

THE MISCHIEF OF MOVING AVERAGE PRICING

Alan Walters

Averaging in Marginal Cost Pricing

One of the strangest paradoxes is the ubiquity of instructions to fix prices at long-run marginal cost in spite of the clear implication from the theory of welfare economics that one should price at short-run marginal cost. The temptation, apparently common to all bureaucracies, seems to be to use some sort of long-run marginal cost so as to avoid the oscillations (that is, the reality) of short-run marginal costs. In practical terms this implies some averaging or spreading of the fixed costs over the projected outputs to produce some mutant of average costs, and calling it long-run marginal cost. Fixing price according to this bastard concept is theoretically absurd and, in practice, has led to considerable waste.¹

There is, however, some vestigial rationalization for such antics. After all, it is difficult to measure short-run marginal costs, and in most industries the short-run marginal cost does tend to move in greater amplitude than average costs. The task of tracking short-run marginal cost may be so expensive that it is best not to try, since the gains would not exceed the cost. (I have yet to see this "burden of proof" type of argument demonstrated. But no matter.)

Such a defense, however flimsy, cannot be deployed to defend other types of averaging of marginal opportunity costs which, apparently, are becoming common in the pricing policies for agriculture. In many countries in the Third World, the government fixes the prices offered to domestic producers of some important agricultural commodities. Such government price fixing often ostensibly reflects politically motivated favored treatment for certain groups. In other

Cato Journal, Vol. 7, No. 1 (Spring/Summer 1987). Copyright © Cato Institute. All rights reserved.

The author is Professor of Economics at Johns Hopkins University and a Senior Fellow of the American Enterprise Institute. During 1981–84, he was Personal Economic Adviser to the Prime Minister of the United Kingdom.

¹See, for example, Walters (1968).

cases, however, reforming governments have embraced the principle that domestic prices should be fixed to reflect the opportunity cost as reflected in world market prices. The ostensible objective is to bring farm-gate domestic prices into line with world market prices—allowing for the cost of transportation of wheat from, say, Kansas, and adding on a supposed “compensating tariff” (of 25 percent, as an example) so as to treat agriculture the same as the proposed protected industry. Note, however, that the price in Kansas does *not* reflect any additional special export promotion subsidies that would nowadays undoubtedly accompany an export of grain from either the United States or the European Economic Community (EEC). In that sense the Kansas price basis is above the marginal opportunity cost. One might argue that this is explicit dumping and so should be shunned in pricing policy; in order to avoid red herrings, this view, although in my opinion fatally flawed, is assumed to be correct for the remainder of this paper.

Smoothing Policies and Moving Averages

The mechanism by which the price in any year is determined, however, typically involves taking a *moving average* of the past three years, the current year, and the futures market quotations of the next year. It is therefore a five-year moving average of market prices.² As with all such processes, the effect of taking a five-year moving average will depend critically on the time pattern of oscillations in the underlying series. One would normally choose a five-year moving average to smooth out an underlying five-year cyclical component of the series, as well as the presumed random elements entering into the price in any given year (due to weather, civil unrest, and so on). In order to discuss the effects in a sensible way I shall assume that the average period of cyclical oscillation is exactly five years. This gives an air of verisimilitude since the *average* period of oscillation of the business cycle over the last century is probably in the region of four to five years.

Even more important is the issue of the underlying *trend*. Granted the period of cyclical movement, then the moving average will reveal the trend in prices. Since the middle of five years is mid-year for year three, and since year four is the current year, the moving average will locate the trend of prices *one year before*. Thus, with all the components being well behaved, the procedure will fix government

²In practical application there are many problems of valuation, such as the appropriate exchange rate to translate Kansas dollar prices into local currency. These are irrelevant to the main point that is being made in the text.

prices this year at *last* year's trend value. Unless the world market prices exhibit stationarity, that is to say the trend is neither increasing nor decreasing, this procedure will give an additional bias against adjusting to the trend. In order to avoid confusing this effect with all the others, I shall *provisionally assume stationarity* of the underlying price series.

An Idealized Illustration

A numerical illustration not too far from actual experience may illustrate the process. Suppose the annual price goes through the following sequence:

Year:	1	2	3	4	5	6	7	8	9	10
Price:	80	40	70	90	100	80	40	70	90	100

The five-year moving average is constant at 76. For two years of the cycle where the price is 80 and 70, the moving average is within less than 10 percent of the actual price. But for the boom years it is only three quarters of the market price, whereas in the depths of the recession the moving average is 90 percent above the market price.

Does it make sense to isolate or insulate or "protect" the farmer from the realities of world markets? Perhaps political realities, whatever that may be taken to mean, may dictate no other course. But, whatever the politics may be, it is worth examining the *economic* consequences of such a policy. It is as well to examine the policy consequences first in the case where the moving average has exactly the right periodicity and where it nicely finds the true trend. Next we can examine the consequences of confounded cyclicalities and shifting trends and other unfortunate characteristics of real world price series. Finally we review briefly the historical examples of such smoothing schemes, such as the marketing boards in British West Africa, and the political temptations of such world market insulations.

Giving the "Right Signals"

The usual ostensible argument for MAS (moving average smoothing) is that the price will reflect the long-run trend and so will not give rise to oscillations in gross farm incomes that are thought to be not in the farmers' interest. Further, the steady price of 76 would be the appropriate signal for long-run investment decisions, whereas, were the farmers subjected to the fluctuating prices in the real world, they would probably make the wrong decisions. (In this stylized case, this amounts to the assertion that the farmer cannot do simple addition and carry out his own averaging. One's credulity is much

strained; even illiterate peasants tend to be numerically rather sharp at least where their own interests are concerned.)

In our previous example, the farmer with the same production costs in each year and the same quantity of output annually would have precisely the same net and gross income over the five-year period—whether there is a MAS of prices or not. The only gain is that of a constant rather than a variable income flow. In many countries this is thought to be a significant improvement since it avoids the farmer borrowing and lending in order to finance a stable consumption pattern. If there are distortions in credit markets this may be a considerable gain. (Although the policy implication surely is to tackle such distortions directly, rather than limit the supply of and demand for credit.) Assuming that administration of such a scheme is costless, and that other things are equal, the proposed smoothing will be a good thing.

Other things, however, will never be equal. Earlier we assumed that, with oscillating world prices for the farmer's outputs, he would not be able to adapt his production to take advantage of high prices or to avoid the price troughs. Even in the short run, and a fortiori if the cycle is predictable, the farmer will adjust his outputs and the amount he produces, stores, or sends to market. Only if the output/market response is near zero or negatively related to price (that is, the supply curve is backward bending for that rather wide price range) are there no gains to be made from allowing world prices to rule. I suspect there is now sufficient accumulated evidence to dismiss such a perverse form of response. Supply curves slope upwards and, even in the short run of a year or so, there is considerable flexibility of supply. The farmer will be able to *increase* his income and welfare by adapting to world market prices. Isomorphically, the consumer will be better off with the variable world market prices than the MAS controlled price, since he will adjust his purchases—substituting into the commodity during the price slump, and economizing, by switching to substitutes, during the price boom. And it follows that if *all* or a sizable number of countries follow this policy of open markets, this will mitigate the oscillation in world prices. In other words this is truly a boost, rather than beggar, thy neighbor policy.

Imperfect Credit Markets

The main rationalization for MAS is that credit markets are “imperfect” or more positively involve large “distortions.” Better, it is said, to smooth away the need for credit. Of course, by so doing one

smooths away a corresponding supply of credit from the private sector. But in any case the *demand* for total credit is not diminished; it is simply transferred to the government. Indeed since the MAS policy precludes the adjustments referred to above, the demand for credit will be *greater* with the MAS than with the open policy. So the argument boils down to a preference for more government borrowing and lending rather than giving the private sector a choice in this process.

Even if one accepted the fact of great distortions in private credit, one should also examine the existence of large distortions in the alternative government credit markets. The issue of government paper, including currency, is associated with obvious distortionary effects— inflation, compulsory government bond and note holdings by banks and other institutions at below-market yields, government credit allocations according to political preference rather than market performance, and so on. Nor can government produce anything comparable to the vast informal private credit market within extended families and other groups which provides for the majority of private credit needs.³

It is not at all clear that on balance the distortions are more with the private than the public sector. But even if this be accepted, then it does not follow that the appropriate policy is to shelter producers and consumers of the chosen commodities from the exigencies of credit markets. Surely as a matter of efficiency, if not equity, *all* those who use such distorted credit markets should have somewhat similar treatment to the farmers and consumers of the specific commodities under the MAS arrangement. In the face of ubiquitous distortions the obvious policy is to try to eliminate or modify them; if one cannot do so then consider a ubiquitous subsidy (or tax relief) to all distorted credit markets and calculate the cost/benefit involved. In any case, there is no rational argument for MAS for a certain limited number of commodities.

Shocks and Bends in Trends

We conclude, therefore, that with the simple stylized model of MAS there is little to be gained and much to be lost from such smoothing of prices. We now need to examine rather more complex cases to see whether this conclusion is likely to be modified. First, it is clear that much of the variation in prices is due to “shocks” or

³Although I concede that in some countries, where fraudulent conversion of public funds to private uses is on a massive scale, it is possible that the fraudulent funds are channeled into productive uses, albeit in the form of capital flight.

random effects due to weather, wars, pests, disease, and tastes. The arguments deployed above for the cyclical case carry over, *mutatis mutandis*, to the shock effects. The only important distinction, on which fortunately little hinges, is that the cyclical pattern could be foreseen, whereas the random effects cannot.

The second complication—a shifting trend—is much more important in practice and in its implications. By the nature of MAS, it will pick up a new trend value only gradually over the five-year period of the process. By the end of the five years, the centered value will track the new trend. It may strike one that five years is a long time for such an adjustment process, since there will be waste, which might be very considerable, over that period. In many cases it is obvious quite quickly that there has been a change in the level or the trend of a price. For example, it was perfectly clear in 1974 that the real oil price was not going to resume its downward trend of the past two or three decades; 1974 was no one-off outlying deviation. A moving average process applied to oil would have delayed the full adjustment until 1979. From the research that has been pursued by Bela Balassa on the adjustment to the oil shocks, we know that the quicker the countries allowed the oil price to increase the less costly the adjustment and the fewer the distortions caused.⁴ It seems at least likely that such a conclusion would apply to most other important commodities.

Empirical Experience with “Smoothing”

Briefly, we may refer to practical examples of such smoothing operations. Perhaps the best researched examples are the West African marketing boards set up by the British colonial administrations in 1946–48. The authorities stated that the export monopolies would be used to stabilize producer prices to shield producers from short-term and cyclical price fluctuations, and that they would on no account be used for taxing producers and withholding money from them. The outcome was very different and the boards have, for more than four decades, been a major discouragement to wealth creation in the constituent countries.⁵ Of course a MAS type of system should in principle prevent any such taxation (or subsidy); but the intention in setting up the marketing boards was exactly the same. Guarantees that the boards would not be used for taxation were reiterated formally to the parliament of the United Kingdom by ministers of the

⁴See, for example, Balassa (1985).

⁵See especially Bauer (1984).

crowd. One may therefore doubt whether the MAS would be resolutely pursued during the high-price boom stage of the cycle. The "ideal" of the MAS is alternating (albeit implicit) taxes and subsidies to equalize the price level. But so far as I am aware, there is no working example of such a nicely balanced system. The political and institutional pressures are such that subsidies or taxes persist for long periods, usually many decades.

Other examples of smoothing operations, usually aligned with buffer stock schemes, are to be found in the recently collapsed tin cartel. The precise reasons for the demise of the buffer stock scheme will have to await the unraveling of their most complicated affairs, but it would not be premature to state that one of the main reasons was to misidentify a *secular* shift in price as a mere *cyclical* oscillation. The cost of servicing the large credit needed to finance excess supply and stocks of tin at the support price proved too much for the resources of the cartel members and their bankers.

With its support levels well above world market prices and the promise of adjustment toward world market prices, the MAS as applied to Third World agriculture recalls the Common Agricultural Policy (CAP) of the EEC. Again the intention was to smooth the prices and supposedly the incomes of European farmers in an adjustment so that eventually agriculture, like industry, could compete more or less freely on world markets. The outcome over the last 29 years has been rather different from this plan.⁶

One of the most poignant aspects of such smoothing schemes is that they are very easy to get into, but very difficult to get out of. Whether they support prices below world market values, as in the case of the West African marketing boards, or above, as in the case of the CAP and United States, the system generates its rents to parties and cliques who find it in their interest to block change, however rational and equitable that reform may be. While informed opinion accepts MAS as an appropriate policy, so will the interested parties deploy such principles to reap the rewards of protectionism (as in the EEC) or confiscation (as in West Africa). MAS provides a veil of legitimacy and intellectual respectability for exploitation and inefficiency.

Conclusion

The thrust of my argument is that, while the instinct of introducing world market prices into LDC pricing policies is entirely laudable,

⁶The United States has also indulged in similar policies for certain commodities, for example, cotton and sugar, in "smoothing" adjustment to world market realities, with effects similar to those of the EEC.

the practice of smoothing by moving average (or indeed any other such technique) negates and even distorts the benefits to be derived from opening economies to the reality of opportunity cost. Moving average smoothing is not merely a less painful way of getting countries to adjust to opportunity cost on world market prices; it is almost precisely the antithesis. It isolates the farmer from the realities of supply and demand, and gives him and the consumer the wrong signals year in year out. Thus it distorts both production and consumption. MAS is easy to get into, and the longer it goes on, the more difficult it is to change. Moreover, the process lends itself to political manipulation. There is no inherent reason why the moving average process should be five years; equally good arguments can be made for two or ten years. And politicians will adjust the time frame when it serves their purposes.

While the objective should be to allow the reality of opportunity cost to be reflected in prices, there is also good reason to enable anyone to insure himself against the oscillation of prices. This can be done by government eliminating restrictions on forward and options markets—or perhaps by government deliberately promoting such contractual arrangements. There are myriads of possible structures that would enable a farmer to buy degrees of stability in both his output and input prices. Under the MAS, even when operating “perfectly,” the farmer has no choice; he has to “buy” the stability of the MAS scheme of prices. World market prices, together with such futures and options that are mutually agreed, will much expand his choice as well as that of many others.

References

- Balassa, Bela. *Change and Challenge in the World Economy*. London: Macmillan, 1985.
- Bauer, Peter T. *Reality and Rhetoric: Studies in the Economics of Development*. Cambridge, Mass.: Harvard University Press, 1984.
- Walters, Alan A. *The Economics of Road User Charges*. Baltimore: Johns Hopkins University Press, 1968.