Efficient Income Redistribution for a Small Country Using Optimal Combined Instruments

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Abstract

In this paper I improve Gardner's surplus transformation curve framework by assuming that government is able to vary many policy instruments simultaneously instead of only one. I use my framework to find the combination of the currently used instruments which provides the most efficient income redistribution for the Austrian bread grains market. Contrasting the most efficient policy to the actual policy reveals that 464 million Austrian shillings were wasted. I theoretically compare for a small country the transfer efficiency of every possible pair of the four major agricultural policy instruments: floor price, production quota, co-responsibility levy, and deficiency payments. Without considering the marginal cost of public funds (MCF), deficiency payments *cum* quota (equal to a fully-decoupled direct income support) is the most efficient policy, succeeded by floor price *cum* quota, and floor price *cum* deficiency payments. If the MCF is taken into account, the ranking crucially depends on the market parameters, the transfer level, and the value of the MCF. For the Austrian bread grains market, I empirically demonstrate, that given the present support level, a fully-decoupled direct income support redistributes income most efficiently as long as the MCF is lower than 1.17. Beyond this value a floor price *cum* quota policy becomes more efficient. A floor price *cum* deficiency payments policy is never superior to the floor price *cum* quota.

1. Introduction

Since Gardner's (1983) seminal work, his surplus transformation curve (STC) framework has been used in several studies to analyze theoretically (Alston and Hurd, 1990; Gardner, 1991; Maier, 1993a) and empirically (Gardner, 1985; Bullock, 1992; Kola, 1993; Maier, 1993b) the efficiency of agricultural policy. An STC, similar to a utility feasibility frontier (Samuelson, 1950; Graaff, 1957) demonstrates government’s potential to redistribute economic surplus (or income) between social groups through an agricultural program. By delineating STCs for different support programs it is possible to compare their redistribution efficiency at various transfer levels. As shown by von Cramon-Taubadel (1992), and recently by Bullock and Jeong (1994) and Bullock (1994, 1995a, 1995b) STCs also indirectly play an important role in political preference function studies.

However, all STCs traced out in the literature, except Bullock (1994, 1995b), suffer from the weakness of assuming that government can change only one policy instrument at a time. Hence, they illustrate government’s redistribution feasibilities only under this very restrictive assumption. To conquer this deficiency, in this study I introduce the more realistic assumption that policymakers are able to vary many policy instruments simultaneously. I generate an ”augmented“ STC by optimally combining all currently used policy instruments, where ”optimal“ means that along this STC instruments are combined in a way which minimizes social costs at every single support level. Therefore, this frontier illustrates government’s redistribution feasibilities, given that it can freely choose the levels of all currently used instruments. The employed theory is independently developed ((name withheld), 1993, 1994) but similar to that demonstrated by Bullock (1994, 1995b). The paper in hand provides the first empirical application of the theory. In particular, I use my framework to determine the most efficient policy of the currently used instruments, floor price, production quota, and co-responsibility levy for the Austrian bread grains market, given that present producer support is at the socially desired level and neglecting the general equilibrium retroactive effects from related markets. Contrasting the optimal combination to the actual policy reveals the social cost of a suboptimal implementation of the present instruments.

Furthermore, I am in search of the most efficient support policy for a small country given the four frequently used instruments of floor price, production quota, co-responsibility levy, deficiency payments, and any possible combination of two of these instruments. By systematizing results of previous studies (de Gorter and Meilke, 1989; Alston and Hurd, 1990; Maier 1993a; Bullock, 1994), I am able to conclude that the efficiency ranking is as follows: deficiency payments *cum* quota (equal to a fully-decoupled direct income support), floor price *cum* quota followed by floor price *cum* deficiency payments.[1] This clear ranking only holds as long as the costs of raising public funds (MCF) are not taken into consideration. Empirically, I investigate the efficiency ranking for the Austrian bread grains market for different values of MCF.

2. Efficiency of the Present Support Policy and Gardner's Surplus Transformation Curve

Structure and support of the Austrian bread grains market (wheat, durum, rye) are illustrated in Figure 1; *D* is the domestic demand, *S* the domestic supply, and *W* the foreign demand/supply line, both perfectly elastic at the prevailing world-market price because of the small-country assumption. Farmers obtain a high floor price *P* of 3,699 Austrian shillings per metric ton (ATS/t) for a specific quota Q_c (961,619 t).[2] Since farmers have to pay a co-responsibility levy (*Y*) the net producer price is (*P* - *Y*) = 3,444 ATS/t. Quantities which exceed the quota can be delivered at a reduced support price (*P* - *Y* - *Z*) = 2,662 ATS/t. This leads to a total demand (Q_d) of 601,668 t and supply (Q_s) of 1,182,892 t.

Figure 1 Austrian bread grains market

To compute the transfers and costs of various social groups caused by the described policy, linear demand and supply curves and elasticities developed in some recent studies are employed. Schneider and Wüger (1988) estimated the demand for wheat and rye flours with single equations and systems of equations. Using statistical criteria, they selected as best parameters their (uncompensated) own-price elasticities for wheat and rye flours of -0.2 and -0.4. Using these results for the computations, I chose a demand elasticity of η = -0.3.

Neunteufel and Ortner (1989) estimated a supply elasticity of 1.13 for wheat in Austria using a simultaneous static model for agricultural products. The multiple regression is based on time series data from 1961 to 1987. Fischer et al. (1988), in a ”Food and Agricultural Model of Austria“, first estimated parameters based on data from 1961 to 1976 and subsequently conducted an ex-ante simulation. This yielded a supply elasticity of 1.28 for wheat in Austria in 1991. However, I prefer the more recent result because of the greater number of observations and assume a supply elasticity of ε = 1.13.

Since the elasticity on a linear curve is not constant, the quoted elasticities are reached at present prices and quantities of demand (P, Q_d) and supply (P - Y - Z, Q_s). Analytically, demand and supply are given by:

$$Q_d = \alpha + \beta P = 782168 - 48.797P, \text{ and} \tag{1}$$

$$Q_s = \gamma + \delta(P - Y - Z) = -153776 + 502.129(P - Y - Z), \tag{2}$$

where α, γ and β, δ are the intercept and slope of the demand and supply functions. The values of these parameters are derived by substituting the observed prices and quantities into equations (1) and (2) and the definitions of the price elasticities ($\eta = \beta P/Q_d$; $\varepsilon = \delta(P - Y - Z)/Q_s$).

Without government intervention the world-market price w (1,120 ATS/t) would apply. Austrian farmers would produce quantity Q_w instead of Q_s. Hence, the income redistributed to farmers (ΔPS), i.e. the economic surplus achieved by producers due to the policy intervention, is *abcdew* in Figure 1, or mathematically:

$$\Delta \mathrm{PS} = \int_{w}^{(P-Y-Z)} [\gamma + \delta \mathrm{x}] \mathrm{dx} + ZQ_c = \gamma(\mathrm{P} - \mathrm{Y} - \mathrm{Z} - \mathrm{w}) + \frac{\delta}{2}\left((P - Y - Z)^2 - w^2\right) + ZQ_c. \tag{3}$$

Because of the floor price, consumers have to pay P instead of w. Consumption is therefore Q_d instead of Q'_w, and consumers' surplus lost (ΔCS) is *Pfgw*, or

$$\Delta CS = \int_{P}^{w} [\alpha + \beta x] dx = \alpha(w - P) + \frac{\beta}{2}(w^2 - P^2). \tag{4}$$

The intervention influences the budget (or taxpayers) in two ways. On the one hand, there are expenditures due to export restitution payments (*fhcdij*); on the other hand, revenues result from the co-responsibility levy (*Phba*). After subtracting the overlapping area (*fhbk*), the budgetary expenditure (T) equals *kbcdij* - *Pfka*, or

$$T = (P - Y - w)(\alpha + \beta P - Q_c) + (P - Y - Z - w)(Q_c - \gamma - \delta(P - Y - Z)) + (\alpha + \beta P)Y. \tag{5}$$

Government's feasibilities to redistribute economic surplus from one group to another can be illustrated using Gardner's surplus transformation curve framework. So far, all STCs traced out in the literature, except in Bullock (1994, 1995b), are computed in the following way: economic surplus redistributed to farmers (ΔPS) and the economic surplus lost by consumers/taxpayers (ΔCT), measured as

$$\Delta CT = \Delta CS + T, \tag{6}$$

are both functions of some constant market parameters, which characterize supply and demand curves, and of policy instruments. Some studies assume ΔCT and ΔPS are functions of multiple policy instruments (Alston and Hurd, 1990; Bullock, 1992; Kola 1993), one of which is variable and the others constant; and other studies assume only one policy instrument, which is variable (Gardner, 1983, 1985; Hofreither, 1992). By changing the variable instrument, one obtains different pairs of ΔPS and ΔCT and, therefore, a surplus transformation curve.

Applying this framework to the Austrian bread grains market, it is possible to derive such standard STCs by continuously varying one of the four policy instruments (P, Y, Z, Q_c) in equations (3) through (6) while holding the other three instruments constant, given the market parameters (α, β, γ, δ, w). For example, STC^P in Figure 2 is computed by increasing the price P continuously, starting at the world-market price w while retaining Y, Q_c, and Z at the present level.[3] The origin represents the situation with no intervention. As government increases the floor price above the nonintervention price level, farmers gain and consumers/taxpayers lose, moving "northwest" along STC^P. The first kink appears when (P - Y) is increased beyond P_c, and the quota hence becomes effective. The second kink appears when (P - Y - Z) exceeds P_c, the point from which it makes economic sense to produce more than the quota. The policy then becomes less efficient and the curve flattens out again. All three parts of this curve are slightly concave.[4] Under the actual floor price the transferred producers' surplus is estimated to be 1,979 million ATS (*0a* in Figure 2). The cost to consumers/taxpayers amounts to 2,738 million ATS (*ab*). This means that the average transfer efficiency (*0a*/*ab*) equals -72%, which represents a social cost (ΔPS + ΔCT) of about 28% (759 million ATS) (Table 1). In this graphical representation, a redistribution policy becomes increasingly efficient, the further the STC lies to the "northeast".

Similarly, one could exemplify three other standard STCs by varying the co-responsibility levy Y or the difference between the high and the reduced floor price Z or the quota Q_c while maintaining the other instruments constant at the present level. All four STCs would intersect at point *b* with different slopes (Bullock, 1994). For example, the dotted line through point *b* intimates the STC derived by varying only the quota keeping all other instruments constant. While STC^P and all other possible standard STCs are able to provide information on the average transfer efficiency of the actual policy, they can illustrate government's redistribution feasibilities only under the very restrictive assumption that government can change just one instrument at a time.

Figure 2	Surplus transformation curves for alternative support policies

Table 1	Implications of the present policy and the optimal support policy

3. Optimal Combination of Policy Instruments and "Augmented" Surplus Transformation Curve

Optimal Combination of Present Intervention Instruments

To give a more realistic picture of government's redistribution feasibilities it will now be assumed that government can vary all currently used instruments simultaneously. Because efficient redistribution feasibilities are of interest above all, one has to solve the optimization problem:

min.

$$-\left[\alpha(\mathrm{w}-\mathrm{P})+\frac{\beta}{2}(\mathrm{w}^2-\mathrm{P}^2)+(\mathrm{P}-\mathrm{Y}-\mathrm{w})(\alpha+\beta\mathrm{P}-\mathrm{Q}_\mathrm{c})+(\mathrm{P}-\mathrm{Y}-\mathrm{Z}-\mathrm{w})(\mathrm{Q}_\mathrm{c}-\gamma-\delta(\mathrm{P}-\mathrm{Y}-\mathrm{Z}))+(\alpha+\beta\mathrm{P})\mathrm{Y}\right]$$

$$\text{s.t. } \overline{\Delta\mathrm{PS}} = \gamma(\mathrm{P}-\mathrm{Y}-\mathrm{Z}-\mathrm{w})+\frac{\delta}{2}\left((P-Y-Z)^2-w^2\right)+ZQ_c \qquad (7)$$

Minimize consumers/taxpayers' costs subject to a fixed producer surplus. This nonlinear optimization problem was solved using GAMS software (Brooke et al., 1988).[5]

The method above can be explained with reference to Figure 2. First ΔPS is fixed at some level of $\overline{\Delta\mathrm{PS}}$, for example at the present support level of 1,979 million ATS while looking for the combination of policy instruments that ensures an outcome for consumers/taxpayers which lies as far as possible to the right on the line *ba*. By solving the minimization problem we obtain point *c*. By changing the fixed value of $\overline{\Delta\mathrm{PS}}$, and repeatedly solving (7) we are able to trace out $\mathrm{STC}^{\mathrm{P,Q_c}}$. This augmented STC illustrates government's redistribution feasibilities, given the four actually applied instruments (P, Y, Z, Q_c) are freely disposable to government, while along $\mathrm{STC}^{\mathrm{P}}$ it is only P. Since the outcome of the actual policy (*b*) is not a point on $\mathrm{STC}^{\mathrm{P,Q_c}}$, government has not combined policy instruments optimally.

The optimal policy instrument combination for the present producer support level is summarized in Table 1. Firstly, it would be optimal to abandon the co-responsibility levy. This result is in accordance to de Gorter and Meilke (1989, pp. 597-598) who argued that a co-responsibility levy can be viewed as a floor price policy in combination with a domestic consumption tax and is therefore never more efficient than a pure floor price policy. Their argument can be reviewed with the help of Figure 1. Abolishing the co-responsibility levy and fixing floor prices at (P - Y) keeps producers' surplus at the same level but reduces the consumer price and therefore increases consumers' surplus by *Pfla*. On the one hand, the budget is disburdened by a higher domestic demand (*klmj*) while, on the other hand, the net revenues from the levy (*Pfka*) are lost. On the whole, by abolishing the levy there are welfare gains of *flmj*. Secondly, supply of bread grains beyond quota should be not supported since the optimal value of Z is 2,482 ATS/t what implies that (P - Y - Z) = P_c. Thirdly, the current quota is 20% too high and the price 12% too low to be optimal for the support provided to producers. This is in accordance to Gardner's (1983, p. 230) finding that a low demand and a high supply elasticity tend to make production control more effective.

If the co-responsibility levy and the reduced floor price instruments were not applied, and P and Q_c were fixed at their optimal values, the average transfer efficiency would increase by about 20% and bring gains for consumers/taxpayers of 464 million ATS (*bd* in Figure 2), while maintaining producers' assistance at the present level. In other words, by not implementing the applied instruments optimally a social cost of 464 million ATS was induced.

Alternative Support Policy

Beside quotas, floor price, and co-responsibility levy, deficiency payments are the most often discussed instrument. Therefore, I will attempt to answer the question of whether adding deficiency payments to the presently used instruments could increase the efficiency of redistribution. Bullock (1994; see also Bullock and Salhofer, 1995) shows that an optimal combination of two policy instruments is at least as efficient as each of these two policy instruments are on a separate basis. Given this fact and the earlier finding that co-responsibility levy is always inferior to a pure floor price policy, one of the following three pairs should be the most efficient for a small country:

(i) floor price *cum* quota

(ii) deficiency payments *cum* quota

(iii) floor price *cum* deficiency payments

Maier (1993a) demonstrated that for any combination of floor price and deficiency payments one can find a more efficient combination of floor price and quota. His argument is briefly retraced in Figure 3. A combination of floor price and deficiency payments policy means that producers obtain a price P for the domestic demanded quantity Q_d, financed by domestic consumers and a lower price P' for the quantity that exceeds domestic demand, financed by taxpayers. By imposing a quota equal to Q_c it is possible to transfer more income to farmers at the same deadweight loss.

Alston and Hurd (1990) have demonstrated graphically that an optimal combination of deficiency payments and quota is to fix output at the nonintervention level Q_w and redistribute the desired support level by lump sum transfers. Obviously, this support policy is equal to a fully-decoupled direct income support policy. As long as the marginal costs of public funds are neglected this policy has no deadweight loss and is illustrated by the 45° line STC^{l} in Figure 2. Given the above, the transfer efficiency ranking is (i), succeeded by (ii), and (iii).

Figure 3 Floor price *cum* quota vs. floor price *cum* deficiency payments

4. Considering the Cost of Public Funds

Alston and Hurd (1990), Alston et al. (1993), and Chambers (1993) pointed out that it is important to take into account the welfare costs of distortions caused by the collection of taxes to finance government spending for the evaluation of farm programs. To this purpose we have to multiply the budgetary burden (T) by the marginal cost of public funds (MCF).[6] As soon as the MCF is greater than 1, any of the three optimal combinations (i), (ii), and (iii) might be the most efficient. The market parameters, the MCF as well as the amount of transfer determine which one is superior. The magnitude as well as the exact theoretical foundation of the MCF are still the subject of discussion (Ballard, 1990; Ballard and Fullerton, 1992; Fullerton, 1991; OECD, 1994, pp. 30-34). Various studies have developed estimates that lie in the range 1.17 to 1.55 (Hagemann et al., 1988).

To obtain empirical results for the Austrian bread grains market, I fix the transfer at the present level of 1,979 million ATS and vary the MCF between 1.17 and 1.55. Figure 4 reveals that as long as the MCF is lower than about 1.17 a fully-decoupled direct income support is most efficient. Beyond this value a floor price *cum* quota policy is superior. As the MCF increases, exports become more costly and therefore the optimal quota decreases. At an MCF of 1.3 the optimal policy is to limit output at the domestic demanded quantity and have no exports. As the MCF increases beyond 1.3 the costs of consumers/taxpayers can be decreased by setting the quota below the self-sufficiency level hence levying the imports.

Because of the inelastic demand, elastic supply, and low world-market price, the optimal combination of floor price and deficiency payments should redistribute all income by floor price instead of deficiency payments for the whole range of MCF values investigated. This means that it is optimal to have no exports, whereby the curve for floor price *cum* deficiency payments is therefore tangent to the curve for floor price *cum* quota if the MCF equals 1.3.

Figure 4 Efficiency ranking and marginal costs of public funds

5. Discussion

The efficiency of agricultural programs is often discussed using Gardner's surplus transformation curve (STC) which illustrates the tradeoff between consumers/taxpayers' and producers' surpluses. As discussed herein, such "conventional" STCs only represent government's feasibilities to redistribute economic surplus (or income) under the very restrictive assumption that government can change just one instrument at a time. In this study, I overcome the above limitation by assuming that government is able to change more than one policy instrument simultaneously. The "augmented" STC hereby derived illustrates the optimal redistribution feasibilities, given that all currently applied instruments are freely disposable to government. With this augmented STC it becomes possible to compare not only simple policies like floor price to quota but combined policies like floor price *cum* quota to deficiency payments *cum* quota. In addition, this method makes it possible to discuss whether government has combined instruments efficiently and determine the social costs of inefficient instrument combination.

Given the four commonly used agricultural policy instruments (floor price, quota, co-responsibility levy, deficiency payments), not considering the cost of raising public funds, the efficiency ranking was found to be deficiency payments *cum* quota (= fully-decoupled direct income support), succeeded by floor price *cum* quota, and floor price *cum* deficiency payments. As soon as the costs of public funds are considered the ranking becomes indeterminate and subject to empirical investigations as shown for the Austrian bread grains market. It was revealed that optimally combining the actual employed instruments could decrease social costs considerably. Perhaps adding other policy instruments (e.g. input subsidy) could further improve transfer efficiency.

The major limitations of the study are common in the literature, and are well known and inherent in static, single-market analyses. Substitution effects in related markets, as well as income leakages to input and intermediary sectors have not been taken into consideration in this paper (Thurman and Wohlgenannt, 1989). Because of the static framework, it is not possible to analyze structural changes. But quota programs can lead to structural changes that depend on the arrangements for quota transfer, and can therefore lead to additional social costs not observed in this study (Burrell, 1991; OECD, 1990, pp. 13-37). Direct income support, on the other hand, is rarely decoupled and can hence be accompanied by many distortions (Kjeldahl, 1993; OECD, 1990, 33-53). As Munk (1989) and Hofreither (1992) have stated, administrative and enforcement costs must also be considered when drawing final conclusions. Finally, the environmental impact of the different policy options have not been taken into account (Gardner, 1991).

[1]Further, an italicized *cum* indicates an optimal combination of two instruments.

[2]In an effort to mitigate the year-to-year price and quantity fluctuations, three-year price and quantity averages over the period 1991 to 1993 were constructed. For the world-market price, the average export price is used. In 1992, 100 ATS = 9.1 US dollars.

[3]Sometimes, STCs are represented using absolute values of PS and CT (Gardner 1983). The diagram used here, with axes of ΔPS and ΔCT, is credited to Gardner (1985).

[4]To be able to calculate the surplus changes of these three different situations by equations (3) to (6), one has to assume that if $(P - Y) \leq P_c = -\gamma/\delta + 1/\delta Q_c$ then $Z = 0$ and $Q_c = Q_s = \gamma + \delta(P - Y)$; if $(P - Y) > P_c$ and $(P - Y - Z) \leq P_c$ and then $Z = P - Y - P_c$.

[5]GAMS programs are available on request.

[6]I use the marginal value because agricultural expenditures accounted for only 1.6% of the total budget in Austria in 1991 (OECD, 1992, p. 350).

References

Alston, J.M. and Hurd, B.H. (1990) Some Neglected Social Costs of Government Spending in Farm Programs. American Journal of Agricultural Economics, 72: 149-156.

Alston, J.M., Carter, C.A. and Smith, V.H. (1993) Rationalizing Agricultural Export Subsidies. American Journal of Agricultural Economics, 75: 1000-1009.

Ballard, C.L. (1990) Marginal Welfare Cost Calculations: Differential Analysis vs. Balanced-Budget Analysis. Journal of Public Economics, 41: 263-276.

Ballard, C.L. and Fullerton, D. (1992) Distortionary Taxes and the Provision of Public Goods. Journal of Economic Perspectives, 6: 117-131.

Brooke, A., Kendrick, D. and Meeraus A. (1988) GAMS: A User's Guide. The Scientific Press, San Francisco.

Bullock, D.S. (1992) Redistributing Income Back to European Community Consumers and Taxpayers through the Common Agricultural Policy. American Journal of Agricultural Economics, 74: 59-67.

Bullock, D.S. (1994) In Search of Rational Government: What Political Preference Function Studies Measure and Assume. American Journal of Agricultural Economics, 76: 347-361.

Bullock, D.S. (1995a) Are Government Transfers Efficient? An Alternative Test of the Efficient Redistribution Hypothesis. Journal of Political Economy, forthcoming.

Bullock, D.S. (1995b) Pareto Optimal Income Redistribution and Political Preference

Functions: An Application to EC Common Agricultural Policy. In: Antle, J. and Sumner, D. (Editors), D. Gale Johnson on Agriculture, Volume 2: Essays on Agricultural Policy in Honor of D. Gale Johnson. University of Chicago Press, Chicago, forthcoming.

Bullock, D.S. and Jeong, K.S. (1994) Comment: A Critical Assessment to the Political Preference Function Approach in Agricultural Economics. Agricultural Economics, 10: 201-206.

Bullock, D.S. and Salhofer, K. (1995) Is a Production Quota Pareto Superior to Price Support Only?: Comment. unpublished manuscript.

Burrell, A. (1991) The Efficiency of Alternative Policies for the EC's Common Agricultural Policy: Comment. American Journal of Agricultural Economics, 73: 533-534.

Chambers, R.G. (1993) The Incidence of Agricultural Policies. Working Paper No. 91-26, Revised September 1993, Department of Agricultural and Resource Economics, University of Maryland.

de Gorter, H. and Meilke, K.D. (1989) Efficiency of Alternative Policies for the EC's Common Agricultural Policy. American Journal of Agricultural Economics, 71: 592-603.

Fischer, G., Frohberg, K., Keyzer, M.A. and Parikh, K.S. (1988) Linked National Models: A Tool for International Food Policy Analysis. Kluwer Academic Publishers, Amsterdam.

Fullerton, D. (1991) Reconciling Recent Estimates of the Marginal Welfare Cost of Taxation.

American Economic Review, 81: 302-308.

Gardner, B.L. (1983) Efficient Redistribution through Commodity Markets. American Journal of Agricultural Economics, 65: 225-234.

Gardner, B.L. (1985) Export Subsidies are Still Irrational. Agricultural Economics Research, 37, No. 1: 17-19.

Gardner, B.L. (1991) Redistribution of Income Through Commodity and Resource Policies. In: Just, R.E. and Bockstael, N. (Editors.), Commodity and Resource Policies in Agricultural Systems. Springer Verlag, Berlin.

Graaff, J. de V. (1957) Theoretical Welfare Economics. Cambridge University Press, London.

Hagemann, R.P., Jones, B.R. and Montador, B.R. (1988) Tax Reform in OECD Countries: Motives, Constraints and Practice. OECD Economic Studies, No. 10: 185-219.

Hofreither, M.F. (1992) Wohlfahrtsökonomische Implikationen der Agrarpolitik: Das Konzept der Transfereffizienz. Discussion Paper No. 11, Department of Economics, Politics, and Law, University of Resource Sciences Vienna.

Kjeldahl, R. (1993) Direct Payments: How to Classify and Evaluate the Schemes. In: Lehmann, B., Popp, H.W. and Stucki, E (Editors), Direct Payments in Agricultural and Regional Policies. Proceedings of the 30th EAAE-Seminar, Hartung-Gorre Verlag, Konstanz, pp. 4-10.

Kola, J. (1993) Efficiency of Supply Control Programmes in Income Redistribution. European Review of Agricultural Economics, 20: 183-198.

Maier, L. (1993a) The Relative Transfer Efficiency of Six Agricultural Support Policies for a Small Exporting Country. Discussion Paper No. 18, Department of Economics, Politics, and Law, University of Resource Sciences Vienna.

Maier, L. (1993b) The Costs and Benefits of U.S. Agricultural Policies with Imperfect Competition in Food Manufacturing. Garland Publishing, New York.

Moschini, G. and Sckokai, P. (1994) Efficiency of Decoupled Farm Programs under Distortionary Taxation. American Journal of Agricultural Economics, 76: 362-370.

Munk, K. J. (1989) Price Support to the EC Agricultural Sector: An Optimal Policy? Oxford Review of Economic Policy, 5: 76-89.

Neunteufel, M.G. and Ortner, K.M. (1989) Auswirkungen eines EG-Beitrittes auf die österreichische Landwirtschaft. Schriftenreihe, Federal Institute of Agricultural Economics, Vienna.

OECD (1990) Reforming Agricultural Policies: Quantitative Restrictions on Production. Direct Income Support. Paris.

OECD (1992) Economic Surveys: Austria. Paris.

OECD (1994) Assessing the Relative Transfer Efficiency of Agricultural Support Policies. Paris.

Samuelson, P.A. (1950) Evaluation of Real National Income. Oxford Economic Papers, 2: 1-29.

Schneider, M. and Wüger, M. (1988) Nachfrage nach Nahrungsmitteln und Getränken.

Monatsberichte 61, Austrian Institute of Economic Research, Vienna, pp. 455-469.

Thurman, W.N. and Wohlgenannt, M.K. (1989) Consistent Estimation of General Equilibrium Welfare Effects. American Journal of Agricultural Economics, 71: 1041-1045.

von Cramon-Taubadel, S. (1992) A Critical Assessment of the Political Preference Function Approach in Agricultural Economics. Agricultural Economics, 7: 371-394.

Table 1 Implications of the present policy and the optimal support policy

	Average transfer efficiency	Floor price P	Co-respons. levy Y	Price difference Z	Quota Q_c	Output Q_s	Δ PS	Δ CS
	%	ATS/t	ATS/t	ATS/t	1000 t	1000 t	million ATS	million ATS
Present support	-72	3,699	255	782	961.619	1,182.892	1,979	-1,714
Optimal support	-87	4,141	0	2,482	679.175	679.175	1,979	-1,975
Difference	20[a]	422	-255	1,700	-282.444	-503.717	0	-261

[a] 100*(-87+72)/(-72)=20

Figure 1. Austrian bread grains market

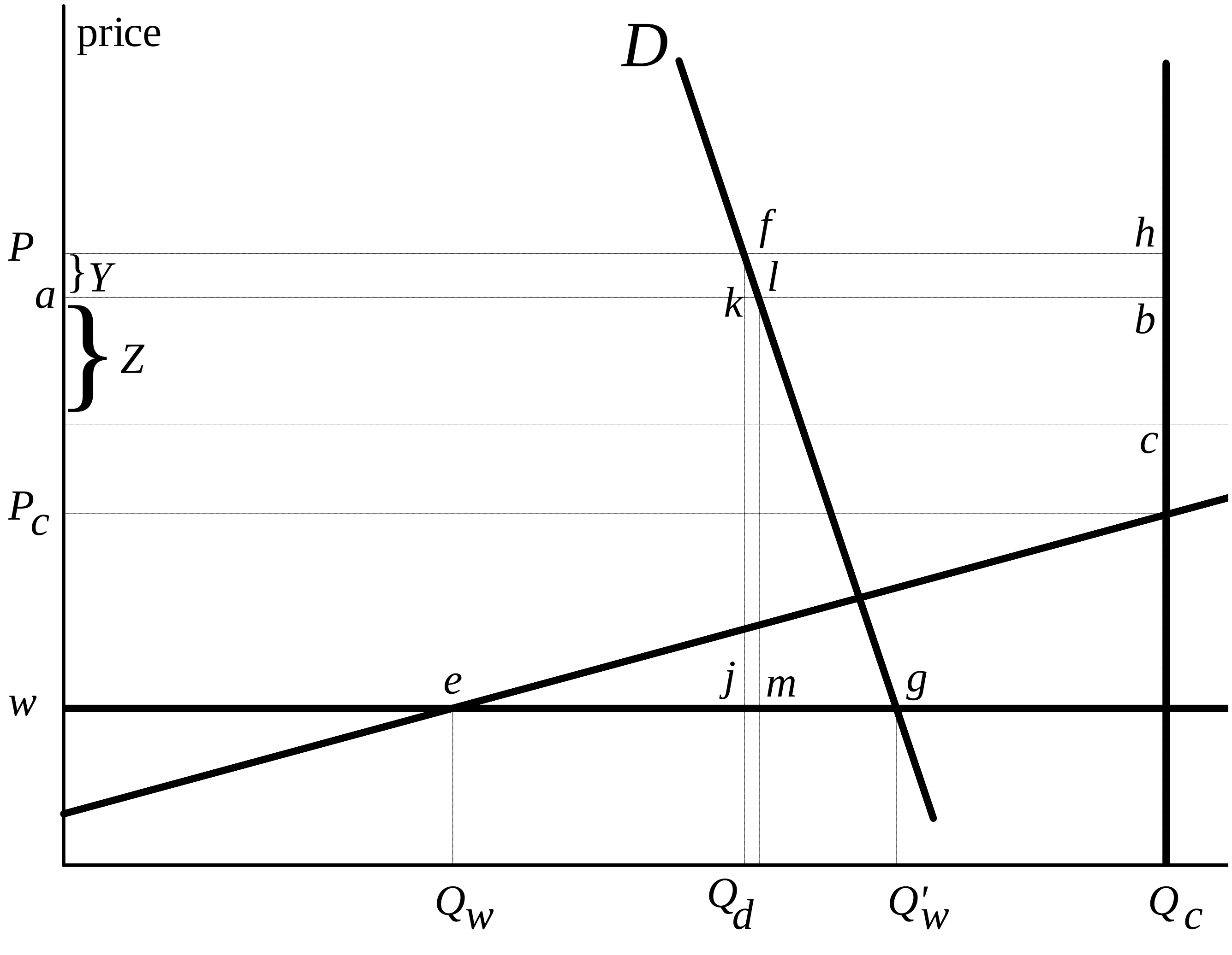

Figure 2 Surplus transformation curves for alternative support policies

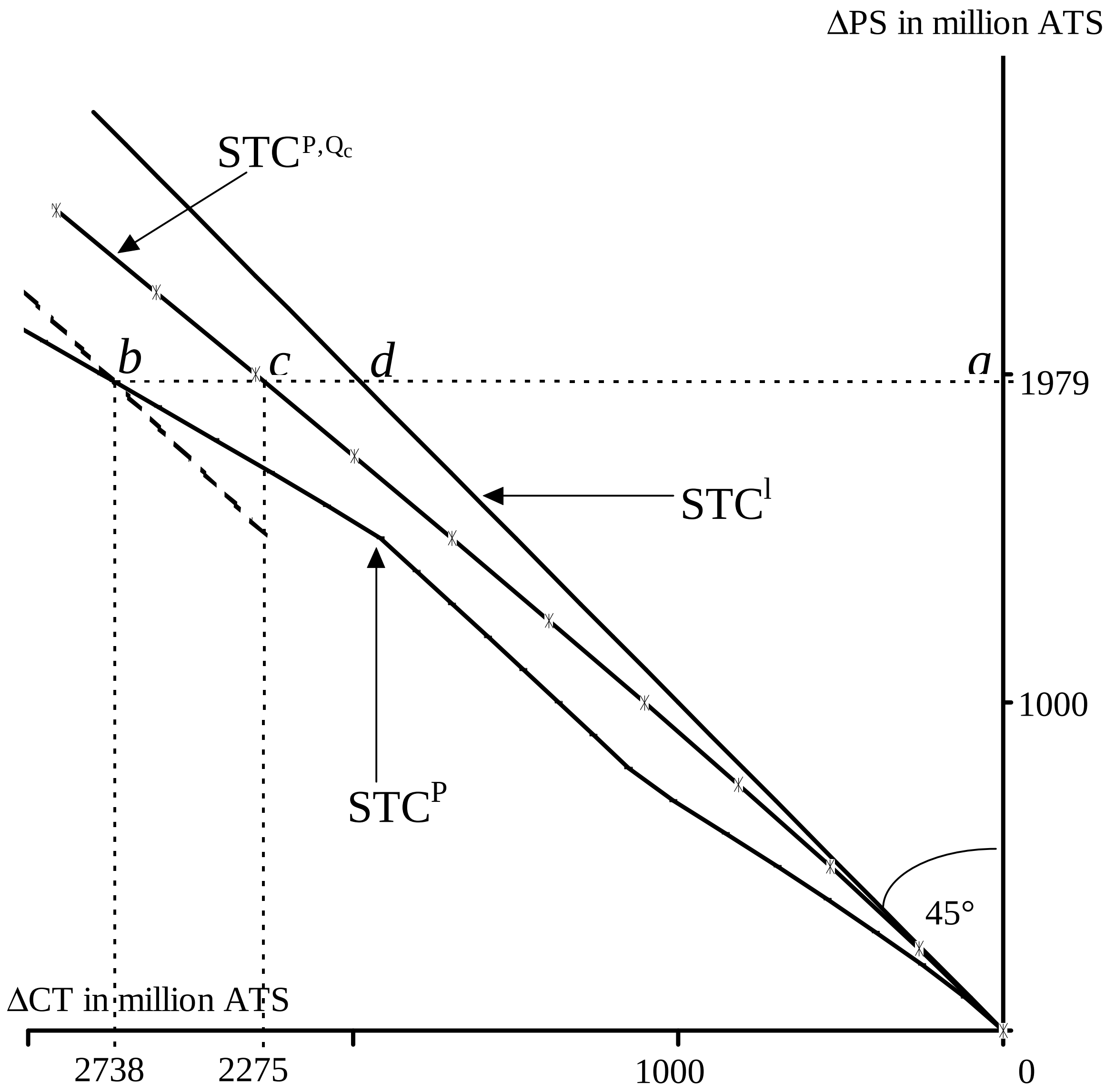

Figure 3 Floor price *cum* quota vs. floor price *cum* deficiency payments

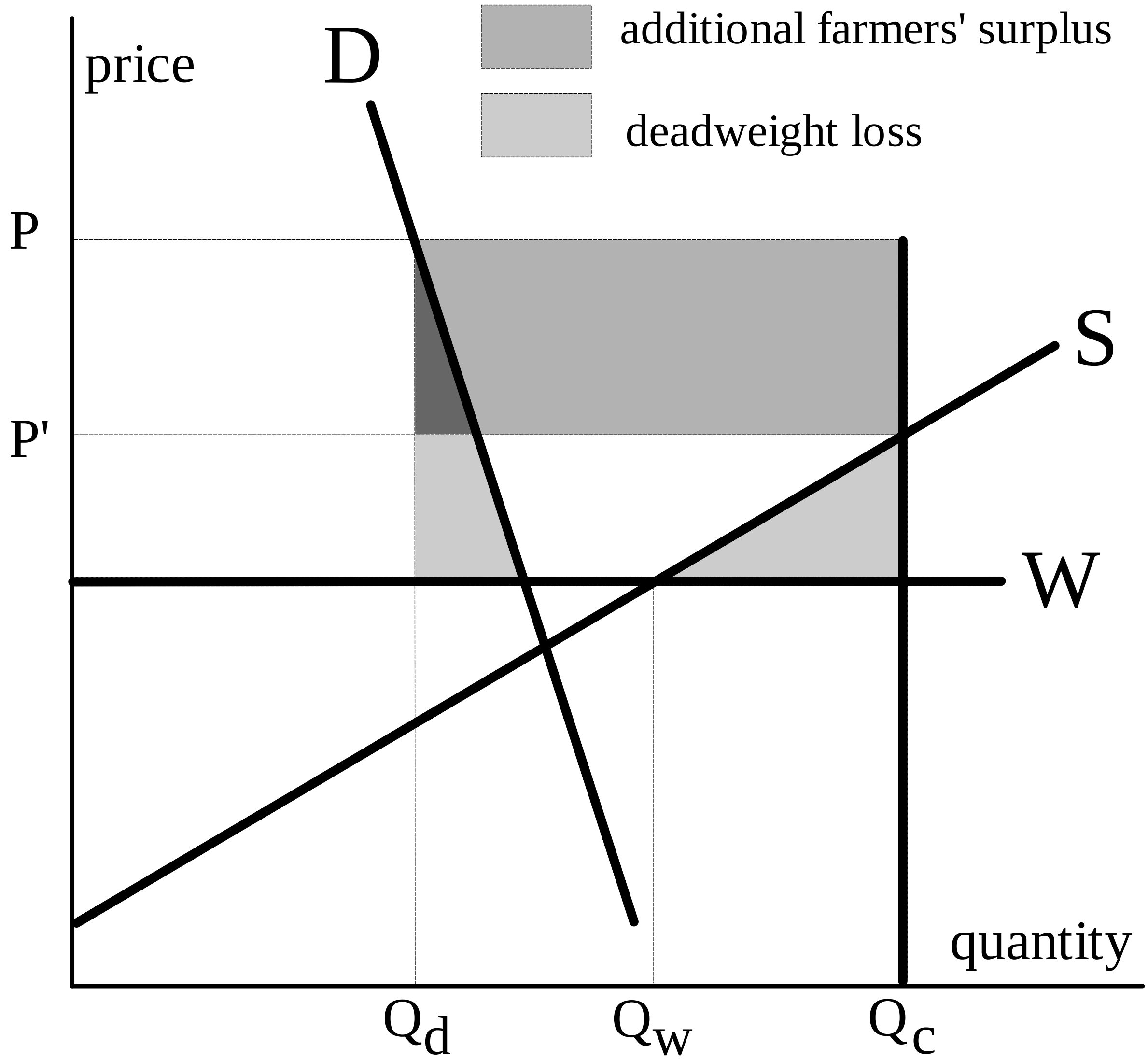

Figure 4 Efficiency ranking and marginal costs of public funds