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IMPACT OF AVAILABLE POLICY OPTIONS ON CONSUMER WELFARE

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INTRODUCTION

Many agricultural policies have evolved over time to deal with the so-called "peculiarities" of agricultural production. Some policies that government and other organizations in South Africa have seen fit to introduce include subsidies and rebates (interest rates, transport), production quotas (sugar, wattle, milk, wine), floor price schemes and permits/quotas (meat, eggs), wool schemes (wool, oilseeds), and single-channel price schemes (maize, wheat). Reasons given for using these measures include greater income stability, price stability and orderly marketing. Such schemes invariably benefit the protected middlemen and usually benefit producers at the expense of consumers.

The objective of this paper is to illustrate with examples from three major South African agricultural industries how interference with market forces comes at a cost to society.

PROCEDURE

In a free market consumer and producer surplus are maximized, that is, social costs are zero. Any departures from the competitive equilibrium give rise to social costs (Beck, p. 242; Johnson, p. 243, Wallace, p. 581). Consumer surplus, a concept popularized by Marshall, is defined as the area under the demand curve above the price line. Producer surplus has traditionally been measured as the area above the product supply curve and below the price line (Currie *et al.*, p. 755). It is assumed that the total area under the demand curve to the left of a given quantity is a measure of total utility or welfare for a commodity and that the area under the product supply curve reflects the opportunity cost of resources used to produce that quantity of product. Since the concepts of producer surplus and economic rent relate to the same phenomenon (*op. cit.*, p. 754), Mishan (p. 1279) argued in favour of the more general concept of economic rent. However, Currie *et al.* found disagreement among economists over the appropriate definition and measurement of economic rent. In this paper the term producer surplus is used.

The social costs of policies administered by the South African sugar, dairy and beef industries and discussed in the following pages were measured in terms of producer and consumer surplus. Policy options used by other industries could be assessed in a similar way.

* Commentary on an earlier paper by Professor W.L. Nieuwoudt and Mr M.C. Lyne of the University of Natal is acknowledge with thanks

RESULTS OF RESEARCH INTO SOCIAL COSTS

Sugar industry

Results presented in this section were derived from a simulation model developed by Ortmann. Using this model social costs of the single-price sugar policy were estimated and compared with social costs estimated for a pool scheme.

(i) The single-price surgar policy

Under this policy, which is in operation until 30 April 1985, the producers' sucrose price on a 1979/80 basis was estimated as R143,60 per tonne, including transport subsidies and Equalization Fund payments. This is a weighted average of the domestic market price, which was estimated as R161,06 per tonne of sucrose, and the export price of R124 per tonne of sucrose (Nourse). The prices are five-year means, centred on 1979/80. Local sucrose consumption was estimated as 1,28 million tonnes while 1,14 million tonnes of sucrose equivalent were exported. The simulation model generated a free market quantity of 1,35 million tonnes of sucrose and an equilibrium price of R130,46 per tonne. Import costs were estimated as R150 per tonne of sucrose equivalent. A diagrammatic model of the single-price policy is presented in Figure 1 where demand and supply are at the farm level.

Social costs stem from two sources, namely (1) higher local prices and lower consumption relative to a free market, and (2) production of sugar for an unprofitable world market.

The first source of social cost is given by area CDE: Due to higher local prices total utility decreases by area ADEF while resources to the value of ACEF are saved. For export sugar resources to the value of ACJG are used while income from sugar sales equals ABHG. The total export subsidy equals BMJH of which farmers receive the net amount CMJ. Social cost due to excess production, therefore, equals BCJH. Hence total social costs for this policy equal CDE + BCJH.

Ortmann's results show that social costs amount to nearly 7% of the totale sucrose value (OPsJG) and about 98% of income transfers from consumers to producers (PePsJE). Compared with other studies these proportions are high mainly because of the large proportion of sugar exports in a depressed world sugar market. Depressed prices may

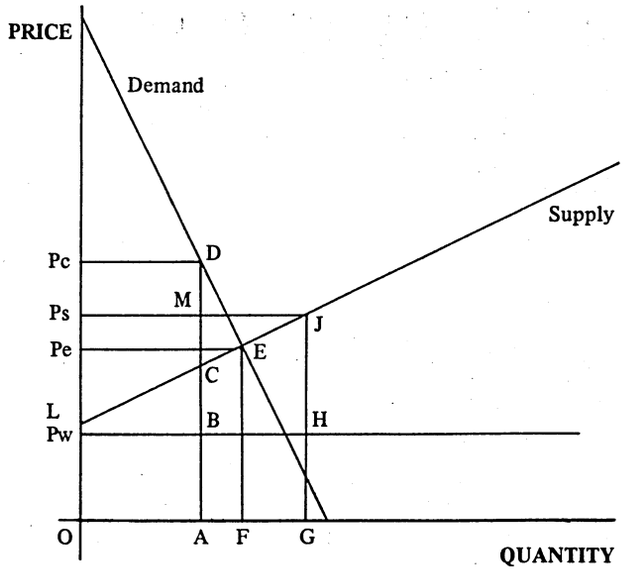

FIG. 1 - Estimation of social costs under the single-price sugar policy

Pc	= domestic market sucrose price (R161,06 per tonne)
Ps	= mean producers' price (R143,60 per tonne)
Pe	= sucrose equilibrium price (R130,46 per tonne)
Pw	= sucrose export price (R124,00 per tonne)
OA	= domestic sucrose consumption (1,28 million tonnes)
OG	= total sucrose production (2,42 million tonnes)

be a longer-term feature of the world market owing to support price policies in other producer countries and the switch to alternative sweeteners in countries such as the USA and Japan. Social cost due to underconsumption in the local market was estimated as 0,7% of total sucrose value.

(ii) The pool scheme

From 1 May 1985 the Sugar Industry intends operating a pool scheme consisting of two pools: The A-pool will account for the domestic sugar market plus about 50% of normal exports in the past. Production will be controlled with quotas and producer prices will be higher than under the single-price policy. The B-pool will account for all other production and producer prices will be based on world sugar prices. Production for this pool will be voluntary.

The producers' sucrose price for the A-pool was estimated as R156,70 per tonne on a 1979/80 basis (Hudson). This is a weighted average of the estimated domestic market price of R172,40 per tonne and the export price of R124 per tonne. The producers' price is about 9% higher than the price under the single-price policy, 20% above the domestic free market price and above the import cost. The B-pool price was estimated as R124 per tonne of sucrose. Domestic sucrose consumption was estimated to fall to about 1,25 million tonnes.

For the pool scheme the model showed that no B-pool cane will be produced because of the unprofitable world price. (In practice some B-pool cane may be produced by farmers as a safeguard to protect valuable A-pool quotas). The scheme, in effect, reverts back to a single-price scheme similar to the first policy. The difference is that the A-pool price is higher and total sucrose production lower.

Using results of the simulation model, social costs of the pool scheme expressed as a proportion of total sucrose value and income transfers were estimated as 4,7% and 32,5%, respectively. Total social costs are lower than under the single-price scheme due to a lower volume of exports. Social cost resulting from higher local prices and under-consumption was estimated as 1,3% of total sucrose value. This is higher than under the single-price policy owing to the higher sucrose price and lower consumption. It is significant that if quotas are made transferable among regions (at present they are only transferable within a Mill Group area) estimates of social costs as a proportion of total sucrose value and income transfers were 2,3% and 16%, respectively. Transferability of quotas reduces social costs because sugar-cane production moves to areas with a comparative advantage in cane production. Nieuwoudt *et al.* (p. 492) reported that social costs decreased when allotments in peanut production in the USA were made transferable.

The above results highlight the effects of interfering with market forces in the South African Sugar Industry. The major source of social cost appears to be price distortions causing excess production for unprofitable world markets.

Dairy industry

Recent research by McKenzie has shown that transfers from consumers to producers and the Dairy Board under the Fresh Milk Scheme in South Africa were between 12,7% and 17,1% of the total value of fresh milk production in the period 1979/80 to 1982/83. Levies to the Dairy Board absorbed 7,6% and producers received between 5,1% and 9,5% (p. 55). On average milk producers received 48% of the income transfer while the Dairy Board absorbed 52% as levies. Social costs were estimated to be less than 1% of total milk value and between 7% and 14% of income transfers to producers (p. 56). Although social costs are negligible when measured in terms of total milk value they are significant in relation to income transfers.

As regards the industrial milk market McKenzie reported that during the period 1979/80 to 1982/83, income transfers were from producers to consumers in 1979/80 and 1980/81 and from consumers to producers in 1981/82 and 1982/83. The largest transfers occurred in 1980/81 and 1981/82 and were valued at 8,2% and 7,2%, respectively, of the total value of industrial milk (at farm level) (p. 59). Social costs in terms of total industrial milk value were small, less than 1% on average over the four-year period. These costs

resulted mainly from loss on exports of industrial milk and surplus fresh milk (p. 60).

Meat industry

The meat industry in South Africa has been the subject of intensive research (for example, Hancock, Laubscher, Nieuwoudt (1978, 1984)). Nieuwoudt (1984) estimated that if permits reduced beef supply by 5% social cost would be about R3,2 million (Ed = -0,77, Es = 0,8) or about 0,3% of the total value of beef sales. Prices at main city abattoirs were estimated to increase by 6,5% whilst country auction prices would decrease by 6,3%. Permits would acquire a value of about R80 million under these circumstances. Although social costs are relatively small the welfare distribution of intervention may be large. Speculators who are allocated permits/quotas gain because they earn quota rents while farmers who do not receive quotas and consumers are harmed.

Although beef farmers with permits may gain through a higher price (the estimated price elasticity of demand is less than one (Hancock, p. 64)) this is doubtful when the additional cost of feeding animals, which cannot be sold because of permits, is considered (Nieuwoudt, 1978, p. 177). According to Hallett (pp. 222-23), if permits are regarded as necessary, then making them saleable would promote efficiency and social costs may fall (Nieuwoudt *et al.*, p. 492).

CONCLUSIONS

The above analysis of some major agricultural industries in South Africa indicates that interference with market forces decreases social welfare. Although estimates of social costs are usually negligible in terms of total production value they are significant when measured in terms of income transfers from consumers to producers (Gardner).

Implicit in using producer and consumer surplus to measure social costs is the assumption of static supply and demand curves and constant elasticities. Shifts in these curves may lead to different estimates of social costs. Future researchers could attempt to build forecasted shifts into their models (Buxton and Hammond, p. 290).

It is significant that the Government in its recent White Paper on Agricultural Policy (p. 11) has recognised the need for agriculture in South Africa to move towrads a freer market. Such a market will promote allocative efficiency, lower food costs and improve social welfare.

REFERENCES

BECK, A.C. "The Social Cost of Production Control in the Australian Egg Industry". *Rev. Mkt. Agr. Econ.* 42(1974): 240-56

BUXTON, B.M., and J.W. HAMMOND. "Social Cost of Alternative Dairy Price Support Levels". *Amer. J. Agr. Econ.* 56(1974): 286-91

CURRIE, J.M., MURPHY, J.A., and A. SCHMITZ. "The Concept of Economic Surplus and its use in Economic Analysis". *Econ. J.* 81(1971): 741-99

GARDNER, B. "Efficient Redistribution through Commodity Markets". *Amer. J. Agr. Econ.* 65(1983): 225-34

HALLETT, G. *The Economics of Agricultural Policy*. Oxford: Basil Blackwell, 1971

HANCOCK, P.J. "An Econometric Demand and Policy Analysis of the South African Meat Industry". M.Sc. Agric. thesis, University of Natal, Pietermaritzburg, 1983

HUDSON, J.R. Assistant General Manager, S.A. Cane Growers' Association. Personal communication, 1984

JOHNSON, P.R. "The Social Cost of the Tobacco Program". *J. Farm. Econ.* 47(1965): 242-55

LAUBSCHER, J.M. "An Analysis of the Economic Performance of the South African Beef and Cattle Market". Ph.D. thesis, University of the Orange Free State, Bloemfontein, 1982

MARSHALL, A. *Principles of Economics*. London: MacMillan, 1930

McKENZIE, C.C. "An Economic Analysis of the South African Dairy Control Scheme". M.Sc. Agric. thesis, University of Natal, Pietermaritzburg, 1984

MISHAN, E.J. "What is Producer's Surplus?" *Amer. Econ. Rev.* 58(1968): 1269-82

NIEUWOUDT, W.L. "Production Quotas with Specific Reference to Meat: Reply". *S. Afr. J. Econ.* 46(1978): 175-78

NIEUWOUDT, W.L. "An Economic Analysis of Demand and Policies in the Beef Industry". Submitted for publication, 1984

NIEUWOUDT, W.L., J.B. BULLOCK, and G.A. MATHIA. "An Economic Evaluation of Alternative Peanut Policies". *Amer. J. Agr. Econ.* 58(1976): 485-95

NOURSE, A.D. Assistant General Manager, S.A. Sugar Association. Personal communication, 1984

ORTMANN, G.F. "The Economic Feasibility of Producing Ethanol from Sugarcane in South Africa". Ph.D. thesis, University of Natal, Pietermaritzburg, 1985

REPUBLIC OF SOUTH AFRICA. *White Paper on the Agricultural Policy of the Republic of South Africa.* WPM-84, 1984

WALLACE, T.D. "Measures of Social Costs of Agricultural Programs". *J. Farm Econ.* 44(1962): 580-94.