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Forecasting the Demand for Agricultural Products

By James P. Cavin

Self-appraisal—serious self-appraisal—is often recommended, rarely practiced. But the following article is a serious effort to set down and appraise the process or methods by which the Bureau of Agricultural Economics does develop its appraisal of the general economic situation which plays so important a part in our commodity, price, and agricultural outlook work. This statement was first prepared by James P. Cavin, formerly Head of the Division of Statistical and Historical Research, in the form of a paper which was presented at the annual meeting of the American Statistical Association in New York City on December 29, 1949. Since that time the original statement has been subjected to review by a considerable number of persons both within and without the Bureau of Agricultural Economics, and the current article is a revision, prepared by Mr. Cavin in collaboration with Nathan Koffsky, which also brings the analysis through 1951.

O. V. Wells

AT the Annual Outlook Conference, held in October or November of each year, the Bureau of Agricultural Economics presents an appraisal of the economic prospects for agriculture during the succeeding calendar year. In the months between the outlook conferences, these prospects are continuously reappraised. The Bureau's work in the field of agricultural outlook is now in its 30th year.[1]

This paper is concerned with the process by which the Bureau develops its appraisals of the economic factors that are likely to affect agricultural prices and incomes in the relatively near future. A second aspect of outlook work concerns the process by which our economic appraisals actually reach farmers and are interpreted to them in terms of their own individual production decisions. However, this function is mainly a responsibility of agencies other than the Bureau of Agricultural Economics. It may also be appropriate to note that, although these economic appraisals are primarily for the purpose of assisting agriculture, they are public documents available to all, and the Department's nonagricultural clientele is fairly substantial.

In this paper, the terms "appraisal" and "forecast" are used more or less interchangeably, although the former is perhaps somewhat more descriptive of the work. The term "fore-

[1] The development of the Department's outlook activities is described in UNITED STATES DEPARTMENT OF AGRICULTURE, OUTLOOK WORK: THE FIRST 20 YEARS. 24 pp. Washington, D. C. March 1942. [Processed.]

cast" implies a sort of precision which we do not claim and a sort of mechanical method which we do not use. The term "appraisal" implies more of a weighing of the factors involved and admits the possibility of presenting the outlook statements in terms of the most likely alternatives, particularly when the course of economic events does not appear to be clear-cut.

Improved Data an Aid in Forecasting

Economic forecasting has always been a hazardous pursuit. It is unnecessary to go back farther than the immediate postwar period for convincing evidence on this point. Nevertheless, it appears that we are at present in a better position to make useful forecasts than in any previous period. We possess more and better economic series, and for most of the more important series we have reasonably accurate measurements that extend back at least to the middle 1920's. More important is the fact that, with the development of national income data we can observe the economy as a whole in terms of its more significant components and can develop statistical relationships among them. We have also the benefit of large-scale statistical investigations of economic fluctuations, of which the best known are the business-cycle measurements of the National Bureau of Economic Research and the equation systems of the economists associated with the Cowles Commission. Finally, as a result of theories stemming principally from Keynes, together with contributions of his followers and critics, we have a markedly enhanced understanding of the forces that cause the general level of economic activity to rise and fall.

Our formulation of the economic forecast for agriculture has three phases: (1) A forecast of the general level of economic activity in the United States, together with a forecast of the level of foreign demand for goods and services from this country; (2) a translation of this forecast into its meaning for agriculture as a whole, that is, in terms of the anticipated general level of agricultural prices and of farm income; (3) a more detailed forecast of the impact of the general level of demand for agricultural products on the prices to be received for and the income to be obtained from the sales of individual crops and livestock products.[2]

In formulating the forecast of general economic activity, we focus attention on two main questions. First, what is the anticipated level of consumers' disposable income in the United States? We use this measurement because it has proved to be the best over-all indicator of the demand for agricultural products consumed domestically. Second, what is the anticipated level of exports from the United States, particularly exports of farm products?

We do not have a self-generating statistical mechanism for producing these estimates. But we have developed a series of basic relationships that are useful in constructing an economic model or framework which provides a rough first approximation of the general economic situation that may emerge in the period with which we are concerned. To do this, we employ a combination of qualitative judgment and statistical estimation, which doubtless involves too much intuition to satisfy the econometricians and too much statistical manipulation for those who believe that predominantly judgmental appraisals are likely to yield the best predictions.

The development of statistics of national income has been an important forward step in economic analysis and in economic forecasting. Use of the gross national product which reflects the total economic activity of the Nation is a much more satisfactory way of describing changes in the economy and relationships within the economy than the old method of relying primarily on indexes of physical output. The index of the Federal Reserve Board, for example, represents only about 25 percent of the Nation's activity. In fact, substantial changes sometimes occur in industrial production with only modest changes in the total level of economic activity. The gross national product for 1950 and 1951, by major components, is shown in table 1. Described

[2] For a description of methods used by the Bureau of Agricultural Economics during the period 1937–42, see THOMSEN, F. L. and BOLLINGER, P. H., FORECASTING NATIONAL INCOME AND RELATED MEASURES. National Bureau of Economic Research, Studies in Income and Wealth, 6:170–193. New York. 1943.

TABLE 1.—*Gross national product, by half years, 1950 and 1951*
Seasonally adjusted annual rates [1]

Component	1950		1951	
	First half	Second half	First half	Second half
	Billion dollars	*Billion dollars*	*Billion dollars*	*Billion dollars*
Personal consumption expenditure				
Durable goods	26.4	31.8	28.6	25.1
Nondurable goods	99.4	105.2	111.1	112.6
Services	60.8	63.4	66.0	67.7
Total	186.7	200.4	205.6	205.4
Gross private domestic investment				
New construction	20.8	23.4	23.2	21.2
Producers' durable equipment	20.2	24.8	26.6	28.0
Changes in business inventories	3.2	5.6	13.2	6.4
Total	44.0	53.8	62.9	55.6
Net foreign investment	*–1.6*	*–3.0*	*–1.4*	*1.8*
Government purchases of goods and services				
Federal	21.6	24.4	35.8	47.8
State and local	19.2	20.0	21.2	21.6
Total	40.7	44.3	56.8	69.2
Gross national product	269.7	295.6	323.8	332.0

United States Department of Commerce.
[1] Totals computed from unrounded data.

briefly below are the major relationships we have found to be useful in forecasting the demand for farm products.

Some Useful Relationships

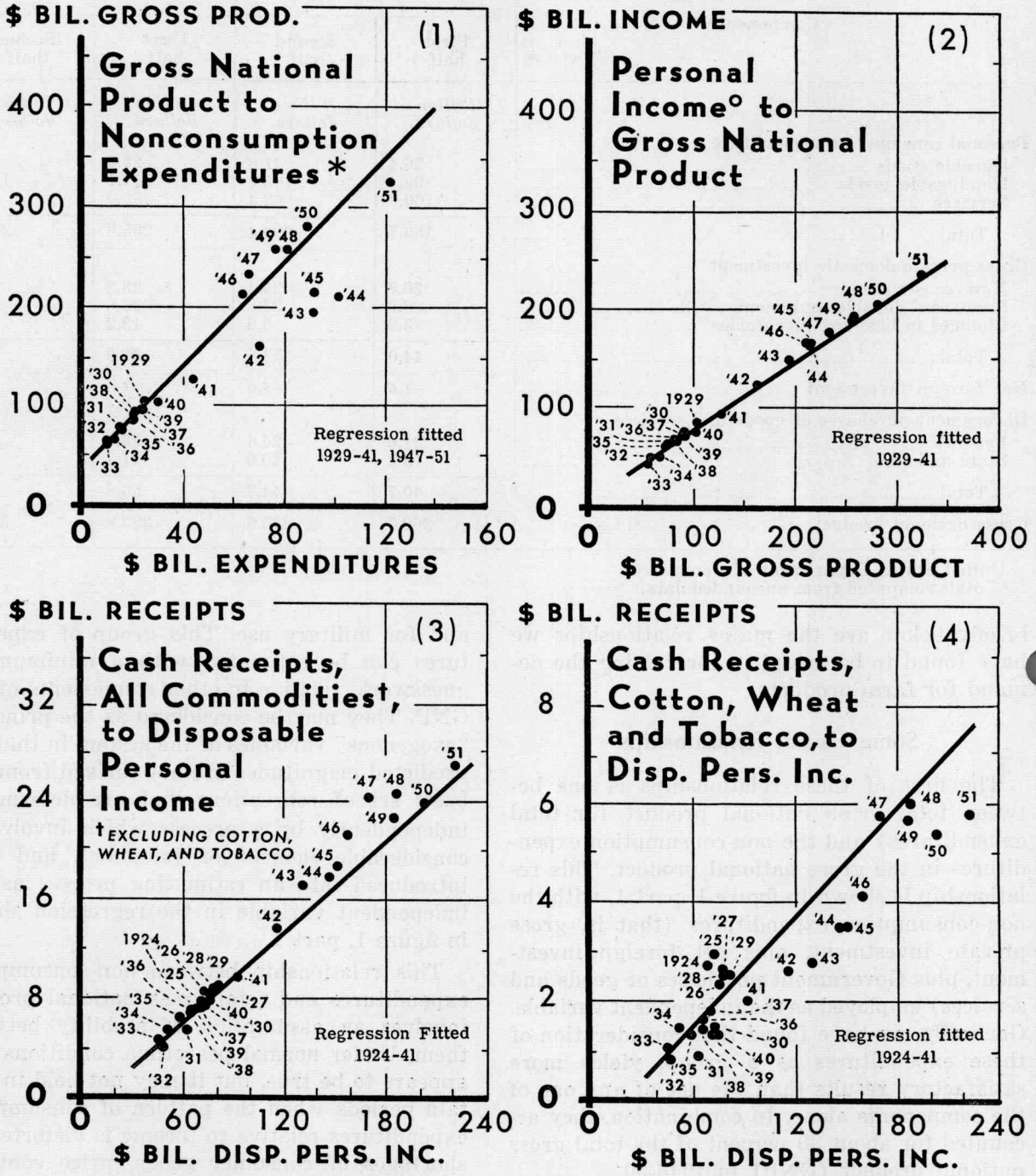
The first of these relationships is one between total gross national product (or total expenditures) and the non-consumption expenditures in the gross national product. This relationship is shown in figure 1, part 1, with the non-consumption expenditures (that is, gross private investment, plus net foreign investment, plus Government purchases of goods and services) employed as the independent variable. Generally, we have found that consideration of these expenditures as a group, yields more satisfactory results than the use of any one of the components alone. In combination, they accounted for about 30 percent of the total gross national product (GNP) in 1946-50.

Under normal conditions their effects on the total level of economic activity will be approximately the same. For example, little difference in the short-term effect is found between the purchase of an airplane for commercial use and for military use. This group of expenditures can be estimated with a minimum of guesswork, relative to other components of the GNP. They may be considered as the principal "exogenous" variables of the system in that the predicted magnitudes are not derived from our basic set of regressions, but are determined independently by a process which involves a considerable element of judgment, and then introduced into an estimating process as the independent variable in the regression shown in figure 1, part 1.

This relationship between non-consumption expenditures and total gross national product involves an assumption of stability between them. Under normal peacetime conditions this appears to be true, but it may not hold in certain periods when the pattern of consumption expenditures relative to income is distorted by shortages of consumer goods, price controls, and buying waves induced by international complications. In such cases it is necessary to make special adjustments for these conditions.

Estimation of non-consumption expenditures is a relatively simple and straightforward pro-

BASIC ECONOMIC RELATIONSHIPS AFFECTING AGRICULTURE



* NONCONSUMPTION EXPENDITURES EQUALS GROSS NATIONAL PRODUCT LESS PERSONAL CONSUMPTION EXPENDITURES

° PERSONAL INCOME ADJUSTED EQUALS PERSONAL INCOME LESS GOVERNMENT AND BUSINESS TRANSFER PAYMENTS AND GOVERNMENT INTEREST PAYMENTS

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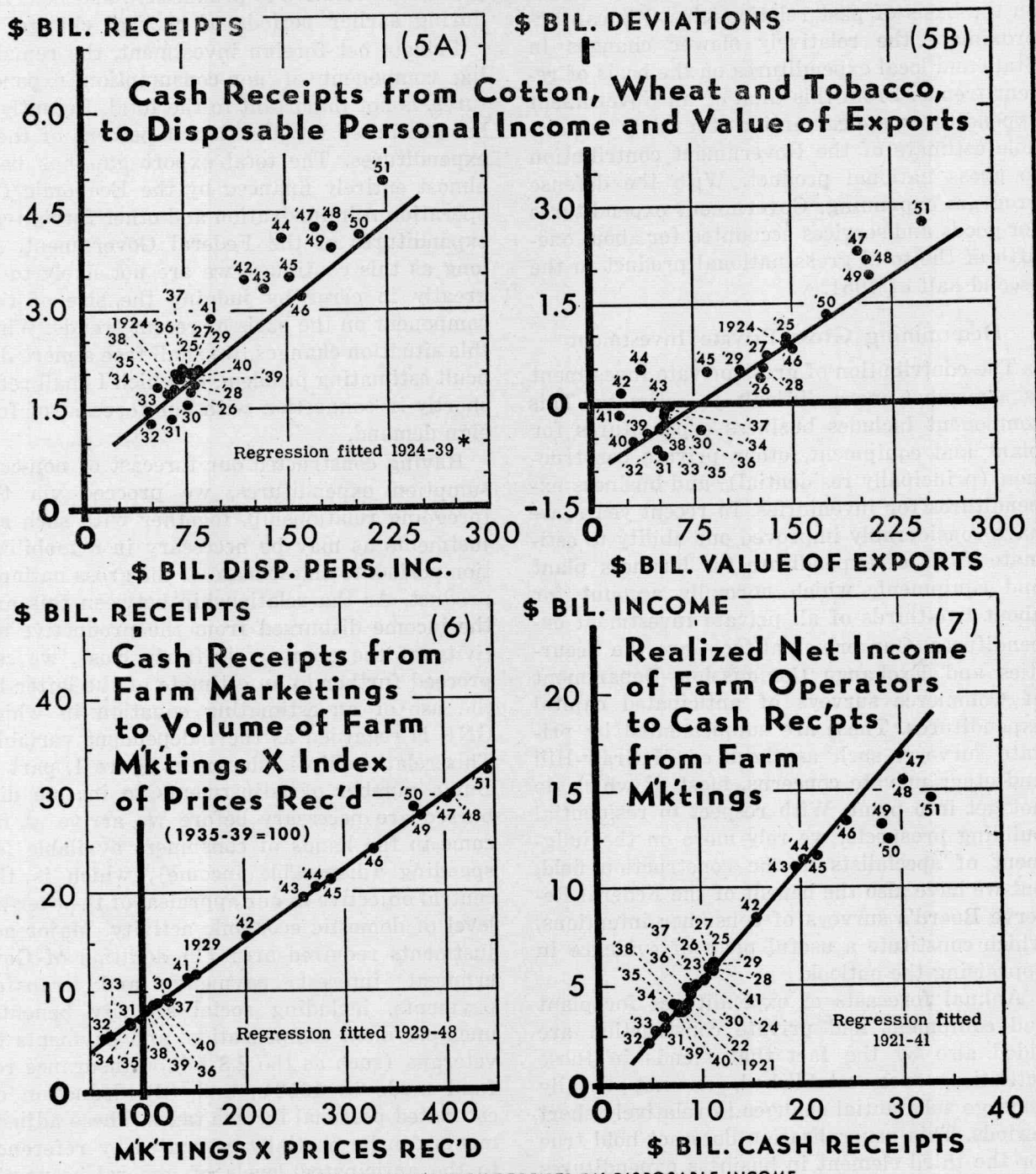

*NET REGRESSION OF CASH RECEIPTS ON DISPOSABLE INCOME

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cedure. With respect to Government purchases of goods and services, we usually know, by the time of our Outlook Conference, the total amount of Federal Government appropriations for the current fiscal year. We can gauge the lag between expenditures and appropriations on the basis of past relationships. We can approximate the relatively slower changes in State and local expenditures on the basis of recent trends. From this total of all Government expenditures, we can arrive at a fairly respectable estimate of the Government contribution to gross national product. With the defense program expanding, Government expenditures for goods and services accounted for about one-fifth of the total gross national product in the second half of 1951.

Determining Gross Private Investment

The contribution of gross private investment is somewhat more difficult to estimate. This component includes business expenditures for plant and equipment, other private construction (principally residential), and business expenditures for inventories. In recent years, we have considerably improved our ability to estimate levels of expenditure for business plant and equipment, which normally account for about two-thirds of all private investment expenditures. Our principal tools are the Securities and Exchange Commission—Department of Commerce surveys of anticipated capital expenditures. These are supplemented by private surveys, such as those of McGraw-Hill and other private concerns, most of which do not get into print. With respect to residential building prospects, we rely more on the judgment of specialists in the construction field, but we have also the benefit of the Federal Reserve Board's surveys of consumer intentions, which constitute a useful piece of evidence in appraising the outlook.

Annual forecasts of expenditures for plant and equipment and private construction are aided also by the fact that trends in these activities, once established, do not usually undergo substantial changes in relatively short periods. This generalization does not hold true for the third element in business expenditures —business inventories. We had a convincing demonstration on this point during 1949 and again after the hostilities in Korea broke out. In estimating this component, we must fall back largely on qualitative considerations, though we do have a few clues, such as ratios of inventories to sales, rate of consumer expenditures relative to production, and behavior during earlier periods of cyclical change.

Private net foreign investment, the remaining component of non-consumption expenditures, is not important in the total. Recently it has accounted for less than 1 percent of these expenditures. The total export gap has been almost entirely financed by the Economic Cooperation Administration and other foreign-aid expenditures of the Federal Government. As long as this continues, we are not likely to be greatly in error by judging the size of this component on the basis of recent trends. When this situation changes, we shall face a more difficult estimating problem, to which I shall refer shortly in connection with our forecast of foreign demand.

Having constructed our forecast of non-consumption expenditures, we proceed via the foregoing relationship, together with such adjustments as may be necessary in a mobilization period, to an estimate of the gross national product. As the relationship between this and the income disbursed from the productive activity of the economy is fairly close, we can proceed further to an estimate of the latter by the use of an estimating equation in which GNP is regarded as the independent variable. This relationship is shown in figure 1, part 2. But a number of adjustments to income disbursed are necessary before we arrive at income in the hands of consumers available for spending (disposable income), which is the central objective in our appraisal of the over-all level of domestic economic activity. Major adjustments required are: (1) addition of Government interest payments and transfer payments, including social security benefits, unemployment compensation, and payments to veterans (such as the 2.8 billion insurance refund made in 1950); and (2) deduction of estimated personal income taxes. These adjustments can be partially estimated by reference to the anticipated levels of general economic activity, but in any given year they may depend significantly on current legislation.

Estimating Foreign Demand Simplified by Role of Government Aid

So much for the forecast of domestic demand. The problem of estimating the level of foreign demand, in terms of the value of exports, has been simplified in recent years by the important role of Government aid in financing United States exports. The value of Government-financed exports is essentially a byproduct of the forecast of the Government contribution to GNP, already mentioned.

The extent of Government aid has a particular bearing on the foreign market for United States farm products, as about two-thirds of our total agricultural exports were financed during 1948-50 under the Economic Cooperation Administration and Army aid to civilians in occupied areas. More recently this proportion has dropped, as high U. S. demand for imports has furnished dollars for expanding trade outside of foreign-aid programs.

In addition to a fairly good idea of the total amount of aid that is to be used in financing agricultural exports, the programming activities of the administering agencies provide some indication as to how that aid is likely to be distributed among the principal agricultural products. Thus we are able to formulate our forecast of Government-financed exports, not only in terms of a total, but also in terms of the major items that comprise that total.

To this estimate of Government-financed exports, we must add an estimate for commercial exports. At present, this can be approximated by treating these exports as a function of our forecast of the general level of domestic economic activity. But as Government-financed exports become less important, more work on export and import elasticities as a means of forecasting changes in foreign trade will be necessary. If the volume of United States private investment abroad again becomes important, some way of estimating this factor must be developed. These estimates will also be necessary in forecasting the private net foreign investment component of non-consumption expenditures.

These constitute the highlights in our procedure of estimating anticipated levels of consumer income and the value of agricultural exports. Although they are our key estimates, we work out a rather detailed break-down of employment, production, and prices, which provides us with a fairly complete model of our forecasted economic situation.

Experts in Other Agencies Review BAE Model of Forecast

We use this more complete model as a basis of discussion and review with other agencies. From experts in these agencies we learn their judgment as to the correctness of the general level of economic activity indicated by our model, as well as to its internal consistency. Some of these experts are specialists in particular fields such as construction, employment, industrial production, and prices. In obtaining their judgments as to the probable future developments in these fields, we get the benefit of much more intensive analysis of some of the components of our model than we ourselves can undertake. To the extent that suggested changes seem to us to be valid, we introduce them into our first model and modify our general forecast accordingly.

Outlook for Agricultural Income and Prices

From this general model of the anticipated economic situation, we proceed to the outlook for agricultural income and prices. What do the prospective levels of disposable income and of the value of agricultural exports mean for farm income? Here again we have developed a number of useful relationships.

The first relationship (fig. 1, pt. 3) shows cash receipts from farm marketings of all livestock, livestock products, and crops (except wheat, cotton, and tobacco) as a function of disposable income. The included items are largely consumed in this country, and changes in disposable income alone provide a fairly good explanation of variations in the level of cash receipts from the sale of these commodities.

The next relationship (fig. 1, pt. 4) shows cash receipts from the sale of cotton, wheat, and tobacco as a function of disposable income. It is apparent that this factor fails to explain a considerable part of the variation in cash receipts from the sale of these crops. These are the chief export crops; they account for about

two-thirds of our total agricultural exports in terms of dollar value. By adding a second variable, consisting of the total value of the exports of these three crops to the correlation, the relationship is materially improved. This is shown in figure 1, parts 5A and 5B.

Although exports are relatively unimportant for the rest of the agricultural commodities taken as a whole, adding the value of exports of these commodities results in some improvement in correlation results over those obtained by using disposable income alone. In any event, a good forecast of disposable income and the value of agricultural exports will yield a good estimate of total cash receipts from farm marketings.

The same factors are useful in estimating the general level of prices received by farmers. This is hardly unexpected, as cash receipts are equal to prices multiplied by marketings (fig. 1, pt. 6) and most of the year-to-year changes attributable to disposable income and the value of agricultural exports are price changes. Marketings, which are mainly a reflection of agricultural output, tend to be relatively stable compared with prices.

We make our first approximation of the index of prices received by farmers on the basis of a logarithmic relationship between prices received by farmers on the one hand and disposable income, value of agricultural exports, and the volume of farm marketings on the other. This relationship is not shown graphically. On the average, a 10-percent change in disposable income results in approximately a 12-percent change in prices in the same direction; a 10-percent change in the value of agricultural exports in almost a 1½-percent change, also in the same direction; and a 10-percent change in the volume of agricultural marketings in about a 17-percent change in the opposite direction.

In developing our final estimate of the general level of prices received by farmers, we do not rely solely on this over-all relationship. Our analysts who specialize in the various commodity fields estimate the expected prices for their individual commodities within the general economic framework that we have assumed, bearing in mind the special conditions that affect their commodities, such as stocks and price-support programs. These estimates for individual commodities are then combined to yield a second estimate of the index of prices received by farmers. Any difference between the index resulting from this summation process and that derived from our over-all regression are reconciled, and our estimate of cash receipts is adjusted accordingly.

In addition to cash receipts, we attempt to approximate the realized net income of farm operators, exclusive of governmental payments to farmers. This measurement of farm income is the sum of cash receipts, the value of home consumption of farm products, and the rental value of farm dwellings, minus production expenses. The general relationship between cash income from farm marketings and realized net income of farm operators is a good one, and in relatively stable periods when prices received and prices paid by farmers are moving along together, it is reliable (fig. 1, pt. 7).

But in periods when prices received are rising or falling rapidly, the resulting lag in production expenditures is difficult to forecast accurately on an over-all basis. A helpful approximation, however, can usually be reached by making a separate appraisal of the principal components of production expenses (which include such items as feed, fertilizer, motor-vehicle operation, hired labor, taxes, and capital depreciation) and summing up the results. Thus, even if our forecast of a change in the level of cash receipts should prove correct, we cannot be sure of the precise percentage change in net income, although it is certain that it will be greater than that in cash receipts.

Outlook for Individual Farm Commodities

The third phase of our forecast is the preparation of outlook statements for the individual farm commodities. This is not characterized by any uniform method of analysis. The price and marketing structures of the several commodities differ decidedly in their complexity, and vary widely in the completeness and accuracy of the basic statistical data. Furthermore, there are differences in the extent to which our individual commodity analysts have been successful in developing quantitative measurements useful in forecasting the demand and supply

situations in their respective commodity fields. This discussion is confined to a single example of a commodity forecast—meat animals—a commodity classification that includes cattle, hogs, sheep, and lambs, and accounts for about 30 percent of the total cash receipts from farming. The procedure with respect to this commodity group may also be described in terms of three successive steps: supply forecasts, distribution forecasts, and price forecasts. The first two are developing more or less independently of the general economic forecasts described earlier; the third is arrived at by joining the general demand analysis with the specific supply and distribution forecasts for meat animals and meat.

Production and Consumption Estimates

In the first step, a forecast of production of meat animals and output of meat for the ensuing year is made without much regard to the outlook for demand. Work on this phase must be begun before the general estimates of demand have been developed; it is a legitimate procedure, in any event, as the general level of demand for meat has a rather small effect on the supply of meat within a 12-month period.

During World War II, needs of the agencies concerned with food led to formation of a Supply Estimates Committee for meat. Since the war, a similar committee within the Department of Agriculture has continued this work on an informal basis. Meeting every 2 or 3 months, it projects meat production by quarters through the current or succeeding year.

Basic data for these forecasts include reports on the size of the pig crops, on hog-breeding intentions, and on hog slaughter; as well as reports on the number of cattle and sheep on feed, moving into feed lots, and going to slaughter.

Several statistical relationships between livestock numbers, feed supplies, and prices on the one hand, and the subsequent output of meat on the other, have been developed. These cannot be described here, but by combining current economic intelligence with the results of those relationships, the estimating committee is able to arrive at reasonably accurate projections of the prospective supply situation.

After the supply estimates have been completed, we take the second step, termed a distribution forecast. This involves a determination of the extent to which the total supply will be distributed among carry-over stocks, military requirements, foreign shipments, and domestic consumption. As about 95 percent of the total meat supply of the United States is usually provided from current production, and approximately the same percentage disappears for domestic consumption, it is obvious that the estimate of consumption for any one year depends mainly upon the accuracy of the production forecast.

The Price Forecast

Our third step—the price forecast—consists in relating the forecast of meat consumption to the forecast of disposable income that has been provided in the over-all demand analysis. Here again we make use of several statistical relationships which cannot be described in this paper. But it may be noted that we have had some success during the postwar period with what may be described as a price-structure approach, as contrasted with the multiple correlation of time series. This involves a separate estimate for each item in the price structure, starting with the retail price of meat and ending with the prices received by farmers for meat animals.

Our estimates of prices for pork and hogs in 1950 may be used as an example. We start with the disposable income estimate of 185 billion dollars which has been provided by the general demand analysis and with a forecasted pork consumption of 75 pounds per person derived from the supply and distribution analysis.

The next step, a crucial one, is an estimate of the percentage of income spent for pork. This averaged 2.3 percent in 1935-39 and appears to have been about the same in 1949. Applying this to the estimate of income for 1950, we find that the per capita retail value of pork consumption in that year will be about 28 dollars and the average retail price of pork about 40.5 cents a pound. This would mean an average price of about 36.5 cents a pound for pork and lard combined.

From analyses of costs and margins, we expect the charge for marketings to be about

14.5 cents a pound, leaving about 22 cents as the farm value of the retail price of pork and lard to which was added an allowance of one-third of a cent to cover byproducts. Thus, we arrive at an estimate of 22.3 cents a pound as the gross farm value equivalent of a pound of pork and lard at retail.

Using equations which indicate that 1.41 pounds of live hogs are required for 1 pound of pork and lard at retail, we move to an equivalent farm price for hogs of about $16 per 100 pounds.[3] Naturally we do not publish this figure as a precise forecast, but we may say that we expect the price of hogs to be down by something more than 10 percent from 1949; or if this seems too exact, we may say that we expect prices to decline "moderately."

This is as far as this article will go on the subject of individual commodity forecasts, except to note that, although the price forecasts are not developed by any uniform method, we do construct uniform supply and distribution tables, applicable to the year ahead, for each major food commodity. This process provides a forecast of the consumption of individual foods, from which we proceed to a forecast of the over-all level of food consumption, as indicated by a price-weighted index number of per capita food consumption at the retail level.

Evaluation of Forecasts

So much for the description of our general procedure. In conclusion brief comments are offered (1) on our results, and (2) on some of the more general problems involved in economic forecasting.

Results summarized in table 2 compare actual year-to-year changes of certain economic indicators during 1947-51 with changes which were forecasted by the methods described above. It should be noted that we do not reproduce these estimates in our published outlook statements, as they imply a greater exactness than we can hope to attain. For 1948, as an example, we were doubtful about the changes in farm prices and incomes indicated by the model and we confined ourselves to the generalizations that prices received by farmers would remain close to current levels and that net income might not be quite so high as in 1947. But as estimates contained in the projection models do influence the general characteristics of our forecasts, they may properly be examined in comparison with the actual events.

Several things about the estimates contained in our models stand out fairly clearly:

The forecasts in terms of "real" elements, such as employment and industrial production, are generally closer to the actual outcome than those of prices and money incomes.

We seriously misjudged the economic climate with respect to inflation during 1947. Prices rose much higher than we anticipated and the inflation continued in 1948, whereas we had thought that it might abate before the end of 1947. The most damaging error affecting our forecasts of agricultural prices and income during 1947 was an underestimate of the liquidation of foreign gold and dollar reserves which greatly increased foreign imports of our farm commodities, particularly food grains, due, in part, to anticipations of United States aid.

A fairly good appraisal was made of prospects in 1948 and it appears that we did rather well in 1949.

The 1950 appraisal was, of course, upset by the situation in Korea. But up to the time of the outbreak of hostilities the behavior of the economy was reasonably in line with our forecast, as shown by a comparison with the major economic indicators during the first half of 1950. The 1951 forecast again appears to have been a fairly good appraisal of subsequent events.

On the whole, our forecasts of changes in agricultural prices and incomes appear to be subject to a relatively larger margin of error than those which measure changes in the economy generally. This is partly due to the fact that the latter are relatively larger aggregates, within which there is some tendency for errors in component items to offset each other. More important, however, is the fact that agricultural prices and incomes are subject to short-run instabilities which we are not fully able to anticipate. This was particularly true in 1951, which was characterized by very sharp movements in prices received by farmers together with some very atypical movements in monthly marketings, particularly of livestock.

[3] The average price of hogs after seasonal adjustment in the first half of 1950, before the outbreak of the Korean conflict, averaged $16.92.

TABLE 2.—*Comparison of forecasted and actual changes in selected economic relations* [1]

Item	Percentage change 1947 from 1946		Percentage change 1948 from 1947		Percentage change 1949 from 1948		Percentage change 1950 from 1949 [2]		Percentage change 1951 from 1950	
	Indicated in forecast	Actual	Indicated in forecast	Actual	Indicated in forecast	Actual	Indicated in forecast	Actual	Indicated in forecast	Actual
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Total employment	0	+2	0	+2	+1	−1	−1	0	+5	+5
Industrial production	+8	+10	−1	+3	−1	−8	−2	+7	+15	+10
Disposable income	+6	+9	0	+11	0	−1	−3	+6	+11	+9
Wholesale prices	+7	+26	+1	+9	−4	−6	−6	−1	+11	+12
Retail prices:										
Total	+6	+14	+1	+8	0	−1	−3	−1	+6	+8
Food	+5	+21	+2	+8	−2	−4	−6	−2	+8	+11
Nonfood	+8	+9	+1	+7	+2	+1	−3	+1	+5	+6
Cash receipts from farm marketings	−6	+20	−7	+2	−3	−7	−11	−4	+12 to +16	+14
Realized net income of farm operators	−12	+22	−17	−6	−8	−14	−16	−17	+19 to +23	+18
Prices received by farmers	−4	+19	−1	+3	−4	−13	−6	−3	+11	+18

[1] Forecasted changes are those made at time of Outlook Conference.
[2] First half of 1950 from calendar 1949. In order to avoid the effect of the Korean outbreak, the full year of 1950 was not used.

It is not possible here to make a full evaluation of our results which would necessarily have to be lengthy and detailed. For recent years, the Bureau is carrying on a continuing record and analysis of the results of the forecasts both for general indicators and for individual commodities.

Concluding Observations

It is perhaps appropriate to conclude with some general comments on several rather persistent issues in the forecasting field.[4] Economic forecasting is still exceedingly unsatisfactory, and some economists regard it as a vice from which the virtuous should resolutely abstain. But so long as individuals, commercial enterprises, and governments must make decisions on the basis of judgment as to the course of economic events in the future, economic forecasts must necessarily be made and acted upon.

As Arthur F. Burns of the National Bureau of Economic Research has said: "Prediction is inseparable from life. All human activity—whether within or outside the economic sphere—inevitably reflects forecasts of the future, mingled with current pressures and past commitments. The choice before man is not whether to engage in forecasting or to abstain from it, but whether to base expectations on 'hunches' or on lessons carefully distilled from experience." [5] This is not to say that all economists must become professional forecasters, but the demand will call forth some supply, and a considerable number of economists and statisticians will continue to concentrate on the forecasting problem, either with the aim of developing more scientific methods or in the formulation of economic forecasts and appraisals for current use.

[4] A large literature on the forecasting problem has arisen during the postwar period. See particularly Michael Sapir, "Review of Economic Forecasts for the Transition Period" and comments by Lawrence Klein, Morris A. Copeland, and Rufus S. Tucker in National Bureau of Econ. Research, Inc., STUDIES IN INCOME AND WEALTH. 11:273–367. New York, 1949. Sapir's article contains references to several of the more important papers, and together with the discussions, touches on most of the basic issues involved.

[5] BURNS, ARTHUR F., STEPPING STONES TOWARDS THE FUTURE. Twenty-Seventh Annual Report of the National Bureau of Economic Research. New York. 1947.

An issue that puts in a fairly regular appearance is whether forecasting is a science or an art. More specifically, the issue centers around the relative merits of what may be described as objective statistical forecasts versus what have been termed judgmental forecasts. In theory, there is hardly any argument. If a statistical system existed that would yield highly accurate predictions by the process of introducing past observations into that system, it would be foolish to waste one's judgmental resources on the forecasting problems. Unfortunately, no fully satisfactory system of this type has yet been constructed and, in fact, a very considerable element of judgment is involved in even the most sophisticated statistical approaches.

Regardless of the method or combination of methods employed, any responsible forecaster recognizes that his predictions or appraisals are subject to error, and this raises the question as to how a forecast should be presented. Any attempt to give a complete answer to this question would lead into a whole new set of topics, including the usefulness of stating forecasts as ranges, the extent to which probability statements with respect to forecasts are valid, what to do when the range is so wide that the values toward either end amount to essentially different forecasts, and so on. All that will be said at this point is that there appears to be no reason why any forecaster must confine himself to any specified method of presentation.

In our opinion, the only essential requirement is that one's forecasts be presented in such a way that the user is not misled as to their inherent accuracy. This involves some differentiation between those parts of the forecast for which substantial support can be adduced and those which are evaluated on more tenuous grounds. Whatever one may think about the forecast of demand and prices made by the Bureau of Agricultural Economics it seems fair to say that we have consistently tried to avoid leaving any false impressions as to the accuracy of our outlook statements. If anything, we hedge too much rather than too little.

Although we shall probably continue to prepare outlook reports relating to the demand for farm products, it should be emphasized that we are by no means completely satisfied with our present procedures. We hope that current research in the field of economic prediction will shortly provide us with a better set of tools.