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AGRICULTURE AND GOVERNMENTS IN AN INTERDEPENDENT WORLD

PROCEEDINGS
OF THE
TWENTIETH
INTERNATIONAL CONFERENCE
OF AGRICULTURAL ECONOMISTS

Held at Buenos Aires, Argentina
24–31 August 1988

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INTERNATIONAL ASSOCIATION OF
AGRICULTURAL ECONOMISTS
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1989

Dartmouth

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Cross-Commodity Trade Effects of Agricultural Policies: Some Implications for the GATT

The Organization for Economic Cooperation and Development (OECD) has recently taken a firm position that domestic price and income support policies are the main cause of current agricultural trade problems (OECD, 1987). It advocated an agenda of gradual and balanced reductions of agricultural support levels for the Uruguay Round of Multilateral Trade Negotiations (MTN) under the General Agreement on Tariffs and Trade (GATT). Given the OECD's use of the Producer Subsidy Equivalent (PSE) indicator in recent analyses, this is commonly interpreted as implying co-ordinated multilateral reductions in PSE levels. Since the PSE is most commonly defined as 'the payment to farmers which would just compensate them for their income loss resulting from a removal of existing support measures', it is usually taken to be an indicator of farm income support accruing from government policies.[1] When standardized to a per unit of production or per cent of total commodity revenue basis, the PSE becomes a relative indicator convenient for comparisons between countries or, in the latter case, between commodities.

However, in their Declaration of September 1986, Ministers of GATT member countries clearly indicated that their goal in the negotiations on agriculture was to reduce the *negative trade effects* of farm support policies. This has led to some debate about whether a multilateral reduction in the level of farm price and income support was in fact a necessary or even a sufficient condition for a reduction in the negative trade effects of that support, as appears to be assumed by the OECD (1987), Miller (1986) and others. Stated simply, the argument of those seeking to distinguish between the income transfer effects of farm support policies and their trade effects is that two programmes which provide the same level of PSE per unit of output may distort the volume traded (for example by stimulating production and depressing consumption) quite differently, depending on differences in the characteristics of: (a) the programmes themselves (for example market price support c.f. deficiency payments; open-ended support c.f. supply-constrained support; and so on); and (b) the economic and physical environments of the countries in which the programmes are used (for example own-price supply and demand elasticities). While there is general agreement that the *complete* removal of agricultural subsidies would be a sufficient (though perhaps not necessary) condition for the disappearance of policy-induced trade distortions, there is considerable scepticism about whether a *partial* multilateral

* International Trade Policy Directorate, Agriculture Canada. The views expressed are those of the authors and should not be attributed to the Government of Canada.

reduction in PSE levels (probably a more realistic GATT outcome) would do much to reduce negative trade effects (for example, Sanderson, 1987).

For practical purposes this debate appears to have been largely resolved. Considerable interest in the use of a broad quantitative indicator in the agricultural negotiations of the Uruguay Round has arisen. Measures of trade distortion which take into account between-country differences, such as those discussed by Gorter and McClatchy in recent years,[2] have been generally rejected as unfeasible in the GATT context because of difficulties in reaching international agreement on levels of supply and demand parameters, by country and commodity, to be used in the calculations. More hope exists, however, for developing an acceptable indicator which reflects differences between different types of support programmes in the degree to which they distort trade. Tangermann, Josling and Pearson (1987), recognizing the more important difficulties with the PSE as an indicator of adverse trade effects, proposed a modified approach to its measurement which would result in an improved proxy indicator for the relative trade distorting effects of a given country's policies. They suggested that GATT negotiators would probably be able to agree on a three-way classification of all agricultural support measures. The first class, which would include those types of support measures whose impact on production could be agreed to be negligible, would be omitted from the calculation altogether. In the second class of significantly-less-production-distorting measures (including those involving some element of supply constraint or control) there would be a negotiated case-by-case reduction ('credit') in the PSE value attributed. The third class of significantly distorting measures would be imputed at their full PSE value.

The essence of this pragmatic solution was adopted by, and included in the 1987 opening negotiating proposals of, the US, Canada (who suggested the new indicator be called a 'trade distortion equivalent' (TDE to avoid confusion with the 'old' PSE) and the Nordic group of countries. In addition, both the Cairns Group and EEC proposals also advocated the use of a PSE-type quantitative indicator as a negotiation instrument, with the EEC also indicating in more general terms that the PSE itself would not suffice unless adjusted. Thus none of these five major proposals appears to be in conflict, either on the need for a quantitative indicator in the current round of negotiations, or on its more precise nature. In the remainder of this paper the term 'AM' (for 'aggregate measurement') is used to refer to a modified PSE-type quantitative indicator of broad levels of trade distorting agricultural support.

The foregoing discussion, like much of the literature, implicitly assumes that it is only programmes and policies supporting the commodity itself which affect commodity income levels and volumes traded.[3] This assumption may be justified when the major interest is in the income support derived from 'own-commodity' policies, subject to the assumption that current levels of support for other, related, commodities remain unchanged. While such a premise may be appropriate for most economic analyses designed to assist unilateral policy decisions, and even for the purposes of international commodity-specific negotiations, it is of questionable relevance for the GATT, where simultaneous policy changes by many countries across the full range of agricultural commodities are clearly contemplated. Furthermore, while 'other-commodity' support policies which affect supply or demand prices for substitute/competing or complemen-

tary/joint products may have little implication for the per unit income derived from the production of the product in question, they may have considerable impacts on the volumes of that product produced, consumed and traded.

The OECD (1987) has recently provided some interesting evidence about the influence of other-commodity support policies on world price distortions in the 1979–81 period (Table 1). These data suggest that the importance of cross-commodity policy effects as a source of international market price distortion varies markedly from one commodity to another. In the period studied, world price distortions caused by OECD region measures were mainly due to *own-commodity* policies in the case of milk, beef, sheepmeat and sugar. In contrast, world prices of rice, wool, poultry and pork were significantly influenced by *other-commodity* support, and the latter was a *more* important source of OECD-induced world price distortion in the cases of wheat, soybeans and coarse grains.

TABLE 1 *Contributions of commodity policies in OECD countries in 1979–81 to world price distortions*

	Fraction of Total Estimated World Price Distortion Attributable to: (a) Same Commodity Policies	(b) Other Commodity Policies*
Milk	1.06	–0.06
Beef	0.97	0.03
Sheepmeat	0.995	0.005
Sugar	0.94	0.06
Rice	0.8	0.2
Wool	0.7	0.3
Poultry	1.9	–0.9
Pork	2.6	–1.6
Wheat	5.3	–6.3
Coarse Grains	1.5	–2.5
Soybeans	0.1	–1.1

Note: * A negative sign in this column indicates that, in sum, the policies of other commodities have an effect on the world price of the commodity in question opposite, in direction, to the effect of its own policies.

Source: Adapted from OECD (1987), Table 2, p. 31

Other evidence about the importance of cross-commodity effects has been provided by Tyers (1985) and, more recently, by Meyers, Devadoss and Helmar (1987). The analysis of the latter paper is limited to interactions between the wheat, feed grains and soybeans sectors and, in so far as they consider trade liberalizations, to the removal only of 'policies that inhibit the transmission of world market price variability to domestic markets'. The authors compared the results of single- and multi-commodity analyses of such trade liberalizations and concluded that the latter resulted in 'directions of change similar to those of single commodity analysis even though the magnitudes of changes are different'. Their

TABLE 2 *Distortions of world prices, net trade with other countries and EEC production due to 1979–81 support for nine commodities or commodity groupings[a] in four major agricultural trading entities[b,c]*

	1979–81 Distortion of:		
	(i) World Price (%)[c]	(ii) EEC Production (%)[c]	(iii) EEC/USA/JPN/CDA net exports to the rest of the world (ROW) (000 tonnes)
Wheat	–1	+8	+1828
Coarse Grains	+1	+10	–5045
Soybeans	+1	+76	–184
Butter	–18	+17	+634[d]
Skim Milk Powder	–28	+17	+677
Beef	–4	+17	+1395[e]

Notes: [a]Wheat, Coarse Grains, Soybeans, Rapeseed, Beef, Pork, Poultry, Eggs, Milk/Dairy Products.
[b]USA, EEC, Japan, Canada.
[c]Numbers rounded to nearest whole percentage point.
[d] Includes a switch in the direction of net trade.
[e] Drop in net imports in this case.

Source: Simulations by authors with TASS, an Agriculture Canada multi-commodity multi-country static world trade model. Details available on request.

results do include, nevertheless, some examples of a reversal of the direction of change estimated by the two approaches, such as Canadian feed-grain exports declining by nine per cent after five years under multi-commodity liberalization but increasing by nine per cent under the feedgrain-only liberalization.

In his earlier paper analysing the effects of total agricultural trade liberalization by the EEC, Tyers reported impact estimates obtained with and without cross elasticities linking his five commodity markets on the supply and demand sides. When the latter were all set to zero, the estimated increases in EEC net imports and in world market prices due to EEC liberalization were substantially higher, particularly in the case of grains imports.

The authors' own work has led to a related observation which is consistent with the previous results. This is that levels of trade *volume* distortions and world market *price* distortions (from free trade values) are not necessarily closely correlated. Our simulations with a multi-commodity, multi-country world trade model[5] suggest that the combination of 1979–81 support policies for wheat, coarse grains, beef, pork, poultry, eggs, milk, soybeans and rapeseed in the US, the EEC, Japan and Canada resulted in relatively small price distortions in world *grains*, *soybeans* and *red meats* markets, but at the same time more serious distortions in the *volume* of these commodities produced in and consumed and traded by these countries. In contrast, in the *dairy products* area both price and trade volume distortions were apparently considerable. Table 2 contains the estimated world price distortions, and also estimated distortions in EEC produc-

tion and 'four-country' net trade as examples of production and trade volume distortions and generally.[6]

Such observations point to the desirability of attaching a more precise economic meaning to the term 'negative trade effects' used in the Punta del Este Ministerial Declaration. Is it distorted world market prices, or distorted trading (volume) pattern, or both, or some other sort of 'negative trade effect' which the ministers and their advisors had principally in mind in September 1986? To what extent do 'positive' cross-price effects, such as the price enhancement (through greater demand) for animal feed components caused by meat, dairy and eggs support policies, partially exonerate 'negative' own-price effects of the same policies? Are the trade effects of policies which distort production downward and imports upward, as, for example, in some developing countries, 'negative'?

It seems clear that, at least in the context of the GATT, it is the political answers to these questions which are appropriate. Whether or not it should be, the political concern is not with 'deadweight' welfare or efficiency losses arising from resource misallocation. It is principally with the effects of depressed world market prices on farm incomes and support programme costs. Implications for consumers appear to count for very little. It is predominantly in the agricultural exporting countries that the dissatisfaction with the current state of affairs lies. International discipline will probably *only* be sought on measures whose effect is to *depress* world market prices, by stimulating production or depressing consumption.

Such pragmatism facilitates some progress towards answering the above questions. The AM, as a proxy for *own-commodity* policy effects on *production*, seems to be generally acceptable also as a proxy both for own-commodity policy *trade volume* effects[4] and for own-commodity policy *world market price* effects. The key remaining difficulty with the AM would appear to be its inability to account for *cross-commodity* policy effects. In the remainder of this paper the possibility that such complications could be adequately handled in a practical, if approximate, manner by imposing pre-negotiated constraints on the relative rates of change of individual commodity AMs which are allowed to be negotiated under the GATT, is explored.

The OECD (1987) and the Uruguay Round Ministerial Declaration have already both made reference to the need for a 'balanced' reduction in offending agricultural support measures. This has been generally interpreted as implying 'balance' between commodities as well as between countries. Such a concept of *balance between commodities* also implies some sort of constraint of the degree to which rates of policy reform in different commodity areas are allowed to vary.

However this inter-commodity 'balance' can still mean quite different things to different people, as illustrated by the example which follows. Differences between countries aside, suppose that the weighted average global AM is 80 per cent for commodity A and 30 per cent for commodity B. Maintaining (or achieving) balance between commodities while reducing trade distortions might be variously considered to imply: (a) reducing the AM for A from 80 per cent to 30 per cent to be equal to the (unchanged) AM for B; (b) reducing both AMs by the same *absolute* amount, such as from 80 per cent to 50 per cent for A and from 30 per cent to zero for B; or (c) reducing both AMs by the same *relative* amount, such as from 80 per cent to 40 per cent for A and from 30 per cent to 15 per cent

TABLE 3 *Effects on world price and EEC production distortions for wheat and coarse grains in 1979–81 of removing four- country[b] support for (i) wheat alone, (ii) coarse grains alone, and (iii) other commodity support[c]*

	1979–81 Total distortion (%)	Percentage Points Contributed by: (1) Wheat Policies	(2) Coarse Grains Policies	(3) Other Policies
Wheat				
World Price	–1	–5	+4	+1
EEC Production	+8	+19	–9	–3
Coarse Grains				
World Price	+1	+1	–2	+1
EEC Production	+10	–5	+18	–3

For source and footnotes, see Table 2.

TABLE 4 *Effects on selected EEC/USA production distortions in 1979–81 of removing four-country[b] support for (i) grains only, (ii) oilseeds only, (iii) dairy only and (iv) meats/eggs only[c]*

	1979–81 Total distortion (%)	Percentage Points Contributed by: (1) Grains Policies	(2) Oilseeds Policies	(3) Dairy Policies	(4) Meats/Eggs Policies
Coarse Grains					
EEC Production	+10	+12	–3		
USA Production	–1	–1			
Oilseeds					
EEC Production (Rape)	+6		+6		
USA Production (Soya)	–1	–1			
Milk					
EEC Production	+7	–3		+9	
USA Production	+2			+2	
Slaughter Cattle					
EEC Production	+18	–3	+1	+5	+15
USA Production	–2		+1	–1	–2
Eggs					
EEC Production	+6	–13			+18
USA Production	+4	+6			

Note: Blanks in the table indicate an effect of less than ±0.5%
For source and other footnotes, see Table 2.

for B. Since we have argued that the main logical reason for imposing constraints on relative between-commodity AM reduction rates lies in cross-commodity policy effects, what does an objective analytical approach offer which may be useful in choosing between these (and possibly other) alternative interpretations of 'balance between commodities' in negotiated AM reductions?

Tables 3 and 4 present selected results from simulations involving extreme imbalance (between commodities) in multilateral reductions (by the US, the EEC, Japan and Canada) of 1979–81 trade-distorting support levels. In effect, AMs for selected commodities or commodity groupings were reduced to zero in all four countries, while AMs in other commodity areas were left unchanged. The reference point is a 'free trade' or 'no distortion' scenario where AMs in all commodity areas (wheat, coarse grains, soybeans, rapeseed, pork, beef, poultry, eggs and milk) are reduced to zero. Clearly, this analysis has had to prejudge the choice of what types of policies would be included in the calculation of an AM. The 1979–81 trade-distorting policies represented individually in the model (and removed for the 'free trade' scenario) are listed by commodity and by country in Cahill (1988).

The numbers in Table 3 are illustrative of a situation for two commodities which are substitutes (resource competitive) in production – wheat and coarse grains. Reducing the AM to zero for either one of these alone results in an over-correction of the own-commodity distortion (which might be seen politically as a good thing), in terms of both EEC production levels and world prices, but an aggravation of the corresponding distortion levels for the other commodity – hardly a surprising result. These numbers also illustrate that what we have called the 'political' attitude – that 'downward' production (upward world price) distortions don't matter – may be largely illusory in that such distortions are usually accompanied by and indicative of 'upward' production distortions in some other, related, commodity area(s). It will be noted that the elimination of trade-distortion support for *both* wheat and coarse grains has generally only 'positive' results, at least for grains trade, with a slight downward distortion in the world wheat price being transformed into a slight upward distortion, and considerable upward distortions in EEC production of both wheat and coarse grains being turned slightly downward.

This example leads to a tentative conclusion that AMs for commodities which are substitutes in production should be reduced at the same or very similar relative rates (corresponding to hypothetical example (c) above).

Table 4 shows the simulated implications in the coarse grains, dairy and beef areas of reducing AM levels to zero in each of three commodity groupings alone: (a) coarse grains and wheat; (b) all dairy products; and (c) all meat products plus eggs (again, in all cases, for the same four countries and commodity range, and for 1979–81 AM levels). It can be seen that dropping grains support alone, in all countries, would have the effect of aggravating existing milk and beef production distortions in the EEC. On the other hand, dropping dairy support alone would contribute, at the same time, to a reduction of existing distortions of beef prices, without apparently having any major disadvantageous impacts in other commodity areas. Dropping meat and eggs support alone would not appear to have a significant effect, either advantageous or disadvantageous, on distortions in the other commodity areas.

On the basis of this very restricted and exploratory analysis we conclude that it would be desirable that GATT member countries, having agreed on a target rate of reduction in the AM for agriculture in general, seek to apply the same relative rate of reduction across all individual grains and oilseeds areas, and not to allow the rates of relative reductions for such crops to greatly exceed the percentage reductions in the livestock areas. In fact, in its opening negotiating proposal in the GATT, Canada has already suggested the rule that the rate of individual commodity AM reductions be kept within 10 per cent of the average rate agreed for all commodities. The above results also suggest, however, that it might be appropriate, or at least harmless, to allow percentage AM cuts in the dairy, meats and eggs areas to exceed rates of reduction for grains and oilseeds. This exception might also appeal to those keen to see absolute AM rates brought more into balance across commodities, given that dairy AMs are, like PSEs, generally higher in percentage terms than those in other commodity areas.

NOTES

[1]More strictly, farm commodity income support due to support measures for *that* commodity in *that* country.

[2]See de Gorter and McClatchy (1984), de Gorter, McClatchy and Lohoar (1985) and McClatchy (1987).

[3]It is recognized that the concept of the effective rate of protection goes some way towards incorporating the per unit *income* effects of other-commodity policies, together with those of own-commodity policies, under the assumption of fixed input/output ratios. There has also been a recent move by the OECD to calculate a modified PSE for livestock products net of the effect of feedgrains support. Even these indicators, however, have nothing to say about how the *volume of production* (or trade), and the level of aggregate commodity income, change as a result of other-commodity support policies.

[4]The principal argument here being that reductions in market price support levels in order to lower production distortions would also automatically result in lower consumption distortions (assuming that demand prices would not be maintained at previous levels by offsetting consumption tax increases). A counter-argument might be that such focus in the negotiations on supply-side distortions alone does not facilitate the possibility of countries obtaining credit for switching from market price support to (less-distorting) deficiency payments.

[5]Documentation for this model, called 'TASS', is available from the authors (see Cahill, 1988).

[6]We include distortion effects specific to the EC and USA in Tables 2, 3, and 4 to illustrate the contributions made by these two trading entities to the more general problem . This would seem justified, given evidence from other studies (in particular OECD and Anderson and Tyers) that both of these trading blocks are significant sources of the distortions present in world markets.

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DISCUSSION OPENING – ALEXANDER SARRIS

The paper by McClatchy and Cahill deals with an interesting question, namely whether the cross-commodity effects should influence the approach to the trade policy negotiations in agriculture in the context of GATT. The basic point made is that since not enough is known about the magnitudes of the cross-commodity effects, reductions in various distortions should be made roughly by the same proportion in all commodities. Furthermore, this proportional reduction should be close to the overall agreed reduction in the general support to agriculture. These comments will raise several critical points concerning this proposal and will suggest what appears to be a more pragmatic alternative. It shall be assumed in the following, just as McClatchy and Cahill do, that there has been agreement among the negotiating parties on a formula for measurement of the PSE-type of quantitative indicator of the broad levels of trade distorting agricultural support, called AM by the authors. Assume, also, that the commodity specific AMs have been computed in each negotiating country. Agreement to reduce all these AMs by the same proportion suffers from the following drawbacks. First, albeit aggregate distortions would doubtlessly be reduced, the types of distortions in terms of deviations of traded volumes and world prices from their free trade values would not change. Only the magnitudes would alter. However, the magnitudes would not change by the same proportions. This is because there is a wide variety among countries in initial AMs, volumes produced and consumed, transmission propensities, and price elasticities of supply and demand. So, for instance, a country with a high initial AM in one commodity but a small quantity produced and traded would appear to be making an equivalent concession with a country with the same initial AM but a large volume produced and traded, while in fact there would be a significant asymmetry in the resulting impact on world trade.

Second, the proposal made would withdraw from individual country policy makers the cross-commodity flexibility they might need in running domestic agricultural policy. Agricultural commodity markets are highly unstable and the yearly stocks are not the same across commodities or countries. For instance, a

policy of public stockpiling by a country in a year of sudden world glut with a stabilizing purpose, might be disallowed by the suggested uniformity of AM reduction, as it might push the support for that commodity and year to unacceptably high levels. However, in that same year the situation in another commodity might be much tighter, necessitating a lower level of AM. Some cross-commodity trade-off in such an instance within overall limits might be desirable.

Finally, monitoring many individual commodities' AMs in every year will not be an easy task, even if specialized institutions are set-up within each trading country. Furthermore, the very fact that measurement and notification take time, especially in agriculture where fluctuations and shocks are many and varied, ensures that discussion and argument among trade partners about the possible 'missing of agreed targets' would occur well after the effects of any given shock or policy have taken their toll.

In the face of the above difficulties it might well be questioned whether there exists a pragmatic way via which negotiations in agriculture in the context of GATT can proceed. Tangermann, Josling and Pearson, in a paper quoted by the authors, have gone a long way toward outlining the difficulties in actually using PSE-type indicators as instruments of negotiation, and have suggested the pragmatic solution mentioned by McClatchy and Cahill. Even this proposal, however, suffers from the fact that it cannot trigger any action *ex ante,* namely before the actual policies have had their effect. This is because one cannot measure commodity specific or aggregate PSEs or anything like them until after they have been applied and trade has taken place. In this sense PSEs are radically different than tariffs or quotas that can be negotiated and applied *ex ante,* namely before trade takes place.

A solution, however, might be possible if one reasons as follows. By their very definition producer subsidy equivalents and consumer subsidy equivalents measure monetary transfers or taxes explicit or implicit made to producers or consumers. If one defines the PSE for one commodity as the simple difference between the effective producer price (namely one including the effects of all policies) and the world price, and the CSE as the simple difference between the world price and the effective consumer price, then by simple arithmetic it follows that the product of net quantity exported by a country times the world price at its border, is equal to the sum of effective producer receipts for the commodity minus effective consumer expenditures minus total net government expenditure for the aggregate commodity specific policy. This public expenditure in turn is equal to the product of the commodity specific PSE, times the total quantity produced, plus the commodity specific CSE, times the total quantity consumed (including stock changes).

Analytically, if by QS and QD we denote the quantities supplied and demanded respectively by a given country in a given year and some commodity, and by pw, ps and pd we denote the border price, the effective producer price and the effective consumer price respectively for the same commodity, country and year; then we have:

$$PSE = ps - pw \tag{1}$$

$$CSE = pw - pd \tag{2}$$

$$(QS-QD)\ pw = QS.\ ps - QD.pd - (QS.PSE + QD.CSE) \tag{3}$$

For a country that maintains effective producer prices equal to effective consumer prices and is a net exporter, effective public expenditure on the commodity would be positive, since the PSE defined as above would be equal and opposite to the CSE. If the absolute magnitudes in (1) and (2) are divided by pw, for instance, then we would have more conventionally defined measures of PSE and CSE in terms of percentages rather than simple differences. Equation (3) could then be similarly transformed.

The important point to be made, however, is that agricultural trade distortions are directly linked to public expenditures on commodities. If, for instance, all public expenditures or revenues for a commodity programme were forced to zero by all trading countries, then it is clear that the commodity market would operate in a free trade mode. Thus, arguing about distortions or PSEs is equivalent to arguing about public expenditures or revenues for the commodity concerned. Adding across commodities one arrives at the conclusion that the aggregate contribution a country makes to world agricultural distortion is directly proportional to its total level of public expenditure on all agricultural commodities. Hence if one is interested in reducing world agricultural distortions, what one should argue about is reductions in the budgeted levels of agricultural commodity support by the various trading countries.

Arguing in these terms evades the major problems with the commodity specific, PSE based approach that has been advocated before, or the approach suggested by McClatchy and Cahill, and has several advantages. First it concentrates attention on visible budgeted numbers which are easy to monitor *ex ante*. For instance it would be easy to observe whether a particular country or the EC have budgeted more than has been agreed internationally for agricultural programmes. Secondly, it would leave countries free, within the agreed budgetary limit, to allocate the funds as they see fit across commodities and programmes. This would allow the desired flexibility. Monitoring would be quite easy as all one would have to use is the existing fiscal institutions. Finally, the developing countries hitherto mainly sideliners in the debate would be brought into the picture in a very simple fashion. Since many of them in effect tax agriculture and subsidize food consumption, they are likely to incur net public expenditure if they are net importers in a commodity, or revenue if they are net exporters. If it is agreed internationally that net public revenue from the exercise of agricultural policy is counted as a credit to be traded off with some debit, for instance in terms of protection for non-agriculture, then one could argue that some industrial protection in LDCs can be justified given their net agricultural taxation. They might then be induced to negotiate about an overall level of protection and be left free to allocate that level between industry and agriculture. Elaborating, however, on this last point would carry the discussion far from the points raised by the McClatchy-Cahill paper.