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# The Lag From Money To Prices

KEITH M. CARLSON

ECONOMISTS generally agree that money affects prices with a lag. Research conducted at this Bank suggests that a change in the growth rate of money is fully reflected in the inflation rate in about five years. This conclusion was based on a statistical analysis of the relation between money and prices in the U.S. from 1955 through the 1960s.[1]

The length of the lag between money and prices represents important information that must be considered in the policy formulation process. The policymaker must allow for such lags when developing a policy to control inflation; he must also consider possible future impacts of short-run policies designed to combat recession. Given the historical presence of lags between money and prices, a policy designed to control inflation will not have immediate effects. The possible short-run costs (benefits) of a restrictive (stimulative) policy in terms of employment and output must be assessed against its long-run benefits (costs) in terms of the price level. The nature of the lag enters importantly into the decision to adopt a specific policy, whether it be short- or long-run in character.

The purpose of this article is to examine the relation between money and prices in light of the U.S. economic experience of the 1970s. Statistical results are summarized first and the economics of information and search are then summarized to provide a theoretical rationale for the results.

## *Statistical Results*

Karnosky's original estimate of the price equation was based on the sample period from 1955 through mid-1971 and used what is now known as "old M1" for the money variable. A version of this equation, estimated by using the "new" M1B definition of money, is summarized in table 1.[2] Compared to the original results, using a different definition of money and modifying the sample period affects the pattern of the coefficients very little. The sum of the coefficients is one, as would be expected from economic theory.[3] The mean lag is estimated at 10.96 quarters for the 1955-69 sample period.[4]

[1]Denis S. Karnosky, "The Link Between Money and Prices," this *Review* (June 1976), pp. 17-23. Also see Albert E. Burger, "Is Inflation All Due to Money?" this *Review* (December 1978), pp. 8-12.

[2]In this article, money is defined as M1B (currency plus checkable deposits at financial institutions). See R. W. Hafer, "The New Monetary Aggregates," this *Review* (February 1980), pp. 25-32. The sample period differs slightly from Karnosky's for purposes of balancing degrees of freedom, so that the 1970s can be compared with the "pre-1970s".

[3]For a discussion of the theory, see Leonall C. Andersen and Denis S. Karnosky, "The Appropriate Time Frame for Controlling Monetary Aggregates: The St. Louis Evidence," in *Controlling Monetary Aggregates II: The Implementation*, Conference Series No. 9, Federal Reserve Bank of Boston (September 1972), pp. 147-77.

[4]The mean lag serves as a summary measure of the speed with which prices respond to money. It is calculated as a sum of products (where each product is the coefficient times the number of the lag) divided by the sum of the coefficients.

## Table 1
## Estimate of Money-Price Equation: Original Specification

Sample period: I/55-IV/69: $m_{21} = 0$

$$\dot{P} = \underset{(.395)}{-.146} + \sum_{i=0}^{20} m_i \dot{M}_{-i}$$

| | Coeff. | \|t\| | | Coeff. | \|t\| | | Coeff. | \|t\| |
|---|---|---|---|---|---|---|---|---|
| $m_0$ | .041 | 1.276 | $m_8$ | .048 | 3.249 | $m_{16}$ | .069 | 3.943 |
| $m_1$ | .034 | 1.538 | $m_9$ | .054 | 3.783 | $m_{17}$ | .062 | 3.712 |
| $m_2$ | .030 | 1.903 | $m_{10}$ | .059 | 4.305 | $m_{18}$ | .053 | 3.511 |
| $m_3$ | .029 | 2.171 | $m_{11}$ | .065 | 4.673 | $m_{19}$ | .039 | 3.338 |
| $m_4$ | .030 | 2.235 | $m_{12}$ | .069 | 4.795 | $m_{20}$ | .022 | 3.191 |
| $m_5$ | .033 | 2.294 | $m_{13}$ | .072 | 4.694 | $\sum m_i$ | 1.031 | 7.870 |
| $m_6$ | .037 | 2.475 | $m_{14}$ | .073 | 4.468 | Mean lag | 10.959 | 5.634 |
| $m_7$ | .042 | 2.798 | $m_{15}$ | .072 | 4.202 | | | |
| $\bar{R}^2$ | .525 | | | | | | | |
| S.E. | 1.066 | | | | | | | |
| D.W. | 2.00 | | | | | | | |

Notation: $\dot{P}$ = compounded annual rate of change of GNP deflator; $\dot{M}$ = compounded annual rate of change of M1B.

To examine the nature of the money-price lag in light of the experience of the 1970s, it is necessary to consider other factors that influenced the price level during this period. From August 1971 to April 1974, a government program of wage and price controls disrupted the money-price level link. In addition, in late 1973 and early 1974, substantial increases in energy prices occurred. At various times during the 1970s, agricultural conditions also appeared to affect movements in the price level or, more properly, in the indexes that are used to measure changes in aggregate prices.

Because of these factors, the basic price equation in this article has been respecified to include prices of food and energy relative to overall prices and dummy variables to capture nonmonetary effects of wage and price controls. Table 2 summarizes the results for the 1970-79 period (center columns) and, for comparison purposes, also summarizes the results of this same specification for the 1955-69 period (left-hand column). As implied in Karnosky's specification, food and energy prices did not play a statistically significant role in explaining inflation during the 1955-69 period.[5]

The results for 1970-79 indicate a number of changes relative to those for 1955-69. The price control dummy is significant with a negative sign, and the post-control dummy has the expected (positive) sign but is not significant. The sum effect of energy prices, as measured by the producer price of fuels and related products and power, is positive and significant. The food price variable has the expected sign and is just short of being significant. More importantly, however, the pattern of coefficients on money is substantially different from that estimated for 1955-69. No coefficients are significant after the eighth lag, and the mean lag is 5.05 quarters. The sum of the coefficients, although close to one in value, is not significantly different from zero.

These results suggest that the 20-quarter lag structure is no longer appropriate for data from the 1970s.

[5]Throughout this article, "statistical significance" refers to a two-tailed test conducted at the 5 percent level. For large samples, the critical "t" is ±1.96.

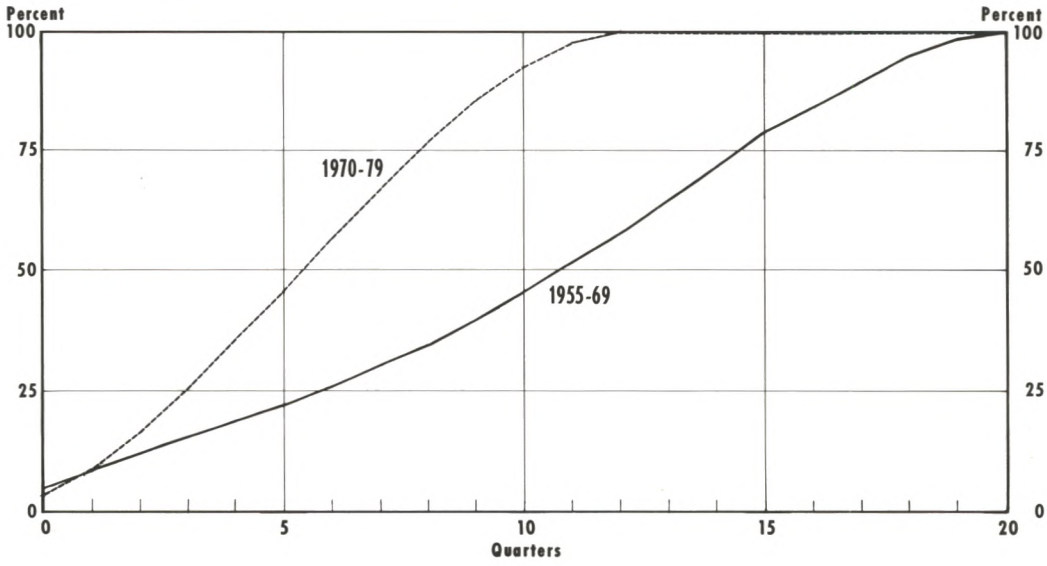
## Table 2
## Estimates of Money-Price Equation: Modified Specification

$$\dot{P} = \text{const.} + \sum_{i=0}^{k} m_i \dot{M}_{-i} + d_1 D_1 + d_2 D_2 + \sum_{i=0}^{6} e_i (\dot{P}_E - \dot{P})_{-i} + f (\dot{P}_F - \dot{P})$$

| | I/55-IV/69: $m_{21} = 0$ | | I/70-IV/79: $m_{21} = 0$ | | I/70-IV/79: $m_{13} = 0$ | |
|---|---|---|---|---|---|---|
| | Coeff. | \|t\| | Coeff. | \|t\| | Coeff. | \|t\| |
| $m_0$ | .048 | 1.215 | .035 | .680 | .038 | .440 |
| $m_1$ | .041 | 1.484 | .070 | 1.881 | .065 | 1.454 |
| $m_2$ | .036 | 1.875 | .096 | 3.168 | .087 | 2.800 |
| $m_3$ | .034 | 2.217 | .115 | 3.821 | .104 | 2.963 |
| $m_4$ | .034 | 2.307 | .125 | 3.777 | .116 | 3.005 |
| $m_5$ | .036 | 2.310 | .129 | 3.458 | .123 | 3.222 |
| $m_6$ | .039 | 2.407 | .128 | 3.789 | .124 | 3.443 |
| $m_7$ | .044 | 2.641 | .121 | 2.692 | .121 | 3.324 |
| $m_8$ | .049 | 3.007 | .111 | 2.308 | .113 | 2.804 |
| $m_9$ | .054 | 3.470 | .097 | 1.926 | .100 | 2.213 |
| $m_{10}$ | .059 | 3.946 | .081 | 1.549 | .082 | 1.744 |
| $m_{11}$ | .063 | 4.293 | .064 | 1.182 | .056 | 1.404 |
| $m_{12}$ | .067 | 4.396 | .046 | .833 | .032 | 1.159 |
| $m_{13}$ | .069 | 4.268 | .028 | .508 | — | — |
| $m_{14}$ | .070 | 4.014 | .011 | .210 | — | — |
| $m_{15}$ | .069 | 3.728 | –.003 | .058 | — | — |
| $m_{16}$ | .065 | 3.459 | –.015 | .296 | — | — |
| $m_{17}$ | .059 | 3.224 | –.023 | .506 | — | — |
| $m_{18}$ | .050 | 3.026 | –.026 | .690 | — | — |
| $m_{19}$ | .037 | 2.858 | –.024 | .850 | — | — |
| $m_{20}$ | .020 | 2.717 | –.016 | .990 | — | — |
| $\Sigma m_i$ | 1.044 | 7.457 | 1.150 | 1.631 | 1.164 | 3.297 |
| Mean lag | 10.542 | 5.201 | 5.047 | .756 | 5.908 | 3.279 |
| $e_0$ | .002 | .089 | .001 | .076 | .003 | .314 |
| $e_1$ | .004 | .216 | .013 | 1.652 | .014 | 1.755 |
| $e_2$ | .007 | .370 | .018 | 2.089 | .018 | 2.097 |
| $e_3$ | .010 | .574 | .017 | 2.465 | .017 | 2.602 |
| $e_4$ | .013 | .706 | .013 | 2.233 | .013 | 2.892 |
| $e_5$ | .013 | .674 | .008 | 1.123 | .007 | 1.386 |
| $e_6$ | .009 | .595 | .002 | .407 | .002 | .444 |
| $\Sigma e_i$ | .058 | .580 | .073 | 2.086 | .075 | 2.586 |
| Const. | –.109 | .281 | –.688 | .174 | –.770 | .356 |
| $d_1$ | — | — | –1.724 | 3.010 | –1.735 | 2.801 |
| $d_2$ | — | — | 1.619 | 1.134 | 1.772 | 1.168 |
| f | –.032 | .536 | .131 | 1.941 | .129 | 1.969 |
| $\bar{R}^2$ | .495 | | .741 | | .728 | |
| S.E. | 1.099 | | 1.264 | | 1.294 | |
| D.W. | 1.94 | | 2.27 | | 2.18 | |

Notation: $\dot{P}$ = compounded annual rate of change of GNP deflator; $\dot{M}$ = compounded annual rate of change of M1B; $D_1$ = price control dummy (III/71-I/74 = 1, 0 elsewhere); $D_2$ = decontrol dummy (II/74-IV/74 = 1, 0 elsewhere); $\dot{P}_E$ = compounded annual rate of change of producer price index of fuels and related products and power; and $\dot{P}_F$ = compounded annual rate of change of food deflator.

Chart 1
**Cumulative Effect on Rate of Price Increase of a Permanent Increase in the Rate of Growth of Money**
Percent of Total Effect




The results of shortening the lag structure to 12 quarters (with the thirteenth constrained to equal zero) are shown in the right-hand columns of table 2. With this specification, the effect of money on prices equals slightly more than one after 12 quarters. The mean lag for the specification is 5.91 quarters, which is significantly different from the 10.54-quarter mean lag obtained for the 1955-69 period.

Chart 1 portrays the results from the left- and right-hand columns of table 2 and indicates that prices apparently responded more rapidly to changes in money during the 1970s than previously. Why did this happen and what does it imply in terms of formulating a policy to combat inflation?

## *Theoretical Rationale for Lags*

Questions about the lag between prices and money can be analyzed within the framework of information and search theory.[6] To facilitate an understanding of lags and of the reasons they change, this article develops a theory of lag determination.[7]

Consider a typical firm that is a price-setter in an economic environment in which information regarding equilibrium prices and quantities is costly to obtain on both sides of the market.[8] Firms do not possess full information about the prices or the quality of their competitors' products. Similarly, customers do not possess full information about the prices that all sellers are charging. Firms must determine whether a change in demand for their products is caused by a switch in consumer preferences or by a general shift in aggregate demand. Moreover, they have to decide whether such a shift is permanent or temporary.

For purposes of illustration, assume that the typical firm obtains information about the demand for its product by observing its sales at the current "posted" price. Given the fact that the firm possesses accumulated information on quantities sold at a given price and assuming that the firm knows its own cost structure, it will eventually learn which price is optimal for its operations.

[6]Most of the literature on information and search theory is in the context of labor markets. For a survey, see Steven A. Lippman and John J. McCall, "The Economics of Job Search: A Survey," *Economic Inquiry* (June and September 1976), pp. 155-89, 347-68. For a discussion of the money-price lag within the context of rational expectations, see Bennett T. McCallum, "Price Level Adjustments and the Rational Expectations Approach to Macroeconomic Stabilization Policy," *Journal of Money, Credit and Banking* (November 1978), pp. 418-36.

[7]Although the economics of information and search is not necessarily a theory of lag determination, this is a common implication of the analysis, as it is usually applied.

[8]The classic article which develops this point is Kenneth J. Arrow, "Toward a Theory of Price Adjustment," in Moses Abramovitz, ed., *The Allocation of Economic Resources* (Stanford: Stanford University Press, 1959), pp. 41-51.

Figure 1
**Economics of the Firm Facing Uncertain Demand**

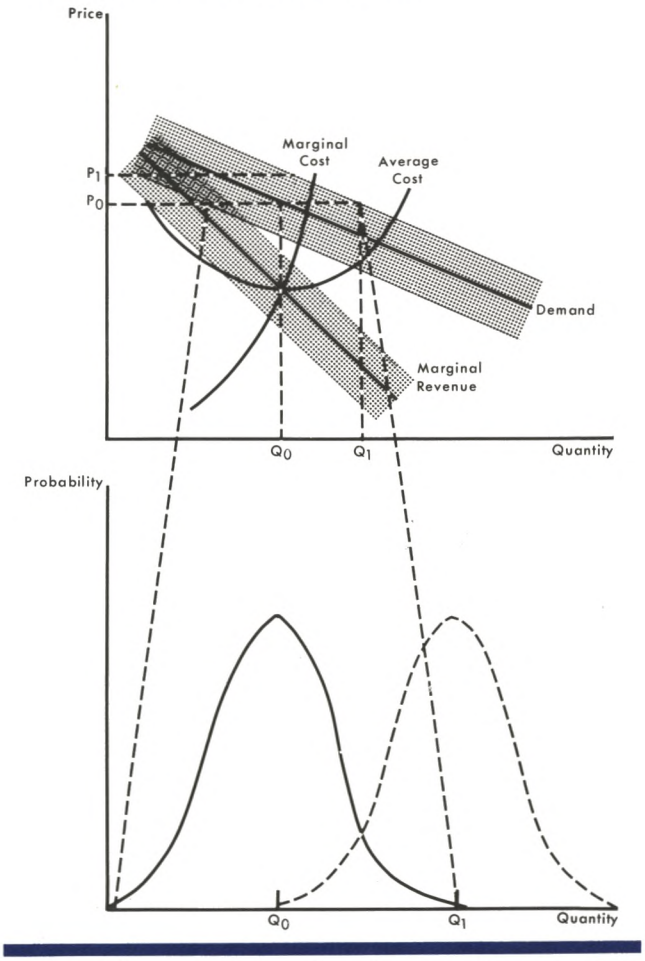



Figure 1 summarizes the situation for a typical firm. If costs and demand are known perfectly, $P_0$ and $Q_0$ represent the profit-maximizing price and quantity. More realistically, perhaps, the demand curve can be viewed as the average rate of sales for given prices based on experience, with some "normally expected" variation around this average. For the sake of exposition, this demand curve is shown in the top half of figure 1 as a band rather than a line, with the additional assumption being made that quantity sold at a particular price is distributed normally about the mean. The bottom half of figure 1 summarizes the nature of this demand curve in terms of a probability distribution. The solid line in the bottom half of figure 1 is a subjectively determined distribution that is based on sales experience, as well as other informational factors, when the price of the product is equal to $P_0$.

Each additional observation of quantity sold at $P_0$ will affect the firm's assessment of the nature of the distribution it faces. Suppose that, in a particular period, the firm realizes sales of $Q_1$ at price $P_0$; will it change its price? If demand shifts so that $Q_1$ is the mean of the new distribution, the profit-maximizing price would be $P_1$ (and the distribution as drawn with respect to $P_1$ will be slightly to the right of $Q_0$).[9] However, the firm will not change its price to $P_1$ unless its subjective assessment of the distribution has shifted accordingly; that is, the firm will change its price to $P_1$ only if the solid line shifts to coincide with the $Q_1$ distribution (drawn with respect to $P_0$).

In the absence of other information, it is reasonable to assume that the firm's subjective distribution will shift only slightly with a single observation, depending on past experience. Continued sales around $Q_1$ for a number of periods, however, would eventually shift the subjective distribution so that it would be centered over $Q_1$. Furthermore, the speed with which the firm will move to $P_1$ depends on the nature of the distribution around $Q_1$. If sales are distributed narrowly around $Q_1$, the firm will have greater confidence in the new distribution than if sales are distributed broadly. Over an extended period of time, the magnitude of price response will be the same but the speed of response will vary.

Even with a new subjective distribution, the firm will not immediately change its price. The fact that the process of adjusting price is costly will influence the firm's decision to change price. Changing price tags, making up new price lists, notifying salesmen, and/or reprogramming computers all involve costs. In addition, because firms do not know precisely what their competitors will do, a premature decision to increase price could result in a loss of customers. There is also a possible loss of customer goodwill if a firm changes price frequently, thereby shifting additional search costs to consumers. The change in sales must be both sufficiently large and perceived as relatively permanent before the firm will adjust its price.

## *The Money-Price Lag in an Aggregate Context*

In a growing economy, firms will experience increasing sales over time and/or the number of firms will change. However, expansion of quantities sold need not imply rising prices. Prices will rise only if aggregate demand is shifting outward more rapidly

[9]Note that nominal resource costs are assumed to be unchanged. In a general inflation, resource costs will also rise. The focus here is on the firm's response to a shift in aggregate demand. Recognition of such a shift before resource costs increase represents exploitable profit opportunities for the firm.

than aggregate supply (which can be interpreted as a "suitable" aggregation of individual firms' marginal cost curves). If the position of the demand curve is dominated by movements in the stock of money, firms' assessments of demand will depend on their expectations of monetary growth.[10]

This reinterpretation of the money-price lag in an aggregate context can be illustrated in terms of figure 1. $Q_0$ represents an average level of sales for a given planning period and is associated with a given rate of monetary growth. The price will equal $P_0$ if this expected monetary growth is realized.[11] However, if the rate of monetary growth is higher than expected, sales averaging $Q_1$ (at price $P_0$) could be consistently realized. Firms will have to determine whether this change in monetary growth is permanent or temporary. Ultimately, firms must decide whether a price change is necessary. As explained earlier, a change in monetary growth will not necessarily lead to an immediate pricing response by firms. Profit-maximizing considerations will still determine whether the decision to change price should be made immediately or postponed until further information is obtained.

Reinterpretation of the analysis demonstrates how additional information influences the pricing process. Firms derive information about the state of demand by observing their sales. In an aggregate context, however, some connection between monetary growth and firms' sales will also apply. For example, if firms have observed a close relation between sales and monetary growth, their subjective distributions might shift significantly in anticipation of a change in monetary growth. In other words, firms' prices might be changed *in anticipation* of an increase in sales.[12] Information about changes in monetary growth will reduce the lagged impact of money on prices. The whole process of determining price changes involves both sides of the market. If firms' customers have similar perceptions about monetary growth, they will expect prices to change, and firms' loss of customer goodwill, as a result of changing prices sooner, will be reduced.

[10]See Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," this *Review* (November 1968), pp. 11-24.

[11]Different rates of expected monetary growth will, of course, imply different $P_0$s, but costs will also be different so that $Q_0$ need not differ. The emphasis here, however, is on the decision to change price.

[12]See Charles Pigott, "Expectations, Money, and the Forecasting of Inflation," Federal Reserve Bank of San Francisco *Economic Review* (Spring 1980), pp. 30-49.

## *A Suggested Explanation of the Statistical Results*

The analysis suggests that when sales deviate from expected levels, price changes will eventually result. The length of the time interval between sales deviations and price changes will depend on the firm's perception that demand has shifted. This perception is conditioned by (1) the past history of inflation and monetary growth and (2) the distribution of recently observed deviations.

First, as shown by the results summarized in table 2, firms and their customers have developed a greater sensitivity to inflation and monetary growth during the 1970s. During the 1955-69 period, the response of prices to money was quite slow because the early part of the period was dominated by relatively slow inflation. As a result, during the latter part of the period, there was a tendency to consider higher rates of inflation and monetary growth as temporary.[13] During the 1970s, however, economic units began placing more emphasis on recent experience when forming their expectations; they learned from their past errors.

Second, during the 1970s, the nature of the distribution of deviations of money growth from what was expected (and, consequently, deviations of sales from what was expected) appears to have changed considerably. Some summary statistics are presented in table 3. Quarter-to-quarter rates of change are examined for 20- and 12-quarter periods during the full 1955-79 period. These measures are examined to determine if the pattern of monetary growth has changed from the pattern observed for 1955-69.

The summary statistics that appear at the bottom of table 3 indicate that the results are mixed. The mean standard deviation, for example, changed little between the 1955-69 and the 1970-79 periods. However, the standard deviation of the means dropped sharply in the latter period, suggesting that the variation in monetary growth became more regular in the 1970s. This movement toward regularity suggests — although it *does not necessarily imply* — greater predictability. Nonetheless, tentative evidence appears to support the notion that monetary growth became more predictable in the 1970s.[14]

[13]This has been labeled the "return-to-normality" hypothesis. For discussion and statistical results, see David H. Resler, "The Formation of Inflation Expectations," this *Review* (April 1980), pp. 2-12.

[14]The pattern of monetary growth would have to be examined more thoroughly, and probably in conjunction with a formal

## Table 3
## Summary of Monetary Growth: 1955-1979

| End of period | 20-quarter periods | | 12-quarter periods | |
|---|---|---|---|---|
| | Mean | Standard deviation | Mean | Standard deviation |
| IV/55 | 3.14 | 1.88 | 2.23 | 1.54 |
| IV/56 | 2.56 | 1.95 | 1.88 | 1.50 |
| IV/57 | 1.54 | 1.66 | 1.31 | 1.78 |
| IV/58 | 1.74 | 1.97 | 1.33 | 2.09 |
| IV/59 | 1.85 | 2.36 | 1.74 | 2.77 |
| IV/60 | 1.34 | 2.41 | 1.68 | 3.01 |
| IV/61 | 1.71 | 2.47 | 2.06 | 2.59 |
| IV/62 | 1.92 | 2.47 | 1.34 | 2.20 |
| IV/63 | 2.38 | 2.24 | 2.65 | 1.45 |
| IV/64 | 2.42 | 2.34 | 3.43 | 1.65 |
| IV/65 | 3.31 | 1.81 | 4.11 | 1.55 |
| IV/66 | 3.49 | 2.17 | 3.86 | 2.47 |
| IV/67 | 4.28 | 2.38 | 4.55 | 2.87 |
| IV/68 | 5.01 | 2.66 | 5.65 | 3.06 |
| IV/69 | 4.95 | 2.79 | 5.48 | 2.77 |
| IV/70 | 5.15 | 2.71 | 5.42 | 2.15 |
| IV/71 | 5.59 | 2.51 | 5.38 | 2.52 |
| IV/72 | 6.25 | 2.38 | 6.37 | 2.45 |
| IV/73 | 6.05 | 2.45 | 6.92 | 2.15 |
| IV/74 | 5.94 | 2.24 | 6.07 | 2.31 |
| IV/75 | 6.12 | 2.24 | 5.50 | 2.18 |
| IV/76 | 5.85 | 2.12 | 5.18 | 1.71 |
| IV/77 | 6.09 | 2.14 | 6.25 | 2.05 |
| IV/78 | 6.31 | 2.09 | 7.11 | 1.92 |
| IV/79 | 6.89 | 2.20 | 7.97 | 1.80 |
| Mean (1955-69) | 2.78 | 2.24 | 2.89 | 2.22 |
| Mean (1970-79) | 6.02 | 2.31 | 6.22 | 2.12 |
| Standard deviation (1955-69) | 1.21 | | 1.51 | |
| Standard deviation (1970-79) | .46 | | .90 | |

prediction model, before more definitive conclusions could be developed. Expectations formation is a complex process and the modeling of this process is probably still in its infancy. More refined explanations of the shortening of the lag await further research. See, however, Robert J. Barro, "Unanticipated Money, Output, and the Price Level in the United States," *Journal of Political Economy* (August 1978), pp. 549-80.

## *Implications of the Analysis*

The lag in the effect of money on prices appears to have shortened during the 1970s, but the reasons for this contraction are unclear. One interpretation is that recent experience now receives more weight in the formation of expectations. Such a situation would be beneficial for the policymaker, because it indicates that there is less inertia to be overcome in designing a policy to reduce inflation. On the other hand, a policy of short-run economic stimulus can give rise to a burst of inflation expectations, with little realized positive effect on output.

A second interpretation of the shortened lag between money and prices is that it occurred because of the pattern of monetary growth. Although conclusions about the nature of the distribution of realized monetary growth are not definite, this interpretation implies that a steady reduction in monetary growth will result in less output loss than an erratic reduction. If both expected and actual monetary growth can be reduced simultaneously, the effect on output need not be severe or prolonged.[15]

[15]Past relationships based on an environment of uncertainty and continuing deviation of expected and realized monetary growth are misleading in assessing the costs of reducing inflation. See Laurence H. Meyer and Robert H. Rasche, "On the Costs and Benefits of Anti-Inflation Policies," this *Review* (February 1980), pp. 3-14.

# Our "Shrinking" Farmland: Mirage or Potential Crisis?

CLIFTON B. LUTTRELL

EACH year, more American farmland is being converted to nonfarm uses such as highways, houses, airports, and shopping centers. This development has engendered fear that the decline in farmland will eventually produce a severe crisis for U.S. food production.

A recent study, in which 11 U.S. government agencies participated, stated: "Every day in the United States, four square miles of our nation's prime farm lands are shifted to uses other than agriculture. The thief is urban sprawl. . . . Ten years from now, Americans could be as concerned over the loss of the nation's prime and important farm lands as they are today over shortages of oil and gasoline."[1]

Leading proponents of the shrinking farmland thesis contend that decisions to convert agricultural land to nonagricultural uses should be transferred from the private to the public sector. Michael Brewer states: "Each choice [by individual farmers to sell farmland to developers] may be sensible in its own context. But, collectively, they reduce the country's capacity to produce food, fiber, and wood." He argues: "The first step is to 'find out' . . . what tools are available to local, state and Federal governments to deal with it."[2] Lester Brown concludes: ". . . it [cropland] can be protected from competing nonfarm demands only through land use planning."[3]

In contrast to these views, this article asserts that the arguments for social planning of land use are erroneous. First, there is no evidence that the quantity of cropland is shrinking or that shortages of food are imminent. Furthermore, even if the alleged problem did exist, there is no evidence that it could be solved more efficiently by social planning than by market participants.

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[1] *Where Have the Farmlands Gone?* (Washington, D.C.: National Agricultural Land Studies, September 1979), pp. 1-2. Similar views were expressed in *The Farm and The City* (The American Assembly, Columbia University, April 10-13, 1980), and in Erick P. Eckholm, *Losing Ground: Environmental Stress and World Food Prospects* (New York: W. W. Norton and Company, Inc., 1976), pp. 183-86.

[2] *Where Have the Farmlands Gone?*, p. 6.

[3] *Ibid.*, p. 14.

### Some Arguments for Social Land Use Planning

A number of individuals and groups have expressed concern about the quantity of prime farmland that is being diverted from agricultural uses. Secretary of Agriculture Bob Bergland stated: "Failure to protect our agriculture and the natural resources on which it depends will put us on a collision course with disaster."[1] Former Secretary of Agriculture Earl Butz warned the nation that the loss of farmland to urbanization uses could spell trouble for our food supplies: "If USDA's projections hold true, the consequences of failure to stem the shrinkage of U.S. farmland will be ominous for the American economy."[2] The American Land Forum, in calling for action to protect farm lands from further loss, stated: " . . . decisions about agricultural lands are actually being made now, at a time when the crucial importance of the resource is practically *invisible* to the average citizen."[3] In addition to their concern for food production, critics of crop land conversion to urban uses see other social costs, including a degraded environment, impaired water quality, lost wildlife habitat, and diminished beauty of landscapes.[4] David Berry and Thomas Plaut likewise consider the loss of scenic qualities an additional cost of urbanization of farmland.[5]

Rupert Cutler stated: "Many otherwise politically aggressive Americans seem to 'clam up,' look the other way, or change the subject whenever it's suggested that the public's stake in private land use decisions has been inadequately protected.

Hasn't the time come for a comprehensive effort by local governments, aided by state and Federal agencies, to preserve some of these traditions, in a democratic way, through the use of local land use plans approved by local people?"[6]

[1] *Where Have the Farmlands Gone?* (Washington, D.C.: National Agricultural Land Studies, September 1979), p. 3.

[2] Earl Butz, "An Economic Analysis: U.S. Farmland Shrinking," *New York Journal of Commerce* (October 16, 1979).

[3] *Where Have the Farmlands Gone?* p. 14.

[4] *Ibid.*, p. 10.

[5] David Berry and Thomas Plaut, "Retaining Agricultural Activities Under Urban Pressure: A Review of Land Use Conflicts and Policies," in *Policy Sciences* (Amsterdam, Elseview Publishing Company, 1978), p. 160.

[6] *Where Have the Farmlands Gone?* p. 20.

## *Implications of "Shrinking Farmland Problem"*

Several implications are immediately suggested by claims that there is a shrinking farmland crisis. First, and most obvious, is the contention that the quantity of farmland is declining. Second, if the amount of such land actually is declining, this fact should be reflected in the relative price of farm products and food. Unless offset by other factors of production, a constant or rising demand for food coupled with a declining quantity of prime cropland would lead to declining farm production and rising farm commodity and food prices relative to prices of other products. Finally, if food is becoming more scarce relative to nonfood products, given a relatively inelastic demand for food (a one percent change in the supply of farm products results in a larger than one percent change in price), a rising proportion of disposable personal income (personal income after taxes) would be spent on food. In other words, with a fixed relationship between land and farm production, a reduction in the real quantity of cropland with a constant or rising demand for food leads to rising farm product and food prices, higher real food costs, and a smaller percent of personal income available for nonfood purchases. Although, all of the above would be implied if a shrinking farmland crisis actually existed, none of these events is consistent with the data.

## *Quantity of Cropland Difficult to Measure*

As Theodore W. Schultz noted, economic analysis of land is not a simple matter. "Land as an economic variable is exceedingly hard to get at. . . . The fact that land is open and aboveboard, physical and concrete, and legally divided into neat, carefully described parcels or lots . . . does not help one determine the supply of land."[4]

In the early 1800s, economists such as Thomas Malthus and David Ricardo considered the contribution of land to food production to be relatively fixed and concluded that the real value of food would inevitably rise along with population growth, eventually necessitating the use of poorer land, more machines, and more labor to produce additional food. Consequently, food prices and rent would rise relative to other prices.[5] While this view recognized that cropland did not refer to a *fixed* number of acres, the *potential* real output of the land was assumed to be predetermined and relatively fixed.[6] It is now recognized that

[4] Theodore W. Schultz, *The Economic Organization of Agriculture* (New York: McGraw Hill Book Company, Inc., 1953), p. 145.

[5] David Ricardo, *The Principles of Political Economy and Taxation*, ed. Ernest Rhys (New York: E. P. Dutton and Co., Inc., 1948), p. 280; and Thomas Robert Malthus, *On Population* (New York: The Modern Library, published by Random House, 1960), pp. 12, 13, 32, and 33.

[6] David Ricardo, *The Principles of Political Economy and Taxation*, pp. 80-81. For a discussion of classical views, see Harry G. Johnson, *Theory of Income Distribution* (London: Gray-Mills Publishing Ltd., 1973), p. 74.

Table 1

**Total U.S. Land Area, Farmland, Cropland, and Crop Yields**

| Date | Millions of acres* | | | Yield per acre 1967 = 100 |
|---|---|---|---|---|
| | Total land | Land in farms | Cropland harvested | |
| 1910 | 1,934 | 879 | 317 | 56 |
| 1920 | 1,934 | 956 | 351 | 61 |
| 1930 | 1,934 | 990 | 360 | 53 |
| 1940 | 1,934 | 1,065 | 331 | 62 |
| 1950 | 1,934 | 1,161 | 336 | 69 |
| 1959 | 2,314 | 1,124 | 317 | 85 |
| 1964 | 2,314 | 1,110 | 292 | 95 |
| 1969 | 2,314 | 1,063 | 286 | 106 |
| 1974 | 2,316 | 1,017 | 322 | 104 |
| 1979 | 2,316 | 1,049 | 337 | 130 |

*Includes Alaska and Hawaii, beginning with 1959.

Source: *Statistical Abstract of the United States* (Washington, D.C.: U.S. Department of Commerce, Bureau of the Census, 1979) 100th ed., p. 6; *Agricultural Statistics* (Washington, D.C.: U.S. Department of Agriculture), 1978, p. 419; 1979, p. 417; *Changes in Farm Production and Efficiency* (Washington, D.C.: U.S. Department of Agriculture, 1978), p. 19; *Agricultural Outlook* (Washington, D.C.: U.S. Department of Agriculture); *Crop Production, 1979 Annual Survey* (Washington, D.C.: U.S. Department of Agriculture, January 1980).

the surface area that can be used for crops is more variable than Malthus and Ricardo thought and that output per unit of surface area is likewise more variable.

## *Acres of Cropland Variable but Increasing*

Despite the difficulty of estimating the amount of cropland, it is now evident that the amount is not fixed. Rather, the quantity actually in use at any given time depends on a number of factors.

Because new technology reduces land development costs and/or increases crop yields, thus providing favorable returns on the investment, land areas currently used for other purposes can be developed into profitable cropland. As Martin Bailey noted: " . . . mountainous land good only for grazing could be leveled and made arable, and marshy lands, lake bottom and the fringes of the ocean could be filled to make arable land."[7] Examples of such conversion in the U.S. include the Imperial Valley in California, which was irrigated and developed into cropland, and the Obion River Valley in Tennessee, much of which was developed into cropland through construction of a drainage system. Further, although there is a vast amount of acreage (such as grazing, range, or forest land) that is not currently used for cropland at present prices, this acreage could be converted to crop production within a short period of time if it was profitable to do so. If the net return on an acre of land is greater when used for crop production than when used for grazing, it will be used for crops. Conversely, if the expected net return on land is greater when it is used for purposes such as grazing, forestry, etc., the land will be used for these purposes.

As shown in table 1, only a small portion of the U.S. land area is currently used for crops. Of the 2.3 billion acres of land in the nation, only about 40 percent is farmland and less than one third of this farmland has been actually used for crop production. Hence, a large amount of land area is available for conversion to or from crop production.

Data on cropland harvested indicate that sizable changes have occurred during the past 80 years in terms of the land area used for crop production. Acres

[7]Martin J. Bailey, *National Income and The Price Level* (New York: McGraw Hill Book Company, Inc., 1962), p. 111.

Table 2

**Changes in Cropland Harvested and Selected Prices (Annual Rates)**

| | 1950-69 | 1969-79 |
|---|---|---|
| Acres harvested | –0.8 | 1.7 |
| Prices received by farmers | 0.2 | 8.5 |
| Price of industrial commodities | 1.6 | 8.3 |
| GNP price deflator | 2.6 | 6.7 |
| Consumer price index (all items) | 2.2 | 7.1 |
| Producer price index (finished goods) | 1.6 | 7.3 |

Source: *Economic Report of the President* (Washington, D.C.: United States Government Printing Office, 1980), pp. 208, 259, 265, 268, 312; *Changes in Farm Production and Efficiency,* (Washington, D.C.: U.S. Department of Agriculture, 1978), p. 19.

harvested rose from 317 million in 1910 to a peak of 360 million in 1930. By 1969, acres harvested had declined to 286 million but increased again in the 1970s and rose to 337 million in 1979. Although government production control and crop diversion programs reduced the acreage of some crops harvested from 1934 through 1974, the effectiveness of these programs in terms of total crops harvested can be overemphasized since production of uncontrolled crops on diverted acres was permitted in most years. Furthermore, the impact of these production controls has been sharply reduced since 1969.

The change in acres of crops harvested has been positively correlated with the change in farm product prices relative to other prices. For example, when the cropland acreage was declining (0.8 percent per year during the two decades, 1950-69), the index of prices received by farmers declined relative to other prices (table 2). During this same period, farm commodity prices rose only 0.2 percent per year — 1.4 percentage points less per year than the prices of industrial commodities or the producers price index, 2 percentage points less than the consumer price index, and 2.4 percentage points less than the GNP price deflator. During 1969-79, however, when the number of acres of crops harvested was rising, prices received by farmers rose at a slightly faster rate than most other prices. For example, during the 1969-79 decade, farm prices rose at an annual rate of 8.5 percent per year, compared with 8.3 percent for industrial commodities and less than 8 percent for each of the other series. This relative increase in farm prices provided farmers with sufficient incentive to convert additional land to crop production.

The increase in farm product prices relative to other prices during 1969-79 is not an indication of potential famine either in the U.S. or abroad. Rather, it represents a rise in export demand for U.S. farm products, attributable primarily to a gradual reduction in foreign trade restrictions (that began prior to World War II) and to the large volume of U.S. currency accumulations abroad (resulting from U.S. petroleum imports following the sharp increase in petroleum prices).[8] The U.S. farm sector, having a comparative advantage in production of farm products (it is relatively cheaper in terms of resources used to produce farm products in the U.S. than in other countries), exported an increasing proportion of total farm output.

## *Yields Per Acre Rising*

While output per acre of cropland varies from year to year as a result of weather and other short-run factors, the sharp increases in crop yields over the longer run indicate that yields are sensitive to other factors of production such as technology and prices. The development of new technology and/or a change in the price of crops relative to the cost of farm inputs leads to a change in output per acre. For example, new technology that reduces the real cost of fertilizers, improves insect and plant disease control, and provides improved seeds increases output per acre and, consequently, has the same impact on output as an increase in the acreage of farmland. In essence, the increase in farmland "quality" produces the same result as an increase in quantity. Similarly, an increase in the price of crops relative to the returns on land from alternative uses provides farmers with incentive for using more yield-increasing factors (e.g., greater quantities of fertilizer) per acre, as well as for using more acres of land for crop production. With the increase in the value of farm products in the early 1970s as a result of rising foreign demand, greater quantities of yield-increasing inputs were added to cropland; consequently, yields increased as did the number of acres harvested.

The use of yield-increasing factors caused average corn yields to rise from 70 bushels per acre in the three years, 1964-66, to 100 bushels per acre in 1977-79, despite the increase in acres harvested during the

[8]See Clifton B. Luttrell, "Rising Farm Exports and International Trade Policies," this *Review* (July 1979), pp. 3-10.

Table 3

**Rates of Change of Selected Prices, Per Capita Personal Income, Percent of Personal Income Spent on Food, and Percent of Farm Commodity Sales Exported and Imported**

| | 1950-60 | 1960-70 | 1970-79 | 1950-79 |
|---|---|---|---|---|
| Prices — rate of change: | | | | |
| Received by farmers (USDA)[1] | –0.8 | 1.5 | 9.1 | 3.0 |
| Food (CPI)[1] | 1.7 | 2.7 | 8.2 | 4.0 |
| All commodities less food (CPI)[1] | 1.4 | 1.9 | 6.3 | 3.1 |
| All services (CPI)[1] | 3.6 | 3.8 | 7.6 | 4.9 |
| Industrial commodities (PPI)[1] | 2.0 | 1.4 | 8.9 | 3.9 |
| Disposable personal income per capita (rate of change)[2] | 3.6 | 5.6 | 9.2 | 6.0 |
| Percent spent on: total food[2] | 22.4 — 20.2 | 20.2 — 17.3 | 17.3 — 16.6 | 22.4 — 16.6 |
| food at home[2] | 17.8 — 16.1 | 16.1 — 13.4 | 13.4 — 12.5 | 17.8 — 12.5 |
| Percent of total farm commodity sales: | | | | |
| Exported[3] | 10.1 — 14.1 | 14.1 — 14.6 | 14.6 — 24.8 | 10.1 — 24.8 |
| Imported[3] | 14.0 — 11.1 | 11.1 — 11.4 | 11.4 — 12.6 | 14.0 — 12.6 |

[1]*Economic Report of the President* (Washington, D.C.: U.S. Government Printing Office, 1979), pp. 240, 248, 290; *Economic Indicators* (Washington, D.C.: U.S. Department of Agriculture, 1980); CPI (Consumer Price Index); and PPI (Producer Price Index).

[2]*National Food Review* (Washington, D.C.: U.S. Department of Agriculture, Winter 1980), pp. 6, 56; and *Economic Indicators.*

[3]*Economic Report of the President* (Washington, D.C.: U.S. Government Printing Office, 1979), pp. 287 and 296; *U.S. Foreign Agricultural Trade Statistical Report* (Washington, D.C.: U.S. Department of Agriculture, 1970), p. 2; *Agricultural Outlook* (Washington, D.C.: U.S. Department of Agriculture).

latter period.[9] As shown in table 1, the trend rise in crop yields is not limited to corn. Yields of all cropland harvested rose from an average index of 83 in 1957-59 to 123 in 1977-79, an increase of 48 percent. Furthermore, there is no indication that a slowing has occurred in the trend growth of crop yields. From 1967-69 to 1977-79, crop production per acre rose at a 1.7 percent rate, well above the 1.1 percent rate of increase from 1910 to 1969.[10]

[9]*Agricultural Statistics* (Washington, D.C.: U.S. Department of Agriculture, 1979), p. 30; and *Agricultural Outlook* (Washington, D.C.: U.S. Department of Agriculture, May 1980), p. 33.

[10]A rate of yield growth higher than that of 1969-79 was realized only in the decade of 1950-60, when output per acre rose at a 2.6 percent rate. During the 1950-60 decade, however, the number of acres harvested declined sharply indicating that less fertile acres were taken out of crop production.

A number of recent studies point to a possible decline in the rate of growth in crop yields in the years ahead. *Agricultural Production Efficiency* (Washington, D.C.: National Academy of Sciences, 1975), p. 195. This study concluded that biological realities suggest a slowing of the rate of increase in productivity for most crops. Yoa-chi Lu, Philip Cline, and Leroy Quance, *Prospects for Productivity Growth in U.S. Agriculture* (Washington, D.C.: U.S. Department of Agriculture, September 1979). The authors expressed doubt that agricultural productivity growth through the year 2000 will equal the historical rate unless research and extension investment increase and unprecedented technologies develop.

On the other hand, Glen L. Johnson contends that agriculture has a high long-run supply elasticity in *The Overproduction Trap in Agriculture,* ed. Glen L. Johnson and Leroy Quance (Baltimore: The John Hopkins University Press, 1972), pp. 20 and 183. Furthermore, he argues that if demand (for farm products) was doubled or tripled, we would have so much money invested in land that earnings would not cover acquisition costs.

## *Shrinkage Not Indicated by Relative Prices of Food*

During the period, 1950-79, farm product prices rose at a slower rate than other major price series and only half as fast as disposable personal income (table 3). Consequently, the proportion of disposable personal income spent on food declined from 22.4 percent in 1950 to 16.6 percent in 1979.

During the more recent decade, 1970-79, farm product prices rose somewhat faster than prices of most nonfarm products. Farm prices rose at a 9.1 percent rate, slightly faster than the 8.9 percent rate for in-

Table 4

**Rates of Change of Specified Prices, Per Capita Personal Income, Percent of Personal Income Spent on Food, and Percent of Farm Commodity Sales Exported and Imported in the First and Second Half of the 1970s**

| | 1970-75 | 1975-79 |
|---|---|---|
| Prices — rate of change: | | |
| Received by farmers (USDA) | 11.0 | 6.8 |
| Food (CPI) | 8.8 | 7.5 |
| All commodities less food (CPI) | 5.8 | 7.0 |
| All services (CPI) | 6.5 | 8.9 |
| Industrial commodities (PPI) | 9.3 | 8.3 |
| Disposable personal income per capita (rate of change) | 8.7 | 9.7 |
| Percent spent on: total food | 17.3 — 17.0 | 17.0 — 16.6 |
| food at home | 13.4 — 13.0 | 13.0 — 12.5 |
| Percent of total farm commodity sales: | | |
| Exported | 14.6 — 25.2 | 25.2 — 24.8 |
| Imported | 11.4 — 10.6 | 10.6 — 12.6 |

dustrial commodities, and well above the rate of increase for all commodities (less food) and for all services. The relative increase in farm product prices during this decade, however, was related to a sharp increase in demand for U.S. farm products, primarily for export, rather than to a shrinkage in cropland. (There is no evidence that farmland conversion to urban uses was greater in 1970-79 than in any other post-World War II decade.) Exports started rising in the 1950s, rose moderately in the 1960s, and accelerated sharply in the 1970s. For instance the rate of increase was relatively low in the 1950s and the 1960s, and exports totaled only 14.6 percent of sales in 1970. However, exports accelerated from 14.6 percent of total sales in 1970 to 25.2 percent in 1975 (table 4). Furthermore, sharp increases in farm commodity exports were not offset by rising imports of farm commodities. Farm commodity imports declined from 11.4 to 10.6 percent of sales of farm products during the period.

By 1975, farm commodity exports as a percent of sales had leveled off, and farm commodity prices began to decline again relative to other prices (table 4). From 1975 to 1979, farm commodity prices rose at the rate of 6.8 percent, 2.1 percentage points less than the rate of increase in the price of all services and 1.5 percentage points less than the price of industrial commodities. The price of food, which had increased at about the same rate as disposable personal income in the first half of the 1970s, rose 2.2 percentage points slower in the second half of the decade than did disposable personal income.

As indicated earlier, much of the increase in farm exports since the mid-1950s can be attributed to a gradual reduction in foreign trade restrictions, which had been almost prohibitive following the Smoot-Hawley Tariff Act of 1930. A number of major reductions in average *ad valorem* rates have been negotiated since the 1947 General Agreement on Tariffs and Trade; numerous studies show that these reductions have a major impact on trade.[11] However, reductions in tariff duties do not increase trade immediately, as evidenced by the gradual rise in exports during the 1950s and 1960s. Part of the sharp increase in exports during the early 1970s may be attributed to the implementation of monopolistic petroleum policies by the OPEC nations, which resulted in a sharp increase in dollar accumulations abroad and the dollar's reduced value in terms of foreign currencies.

Despite the accelerating export demand for U.S. farm products, however, the farm sector concurrently produced enough food to maintain relatively stable

[11]See Clifton B. Luttrell, "Rising Farm Exports and International Trade Policies," pp. 6-7.

real prices for food in the U.S., further reducing the proportion of disposable personal income spent on food.

## *Little Basis for Cropland Preservation Plans*

Considering the facts that cropland acreage is not shrinking, crop yields have increased, and food costs as a percent of personal income have declined, allegations of a "shrinking" farmland appear to be unfounded. Consequently, the arguments for developing comprehensive social plans to convert cropland to urban uses have little validity. Moreover, it is important to note that, even if the claims of reduced farmland had been substantiated, proponents of *social* cropland control have not made a convincing case for such action. There are certain circumstances that might call for social land use planning: (1) if farmers are not price conscious, i.e., they are not responsive to current or expected future crop prices since they do not recognize the real value of prime cropland; (2) if farmland prices do not reflect the true value of the product of the land; and (3) if social planners' knowledge about future land values is superior to that of current landowners and developers.

Existing evidence does not corroborate the validity of these circumstances. Research clearly indicates that farmers are highly responsive to current and expected future prices.[12] They sell their land to urban developers because its value is greater if used for urbanization purposes than for cropland (cropland value being determined by the current and expected future prices of the crops grown on it). When the value of land converted to urban use exceeds the value obtained from farming, the farm owner, land developer, and the general public will profit from conversion.[13] In the absence of harmful neighborhood effects (hidden costs), the costs and benefits of such shifts are carefully assessed by the transacting parties. In other words, the cost to the individual and to society is the foregone value of the land's contribution to farm output. Unless the gain in the new use exceeds the loss, the individuals involved would have no incentive for making the change.

The second argument for social planning — that prices alone do not reflect the true value of the product — implies that neighborhood effects are an important factor. Some external costs, such as reduced water quality and impaired landscapes, have been mentioned by the proponents of social control over cropland. However, this argument is subjective because one can easily visualize rural scenes that are quite the opposite of the beautiful landscape ideally depicted by advocates of social control. Cattle feeding pens, swine producing areas, and other livestock facilities are often sources of pollution. In addition, other "unsightly" views associated with farming communities include dilapidated buildings, fences, and equipment dumped along the roadside.

In regard to water quality, most authorities contend that both rural and urban uses may result in water pollution. Those types of pollution that result from farming activities include runoff from livestock habitats and chemicals used for controlling crop diseases, insects, and weeds. Allen Kneese contends that agricultural chemicals present a special (pollutants) problem "as they are delivered to streams in storm runoff from the land and bypass waste treatment plants."[14]

The third argument for social planning — that social planners possess superior knowledge compared to that of private individuals — implies that individual farmers and urban land users distribute their resources between the present and the future on a relatively uninformed (of true value) basis. In other words, individual landowners are perceived to be somewhat myopic in assessing the future value of cropland, whereas social land use planners can clearly foresee the "correct" future value of land in its various alternative uses. This argument fails to consider that such vision would provide social planners with amazing opportunities for personal investment gains so that they would not be likely to remain "planners" when they could become wealthy as "doers."

Of even greater importance for the public welfare, however, is the assumption by proponents of social planning that such programs operate in the "public interest" rather than in self-interest. There is little justification for the view that self-interest is eliminated when social groups are given monopoly power over economic functions. As pointed out so cogently by George Stigler, alleged market failures are not evidence that social planners can provide more services

[12] See Holbrook Working, "The Theory of Price of Storage," in *Selected Writing of Holbrook Working*, ed. Dana Kellerman (Board of Trade of the City of Chicago, 1977), pp. 28-30; Marc Nerlove, *The Dynamics of Supply: Estimation of Farmers' Response to Price* (Baltimore: The John Hopkins Press, 1958), pp. 186-235; and Zvi Griliches, "Estimates of the Aggregate U.S. Farm Supply Function," *Journal of Farm Economics* (May 1960), p. 282-93.

[13] For a discussion, see Neil A. Stevens, "Rising Farmland Prices and Falling Farm Earnings: Is Agriculture in Trouble?" this *Review* (May 1978), p. 16.

[14] Allen V. Kneese, *The Economics of Regional Water Quality Management* (Baltimore: The John Hopkins Press, 1964), p. 11.

at reduced costs. "We may tell the society to jump out of the market frying pan, but we have no basis for predicting whether it will land in the fire or a luxurious bed."[15] Any impediment to the transfer of cropland to urban use will increase the cost of land for housing, factories, hospitals, parking, and other uses vital to the public well-being. There is no evidence that social groups can more equitably resolve the conflict between costs and benefits of land use than can private markets.

## SUMMARY

As prime farmland is converted into streets, shopping centers, and residential areas, observers conclude that the quantity of farmland is declining sharply and that this decline should be controlled by social action. Unobserved, however, are the less noticeable but dramatic increases in acres of cropland and in production per acre. The number of acres from which crops were harvested rose from the 1969 low point of 286 million to 337 million acres in 1979. Yields per acre of cropland rose at a 1.1 percent rate from 1910 to 1969 and at a 1.7 percent rate during the period from 1967-69 to 1977-79.

As a consequence of the increase in acres harvested and in yields per acre, farm product and food prices have consistently declined relative to other prices, except during the first half of the 1970s when export demand rose sharply. Since 1950, consumers have spent a declining proportion of their disposable personal income on food, even while a larger proportion of domestic farm output was being exported.

Consequently, there is no justification for using *social* action to preserve cropland as proposed by critics of the current land market system. Furthermore, even if there was some shrinkage in cropland, there is no evidence that the problem can be solved more efficiently by social action than it can be in the market place.

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[15]George F. Stigler, *The Citizen and the State* (Chicago: The University of Chicago Press, 1975), p. 113. For a further discussion of this problem, see R. H. Coase, "The Problem of Social Cost," *The Journal of Law and Economics* (October 1960), pp. 1-49; and Roger Leroy Miller, *Economics Today* (San Francisco: Canfield Press, 1976), pp. 615-23.