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THE NATIONAL ECONOMY AND AGRICULTURE: STABILIZATION PROBLEMS AND LABOR POLICY

Chairman: Glen Fulcher, University of Nevada

NATIONAL POLICY AND STABILITY OF FARM INCOME*

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I

Instability of farm income was clearly a dominant feature of our agricultural economy during the first half of this century. In 1945 Professor Schultz in Agriculture in an Unstable Economy identified the fluctuations in the nonfarm economy as the principle source of agriculture's unstable environment.

> "It is these problems, rooted in the instability of industrial production and employment, and mainly short-run in duration..., that have claimed most of the attention of farm groups, legislators, and the public."1/

The instability of farm income brought forth an overwhelming demand that government alleviate the symptoms while only a few called for elimination of the source of the illness. The immediate welfare of farm people in an unstable economy provided the impetus for enactment of the foundations of current farm policy.

The more sophisticated prescriptions for solution of the stability problem probably had negligible influence on the treatment that evolved, but it must be admitted that they were prophetic of what was accomplished outside the farm policy arena. In fact, at the time professors Schultz and Johnson were writing, the legal framework had already been established for a system of stabilizers for the general economy. However, the potential of these stabilizers was not obvious at that time since their effects were masked by the hyperactivity of World War II which came soon after the enactment of some of the stabilization programs and increases in the level of operation of others.

That farm income over the past decade has become more stable than before is a widely recognized fact. However, the basis for this recent stability has not been adequately examined or understood.

That national income since 1950 was more stable than during the previous half century is fairly obvious. What is not obvious is the degree to which consumer purchasing power has been stabilized relative to national income.

It is the major hypothesis of this paper that a sufficient explanation of the postwar stability of farm income can be found in structural changes in the nonfarm economy--aside from government policies for agriculture.

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* Arizona Agricultural Experiment Station, Technical Paper No. 823.

1/ Schultz, T. W., Agriculture in an Unstable Economy, New York: McGraw-Hill Book Company, Inc., p. 128, 1945.

II

Since this study has as its very essence the measurement of variability, the statistical concept of variance was chosen as the basis for analysis. Year-to-year changes in various series represent the variability to be measured, and the analysis proceeds in a manner analogous to the computation of a moving average.

When two series, A and B, are summed, it can be shown that the variance of the combined series (A+B) is the following function of the variances of the individual series and their covariance.

$$\sigma^2_{(A+B)} = \sigma^2_{(A)} + \sigma^2_{(B)} + 2\sigma_{(AB)} \qquad \text{(I-1)}$$

In this formulation it is seen that the net effect of series (B) is represented by the last two terms of the equation. By the definition of variance, the next to last term will always be positive. The last term will be negative or positive. A zero correlation implies that the variance of series (A+B) is <u>increased</u> by exactly the amount of the variance of series (B).

An index of the net effect of the variance of (B) on the variance of (A+B) may be constructed by dividing the last two terms of the equation by the variance of (A).

$$S_{(AB)} = \frac{\sigma^2_{(B)} + 2\sigma_{(AB)}}{\sigma^2_{(A)}} \qquad \text{(I-2)}$$

This index measures the net change in variance contributed by (B), as a proportion of the variance of the original series, (A). Stabilization of (A+B) relative to (A) will have taken place if

$$-1 < S_{(AB)} < 0$$

Often it is impractical to explicitly include all variables which may influence the dependent variable and the functional relation may be linear rather than a simple sum. Such a linear function common to econometric analysis is

$$Y = c + aA + bB + u \qquad \text{(II-1)}$$

where u is an error term representing the influence of variables excluded from the analysis. In this case the variance of Y can be shown to be composed of the elements

$$\sigma^2_{(Y)} = a^2\sigma^2_{(A)} + b^2\sigma^2_{(B)} + 2ab\,\sigma_{(AB)} + \sigma^2_{(u)}. \qquad \text{(II-2)}$$

Thus, it is possible to "explain" the variance of one series by the variances and covariance of two other series and the residual variance of the error term. All of the information needed to make the allocation of the variance as in equation (II-2) is obtained from the least-squares estimation of the regression coefficients of equation (II-1).

The optimum balance between the conflicting goals of statistical reliability of the estimate and homogeneity of structure must ultimately be resolved by an arbitrary choice of length of period. A ten-year period, which involves nine year-to-year changes of first-differences, was chosen for the variance and regression estimates in the following analysis.

Population and price level changes taking place at constant rates would not affect the results of this analysis. However, since these conditions have not been met, all of the dollar series in the following analyses have been deflated for price level changes, and the series of section IV have also been reduced to per capita terms.

III

Figure 1 shows the variance of real farm income in terms of percentage year-to-year changes. The variance for a specific ten-year period is plotted for the year at the end of the period. Thus, the value plotted for 1922 is the variance for the period 1913-22. A major downward trend in the variance of farm income from 1913 to 1962 is suggested by the first figure.

Equation (II-2) provides a basis for allocating the variance of farm income among several supposed causes.

A high proportion of the variance of real farm income seems to be associated with the variance of national income for periods beginning after 1919 and ending before 1945 (Figure 1). Changes in the level of variance associated with national income and total variance of farm income seem highly correlated for periods beginning after 1919 and ending before 1952. It is interesting to note that Agriculture in an Unstable Economy was published in 1945.

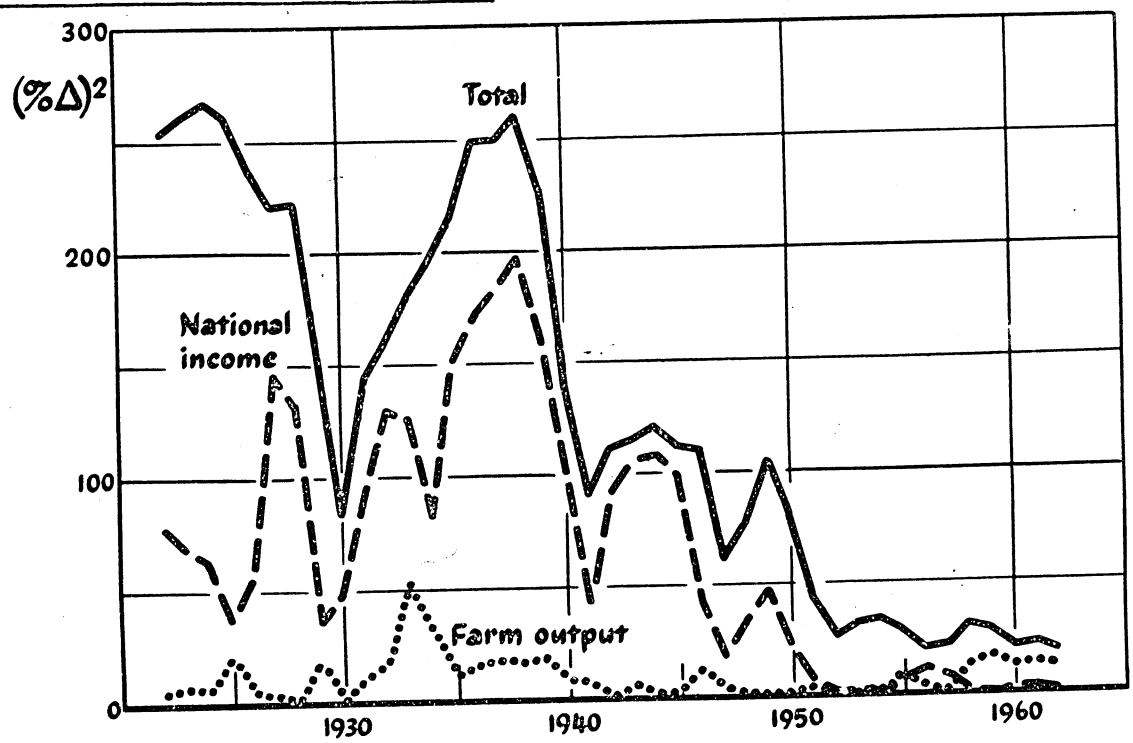

Figure 1. Variance Associated with National Income, Farm Output, and Total Variance of Cash Receipts from Marketing Farm Products.

The amount of variance of farm income which can be associated with the variance of farm output has been very low relative to that associated with national income except for the last five periods. Foreign demand for United States farm output and government demand associated with price support programs would tend to make the price elasticity of demand higher in absolute value than would otherwise prevail and lessen the effects of output fluctuations.

If farm output declined in years of declining national income, as some people believe, the result would be a reduction in variance of farm income. However, the effects of covariation of national income and farm output appear to have been random.

Equation I-2 provides a basis for measuring the stabilizing effect of direct payments to farmers. The computed index when converted to percentage terms gives the net change in variance resulting from direct payments as a percentage of the variance of cash receipts (Figure 2).

The first ten-year period of the direct payments program is 1932-41, and the stabilization effect of this period exceeds 20 per cent. Following that it declines to just over one per cent and climbs back to 10 per cent for 1946-55. The net effect of the direct payments for the period 1947-56 is an addition to variance equivalent to nearly 7 per cent of the variance of cash receipts. Additional destabilization of 2, 10, and nearly 8 per cent occurs for the periods 1948-57, 1952-61, and 1953-62 respectively.

IV

The variance of farm income that can be associated with the variance of general business activity has fallen considerably for recent periods (Figure 1). Stabilization of disposable income relative to national income would imply stabilization of demand for farm products.

Figure 3 plots the ratios of the variances of national, personal, and disposable income. From the first to the last period the ratio of the variance of disposable income to national income has fallen by nearly three-fourths its earlier value. The implication is that for a given level of variance of national income, the variance of disposable income would be about one-fourth as large in 1953-62 as it would have been in 1913-22.

The addition of a stabilizer to an income series will result in a new series with smaller variance than the original. A basis for gauging the effect of a stabilizer is given by equation (I-2), and its use is demonstrated at the end of the preceding section.[2/]

Corporations have been observed to vary their annual undistributed profits so as to stabilize the stream of dividends paid out relative to annual profits, and in this way the incomes of stockholders are stabilized by corporate saving.

2/ For a more comprehensive discussion of this type of analysis see Milton Freidman, "The Effects of a Full-Employment Policy on Economic Stability: A Formal Analysis," Essays in Positive Economics, Chicago: The University of Chicago Press, pp. 117-132, 1953.

Corporate profits are positively correlated and very sensitive to fluctuations in general business activity.

The stabilization of corporate saving is equivalent to 40 per cent of the variance of national income for some of the early periods (Figure 4). After that the index has a downward trend until it is substantially negative in 1945-54. After that it again attains a high level of stabilization.

Under current tax rates the government absorbs approximately half of any increase or decline in profits before the corporation exercises its discretion over the residual. Thus, we should expect that corporate income tax would have an important stabilizing influence on personal income, but we should also be suspicious of its effect on the stabilizing potential of corporate saving.

Figure 4 suggests that the corporate income tax has been an important stabilizer for the economy. Until the 1945-54 period a high rate of stabilization by corporate income tax is associated with a low rate of stabilization by corporate savings. Until that point it seems that the government imposed stabilization has not been a net contribution to stability but rather a displacement of a function of corporate enterprise. In more recent periods the levels of stabilization by both corporate saving and corporate income tax have been high and tend to move together.

Government transfer payments have become an important element in the economy since the institution of the various social security programs during the 1930's. Benefit payments from unemployment insurance funds would be expected to increase with declines in business activity offsetting part of the decline of wages in personal income. Figure 5 indicates that in recent years both net government transfer payments and unemployment insurance benefits have been important in stabilizing personal income relative to national income.

Until the late 1930's only higher incomes were subject to personal income tax and then the effective rates were relatively low. Figure 5 shows that the rate of stabilization is less than 7 per cent of the variance of personal income until 1933-42. After that point it rises on a general trend and exceeds 40 per cent for most of the years since World War II.

V

In section IV the stabilizers were evaluated for their roles in stabilizing disposable income relative to national income with the variance of the latter taken as being predetermined. However, the stabilizers may have had a comparable additional impact on the stability of disposable income through the reduction of the cyclical multiplyer and stabilization of national income.[3/]

The benefits paid from unemployment insurance funds have become substantial in recent recessions as the coverage has expanded. The programs have not only contributed to a reduction in the variance of disposable income as illustrated

3/ Firch, Robert S., "Stabilization of the United States Economy and Stability of Farm Income," Unpublished Ph.D. Dissertation, University of Chicago, pp. 45-47, 1963.

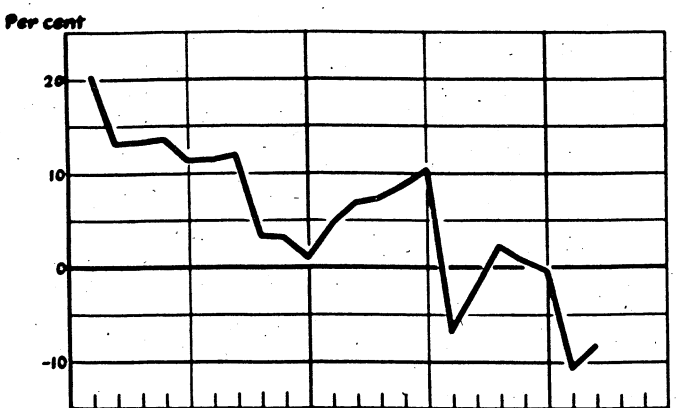

Figure 2. Stabilization of Farm Income by Direct Government Payments.

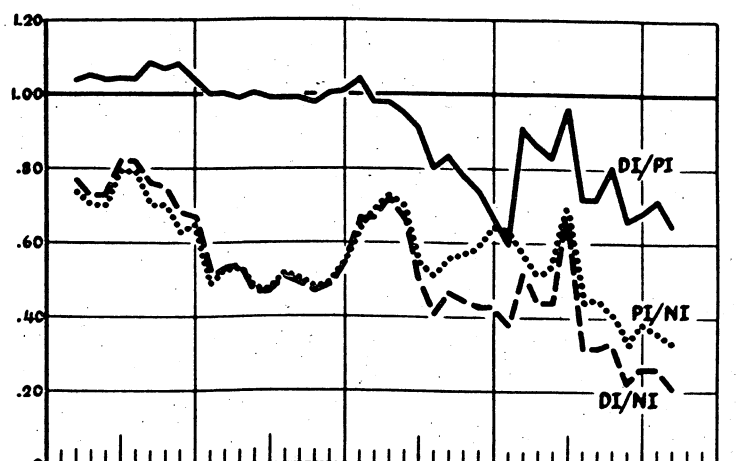

Figure 3. Ratios of Variances of National, Personal, and Disposable Income.

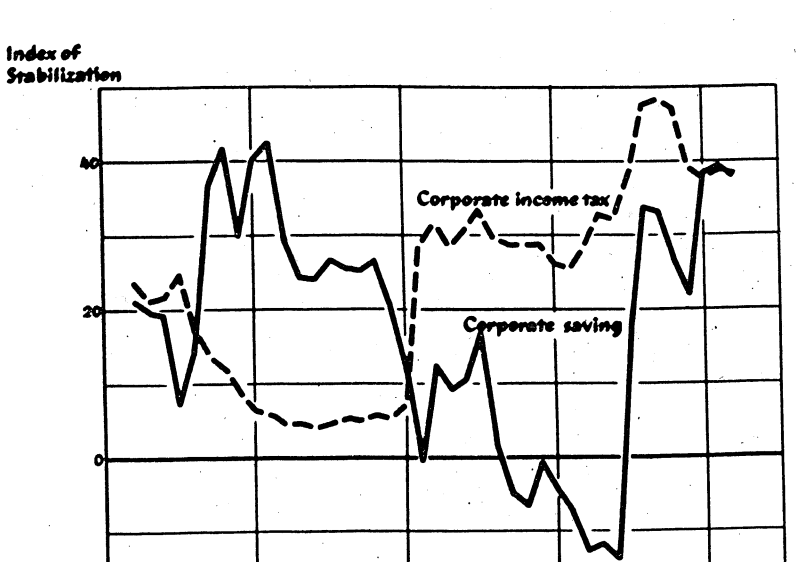

Figure 4. Stabilization of Corporate Income Tax Liability and Corporate Saving as a Proportion of the Variance of National Income.

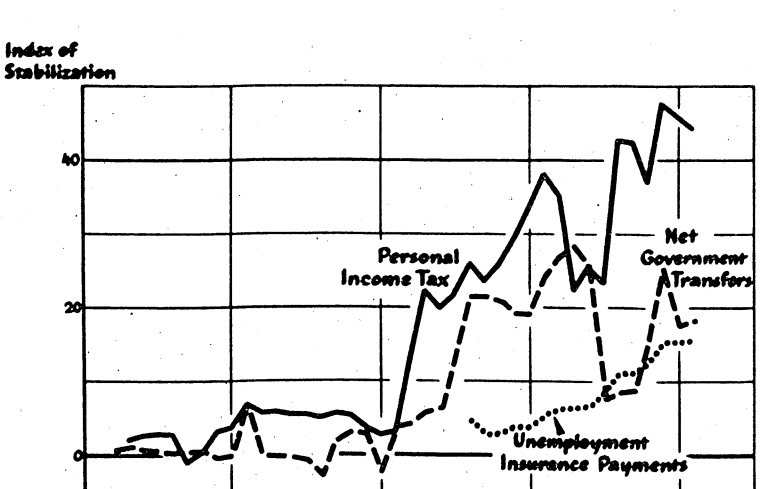

Figure 5. Stabilization by Net Government Transfer Payments and Unemployment Insurance Payments as Proportions of the Variance of National Income, and Stabilization by Personal Income Tax as a Proportion of the Variance of Personal Income.

in section IV, they have also placed a floor under the incomes of low-income families whose incomes and food expenditures would otherwise be extremely volatile. It seems probable that these programs have had an influence on the stability of retail food expenditures which substantially transcends their influence on average disposable income.

Instability of farm income provided the major thrust for the establishment of national price support programs. The research reported in this paper suggests that the unstable nonfarm economy has been the principle source of agriculture's past instability. This source has been essentially eliminated and farm income dramatically stabilized in a manner consistent with the recommendations of Professors Schultz and Johnson.