AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

A NOTE ON HIDDEN GAINS AND LOSSES OF BUFFER STOCK SCHEMES FOR WOOL

A. C. LEWIS

Lincoln College, University of Canterbury

This note is concerned with one aspect of the methodology for examining the gains and losses of a buffer stock scheme for wool. It is shown that it is incorrect to debit interest due on capital tied up in stocks of wool without, at the same time, crediting a portion of this to the grower. The errors that can occur in calculations that do not take account of the changed time distribution of growers' receipts are demonstrated.

A buffer stock authority could be seen to be beneficial in two aspects. First, there may be some advantage in the stabilizing effect of the Wool Authority's intervention. Second, the growers will recognize some advantage if a scheme raises their return and at the same time covers the cost of operation. This second benefit means that for a two-year scheme operation, with equal quantities of wool coming from the grower each year (the Powell-Campbell simplification), the Wool Authority must sell its stocks 'at an average price approximately 7d per lb higher than it buys them, this margin being just sufficient to meet all its trading expenses including a 6 per cent return on working capital'. [1] This 7d per lb, of course, depends on further assumptions about the size of the clip and the price level. Approximately half of it consists of the interest charge.

After this has been taken into account, for the scheme to benefit the growers, the nature of the demand schedules in the two periods must be such that the price raising effect of the Authority's purchase must be greater than the price lowering effect of stock disposal.

But there is another advantage of the scheme as outlined by Powell and Campbell which they do not recognize.

While it is proper to charge interest on capital tied up in the scheme to the cost of operations, it is also proper to credit interest to those who receive payment earlier than they would have without the scheme. Even if the total return for the two periods to the grower is unchanged by the intervention of the Authority, the earlier receipt of some part of this return will benefit the grower. The time shape of the grower's income will be improved.

Powell and Campbell define net returns arising from the operation of a buffer stock scheme as '. . . total revenue accruing to the wool growers under the scheme, minus total returns which would have been secured in the absence of the scheme, plus (or minus) the trading profits (or losses) made by the Wool Authority'. From this definition they derive the formula

$$N_o = D_1 - L_o - H_o - 2F - V_o - M_o$$

for a scheme that operates over two periods.

Where N_o = Net returns from the scheme

F = Fixed cost of administering the scheme for one year

V_o = Variable costs

M_o = Interest on working capital (K_o)
L_o = Hidden loss (gain if negative) from depressing effect on price of selling stocks
H_o = Hidden loss (gain if negative) from price raising effect of purchasing stocks. H_o does not include K_o and is therefore a loss to the scheme, not to the grower.

The term K_o does not come into the formula since, as a payout by the Authority to the grower for the stocks purchased in period 0, it is a transfer payment.

Under the scheme the grower receives $K_o - H_o$ more in the 'buying-in' period than he would have without the scheme. He may either invest this or spend it on consumption. If he invests it at i rate of interest then he will have $(1 + i)(K_o - H_o)$ at the end of period 1 and his net revenue will gain by $i(K_o - H_o)$.

If he consumes this extra $(K_o - H_o)$ in period 0 then he does so because he prefers consumption of $(K_o - H_o)$ in period 0 to consumption (or reinvestment) of $(1 + i)(K_o - H_o)$ in period 1, i.e. his *rate of time preference* is greater than i. In any case the gain in net revenue will be at least $i(K_o - H_o)$.

If we make the conventional assumption that $i = B$ where B = interest rate to the Authority and noting that $BK_o = M_o$, then M_o is a 'transfer payment' as is K_o and should not be included in the formula. Instead it should be replaced by BH_o, that is, by iH_o.

BH_o will only equal M_o when the elasticity of demand in period 0 (ED_o) is infinite—in which case there would be no point in having a scheme anyway.

It can easily be shown that when

$$\begin{aligned} 0 > ED_o > -1 \quad &, \quad H_o < 1 \\ ED_o = -1 \quad &, \quad H_o = 0 \\ ED_o < -1 \quad &, \quad H_o > 1 \end{aligned}$$

M_o can still be included in the trading profit computations and if Powell and Campbell's assumptions about zero trading profits are retained then the gains and losses given in the article should be modified in two ways.

(1) M_o should be added to all figures.
(2) BH_o should be subtracted from all figures.
BH_o will depend on ED_o.

This calculation is equivalent to debiting M_o to the scheme and crediting $B(K_o - H_o)$, since $M_o = BK_o$.

Table IV in the Powell-Campbell article is calculated with an assumed average floor price of 50 pence (Australian currency) per lb and an output in each year of 1540 million lb. Ten per cent of the clip is acquired in period 0. On this basis Table 1 was calculated too. Table 2 is Table IV from the Powell-Campbell article with the revised calculations in parentheses.

At elasticities in the purchase period of less than minus unity the interest due on the capital tied up in stocks is greater than that due to the earlier receipt of income. At elasticities less than minus three, Powell and Campbell's calculations confer an erroneous advantage on the scheme; for elasticities greater than minus three they confer an erroneous disadvantage on the scheme.

TABLE 1

Net Interest on Wool Authority's Working Capital and Growers' Hidden Loss

Net Interest [a]	Elasticity of Demand During Purchase Period							
	−0·5	−0·7	−0·9	−1·0	−1·1	−1·5	−3	−10
	−1·73[b]	−0·79	−0·02	0	+0·02	+0·65	+1·27	+3·65

[a] Interest on working capital = £1·9 m.
[b] Expressed in £ million.

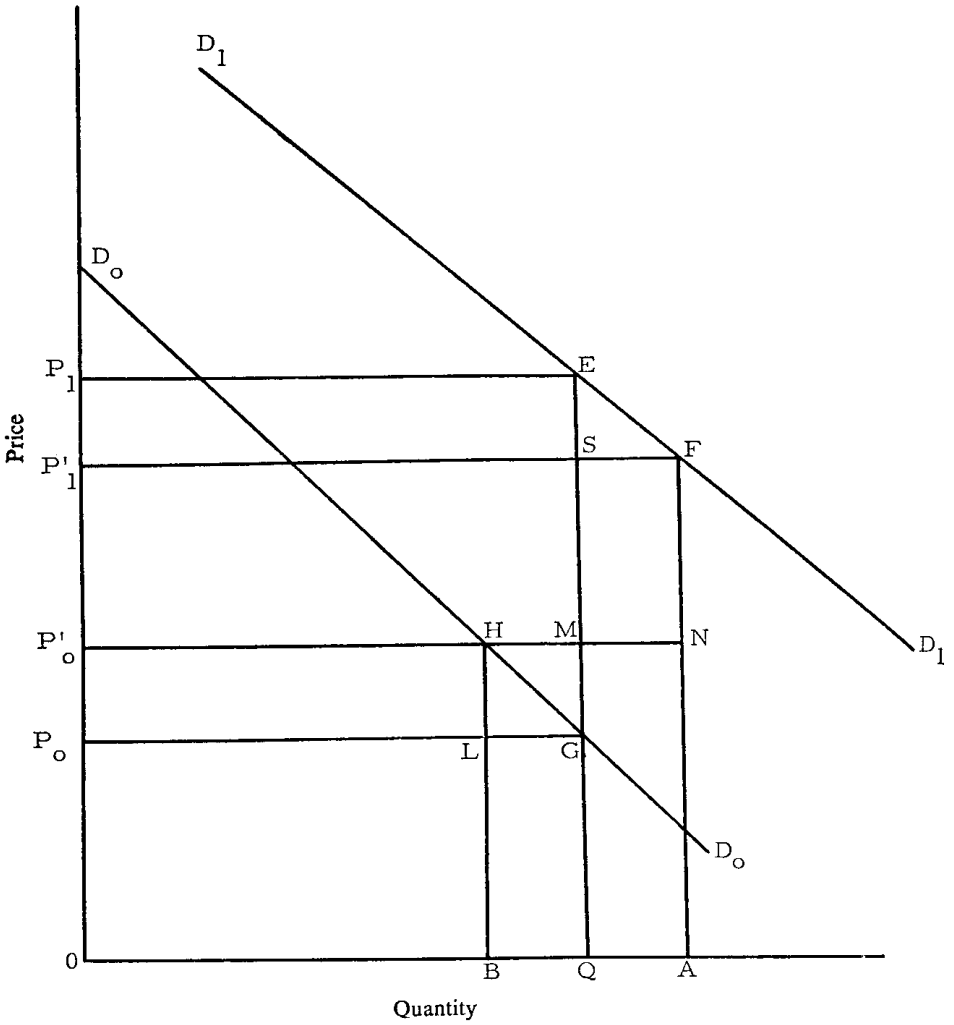

FIG. 1—Price-quantity relations for a buffer stock scheme.

It is instructive to review the matter in terms of Gruen's [2] diagrammatic representation of the situation. This is done with reference to Figure 1.

OQ is produced and available for purchase in each period. The demand curve D_o indicates that in period 0 buyers would be willing to

TABLE 2

Hidden Gains and Losses Resulting from the Floor-Price Scheme[a]

Elasticity of Demand during Disposal Period	*Elasticity of Demand During Purchase Period*							
	− 0·5	− 0·7	− 0·9	− 1·0	− 1·1	− 1·5	− 3·0	−10·0
−0·5	−15·4[b] (−11·8)[c]	−31·5 (−28·8)	−40·9 (−38·8)	−44·3 (−42·4)	−47·1 (−45·4)	−54·6 (−53·4)	−65·3 (−64·7)	−73·0 (−74·8)
−0·7	+ 7·9 (+11·5)	− 8·2 (− 5·5)	−17·6 (−15·5)	−21·0 (−19·1)	−23·7 (−22·0)	−31·3 (−30·1)	−42·0 (−41·4)	−49·7 (−51·5)
−0·9	+20·3 (+23·9)	+ 4·2 (+ 6·9)	− 5·2 (− 3·1)	− 8·5 (− 6·6)	−11·3 (− 9·6)	−18·9 (−17·7)	−29·5 (−28·9)	−37·3 (−39·1)
−1·0	+24·6 (+28·2)	+ 8·5 (+11·2)	− 0·9 (+ 1·2)	− 4·3 (− 2·4)	− 7·1 (− 5·4)	−14·6 (−13·4)	−25·3 (−24·7)	−33·0 (−34·8)
−1·1	+28·1 (+31·7)	+11·9 (+14·6)	+ 2·5 (+ 4·6)	− 0·8 (+ 1·1)	− 3·6 (− 1·9)	−11·2 (−10·0)	−21·8 (−21·2)	−29·6 (−31·4)
−1·5	+37·1 (+40·7)	+21·0 (+23·7)	+11·6 (+13·7)	+ 8·2 (+10·1)	+ 5·5 (+ 7·2)	− 2·1 (− 0·9)	−12·8 (−12·1)	−20·5 (−22·3)
−3·0	+49·2 (+52·8)	+33·1 (+35·8)	+23·7 (+25·8)	+20·4 (+22·3)	+17·6 (+19·3)	+10·0 (+11·2)	− 0·7 (− 0·1)	− 8·4 (−10·2)
−10·0	+57·5 (+61·1)	+41·4 (+44·1)	+32·0 (+34·1)	+28·6 (+30·5)	+25·8 (+27·5)	+18·3 (+19·5)	+ 7·6 (+ 8·2)	− 0·1 (− 1·9)

[a] Two year transactions cycle, 10 per cent of the clip acquired.
[b] Expressed in £ million.
[c] Modified figures in parentheses.

take OQ at price P_o. The demand curve D_1 for period 1 is not relevant to the present argument. The stabilising authority acts to take BQ off the market, as a consequence OB is available to commercial buyers who are willing to pay P'_o for this quantity. Growers' income is raised because of this from OP_o GQ to OP'_o MQ—a 'hidden' gain of $P_o P'_o$ MG. The Authority's outlay in period 0 is BHMQ. $P_o P'_o$ MG is available to the growers and they can earn interest on this amount. LHMG is common to both growers and authority. What is of interest is the size of $P_oP'_o$ HL compared to BLGQ. The difference between these two areas is the hidden loss.

No general statement can be made about the size of the hidden loss and the interest on it in terms of slopes, but for constant elasticity demand curves, an elasticity of demand in period 0 of minus unity means that the areas $P_oP'_o$ HL and BLGQ will be equal. In this case the interest charge on the Authority's outlay will just equal the interest due to the grower from earlier receipt of income.

BHMQ is K_o in the Powell-Campbell article; they charge interest on K_o as a cost to the scheme. $P_oP'_o$ MG is $K_o - H_o$ in the Powell Campbell article; they do not not credit interest on this to the scheme. The scheme costs the authority iK_o in interest; the growers benefit by $i(K_o - H_o)$. Net gain is iK_o.

The estimate that 'The Wool Authority sells its stocks on an average price approximately 7d per lb higher than it buys them, this margin being just sufficient to enable the Wool Authority to meet all its trading expenses including a 6 per cent return on working capital', [1] is thus relevant only to trading operations of the Commission. The 3·5d per lb due to interest is more or less transferred to the grower.

References

[1] Powell, A. A. and Campbell, K. O., 'Revenue Implications of a Buffer-Stock Scheme with an Uncertain Demand Schedule', *The Economic Record*, Vol. 38, No. 83 (September 1962), pp. 373-385.

[2] Gruen, F. H., 'Some Hidden Gains and Losses of a Wool Reserve Scheme'. *Australian Journal of Agricultural Economics*, Vol. 8, No. 2 (December 1964), pp. 181-188.