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EFFICIENCY OF ALTERNATIVE POLICIES FOR THE  
EC's COMMON AGRICULTURAL POLICY

by

Harry de Gorter\*  
and  
Karl D. Meilke\*\*

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Department of Agricultural Economics and Business  
University of Guelph  
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- \* Harry de Gorter is Assistant Professor of Agricultural and Food Policy, Department of Agricultural Economics, Cornell University.
- \*\* Karl D. Meilke is Professor of Agricultural Economics, Department of Agricultural Economics and Business, University of Guelph.

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## EFFICIENCY OF ALTERNATIVE POLICIES FOR THE EC's COMMON AGRICULTURAL POLICY

### 1. INTRODUCTION

The Common Agricultural Policy (CAP) of the European Economic Community (EC) is facing a crisis of substantial proportions from budgetary and political pressures. Farm spending accounts for more than two-thirds of the EC's budget and the CAP is generally viewed as a major contribution to distorted world markets. The budgetary dilemma is well illustrated in the cereals sector where gross expenditures have more than doubled since 1985 from 2.3 billion ecu to over 5 billion ecu in 1987 (European Commission, 1988). This has been exacerbated by the decline in variable import levy revenues received on imports of third country grains. Levy revenues have fallen sharply as the EC-12 has evolved from a net importer of 28.6 mmt of cereals in 1976 to an annual average net exporter of 15 mmt since 1984. Internal political pressures for reform of the CAP emanate from taxpayer protests of burgeoning stocks and escalating budgetary costs, consumer resistance to higher prices and conservationists' concerns for the environment (Tanner and Swinbank).<sup>1</sup> International pressure is a result of a deterioration in world market conditions, an awareness of the adverse impact of the CAP on some developing countries and the multi-lateral trade negotiations which will require adjustments in EC policy before any progress on trade liberalization is to be achieved.

The EC's policy regime of variable import levies, high domestic price supports and export restitutions was embraced by the European Community at its inception when it was a substantial net importer of grains. Many past economic studies reflect this orientation by evaluating the terms of trade improvements and revenue gains from actual or potential import price policies (e.g., Sampson and Snape; Carter and Schmitz). The shift of the European Community from a net importer to a net exporter of cereals, coupled with the sharp decline in world grain prices in the 1980's, has resulted in the undertaking of several policy initiatives to control farm expenditures. The EC emergency summit in Brussels in February

of 1988 reached an agreement to establish a complex system of 'stabilizers' that set production 'thresholds' called 'maximum guaranteed quantities' - MGQs. Penalties for exceeding MGQs in the form of special producer taxes or 'co-responsibility levies' and reductions in support prices were implemented. A complementary paid acreage set-aside program is to operate as a partial production control scheme that allows farmers to idle 20 percent or more of their arable land.

The compromise forged at the Brussels summit is widely regarded as essential to the European Community in overhauling its finances and in easing its transition to a barrier free market by 1992. Prior to this agreement, the European Community was technically insolvent and hence an accord on agricultural subsidies was necessary to forestall complete bankruptcy and the collapse of the CAP. Something more than mere tinkering with past policy levers was necessary to cope with the budget problem. Three policy instruments for cereals are the primary focus of EC reform: (a) decrease in intervention prices, (b) producer co-responsibility levies, and (c) a modified form of production controls via acreage set-asides. Although not specifically recognized, a two-price plan could be easily implemented via MGQs by the European Community as a fourth policy option.<sup>2</sup> Ultimately, the choice of policy option(s) will be conditioned by the ability of the policies to maintain farm income, while simultaneously lowering government expenditures.

The purpose of this paper is to evaluate and compare the economic costs and benefits of four EC policy alternatives: a production quota; a two-price plan with domestic prices higher than that for export sales; a price reduction policy; and a producer co-responsibility levy. The issue is analyzed in terms of which individual policy is most efficient in redistributing economic welfare from consumers/taxpayers to producers (Gardner). Consequently, the task is not to find an abstract welfare maximizing policy for the EC cereal sector but to analyze options that meet a specific producer welfare criterion while minimizing consumer/taxpayer costs. The results show that the emphasis on co-responsibility levies and price reductions by the European Community is misplaced. Production controls or a

two-price plan are more efficient methods of achieving producer income goals at minimum cost.

This paper is organized as follows: the next section provides a brief overview of the evolution of EC cereal policy. Section 3 expands Gardner's framework of analysis in comparing the efficiency of redistribution among the four policy options under consideration. Section 4 adopts this analytical framework to specific features of the EC wheat market while section 5 presents the empirical results and describes the consumer/taxpayer costs and world price effects of each policy option. The final section gives some concluding remarks on the implications of the pending EC policy changes.

## 2. BACKGROUND

The principles of the CAP are not easily reversed as it constitutes an important symbol of European integration and unity. Economists have long analyzed the effects of the CAP by calculating its detrimental impacts on consumer/taxpayer welfare and on world prices. This analysis has had little impact on policy making because the objectives of the Treaty of Rome give priority to farm incomes. Little analysis has been done on the efficiency of alternative instruments to achieve producer income goals under changing economic circumstances.

International realities, financial constraints and the switch to a net exporter of cereals in the 1980's reflect the radical change in the economic environment within which the CAP operates. Resolution of the cereal regime's problems is fundamental to the future of the CAP. The recent appreciation of key European currencies against the U.S. dollar, which increases the cost of export restitutions, coupled with the GATT initiatives for agriculture in the Uruguay Round of trade negotiations also increase the urgency for the European Community to find policy alternatives that both decrease budget costs and increase world market prices. Since cereals was the first regime of the CAP and a trend setter for other commodity regimes, a reform of the cereal regime could signify a reform of the CAP as a whole

(Harvey). Hence, an evaluation in the efficiency of alternative grain policies takes on special significance for both EC policy makers and competing exporters.

The stabilizer package included an overall limit on CAP expenditures. To achieve this, the European Community has proposed price decreases after production exceeds the level of a pre-specified MGQ. Indeed, 'price prudence' has long been exercised by the European Community in the past since price supports have often declined after adjusting for inflation. Nevertheless, these and the more recent nominal price reductions have not been sufficient to stem the increase in budget costs. Further extensive price reductions to meet budget limits appear not to be politically acceptable. Hence, an adjunct policy of producer co-responsibility levies has been added. A co-responsibility levy is a tax levied on producers which in the presence of a fixed price support, results in the tax burden being borne entirely by farmers. Hence, the producer supply price falls by the amount of the tax while consumer prices remain fixed. This policy can be viewed as a producer price support *cum* a domestic consumption tax with export restitutions used to dispose of surplus output. Co-responsibility levies are also currently in place for the milk and sugar sectors.

The MGQs provide a mechanism to trigger a reduction in the support price and an increase in the co-responsibility levy. Indeed, production 'guarantee thresholds' have previously been used to restrict intervention buying and to initiate a reduction in the price support. The effectiveness of 'thresholds' has been limited in the past and partially offset by the introduction of 'green rates of exchange' and 'monetary compensatory amounts' by member governments.

The recent agreement specifies that production in excess of the MGQ is specifically tied to a reduction in support prices or an increase in co-responsibility levies. Although not explicitly recognized by the European Community, MGQs provide a mechanism to implement another policy option, namely a two-price plan. Market prices could be differentiated between the domestic and export markets, as currently is done in the EC sugar regime. Producers would receive the higher support price for sales to the domestic market, with sales

allocated by MGQs, and a lower world price for production above MGQs, sold in the export market.

Finally, the stabilizer package includes a complementary acreage set-aside program. This represents a modified form of production control similar to that in the United States. Price supports with production quotas and export restitutions are currently in place for the EC dairy sector but similar direct quantity limits have not yet been introduced for cereals.

### 3. REDISTRIBUTION EFFICIENCY OF POLICY OPTIONS

Gardner's framework of efficient redistribution, measured in terms of the deadweight loss per dollar of economic surplus transferred from consumers/taxpayers to producers, is extended to evaluate four EC policy alternatives. Our analysis compares four policy instruments with price supports and export subsidies maintained:

- (a) a production quota restricting production while maintaining the same price support for domestic and export sales;
- (b) a two-price plan which maintains price supports for the portion of total production sold domestically and a lower price for grain exported. Note that the rents obtained from domestic consumers could be allocated to producers *via* MGQs (or production quotas as in current EC sugar policy).
- (c) a reduction in the intervention (support) price;
- (d) a producer co-responsibility levy or a tax levied on producers.

In each case, production and exports decline as does the per unit export restitution payment due to the terms of trade effect. The implementation of a quota system will require the control of production on individual farms. Practical and legal difficulties would have to be overcome in preventing farmers from producing more than their allocated quota and selling it at the prevailing world market price or for their own feed use. Implementation procedures for cereal production quotas in previous proposals and for the set-aside scheme outlined in the recent stabilizer package have not been described. However, it is presumed that



an incentive system along the lines of the United States is envisioned where penalties for planting beyond specific acreage limitations result in no production receiving the support price. Such a system for the European Community would require an administrative capacity that may not currently exist. Alternatively, the European Community could implement super-levies to control overproduction as it currently does in the EC dairy and sugar quota regimes. The administration of support prices with export restitutions as currently exists would have to be maintained with quotas. The analysis in this paper presumes that cereal quotas are administratively feasible as it is currently for milk and sugar in the European Community and for cereals in the United States.

A two-price plan can be implemented using the MGQs which are proposed in the recent stabilizer package. Quotas *per se* would not be required in that MGQs can be used as 'payment eligibility quotas' for the higher price with no explicit limits on aggregate output. Marginal output beyond the MGQ would receive a lower price which would be maintained above the world price with the current export restitution scheme. However, it would be difficult to enforce the higher price for domestic feed consumption under a two-price plan because much of feed consumption occurs outside commercial channels on the farm where it is grown or after farm-to-farm transactions. Hence, prices received for feed would fall to the lower of the two prices under a two-price plan. Discussion of this distinct implementation problem, applicable also to the co-responsibility levy policy option, is delayed until section 4.

The following analytical discussion orders these four prototype policies in terms of their efficiency in achieving a prescribed level of producer welfare. A production quota has the advantage of directly improving an exporter's terms of trade while a two-price plan permits price discrimination across markets. It is shown that a two-price plan is superior to a production quota at lower prescribed producer income goals. However, at higher producer welfare levels, a production quota becomes more efficient than a two-price plan. A price reduction policy has the advantage of lowering domestic consumer prices which also reduces

the level of excess supplies while a co-responsibility levy reduces output and generates budget revenue. A price reduction policy is shown to be more efficacious than a co-responsibility levy but both are shown to be inferior to either a production quota or a two-price plan.<sup>3</sup>

Figure 1(a) compares the efficiency of a production quota to a two-price plan in achieving a fixed producer welfare goal. The domestic demand and supply schedules are denoted by  $D$  and  $S$ , respectively while an infinitely elastic excess demand function at world price  $w_0$  is assumed. The current domestic support price is  $a$  resulting in domestic consumption of  $OA$ , exports of  $AC$  and export restitutions of area  $mefn$ . Consider a two-price plan with no export subsidies which requires exports to be priced at the fixed world price  $w_0$ . This results in a producer surplus of area  $amnlc$  in Figure 1(a). A production quota of  $OB$  would be required to generate an equivalent producer surplus of area  $ajqc$ . Because consumer welfare is equal between the two policy options and taxpayer costs of  $mjkn$  are associated only with the production quota, a two-price plan is more efficient than a quota in achieving this prescribed level of producer welfare. Although the quantity of output and exports are lower with a quota compared to a two-price plan, exports with a quota are sold at the higher domestic support price resulting in taxpayer costs.

If higher levels of producer surplus are desired such that export subsidies are also required under a two-price plan, then a production quota can become a more efficient policy. Consider a two-price plan in Figure 1(a) where exports are sold at price  $b$ , generating a producer surplus of area  $amm'e'c$ . A production quota of  $OB'$  is required to achieve an equivalent level of producer surplus of the area  $aj'q'c$ . The most efficient policy is determined by the relative magnitude of the export subsidy costs of area  $m'e'f'n$  under the two-price plan and area  $m'j'k'n$  under the production quota. Because the area  $m'dk'n$  is common to both policy options, the most efficient policy is determined by comparing the area  $m'j'dm'$  to area  $de'f'k'$ . Since the area  $m'j'dm'$  is equal to area  $de'q'$  (in order for the producer surplus under each policy to be equal), the export subsidy costs of a two-price plan exceeds that of

a quota only when the area  $e'f'l$  is greater than the area  $k'lq'$ . This is more likely to occur at higher levels of  $b$ . Hence, a two-price plan becomes relatively more inefficient as the price of exports  $b$  is increased to achieve higher levels of producer welfare.

The above analysis shows that the cost advantage of a two-price plan due to lower export prices can be offset by the increased cost due to greater export quantities. This is more likely to occur at higher levels of desired producer welfare. Allowing for terms of trade effects makes production quotas more attractive relative to a two-price plan. Although the terms of trade improve under each policy option, it improves more with a quota because production and exports are directly reduced thereby reducing export subsidies and increasing export prices.<sup>4</sup> The two-price policy maintains its distinct feature of price discrimination between the more inelastic domestic demand and the more elastic export demand curve.

Figure 1(b) compares the efficiency of a price reduction policy (reducing prices from  $a$  to  $b$ ) to that of a production quota of  $OB$  with domestic prices fixed at  $a$ . A small country exporter is assumed with world prices fixed at  $w_0$ . The production quota imposes an extra cost on consumers of the area  $aegb$  and a taxpayer cost of the area  $efhj$  while a price reduction costs taxpayers the area  $gdlk$ . Because the area  $bdc$  must equal the area  $afhc$  for producer welfare to be equal between the two options, it is necessarily the case that the area  $afib$  equals the area  $idh$ . It follows that part of the taxpayer costs of area  $idh$  associated with the price reduction policy is necessarily equal to the area  $aegb$  (incremental consumer costs of a production quota) plus part of the taxpayer costs with quotas represented by the area  $efig$ , with area  $gihk$  representing costs common to both policy options. Hence, the residual costs of a production quota (area  $egkj$ ) can be compared to the residual costs of a price reduction policy (area  $dlh$ ) to determine which policy is more efficient. A production quota is superior to a price reduction only if the area  $dlh$  is greater than the area  $egkj$  (for identical levels of producer welfare  $afhc$  with quotas and  $bdc$  with a price reduction). For a fixed domestic and world price, a production quota is more likely to be a superior instrument with a more inelastic domestic demand curve (that reduces the size of the area  $egkj$

for a given price increase), a more elastic supply curve (that increases the size of the area  $dlh$ ) and with a more inelastic export demand curve. The latter parameter allows an exporter to directly improve the terms of trade with a production quota and hence reduce the amount of export subsidies more relative to that with a price reduction policy. Hence, a production quota for the EC is expected to be a superior instrument to a price reduction policy given the inelastic demand for total food wheat in the EC, an elastic supply curve and, with the EC being a large wheat exporter, a more inelastic export demand curve compared to the small country assumption of Figure 1(b).

Figure 2 compares the efficiency of a two-price plan to a price reduction policy. A two-price plan has a domestic price  $a$ , no export subsidies and a level of producer welfare of area  $aejhc$ . A price reduction policy decreases support prices to  $b$  in order to generate an identical level of producer welfare of the area  $bdc$ . Although consumers benefit with a price reduction by the area  $aegb$ , taxpayer costs of area  $gdlk$  are generated. Because area  $aefb = fdhj$  with identical producer welfare levels between the two options, it follows that overproduction costs with a price reduction policy of the area  $dlh$  can exceed or be less than consumer costs with a two price plan of the area  $egf$ . However, consumer costs with a two-price plan are smaller with a more inelastic demand curve and overproduction costs with a price reduction are larger with a more elastic supply curve. In the EC wheat market, the demand curve is inelastic and the supply curve is elastic. Hence, a two-price plan is expected to be a more efficient policy than a price reduction in achieving a prescribed level of producer welfare. With terms of trade effects, the advantages of a two-price plan is reinforced since exports under a two-price plan are lower than that under a price reduction scenario, especially when the domestic demand curve is inelastic and the supply curve is elastic.

Figure 3 compares the efficiency of a price reduction policy to a producer co-responsibility levy. In order to achieve an identical level of producer surplus to that of a price reduction policy that reduces prices from  $e$  to  $f$ , a co-responsibility levy or a producer tax of  $t$  is required (i.e., the distance  $bd$ ) as shown in panel (a) of Figure 3. Consumer surplus is

unchanged with the co-responsibility levy but increases by the area  $eacf$  under a price reduction scenario. Export subsidies are eliminated under the price reduction option in Figure 3 (for ease of exposition) but are equal to the area  $abjk$  in panel (b) for the co-responsibility levy policy. However, the co-responsibility levy option generates tax revenue of the amount corresponding to the area  $ebdf$  in panel (a). Note that the distances  $ab$  and  $cd$  are equivalent in each panel in Figure 3. To determine which instrument is superior depends on whether the net budget revenue of a co-responsibility levy (area  $ebdf$  minus  $abjk$  in panel (b)) is greater or less than the gain in consumer surplus under the price reduction policy (area  $eacf$  in panel (a)). Given that the area  $abd'c$  in panel (b) is equivalent to the area  $abd'$  in panel (a) and since the distance  $ab$  is always greater than the distance  $cd$  in panel (b), then the co-responsibility levy involves additional deadweight losses in consumption of the area  $acd$  and in budget costs of the area  $cd'jk$ . The intuition that explains why a co-responsibility levy is an inferior instrument in redistributing welfare is that it involves a consumption tax (producer supply prices are identical for both a co-responsibility levy and price reduction policy) that necessarily results in a deadweight loss in consumption (area  $acd$ ) while simultaneously reducing the terms of trade resulting in higher export subsidy costs of the area  $cd'jk$ .<sup>5</sup>

In summary, a general ordering of the efficiency for the four alternative policy options in achieving producer income goals can be derived. The efficiency of a two-price plan compared to a production quota depends critically on the level of desired producer surplus and the terms of trade effects. However, a price reduction policy was shown to be unequivocally superior to a co-responsibility levy. Both a production quota and a two-price plan is determined to be superior to a price reduction policy with a more inelastic domestic demand curve, a more elastic supply curve and with terms of trade effects. Hence, with these several qualifications, a production quota and a two-price plan are more efficient than a price reduction while a co-responsibility levy is the least desirable option. It should be noted that none of these policy options represent a unique EC welfare maximum. The best

policy option in overall welfare terms would be to reduce domestic prices below the world market through an optimum export tax and to compensate farmers through "decoupled" aids. This paper evaluates, however, the efficiency of traditional policy instruments (producer and consumer support prices held above world prices through export restitutions) and of the instruments actually agreed to in the recent stabilizer package. Decoupled subsidies to farmers with optimal export (for "soft" wheat) and import (for high quality wheat) taxes that are calculated by explicitly incorporating the interdependencies of demand for the two types of wheat are not analyzed in the paper.

### 3. AN ANALYTICAL FRAMEWORK FOR THE EC WHEAT SECTOR

This section describes the framework used to assess empirically the options described above for the EC wheat sector. The principal policy instrument in the EC is a domestic producer price support (intervention price) which is maintained by (a) a variable import levy which raises the lower world price to a higher import threshold price; (b) obligatory purchases of grain by the Community at the intervention price; and (c) variable export restitution (subsidy) payments to dispose of any grain surplus to domestic consumption and inventory (both public and private) demand. EC intervention prices are normally higher than world prices and well below the threshold price. Nonetheless the EC imports small quantities of high quality wheat from North America for domestic food consumption and exports "soft" wheat to third country markets. Consequently, wheat imports are modeled to be imperfectly substitutable in consumption with domestic supplies (de Gorter and Meilke).

Within the EC, significant quantities of wheat are used for animal feed (38 percent of total use in 1986/87) which is an important feature with respect to the implementation of the policy alternatives. Specifically, the *status quo* policy of domestic price supports with export restitution payments results in a domestic supply price equal to the weighted average of domestic food and feed prices (whose prices differ because of quality differentials). However, for ease of exposition assume that all three prices equal  $P_0$  in Figure 4. Two of the policy options considered, namely a price reduction and production quota, maintain the

offer to purchase price support scheme and so the domestic food, feed and supply prices would remain at  $P_0$ . However, for a two-price plan and a co-responsibility levy, prices received by producers for output on the margin is less than the *status quo* price support  $P_0$  and domestic feed prices would likely fall below  $P_0$  to the new marginal supply price. This is because much of the wheat feeding occurs on the farm where it is grown and its opportunity cost is the marginal supply price. In addition, it would be very difficult for the EC to enforce higher prices on feed sales outside of commercial channels (e.g., farm-to-farm sales). The co-responsibility levy is collected only at the time of first processing, intervention buying or export. If the substitution between on-farm feed milling and commercial feed milling becomes very large as the marginal producer supply price falls significantly below the consumer price  $P_0$ , then almost all feed consumption will occur at the lower producer supply price under both a two-price plan and a co-responsibility levy scheme.

The importance of this phenomenon in the EC wheat sector is shown in Figure 4 for a two-price plan. The feed demand function is denoted by  $F(P)$  and the domestic supply function is given by  $S(P)$  in panel (a). The food demand function from domestic supplies is given by  $D(P, P_0^t)$ , where  $P$  is the domestic price and  $P^t$  is the price of imported wheat. For initial values of the import (threshold) price  $P_0^t$  and domestic price  $P_0$ , an excess supply of the quantity  $OC$  is generated. Equilibrium world price  $w_0$  is determined where the excess supply  $OC$  equals the excess demand curve  $E(w)$  with export restitution costs of  $efgh$  resulting. If the domestic feed and food prices are maintained at the *status quo* level of  $P_0$  under a two-price plan with no export subsidies, then the excess supply function is  $S(P) - OA - OB$  and a world price of  $w_1$  results. However, there may not be a mechanism to prevent farmers from selling their feed locally at prices below  $P_0$  if the supply price is at the world price  $w_1$  for their marginal production beyond domestic food requirements  $OA$ . If all domestic food sales occur at the lower price under a two-price plan, then the excess supply function becomes  $S(P) - F(P) - OA$  in Figure 4. The world price increases to  $w_2$  with domestic feed consumption expanding from  $OB$  to  $OB'$ . As a consequence, producers lose the

revenue of the area *abdc* in panel (a) of Figure 4. Therefore, a two-price plan applied to only a portion of total grain consumption becomes a less efficient instrument in achieving a given level of producer welfare compared to a production quota. For the same reasons, a co-responsibility levy option becomes less attractive because revenue may not be collected on sales of feed wheat outside commercial channels. This loss in revenue will be equal to the difference between the original price support  $P_0$  and the new lower producer price support (which is simply the original intervention price minus the co-responsibility levy). Given that feed consumption represents a significant proportion of total EC domestic wheat disappearance, it is an important characteristic in the implementation of the policy alternatives under consideration and hence is incorporated in the empirical analysis to follow.<sup>6</sup>

The conceptual analysis of a production quota and a co-responsibility levy specifically for the EC wheat market is very similar to that described in the previous section describing the theory. However, a policy price reduction is slightly complicated given the uniqueness of the EC wheat market because of the existence of both a threshold (import) and intervention price. A reduction in the intervention price results in a shift to the left in the import demand function (not shown in Figure 4). This welfare impact on consumer surplus for imported wheat (unique to the price reduction scenario) is incorporated in the empirical analysis to follow where in all cases it is assumed that the threshold price is held constant.

#### 4. EMPIRICAL RESULTS

The econometric model of the EC-10 wheat sector used to evaluate the policy alternatives is explained in detail in de Gorter and Meilke and in Meilke and de Gorter. A key feature of the model is that the demand for food wheat is estimated with a two stage budgeting process employing the AIDS demand system (Deaton and Muelbauer). Table 1 presents the estimated uncompensated price and expenditure elasticities. The demand for both imported and domestic wheat is elastic as shown by the direct price elasticities and the two types of wheat are gross substitutes. The total expenditure on food wheat in the EC, determined from the first stage of the demand system, was constrained so as to imply a direct



price elasticity of demand for food wheat of  $-0.10$ .<sup>7</sup> The long-run elasticity of wheat supply was found to be approximately 1.4 and the direct price elasticity of demand for feed wheat  $-2.5$ . For the policy evaluations the model is solved for crop years 1985/86 and 1986/87 using Tyers and Anderson's estimate of  $-4.5$  for the elasticity of the excess demand curve faced by the EC.

In order to abstract from short run adjustments following the introduction of the policy alternatives, the lagged prices in the EC wheat supply function were replaced by their current values and the intercept of the supply function was calibrated so that given the actual policy prices, it generates the actual quantity supplied. In addition, public and private stocks of grain were fixed at their actual values and the co-responsibility levy imposed in 1986/87 was not included in the base simulation. As a result of these changes, even though the model is only simulated for two years, the results should be interpreted as long-run results.<sup>8</sup>

Table 2 compares the efficiency of redistribution among the four policy alternatives for two alternative scenarios: a 5.5% and 1.7% reduction in producer surplus compared to the *status quo*. Because producer welfare is identical across options, the final column indicates the net social benefits of each policy. Two results are reported for the two-price plan and the co-responsibility levy: row (a) indicates the outcome if it were possible to verify feed sales such that food and feed prices remain equal while row (b) shows the outcome if the feed price equals the lower marginal supply price. At lower levels of producer surplus in Scenario I, the two-price plan is more efficacious than a production quota but only in the case where food and feed prices are equal. In Scenario II, however, the production quota is unequivocally more efficient than a two-price plan, confirming the earlier conclusions that quotas are relatively more effective at higher producer welfare targets.

As shown in the previous section, the efficiency of the two-price plan and the co-responsibility levy declines if it is assumed that the feed price equals the lower marginal supply price. Presumably, some feed sales would occur through commercial channels such that

the average feed prices would be higher than that assumed in row (b). Hence, the net welfare changes for a two-price plan and co-responsibility levy would fall between the results reported in rows (a) and (b) in Table 2.

As expected, the price reduction and co-responsibility schemes are always inferior to either the production quota or two-price plan while the co-responsibility levy is the least desirable policy of all options under consideration.<sup>9</sup> Note however, that a price reduction policy results in much smaller gains in consumer/taxpayer welfare than a production quota (for example 636 mil. ecu *versus* 1286 mil ecu in Scenario I). The principal reason for the price reduction and co-responsibility levy to be such inferior policies is the small decline in net exports as shown in Table 3. EC consumers/taxpayers prefer a two-price plan to be implemented while U.S. producers would prefer a production quota because the increase in world prices is highest with quotas. However, U.S. interests would be also well served if the EC implements a two-price plan because world prices increase by more than either the co-responsibility levy or price reduction schemes.

## 5. CONCLUDING REMARKS

The reform of the cereals regime is a critical test for the EC and will depend largely on political feasibility. This paper evaluates several alternative policies currently under consideration to 'solve' the chronic cereal surplus of the Community by assessing the effectiveness of these policies in achieving prescribed producer income goals.<sup>10</sup> Conceptually, a two-price plan and a production quota are superior policy instruments for exporters compared to either the price reduction or the co-responsibility levy options. This result is confirmed empirically for the EC wheat sector. However, the quantity of wheat fed to livestock coupled with the problems of maintaining equality of food and feed prices under a two-price plan makes production quotas a very attractive alternative, both for the EC and competing exporters. A producer co-responsibility levy is found to be the least attractive policy measure while a price reduction policy is only marginally better.

The analysis has important implications for how the EC should proceed following the recent stabilizer agreement. The ongoing US/EC trade confrontation and the Uruguay round of GATT negotiations on agriculture will require the EC to continue to make adjustments in both the method and level of protection for producers in the face of international and budgetary pressures. Our results provide some insight as to the comparative effectiveness of the proposed or pending EC policy alternatives. It shows that the current emphasis by the EC on co-responsibility levies and price reductions in achieving domestic farm income goals may be misplaced. Production quotas or a two-price plan are options open to the EC, have been employed in other sectors, and are shown to be superior options among the class of policies under consideration.

This paper is in contrast to the OECD and US/EC Policy Harmonization studies which have simply evaluated the effects of reducing the levels of current policy instruments ("producer subsidy equivalents" and "price re-alignments" respectively). These studies reflect, however, the awareness of the international community in the importance of understanding the trade impacts of domestic agricultural policies. Our analysis goes further by extending and giving an empirical example of Gardner's framework whereby alternative measures are evaluated in achieving pre-determined political goals.

## FOOTNOTES

- <sup>1</sup>For a review of the major policy options under consideration in the European Community, see the communication by the EC Commission entitled "Perspectives for the CAP" or otherwise known as the "Green Paper". Also, see the special issue of the European Review of Agricultural Economics, Volume 14, No. 1, 1987 (especially Meester; de Veer; and Marsh); the Curry Foundation special conference proceedings (especially Josling); Harvey; Blom; and the US/EC Policy Harmonization study (Koester).
- <sup>2</sup>The stabilizer package announced in February uses MGQs to trigger a simultaneous reduction in the price support facing domestic consumers and producers and in the co-responsibility levy imposed on farmers. However, MGQs could be used instead as a mechanism to implement a two-price plan whereby output beyond domestic consumption, at the fixed domestic support price, would be sold at a lower price.
- <sup>3</sup>It should be noted that all four policies result in decreased output and higher world prices.
- <sup>4</sup>Gardner does not evaluate the relative efficiency of production quotas *cum* export subsidies.
- <sup>5</sup>There appears to be some misunderstanding as to this important relative impact of a co-responsibility levy. For example, Munk incorrectly argues that "...the co-responsibility levy may be seen as the replacement of one policy instrument - price support for cereals - by two policy instruments - a commodity tax and deficiency payments ....therefore....a constraint has been removed .....implies the potential of a welfare improvement.....". The analysis in Figure 3 shows that a co-responsibility levy is a consumption tax *cum* producer price support with export subsidies and always results in a decline in welfare compared to a single open-ended price support policy.
- <sup>6</sup>The empirical model includes the calculation of changes in import levy income. Although previous studies have focused on this aspect of EC policy (see Carter and Schmitz; Sampson and Snape), the current economic environment apparently has changed such that



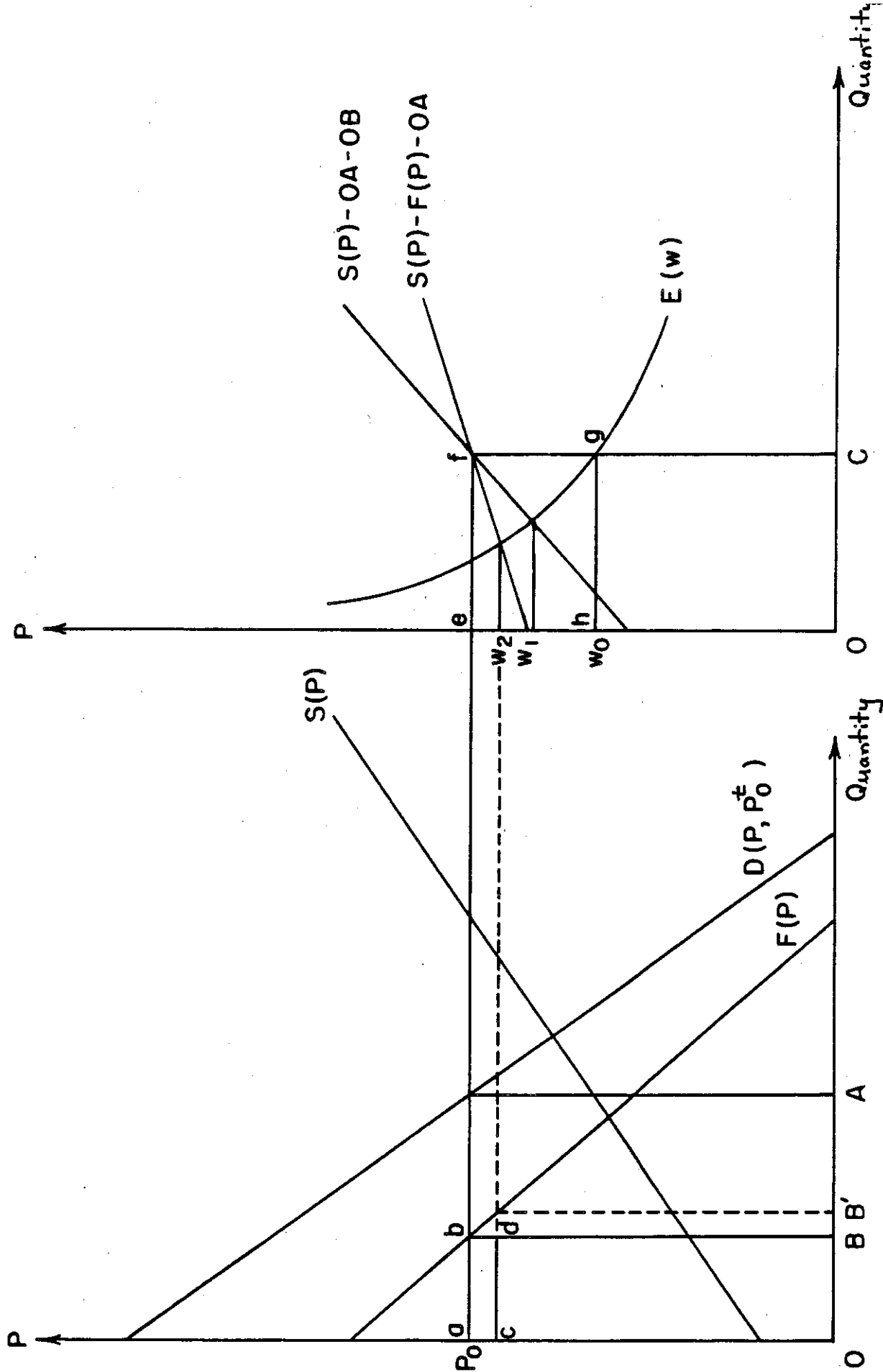


FIGURE 4: THE EFFECTS OF A FEED AND FOOD DEMAND FUNCTION IN IMPLEMENTING  
A 2-PRICE PLAN

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