and Parsons, 1987). In algebraic terms, the *NRPP* can be defined as in appendix 1, where the ratio PDi/PWi is often termed the Nominal Protection Coefficient. Policies captured by the *NRPP* include border measures and producer subsidies and taxes that change producer prices. Taxes and subsidies on intermediate and primary inputs are excluded, as are lump-sum and other income transfers that do not affect current production levels (such as decoupled income support; see appendix 2) (Schwartz and Parker, 1988). Therefore the *NRPP* encompasses policies that protect producers by providing them with a higher market price than they would get in free trade (GATT, 1987d). The *NRPP*, however, only partly indicates how government policies influence domestic production, as it ignores the effect of support to intermediate inputs. Because of its small policy coverage (appendix 2), the *NRPP* is however the most simple measure. It includes only the support to output prices brought about through intervention at the border and therefore only needs information about the domestic prices and the world market prices.

2.2.3 The Nominal Rate of Assistance (*NRA*) or Price Adjustment Gap (*PAG*)

The Nominal Rate of Assistance (*NRA*) is defined as the relative difference between unit gross returns to producers for domestic output (RDi) and the world price (PW_i) of the commodity of interest. The difference is due to border measures and other forms of assistance that directly affect producers' unit gross returns. For the algebraic definition, see appendix 1. The *NRA* is a more comprehensive measure than the *NRPP* is, since it incorporates all assistance to output. However it does not take into account the assistance to intermediate inputs, which means that only gross assistance rather than net assistance is measured. It is therefore a quite simple metric to measure as no detailed input or output coefficients are required. The *NRA* is however not as simple as the *NRPP* is, because also direct assistance to output, which is not reflected in the domestic price, has to be transformed to a basis per unit and added to the domestic price. Miller (1986) used the term Price Adjustment Gap (*PAG*) to describe the *NRA*.

2.2.4 The Effective Rate of Protection (*ERP*)

Whereas the *NRPP* encompasses policies that affect a farmer's gross returns, the Effective Rate of Protection (*ERP*) encompasses policies that also affect input costs. The *ERP* is thus a more general measure (GATT, 1987d). The *ERP* is defined as the relative difference between, on the one hand, the value added per unit of output at domestic prices (VAD_i), incorporating the effects of border measures that influence prices for the specified commodity and the prices of the inputs used in producing it and, on the other hand, the value added at world prices (VAW_i) for the

outputs and inputs (appendix 1). Value added is defined as the return to the primary factors of production (land, labour, capital) used in a particular activity or industry and is measured as the value of the final output minus the costs of purchased intermediate inputs (Haszler and Parsons, 1987). Corden (1985) states in his essays that, in the trade literature, the *ERP* has been used to analyse resource allocation among sectors in an economy. The *ERP*, however, can be viewed as an 'extended nominal rate', calculated as a weighted average of the impact of trade policies on output and intermediate inputs, where the weights are fixed input-output coefficients. Used in this way, the *ERP* is an aggregate measure of protection that captures the net price effect of policies applied throughout an economy (Schwartz and Parker, 1988). Therefore Schwartz and Parker (1988) state that by including intermediate input prices, the *ERP* provides a better indication of how government policies alter producer incentives than the *NRPP* does. Calculating an *ERP* for a commodity, however, requires an estimate of the *NRPP* for the output good, *NRPPs* for all intermediate goods, including non-agricultural products, and a set of undistorted input-output coefficients. These required data are quite detailed and therefore not always available (Schwartz and Parker, 1988).

2.2.5 The Effective Rate of Assistance (*ERA*)

The Effective Rate of Assistance (*ERA*) is defined as the relative difference between the value added per unit of output measured with the assistance structure (assisted value added, *AVA*) and without the assistance structure (unassisted value added, *UVA*) (appendix 1) (Haszler and Parsons, 1987). This measure takes account of assistance to output, to purchased intermediate inputs (for example fertilizers) and to value adding factors (for example, land and capital). Besides it considers the direct effect on prices of intermediate inputs of protection given to industries producing the inputs, and has thus the broadest policy coverage (appendix 2). With respect to the data necessary for its calculation, it faces the same problem as the *ERP* does in that it requires very detailed data, like input-output coefficients, information about the value added, direct assistance per unit of output or related to the price, etc. This information is not always available.

2.2.6 The Producer Subsidy Equivalent (*PSE*)

All the measures listed here can be negative as well as positive. In addition, all these measures can be expressed as subsidy equivalents. According to Webb (1984) a subsidy equivalent can be defined as the single monetary value needed to compensate the recipients of benefits of policy interventions for the removal of the particular intervention(s) of interest.

While the concept of subsidy equivalent is quite general, it has been given a particular application by Josling in his concept of the Producer

Subsidy Equivalent (*PSE*), which he developed in the early seventies for the Food and Agricultural Organisation (FAO) as a measure of support for agriculture (FAO, 1973; FAO, 1975; Webb, 1984).

The concept of Josling was however not given much attention, until the OECD in the early eighties started to make calculations of *PSEs* as part of the implementation of the Ministerial Trade Mandate on agricultural trade ¹). Calculations (also of Consumer Subsidy Equivalent (*CSE*)) were made for the period 1979-81 in seven countries (Australia, Austria, Canada, the European Community, Japan, New Zealand and the United States). These *PSE* and *CSE* estimates, together with extensive explanations of the definitions and methodology, were published in the synthesis report '*National Policies and Agricultural Trade*' in 1987 and in the associated series of country reports on these seven country studies (OECD, 1991) ²).

Mainly on the basis of this OECD report the *PSE* concept has since then been extensively discussed in all its aspects, not the least because it was chosen as a basis for the discussion about the AMS in the Uruguay Round. This discussion has developed the *PSE* concept in its definition, function, contents, etc, with which we will deal in the following chapters. Although these discussions have largely revealed the abilities of *PSEs*, the methodology is still not fully agreed upon. The OECD remarks for instance in one of her reports containing *PSE* estimates, that 'the methodology used in the calculations continues to evolve through a process of constant review within the Organisation. In particular, the calculation of the market price support element of the beef and milk estimates is still the subject of examination' (OECD, 1991, pp. 113).

The definition and policy coverage of the *PSE* have of course also evolved over time by way of the discussions, and as mentioned before, they are still evolving. For the purpose of this chapter, the definition and policy coverage of the *PSE* will be given as currently used by the OECD. The OECD (1992, pp. 231) defines the *PSE* as

'Assistance to producers as measured by the value of transfers to farmers generated by agricultural policy. These transfers are paid either by consumers or by taxpayers in the form of market price support, direct payments and other support.'

The OECD includes five categories of agricultural policy measures in their calculations of *PSEs* (OECD, 1992, pp. 243):

-
- 1) Even though the *PSE* already existed for fifteen years and while the FAO carried out calculations on the basis of the *PSE*, which were updated every two years, in order to give an indication of world agricultural protection.
 - 2) Based on subsequent prolongations of the Ministerial Trade Mandate after 1987, the OECD published several reports with (among other things) estimates of *PSEs* (OECD, 1988, 1989, 1990, 1991, 1992).

1. *Market Price Support*; all measures that simultaneously affect producer and consumer prices, for instance import restrictions by means of tariffs, levies, and quotas, export subsidies, etc;
2. *Direct Payments*; all measures that transfer money directly from taxpayers to producers without raising consumer prices, like deficiency payments;
3. *Reduction in Input Costs*; all measures that lower input costs without distinguishing between subsidies to capital and those to other inputs;
4. *General Services*; measures that in the long term reduce costs but which are not directly received by producers (for instance research and development expenditures (Schwartz and Parker, 1988));
5. *Other Indirect Support*; mainly sub-national subsidies (this is, measures funded nationally by Member States in the case of the European Community) and tax concessions.

The *PSE* calculations do not include all transfers generated by agricultural policies. They exclude for instance certain budget outlays on agricultural policy measures that are not received by producers, such as subsidies specific to food processing and distributing sectors, outlays that are not specific to the agricultural sector, outlays for stockholding and budgetary payments associated with measures that result in the permanent withdrawal of resources from agriculture (OECD, 1992, pp. 243-244).

With respect to the *Reduction in Input Costs*, the *PSE* includes subsidies on intermediate inputs. However, taxes on intermediate inputs, like tariffs on farm machinery or higher prices of feed grains for livestock farmers resulting from crop support programmes, generally are not included 1) (Haszler and Parsons, 1987).

In terms of policy coverage the *PSE* is a mix between the *ERP*, the *NRA* and the *ERA* (see appendix 2). Its policy coverage is larger than in case of the *ERP* and the *NRA*, but smaller than the *ERA* (which includes all intermediate input policies). However, the advantage of the *PSE* as compared to especially the *ERP* and the most complete measure with respect to policy coverage, the *ERA*, is that the *PSE* needs less data and is therefore simpler to calculate (see appendix 1). Its calculation is completely based on the price gap (domestic price minus world market price) and data about budgetary expenditures (GATT, 1987d).

2.2.7 Policy Coverage in Practice

Some authors demonstrate that in practice, the differences between the four measures of support with respect to policy coverage are smaller

1) The OECD, though, also estimates a *PSE*, called *Net PSE* as opposed to *Gross PSE*, which includes distortions in the costs of feed. We will return to this point later.

than they seem to be. According to Schwartz et al. (1988) policies with direct price effects, border measures, output and input price subsidies, make up between 80% and 90% of the total value of *PSEs* for most developed countries. Border and output price policies compose more than 70%. The US Department of Agriculture estimates that the Price Adjustment Gap accounts for well over 80% of support provided to farmers in Japan and the European Community (Haszler and Parsons, 1987). Schwartz and Parker (1988) therefore state that whatever measure is taken in trade negotiations, any significant reduction in such a measure should lead to a substantial increase in market access and reduction in trade distortion.

2.3 Conclusion

In this chapter five measures of support have been explained and compared with regard to policy coverage and the amount of data required. One of those, the *PSE*, is chosen as a basis for the *AMS* discussion in the Uruguay Round. One of the questions posed in the introduction of this chapter was why the *PSE* was chosen rather than another measure of support. Following the analysis in this chapter, it can be concluded that the choice for the *PSE* is due to some practical and conceptual problems with the other four measures:

1. the *NRPP* and the *NRA*, the nominal rates, have a too small policy coverage, as shown in appendix 2;
2. the *ERP* and the *ERA*, the effective rates, have a large policy coverage, but face practical problems with respect to the detailed data required. For example, to include the intermediate input assistance in the calculation of the net support, detailed input-output coefficients are required, which are hard to get.

The *PSE* has a policy coverage which can be measured between that of the *ERP* and the *ERA* (the *ERA* is conceptually the best measure with respect to policy coverage) but faces a much smaller need of data. The *PSE* does not require detailed input-output coefficients to calculate the net assistance to the product concerned due to intermediate inputs, but measures this by using budgetary expenditure data. This also means that not all the assistance to intermediate inputs is taken into account. For instance, direct assistance to the producer of the intermediate input is not considered.

Summarizing, it can be stated that the major attraction of the *PSE* at the political level beyond the other measures, is due to the combination of two qualities:

1. policy coverage; the *PSE* captures the combined impacts of many different policies;

2. ease of calculation; it is calculated largely through the difference between domestic prices and external reference prices (multiplied by the applicable quantity) and the expedient of adding up dollar amounts of transfers before dividing by quantity (to get back to a measure per unit) or by sales value (to get back to a measure in terms of percentage).

This combination of qualities makes the *PSE* a very flexible measure, which can be adapted (to certain limits) in negotiations as desired.

A third reason for the choice of the *PSE* was that estimates of the *PSE* were already available for some products and some countries due to work of the FAO, the OECD and USDA, which represented a considerable increase in both their political visibility and in the resources devoted to their calculation (Josling and Tangermann, 1987).

In the next chapter the *PSE* concept will be analysed in greater detail.

3. SUITABILITY OF THE *PSE* AS AN *AMS* IN GATT NEGOTIATIONS

3.1 Introduction

At the start of the Uruguay Round in Punta del Este in 1986 the Contracting Parties of the GATT expressed the necessity of an Aggregate Measure of Support (*AMS*) in the negotiations. With such a measure of support they wanted to put the wide variety of existing agricultural policy measures and trade distortions under one denominator. When the Contracting Parties would be able to reach agreement on such an *AMS* (in definition, policy coverage, methodology, etc), it could serve as a basis on which binding commitments could be made with respect to the reduction of support levels. The *AMS* could then replace the traditional offer and request method.

As analysed in the previous chapter, the *PSE* was chosen as a basis for the discussion about a possible *AMS* due to its potential policy coverage and its easy calculation. Besides the OECD had popularized the measure by publishing in 1987 *PSE* estimates for seven countries (large trading partners in the GATT) and thirteen commodities, on the basis of the first Ministerial Trade Mandate. After the replacement of the first Trade Mandate, the OECD was asked to follow and describe the reform of the agricultural policy (as agreed in global terms in OECD circles), which implied pursuing the calculation of *PSEs* (Silvis, 1994, forthcoming).

After the start of the Uruguay Round, the USDA (1987) also began to make *PSE* estimations, mainly due to the decision of the Contracting Parties of the GATT to put agriculture high on the political agenda of the Uruguay Round. The estimations of the USDA were intended to support the American negotiators in the GATT with information about the agricultural and trade policy of other countries.

The aims of the OECD and the USDA for the *PSE* are therefore of a descriptive nature, which coincides with the aim for which the concept has originally been developed by the FAO (Silvis, 1994, forthcoming). As described at the beginning of this section the *PSE* (as an *AMS*) was intended for a more ambitious use in the GATT. The analysis in this chapter will therefore be focused on the suitability of the *PSE* concept to serve as an *AMS* in GATT negotiations, on the basis of which binding commitments could be made. This will be done by analysing the *PSE* in all its elements from a technical and economic point of view, therewith referring to the consequences of its use in the negotiations.

Section 3.2 will therefore start with the definition of the *PSE* and the data necessary for the calculations. In the previous chapter the currently accepted definition was given. This is however the evolved definition that resulted from the many discussions after the start of the

Uruguay Round. It is however not the definition that the discussion in the Uruguay Round started with.

In section 3.3 some measurement issues of the *PSE* will be discussed. Among the most difficult measurement issues are policy coverage, the treatment of supply control policies and exchange rates.

In section 3.4 the *PSE* will be evaluated in its function as indicator of trade distortions and finally in section 3.5 some conclusions will be drawn.

3.2 Definition of *PSE*, policy coverage and required data

3.2.1 Definition

In chapter two the definition of the *PSE* was given as currently applied by the OECD (1992, pp. 231):

'Assistance to producers as measured by the value of transfers to farmers generated by agricultural policy. These transfers are paid either by consumers or by taxpayers in the form of market price support, direct payments and other support. (...).'

This was not the definition the OECD gave in her summary report containing *PSE* estimates in 1987. At that time, as mentioned before, the *PSE* had not gained much attention yet. This explains why there was no clear view on how the *PSE* should be interpreted and for what kind of problems it could potentially be used. Different authors therefore gave different definitions. The OECD gave in her report the following definition (OECD, 1987, pp. 100):

The PSE is defined as the payment that would be required to compensate farmers for the loss of income resulting from the removal of a given policy measure

Tangermann et al. (1987) define the concept of *PSE* as follows:

It is the subsidy that would be necessary to replace the array of actual farm policies employed in a particular country in order to leave farm income unchanged. It can be thought of as the 'cash value' of policy transfers occasioned by price and non-price means.

The United States Department of Agriculture (USDA, 1987) defines it as:

A PSE is an estimate of the revenue required to compensate producers if existing government programmes were eliminated.

Schwartz and Parker (1988) finally state the following:

The producer subsidy equivalent measures the percentage of current gross farm income for producers of a commodity that comes from government programmes. This roughly translates into the compensation that would be required in the absence of sectoral policies to maintain sector income at its protected level, assuming fixed output and constant world prices.

Peters (1989a) however demonstrates that all the above definitions, except the one used by the USDA, misinterpret the PSE concept by talking about (one way or the other) 'income loss', which is a misnomer of 'revenue loss'. This can easily be demonstrated in figure 3.1.

In figure 3.1 'S' is the supply curve of a given product and 'D' the demand curve. Under free market conditions, the product price is the world market price P_W , domestic production is Q_1 , domestic consumption D_1 and imports are $D_1 - Q_1$. In this situation the PSE is zero. Let's assume that the government intervenes by implementing an import tariff of $P_D - P_W$ per unit. The domestic price for both the producer and the consumer will increase to P_D , domestic production will increase from Q_1 to Q_2 , domestic consumption will, due to the higher domestic price, decrease

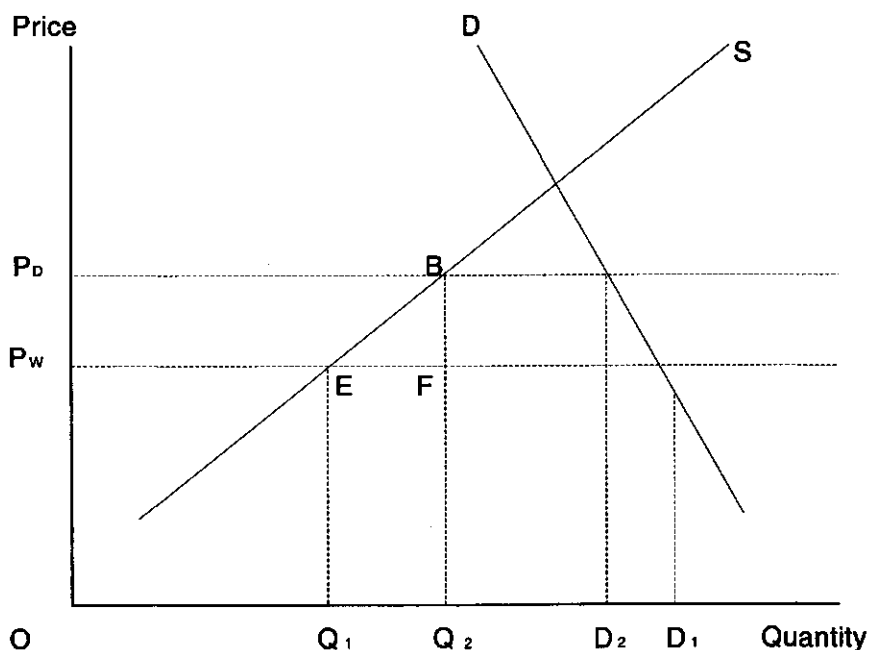


Figure 3.1 PSE as a measure of revenue loss or income loss

Source: Peters (1989a).

from D_1 to D_2 and finally the imports will decrease from $D_1 - Q_1$ to $D_2 - Q_2$. The total *PSE*, measured by the difference between domestic price and external reference or world market price, multiplied by domestic production $(P_D - P_W) \cdot Q_2$, will be $P_D BFP_W$. However, this is not purely income for the farmers as suggested by the above definitions. Namely the triangle BEF forms the extra costs for the farmer due to the increase in production from Q_1 to Q_2 . Moreover, even without any costs for the individual farmer, not all transfers as measured by the *PSE* are income transfers. For instance one dollar of support in terms of research and extension are in the *PSE* calculations treated in the same way as one dollar of direct income support. The support by means of research and extension is however by no way a direct income transfer, while the direct income support is. Thus only part of the total *PSE* is an income transfer to the farmer, the other part is a transfer to cover the extra costs. The total *PSE* indicates therefore the 'revenue transfer' due to the government policy. A removal of the policy will therefore indicate a loss of revenue for the farmer and not a loss of income.

A second problem with the above definitions is that it suggests that *PSEs* measure dynamic effects, i.e. that it measures the loss of income resulting from the removal of a given policy measure (Silvis, 1994, forthcoming). However all variables, which are the basis for *PSE* calculations are assumed independent from each other. This means that in the *PSE* calculations it is assumed that when one or a couple of policy measures is abolished, this will cause no quantity or price reactions. The *PSE* is therefore a static measure. It summarizes and reflects the situation with respect to the assistance to producers at a particular point in time.

3.2.2 Total *PSE* or ratio *PSE*

PSEs can be expressed in various ways. The OECD currently expresses the *PSEs* in four different manners (OECD, 1992, pp. 244):

1. *Total PSE*: the total value of transfers to producers;
2. *Percentage PSE*: the total value of transfers as a percentage of the total value of production (valued at domestic prices), adjusted for direct payments and levies;
3. *Unit PSE*: the total value of transfers per tonne;
4. *Nominal Assistance Coefficient on Production (NAC)*: the ratio of the border price plus the *Unit PSE* to the border price.

As said earlier the *PSE* takes subsidies on inputs into account, but no taxes on inputs that result from market price support to the producers of these inputs. The OECD however makes in their calculations an exception for feed. That is, the feed adjustment to the *PSE* calculation for all live-stock products is made to take account of the effect of market price support for feed grains, oilseeds and taxes on processed feedstuffs used

in animal feed 1). The OECD therefore calculates two different *Total PSEs*. Transfers to producers before deduction of the feed adjustment is called *Gross PSE*, while transfers to producers after deduction of the feed adjustment is called *Net PSE*.

In algebraic form, the above *PSE* expressions can be written as (OECD, 1991, pp. 116-117; adapted from OECD, 1992, pp. 244):

1. *Total PSE (TPSE)*:
 - a. *Gross PSE* = $Q*(P_D - P_W) + DP - LV + OS$ (3-1)
 - b. *Net PSE* = $Q*(P_D - P_W) + DP - LV + OS - FA$ (3-2)
2. *Percentage PSE* = $100*TPSE / (Q*P_D + DP - LV)$ (3-3)
3. *Unit PSE (PSEu)* = $TPSE / Q$
4. *NAC* = $\frac{P_W + PSEu}{P_W}$ (3-4)

where:

- Q = volume of production;
- P_D = domestic producer price;
- P_W = world price (reference price) at the border in national currency; the import (c.i.f. 2)) or export (f.o.b. 3)) price of a commodity;
- DP = direct payments; the value of budgetary outlays paid directly to producers, as subsidies on farm output or on the primary factors used to produce it (i.e. land, labour and capital); also includes stabilization and disaster payments;
- LV = levies on production; taxes on farm output that reduce the price received by producers as a result of market price support;
- OS = all other budgetary-financed support; the value of transfers that indirectly benefit producers. Includes explicit or implicit subsidies on purchased inputs, farm credit, agricultural research and development, extension services, education and agricultural infrastructure minus any taxes or levies on farm inputs (except for feedstuffs). Also includes subnational assistance measures and taxation concessions directed at agriculture;

-
- 1) The purpose of the feed adjustment is to allow commodity *Total PSEs* to be summed up to give a total for the agricultural sector without double-counting the market price support paid by livestock producers to producers of *PSE* feeds, and also to deduct any other taxes on feeds or on processed feedstuffs (OECD, 1991, p.116).
 - 2) Cost, insurance and freight.
 - 3) Free on board.

FA = feed adjustment (only for livestock products); the sum of the additional costs of animal feed to livestock producers as a result of market price support on feeds for which PSEs are calculated and taxes on feeds and processed feedstuffs.

In appendix 1 another algebraic definition of *Total PSE* than presented above has been given, for reason of comparability with the other measures mentioned there. The policy coverage expressed by the equation in appendix 1 is however exactly equal to the *Gross PSE* as mentioned above. We have used here the algebraic definitions as applied by the OECD, because these are the expressions most commonly used.

The advantage of expressing *PSEs* as a ratio is that this may facilitate comparison of *PSEs* over products, countries or time (GATT, 1987a). Tangermann et al. (1987) for instance, are of the opinion that, if complex tables should make sense across commodities and countries, *Percentage PSEs* are needed as the simplest possible aid to inspection (since they lend weight to comparative levels). There are however also some disadvantages in interpreting *PSEs* expressed as a ratio. McClatchy (1987) remarks that, since a change in support affects both the numerator and the denominator, the proportionate change in the *Percentage PSE* is not consistent with the proportionate change in the corresponding *Total PSE*. Another, related problem of *Percentage PSEs* was demonstrated by Peters (1989b). He showed that a move from market price support (MPS) to other support (OS) in such a way that *Total PSE* will not change, will change the *Percentage PSE* as Other Support (OS) does appear in the numerator of the *Percentage PSE* (see equation (3-2)), but not in the denominator. Peters states that 'all of these could be avoided by nothing more fundamental than a change of base. Unsupported revenue as the denominator is unambiguous' (Peters, 1989b). From a scientific point of view this is true. However from a negotiating point of view the question remains of how to determine unsupported revenue.

The remark of McClatchy with respect to *Percentage PSEs* is basically equally valid for both other ratio *PSEs* mentioned above (*Unit PSE*, and *NAC*). Changes in *Total PSEs* can be caused by all elements that constitute *Total PSE* as given in equation (3-1). When for instance the volume of production (Q) increases and the direct payments (DP) decrease, such that *Total PSE* remains equal, *Unit PSE* will change due to the increased denominator (Q).

The OECD recognized this problem and started in 1990 with the decomposition of *Total PSEs* in its constituting components. By identifying the relative importance of the various *PSE* components they tried to explain the overall yearly change in *PSEs* for the chosen aggregate (OECD, 1992, pp. 246). The OECD presented the decomposition in graphical form using a tree structure to clarify the relationships between the components of assistance, like in figure 3.2. The decomposition involves breaking down the change in *Net Total PSEs* into a production volume

(Q) and in the *Unit PSE* (*PSEu*). The change in *PSEu* has in turn been broken down into a series of unit value components: market price support (MPSu), output levies (LVu), direct payments (DPu), other support (OSu) and feed adjustment (FAu). Market price support itself is further decomposed into a domestic producer price component (P_D) and a border price in domestic currency (P_{wnc}). The latter in turn is made up of an exchange rate component and a border price in US dollars (OECD, 1992, pp. 246). For each component, two indicators are calculated. The first indicator is an index measuring the alteration in the component. The other indicator measures the contribution, in percentage points, of that alteration to the overall change in the *Net Total PSE*. The contribution is derived by weighting the index by the share of the component in question in total assistance in the base year from which the index is calculated. As these shares may vary from year to year the impact of the same relative change in a component may also vary from year to year. The contribution can be interpreted as the relative change that would have occurred in the *Net Total PSE* if nothing had changed. The sum of the contributions from all components equals the relative change in *Net Total PSE* (OECD, 1990, pp. 95) 1).

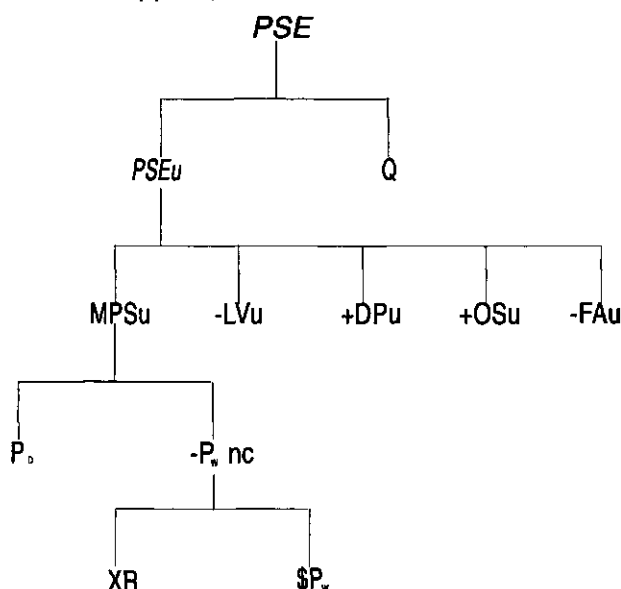


Figure 3.2 Decomposition of the changes in the Net Total PSE
Source: OECD, 1992, pp. 257.

- 1) This means that the changes in components are regarded as independent from each other. As this is rarely the case in practice, the results of the decompositions have to be interpreted with care (Silvis, 1994, forthcoming).

The Nominal Assistance Coefficient (*NAC*) as a way to express *PSEs*, has been introduced by the OECD in 1991 (OECD, 1991, pp. 135). Equation (3-4) above indicates that the *NAC* is calculated as the implicit reference border price in national currencies (P_W) plus the *Unit PSE* (*PSEu*), divided by the implicit reference border price in national currencies (P_W). The *NAC* in fact measures the wedge between domestic and world prices as created by agricultural policies. According to the OECD (1991, pp. 135), an indication of these price wedges is useful in evaluating policy developments. A *NAC* of one, for instance, indicates that domestic prices are not insulated from world prices. As the value of the wedge rises, the *NAC* will increase and vice versa. The OECD (1991, pp. 135) remarks that the advantage of transformation of *Unit PSEs* in *NACs* to compute price wedges on the production side instead of *Percentage PSEs*, is that the latter measures transfers relative to the gross revenue of producers. Therefore it obscures the extent of the wedge between domestic and border prices and hence the degree of distortion in production. The implicit assumption underlying this statement is that each dollar of assistance has the same incidence on distortion in production. This is especially questionable for assistance in the form of research, extension, etc. The OECD is aware of this, but remarks that 'the measures for which the distortion effect is expected to be minimal, account for only a small share in total assistance, thus the error implied is likely to be minimal' (OECD, 1991, pp. 144).

Besides the four mentioned ways of expressing *PSEs*, which are most frequently used, there are also other manners of expressing *PSEs*, which will be briefly mentioned. Tangermann et al. (1987) and Peters (1989b) have put forward the already mentioned *Percentage PSE* in which the *PSE* is expressed as a percentage of producer revenue valued at world prices instead of domestic prices as in equation (3-2). In such a ratio the *PSE* is comparable to an *ad valorem* tariff. Other ways of expressing *PSEs* are a *PSE* per farmer and a *PSE* per unit of farmland. The latter ratios have been presented only once by the OECD in 1991 (OECD, 1991, pp. 133) and are uncommon.

Finally it has to be mentioned that apart from expressing *PSEs* as a total or as a ratio, *PSEs* can be calculated per commodity, per group of commodities, per sector, country, etc. However, as this is rather a political issue than one of definition, it is not dealt with in this chapter.

3.2.3 Policy coverage and data

3.2.3.1 Policy coverage

The advantage of the *PSE* is that it is able to cover almost the whole range of support measures that might operate. In the original version of Josling/FAO, the measurement was geared essentially to expressing the effects of all policies that could reasonably be thought to be commodity specific. The OECD (1987) broadened the definition by including more

general measures like government expenditure on research, extension, etc, which are not necessarily commodity specific (see previous section). The USDA (1987) in its analysis for a large number of countries, broadened the definition further by including some of the effects of exchange rate distortions in the case of developing countries.

Inclusion of a wide range of policies has the advantage of avoiding the switching from included policy instruments to excluded ones while negotiating, to keep up protection while apparently observing the agreement (Josling and Tangermann, 1987). However by including almost all the policies, like the OECD and the USDA, one assumes that each dollar of assistance has the same production (and hence trade) effect. This is an oversimplification which both organizations neglect in their reports in 1987 1). There is fairly widespread agreement that any measure that falls into the categories of 'market price support', 'direct income support', 'indirect income support' (policies affecting variable production costs) and 'programmes affecting marketing costs' should always be included. For the policies not falling under these categories the main question is whether these policies provide **decoupled** assistance or not (GATT, 1987d). Peters (1989b) defines **decoupled** as follows: 'a lump sum revenue transfer which provides no incentive to alter output given the price level. Further there would be no trade diversion impact'. By contrast any policy measure which shifts the supply schedule is **not** decoupled. The question is, whether a decoupled payment should be included in the *PSE*? This is both an economic and a political question. In this chapter only the economic side of the medal will be dealt with.

Tangermann et al. (1987) propose in their article a simple categorization of policy instruments into three groups:

1. 'pure' transfers that are agreed upon to have no measurable output and trade effects;
2. instruments that encourage output directly or indirectly through the increase in farm profitability without supply control;
3. instruments that involve supply control with or without payments.

The policies under 1 are decoupled and could be ignored if *PSEs* are used in negotiations. For policies under 2, negotiation on the basis of implied *PSEs* would directly improve the trading system. The principal problems arise with the policies in the third group. These problems will be discussed in the next section where measurement issues will be discussed.

To conclude one could say that the *PSE* is flexible in that it can measure most (not all) of the policy measures applied by the different

1) In more recent reports, the OECD pays attention to this problem as indicated in the previous section where the *NAC* concept was discussed.

countries. Which policy coverage will be chosen when *PSEs* would be used in negotiations is therefore a political question.

3.2.3.2 Data

Most estimates of the *Total PSE* value are measured in one of two ways (GATT, 1987a; GATT, 1987c; McClatchy, 1987; OECD 1991; USDA, 1987):

1. the wedge that a policy instrument (or mix of instruments) drives between domestic and external prices;
2. the budgetary effects of government policies.

Market price support policies act to separate domestic and external prices. The *PSE* part for those policies is measured by the first way mentioned. In fact in this way, the border measures, internal measures and programmes to support export (in whatever way) are generally spoken measured together. Thus the contribution of an individual measure to the protection level is hidden.

Most other policies can be measured by data from budgetary outlays. Some policies are measured by a combination of the two. To give a clear and extended overview of policy coverage, the way they are measured in the *PSE* and examples of products per country to which a policy is applied, a table is given in appendix 3, which is in fact an overview of the USDA report of 1987.

3.3 Measurement issues

In the following subsections the measurement problems that the *PSE* faces will be discussed and proposals will be given of how these problems could possibly be solved.

3.3.1 Policy coverage

Section 3.2 described what policies can normally be measured by the *PSE*. However there are some policies which from an economic point of view should be taken into account, but which are some way or the other not measured by the *PSE*, or not accurately measured. Examples are income tax rates, intermediate product taxes, supply control policies, voluntary export restraints etc. The problems that arise with these policies with respect to the *PSE* will be described in the following subsections.

3.3.1.1 Income tax rates

The current *PSE* concept as used by the FAO, OECD and USDA focuses on differential treatment between population groups within a society, not between farmers in different countries. Thus income tax rates would be excluded from the calculation for a given commodity if they equally apply to farmers and other groups. Thus substantial differences between countries in income tax rates applying to farmers, would not be captured by the *PSE* (McClatchy, 1987).

3.3.1.2 Trade at favourable conditions and food aid

PSE calculations of national and international organizations generally do not take into account trade at favourable conditions and food aid. There is a possibility that for example food aid is incorporated in the *PSE* by the price gap between domestic price and external reference price, as this method does not distinguish between the destination of production benefiting from support. Whether this is true or not is not known (GATT, 1987a). However in negotiations, the inclusion of trade at favourable conditions and food aid into the *PSE* calculations, raises a number of additional difficulties with respect to the *PSE* concept and its calculations (GATT, 1987a). These are:

1. the impact of food aid on trade is not absolutely clear. This aid may decrease trade demand or encourage it. Or it is, according to the normal commercial import criterion of the FAO, almost neutral with regards to trade;
2. further, even when one could identify the origin of these effects, it would be difficult to calculate their impact on the reference price element in the *PSE* calculations.

3.3.1.3 Intermediate input assistance

PSEs do include government policies, which subsidize inputs for farmers, but they exclude the effects of government policies on intermediate product prices which fall to the producers of these intermediate inputs (USDA, 1987). Thus they do not consider the indirect effects of other policy measures on the costs of farm inputs. For example, in some countries farmers are effectively taxed by government protection or regulation of other sectors such as farm machinery, fertilizers, and transportation. These effects are not reflected in the *PSE* calculation. The reason for not being incorporated in *PSEs* is that it raises practical difficulties, because a set of input-output coefficients is required, which is very difficult to get. However exclusion from the *PSE* involves that *PSEs* cannot be accurately compared over countries, when used in the negotiations.

In section 3.2.2 it was already mentioned that in this respect the OECD makes an exception in her calculations of *PSEs* for animal feed costs in the *PSE* on livestock, therewith transforming *Gross Total PSEs* to *Net Total PSEs*. By means of the animal feed costs, we will show what happens when government policies on intermediate inputs that fall to the producers of these inputs are not taken into account in the *PSE* calculations for the final product.

High prices for feedstuffs clearly act as negative subsidies (i.e. taxes) on the livestock industry. Omission of these policies from the calculations would overstate the incentive effect of high support levels for livestock product prices, much of which might merely offset higher feed costs (Tangermann et al., 1987). The effect of the omission of assistance to feed producers from livestock *PSEs* are demonstrated in figure 3.3.

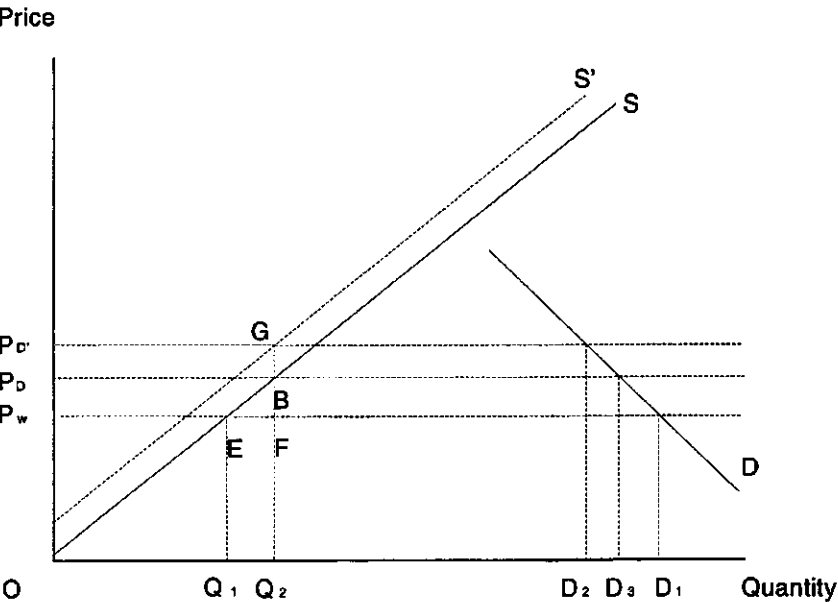


Figure 3.3 Effect of the exclusion of assistance to feed producers out of livestock *PSE*
Source: adapted from Peters (1989a).

S in figure 3.3 is the livestock supply curve when feed inputs are unprotected. P_D is the supported domestic price for livestock. When support for cereals, used for the production of feed stuff, is introduced, this will raise the price for feed stuff and hence shifting the livestock supply upwards to the left to S' . Now assume that the internal livestock price is raised to P_D' , in order to offset the higher feed price and therefore main-

taining the livestock production level Q_2 . The *Total PSE*, previously $P_D BFP_W$ (P_W is the world market price) rises to $P_D' GFP_W$. Apparently there is greater protection. However the factors of production (total revenue minus intermediate input costs) are receiving exactly the same reward in the two situations. Thus if internal prices are raised to compensate for feed costs the erroneous impression is given that the value of protection has increased.

3.3.1.4 Supply control policies

According to Josling and Tangermann (1987) the issue of supply control and how this is handled by the *PSE* is the most serious analytical issue of the *PSE*, reason why it will be discussed here in detail.

The best-known supply control measures are the milk quota system in the EC, started in 1984, the milk production quota system in Canada and the acreage reduction programmes in the US (USDA, 1987). From an economic point of view, those countries, which effectively restrict domestic production through supply control policies, should receive 'credits' on the *PSEs* for the commodities concerned, for at least two reasons.

1. traditional *PSEs* overestimate the effect on quantities produced and hence on trade;
2. 'contribution' to balancing international markets.

The first argument implies that the total transfers to producers as measured by traditional *PSEs* overestimate the effect on produced quantities and hence on trade, due to the fact that part of the transfers to producers is pure 'economic rent' to which producers cannot react by expanding production because of the supply restriction (GATT, 1987a; Tangermann et al., 1987). In figure 3.4. the above problem is demonstrated. In this figure, S is the existing domestic supply curve of the commodity, D the domestic demand curve, P_D the domestic supported price level and P_W the world market price. Now consider three situations:

- A: production quota established at the existing production level Q_2 , *ceteris paribus*;
- B: production quota established at 90% of the existing production level, which means at Q_3 . The price remains at P_D and there are no compensatory direct payments;
- C: production quota established at 90% of the existing production level (Q_3). The price remains at P_D and the producers will be compensated by direct payments up to the revenue level in the situation without a quota.

P_S is the price necessary to achieve the same reduction in production as with the quota system.

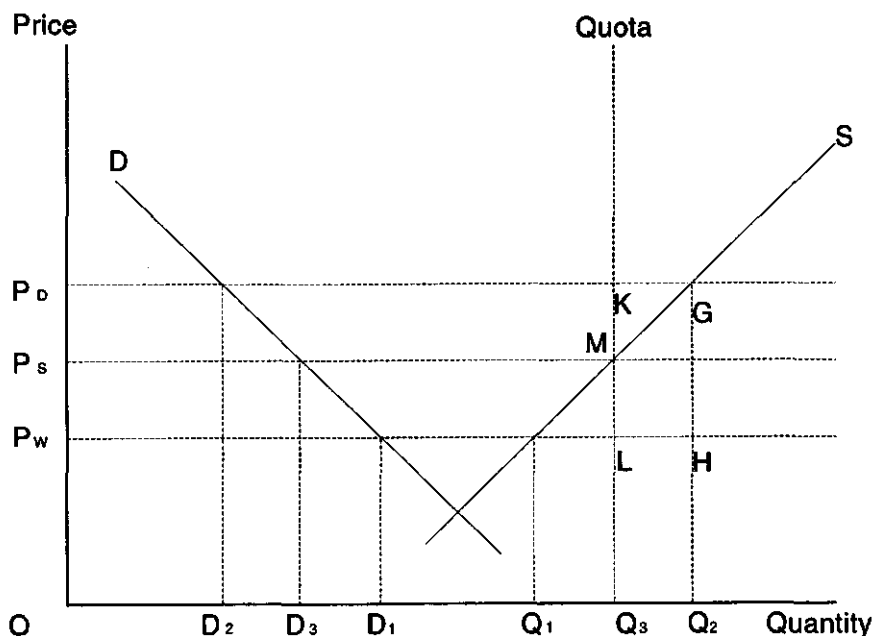


Figure 3.4 PSEs in case of supply control

The *Total PSE*, *Unit PSE*, the *Percentage PSE* and the *NAC* in these cases are given in figure 3.5 together with a numerical example ($Q_2 = 1,000$ tons, $P_W = 30$ units and $P_D = 50$ units).

The starting situation is of course the same situation as A because of the fact that the production quota has been established at the existing level. In situation B however one can see that while the *Total PSE* has changed, the *Unit PSE*, *Percentage PSE* and *NAC* have not changed. Thus the *PSEs* expressed as a ratio have not changed while the production and thus in fact the total support has declined. Situation C is probably even more clear. Total production has decreased and total revenue to the producers has not changed, but the *Total PSE*, *Unit PSE*, *Percentage PSE* and *NAC* increased.

Without the quota system, though, P_S would have been the necessary price to reduce the total production to the same level as with the quota system. So whatever the producers receive above the price level P_S they may not produce more than Q_3 . Thus all the assistance or revenue provided by government policies beyond the area OP_SMQ_3 is an 'economic rent'. In the traditional *PSE* one does not take the existence of an 'economic rent' into account.

Situation of supply control	Total PSE	Unit PSE	Percentage PSE	NAC
Start	$P_W P_D GH$	$\frac{P_W P_D GH}{Q_2}$	$\frac{P_W P_D GH}{OP_D GQ_2} * 100$	$1 + \frac{PSEu}{P_W}$
A	$P_W P_D GH$	$\frac{P_W P_D GH}{Q_2}$	$\frac{P_W P_D GH}{OP_D GQ_2} * 100$	$1 + \frac{PSEu}{P_W}$
B	$P_W P_D KL$	$\frac{P_W P_D KL}{Q_3}$	$\frac{P_W P_D KL}{OP_D KQ_3} * 100$	$1 + \frac{PSEu}{P_W}$
C	$P_W P_D KL + Q_3 KGQ_2$	$\frac{P_W P_D KL + Q_3 KGQ_2}{Q_3}$	$\frac{P_W P_D KL + Q_3 KGQ_2}{OP_D GQ_2} * 100$	$1 + \frac{PSEu}{P_W}$
Start	20,000	20.0	40.0	1.67
A	20,000	20.0	40.0	1.67
B	18,000	20.0	40.0	1.67
C	23,000	25.6	46.0	1.85

Figure 3.5 PSEs in three different cases of supply control

The second reason why the *PSE* should be adapted in order to be able to allow a credit for supply control policies, is not an economic reason but a reason originating from an international trade perspective, with which the *PSE* has to deal when used in the negotiations.

Countries pursuing supply control policies make a 'contribution' to balancing international markets, even if the primary objective of supply controls is domestic, such as to affect budget savings. From a purely economic point of view, supply controls lead to domestic inefficiencies in resource use. However, from an international trade perspective supply control policies contribute in a positive way by reducing 'overproduction' and hence limiting the distortion of international trade that would otherwise occur. When the country is large, this may raise the world price; consequently other countries' *PSE* for this commodity will decrease, without having changed their policies. This may of course also recompensate the country itself, though a small country (dealing with supply control) will not enjoy this advantage.

Due to the above reasons countries pursuing supply control policies should receive some reductions of their measured commodity *PSEs*, when used in the negotiations. The question however is by how much the *PSEs*

should be reduced in order to take into account the effect of supply control policies. Theoretically the *PSE* for a product under supply control should be reduced exactly by the part of the overall amount of support that is beyond the support which would have sufficed to induce farmers to produce the quantity supplied under the supply control scheme. In order to do this properly, the 'shadow price' (P_s in figure 3.4) for the commodity concerned would have to be estimated, which is however practically almost impossible.

Therefore various authors, both scientists and politicians have tried to find a solution for the above problem. All the contributions to this problem can be summarized in three main options, of which the first two are practical solutions and the third one gives a solution which is in accordance with economic theory.

1. a lump sum of $x\%$ credit (Commission of the European Communities, 1988d; Tangermann et al., 1987);
2. credit categories based on a 'self election approach' (Tangermann et al., 1987);
3. mathematical approaches that mainly try to estimate the above-mentioned 'shadow price' or try to estimate the 'would-be-production level' at current supported prices (Commission de la Communauté Européenne, 1988a; Commission of the European Communities, 1988d; GATT, 1988a; GATT, 1988e).

Sub1: According to Tangermann et al. (1987) one possibility is to define a limited number of categories of supply control policies and agree on flat rate relative reductions of the *PSEs* as traditionally measured for these categories (say 10, 20 and 30% reductions). Criteria have to be defined in order to allocate the supply control policies in categories according to the extent to which they reduce domestic production below what would have been produced in the absence of the policies concerned. They also state that agreement on such criteria will be difficult.

In a document of the Commission of the European Communities (1988d) dealing with the problem of how to incorporate the EC quota system into the *PSEs* it is stated that a first attempt was made using a lump sum of 20% as a credit for the milk quota implemented in 1984/85. Calculations, though, carried out under this assumption indicated that a straightforward application of a fixed relative amount will not sufficiently reflect economic reality.

Sub2: The second approach, mentioned by Tangermann et al. (1987) is based on the 'self-election' approach of the countries concerned and provides political incentives to contribute to improvement of the situation in international trade. Countries that believe they pursue effective supply control policies could be granted a given relative reduction of the *PSE* concerned (say 30%) if they would

agree to bind the *Total PSE* (in million dollars) (because of the *Percentage PSE* problem with supply control measurement mentioned earlier). The result of this approach would be that such countries, as long as they do not expand the volume of domestic production, would then be subject to the equivalent price disciplines in *PSE* per ton. If they are less sure about their own policies, they would be free to choose the *Percentage PSE* (rather than the *Total PSE*), although by doing so they would forego the supply control 'credit'. The advantage of this method is that no agreement on international level is necessary to see if a domestic supply control policy is actually restricting domestic production effectively. The government of the country concerned could make its own choice under this 'self-election' approach.

Sub3: In a document of the Commission of the European Communities (1988d) it is proposed to incorporate the EC milk quota system into the *PSE* by a more refined approach than the lump sum approach. Besides an estimation is made of the product price change necessary to obtain an equivalent supply level as fixed by the quota system under the hypothesis of a simple *trend* and *price elasticity* component of the quantity development. The following supply function served as the underlying production function for EC milk supply:

$$Q(t) = \text{ex. } (T_t + w(P(t))) \quad (3-5)$$

In which: $Q(t)$ = milk supply at time t ;

$P(t)$ = milk price at time t ;

w = supply price elasticity and;

T_t = the trend coefficient representing all other than price induced effects on milk supply (autonomous trend, technical changes, productivity increases, etc).

Canada submitted a discussion paper in the light of the GATT negotiations (GATT, 1988a), in which a revision of the *Unit PSE* was made in order to better reflect trade distortions. One of the modifications dealt with market price support in case of production quotas, which will be briefly explained here.

The idea can be reflected by figure 3.4 (as presented in this section). In this figure, without supply control, production would be Q_1 at world market price P_W and Q_2 at supported domestic prices P_D . With supply control at Q_3 , the 'shadow price' (as defined earlier) is P_S . Thus the production distortion is only $(Q_3 - Q_1)$ and the per unit dollar value corresponding to this actual distortion is $(P_S - P_W)$, which is called the production distortion equivalent (*PDE*). On the demand side, the existence of managed supply makes no difference

to the distortion of consumption as the consumer price remains at P_D . The difference ($P_D - P_W$) is called the consumer tax equivalent ($CTE = -CSE$, consumer subsidy equivalent). The relative importance of volume distortions will depend on the slopes of the supply and demand curves. If these slopes are unknown then the adjustment formula for the *Unit PSE* is given as:

$$\text{adjusted Unit PSE} = 0.5 (CTE + PDE) \quad (3-6)$$

$$\text{adjusted Unit PSE} = 0.5 (CTE + (PSE_u - W*i)) \quad (3-7)$$

Where: CTE = consumer tax equivalent;
 PDE = producer distortion equivalent;
 PSE_u = unadjusted Unit PSE;
 W = observed market-determined value of the entitlement to produce one unit per year;
 i = prime interest rate (or equivalent) in the country in question.

As one can see, the PDE in (3-6) has been replaced in (3-7) by $(PSE - W*i)$. This is because in practice there are problems with determining the 'shadow price' (P_S) and thus the PDE . Therefore ' $W*i$ ' is introduced, the marginal economic rent accruing to producers at quantity Q_3 and price P_D , which should indicate the difference between the domestic price (P_D) and the 'shadow price' at Q_3 (P_S). The only guide to the value of ' $W*i$ ' in practice is its capitalized value, namely the market price for production entitlements (W). Multiplying by the interest rate ' i ' consequently gives an indication of the price difference ($P_D - P_S$). It follows that a correction as proposed here is only possible where production quotas are held at the individual farm level.

In the event that there is agreement on the slopes of the supply and demand curves (dS and dD respectively), then the formula would be:

$$\text{adjusted Unit PSE} = 0.5 (-dD*CTE/dS + (PSE_u - W*i)) \quad (3-8)$$

Where: dD = slope of demand curve;
 dS = slope of supply curve.

3.3.1.5 Quantitative import restrictions and voluntary export restraints

In the *PSE* concept, quantitative import restrictions are incorporated, together with a lot of other policies, by the price gap between domestic prices and external reference prices. However this immediately raises the problem of desegregation. It is very difficult to estimate in advance the modification in *PSE* resulting from a reduction of quantitative restrictions

or to estimate to what extent the *PSE* has to be reduced in order to eliminate quantitative import restrictions (GATT, 1987a).

The same could be stated for voluntary export restraint agreements (VERAs). VERAs and some other instruments of protection against imports lead to higher c.i.f (cost, insurance, freight) prices for the importing country because of the existence of 'contingental rents'. The protectionist effects of such measures are not measured by *PSEs* as they raise the c.i.f price which is used in this case as external reference price. For example, replacement of an import tariff by an equivalent VERA would lead to a reduction in the *PSE* as usually measured, without reducing protection for domestic producers (Tangermann et al., 1987). A solution to this problem, in accordance with economic theory, would be to estimate with economic models (which include supply and demand coefficients) the effect of quantitative import restrictions and VERAs on domestic and world market price levels. This way the different effects of different policies included in the price gap could be unravelled. Though this solution is theoretically ideal, for the negotiations it would involve that supply and demand coefficients and economic models have to be available for all products and all countries incorporated in the calculations. As some authors considered this to be almost impossible, they proposed some practical solutions, though not fully in accordance with economic theory.

1. estimation of 'true' c.i.f prices. This means c.i.f prices of the same commodity in other importing countries whose comparable imports were not subject to such measures (GATT, 1987a; Tangermann et al., 1987);
2. 'rule of thumb'. The *PSE* of the commodity concerned would be increased by x percent automatically, unless the importing country were to provide evidence that a lower increase is justified (Tangermann et al., 1987);
3. traditional negotiations on the basis of offer and request about the levels of import quota, their administration etc. This solution has been put forward by a technical group in the GATT, dealing with the AMS. They state that it is impossible to modify the *PSE* technique with respect to the measurement of policies like VERAs (GATT, 1988f).

3.3.1.6 Public stockholding activities

Public stockholding activities can appear in *PSE* calculations both by the difference between domestic prices and external reference prices and by the budgetary expenditures by governmental organizations to cover the storage costs itself. The question is whether according to economic theory these stockholding activities are accurately measured by the *PSE*. First of all it should be mentioned that, as with the quantitative import restrictions and the VERAs, their effect on the domestic and world mar-

ket prices is disguised as also other policies are measured by this price gap (GATT, 1987a). Secondly, unlike most types of agricultural support measures, the relationship between net government expenditures on stockholding activities in a given year and the world market price effect of such activities in the same year is quite variable. To the extent that stock accumulation by a given country provides support to world market prices it will have a (small) production increasing effect in all countries with prices linked to the world market, and not only in the country bearing the cost. However permanent accumulation of public stocks is not a long-term viable means of farm revenue support (GATT, 1988a), as once in the future they will appear on the market.

Therefore from an economic point of view stockholding activities should be omitted from the *PSE* indicator, on the grounds that their direct influence is on market supplies rather than production levels and that they are not long-term sustainable farm revenue support measures. Because their influence on the price gap is impossible to eliminate, this will imply that in practice only the direct budgetary expenditures related to stockholding activities can be excluded from *PSE* calculations.

3.3.2 Large country case

PSEs do not explicitly take into account the large country effects on world reference prices (USDA, 1987). The main point to be made on the large country problem is that any reductions or rises in domestic support levels for producers of a certain product are also likely to have an impact on the world price. Examples of countries that are large in this sense are the US (as a wheat exporter), Australia (as a wool exporter) and Japan (as a beef importer) (Haszler and Parsons, 1987). For example, if a large country protects domestic producers and expands production, this will tend to depress world prices. Since the *PSE* estimate would be based (directly or indirectly) on actual world prices, it would include not only the policy induced increase of the domestic prices, but also ensuing world price reductions. The resulting *PSE* will therefore be higher than without the world price effect and 'exaggerated'. Conversely, when a large country controls domestic supplies, world prices are higher than they would have been in the absence of these supply controls. The question raised is whether the *PSEs* of large countries should be adjusted for their world price effects. According to economic theory no adjustment should be made, because the distorting effect of policies on the prices will only be fully reflected when actual world prices are used.

Also from a negotiating point of view, various authors come to the conclusion that no adjustment should be made, due to the following reasons.

1. large countries have particular responsibilities for the functioning of international trade (Tangermann et al., 1987). If they pursue policies

- that depress world prices, there is no reason why this should not be measured;
2. if on the other hand world prices increase due to domestic supply controls by large countries, this will also be reflected in the *PSE*, which will be lower than without this effect. Additional credit is not necessary;

The OECD and USDA do not take the large country effect into consideration but both acknowledge the problem.

For the other (not only small) countries, facing the change in world price due to another country's policy, an adjustment could be made however. For policies of large countries that depress world prices of a certain commodity, will without adjustments increase the *PSE* for that commodity in other countries without having changed their policies or their protection level. This problem, which is a more general one in *PSE* measurement rather than only a large country effect, will be dealt with in the next section.

3.3.3 Issues relating to external reference prices

3.3.3.1 Introduction

Within the overall *PSE* concept, the trade measures under market price support are normally captured as the difference between an internal price (producer price) and an external reference price. It follows from this procedure that a *PSE* may change when the external reference price changes, due to problems like world price and exchange rate fluctuations, inflation and natural circumstances (GATT, 1988c; USDA, 1987). With respect to the negotiations, exogenous changes in external reference prices, which result in corresponding fluctuations in calculated *PSE* levels, are outside the control of governments (GATT, 1988a). Without corrections governments will not be keen on agreeing with commitments based on *PSEs*. In particular, what will happen if *PSEs* increase not because of policy changes in the country concerned but because of falling world prices or because of exchange rate changes? Would domestic prices (or subsidies) then have to be brought down in order to comply with the bound *PSEs*?

In her calculations the OECD uses reference prices which are derived (as much as possible) from the market prices that prevail at the border of the various countries. For net importing countries this implies 'cost, insurance and freight' (c.i.f.) prices and for net exporting countries, 'free on board' (f.o.b.) prices. The reference prices thus differ per country and although the OECD acknowledges the problems mentioned, they do not make any corrections in their calculations.

A look at the *PSE* calculations of the OECD, will set out the importance of the problem. In their calculations the *PSE* decreases till 1984, while particularly in those years before 1984, one should expect a raise in

PSE levels due to decisions with respect to market and price policies. This controversial course of *PSEs* is due to the development in world prices and the increasing dollar value. An analysis of Buchholz (1989) of the OECD figures resulted in the same conclusions.

The economic solution to this problem is to use reference prices and exchange rates which would be realized in a free trade situation. However, because it is (as yet) not possible to determine these prices, this problem can with respect to the negotiations be regarded as purely political. Therefore the problems and their solutions as discussed in the following sections must not be regarded as purely economic, but more as practical solutions when the *PSE* would be used in the negotiations.

3.3.3.2 Choice of external reference price

Apart from the fact that external reference prices may change due to exogenous factors there are several other issues which make it fairly impossible to choose one unique world price per product as external reference price.

First of all there are differences in product quality and in processing level. The OECD has tried to solve this problem in her calculations by using technical coefficients and price corrections (Silvis, 1994, forthcoming).

A second issue concerns the difference between the observed world price and the hypothetical 'free trade' price. The external reference prices used in the calculations of *PSEs* are normally derived from observed market prices, which are in fact also distorted prices (USDA, 1987). The existing evidence points out that some commodities (e.g. dairy products) are much more distorted than others (e.g. oilseeds). One implication of this is that a given *PSE* for one commodity may be much more serious than a numerically similar *PSE* for another commodity if the world price of the first commodity is more artificially depressed than that of the second (McClatchy, 1987). This raises the question as to whether the actual (distorted) world price or the 'free trade' world price is the theoretically appropriate reference point. As already stated in the introduction, from a scientific point of view a 'free trade' reference price has to be used, although such a price is hard to estimate accurately (Tangermann et al., 1987). A possible practical solution may therefore lie in a proposal to reduce only *PSEs* that are above a certain minimum level (agreed by the negotiating partners).

Another issue relates to the appropriate external reference price being higher when a country is a net importer than when it is a net exporter. For an exporting country the relevant world price is the f.o.b. export price at its borders. For importing countries the relevant world price is the c.i.f. price (Haszler and Parsons, 1987). This may result in anomalies such as two neighbouring countries having the same support price level but different *PSE* values due to the fact that one is a slight net exporter and the other a slight net importer. Similarly a country's *PSE*

may suddenly rise from one period to the next without any change in support measures, but merely because the country moved from a slight net import to a slight net export position (McClatchy, 1987). One way to remedy the problem is to use c.i.f.-based prices for production up to total domestic consumption and f.o.b. prices thereafter (GATT, 1988j), as shown in figure 3.6 below. The shaded area illustrates the market price component of the PSE, i.e. the difference between the producer price P_p and the external reference price, $P_{c.i.f.}$ and $P_{f.o.b.}$, multiplied by the quantity produced (Q_p). If as assumed in the graph, the domestic consumption Q_c is less than domestic production Q_p , two different prices are used as reference price when calculating the market price support, MPS:

$$MPS = (P_p - P_{c.i.f.}) * Q_c + (P_p - P_{f.o.b.}) * (Q_p - Q_c) \quad (3-9)$$



Figure 3.6 Influence of c.i.f. and/or f.o.b. prices on PSEs

Assuming that the black block on the right side in figure 3.6 represents all non-market support (DP, LV and OS in equation (3-1), aggre-

gated here as *NMS*), then *Total PSE*, *Unit PSE* and *Percentage PSE*, are calculated as follows 1):

$$\text{Total PSE} = \text{MPS} + \text{NMS} \quad (3-10)$$

$$\text{Unit PSE} = (\text{MPS} + \text{NMS})/Q_p \quad (3-11)$$

$$\text{Percentage PSE} = (\text{MPS} + \text{NMS})/(\text{NMS} + P_p * Q_p) \quad (3-12)$$

The economic justification of this approach is an extension of the marginal revenue reasoning. At the domestic market, a producer has to compete against the price of imported goods at the border, which can be considered as the marginal revenue of production. For the same reason, for the part of production exceeding the domestic consumption, prices free on board at the border can be regarded as the marginal revenue of production (GATT, 1988j).

A final issue mentioned here, refers to the problem of fluctuating world prices. World prices can fluctuate a lot from year to year due to policy changes of large countries (see section 3.3.2), abnormal seasonal conditions (Haszler and Parsons, 1987), exchange rates (see next section) etc. Fluctuating world prices translates to fluctuating *PSEs* for countries, without having changed policies. Most solutions for this problem mentioned in the literature focus on averaging world prices of several years (Tangermann et al., 1987; GATT, 1988a).

3.3.3.3 Exchange rate and currency fluctuations

Exchange rate variations essentially show up as world price movements, but in behalf of surveyability they have not been discussed in the previous section but will be dealt with separately in this section. As external reference prices will vary due to exchange rate and currency fluctuations, the *PSE* will vary as well. That situation is illustrated in table 3.1 with the help of figures used by the OECD in calculating the *PSE* for wheat (GATT, 1988c).

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- 1) The solution of a combined use of c.i.f. and f.o.b. prices was put forward at a time when the earlier mentioned *NAC* had not been introduced yet by the OECD. Also thereafter the *NAC* has, as far as the author knows, not been discussed in this context. A possible formula for the *NAC* in this respect would be:

$$\text{NAC} = (\text{Unit PSE} + P_a)/P_a$$

$$\text{where: } P_a = \frac{(P_{c.i.f} * Q_c) + (P_{f.o.b} * (Q_p - Q_c))}{Q_p}$$

Table 3.1 *The influence of exchange rates and currency fluctuations on producer prices and external reference prices of wheat in the EC and the USA in 1983 and 1985*

Prices in EC and USA	Year				Price dif- ference (%) 1983-1985	
	1983		1985			
	ECU	\$	ECU	\$	ECU	\$
EC						
Producer price/ton	197.0	184.6	177.8	129.5	-9.7	-29.8
External price/ton	175.0	163.8	124.0	90.3	-29.1	-44.9
Price difference	22.0	20.8	52.8	39.2	140.0	88.5
US						
Adjusted producer price *)	191.9	179.7	205.0	149.3	6.8	-16.9
Producer price **)	138.5	129.7	155.5	113.2	12.2	-12.7
Price difference	53.4	50.0	49.5	36.1	7.3	-27.8

*) For the US the adjusted producer price equals the producer price increased by direct payments; for the EC producer price and adjusted price are identical;

**) For the US the producer price is considered equal to the external price.

Source: Adapted from GATT (1988c).

Focusing our attention on the differences between the domestic producer prices and the external reference prices (as these are used directly in *PSE* calculations), the influence of exchange rates and currency fluctuations becomes clear immediately. The figures in the table show that the price gap for wheat increased in 1985 as compared to 1983 with 140% when expressed in ECUs, while the increase was 'only' 88.5% when measured in US dollars. The incidence of exchange rates and currency fluctuations becomes even more clear when one looks at the development of the price gap for producers in the US. When measured in ECUs, the price gap in 1985 as compared to 1983 increased with 7.3%, while it decreased with 27.8% when measured in US dollars.

The presented figures clearly indicate that without correction comparison of national *PSEs* over time is impossible, because exchange rates and currency fluctuations influence the calculation of *PSEs*. From a purely economic point of view there are good reasons to adjust domestic markets to changes in exchange rates or currency fluctuations to the extent that they indicate changing international comparative advantages. In

practice this is very difficult. Therefore several possible practical solutions to this problem have been put forward in the negotiations:

1. the choice of a reference year for the exchange rates to be used. This approach suffers from arbitrariness of the choice itself (Commission of the European Communities, 1988a);
2. use of a moving average. However the choice of the period on the basis of which the moving average would be calculated is delicate since this period has to cover the range of considered fluctuations (Commission of the European Communities, 1988a);
3. using a fixed external reference price, expressed in the currency of the party concerned (GATT, 1988c). However the problem of this approach is that it does not reflect the real economic situation.

3.3.3.4 Inflation

The problem of inflation appears automatically in *PSE* calculations, when *PSEs* and thus agricultural support policies of different countries are compared. From an economic point of view no correction for inflation is necessary, because they are part of the actual economic situation in a country. From a negotiating point of view it seems, as stated in a document of the Commission of the European Communities (1989g), appropriate to deflate the relevant support elements and derive a support level expressed in real terms.

The same document mentions that international comparative statistics offer two different deflators that can be applied.

1. the Gross Domestic Production deflator (GDP);
2. the Consumer Price Index deflator (CPI).

Besides it is stated without further comments that the GDP deflator has certain advantages compared to the CPI deflator and should be used to deflate support levels in agriculture. In appendix 4, the two major deflators used for international statistics are demonstrated in table 1 and table 2 respectively, with 1986 as the base year. They seem to give comparable results. Table 1 shows that if EC 12's GDP deflator is applied to the level of support calculated for the period 1986 to 1990, the total support declines in line with the deflator and shows always smaller figures compared to those compiled in nominal terms. The difference between the two series (1986 and 1990) is defined by the deflated GDP index which shows in 1990 an amount of 119.5 on the base 1986 = 100. This implies that cumulated rates of inflation for the EC add up to 19.5% in 1990 as compared to 1986. In other words, the real monetary value of a given payment is only worth 80.5% in 1990 compared to 100 in 1986. From the same table can be seen that the deflated support levels for the US will evolve in a comparable way due to an almost identical price evolution. Japan however would have less 'advantages' by applying the real

term notation as a result of the modest rates of inflation recorded in the past.

3.4 PSE as an indicator of trade distortion

3.4.1 Introduction

As can be derived from the aims of the Uruguay Round as put forward in chapter one (improvement of market access and export competition and reduction of internal support), an *AMS* which would be used in the negotiations as a basis for binding commitments should not only be able to reflect the support levels provided by different policies, but also the extent to which those policies distort trade.

Therefore in the next section the problems that the *PSE* faces in reflecting trade distortions will be discussed. In section 3.4.3 a derivative of the *PSE*, the Trade Distortion Equivalent (*TDE*), will be discussed, which intends to solve the problems that the *PSE* comes across in measuring trade distortions.

3.4.2 Problems of the PSE in measuring trade distortions

While in general higher *PSEs* imply greater trade distortions, the magnitude of trade distortion is not proportional to the magnitude of the *PSE*. Positive *PSEs* can be associated with positive, zero or negative distortions of net export volumes (McClatchy, 1987). This is due to various reasons.

First of all the assumption inherent in the *PSE* concept is that each dollar of assistance has the same production (and hence trade) effect. This is clearly an oversimplification (Ballenger, 1988; Josling and Tangermann, 1987; OECD, 1987). Probably the most problematic example is formed by government expenditures for programmes like research and extension, which are treated in the *PSE* concept as if they are direct product subsidies.

A second issue involves policy switching. The *PSE* concept includes the possibility of switching from included to excluded policy instruments to keep up protection while apparently observing a different *PSE* level. On the other hand it is also possible to switch between two included policy instruments, which reflect different trade distortions, while keeping the *PSE* level unchanged. This is possible due to the previously mentioned assumption of each dollar of assistance having the same trade effect. Ballenger (1988) states therefore that the mix of policies is important for the real trade distortion. Hertel (1988) subsequently proved this by studying the trade effects of different policy mixes. He finally came up with eleven propositions on the effects of alternative types of agricultural subsidies, which have been described in appendix 5. Hertel concludes for example that the removal of an agricultural input subsidy will

have a greater impact on long-term output (and hence exports) than the removal of an equal-PSE output subsidy will have (provided that the subsidized input is a substitute for land).

Several of the following issues are related to the comments above, but will be mentioned separately in order to get a better overview of the different issues.

The first issue concerns different consumption effects. One country may support its farmers mainly through direct payments which do not affect consumption and thus trade, while other countries give the same level of support (measured in *PSEs*) through administered prices (with border controls) which do have these effects (Ballenger, 1988; McClatchy, 1987; Peters, 1989a). Thus while two different policies can lead to equal *PSE* effects, they may have different consumption and therefore trade effects.

Furthermore, the trade effects resulting from the support of a certain commodity can be influenced by the support given to another commodity. For instance, Canadian barley production (and consequently trade) would be much more affected by current rates of transport subsidy and stabilization payments if these programmes only applied to barley rather than to other western grains as well. *PSEs* however do not measure these effects (McClatchy, 1987).

Different supply response coefficients in different countries is a further impediment for *PSEs* to measure trade distortions correctly. A given level of *PSE* will stimulate production (and therefore trade distortion) of a commodity or group of commodities more in a country where the price elasticity of supply is higher. A similar point applies with respect to the elasticity of demand and therefore to the extent that agricultural support affects consumer prices (Ballenger, 1988; GATT, 1988a; McClatchy, 1987; Schwartz and Parker, 1988).

Although they have already been discussed in section 3.3.1.4, supply control policies are mentioned here again as another impediment for *PSEs* to measure trade distortions correctly. Supply control policies, like production quotas, fallow requirements, etc often constrain the production stimulating effect of price and income enhancing programmes. It is even possible that those policies can do more than offset the production stimulation of the higher farm product prices resulting in a negative net trade distortion from the overall commodity package, even when the *PSE* is positive (McClatchy, 1987; Peters, 1989a).

A final, but not the less important issue mentioned here is the influence of a country's trade share. A country with a small *PSE* and a large world market share can have a bigger influence on trade and international prices than a country with a smaller market share and a larger *PSE*. The *PSE* ignores this effect (Ballenger, 1988).

The issues mentioned in this section demonstrate very clearly that the *PSE* concept as traditionally developed does not accurately reflect trade distortions.

Canada proposed to solve the problem by developing an adjusted *PSE*, called Trade Distortion Equivalent (*TDE*), which will be described in the next section (GATT, 1988a).

3.4.3 The Trade Distortion Equivalent (*TDE*) as an alternative for the *PSE*

Since the *PSE* is such a poor proxy indicator for the degree of trade distortion contributed by countries' agricultural support measures, Canada proposed a more direct indicator of trade distortion, called the Trade Distortion Equivalent (*TDE*). The two principal issues involved in the measurement of a *TDE* using a 'modified *PSE*' approach are (GATT, 1988a):

1. The classification of all agricultural support measures into three groups:
 - a. **non-distorting.** These include largely production neutral policies with little or no impact on production and trade. These policies will not be included in the *TDE* (*TDE* value zero);
 - b. **partially distorting.** This group includes programmes incorporating some supply constraining features like supply management, set-aside, market-oriented stabilization schemes etc. The *TDEs* for these programmes are smaller than the corresponding (traditional) *PSE*, in that the *PSE* value would be adjusted downwards by a negotiated 'credit' factor, for example by corrections as demonstrated in section 3.3.1.4 for supply control policies;
 - c. **fully distorting.** This group includes policies like open-ended price support and direct payments, and all export policies. For this group the *TDE* value will be the same as the *PSE* value.

For a detailed list of policies included in the three groups I refer to appendix 6. For the group of fully distorting measures it is assumed that all such measures distort production to the same extent as a simple subsidy of equivalent value does, and thus that the unadjusted *PSE* levels are also appropriate as a proxy indicator for the production distortion level. The question is now to what extent the *TDE* reflects trade distortions better than the traditional *PSE* does. The best way to do this is to evaluate the *TDE* with respect to the problems of the *PSE* in measuring trade distortion enumerated in the previous section. A correction made on the original *PSE* tried in fact only to solve the issue concerning supply control policies. The assumption in *PSEs* of equal trade effects per dollar of assistance is only partly solved by creating three groups of policy measures of which the non-distorting ones are left out. However for the fully distorting group equal trade effects per dollar of assistance are still assumed, while Hertel (1989) showed that this is not always a valid assumption (see appendix 5).

With respect to the problem of policy switching a partly solution has been found to restrict the number of policies included, although within the group of included policies it is still possible to switch. The other issues mentioned, like different consumption effects, Non-tariff Trade Barriers (NTBs), different supply response coefficients, etc are neither dealt with by the *TDE* nor by the *PSE*.

McClatchy (1987) also defined a *TDE* but in a different way:

(3-13)

$$TDE = (\% PSE \times \text{Supply Elasticity} \times \text{Domestic Production}) - (\% CSE \times \text{Demand Elasticity} \times \text{Domestic Consumption})$$

In which: CSE = Consumer Subsidy Equivalent (based on the same principles as the PSE)

On surplus of equation (3-13) McClatchy proposes to incorporate a correction for supply control policies. The 'McClatchy *TDE*' in fact solves the problems of NTBs, different supply response coefficients and supply control policies but has no solution for the other trade distortion problems.

To conclude one could state that although the *TDE* (in whatever formulation) reflects trade distortions better than the traditional *PSE* does, it still does not measure trade distortions correctly. Besides, the problems of the *PSE* as described in this chapter, like reference prices, large country cases, exchange rate fluctuations etc, also hold for the *TDE*. Therefore it cannot be stated, as Canada does (GATT, 1988a), that '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% over Y years)'. Probably a combination of the two proposed *TDEs* could solve the problem of trade distortion for a big deal, but it would need data (supply and demand coefficients, non-visible trade prices etc) which are probably not directly available and if they are, would also be subject to negotiations.

3.5 Conclusion

In this chapter it has been analysed whether the *PSE* concept may be suitable to function as a possible *AMS* in the Uruguay Round as a basis on which binding commitments can be made.

The analysis in this chapter appears to lead to several conclusions. If countries choose an across-the-board approach to the issue of negotiations on agricultural policies, the *PSE* has a number of advantages:

- a. it can include a wide variety of domestic policy instruments;
- b. it can be tailored to exclude 'desirable' programmes, such as those that decouple income/revenue support from price incentives;
- c. it can be modified to handle supply control policies;
- d. it can be added up across commodities to give overall protection levels.

However in this chapter it has also been shown that the *PSE*, when used as a possible *AMS*, faces several problems too. In fact all these problems can be summarized and reflected by two main headings:

1. *PSEs* are only partly under a country's control;
 2. *PSEs* do not adequately reflect trade distortions.
- Sub1: *PSEs* normally alter whenever world prices alter due to exchange rate differences, important policy changes in other countries or because of (e.g. weather-related) variations in the world supply situation. Thus the level of a country's *PSEs* is only partly under the country's control;
- Sub2: Due to a number of reasons *PSEs* do not adequately reflect trade distortions. Therefore it is possible to reduce the *PSE* while in fact increasing trade distortion (the same counts for the opposite). The *TDE*, as proposed by Canada is only a partial solution of the problem.

Despite their potential advantages it must be concluded that due to the above-mentioned problems, from a technical and economic point of view the *PSE* is not suitable to serve as an *AMS* in trade negotiations on the basis of which binding commitments can be made.

In fact the *PSE* is just the first phase of the total analysis, namely the measurement of transfers between producers, consumers and taxpayers induced by agricultural policies. However the second phase consists of estimating the effects of removing this government protection on world trade flows and prices, on production and consumption at the national and international level and on farmers' revenue. Therefore the *PSE* can serve as input into a broader economic model, a kind of world policy simulation model, as being developed for example by the Economic Research Service of the USDA or the MTMM model as developed by the OECD.

4. THE *PSE* CONCEPT DISCUSSED BY THE CONTRACTING PARTIES OF THE GATT

4.1 Introduction

The complexity and the diversity of policy measures used to protect the functioning of systems to support revenues and internal prices have been, in past GATT negotiating rounds, one of the main hindrances in elaborating an aggregate and balanced approach to liberalize agricultural trade. The Contracting Parties regarded past negotiations conducted on a request and offer basis as not successful (GATT, 1987a). At the start of the new GATT round, the Uruguay Round in Punta del Este in 1986, Contracting Parties committed themselves to establish an agreement on the progressive reduction and wherever possible the elimination of trade restrictions and distortions arising from government agricultural policies by September 1990 (which has later been postponed) (GATT, 1990). In the specific negotiating proposals, made before the end of 1987 by the US, Cairns Group, Canada and the EC, these countries call for a reduction across the board which can only be monitored by similarly comprehensive measures (Josling and Tangermann, 1987). The *PSE* was favourite and from that moment on its measurement has been discussed intensively in GATT circles. In fact the discussion with respect to the *PSE* dealt with issues of both conceptual and practical or diplomatic character. Therefore the discussion by the Contracting Parties of the GATT was pursued by both the Negotiating Group on Agriculture (in code: NG5), which has primary responsibility for the sector in the Uruguay Round and dealt mostly with the diplomatic issues (proposals of the main agricultural countries), and an established Technical Working Group (TG) whose only target was to deal with the *AMS* and related issues and therefore handled the conceptual issues (Ford Runge and Heimpel Stanton, 1988).

The aim of this chapter is to give a brief overview of the discussion by the Contracting Parties in the GATT with respect to the *AMS* and to analyse the final proposal to use the *AMS* in the Uruguay Round as reflected in the resulting GATT agreement. As will become clear later in this chapter, the terms *AMS*, *PSE* and also other terms have been mixed in the negotiations. While one Contracting Party talks about the *AMS*, the other talks about the *PSE*, etc. As the discussion of the Contracting Parties will be followed, also in this chapter the terms will be used interchangeably. In order to avoid misunderstandings though, the relationship between the various terms will be clarified. The *AMS* is an aggregate name for all measures of support. This term was used at the start of the Uruguay Round, as it was not yet known which measure of support would finally be used. However, as the *PSE* was chosen as the basis for the discussion about the *AMS*, in the negotiations (and also in

this chapter) the two terms are considered to reflect the same, namely the *PSE* concept as discussed in the previous chapter. Also other measures of support, which have been introduced (as will be shown later) during the negotiations by the various Contracting Parties, are all derivatives of the *PSE*. They all reflect the *PSE* concept, adapted on one or more points.

The intention as put forward at the start of the Uruguay Round was to look for an *AMS*, on the basis of which binding commitments could be made and which would therefore cover all three target areas (market access, internal support and export competition). However the discussion in the Technical Group (which will not be repeated here) recognized quite early that it would be very difficult to use the *AMS/PSE* as a basis for binding commitments due to the same reasons as revealed in chapter three (GATT, 1988d). Therefore both the NG5, technical group and scientists proposed some additional optional uses for the *AMS*, which will be enumerated and discussed in section 4.2. In section 4.3 a brief overview will be given of the most important issues with respect to the *AMS* in the Uruguay Round and the points of view of the main trade blocks regarding these issues. In this section our attention will be focused mainly on the more political issues of the *PSE* as discussed by the Contracting Parties, like policy coverage, commodity coverage, country coverage, reference price, reference year, optional use etc. The discussion as pursued in the Technical Group will not be dealt with as this would lead to a reiteration of the issues analysed in chapter three. In section 4.4 the preliminary proposal with respect to the *AMS* as presented in the Dunkel paper in December 1991 will be analysed. Although this agreement was rejected by the Contracting Parties it functioned as the basis for the Blair House agreement between the EC and the US in December 1992, which is discussed in section 4.5 in relation to the *AMS*. In section 4.6 the final GATT agreement of December 1993 is described, with special attention for the modifications in the final agreement as compared to the Dunkel paper (also related to the *AMS*). Finally in section 4.7 some conclusions are drawn by comparing the views of the Contracting Parties in the GATT with the final GATT agreement.

4.2 Optional uses of the *PSE* in the Uruguay Round

4.2.1 Introduction

As mentioned in section 4.1, the NG5 and the Technical Group recognized after intensive discussion about the *AMS/PSE* that it would be very difficult, if not impossible to find an *AMS* on the basis of which binding commitments could be made, as also concluded in chapter three. Therefore both the NG5, the Technical Group and scientists proposed some additional optional uses for the *AMS/PSE*.

- Option I:** Commitments to reduce protection and support expressed in terms of *PSE* (Ballenger, 1988; GATT, 1987a; GATT, 1988a; GATT, 1988d; Tangermann et al., 1987);
- Option II:** The *PSE* as a unit of account or yardstick (GATT, 1987a; GATT, 1988a; GATT, 1988d);
- Option III:** The *PSE* as a monitoring device (Ballenger, 1988; GATT, 1987a; GATT, 1988a; GATT, 1988d; Tangermann et al., 1987);
- Option IV:** The *PSE* as an adjunct to strengthened and more operationally effective GATT rules and disciplines (GATT, 1987; GATT, 1988d).

These options will be described in the following subsections.

4.2.2 Option I

This option would involve using the *PSE* itself as a medium for expressing commitments to progressively phase down protection and support. This is the option for which the *AMS* was intended at the start of the Uruguay Round and which has been the basis for the discussion. Within this option there is spectrum of possibilities:

- a. *'pure' PSE approach*; on the one end of this spectrum, *PSEs* could be made the central medium of GATT commitments and disciplines of agriculture (as was intended in the Uruguay Round). *PSEs* would then substitute for traditional GATT rules in agriculture. Instead of using rules and disciplines on the use of particular policy instruments, like import restrictions or export subsidies, all commitments and disciplines would be defined just in terms of *PSEs*. The objective would then be to reach agreement, after multilateral agreements were reached on the definition of *PSE* measurement, on a base reference *PSE* for a given product or sector and on a transition period for the progressive formula (GATT, 1988d). Negotiations could then be held on gradual and balanced reductions of *PSEs*. (Ballenger, 1988). In this *'pure' PSE* option of course also the commodity coverage would be subject to negotiations. The commodities which would not be subject to *PSE* commitments would then be subject to the existing (or modified) GATT disciplines. In this scenario, each participant would decide for himself how the annual *PSE* reduction would be implemented. The specific measures taken to reduce direct or indirect support would be notified and would be subject to monitoring by other participants in the agreement to check that they brought about the annual reduction (GATT, 1988d).

The problems with this approach have already extensively been discussed.

- b. *PSE bindings with GATT disciplines*; another possibility, instead of a 'pure' *PSE* approach, is to combine *PSE* bindings with existing (or modified) GATT disciplines for agricultural trade (Tangermann et al., 1987), in particular the disciplines of Articles XI and XVI (GATT, 1969) (these articles have been cited in appendix 7). The principle would be that whatever is truly binding in any particular sense, the country concerned would have to respect the *PSE* binding or the traditional GATT discipline. For example, an exporting country would have to respect its *PSE* binding as long as its exports did not exceed the equitable share. However, if the country nonetheless were to export more than its equitable share, it would have to respect the equitable share discipline. The advantage of such an approach would be that it would seem to provide more 'security' and therefore reduce the problem of equal *PSEs*, differing trade distortions.
- c. *PSE only for certain GATT disciplines*; one further step away from substituting *PSEs* for traditional GATT disciplines would be to use the *PSE* approach for only certain GATT disciplines, while other issues are left to be regulated under traditional GATT rules (Ballenger, 1988; Tangermann et al. 1987). For example, it could be agreed that *PSE* bindings would apply only to exported commodities, while imports would remain subject to traditional GATT disciplines. The advantage of this approach would be that some problems of the *PSE* concept could be avoided. For example only the real trade distorting measures would be included in the *PSE* and other policies would fall under additional GATT rules. The disadvantage of this approach is that it may imply the danger of creating imbalances in terms of different stringency of GATT obligations for different countries.

4.2.3 Option II

This option would involve using the *PSE* as a yardstick or unit of account to measure or assess the value of specific commitments to reduce protection and support (GATT, 1988d). In this option *PSEs* are only used for measuring the status quo and for defining the extent to which policies have to be adjusted, whereas commitments would then be defined in terms of policies rather than in terms of *PSEs* (GATT, 1987). After measuring existing *PSEs*, countries would have to reach agreement on how much *PSEs* should be reduced. Negotiations could then take place on how individual policy measures should be adjusted to affect the intended *PSE* reductions. This option would have the advantage of protecting countries from the vagaries of world price and exchange rate changes. A subsequent appreciation of a country's currency (external reference price fall) would often have the effect of increasing the *PSE* level, but would not oblige the country to make greater cuts in, say, its

target support prices than had been previously agreed. On the other hand, whether the indicated *PSE* reduction is considered to adequately reflect proposed commitments is another matter. For example, one of the main problems is that certain types of commitments, particularly those whose effects are measured jointly via the domestic/external price differential technique, would not be reflected automatically in a re-calculated *PSE*.

4.2.4 Option III

This option would involve using the *PSE* as a monitoring device, either as an adjunct to options I and II, or as a device for monitoring the general shape and direction of domestic agricultural policies (GATT, 1988d). Obligations and commitments would continue to be defined in terms of existing or modified GATT rules and disciplines. *PSEs* would be used only as a starting point and as an information base for traditional negotiations and as a way of monitoring progress in achieving the negotiating objectives. In this option there would be no intrinsic connection between the base reference *PSE* and the *PSE* for a subsequent year unless certain parameters remain constant, as the *PSE* for a more remote year would reflect the particular price and other relevant economic conditions prevailing in that year.

4.2.5 Option IV

The general objective under this option would be to give greater precision and authority to the GATT rules and disciplines, particularly under Articles XI and XVI (see appendix 7) (GATT, 1987a; GATT, 1988d). The essence of an effective reinforcement of the Article XI:2(c) disciplines relating to effective limitation of production and access would be to extend the explicit coverage of the Article. It should include all non-tariff access restrictions, possibly as well as such high tariffs that discourage the importation of even minimum quantities, and to spell out in concrete terms the extent of contracting parties' obligations under the minimum access provisions of Article XI:2(c). Under such an approach a general monitoring role could be envisaged for the *PSE* in the context of the transitional arrangements under which contracting parties would bring their existing measures into line with reinforced disciplines relating to effective control of production and access. Such a role would however not be essential in the context of access.

4.3 AMS discussion by the Contracting Parties in the Uruguay Round

4.3.1 Issues raised by NG5

The discussion on the *AMS* and the *PSE* in particular by the Contracting Parties of the GATT was launched in September 1987 by a note of the NG5 group which was intended to serve as a basis for intensive examination (GATT, 1987a).

In this note the following issues are raised which had to be dealt with by the Contracting Parties when the *AMS* would be used in the negotiations:

1. *Optional use.* What will be the role of the *AMS*, Option I, II, III or IV (as described in the previous section)?;
2. *Policy coverage.* Which policies should be included? Should all policies, only the trade distorting policies or another group of policies be included?;
3. *Product coverage.* Which products should be included? Should the *AMS* be calculated for all products, only for products of which data are available or only the products that distort trade most?;
4. *Country coverage.* Should the number of countries covered be as large as possible in order to cover a substantial part of production and trade of the product concerned or should only a selected group of countries be covered?;
5. *Reference or base period.* Which reference year or period should be chosen as the starting point in the negotiations?. Should this be a common reference period, with the risk of not reflecting the most actual support policies or a reference period which differs per country, but which reflects the most recent situation of the countries concerned?;
6. *Reference price.* Which reference price should be used, a moving average of several years, a fixed reference price or something else?;
7. *Monetary fluctuations.* Exchange rate and world price fluctuations are exogenous factors, which influence the *AMS* of a country without having changed policies. How should this problem be dealt with?;
8. *Supply control.* It is stated that the effect of domestic supply control policies on world trade is underestimated in the *AMS*. The question is therefore if credit should be given to countries applying domestic supply control policies?

After September 1987 delegations have been asked several times to submit papers on the *AMS*. In the next section the views expressed by the Contracting Parties on the issues put forward in the GATT (1987a) are summarized.

4.3.2 Views on *AMS* issues expressed by the Contracting Parties

In the following subsections the points of view on the various issues with respect to the *AMS* will be discussed. To improve the comprehensibility and clearness, I tried to unravel the various views of the Contracting Parties in order to present them per issue as was done in the previous section.

4.3.2.1 Optional use

The US regards an *AMS* as a tool to monitor which should not take a more substantial role (Commission of the European Communities, 1988b). In another document of September 1988 (GATT, 1988i) they state that the monitoring role of the *PSE* must involve the tracking of specific policy commitments undertaken by countries (option III). They state that probably a family of aggregate measures drawing from the same data base might be considered for this purpose. They are not in favour of option I as the Technical Group has proved that the *AMS* cannot reveal which market price support is provided by which policies. Commitments must therefore be defined in terms of specific policies, which is option II. The US, when talking about the *AMS*, is in fact referring to the *PSE* as they use the *PSE* concept of the OECD as a reference point (GATT, 1987d; GATT, 1988i).

The EC is in favour of option I and III, however only when the Support Measurement Unit (*SMU*) is used as *AMS*. The *SMU*, as introduced and proposed by the EC, is a derivative of the *PSE* concept. The principal difference between the *SMU* and the *PSE* is that the external reference price, which fluctuates in the *PSE*, remains fixed in the *SMU*. By doing so, one makes sure that changes in the *SMU* are only due to modification of support policies (Commission of the European Communities, 1988f; GATT, 1988c).

Canada is in favour of using options II and III, which means the 'target' and the monitoring option. They are not in favour of option I because they think that the key role played by external reference prices, fluctuating world prices etc in the calculation of the *AMS*, could pose a serious problem. *AMS* levels would have to be regularly recalculated in order to verify if commitments are met (GATT, 1988a).

The Cairns Group puts forward the same opinion and reasoning as Canada does and therefore also proposes options II and III. According to the Cairns Group option I is not relevant as the *AMS* as such cannot be an instrument to reduce support in agriculture. It would only be possible to make commitments on the basis of an *AMS* when the policy measures included would be valued on the basis of their trade distorting effect. This would mean that for example export subsidies would be given a high negative coefficient, while 'decoupled measures', like research and extension, would be given a credit. Such a 'perfect' *AMS* would also have to take domestic supply control policies, food security measures, regional

development measures etc into account. As this is impossible they consider option I as irrelevant (GATT, 1988l).

4.3.2.2 Policy coverage

The US wants the *AMS* to cover all subsidies and other measures that directly or indirectly have an impact on agricultural trade. Therefore all direct payments related to production, those payments that provide a safety net against natural disasters and other extraordinary circumstances (decoupled payments) and the bona fide foreign and domestic food aid are excluded from the negotiation. The US focuses special attention on distinguishing 'decoupled policies' (GATT, 1988i).

The EC states that only measures with a significant incidence on trade should be taken into consideration (GATT, 1988c). They add that the initial policy coverage must be as large as possible in the discussions, in order not to forget anything, until decisions have been taken on what policies should be included or left out. However the EC proposes that policies which will be excluded from the *AMS* still have to be measured by a kind of surveillance system (GATT, 1988k).

Though Canada is a member of the Cairns Group, whose proposal they subscribe, they also have their own proposal. Canada proposed another *AMS*, which can again be regarded as a derivative of the *PSE* concept and is called the Trade Distortion Equivalent (*TDE*) (GATT, 1988a). The idea in fact is to modify the *PSE* to the extent that it will better indicate trade distortions, which, as has been shown in chapter three, is one of the main problems of the *PSE* as an *AMS* in trade negotiations. As also shown in chapter three, in the *TDE* approach all agricultural programmes will be classified into three groups, namely the non-distorting, the partially-distorting and the fully-distorting group. The precise classification is given in appendix 6. The first group will be completely omitted from the *TDE* calculation, as they are not trade-distorting. The third group will be wholly included and will therefore be the same as in the *PSE*. However for the second group, the partially-distorting one (supply quotas, stabilization schemes etc), corrections will be made in order to give countries that apply those measures some credit.

The Cairns Group proposed to use an *AMS*, expressed as an aggregate monetary value and based on support measures that have an incidence on the production level. This kind of *AMS* is called the 'Aggregate Monetary Level of Output-Based Support' (*AMLOBS*) The Output-Based Aggregate Measure is also a derivative of the *PSE* (GATT, 1988l). They state that all trade-distorting support measures which affect production and undermine the functioning of market prices, can be defined as transfers to the benefit of producers and should be included in the *AMLOBS*. These transfers include the policies resulting in the difference between domestic production prices and world market prices, all budgetary transfers related to producer incentives and exclude fiscal concessions and

support measures which can be categorized in the group of general services (GATT, 1988l).

4.3.2.3 Product coverage

The US favours as broad a commodity coverage as practically and technically possible (GATT, 1987d). The US is not in favour of including processed products into AMS calculations, as the support they receive is less pervasive than for raw, bulk commodities. Besides, this support is often tied to support of basic commodities and is therefore reflected in the AMS of those basic products. If support to basic commodities is effectively dealt with through the Uruguay Round negotiations, a simpler, more direct, rules-based treatment for processed products is proposed by the US (GATT, 1987d; GATT, 1988i).

The EC states that the product coverage depends on the way in which negotiations are conducted. As long as the negotiations are concentrated on major products, the products chosen by the OECD (1987) are considered to be sufficient. This in fact applies to the short term. For the long run, they state, it might be appropriate to determine SMUs for other products (GATT, 1988c; GATT, 1988k).

Canada thinks that the more appropriate quantitative indicators like the TDE are, the more homogeneous the traded commodity will be. Including all types and qualities of products, which all require a separate TDE calculation, would increase the logistical burden. Therefore Canada proposes, at least during the first round of its use in the context of the GATT, to restrict the application of the TDE 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. For the long run the product coverage must be as wide as possible (GATT, 1988a).

The Cairns Group is in favour of the product coverage being as wide as possible, even if for practical reasons the AMS will in the short run be restricted to the most trade-distorting products. The Cairns Group therefore proposes that for early action products will be covered of which the AMLOBS is greater than 10% (GATT, 1988l).

4.3.2.4 Country coverage

Concerning the country coverage the US is in favour of the point of view of the GATT secretariat, namely 'that a comprehensive collection of data covering as many countries as possible is desirable to assist further consideration of both technical and policy issues' (GATT, 1987d).

The EC is also in favour of having a country coverage as large as possible, namely in order to cover a substantial proportion of the production and trade of a given product (GATT, 1988c).

Canada states that there is considerable evidence for a large proportion of total world price distortion being contributed by the support

policies of a relatively small number of major producers and traders. Therefore Canada proposes that first those countries will be covered that distort world trade most, to be extended later on with other countries (GATT, 1988a).

The Cairns Group agrees with Canada to restrict the number of countries covered to the most trade-distorting ones for the short run due to the logistical problems of a larger country coverage. They state however that in the long run the country coverage must be as wide as possible (GATT, 1988l).

4.3.2.5 Reference year or base period

The US states that in general, support must be dealt with in a manner that reflects current conditions as closely as possible, which means the most recent period possible for which data are available (GATT, 1987d).

Also Canada and the Cairns Group are in favour of the most recent reference year of which data are available. According to the Cairns Group this means that the year 1988 is most suitable (GATT, 1988l). Canada adds that the chosen reference year must also meet the criterion that it can be applied equally to each country and each commodity (GATT, 1988a).

The EC states that the year 1984 should be taken for both the short and the long run (GATT, 1988k). However this reference year has been proposed by the EC under the *SMU* approach, but not under the *PSE* approach (Commission of the European Communities, 1988f; GATT, 1988e). Figure 1 in appendix 8 (figure based on data of the Commission of the European Communities, 1988f) shows why. The figure learns that the *PSE* increases considerably until 1987 in spite of the CAP reform. This is mainly due to the fact that the world market prices were rather high in 1984 because of the high value of the US \$. From 1987 onwards, the *PSE* shrinks because the world market prices increase and the internal CAP prices continue to decrease. Therefore under the *PSE* approach the year 1987 would be most suitable as a reference year from the Community's point of view (which is however only valid if the present favourable world market situation prevails over further years). The best base year under the *SMU* approach would evidently be the one in which the Community started with its substantial changes in the CAP, namely 1984. A more recent base year would still measure the positive effects of the CAP, but would imply that credits for earlier efforts would be given away. The Community also states that the *PSE* concept in no way would allow commitments on basis of the year 1984 (Commission of the European Communities, 1988c). The same effect is shown in table 1 and 2 in appendix 8 (Commission of the European Communities, 1988e). Price reductions or increases (presented as negative reductions) are shown for milk, sugar beet and beef, necessary to achieve a reduction of support of 10, 15 or 20%, measured in *Total SMU* or *Total PSE* when three different

base years are chosen. The conclusions which can be drawn from these tables suggest the same as figure 1.

4.3.2.6 Reference price

The US proposes to adopt the OECD methodology on reference prices which, in general, involves the use of observed border prices. The US is not in favour of fixed external reference prices as changes in support brought about through border measures will not be directly or fully reflected and will therefore not reveal the actual support situation (GATT, 1987d).

In contrast with the US, which rejects it, the EC proposes a fixed external reference price (the characteristic feature of the *SMU*), which is therefore not vulnerable in respect of exogenous factors. Another advantage according to the EC is that Contracting Parties know exactly what are the contents of their commitments (GATT, 1988c; GATT, 1988k).

The fixed external reference price that the EC proposes should be the lowest external reference price, as calculated by the OECD for the period 1979-1987 and will be selected per country and per commodity and expressed in the country's own currency.

In a document of the Commission of the European Communities (1988c) the political importance of this issue for the EC in the negotiations was clearly put forward. It was stated that for the CAP (Common Agricultural Policy) the major element in the *PSE* is reflected in the difference between the world market price (= external reference price) and the internal market price. The *SMU* approach with its fixed external reference price would therefore better capture the effects of the CAP reform and would lead to a steadily decreasing figure (Commission of the European Communities, 1988c).

Canada proposes to use the most recently available estimates of commodity prices as external reference price in the *TDE* calculations (GATT, 1988a). Canada is also in favour of c.i.f./f.o.b. smoothing with respect to the difference in external reference price for an importing and an exporting country. As explained in chapter three 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 (GATT, 1988a).

The Cairns Group follows, just like the US, the OECD methodology. This means that the reference prices are proposed to be established per country and per product and to be derived from the price of another product, with which the first one has to compete (GATT, 1988l).

4.3.2.7 Monetary fluctuations

According to the US, exchange rates are an integral part of the international economic environment within which agricultural trade

takes place. Therefore they propose to use the OECD methodology, which involves no correction for exchange rates. However a 'smoothing' of the effects of exchange rate movements by taking an average of recent exchange rates is not excluded by the US (GATT, 1987d).

The EC proposes to solve this problem by taking fixed external reference prices in the *SMU*, as mentioned earlier (GATT, 1988k). The EC also mentions the problem of inflation and states that it could be appropriate to adjust commitments by a deflator (GATT, 1988c).

Canada proposes a possible moving average of exchange rates in order to abandon fluctuations. Another possibility they put forward is to devise a mechanism by which *TDE* commitments of individual countries would be automatically adjusted in line with changes in each country's trade-weighted exchange rate (GATT, 1988a).

As with the external reference prices, the Cairns Group follows with respect to this issue the methodology of the OECD (which involves no correction), or a possible moving average of exchange rates (for example of the three most recent years) (GATT, 1988l).

4.3.2.8 Supply control

The US is of the opinion that no 'credit' should be given to countries applying domestic supply control policies. According to the US these measures are adequately reflected in the *Total PSE*. They state that 'all countries take actions from time to time that at least marginally improve (or worsen) the trading environment for others' (GATT, 1987d).

The EC is in favour of modifying the *SMU* in order to be able to give credits to countries that effectively apply supply control measures (GATT, 1988c). The EC therefore launches two possible solutions (GATT, 1988c).

1. use the *Total SMU*. This total amount will be reduced in proportion to the reduction of the production. However this method does not allow for an 'extra credit', but just takes the production effect into account, which will not happen when a *Percent SMU* is used;
2. more accurate methods, like simulating a future production, if the production quota had not been introduced, and the reduction in producer prices which would have been necessary to ensure a production level equal to that introduced by quantitative restrictions.

Despite these possible solutions, the EC states that it must be considered case-by-case whether a country should be given a credit.

Canada is in favour of giving credits to countries applying various supply control policies and proposes some mathematical corrections (GATT, 1988a). A few of these approaches have been explained in the previous chapter in section 3.3.1.4 in which supply control policies have been dealt with. However as Canada recognized that these corrections require information, like supply and demand elasticities which are not

always available, they propose to use a more pragmatic approach in the negotiations, which means that negotiated credits should be given to countries applying supply control policies at world market price levels (GATT, 1988a).

The Cairns Group is of the opinion that supply control policies are already taken into account by the *PSE* (and in the *AMLOBS*, as proposed by the Cairns Group) when it is expressed as an aggregate monetary value. Besides they state that the surpluses of the products, to which those supply control policies are applied, have arisen from internal support policies and that there is no need for extra credit (GATT, 1988l).

4.3.2.9 Synopsis of views on various *AMS* issues

In the previous sections the proposals or points of view on the most important issues with respect to the *AMS* haven been given of four major trade blocks in the GATT negotiations. In appendix 9 the main points are summarized. For information this overview is extended with the points of view of Jamaica and the Nordic countries ¹⁾, which have however not been dealt with in separate sections. The information in this overview is based on the information from the previous sections, and two additional GATT documents (GATT, 1988b; GATT, 1988h). From this overview one could draw some conclusions on the points of view as expressed by the Contracting Parties.

First of all, apart from the EC all Contracting Parties are in favour of option II for the use of an *AMS* in negotiations. Jamaica and the EC are the only ones in favour of option I.

With respect to policy coverage, there seems to be agreement, in that all Contracting Parties focus on inclusion of the trade-distorting measures. However except from Canada no Contracting Party really defines which policies can be regarded as trade-distorting.

Concerning product coverage there is more or less agreement about first starting with surplus products because those are most trade distorting. For the long run the product coverage can be extended.

The opinions concerning country coverage also seem to lead to agreement. The general opinion is to take a country coverage as wide as possible for the long run, but to take the practical problems into account for the short run. This means that for the short run countries should be covered that distort trade most.

The choice of the reference year varies considerably among the Contracting Parties. From the overview can be concluded that this is a political point and therefore very touchy. The EC proposes 1984/85 as reference year combined with the use of the *SMU*. This base year will take best into account the agricultural reforms since 1984. However the

1) The choice of especially these countries is arbitrary and based on the fact that these were the only countries of which information was available.

Cairns Group (including Canada) as a major agricultural exporter is in favour of using the most recent base period.

For the external reference price, the same can be stated as with the reference year. While some Contracting Parties, like Canada and the US are in favour of using reference prices reflecting the market reality best, the EC is in favour of fixed external reference prices (the lowest of the period 1979-87) in that those prices do best take account of the CAP reform (see appendix 8).

The problem of fluctuating exchange rates is, according to most Contracting Parties, to be solved by a moving average of the two or three most recent years. Only the EC solves the problem by using a fixed external reference price for the same reason as mentioned in the previous paragraph.

With respect to supply control policies the EC and Canada are in favour of correcting the AMS with a credit. The other Contracting Parties are of the opinion that supply control policies are already accurately measured by the AMS and that there is no need for extra credit.

As can be seen from the above conclusions, very few AMS questions are purely technical. As is also stated in a document of the Technical Working Group, 'the choice of variant of the aggregate measure is bound up with the aims for its use, and this is a political question which concerns the form of the negotiations as a whole' (GATT, 1988g).

The above points of view with respect to the various issues of the AMS have already been expressed by the Contracting Parties before the Mid-Term Review in April 1989. At the Mid-Term Review itself an important decision was taken, namely the acknowledgement that credits for actions taken since the beginning of the Round would be taken into account. The EC therefore revised its proposal with regards to the AMS in July 1989 on the issue of the base or reference year chosen and stated that due to this decision at the Mid-Term Review they were in favour of taking as a reference period the average of the years 1984, 1985 and 1986 (GATT, 1989).

Since the Mid-Term-Review Agreement in April 1989, apart from the EC, no real modifications have taken place in the proposals on the AMS of the different Contracting Parties as they were tabled at the Mid-Term-Review. Therefore, when in March 1991 Arthur Dunkel, the secretary-general of the GATT, suggested a checklist of issues for the consultations on agriculture, still the same issues were tabled and there still was no solution (GATT, 1991a).

In his checklist Dunkel distinguished five main areas of issues (GATT, 1991a).

1. policy coverage;
2. definition of an AMS;
3. the definition of equivalent commitments, where it is not possible to calculate an AMS;

4. the relationship between commitments and inflation;
5. the reinforcement of GATT rules and disciplines.

For each area Dunkel listed a range of questions to be checked by the Contracting Parties, which should be dealt with in the final GATT agreement. The questions posed in the checklist give a fairly good overview of the issues with respect to the *AMS* which were still being discussed at that moment. Therefore the most important questions of each area mentioned in the paper will be briefly summarized.

Sub1: The main question concerning policy coverage is still which policies should be exempt from reduction (the 'green' policies) and which policies should be subject to reduction (the 'amber' policies). The 'amber' policies would be regarded as trade-distorting. The second important question referred to by Dunkel is how the distinction between those two groups should be made. Dunkel mentions therefore three alternatives to consider.

- a. descriptive lists of policies in particular categories;
- b. criteria for assigning policies into a particular category;
- c. a combination of the above approaches.

Sub2: Out of the checklist can be concluded that at that point in time (April 1991) there was still no agreement about the definition of the *AMS* and the choice of the base year. Dunkel considers those questions as 'largely political' and states that they have to be solved by the Contracting Parties in the time period left.

Sub3: The next problem is what form of equivalent commitments should be made, where it is impossible to calculate an *AMS*. Especially the question of how such commitments could be compared to *AMS* commitments is a main issue.

Sub4: Concerning the relationship between commitments and inflation, Dunkel considers as the most important questions c.q. points whether there should be a correction for inflation or not and if there will be one, how it will be done.

Sub5: The final area Dunkel refers to is the reinforcement of GATT rules and disciplines. He focuses especially on the question what the relationship should be between the *AMS* as used in the reform programme and the reinforced GATT rules and disciplines, in particular the second sentence of Article XVI:1 (see appendix 7).

All the questions/problems were submitted by Arthur Dunkel to all Contracting Parties once again in order to give them an overview of issues that must be solved with respect to the *AMS* before the end of

1991, which was the intended year to come up with a GATT Agreement for the Uruguay Round. Whether real agreement was reached by the Contracting Parties on all the issues mentioned in the period that was left is not known, however in December 1991 a compromise proposal, called the Dunkel paper, (GATT, 1991b), was presented by the secretary-general to all Contracting Parties. The preliminary points of view in this paper with respect to the AMS and its related issues (as mentioned above) will be analysed in the next section.

4.4 The Dunkel paper

4.4.1 Introduction

The Dunkel paper (GATT, 1991b) was a compromise proposal indicating how the targets as agreed upon at the start of the Round in 1986 could be realized. The Agricultural Part of the paper therefore described, among other things, how the targets:

1. improvement of market access;
2. internal support reduction; and
3. improvement of export competition,

could be realized for agriculture.

What is especially interesting for the underlying study in this respect, is the way the AMS is dealt with in the Dunkel paper. From the Dunkel paper can be derived that the AMS will be used as a basis for commitments in the area of internal support reduction and the monitoring thereafter. These are in fact the options I and III as defined earlier, however utilized only for part of the total support. The commitments for the other two areas, market access and export competition, have been established by rules defined by the traditional offer and request method.

In order to get a good overview of the function of the AMS as proposed in the Dunkel paper, the next section will start with the definition of the AMS as defined in the Dunkel paper. In section 4.4.3 the areas of market access and export competition, which are excluded from the AMS will be briefly discussed. In section 4.4.4 finally, the internal support area on which the AMS will be applied, will be discussed.

4.4.2 Definition of the AMS

The Dunkel paper provides no clear definition of the AMS but describes it in its various elements. In the Dunkel paper (GATT, 1991b) is stated that an AMS 'shall be calculated on a product-specific basis for each basic product (defined as the product as close as practicable to the first point of sale) receiving market price support, non-exempt direct payments, or any other subsidy not exempted from the reduction com-

mitment (...)' Support which is non-product specific shall be totalled into one non-product-specific *AMS* and will also be expressed in total monetary terms. Further on a specific *AMS* shall be established for each basic product, expressed in total monetary terms.

The market price support shall be calculated using the gap between a fixed external reference price and the applied administered price multiplied by the quantity of production eligible to receive the applied administered price. Budgetary expenditures made to maintain this gap, such as buying-in or storage costs shall not be included in the *AMS*.

The external reference price used in measuring the price gap will be fixed on the basis of the average of the period 1986-1988 and will in general be the average f.o.b. price of the product for a net exporter and the average c.i.f. price for a net importer in the period considered. The used reference price can be adapted, as necessary and desired, in order to take quality differences into account. All the prices used will be in real terms, although it is not mentioned which deflator will be used.

The non-exempt direct payments will be measured either by the earlier mentioned price gap or by using budgetary outlays.

The internal support given to agricultural processors will be included to the extent that this support is also to the benefit of the producer of the base product.

Finally the Dunkel paper mentions that for all products where market price support exists, but for which calculation of this component of the *AMS* is not practicable, equivalent measurements of support will be calculated. Those equivalent measurements of market price support shall be made using the applied administered price and the quantity of production eligible to receive that price or, where this is not practicable, on budgetary outlays used to maintain the producer price.

4.4.3 Market access and export competition

The improvement of market access and export competition are proposed in the Dunkel paper to be kept out of *AMS* calculations and to be realized by commitments on the basis of rules. In summary these commitments involve that:

1. for agricultural products currently subject to ordinary customs duties only, these duties will be bound on the level as agreed upon in the negotiations and reduced on average with 36% for the period 1993-1999, with a minimum of 15% for each tariff line;
2. for agricultural products subject to border measures other than ordinary customs duties, these measures will be converted to 'tariffication'. This means that for those measures an equivalent ad valorem tariff will be calculated which will thereafter be subject to the same reduction commitments as the ordinary customs duties are.

The most important policies that are intended to be subject to this tariffication and therefore to be excluded from the *AMS* involve among others:

1. quantitative import restrictions;
2. variable import levies;
3. minimum import prices;
4. discretionary import licensing;
5. non-tariff measures maintained through state trading enterprises; and,
6. voluntary export restraints.

Moreover some rules have been defined for the establishment of minimum access opportunities in cases where there are no significant imports. These minimum access opportunities perform as an extra guarantee for the improvement of market access on top of the above defined reductions in tariffs.

The commitments for the export area involve a reduction of both export subsidies and export quantities with respectively 36% and 24% during the period 1993-1999 based on the period 1986-1990. The policies envisaged in the term 'export subsidies' and which are therefore excluded from the *AMS* calculations are the following.

1. the provision by governments or their agencies of direct subsidies to a firm, to producers of an agricultural product, etc, contingent on export performance;
2. the sale or disposal by governments or their agencies of non-commercial stocks of agricultural products at a price lower than the comparable price for buyers in the domestic market;
3. payments on the export of an agricultural product that are financed by virtue of governmental action, whether financed by the public account or by the proceeds of a levy imposed on the agricultural product concerned or on an agricultural product from which the exported product is derived;
4. subsidies adjudged in order to reduce costs of marketing exports of agricultural products;
5. internal transport and freight charges on export shipments, provided or mandated by governments, on more favourable terms than for domestic shipments;
6. subsidies on agricultural products contingent on their incorporation in exported products.

4.4.4 Internal support

The area of internal support is the only area for which commitments are agreed upon on the basis of the *AMS*, as defined in section 4.4.2. The Dunkel paper envisages a reduction of all domestic support in favour of

agricultural producers, by 20% during the period from 1993 till 1999, taking as the reference period 1986 till 1988. This reduction commitment was proposed to be expressed and implemented through an *AMS* for each individual product, or through equivalent commitments where the calculation of an *AMS* is not practicable. The equivalent commitments will be calculated by taking the administered price and the production quantity, or if not available, the budgetary expenditures used for maintaining the support level.

With respect to the policy coverage of the *AMS*, one of the main issues in the negotiations, the Dunkel paper states that all internal support policies should be included except those that have no or a negligible trade distorting effect. This was also put forward by the Contracting Parties. The problem however is how to distinguish between policies. The Dunkel paper proposes to make the distinction on the basis of objective criteria. The paper puts forward two general criteria and specific criteria per policy measure. Policies must meet both the general criteria and their own specific criteria. The policies that meet the criteria will be excluded from the reduction programme, others will be included. Newly introduced policies, for which no specific criteria are mentioned, will be checked on the two general criteria. These two general criteria are:

1. the support in question shall be provided through a publicly-funded government programme not involving transfers from consumers; and;
2. the support in question shall not have the effect of providing price support to producers.

The measures for which specific criteria have been established are:

1. Government Service Programmes:
 - research, training, and extension and advisory;
 - pest and disease control;
 - inspection;
 - marketing and promotion, excluding expenditure for unspecified purposes that could be used by sellers to reduce their selling price or confer a direct economic benefit to purchasers;
 - infrastructural services;
2. Public stockholding for food security purposes;
3. Domestic food aid.

The policies mentioned in the following under points four to nine all include programmes providing direct payments to producers.

4. Decoupled income support. The Dunkel paper gives five criteria, that a support measure must meet in order to be regarded as decoupled:

- eligibility for such payments shall be determined by clearly defined criteria such as income, status as a producer or land-owner, etc;
 - the amount of such payments in any given year shall not be related, or based on, the type of volume or production (including livestock units) undertaken by the producer in any year after the base period;
 - the amount of such payments in any given year shall not be related to, or based on, the prices, domestic or international, applying to any production undertaken in any year after the base period;
 - the amount of such payments in any given year shall not be related to, or based on, the factors of production employed in any year after the base period;
 - no production shall be required in order to receive such payments;
5. Government financial participation in income insurance and income safety-net programmes;
 6. Disaster payments;
 7. Structural adjustment assistance provided through:
 - a. producer retirement programmes;
 - b. resources retirement programmes;
 - c. investment aids;
 8. Payments under environmental programmes;
 9. Payments under regional assistance programmes.

The different programmes mentioned above are all subject to different criteria, which will however not all be mentioned here. Only one criterion will be mentioned, as this is commonly proposed for all direct payments. This criterion involves that the payments may not be related to the type of production, the production level (included payments granted per animal), internal or international prices and production factors. When the above programmes meet the two general criteria and their specific criteria, they will be exempted from the AMS.

However, the Dunkel paper gives one other opportunity for policies to be exempted from the internal support reduction programme. Namely product-specific domestic support which would normally be required to be included, is allowed to be exempted, when it does not exceed 5% of the total value of production of a basic product. Domestic support that is not product-specific is not required to be included where such support does not exceed 5% of the value of total agricultural production.

4.5 The Blair House agreement

Although the Dunkel paper was not accepted by the Contracting Parties, it would be the basis for the 'Blair House' agreement in Novem-

ber 1992 between the US and the EC (Silvis, 1994 forthcoming). This bilateral agreement contained special terms about grain substitutes and oilseeds. Furthermore it contained agreements about market access, export subsidies, and internal support. With respect to the latter, the EC and the US agreed, upon a general reduction of the *AMS* over all products of 20% for the period 1994 - 2000 ¹⁾. Thus the EC and the US assigned a different role to the *AMS* than was done in the Dunkel paper. The Dunkel paper proposed to apply the commitment of a 20% reduction on the *AMS* for each product individually. This proposal would impede the Contracting Parties to a large extent as to decide how the *Total AMS* reduction over all products together would be realized. Therefore the EC and the US rejected the use of the *AMS* as proposed by Dunkel. The general reduction of the *AMS* over all products together as agreed in the Blair House agreement by the EC and the US, gives countries more flexibility in reaching their commitments. A general reduction of the *AMS* over all products allows to meet the *AMS* commitment by reducing the *AMS* of one specific product with more than 20% while leaving the *AMS* of other products unchanged.

Furthermore, the EC and the US agreed that the internal support measures that were to be exempted from the *AMS* would not have to be reduced. Moreover the direct income support (per hectare and per animal) implemented in the view of the EC Common Agricultural Policy, would be exempted from internal support reduction.

4.6 The final GATT agreement

4.6.1 Introduction

When the two most important trading partners of the GATT had reached bilateral consensus about a few critical issues and had laid it down in the Blair House agreement in November 1992, the negotiations with the other Contracting Parties could start again in order to reach a final GATT agreement and to end the Uruguay Round. This final agreement was reached in December 1993. In this section will be analysed in what respect the final agreement differs as compared to the Dunkel paper, while special emphasis will be put on the use of the *AMS*. In subsection 4.6.2 the changes in the definition of the *AMS* will be discussed. In subsection 4.6.3 modifications in the area of market access and export competition will be analysed, while finally in subsection 4.6.4 the changes in the internal support area will be discussed.

1) In the Dunkel paper the implementation period was defined to be 1993 - 1999. However due to the rejection of the Dunkel paper and the consequent delayed final agreement, also the implementation period was shoved forward to 1994 - 2000.

4.6.2 Definition of the AMS

In contrast with the Dunkel paper, in the final GATT agreement a definition is given of the AMS, namely as (GATT, 1993a, pp. 2):

'the annual level of support, expressed in monetary terms, provided for an agricultural product in favour of the producers of the basic agricultural product or non-product-specific support provided in favour of agricultural producers in general, other than support provided under programmes that qualify as exempt from reduction (...).'

The description of the AMS concerning its calculation has not been modified as compared to the Dunkel paper. What has changed however is that a few additional definitions are presented in the final agreement. First of all the *Total AMS* is introduced and described as the sum of all domestic support provided in favour of agricultural producers, calculated as the sum of all aggregate measurements of support for basic agricultural products, all non-product-specific aggregate measurements of support and all equivalent measurements of support for agricultural products (GATT, 1993a, pp. 3). This *Total AMS* is further split out in a *Total AMS* for support provided during the base period (*Base Total AMS*), a *Total AMS* indicating the maximum support permitted to be provided during any year of the implementation period or thereafter (*Annual and Final Bound Commitment Levels*) and a *Total AMS* indicating the level of support actually provided during any year of the implementation period and thereafter (*Current Total AMS*). The reason for the introduction of these new terms is the switch from a reduction commitment for internal support for the AMS of each individual product to a general reduction commitment for the *Total AMS* for all agricultural products together, which was arranged in the Blair House agreement. As we will see later in the subsection dealing with the internal support area, this modified use of the AMS has been adopted in the final GATT agreement from the Blair House agreement.

4.6.3 Market access and export competition

In the area of market access, the reduction commitment of 36% of both ordinary customs duties and the border measures converted to tariffication which were already proposed in the Dunkel paper, have not altered in the final GATT agreement. Only the reduction period has changed, due to the delay in reaching the final agreement. The reduction is now agreed to be realized over a six-year period, commencing in the year 1995 (GATT, 1993b).

A modification, which has been made in the final GATT agreement deals with the measures subject to tariffication. Both in the Dunkel paper and in the final agreement it was stated that members should not resort to, or revert to measures of the kind which have been required to be

converted into ordinary customs duties (GATT, 1993a, pp. 4). However in the final agreement exemptions to this rule are accepted and the conditions which have to be complied with in order to get this 'special treatment' have been clearly described (see GATT, 1993a, pp. 23-25).

With respect to the area of export competition one major change has been made in the final agreement as compared to the Dunkel paper. While it was proposed in the Dunkel paper to reduce the quantities of each specified agricultural product or group of products with 24%, this reduction commitment has been decreased to 21% in the final agreement. Moreover additional commitments are made in the latter, both for reducing export subsidies and export quantities, with respect to the annual instalments of the reductions. Eventually the final agreement also provides possibilities to member countries to provide export subsidies in excess of the corresponding annual commitments in the second through fifth year. The conditions for these possibilities are consequently clearly described (GATT, 1993a, pp. 9).

4.6.4 Internal support

Just as proposed in the Dunkel paper, in the final agreement, the internal support area is the only area where the reduction commitments take place on the basis of the *AMS*. However as mentioned earlier, the use of the *AMS* has changed. Reductions commitments will not apply on the *AMS* of each individual product as proposed in the Dunkel paper. In the final agreement a *Total AMS* shall be calculated as the sum of the value of all Aggregate Measurements of Support and Equivalent Measurements of Support. The *Total AMS* will consequently be reduced during the period of implementation in equal annual instalments and will be bound, at the end of the period, at a level 20% below the base period level. The total internal support in the base period is indicated by the earlier defined *Base Total AMS*. The commitment that is expressed each year and the support as agreed at the end of the reduction period are called the *Annual and Final Bound Commitment Levels*. The actual internal support given in a certain year in the implementation period is called the *Current Total AMS*.

With respect to the policies that will be included or excluded in the *AMS* calculation the same procedure is followed as in the Dunkel paper. This means that internal support policies will be included except when they have a negligible trade distorting effect. In order to distinguish whether a policy measure belongs to this last category, two general criteria have been formulated, which a policy measure should meet in order to be exempted from the *AMS* and thus the reduction commitment. Moreover some specific criteria have been described for some particular policy measures. The previous had however already been proposed in the Dunkel paper and has not changed since.

What has changed however is that in the final agreement as compared to the Dunkel paper, conditions have been agreed upon in order

to exempt direct payments under production-limiting programmes from the *AMS* calculation, as initiated by the Blair House agreement. Following these conditions, direct payments under production-limiting programmes will be exempted from the commitment to reduce domestic support if such payments are based on fixed area and yields, or are made on 85% or less of the base level of production, or if livestock payments are made on a fixed number of heads.

4.7 Conclusion: views of Contracting Parties compared with final GATT agreement

As one can infer from the previous sections, dealing with the Dunkel paper, the Blair House agreement and the final GATT agreement of December 1993, for almost all the questions enumerated in the earlier mentioned checklist of Arthur Dunkel an answer has been provided.

The question however is to what extent the answers conform to the points of view of the different Contracting Parties, as described in section 4.3. When one compares the final GATT agreement with the views of the Contracting Parties with respect to the *AMS*, one can conclude that the final outcome is a real compromise of the views of the Contracting Parties.

The optional use of the *AMS* proposed in the paper is two-fold, options I and III, which means the function of commitments on the basis of the *AMS* and the monitoring role. This was the proposal of the EC. However, although option I is proposed for the *AMS*, the *AMS* will only be applied to a very small area, namely the internal support area, with a lot of possible exemptions. The application area can therefore be regarded as very restricted, although the original intention was to develop an *AMS* which would be able to capture all policies applied by the different Contracting Parties.

The small application area proposed for the *AMS* is in fact a logical consequence of the negotiations. As one can see out of the alternatives for the traditional *PSE* as proposed by the different Contracting Parties (*SMU*, *TDE*, *AMLOBS*) and the comments given by other Contracting Parties, referring to the *AMS*, almost all Contracting Parties agreed upon the fact that only trade-distorting policy measures should be taken into account. As everybody was sure about the policies which should, without any doubt, be included in or excluded from the *AMS*, there was a big 'grey' area of policies in between, for which no Contracting Party could give criteria on the basis of which they should be included or left out. The reason for this 'lack of clarity' was that the trade-distorting effects of these measures were unknown. However there was also a problem with respect to the measures which would for sure be included (the 'amber' policies). Policies like import quotas and voluntary export restraints should be included and would be measured by the price gap between the domestic price and an external reference price. However due to the

way they were measured and due to policy switching possibilities it was possible to reduce or remain the existing *AMS* level, while increasing trade distortion. On the other hand a realized reduction in import restrictions would not necessarily lead to a change in *AMS*.

In the final GATT agreement this problem is proposed to be solved by excluding all market access and export subsidy policies from the *AMS* and subject them to 'traditional' commitments. Only the remaining policy measures, falling under the area of 'internal support' are included in the *AMS* and subject to reduction when they are regarded as trade-distorting. To distinguish between measures that can reasonably be considered as trade-distorting and that cannot, in the final GATT agreement a set of criteria per policy measure has been developed. Policies that meet the criteria will not be subject to reduction, other policies not meeting the criteria will. The resulting policy coverage is especially close to the policy coverage used in the *AMLOBS* as proposed by the Cairns Group.

The issue of possible credits for countries applying supply control policies has been widely discussed by the Contracting Parties and was one of the main issues of the *AMS*. It is therefore at least surprising that the final GATT agreement does not spend many words on this problem. The only way in which the problem has gained attention in the final agreement is by way of the conditions provided to exempt direct payments under production-limiting programmes from internal support reduction. However nothing is said about possible credits. It has therefore to be assumed that no extra credit will be given above the effect measured by the difference between the domestic price and the external reference price and the production effect (as the *AMS* is expressed as a total monetary value), therewith neglecting the views of Canada and the EC, who were in favour of a credit.

The last main discussion point of the *AMS* dealt with the problem of fluctuating external reference prices and exchange rates and the choice of the base year. With respect to the world price and exchange rate fluctuations, two opinions were expressed by the Contracting Parties. Most Contracting Parties were in favour of taking a (changing) average of the most recently available reference prices and exchange rates in order to best reflect the market reality and the current support situation. However the EC proposed in its *SMU* concept to use a fixed external reference price which would solve both the problem of fluctuating external reference prices and the problem of fluctuating exchange rates. This way a change in *AMS* would reflect purely a change in policy. In the final agreement the stance is taken of a compromise in agreeing upon a fixed external reference price based on the three-year average of 1986 till 1988.

With respect to the base year almost the same problem arose. Most countries were in favour of the most recent year of which data were available, while the EC was in favour of the year 1984/85, as this base year would best take into account the CAP reform measures started in this period. However after the Mid-Term Review where it was decided

that credits would be allowed for support reduction programmes already started before the base year finally chosen, the EC changed its stance and proposed 1986 as the base year. In the final agreement, though, it is decided to take the average of the years from 1986 till 1988 as reference period.

Of course the final GATT agreement could be compared on even more issues with the Contracting Party proposals, like the way products are dealt with for which no *AMS* can be calculated, how inflation is treated etc. However as these issues have not caused principal disagreement among the Contracting Parties, they will not be discussed here.

5. CONCLUSIONS

When the Uruguay Round was launched in 1986 in Punta del Este it was agreed to develop an Aggregate Measure of Support in order to provide transparency in the wide range of different existing policies and to bring them under one denominator. As the traditional method of negotiating in previous Rounds on the basis of request and offer was not suitable any more, a developed *AMS* should be the basis for binding reduction commitments for all three agricultural target areas, namely improvement of market access and export competition and reduction of the internal support.

In spite of theoretically not being the best measure of support, the *PSE* was chosen as a basis for the discussion in stead of other (well-known) measures like the *NRPP*, *ERP*, *NRA* and *ERA*. As analysed in chapter two, the political preference of the *PSE* above the other measures was due to the combination of the *PSE* capturing the effects of many different policies and being calculated very easy by using price gaps and budgetary expenditure data. Moreover calculations of *PSEs* for various products were already available through the work of the OECD.

The question which then naturally follows and which was also the aim of the analysis in this study, is whether the *PSE* is suitable to serve as an *AMS* in the Uruguay Round on the basis of which binding commitments can be made. Schwartz and Parker (1988) state that an *AMS* used in negotiations to bind and cut protection should satisfy at least five criteria.

1. **Transparency;** the measure should make the effects of policies transparent;
2. **Simpleness and comprehensibility;** as negotiators can minimize their time spent arguing over measurement issues and maximize their effort to reduce trade distortions;
3. **Flexibility;** it should be flexible enough to accommodate policy reform packages necessary to manoeuvre for domestic political support, but not so flexible that parties can manipulate reforms in non-bargained, self-serving ways;
4. **Consistency;** it should be consistent across products, countries, and over time, so that outcomes of the measures can be compared and ranked;
5. **Reliability;** it should be a reliable indicator of how changes in policies affect real economic variables; that is it should be positively correlated in a roughly linear manner with the main objectives of the negotiations.

To answer the above question, the *PSE* concept has been analysed in chapter three in order to see what the *PSE* is, what it does, the problems it faces and whether from a scientific/economic point of view the *PSE* is suitable to serve as a basis for reduction commitments. Also the practical problems that the *PSE* may face when used in the negotiations are dealt with. From this chapter it can be inferred that apart from the confusion in definition (the *PSE* measures revenue support, no income support), the *PSE* faces several conceptual problems like:

- a. intermediate input assistance is not fully taken into account;
- b. supply control policies are not adequately measured;
- c. policies hidden under the price gap; a wide range of policies is measured by the difference between domestic prices and external reference prices. The effects of individual policies on price and trade can therefore not be distinguished. It is therefore not known what change in *PSE* is due to what policy change;
- d. fluctuating world prices and exchange rates; fluctuating world prices and exchange rates change the *PSE* of a country without this country having changed its policies;
- e. the *PSE* can be reduced while not changing real agricultural support.

For the negotiations, all the conceptual problems the *PSE* faces can be summarized as follows:

1. *PSE* levels are only partly under a country's control;
2. *PSEs* do not adequately reflect trade distortions.

These two problems very clearly show that the *PSE* does not meet the criteria of respectively consistency and reliability as put forward by Schwartz and Parker (1988). Thus from a scientific point of view one must state that in spite of its advantages the *PSE* is not suitable to be used as an *AMS* in negotiations on the basis of which binding commitments can be made. Option I must therefore be excluded. Besides consistency and reliability, also the criterion of transparency is a problem because the *PSE* measures a wide range of policies through the price gap, but the effects of individual policies are not shown.

As also the Technical Group in the negotiations recognized quite early that option I would be difficult in practice, they put forward a few alternative optional uses for the *AMS* of which the most important are options II and III, respectively the 'target' role with commitments on the policies itself and the 'monitoring' role. The target role is especially interesting as by agreeing commitments on the basis of the policies themselves, it can be avoided that trade distortion will increase while reducing the *AMS/PSE*. However one can ask oneself what the additional value would be of an *AMS* that is not used like in option I. It is therefore interesting to look at the opinions about the *PSE* or its derivatives as put

forward by the Contracting Parties in the negotiations and the finally agreed use of the *AMS* in the final GATT agreement, which have been analysed in chapter 4.

As can be inferred from that chapter, most of the conceptual problems of the *AMS* as analysed in chapter 3 were also recognized in the GATT by the Negotiating Group on Agriculture (NG5) and the Technical Group. However some of these conceptual or technical problems appeared in the negotiations to be more political, like the policy coverage and the choice of the reference price. Moreover also other questions were raised, not important for a conceptual analysis, but very important in the negotiations, such as the choice of the base year (important for the final commitments), commodity coverage and country coverage. Besides the discussion about those issues, the Contracting Parties proposed various derivatives, which should solve the earlier mentioned problems that the *PSE* faced. For example the EC proposed the *SMU* (*PSE* with fixed external reference price, Canada the *TDE* (*PSE* which only takes into account the trade-distorting policies) and the Cairns Group proposed the *AMLOBS* (*PSE* only taking into account policies directly affecting production).

The use of the *AMS* as agreed upon and described in the final GATT agreement with respect to the *AMS* can be regarded as a compromise between the proposals of the different Contracting Parties. In spite of what was concluded from a scientific point of view, the *AMS* was proposed in the final agreement to be used as a basis for binding commitments, which is in fact option I. The problems mentioned above, which the *AMS* faces in this option are solved by simply slimming the application area of the *AMS* to policies in the internal support area, therewith excluding all market access measures, like import levies, voluntary export restraints, etc, and export competition measures, like export subsidies, transport subsidization etc, which are subject to separate GATT commitments. For the internal support area it was proposed that measures having no or a negligible incidence on trade should be excluded from the *AMS*. To determine which policies could therefore be excluded, two general criteria and specific criteria per policy measure were developed, which a policy should meet in order to be excluded. Theoretically therefore all internal support measures can be included. However the criteria developed in order to distinguish whether a policy is included or left out, offer such a large scale of exemption possibilities, that in practice the application area is very small. From the originally three categories of policies which could, one way or the other, be included:

- a. the border measures;
- b. direct payments; and
- c. input subsidies.

only the input subsidies are fully captured. The border measures, as measured by the price gap have been reduced to only direct price or output subsidies, as all non-internal support has been removed from the

AMS and is subject to other commitments. All direct payments are subject to the mentioned exemption criteria for the decision of being included or excluded, or to the conditions for exemption as described for the direct payments under production-limiting programmes.

However, in spite of the fact that the application area of the *AMS* is restricted to internal support, also for this area the *AMS* is still not an accurate one in that the trade-distortions are still not reflected the way they should be. For example the trade-distorting effect of an output subsidy is not the same as the trade-distorting effect of an input subsidy as shown by Hertel (1989) (see appendix 5).

Summarizing one can state that the use of the *AMS* in the Uruguay Round as agreed upon and described in the final GATT agreement essentially is in accordance with the scientific conclusion, namely that the *AMS* is not suitable to serve as a basis on which binding commitments can be made and which could therefore replace the original negotiating method of request and offer. Though in the final GATT agreement this is not said with so many words, it can be concluded from the fact that, although in the final GATT agreement the *AMS* is used as a basis for binding commitments, it is applied to such a small range of policies that in practice the *AMS* use is minimal.

The contribution of the economic science to the *AMS* discussion was reflected by the *PSE*. The *AMS* namely is the *PSE* concept adapted on various elements in order to better comply with the wishes of the Contracting Parties. However, looking at the many problems of the *PSE*, when practically used in the negotiations and the final proposed slimmed use of the *AMS* in the final GATT agreement, one must conclude in fairness, that the economic science has not been able to deliver an *AMS* that is suitable to meet all the criteria as enumerated at the start of this chapter, necessary for use on a large scale in the negotiations. One option people are working on at the moment are models for which the *PSE* is used as an input, which try to determine the world trade effects of certain levels of protection. However as has been clearly demonstrated in this study, when used as a negotiating basis, it is insufficient to develop an *AMS* that solves most of the conceptual and technical problems it faces now in the negotiations. Many technical problems turn out to be political. Therefore it is impossible to develop an *AMS* that meets all the criteria, both conceptual and political and which can be used in all three negotiation areas of the Uruguay Round. It is therefore to be expected that in the negotiating Rounds to come, still much emphasis will be put on the traditional request and offer method as no acceptable alternatives are available.

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APPENDIXES

Appendix 1 Mathematical formulas and policy coverage of five measures of support

Nominal Rate of Protection for producers (NRPP):

$$\begin{aligned} NRPP_i &= (PD_i - PW_i)/PW_i \times 100 \Leftrightarrow \\ &= (PD_i/PW_i - 1) \times 100 \end{aligned}$$

Effective Rate of Protection (ERP):

$$\begin{aligned} ERP_i &= (VAD_i - VAW_i)/VAW_i \times 100 \Leftrightarrow \\ &\frac{t_i - S_{ij}(t_i)}{1 - S_{ij}} \times 100 \Leftrightarrow \\ &\frac{NRPP_i - AT_j}{1 - A} \times 100 \end{aligned}$$

Nominal Rate of Assistance (NRA) or Price Adjustment Gap (PAG):

$$NRA_i = PAG_i = (RD_i - PW_i)/PW_i \times 100$$

Effective Rate of Assistance (ERA):

$$\begin{aligned} ERA_i &= (AVA_i - UVA_i)/UVA_i \times 100 \Leftrightarrow \\ &\frac{x_i - S_{ij}(x_i)}{1 - S_{ij}} = x \times 100 \Leftrightarrow \\ &\frac{NRA_i - AX_j}{1 - A} = x \times 100 \end{aligned}$$

Producer Subsidy Equivalent (PSE):

$$\begin{aligned} PSE_i &= (PD_i - PW_i)Q_i + (AT'_i + B'_i + C'_i + D_i) \Leftrightarrow \\ &(NRPP_i)PW_iQ_i + (AT'_i + B'_i + C'_i + D_i) \end{aligned}$$

For the i th commodity and the j th intermediate input:

- a_{ij} = undistorted input-output coefficient;
- A = set of input-output coefficients (Sa_{ij});
- AVA_i = assisted value added per unit of output;
- B_i = net subsidies on primary inputs (capital, labour, land);
- B'_i = subset of B_i ;
- C_i = output policies that do not affect PD_i ;
- C'_i = subset of C_i ;
- D_i = long-term structural program costs for the i th good;
- PD_i = domestic producer price;
- PW_i = undistorted (world) price;
- Q_i = domestic quantity produced;
- RD_i = unit gross returns to producers for domestic output;
- S_j = Sum;
- t_i = $NRPP$ on the i th output;
- t_j = $NRPC$ on the j th intermediate input;

$NRPC = (PCD_i - PW_i)/PW_i$ in which:

$NRPC$ = Nominal Rate of Protection for consumers

PCD_i = domestic consumer price

- T_j = set of all net taxes on intermediate goods, t_j ;
- T'_j = subset of T_j (varies depending on PSE definition);
- UVA_i = unassisted value added per unit of output;
- VAD_i = value-added at domestic prices;
- VAW_i = value-added at world prices;
- x_i = NRA on the i th output;
- x_j = NRA on the j th intermediate input;
- X_j = set of all net assistance on intermediate inputs, x_j ;

Appendix 2 Policy coverage of five aggregate measurements

Policy coverage	Aggregate measurements				
	NRPP	PAG	ERP	PSE	ERA
Assistance to output					
Via market prices					
- tariffs, export taxes, import quotas	X	X	X	X	X
- two-price schemes	X	X	X	X	X
Via other means					
- export incentives, inspection		X		X	X
- stabilization activity and funds		X		X	X
- production bounties		X		X	X
- acreage diversion payments		X		X	X
- subsidized marketing costs		X		X	X
Assistance to inputs					
- Intermediate Input Subsidies and Taxes			X **)	X *)	X
- Primary Input Subsidies and Taxes			X **)	X *)	X
Research, Long-term Structural Policies					
- research and extension				X *)	X
- farm adjustment				X *)	X
- conservation programmes				X *)	X
- income tax concessions				X *)	X

*) These policies are only included in the *PSE*, when they are Agriculture-Specific. Agriculture-Specific refers to policies that are specific to agriculture and generally not used in the rest of the economy, e.g. fertilizer subsidies. Precisely which policies are included depends on the definition of the *PSE* being used; **) Only the measures that influence the prices of the inputs are incorporated.

The information in the tables is derived from work by Haszler and Parsons (1987), Industries Assistance Commission (1983), Scandizzo and Bruce (1980), Schwartz and Parker (1988), Strak (1982), US Department of Agriculture (1987), Webb (1984) and my own contribution.

Appendix 3 Overview of policy measures in *PSE* estimates, their conceptual approach and a few examples

Policies	Conceptual approach	Examples
A. MARKET PRICE SUPPORT		
1. import quotas/variable levies state trading	price difference (border price-domestic price) * domestic prod.	sugar:US,EC,JAP rice, wheat:EC,JAP beef:EC,JAP corn:EC pork:JAP,EC poultry:EC,JAP milk:US,EC,CA,JAP
2. tariffs only	tariff(\$/ton) * domestic production	US:beef JAP:poultry CA:sugar,corn
3. two price systems	price difference (border price-domestic price) * domestic cons.	AUS:wheat,rice CA:wheat,oats
4. export refunds	assumed to be captured by price differences	EC:wheat,beef,sugar
5. marketing boards	AUS:interest subsidy on funds use by AWB CA: govt. contributions to stabilization fund	AUS:wheat; CA:wheat,barley
6. US grains & soybeans		
- CCC inventory cost	'budget' data: economic cost of CCC inventory operations, derived from CCC financial data	US:grains,cotton, soybeans
- commodity loans	'budget' data: interest subsidy on loans (market rate - CCC rate) * loan volume	US:grains,cotton, soybeans
7. price premiums fluid milk	price difference (fluid price - manufactured price) * fluid use * weight	CA,US,AUS
8. export credits, food aid, export enhancement	not included in ERS or OECD estimates	

Policies	Conceptual approach	Examples
B. DIRECT INCOME SUPPORT		
1. direct cash payments (disaster, headage, deficiency, paid land diversion, stabilization)	budget data	US:all grains, cotton EC:soybeans, rapeseed JAP:rice,wheat CA: grains,soybeans, pork, beef
2. producer levies	budget data: negative support	EC:dairy,sugar US:dairy
C. INPUT SUBSIDIES		
1. crop insurance	'budget' data: premiums indemnities (US,CA) + premium subsidy (US); government outlays (JAP)	US,JAP:crop,specific data CA:allocated by cash receipts
2. concessional credit farm operations	'budget' data US, AUS: (market interest rate - programme rate) * loan volume. US: add appropriate for losses, ACIF; CA: budget outlays	US, CA, AUS: all commodities
3. fuel subsidies	'budget' data. CA: govt. outlays. US: \$ value fuel tax non-agr. users * fuel use in agriculture	US,CA:all commodities
4. fertilizer subsidies	'budget' data. Subsidy/ ton * fertilizer use	AUS:all crops
D. MARKETING PROGRAMMES		
1. processing, inspection, marketing, programmes	budget data	most coun- tries, all commodities
2. transportation	budget data CA: railway programmes, allocated generally by cash receipts. US, COE and railway budget data	CA:grains & oilseeds; US:all commodities

Policies	Conceptual approach	Examples
E. LONG-TERM POLICIES		
1. research, extension, structures, conservation	budget data	most countries, all commodities
F. EXCHANGE RATES		
1. fixed or pegged exchange rates	calculate parity exchange rate ratio based on relative purchasing power vis-a-vis US. Apply exchange rate distortion /ton to total production	Nigeria, Mexico, Brazil

Appendix 4 Gross domestic production and consumer price index used as deflators for the EC 12, the US and Japan

Table 1 Gross Domestic Production, EC 12, US and Japan

Year	Deflator			Index 1986 = 100		
	EC 12	US	JAPAN	EC 12	US	JAPAN
1979	11.0	8.9	3.0	55.71	69.68	86.96
1980	13.0	9.2	3.7	62.98	76.06	90.19
1981	10.9	9.5	3.3	69.82	83.26	93.12
1982	10.4	6.5	1.9	77.10	88.63	94.87
1983	8.4	3.4	0.8	83.59	91.63	95.60
1984	7.0	3.6	1.2	89.41	94.91	96.78
1985	6.0	2.7	1.4	94.75	97.48	98.11
1986	5.5	2.6	1.9	100.00	100.00	100.00
1987	4.0	3.1	-0.2	104.00	103.05	98.83
1988	4.4	3.4	0.5	108.59	106.53	100.30
1989	4.9	4.7	3.1	113.91	111.50	103.39
1990	4.6	4.6	3.0	119.15	116.64	106.48

Table 2 Consumer Price Index, EC 12, US and Japan

Year	Deflator			Index 1986 = 100		
	EC 12	US	JAPAN	EC 12	US	JAPAN
1979	10.9	9.3	3.6	55.60	68.65	81.64
1980	13.5	11.0	7.1	63.13	76.19	87.44
1981	12.0	9.3	4.4	70.71	83.24	91.27
1982	10.6	6.0	2.6	78.18	88.25	93.65
1983	8.4	3.5	1.9	84.78	91.30	95.38
1984	7.3	3.9	2.1	91.00	94.87	97.36
1985	5.9	3.1	2.2	96.33	97.85	99.50
1986	3.8	2.2	0.5	100.00	100.00	100.00
1987	3.4	4.2	-0.1	103.39	104.24	99.87
1988	3.7	4.1	0.3	107.20	108.50	100.16
1989	4.2	5.1	3.2	111.71	114.00	103.33
1990	3.8	4.9	2.7	115.99	119.58	106.14

Source: Commission of the European Communities, 1990.

Appendix 5 Eleven propositions on the effect of alternative types of agricultural subsidies

Establishing the link between output and exports

1. Introducing direct farm subsidies on inputs or outputs tends to increase aggregate production. The resulting proportional increase in farm exports will exceed the proportional rise in agricultural production when demand is more price responsive than domestic demand for farm products.

Comparing output and input subsidies

2. Removal of an agricultural input subsidy will have a greater impact on long-run output (and hence exports) than will the removal of an equal-PSE output subsidy, provided the subsidized input is a substitute for land.
3. The drop in the long-run price of land following a given PSE reduction will tend to be more moderate (or perhaps even reversed) in those cases where the PSE is reduced by cutting a subsidy on an input which is a substitute for land, as opposed to cutting an output subsidy.
4. The largest effects on long-run employment will tend to arise when producer support is directed towards subsidizing inputs that (i) are a substitute for land and (ii) are complementary with labour.
5. The effect of equal PSE input and output subsidies will be equivalent only when the subsidized input is always employed in a fixed proportion to output, regardless of relative prices.

Comparing output and export subsidies

6. When domestic and export demand elasticities are equal, replacing an output subsidy with an export subsidy of equal cost increases exports. The associated factor of proportionality equals the ratio of total output to exports. When export demand is more price responsive this factor of proportionality becomes even larger.
7. The impact on the farm sector of an export subsidy will generally exceed that of an output subsidy of equal cost. The associated factor of proportionality is determined by the ratio of the elasticity of demand for exports to the elasticity of demand for aggregate farm output.
8. When an output subsidy is replaced by an export subsidy of equal cost, domestic consumers must pay more for food. When the elasticities of domestic and export demand are the same, the increase in domestic prices equals the amount the government was spending on the output subsidy. When export demand is relatively more price responsive, domestic prices for farm products increase by more than the subsidy.

9. Replacing an output subsidy with an equal PSE export subsidy will reduce government budget expenditures by a factor of proportionality equal to the ratio of exports to domestic production. Assuming that the export demand for farm products is more price responsive than domestic demand, such a switch will also lower revenues per unit of production to domestic farmers.

Acreage controls

10. Acreage controls will reduce long-run output and exports, while increasing land rents. In the long run, agricultural employment will increase as a result of acreage controls if the substitutability of labour for land exceeds the absolute value of the elasticity of demand for total farm output.
11. Long-run returns to land can be left unchanged after removal of an output subsidy if this removal is accompanied by acreage controls of appropriate magnitude. The size of this acreage reduction is proportional to the elasticity of demand for farm output.

Source: Hertel, 1989.

Appendix 6 Classification of support measures in the *TDE* as proposed by Canada

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 planning/production/marketing/quota in a period prior to the first announcement of the programme);
- 1.13 Government-funded Stockholding 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);

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 market-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;

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 targeted subsidies);

Source: GATT, 1988a.

Appendix 7 Articles XI and XVI of the GATT

Article XI:

General Elimination of Quantitative Restrictions

1. No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licences or other measures, shall be instituted or maintained by any contracting party on the importation of any product or the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party.
2. The provisions of paragraph 1 of this Article shall not extend to the following:
 - (a) Export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party;
 - (b) Import and export prohibitions or restrictions necessary to the application of standards or regulations for the classification, grading or marketing of commodities in international trade;
 - (c) Import restrictions on any agricultural or fisheries product, imported in any form, necessary to the enforcement of governmental measures which operate:
 - (i) to restrict the quantities of the like domestic product permitted to be marketed or produced, or, if there is no substantial domestic production of the like product, of a domestic product for which the imported product can be directly substituted; or
 - (ii) to remove a temporary surplus of the like domestic product, or, if there is no substantial domestic production of the like product, of a domestic product for which the imported product can be directly substituted, by making the surplus available to certain groups of domestic consumers free of charge or at prices below the current market level; or
 - (iii) to restrict the quantities permitted to be produced of any animal product the production of which is directly dependent, wholly or mainly, on the imported commodity, if the domestic production of that commodity is relatively negligible.

Any contracting party applying restrictions on the importation of any product pursuant to sub-paragraph (c) of this paragraph shall give public notice of the total quantity or value of the product permitted to be imported during a specified future period and of any change in such quantity or value. Moreover, any restrictions applied under (i) above shall not be such as will reduce the total of imports relative to the total of domestic production, as compared with the proportion which might reasonably be expected to rule between the two in the absence of restrictions. In determining this proportion, the contracting party shall pay due regard to the proportion prevailing during a previous representa-

tive period and to any special factors which may have affected or may be affecting the trade in the product concerned.

Article XVI:

Subsidies

Section A-Subsidies in General

1. If any contracting party grants or maintains any subsidy, including any form of income or price support, which operates directly or indirectly to increase exports of any product from, or to reduce imports of any product into, its territory, it shall notify the CONTRACTING PARTIES in writing of the extent and nature of the subsidization, of the estimated effect of the subsidization on the quantity of the affected product or products imported into or exported from its territory and of the circumstances making the subsidization necessary. In any case in which it is determined that serious prejudice to the interests of any other contracting party granting the subsidy shall, upon request, discuss with the other contracting party or parties concerned, or with the CONTRACTING PARTIES, the possibility of limiting the subsidization.

Section B-Additional Provisions on Export Subsidies*

2. The contracting parties recognize that the granting by a contracting party of a subsidy on the export of any product may have harmful effects for other contracting parties, both importing and exporting, may cause undue disturbance to their normal commercial interests, and may hinder the achievement of the objectives of this Agreement.
3. Accordingly, contracting parties should seek to avoid the use of subsidies on the export of primary products. If, however, a contracting party grants directly or indirectly any form of subsidy which operates to increase the export of any primary product from its territory, such subsidy shall not be applied in a manner which results in that contracting party having more than an equitable share of world export trade in that product, account being taken of the shares of the contracting parties in such trade in the product during a previous representative period, and any special factors which may have affected or may be affecting such trade in the product.
4. Further, as from 1 January 1958 or the earliest practicable date thereafter, contracting parties shall cease to grant either directly or indirectly any form of subsidy on the export of any product other than a primary product which subsidy results in the sale of such product for export at a price lower than the comparable price charged for the like product to buyers in the domestic market. Until 31 December 1957 no contracting party shall extend the scope of any such subsidization beyond that existing on 1 January 1955 by the introduction of new, or the extension of existing, subsidies.
5. The CONTRACTING PARTIES shall review the operation of the provisions of this Article from time to time with a view to examining its effectiveness, in

the light of actual experience, in promoting the objectives of this Agreement and avoiding subsidization seriously prejudicial to the trade or interests of contracting parties.

Source: GATT (1969).

Appendix 8 The influence of the choice of the base year in using the *PSE* or the *SMU* concept

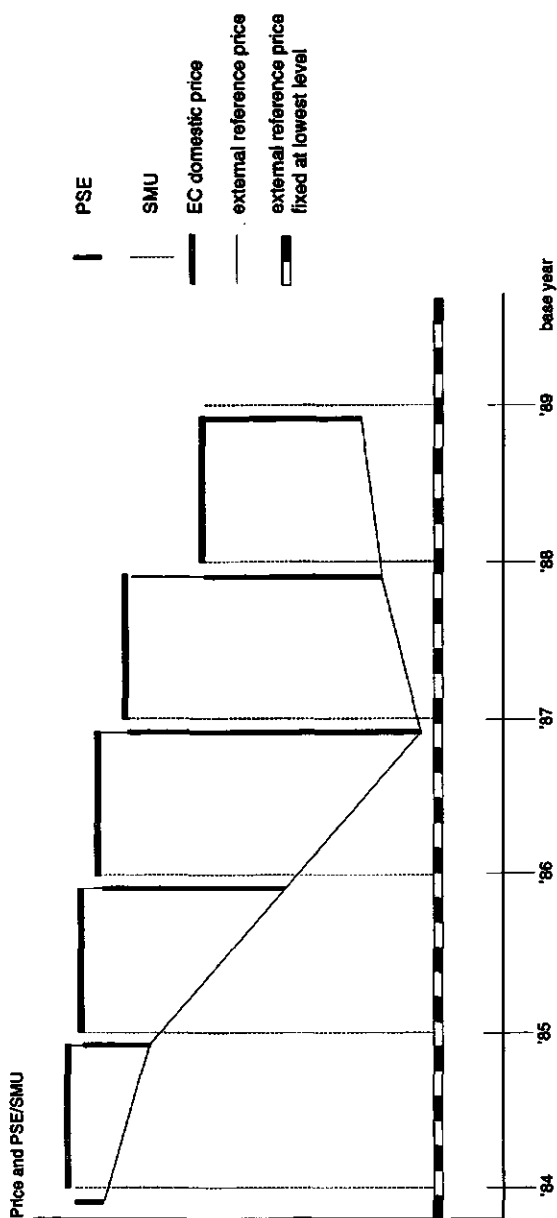


Figure 1 Schematic description of PSE and SMU (per unit of production)

Table 1 *Required percentage price reduction of milk, sugar beet, and beef, to meet in 1988 *) a 10, 15 or 20% reduction in Total SMU compared to different base years; EC 10 **)*

Product	Base year								
	1984			1985			1986		
	10%	15%	20%	10%	15%	20%	10%	15%	20%
Milk ***)	-9.2	-4.8	-0.5	-7.1	-2.7	-1.6	-6.4	-2.1	2.2
Sugar beet	-2.6	0.8	4.3	2.7	6.2	9.6	0.0	3.5	7.0
Beef	2.1	4.8	7.6	1.4	4.1	6.9	0.2	2.9	5.7

*) Latest available estimates October 1988; **) Negative price reduction indicates potential price increase; ***) A milk quota credit is considered for the SMU calculation.

Table 2 *Required percentage price reduction of milk, sugar beet, and beef, to meet in 1988 *) a 10, 15 or 20% reduction in Total PSE compared to different base years; EC 10 **)*

Product	Base year								
	1984			1985			1986		
	10%	15%	20%	10%	15%	20%	10%	15%	20%
Milk	7.7	10.5	13.4	1.3	4.1	6.9	-8.4	-5.6	-2.7
Sugar beet	-0.8	2.5	5.8	-0.4	2.9	6.2	-3.0	0.3	3.6
Beef	5.6	8.3	11.1	1.2	3.9	6.7	2.8	5.6	8.3

*) Latest available estimates October 1988; **) Negative price reduction indicates potential price increase.

Source: Commission of the European Communities, 1988e.

Appendix 9 Synopsis of views expressed on the AMS by various contracting parties

Issue	Contracting Party	
	Cairns	Canada
Options I to IV	Options II and III	See Cairns
Policy coverage and de-coupling	All measures, focusing on the removal of trade-distorting subsidies and access barriers. Exceptions direct decoupled income assistance (non-commodity-specific); natural disaster assistance. Subnational policies should be included as appropriate.	All measures having a trade-distorting effect (<i>TDE</i>), including market price support, direct income payments and reduction of import costs both at national and subnational level
Product coverage	Widest possible range of agricultural products. Early action: products for which output-based support is greater than 10 percent	At first stage the more important and homogeneous products, in the long run being extended with other products
Country coverage	Early action (1989-90) by certain developed countries; Fuller participation there-after	See Cairns
Reference year	Most recent (1988)	See Cairns. Same year/period for all countries and commodities
Reference price	OECD methodology (country specific border price for competing products)	Reference price as close as possible to current world market conditions and exchange rate situation. Quality and transport factors. C.i.f./f.o.b. smoothing
Monetary fluctuations	OECD methodology (possible moving average)	See Cairns
Supply control	Adequately measured by <i>Total PSE</i> . No special adjustment technically required	Pragmatic approach: adjustment where supply is controlled at world market price level

Issue	Contracting Party	
	EC	Jamaica
Options I to IV	Short term: Options I and III (<i>SMU</i>)	<i>PSE</i> technique implying binding of specific commitments and transparency. Options II/IV
Policy coverage and de-coupling	Measures having a significant impact on producers, including market support and direct income payments. Possible exceptions	Both the question of what could be understood to be a binding of a policy which goes beyond trade policy and decoupled income support require more discussion
Product coverage	Products in surplus so far as short-term <i>SMU</i> commitments are concerned. Maybe other products at a later stage	Possibilities to use the <i>PSE</i> for processed agricultural products should be examined (raw material equivalent)
Country coverage	As wide as possible: necessary to have developing countries participation even if their <i>PSEs</i> are negative	Not specified
Reference year	1984/85: policy profile for all countries and commodities but different external reference prices used to calculate base <i>SMU</i>	Year of period prior to 1986 Punta stand-still
Reference price	Lowest external reference price, as calculated by the OECD (1979-87) to be selected according to country and commodity. Remains fixed	Requires more discussion
Monetary fluctuations	Resolved through fixed reference prices	The present methodology (OECD) does not adequately address the problem, notably in the case of developing countries
Supply control	OECD methodology to be modified so as to provide for credits for effective supply controls. Case-by-case: conservation programmes but not set aside linked to deficiency payments	Supply controls should not result in import or export restrictions nor be detrimental for term of trade of net food importing countries

Issue	Contracting Party	
	Nordics	US
Options I to IV	Options II and III	Options II and III
Policy coverage and de-coupling	Measures which have only minor trade effects could be excluded. They should, however, be clearly defined. Most of the development assistance programmes could be excluded. Sub-national policies included as appropriate	All measures, excluding bona fide food aids and decoupled safety net payments. Case should be made for excluding other items. Sub-national measures should be included as appropriate
Product coverage	OECD product coverage as starting point	All agricultural products, fish and forestry products. Surplus products possible criterion for starting point. Move on to products where trade restrictions/problems are the greatest
Country coverage	Support a pragmatic approach in developing the PSE in order to widen the eventual country coverage	As wide as possible
Reference year	Multi-year average preceding immediately the Punta commitment	Need for logical basis and mutual acceptability. Should reflect current levels of support. 1986, or 1988 if process starts in 1989
Reference price	Depends on option selected. Under III, it is feasible to use fluctuating market prices. Common reference prices if used, should reflect the world market situation. C.i.f./f.o.b. smoothing	Should reflect market reality
Monetary fluctuations	As for reference prices. Moving average/currency basket worth exploring. Inflation should be taken into account	OECD methodology. Possibility of averaging not excluded
Supply control	Supply controls should be taken into account through the use of <i>Total PSE</i> . Diversion payments should be excluded from <i>PSE</i> calculation (for some time)	Adequately reflected in <i>Total PSE</i> . No blanket credit. Resources would have to be withdrawn from production.