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STAFF PAPER 10

APPRAISAL OF ALTERNATIVE CONCEPTS AND MEASURES OF AGRICULTURAL PARITY PRICES AND INCOMES

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The agricultural parity concept developed step by step during the late 1920's and early 1930's.¹ ". . . the concept as we now know it did not spring full blown from the brain of some economic Jupiter, but rather grew out of the continuous groping for a concrete measure of justice for the farmer, and was steadily modified by conditions prevailing in the economic life of farmers and the Nation. In other words, parity did not develop as the practical application of an economic theory immaculately conceived, free from all taint of original sin in the form of class interest. On the contrary, parity, like Topsy, just grewed; and whatever economic justification can be found for it in its present form may be considered largely a rationalization."²

OBJECTIVE OF THE PARITY LEGISLATION

The first specific parity formula was incorporated in the Agricultural Adjustment Act of 1933. The objective stated in the act was to "reestablish prices to farmers at a level that will give agricultural commodities a purchasing power, with respect to articles that farmers buy, equivalent to the purchasing power of agricultural commodities in the base period. The base period in the case of all agricultural commodities except tobacco shall be the prewar period, August 1909-July 1914. In the case of tobacco, the base period shall be the postwar period, August 1919-July 1929."³

Parity prices, then, were to be prices which would give *farm products* the same purchasing power *per unit* (bushel, bale, etc.) for goods and services used in both production and family living as prevailed in the base period.

The legislation was passed, of course, not for the benefit of the farm products concerned as such, but for the benefit of the farmers who produced these products. The objective was to restore the price conditions that existed during the base period, on the assumption that this would restore the economic situation of the producers of the products.

The word parity itself was not used in the AA Act of 1933. It first appeared in agricultural legislation in the AA Act of 1938. The purpose of that act, as stated in the opening paragraph, was to accom-

¹ The development and present status of the present parity price formula is well outlined in *Possible Methods of Improving the Parity Formula*, Senate, 85th Cong., 1st sess., S. Doc. 18, pp. 8-13, 1957. See also *An Alternative Parity Formula for Agriculture*, Research Bulletin 476, Iowa State University, Ames, Iowa, February 1960.

² E. W. Grove, *The Concept of Income Parity for Agriculture*, Studies in Income and Wealth, Vol. 6, New York, National Bureau of Economic Research, 1943.

³ Agricultural Adjustment Act, Public Law 10, *U.S. Statutes at Large*, 73d Cong., 1st sess., XLVIII, May 12, 1933, p. 32.

plish a number of things "assisting farmers to obtain, insofar as practicable, parity prices for such commodities and parity of income"

Pursuant to the objective stated in the AA Act of 1933, the parity formula was developed to reflect changes in the prices of the "articles that farmers buy." Parity prices then could be computed for agricultural commodities that farmers sell which would give those commodities the same purchasing power that they had in the base period.

CONTENT OF THE PARITY FORMULA

The Department of Agriculture had been compiling and publishing the price data called for in the AA Act of 1933 for some years previous to 1933. The index of prices *received* by farmers for the products they sell was compiled on a monthly basis beginning with 1909. It was first published in 1921.

The basic data for the index of prices paid for the "articles that farmers buy" were more difficult to obtain. This index was compiled on an annual basis beginning with 1909, on a quarterly basis beginning with 1924, and on a monthly basis beginning with 1937. This index of prices paid by farmers was first published in 1928.⁴ At that time, the pre-World War I base, 1910-14, seemed a reasonable base to use for both series—the prices received by farmers, and the prices paid by farmers. That base was written into the AA Act of 1933.

The parity formula laid down in the AA Act of 1933 was amended and reenacted several times after 1933.⁵ The prices of certain services were added to the prices paid by farmers, and "comparable prices" were provided for some products which had not come into general use until after 1929. In addition, the Agricultural Act of 1948 introduced a table of loan rates that varied inversely with the supply of the crop.

PRICE BASES

The Agricultural Act of 1948 also included provisions which "modernized" the parity formula; it brought the base period for computing the relative parity prices of individual farm products (the parity prices relative to each other) up to a more recent date—the most recent 10-year moving average. The 1910-14 base period was retained, however, for parity prices as a whole. This modernized formula was to become effective in 1950. The Agricultural Act of 1949 modified the formula by the inclusion of farm wage rates in the parity index and the inclusion of direct subsidy payments on dairy products, cattle, and lambs in prices received before it became effective.

To avoid extremely sharp declines in the parity prices of any commodity, transitional parity prices were provided by the 1948 act. They were to be used for those commodities for which the new parity prices are less than 95 percent of the old parity prices in 1950, 90 percent in 1951, and so on. In other words, the parity price as cal-

⁴ In the Agricultural Acts of 1948 and 1949, the index of prices paid by farmers was legally defined as the parity index.

⁵ The details concerning these amendments, and the steps involved in the computation of parity prices for different products, are given in B. R. Stauber, et al., "The Revised Price Indexes," *Agricultural Economics Research*, 11, 2, April 1950, pp. 33-62. Some interesting background on the evolution of the term "parity" is given in R. L. Tontz, "Evolution of the Term Parity in Agricultural Usage," *Southwestern Social Science Quarterly*, March 1955, pp. 345-355.

culated under the old method was to be reduced 5 percent each year until the transitional parity was less than the parity prices as defined by the new act. From then on, the new parity was to be used. These transitional prices were incorporated into the 1949 act. In actual practice, for several years, "dual parity" was used with the six basic crops. The parity prices computed by the modernized formula went into effect only if they were higher than prices computed under the old formula.

For the purpose of illustrating the computation of parity prices the calculation of the effective parity price for corn based on data for January 1960 is given below. The parity price under the new formula of the amended act is computed as follows:

"The 120-month, January 1950–December 1959, average of prices received by farmers for corn, adjusted to include an allowance for unredeemed loans, etc., was \$1.39 per bushel. The 120-month average of the Index of Prices Received by Farmers, adjusted to include an allowance for unredeemed loans, etc., was 255. Dividing \$1.39 by 255 gives \$0.545 per bushel, the adjusted base price. Multiplying this adjusted base price by 299, the Parity Index based on data for January 1960, gives the indicated price of \$1.63 per bushel as computed using the new formula."

Since the effective parity for corn, a basic commodity, was the transitional parity based on data for December 1959, it was also necessary to compute the transitional parity based on data for January 1960. As noted above the transitional parity for basic commodities during 1960 is 80 percent of the parity price computed by the old formula. The parity price according to the old formula is calculated by multiplying the average price received by farmers for corn for the 60-months, August 1909–July 1914, which was \$0.642 per bushel, by the January 15, 1960, unrevised Index of Prices Paid, including Interest and Taxes, which is 315 percent. This gives an indicated parity price of \$2.02 per bushel under the old formula. Multiplying by 80 percent gives \$1.62 the transitional parity price. Since this is lower than the indicated parity price under the new formula of \$1.63 per bushel, the parity price under the new formula is now the effective parity price for corn.

Effective parity prices for most commodities have shifted to the new formula, but for some commodities the transitional parity is still the effective parity price.⁶

WEIGHT BASES

In 1950, the weight base used in computing the index of prices paid was moved up from 1924–29 to 1937–41, and the weights were revised in line with the quantities used in the later period. In January 1959, the weight-base period was moved up again, to 1955, with weights revised in line with the 1955 Farm Expenditure Survey and the 1955 Food Consumption Survey.⁷ The weight base for the index of prices

⁶ *Agricultural Prices*, Department of Agriculture, Agr. Mktg. Serv., Jan. 29, 1960, p. 44.

⁷ B. R. Stauber, R. F. Hale, and R. S. Peterson, "The January 1959 Revision of the Price Indexes," *Agricultural Economics Research*, Vol. XI, Nos. 2 and 3.

received was moved up to 1953-57 (the 5-year period was used so as to average out most of the year-to-year variations in quantities sold which result chiefly from irregular variations in weather).

The indexes of prices received and prices paid from 1910 to 1959 are given in Table 1. The ratio between the two indexes (the parity ratio) is also given. The data since World War II are shown graphically in Figure 1.

FIGURE 1

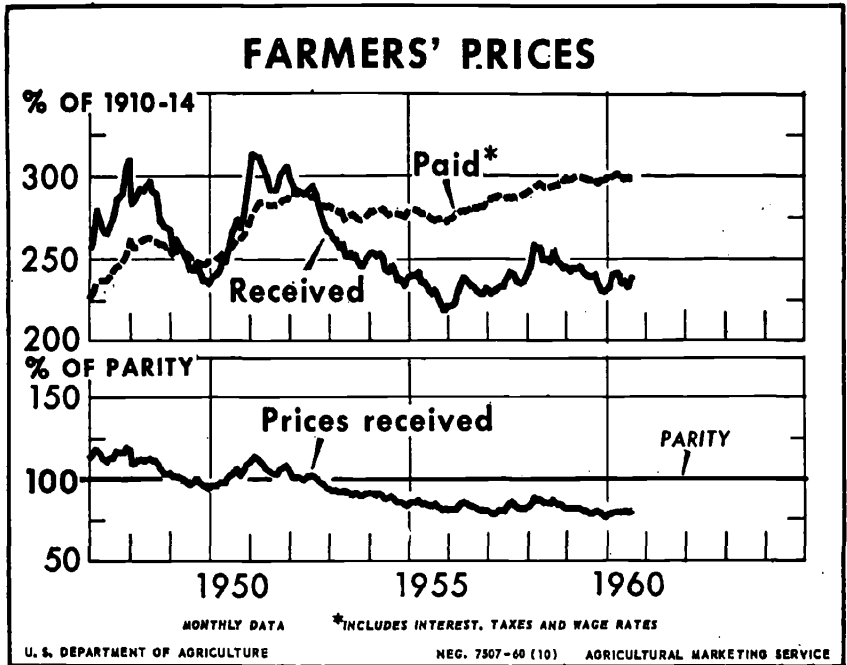


TABLE 1.—Indexes of Prices Received by Farmers for Commodities, and Prices Paid for Commodities, Interest, Taxes, and Wage Rates, and Parity Ratios, United States, 1910-59

(Index base, 1910-14=100)

Year	Index of prices received	Index of prices paid ¹	Parity Ratio	Year	Index of prices received	Index of prices paid ¹	Parity ratio
1910.....	104	97	107	1949.....	250	251	100
1920.....	211	214	99	1950.....	258	256	101
1930.....	125	151	83	1951.....	302	282	107
1940.....	100	124	81	1952.....	288	287	100
1941.....	124	133	93	1953.....	255	277	92
1942.....	159	152	105	1954.....	246	277	89
1943.....	193	171	113	1955.....	232	276	84
1944.....	197	182	108	1956.....	230	278	83
1945.....	207	190	109	1957.....	235	286	82
1946.....	236	208	113	1958.....	250	293	85
1947.....	276	240	115	1959.....	240	298	81
1948.....	287	260	110				

¹ Including interest, taxes, and farm wage rates.

PERCENTAGES OF PARITY PRICES USED AS BASES FOR CCC LOAN RATES

In October 1933, the Commodity Credit Corporation was organized for the purpose of stabilizing the supplies and prices of the basic farm products. It operated as a storage agency, making nonrecourse commodity loans to farmers and taking over the commodities for which the loans were not redeemed.

For the first few years, the CCC set the loan rates at appropriate levels for stabilization purposes. But in 1938, the Agricultural Adjustment Act of 1938 took the setting of the loan rates out of the CCC's hands and wrote into law the range of percentages of parity prices within which the loan rates were to be set. The range extended from 52 to 75 percent of parity. In the case of corn, the loan rate varied within the range, inversely with the size of the crop.

In May 1941, Congress went further. It directed the CCC to set the loan rates for the "basic" commodities—cotton, corn, wheat, tobacco, and rice—at 85 percent of parity. This raised loan rates about 50 percent higher than the 1940 rates on cotton and wheat and 13 percent higher on corn. The rates for most products were raised to 90 percent of parity in 1944, where they remained until they began to be reduced in 1955. The data for corn are given for illustration in Figure 2 and Table 2.

FIGURE 2

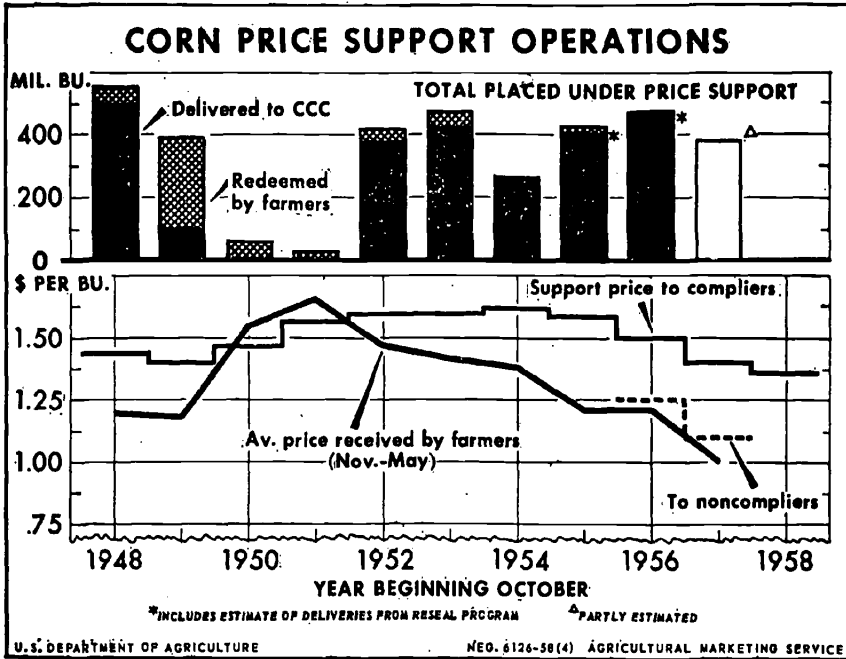


TABLE 2.—Corn: U.S. Loan Rates, U.S. Average Farm Prices, and Differentials Between Them, Support Prices and Quantity Placed Under Support, 1933-56

Year beginning October	Announced national average loan rate (dollars per bushel)	Average price November-May ¹ (percentage of parity)	Average price minus announced loan rate (dollars per bushel)		Placed under price support				Under loan or owned by CCC at end of crop year (million bushels)
					Loans ² (million bushels)	Purchase agreements (million bushels)	Total (million bushels)	Percentage of production	
1933	\$0.45	60	\$0.45	\$0.00	268		268	11.2	82
1934	.55	68	.83	.28	20		20	1.4	
1935	.45	55	.55	.10	31		31	1.3	
1936	.55	66	1.06	.51	(³)		(⁴)		
1937	.50	58	.51	.01	61		61	2.3	45
1938	.57	70	.44	-.13	230		230	9.0	258
1939	.57	69	.55	-.02	302		302	11.7	471
1940	.61	75	.58	-.03	103		103	4.2	403
1941	.75	85	.74	-.01	111		111	4.2	197
1942	.83	85	.90	.07	56		56	1.8	8
1943	.90	85	1.12	.22	8		8	.3	6
1944	.98	90	1.07	.09	21		21	.7	9
1945	1.01	90	1.15	.14	3		3	.1	
1946	1.15	90	1.38	.23	26		26	.8	9
1947	1.37	90	2.20	.83	1		1		
1948	1.44	90	1.20	-.24	377	\$ 174	551	15.3	493
1949	1.40	90	1.18	-.22	332	65	367	11.9	650
1950	1.47	90	1.55	.08	62	2	64	1.8	488
1951	1.57	90	1.68	.09	25	1	26	.9	306
1952	1.60	90	1.47	-.13	809	107	417	12.7	680
1953	1.60	90	1.42	-.18	369	102	471	14.7	736
1954	1.62	90	1.38	-.24	200	59	259	8.5	870
1955	1.58	87	1.21	-.37	356	65	421	13.0	1,060
1956 ⁵	1.50	84	1.21	-.29	401	76	477	13.8	1,295
1957 ⁶	1.40	77	1.02	-.38	320	49	369	10.8	1,355
1958 ⁶	1.36	77	1.05	-.31	343	38	381	10.0	1,400
1959	1.12	66	1.00	-.12	\$ 439	\$ 38	\$ 512	11.7	
1960 ⁷	1.06	65							

¹ Applies to commercial area only in years when acreage allotments are in effect.

² Average price received by farmers in period when most of the corn is placed under price support. In recent years, loans have been available from time of harvest through May.

³ Excludes purchase agreement corn placed under loan in the following year during the period 1948 to date.

⁴ Included 14 million bushels of 1937 corn placed under loan for first time in 1938 under short-term loan program.

⁵ Purchase agreements not available prior to 1947.

⁶ Loans were made to noncooperators at \$1.25 per bushel in 1956, \$1.10 in 1957, and \$1.06 in 1958.

⁷ Minimum support; may be increased at beginning of marketing year if higher support is required.

⁸ Preliminary. Compiled from reports of Commodity Stabilization Service. Data published currently in: Department of Agriculture, Agricultural Marketing Service, *The Feed Situation*.

Source: Department of Agriculture, *Agricultural Outlook Charts*, 1956, Nov. 1955, Table 35, p. 68; Department of Agriculture, *Grain and Feed Statistics*, through 1954. Department of Agriculture Statistics Bulletin 159, March 1955, Table 48, p. 46; Department of Agriculture Agricultural Marketing Service, *The Feed Situation*. May 1959, p. 23.

EFFECTS OF USING PERCENTAGES OF PARITY PRICES

The effects of this use of percentages of parity prices as the bases for loan rates were spectacular. They distorted the allocative function of prices in the direction of the supported commodities. Agricultural production in the United States was already increasing faster than the demand was increasing, under the impact of rapid technological development. The setting of price supports at percentages of parity, above long-run free-market equilibrium levels, further stimulated overproduction of the supported commodities above market needs, and at the same time reduced the consumption of those products.

As a result, huge stocks of corn, cotton, and wheat, particularly, accumulated in CCC hands. Desperate attempts to reduce production by acreage controls and stimulate consumption by domestic and export consumption subsidies have been only partially successful. The sizes of the stocks in recent years—several times larger than needed for stabilization purposes—are shown in Figure 3.

FIGURE 3

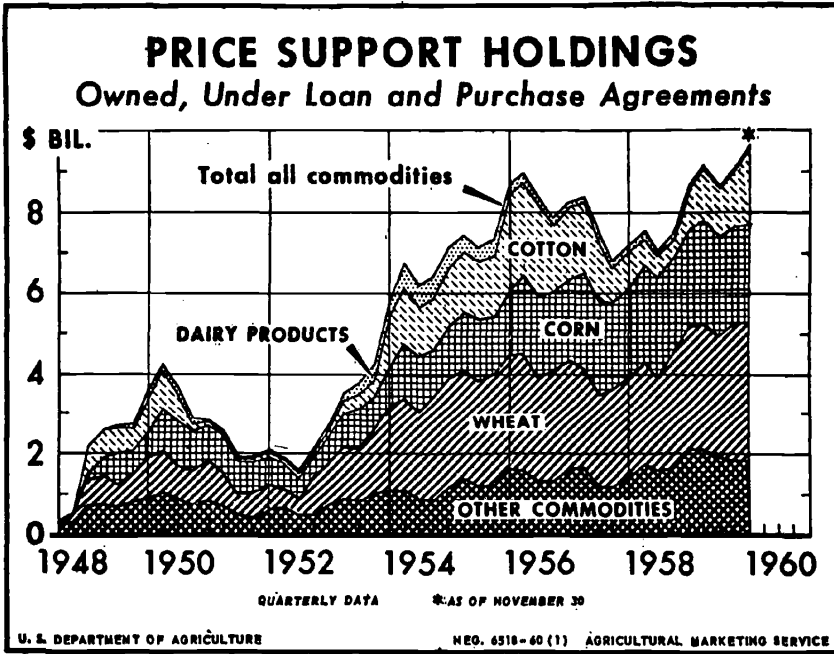
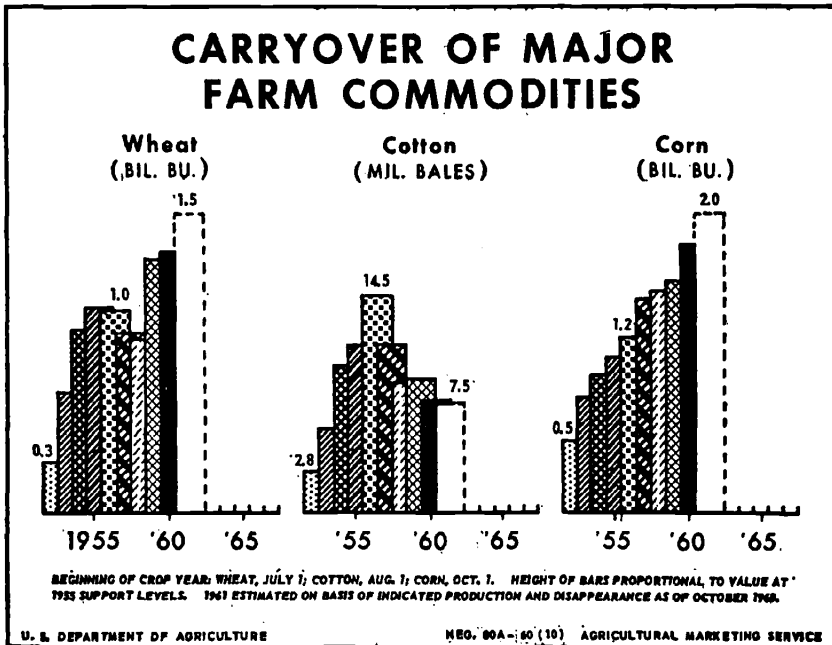


FIGURE 3—Concluded



On January 31, 1960, the "investment of the CCC in price-support programs amounted to \$9,239,499,000—made up of loans outstanding of \$1,944,551,000 and the cost value of inventories, \$7,294,948,000." The "realized cost" of "programs primarily for stabilization of farm prices and income" in fiscal 1958 was \$2,665,700,000.^{7a} Only a part of these expenditures went directly to farmers. The rest went to other groups, such as storage agencies for storage fees, and indirectly to construction companies for the building of additional storage space. These other agencies received a substantial part of the income transferred from taxpayers. In fiscal 1958, for example, the "realized cost" of the corn program was \$271 million. Of this amount, \$110 million—more than a third—went to the grain trade and transportation agencies to cover storage and handling charges. None of this went to farmers.⁸ The program thus was a "grain trade program" as well as a farm program.

APPRAISAL OF THE PARITY PRICE INDEXES

The present parity price indexes and ratios may now be appraised with reference to the job they were originally set up to do—to measure the prices received by farmers, the prices paid by farmers, and the ratio between the two, for agriculture as a whole and for individual farm products. The parity price indexes and ratios may also be appraised with reference to the uses to which they are now being put. These are vastly different from the uses for which the indexes were originally designed. The two appraisals are given separately in order below.

APPRAISAL OF THE PARITY INDEXES WITH REFERENCE TO THE USES FOR WHICH THEY WERE ORIGINALLY DESIGNED

Type of Formula Used.—The parity price indexes are computed by the use of an aggregative Laspeyres type formula, with base-year weights.⁹

This formula meets neither the factor-reversal test nor the time-reversal test. But the use of a formula such as Fisher's Ideal (the geometric average of a Laspeyres formula with base-year weights and a Paasche formula with given-year weights) is impractical. The cost of getting given-year weights for the index of prices paid in time to use for current calculations would be prohibitive. Getting given-month weights would be clearly impracticable.

The Laspeyres type formula is subject to the problem of the increasing obsolescence of the base-period weights with the passage of time. The USDA has dealt with this problem by using the same weight base period for a number of years, then using a more recent period and splicing the two indexes at an appropriate point. This has the disadvantage of causing a sudden change in the index of 3.4 percent, for

^{7a} The "realized cost" is large in recent years partly because it includes the cost of acquiring the large inventory built up in those years. If crops were very small in 1960 and later years, and prices rose enough to pull substantial quantities out of storage for sale on the market, the revenue from those sales would offset a large part of the total costs in those years and "realized cost" would be relatively small.

⁸ Correspondence from CCC.

⁹ B. Ralph Stauber, Nathan M. Kofsky, and C. Kyle Randall, *The Revised Price Indexes, Agricultural Economics Research*, USDA, Bureau of Agricultural Economics, April 1950, p. 53.

example, when the last revision was made in January 1959. In principle, this could be avoided or at least reduced to insignificance (actually, spread out in little steps over a period of years) by the use of a recent moving average weight base period. But the cost of obtaining the weights for the index of prices paid would be high and other disadvantages of a more technical nature would be incurred. On the whole, the USDA practice seems justified, and their request for permission and funds to put the gathering of the weight data on a regular and more frequent schedule than in the past seems to be reasonable.

Adequacy of Coverage.—Another feature of a price index is the adequacy of its coverage of the prices it purports to measure.

The index of prices received by farmers began in 1910 as a weighted average of price relatives for 10 crops; the base period was the average of December 1 prices for 1866–1908. Several years later, livestock prices were added. In 1924, the index included the prices for 30 commodities, and the base period was moved up to August 1909–July 1914. In 1924, prices for 20 more products were added. Some changes in the coverage were made in 1950. Under the latest revision in 1959, the prices for 55 farm products are included, which are weighted by the quantities marketed in 1953–57, and represent 93 percent of total farm marketings in 1953–57. The largest single item omitted is farm forest products.¹⁰

This coverage of 93 percent is close enough to 100 percent to be regarded as satisfactory. It probably represents an optimum allocation of limited appropriations to alternative uses.

The index of prices paid by farmers began in 1910 with 142 commodities, expanded to 181 in 1927, to 335 in 1935, and to about 390 in 1959. The production component of the index contains about 230 items; the living, about 200 items (two-thirds as many as the BLS consumer price index) and both production and living, 46 items. These items are weighted by expenditures in 1955. They cover about 84 percent of farmer expenditures in 1955.

The most important fields not covered in the family living part of the parity index are medical, dental, and hospital expenses, which in 1955 amounted to \$1,444 million or 7.2 percent of all farm family living expenditures. Others were personal insurance and recreation which accounted for 2.6 and 2.1 percent, respectively, of all living expenditures. In production, important omissions are machine hire and custom work, marketing expenses for crops and livestock, cash rent, irrigation, and business insurance, which in 1955 accounted collectively for nearly 9 percent of all production expenditures.¹¹

This coverage appears less adequate than the coverage of the index of prices received. Larger appropriations would permit the USDA to increase the coverage.

Separate Parity Indexes for Individual Farm Products.—The present legislation provides for the use of the same index for all farm products (except for the use of the "Unrevised Index" for the few commodities still on the transitional basis). The present parity index is a single index for the whole United States. It is based upon the prices of about 389 goods and three services (interest, taxes, and

¹⁰ B. R. Stauber, *Critical Problems in Index Number Construction*, Agricultural Marketing Service, USDA. Presented to a joint meeting of the American Statistical Association and the American Farm Economic Association, December 1959, pp. 13–14, 21.

¹¹ Stauber, *op. cit.*, p. 21.

wages). The index shows the prices of goods and services for the average farmer in the United States.

But most actual farmers differ widely from average farmers. Some of them are cotton farmers, using cotton machinery, fertilizer, and labor; some are Corn Belt farmers, using corn planters, pickers, etc.; some are wheat farmers, using "one-way's" and combines; some are truck farmers, ranchers, fruit growers, etc., each with his own list of goods and services purchased, differing in kind and quantity from that of the others. The parity index—an average index for the whole United States—does not accurately fit any of them.

The prices paid for different items in the parity index have risen at markedly different rates since 1940. Hired labor wages have risen to an index of well over 400 (1935-39=100). Machinery prices have more than doubled. But fertilizer prices have risen only 50 percent. The combination of resources used in the production of different farm products has changed in different ways in different areas. The use of machinery on Southern Piedmont cotton farms exactly doubled from 1935 to 1953, but on Central Northeast dairy farms it rose only 36 percent. The use of labor declined at different rates among the different farm areas. Yet the same weights for all types of farms are used in the parity index. The prices of the different factors of production change at different rates, so the use of the same quantity weights for all farm areas, when in fact the quantity weights change at different rates, means that the single parity index for the United States as a whole is not an accurate index of the prices paid in each of the different farming areas. Parity prices for individual farm products would more accurately reflect the parity purchasing power of those products if the parity index were computed separately for each product.

Separate indexes of prices paid for commodities used in production for 27 types of farms in several major farming areas in the United States, have been computed by the USDA. They are shown in Table 3, along with the index for the United States as a whole. Each one of these indexes for important types of farms represents the situation on commercial family-operated farms of a particular type in a particular location. For this reason, the indexes are not necessarily representative of all farms involved in the production of a particular commodity over the Nation as a whole. They approximate, however, the differences in price trends for production items that might be expected between farms producing different commodities and also the differences between areas producing the same commodity.

Table 3 indicates that all the special prices-pair indexes for the different types of farms shown from 1947-49 to 1955, ranged from a 4-percent decline for sheep ranches in the Southwest to an increase of 26 percent for wheat-pea farms in Washington-Idaho. This is a total range of 30 percentage points. The rise in the United States index during the same period was 14 percent.

There is almost as much variation in some instances in the cost-rates indexes in the production of the same commodity in different areas as there is between different commodities. For example, increases in the specialized price indexes for cattle ranches range from 9 percent in the Southwest to 25 percent in the northern Great Plains and Intermountain areas. Similarly, the increases since 1947-49 for

TABLE 3.—Indexes of Prices Paid for Commodities Used in Production, United States, and Types of Farming Areas

[1947-49=100]

	1937-41	1947-49	1952	1953	1954	1955	1956
United States ¹	50	100	117	112	112	112	114
Dairy farms:							
Central Northeast ²	50	100	115	110	109	107	108
Eastern Wisconsin ²	51	100	116	114	114	112	115
Western Wisconsin ²	51	100	115	114	114	114	116
Hog-dairy farms, Corn Belt ²	54	100	116	114	113	113	114
Hog-beef raising farms, Corn Belt ²	53	100	117	116	114	113	114
Hog-beef fattening farms, Corn Belt.....	45	100	112	102	105	103	100
Cash grain farms, Corn Belt ²	55	100	119	120	121	123	124
Tobacco-livestock farms, Kentucky Blue-grass ²	45	100	118	118	121	118	120
Tobacco-cotton farms, Coastal Plains, North Carolina ²	(³)	100	114	116	118	119	123
Tobacco farms (small), Coastal Plains, North Carolina ²	(³)	100	113	115	117	117	117
Tobacco-cotton farms (large), Coastal Plains, North Carolina ²	(³)	100	109	110	117	118	123
Cotton farms:							
Southern Piedmont ²	48	100	115	112	108	118	112
Black Prairie, Texas ²	46	100	115	111	111	110	106
Nonirrigated, High Plains, Texas ²	47	100	112	119	104	109	112
Irrigated, High Plains, Texas ²	(³)	100	108	104	99	101	101
Small, Delta ²	(³)	100	113	110	109	108	107
Large-scale, Delta ²	(³)	100	116	107	110	108	107
Wheat-small grain-livestock farms, Northern Great Plains ²	49	100	115	115	116	116	111
Wheat-corn-livestock farms, Northern Great Plains ²	59	100	117	114	117	117	116
Wheat-roughage-livestock farms, Northern Great Plains ²	51	100	117	115	113	115	112
Winter wheat farms, Southern Plains ²	52	100	118	119	117	120	121
Wheat-pea farms, Washington and Idaho ²	51	100	121	122	120	118	126
Sheep ranches:							
Northern Great Plains livestock area ²	47	100	133	119	117	116	115
Southwest ²	(³)	100	123	103	97	103	96
Cattle ranches:							
Northern Great Plains livestock area ²	50	100	126	121	119	121	125
Intermountain region ²	53	100	121	120	115	121	123
Southwest ²	(³)	100	128	108	110	104	109

¹ Prices paid for production items, interest, taxes, and wages as published in monthly Agricultural Prices.² Prices paid, including taxes (but not interest), and wages to hired labor as published in *Farm Costs and Returns*, Agriculture Information Bulletin No. 158, A.R.S., USDA.³ Not available.SOURCE: *Policy for Commercial Agriculture*, Joint Committee Print, 1957, p. 516.

cotton farms range from only 1 percent for irrigated operations in the high plains of Texas to some 12 percent in the southern Piedmont.

The USDA study implies that this variety of experience even within a given commodity area constitutes an argument against the use of separate parity indexes. The report says: ¹² "A specialized cost rate or prices-paid index reflecting the average wheat farmer under this variety of situations might be considered no more satisfactory to producers in particular areas or particular kinds of operations than the generalized parity index."

To us, this variety of experience seems rather to be a point in favor of using separate parity indexes for separate areas producing the product under different conditions.

A Separate Parity Index for Cotton.—We may form some quantitative estimate of the effects of using separate commodity parity indexes

¹² Doc. 18, op. cit., p. 24.

by considering the case of cotton. Estimates for cotton are quoted from a USDA report on cotton.¹³

An index representing the composite average price of items used in producing the United States cotton crop was developed for each year 1945 through 1955 and for 1939. Items included were labor, land planting seed, insecticides, fertilizer, irrigation water, power and machinery, and ginning. Items not included were management and general overhead.

The index was computed in the following manner. A weighted aggregate of actual prices of the production items was obtained for each year, using as weights the average quantity of each item used in 1947-49. In the development of the weights, the total quantity of each item actually employed in production was used whether or not it was usually purchased. The 1947-49 period was chosen largely because better data were available for those years than for any others. However, this period is considered representative of the postwar period before reinstatement of acreage allotments and marketing quotas.

The price index for production items was calculated by dividing the weighted aggregates for each year by that for a base year and multiplying the result by 100. To derive a parity price based only on items used in cotton production, the price index for each year was multiplied by the parity price for the same base year, as then calculated.

In addition to being an index for cotton rather than an average index for all farms, this concept differs from the present parity formula in two important respects. Items used in family living are given weights and are included in present parity calculations but not in cotton's own parity calculations.¹⁴ The present parity formula includes and gives weight only to items which are purchased, and weights are assigned on the basis of relative importance in total purchased items. In cotton's own parity full weight is given to each item even though only a part of the item is usually purchased.

Table 4 gives results of the calculation of cotton's own parity in index form for selected years and for 2 base years. Two important comparisons can be made from these data. For the period 1945-55, with 1945 taken as a base, the index of cotton's own parity changed in about the same proportion as did the old parity index. If such comparisons are made from the prewar base of 1939, however, it will be noted that the index of cotton's own parity increased about threefold while the old parity index rose only to about 2¼ times its 1939 level. This difference is due largely to the fact that labor and land account for a substantial part of the total weight in cotton's own parity. Farm wage rates and farmland values have increased at a substantially greater rate

¹³ *Report on Various Methods of Supporting the Price of Cotton*, 85th Cong., 1st sess., S. Doc. 12, 1957, pp. 13-16.

¹⁴ It might be better to include or exclude items used in family living so as to make the two directly comparable.

since 1939 than have prices of items such as fertilizer and farm machinery.

TABLE 4.—*Indexes of Parity Prices of Cotton*

Year	1945=100		1939=100	
	Old parity	Cotton's own parity	Old parity	Cotton's own parity
1939.....	70	51	100	100
1945.....	100	100	143	196
1950.....	149	132	214	258
1955.....	159	157	238	307

Representativeness of the Price Base Period.—Another important question concerning the parity price indexes is the representativeness of the base periods.

A recent USDA report on the parity formula stated the requirement for a base period clearly. It said, "The base period should be fairly representative of the kind of agriculture that is likely to prevail for some years ahead. Otherwise, the parity measurement would have little meaning in appraising the agricultural situation as it develops in the future."¹⁵ How do the parity price indexes measure up to this standard?

In the computation of "modernized" parity prices, the adjusted base price for each farm product is computed by dividing the average of the United States average price for that product, over the most recent 10 years, by the average index of prices received by farmers for the same 10 years. This permits the parity prices for individual farm products to reflect recent market forces, but keeps the parity prices for farm products as a group on the original 1910-14 base.

This brings the *relative* parity prices in line with *relative* market prices over the most recent 10-year averages. But it only "modernizes" the relations among the prices. It leaves the parity prices all high or low relative to the most recent 10-year average relationship, if the 1910-14 base is high or low relative to that most recent 10-year average relationship. It leaves parity prices as a group, and the overall parity ratio, as anciently based as before.

In a world full of pronounced and rapid changes, it is anachronistic to measure relative prices with reference to a 1910-14 base, 46 years and two world wars in the past. Increasingly with the passage of time since 1910-14, therefore, suggestions have been made that the 1910-14 base should be replaced by a more recent base.

Alternative Base Periods.—A 1958 USDA report¹⁶ considered several different more recent periods, and computed their effects on the average level of prices. Their figures are shown in Table 5. We have added two more recent bases, 1950-59 and 1955-59, to bring their table up to date. The report recommended that the base period be changed from 1910-14 to 1947-56. No legislation to that effect, however, has been passed.

¹⁵ *Possible Methods of Improving the Parity Formula*, Report of the Secretary of Agriculture pursuant to Section 602 of the Agricultural Act of 1956, 85th Cong., 1st sess., S. Doc. 18, Feb. 1, 1957, p. 18.

¹⁶ *Ibid.*

TABLE 5.—*Indexes of Prices Received and Paid by Farmers and the Parity Ratio, Selected Periods, 1910-59*

Period	Index of prices received (1910-14=100)	Index of prices paid (parity index, 1910-14=100)	Parity ratio (1910-14=100)	Percentage change in the average level of parity prices
1910-14.....	100	100	100	0
1925-29.....	147	161	91	-9
1935-39.....	107	125	86	-14
1947-51.....	275	258	108	+8
1947-56.....	264	270	98	-2
1950-59.....	254	281	90	-10
1955-59.....	237	280	83	-17

If 1947-56 was a good base for the USDA to recommend in 1957, would 1950-59 be a better base to recommend in 1960?

The answer depends upon what the parity index is used for. If the purpose is still to compare the purchasing power of farm products as a group now with their purchasing power in 1910-14, but without the stigma attached to the use of this ancient base, then the use of the 1947-56 base would come within 2 points of doing the job.

If, however, the purpose is to follow the principle laid down in the USDA report, that the base period should be fairly representative of the kind of agriculture that is likely to prevail for some years ahead, then the 1950-59 base would come closer to doing this job than the 1947-56 base. The use of the 5-year base, 1955-59, would come still closer. Agriculture for some years ahead is likely to be more similar to agriculture over the past 5 or 10 years than to agriculture in 1910-14 or 1949-56.

It is not within the power of the USDA to change the base period on its own initiative. The base period is laid down as 1910-14 in the legislation, amended by later legislation to permit the use of the most recent 10-year average of market prices for individual farm products, but still retaining 1910-14 as the base for farm products as a group. New legislation would be required to permit the use of a more recent base than 1910-14.

APPRAISAL OF THE PARITY INDEXES WITH REFERENCE TO THE CHIEF USES TO WHICH THEY ARE NOW BEING PUT

The present parity price indexes were designed originally simply to measure the prices received by farmers, the prices paid by farmers, and the ratio between the two price indexes. But with the passage of time, the indexes began to be used also for two other different purposes.

1. The parity ratio—the ratio between the prices received and the prices paid by farmers—is widely used now to measure the economic status of agriculture.¹⁷ This ratio is published on the front page of the monthly USDA publication, *Agricultural Prices*, and is frequently quoted as it comes out by newspapers and farm magazines. When the parity ratio is 78, for example, as it was in February 1960, that

¹⁷ For example: "The drop in prices . . . caused the parity ratio—index of relative farm prosperity—to fall one point . . ." (*Des Moines Register*, July 28, 1956).

". . . the parity ratio—measure of the farmers' well-being in relation to the whole economy . . ." (News Item by Charles Bailey of the *Des Moines Register's* Washington Bureau, *Des Moines Register*, Nov. 30, 1957, p. 11).

"Regardless of the pros or cons of the parity formula in regard to getting price supports, it still is the nation's chief yardstick for measuring the relative position of the farmer and the long-term price trends." (John Harms, "Outlook for Ag. Leaders," *County Agent and Vo-Ag Teacher*, February 1959).

ratio is regarded as indicating that the prices received by farmers are too low; some regard a parity ratio of 78 as indicating that the prices of farm products are 22 percent too low. Some farm programs are being proposed with the objective of raising the prices of farm products to 100 percent of parity, presumably in the belief that this would restore agriculture to its fair economic status.

In addition, the ratio between the actual market price for an individual farm product and the parity price of that product is widely used as a measure of the economic status of the producers of that product. This ratio for corn, for example, was 61 in February 1960. These ratios are also published monthly in *Agricultural Prices*. Such a ratio, of course, does not measure the economic status of the producers of the product but merely expresses a purchasing power ratio for the particular commodity.

2. Since the passage of the Agricultural Adjustment Act of 1938, the parity prices for some individual farm products (actually, certain percentages of parity prices) have been used as bases for the price-support operations of the CCC for those products. The operations involve billions of dollars, as shown earlier in this report.

Are the indexes well suited to these two purposes?

It is obvious that the parity price indexes are not well suited to these two purposes. Economic status depends upon *income* relationships, not merely upon price relationships. The measurement of income requires that quantities purchased and sold be taken into account as well as prices. Price supports also need to be set with reference to quantities as well as to prices.

One simple illustration of this inaccuracy is the situation in 1958. The parity ratio then was only 85, but net income per person on farms was at an alltime high. Even net income per person on farms from farm sources only was exceeded by only two other years, and then only slightly.¹⁸

Another illustration is the divergence between movements of the parity ratio from 1951 to 1959 and the income per person on farms over the same period. The parity ratio declined 27 points, from 107 in 1951 to 80 in 1959. But income per person on farms declined only 2 percent, from \$983 to \$960. Even income from farming alone declined only about 14 percent. This point is important, since technological developments in agriculture production have markedly changed the output per unit of input over the past 15 or 20 years. Accordingly, suggestions have been made that these changes in quantities should be included in the present parity price formula.

Here again the USDA is not free to include, on its own initiative, quantities as well as prices in order to measure the purchasing power of the farmer. New legislation would be required for that purpose, also. The USDA, however, has made some estimates of the effects of taking quantities into account, for farm products as a group.¹⁹

¹⁸ See Table 7 later in this report.

¹⁹ The next four paragraphs are quoted from S. Doc. 18, p. 26 (see footnote 15).

These estimates are presented and discussed below.

Illustration of an Efficiency Modifier and Its Effect on Parity Prices.—

"The development of a price-support system which permits the adjustment of price supports in line with changes in efficiency involves the calculation of an index of efficiency for a period of years. This index is referred to in this report as the "efficiency modifier."

A preliminary index treating agriculture as a whole has been developed to reflect the trend in the use of productive inputs per unit of farm output since 1940. This index and the separate indexes of the total volume of selected farm inputs and of farm output from which it was derived are shown in Table 6 and Figure 4.

TABLE 6.—*Indexes of Selected Farm Inputs, Total Farm Output, and the Ratio of Selected Inputs Per Unit of Output*

[1940=100]

Year	Index of selected farm inputs ¹	Index of total farm output ²	Index of selected farm inputs per unit of total farm output ³
1940.....	100	100	100
1941.....	99	104	95
1942.....	103	116	89
1943.....	104	113	92
1944.....	104	117	89
1945.....	100	116	86
1946.....	99	118	84
1947.....	99	114	87
1948.....	100	125	80
1949.....	101	122	83
1950.....	99	120	82
1951.....	103	124	83
1952.....	103	129	80
1953.....	103	130	79
1954.....	103	130	79
1955.....	104	135	77

¹ Preliminary. Based on estimated inputs of total farm labor, land, buildings, machinery, fertilizer and lime, combined on basis of average 1947-49 cost rates.

² Published regularly on a 1947-49 basis.

³ Preliminary index of selected inputs divided by index of total farm output.

Source: S. Doc. 18, p. 27.

NOTE.—The information in this table has been discontinued and replaced by the slightly different series given in Table 6a, based on estimated farm production output in terms of constant dollars.

According to these preliminary calculations, which can only be considered indicative of the general trend, farmers, as a group, used some 23 percent fewer inputs per unit of farm production in 1955 than in 1940. The chart also indicates that the improvement in efficiency reflected by the reduction in inputs per unit of output was substantially greater in the 5-year war period, 1940 to 1945, than in the ensuing 10 years.

For reasons of lack of data, the index presently cannot be carried back to the 1910-14 base period. Thus, it is impossible to appraise the effects of an adjustment for improved efficiency on parity prices since that period. However, even

FIGURE 4

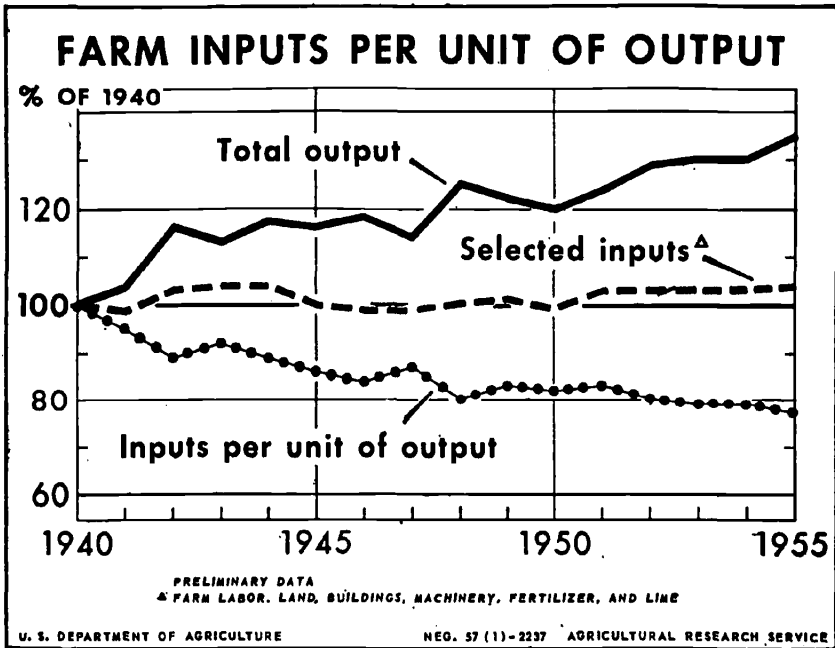


TABLE 6a.—Index Numbers of Inputs, Output, and Productivity, United States Agriculture, 1940-58

[1947-49=100]

Year	Production inputs ¹	Farm output	Productivity ²
1940	97	82	85
1941	97	85	88
1942	101	96	95
1943	101	94	93
1944	101	97	96
1945	99	95	96
1946	99	98	99
1947	99	95	96
1948	100	104	104
1949	101	101	100
1950	101	101	100
1951	104	104	100
1952	104	108	104
1953	103	109	106
1954	102	109	107
1955	102	113	111
1956	102	114	112
1957	100	114	114
1958	101	124	123

¹ Combined volume of farm labor; land and service buildings; machinery and equipment; fertilizer and lime; purchases of feed, seed, and livestock; and miscellaneous production items, in terms of constant dollars.

² Output per unit of production inputs.

SOURCE.—B. R. Stauber, USDA.

if only the efficiency increases that have taken place in agriculture since 1940 were given full weight in the parity formula, the level of parity prices for all farm products would have been reduced 23 percent in 1955. If the adjustment for efficiency were to reflect only the improvement since 1945, the parity prices would be reduced some 10 percent. In other words, if the base period for parity prices is moved to more recent years, the effect of the efficiency modifier on parity prices would be sharply diminished. Thus, assuming the recent 10-year period as a base, the downward adjustment to the parity level from the efficiency factor would be about 5 percent.

The USDA report then goes on to raise the question whether an efficiency modifier should be used in the parity formula in any case. Its use would imply that the gains from increased production efficiency should be passed on to the consumers in the form of lower prices. The report states that this is not the general practice in the nonfarm economy, and concludes that it should not be adopted in agriculture.

The USDA report also developed an efficiency modifier for a specific farm product, cotton.

Efficiency Modifier for Cotton.—

In order to calculate the efficiency modifier, it was necessary to obtain estimates of the quantities of the major items used in producing the United States cotton crop [inputs] during each year of the 1945-55 period and for 1939. The items included are the same as those listed on page 13 [of the report]. The estimates of inputs relate to those actually used in cotton production each year and do not make allowance for resources that might have been unemployed in a given year because of fluctuations in the size of the cotton crop.

Production input data were obtained from several sources. The acreage of cotton planted and harvested, the total quantities of labor, fertilizer, and planting seed used in producing cotton and the cost of ginning were available largely from published information. Estimates of power, machinery, irrigation, and other items were developed from various local area studies and from miscellaneous sources.

An index of the quantity of physical inputs required to produce a bale of cotton for the years 1945-55 and for 1939 was computed as follows: A weighted measure of the total quantity of inputs used in production was obtained for each year by applying appropriate average 1947-49 prices as weights to the quantity of each input item used in each year and summing their products. These weighted aggregates were converted to index numbers by dividing the total for each year by the total for a base year and multiplying by 100. An index of the number of bales of cotton produced was also calculated. The index of quantity of inputs was divided by the index of bales produced to derive an index of quantity of inputs per bale of cotton, called the efficiency modifier.

FIGURE 5

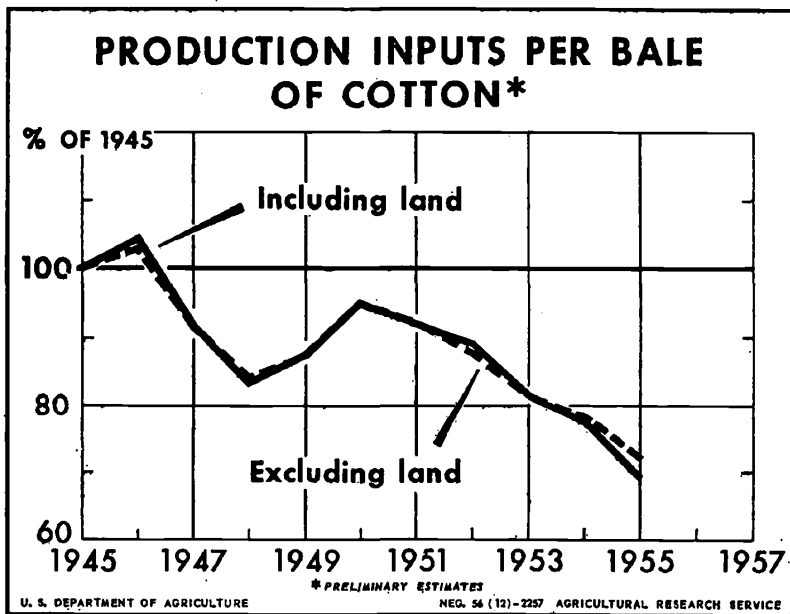
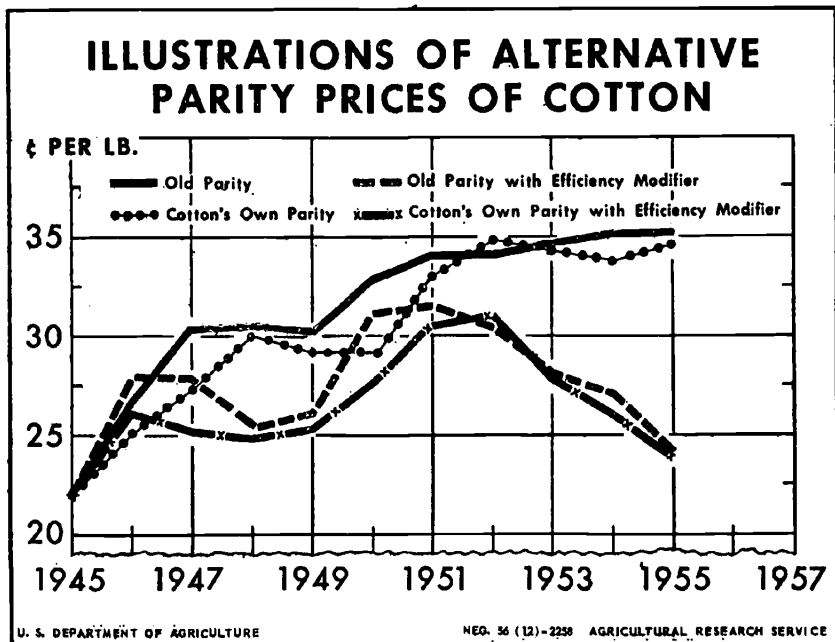


FIGURE 6



The results of these calculations using the year 1945 as a base are given in Figure 5. In general, there has been a sharp decrease in inputs per bale and they were 30 percent less in 1955 than in 1945. The inclusion or exclusion of land as an input had relatively little effect on the index during the 1945-55 period.

A trend line fitted to the data shown in Figure 5 indicates that the quantity of inputs per bale of cotton has decreased at an average rate of about 3 percent per year from 1945 to 1955. Figure 6 shows the parity price for cotton that would result from use of cotton's own parity and the efficiency modifier during the 1945-55 period. As indicated above, the use of cotton's own parity (1945 equals 100) would have resulted in substantially the same parity prices for cotton in most years as those resulting from the use of old parity. In this instance the old parity price for 1945 and cotton's own parity for 1945 were assumed to be the same. The application of the efficiency modifier (1945 equals 100) to the old parity price of cotton and to cotton's own parity would have reduced the parity price of each substantially during most of the years considered. For example, if in 1955 the efficiency modifier were multiplied by the old parity price and by cotton's own parity, respectively, resulting prices would be about 24.2 and 23.9 cents a pound. Without use of the efficiency modifier, cotton's own parity would have been about 34.6 cents in 1955. Old parity in 1955 was 35.1 cents per pound.²⁰

The use of the efficiency modifier would have had a much larger effect than the use of a separate parity index for cotton; the efficiency modifier would have lowered the parity price of cotton in 1955 by 31 percent.

Parity Ratio Type Indexes for Different Income Classes of Farms.—Just as a single parity index is calculated for all farm products, so it is made to cover all farms, ranging from very small to very large. Again the question arises: how important are the different farm expenses, in this case for different size farms? To answer the question, it would be necessary to compute separate parity-ratio type indexes for different sizes of farms, with size measured by income class. The indexes weighted by appropriate quantities for low-income farms may differ appreciably from those for medium- or high-income farms, and from all of them as a group.

Data for prices received are not available by economic (income) class of farm. Accordingly, only the regular United States index of prices received could be used for all income classes. Data for prices paid are available by economic class, but only based on the 1955 expenditure survey extended back to 1952.

Similarly, data on prices paid are not available by economic class of farm, and it was likewise impossible to approximate a prices-paid index for low-income farmers prior to 1952, when the current weighting data were first used. Expenditure data by economic class of farm were not available for earlier weight-base periods. In consequence, indexes

²⁰ S. Doc. 18, pp. 15-16.

of cost rates for goods and services for the several economic classes (including interest, taxes, and wage rates) were computed with 1955 equalling 100 and all linked to the current index in September 1952. These approximations were made using existing group indexes with weights appropriate to each economic class.

These "approximations" probably measure with acceptable accuracy the course of prices paid for commodities and services for the several economic classes of farms since September 1952. It is doubtful that they can be considered as having more than casual value as measures of comparisons of the present with 1910-14 by economic class of farm, since linking in September 1952 *assumes* that the indexes for all economic classes were identical for that date—a most unlikely assumption.²¹

Within these limitations, the USDA computed parity ratios for large (classes I-II), medium (classes III-V), and small (classes VI-VIII) farms from 1952 to 1959.

A summary of the weights used in the computation of the indexes by economic class of farms is given in Table 7. The price indexes themselves are shown in Table 8. The maximum difference between them at any one time was 3 points. They ended only one point apart in 1959.

TABLE 7.—*Farm Expenditures: Percentage Distribution by Economic Class of Farm, United States, 1955, by Commodity and Service Groupings*
[Percent]

Item	Economic class of farm			
	All	I-II	III-V	VI-VIII
Living.....	39.5	22.5	41.6	68.4
Food.....	13.4	6.69	14.2	24.7
Clothing.....	6.34	3.63	7.07	10.3
Auto and supplies.....	6.63	3.11	5.40	10.9
Household operations.....	5.77	3.49	6.37	9.00
Household furnishings.....	3.99	2.46	4.21	6.70
Building materials.....	4.37	3.12	4.35	6.80
Production.....	50.9	62.6	50.7	28.4
Feed.....	12.8	17.0	11.6	7.06
Livestock.....	4.60	7.51	3.31	1.62
Motor supplies.....	3.39	8.43	9.93	5.10
Motor vehicles.....	4.38	4.47	5.08	2.76
Farm machinery.....	5.21	5.95	5.85	2.45
Building and fencing.....	5.20	6.30	5.01	3.41
Fertilizer and lime.....	4.11	4.88	4.10	2.60
Equipment and supplies.....	3.66	5.17	3.06	1.99
Seeds.....	2.65	2.89	2.76	1.42
Total commodities.....	90.4	85.1	92.3	96.8
Taxes.....	2.04	2.45	2.21	.86
Interest.....	.96	1.05	1.06	.66
Cash wage rates.....	6.60	11.4	4.43	1.78
Total commodities, taxes, interest, cash wage rates.....	100.0	100.0	100.0	100.0

SOURCE.—Materials supplied upon request to the Price Review Committee by AMS, USDA.

²¹ These paragraphs and tables were supplied by the Agricultural Marketing Service, USDA.

TABLE 8.—Parity Ratios for All Farm Product Price and Ratio Approximations by Type of Farm Groupings, United States, September 1952 and June 1953-59

Month and year	Economic class of farm			
	All	I-II	III-V	VI-VIII
September 1952.....	101	101	101	101
June 1953.....	92	93	91	90
June 1954.....	88	89	87	86
June 1955.....	85	86	84	84
June 1956.....	86	87	85	84
June 1957.....	81	83	81	80
June 1958.....	85	86	84	84
June 1959.....	81	82	81	81

SOURCE: Same as Table 7.

The differences between the parity ratios by economic class of farms in this brief period, then, were small. But the results raise another type of question concerning the parity index for all farms as a group. The low income farms (classes VI-VIII) account for only about 3.5 percent of the value of total farm products sold, according to the *1954 Census of Agriculture*. These farms, however, account for 35 percent of the expenditures by farm operators for living, but for only 10.8 percent of expenditures for production, other than interest, taxes, and wage rates.²²

This raises the question, then, whether these class VI-VIII farms, which contribute so little to farm production but so much to the weight of family living items in the computation of the parity index, should continue to be included in the computations. Most of them are not farms at all in the ordinary use of the term, but only country residences, part-time farms, etc.

The new definition of a farm used in the 1960 Census, raising the minimum size from 3 acres to 10 acres (unless it has sales of \$250 or more per year), will cut out a number of these "farms." This may reduce the size of the problem, but the problem as such will still remain. There are good grounds for maintaining that the coverage of the indexes should be restricted to commercial farms (classes I through VI) defined as those with annual sales of \$250 or more, with operator not working off the farm as much as 100 days, and farm sales greater than income of family members from off-farm sources, with weights appropriate to those farms.

Farm Parity Indexes Reflecting Farm Income from Nonfarm Sources.—A full measure of the economic status of farmers would presumably cover as wide a range of farmers' income as of their expenditures. Since the indexes of prices paid by farmers cover their entire living costs, it can be argued that the corresponding index of prices received by farmers should reflect the large amounts of income received from off-farm work.

That is, the present index of prices paid by farmers covers living as well as production expenses, so it obviously pertains to the farm household as a consumer as well as producer. Accordingly, the index of prices received should be equally comprehensive, and include farm income from off-farm sources as well as from farm sources.

²² Department of Agriculture Appropriations for 1960. Hearings before the Subcommittee of the Committee on Appropriations, H.R., 86th Cong., 1st Sess., p. 215.

This argument is not quite airtight. The division of the two kinds of costs (of farm production and of running the household) is not the same as the division of income (from the farm and from off the farm). But there are in any case good grounds for wanting two price indexes—the present one representing the price component of farm income from the sale of crops and products and a second one representing the price component of farm income from nonfarm sources. The two then could be combined to show the farm income from nonfarm sources as well as from farm sources. Neither one would be right or wrong; both would have their uses, much the same as it would be useful to compile an index of professors' income from books, consultation, etc., as well as from salaries alone.

A parity price formula could be constructed to reflect farm income from off-farm sources as well as from farm sources by assuming that the off-farm income is all wage income (although in fact there are numerous other minor sources) and adding a term in the formula to the present prices-received term, made up of the off-farm wage ratio multiplied by the percentage of net farm income that comes from off-farm sources.

The USDA publishes two series of farm incomes in dollar terms—farm income from farm sources and farm income from nonfarm sources. Off-farm wages could be used as the prices, and the relative size of the off-farm income could be used as the weights, to compute indexes of "prices" received by farmers for their services sold off-farms. The combined formula would include the present price term, plus another one to represent off-farm prices, as follows:

$$\text{Index of prices received} = P_{FI} \left(\frac{\Sigma P_1 Q_0 / \Sigma P_0 Q_0}{1935-39 \text{ Avg. of numerator}} \right) + P_{OFI} \left(\frac{W_1}{W_0} \right)$$

Where

P_{FI} in the first term is the 1935-39 average percentage of farm income that comes from farm sources,

P_{OFI} in the second term is the 1935-39 average percentage of farm income that is received from off-farm sources,

W_1 is the off-farm wage rate of the current year,

W_0 is the average off-farm wage rate for 1935-39.

The off-farm term would have fixed weights, like the present (on-farm) price index term does. It, therefore, would reflect only changes in wage rates, not changes in the quantity of off-farm services. But at least in this respect it would be similar to the present price index term.

The weight base period for the present index of prices received is 1953-57. The *price* base period for the present index of prices received, as a group, is still 1910-14. This base period cannot be used for the off-farm income term, since the relevant division of farm and off-farm income data runs back only to 1934. Accordingly, if the two terms are to be comparable, a more recent base period (since 1934) has to be used. The period chosen is 1935-39 and the adjustment is made by dividing both terms by their 1935-39 average.

The annual indexes computed by the use of this formula are given in Table 9. The shortcomings of these indexes are obvious. The assumption that all farm income from off-farm source is received in the form of wages is clearly an oversimplification. The off-farm income may consist chiefly of factory wage income, but while the exact percentages are unknown, a substantial part of the off-farm income consists of items other than factory wages—interfarm work, interest, insurance payments of one sort or another, miscellaneous receipts as from hauling, custom work, and perhaps other items. There is no satisfactory way of introducing the prices of such items into a price index. It is difficult to put a price to be entered on an interest return, or on an insurance indemnity payment, and to include a wage element for off-farm work which may vary from merely the exchange of a little labor with a neighbor down the road to virtually full-time employment in a factory for some of the small "farmers" living in metropolitan or industrial suburbs.

TABLE 9.—*Index of Prices Received by Farmers for Income from Both Farm Sources and Off-Farm Sources, United States, 1934-59*

Year	Million dollars	Million dollars	Million dollars	Per cent	Per cent	Index	Dollars	Index	Index	Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1934.....	2,941	1,900	4,841	60.75	39.25	90	0.53	56.96	28.51	85.47
1935.....	5,303	2,000	7,303	72.61	27.39	109	.55	68.99	29.59	98.58
1936.....	4,332	2,300	6,632	65.32	34.68	114	.66	72.15	30.12	102.27
1937.....	6,048	2,500	8,548	70.75	29.25	122	.62	77.21	33.36	110.57
1938.....	4,405	2,300	6,705	65.70	34.30	97	.63	61.39	33.89	95.28
1939.....	4,489	2,500	6,989	64.23	35.77	95	.63	60.13	33.89	94.02
1940.....	4,570	2,700	7,270	62.86	37.14	100	.66	63.29	35.51	98.80
1941.....	6,573	3,100	9,673	67.95	32.05	124	.73	78.48	39.27	117.75
1942.....	9,924	3,800	13,724	72.31	27.69	159	.85	100.63	45.73	146.36
1943.....	11,822	4,200	16,022	73.79	26.21	193	.96	122.15	51.65	173.80
1944.....	11,807	4,400	16,207	72.85	27.15	197	1.02	124.68	64.88	179.66
1945.....	12,411	4,200	16,611	74.72	25.28	207	1.02	131.01	64.88	185.89
1946.....	15,252	4,300	19,552	78.01	21.99	236	1.09	149.36	58.64	208.00
1947.....	15,544	4,900	20,444	76.03	23.97	276	1.24	174.68	66.71	241.39
1948.....	17,789	5,100	22,889	77.72	22.28	287	1.35	181.64	72.63	254.27
1949.....	12,928	5,200	18,128	71.81	28.69	250	1.40	158.23	75.32	233.55
1950.....	14,000	5,300	19,300	72.54	27.46	258	1.47	163.29	79.07	242.38
1951.....	16,334	5,600	21,934	74.47	25.53	302	1.59	191.14	85.54	276.68
1952.....	15,337	6,100	21,437	71.54	28.46	288	1.67	182.28	89.85	272.13
1953.....	13,278	6,000	19,278	68.88	31.12	255	1.77	161.39	95.23	256.62
1954.....	12,691	5,800	18,491	68.63	31.37	246	1.81	155.69	97.38	253.07
1955.....	11,767	6,300	18,067	65.13	34.87	232	1.88	146.83	101.14	247.97
1956.....	11,617	6,700	18,317	63.42	36.58	230	1.98	145.57	106.52	252.09
1957.....	11,780	6,600	18,380	64.09	35.91	235	2.07	148.73	111.87	260.10
1958.....	14,017	6,400	20,417	68.65	31.35	250	2.13	158.23	114.59	272.82
1959.....	11,820	6,800	18,620	63.49	36.51	240	2.22	151.90	119.44	271.34

Column Legend

- (1) Net income of farm operators from farm sources, including government payments.
- (2) Net income of farm operators from off-farm sources.
- (3) Total net income of farm operators (col. 1+col. 2).
- (4) Percent of farm operator income coming from farm sources (col. 1 divided by col. 3).
- (5) Percent of farm operator income coming from off-farm sources (col. 2 divided by col. 3).
- (6) Current index of prices received by farmers.
- (7) Current hourly wages for all manufacturing production workers or nonsupervisory employees.
- (8) First term of new index or prices received (income from farm sources).
- (9) Second term of new index of prices received (income from off-farm sources).
- (10) Proposed new index of prices received by farmers for income from both farm and off-farm sources.

CONCEPTS OF PARITY INCOME

The preceding discussion has moved step by step from price indexes, which reflect income very imperfectly, to various modifications which bring the price indexes closer and closer to measures of income. The present section takes the last step and deals with concepts of parity income.

HISTORICAL DEVELOPMENT OF CONCEPT

It was recognized as parity price indexes were developed that prices were only one of the things that determined income. It was recognized also that what farmers were really interested in was income, not prices. So, along with the development of parity prices went several legislative attempts to define parity income.

During the 1930's the concept of parity income developed as an extension of the parity price concept. It first appeared in legislation in 1936. A declared purpose of the Soil Conservation and Domestic Allotment Act of 1936 was the "reestablishment, at as rapid a rate as the Secretary of Agriculture determines to be practicable and in the general public interest, of the ratio between the purchasing power of the net income per person on farms and the income per person not on farms that prevailed during the 5-year period August 1909-July 1914, inclusive, as determined from statistics available in the United States Department of Agriculture and the maintenance of such ratio."

There was a good deal of criticism of this definition of parity income. In the Agricultural Adjustment Act of 1938, therefore, the definition was changed to read as follows: "Parity, as applied to income, shall be that per capita net income of individuals on farms from farming operations that bears to the per capita net income of individuals not on farms, the same relation as prevailed during the period from August 1909-July 1914."

The 1938 definition of parity income differed from the 1936 definition in four respects. (1) The term "net" was used; it was applied to per capita income of persons not on farms as well as to that of persons on farms. (2) The "purchasing power" provision in the 1936 definition was omitted in the 1938 definition. (3) The income of persons on farms included income from farming operations only. (4) The limitation "as determined from statistics available in the USDA" was omitted.

The 1938 definition of net income avoided the difficulty of measuring intangibles—the nonmonetary items of income on the farm and off the farm, such as the independence of the farm operator compared with the dependence of the urban worker on his job, the open air nature of farm work, the generally poorer schools in the country, etc. It did not call for direct comparisons of current net incomes on farms with current net incomes off farms. Thus if current income data showed net farm income to be only half as much as nonfarm income (or twice as much) that would still represent income parity if half (or twice) were the relation that existed in the base period.

The Agricultural Act of 1948 changed the definition of parity farm income again. Title II, Sec. 201 (2), defined parity farm income as follows: "(2) 'Parity,' as applied to income shall be that gross income from agriculture which will provide the farm operator and his family with a standard of living equivalent to those afforded persons dependent upon other gainful occupation." This new definition was incorporated in the Agricultural Act of 1949 and became effective on January 1, 1950.

This definition got away from the problems involved in any formula which includes a base period. It got away, for example, from the problem of what base period to use (one period might have a much higher or lower parity income than another). It also got away from the problem of continuous obsolescence of any base period. But it got

into a different problem—the problem of comparing levels of living in different occupations. The new formula involved more than a simple comparison of farm and nonfarm dollar incomes. It required in addition the determination of differences in their purchasing power, as represented by their different levels of living. So far, this new definition, while “effective January 1, 1950,” has not been computed and put into actual use.

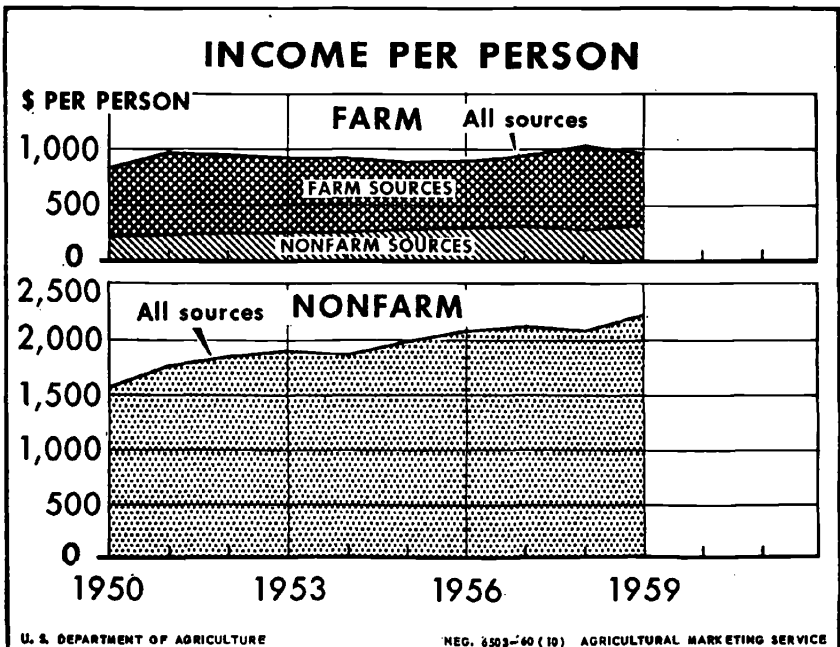
The Agricultural Act of 1948 also defined parity gross income for individual commodities as follows: “‘Parity’ as applied to income from any agricultural commodity for any year, shall be that gross income which bears the same relationship to parity income from agriculture for such year as the average gross income from such commodity for the preceding ten calendar years bears to the average gross income from agriculture for such ten calendar years.” This was the first time that a method of apportioning income parity among the individual commodities was prescribed by law. Inasmuch as the overall level of parity gross income could not be determined, this additional step has not had much significance.

ALTERNATIVE MEASURES OF FARM INCOME

What income data are available which might make it possible to measure the economic status of farmers more accurately than the existing parity prices indexes, and permit parity *income* to be computed?

Measures of gross income (prices received times quantities sold) and of cost (prices paid times quantities purchased) are available, and they can be used to measure net income per farmer. The USDA compiles several measures of this character.

FIGURE 7



FARM INCOME PER CAPITA

The one that is most widely publicized is farm income per capita. It is shown in Table 10 and Figure 7. These data are the basis for the frequently repeated statement that farm income is only about half as high as nonfarm income.

TABLE 10.—Average Per Capita Net Income, by Residence and by Source of Income, 1910–58

Year	Average net income per capita of—										Total population from all sources
	Farm population					Nonfarm population					
	From agriculture			From nonfarm sources	From all sources		From agriculture	From nonfarm sources	From all sources		
	Excluding Government payments	Government payments	Total		Amount	Percent of nonfarm average					
1910.....	\$147	0	\$147				\$12				\$300
1920.....	282	0	282				22				711
1930.....	166	0	166				14				613
1931.....	129	0	129				10				494
1932.....	80	0	80				8				345
1933.....	90	\$3	93				9				323
1934.....	94	12	106	\$59	\$105	35.3	9	\$459	\$468		391
1935.....	167	15	182	62	244	47.2	10	507	517		448
1936.....	148	8	156	72	228	38.5	10	582	592		502
1937.....	207	9	216	80	296	46.1	10	632	642		558
1938.....	153	12	165	74	239	40.6	9	580	589		506
1939.....	147	21	168	81	249	39.8	10	616	626		537
1940.....	153	21	174	88	262	38.2	10	675	685		588
1941.....	230	16	246	103	349	42.4	13	810	823		715
1942.....	360	19	379	130	509	49.2	16	1,019	1,034		920
1943.....	476	21	497	157	654	52.7	17	1,223	1,240		1,126
1944.....	497	27	524	172	696	52.4	17	1,311	1,328		1,211
1945.....	528	26	554	160	720	54.0	17	1,295	1,312		1,205
1946.....	618	26	644	162	806	62.2	21	1,274	1,295		1,204
1947.....	634	10	644	181	825	59.2	22	1,372	1,394		1,287
1948.....	756	9	765	197	962	62.7	22	1,512	1,534		1,433
1949.....	561	6	567	200	767	50.8	20	1,491	1,511		1,381
1950.....	616	10	626	212	838	52.9	20	1,565	1,585		1,461
1951.....	741	10	751	232	983	55.8	20	1,743	1,763		1,641
1952.....	701	10	711	251	962	52.0	20	1,829	1,849		1,712
1953.....	658	8	666	265	931	48.9	19	1,883	1,902		1,764
1954.....	644	10	654	262	916	49.5	18	1,834	1,852		1,724
1955.....	593	9	602	251	883	44.6	17	1,962	1,979		1,830
1956.....	576	21	597	300	897	43.2	17	2,057	2,074		1,917
1957.....	586	41	627	306	933	44.1	16	2,100	2,116		1,967
1958.....	702	46	748	295	1,043	50.3	18	2,055	2,073		1,946

The averages in this table are derived by dividing appropriate totals appearing in Tables 3 and 5 by the population estimates in Table 6. Gaps arise from the same difficulty mentioned in footnote 4 of Table 3 (of the source publication).

SOURCE.—The Farm Income Situation, AMS, USDA, Feb. 1960, p. 32. This is a revised version of page 39, FIS-174, July 1959.

These figures, however, understate the average farm income per person in the usual sense of the word farm, because "farm" in this case is "farm" as defined by the Census. This definition includes "farms" all the way down to 3 acres in size if the value of agricultural products exclusive of home gardens is \$150 or more; it includes places of less than 3 acres if the value of sales of agricultural products is \$150 or more.

Most of the "farmers" on these small "farms" are not farmers at all in the ordinary sense of the term. Their chief source of income is

a nonfarm job, not farming. About 1.7 million of these small farms are classed as noncommercial farms—part-time, residential, or subsistence farms. These are really acreages where city people live, rather than farms. They constitute more than a third of the total of 4.8 million farms of all kinds in the United States.²³ This large number of “not really farms” inflates the number of farms and farmers that is divided into the total United States net farm income, and therefore reduces the “average farm income” substantially below the average income for *commercial family* farms, with the part-time, residential, and subsistence farms taken out.²⁴

In 1956, these part-time and residential farms, nearly one-third of all farms, made only 2 percent of all sales of farm products. “Clearly, the welfare of the families on low-production farms is more closely linked with the expanding nonfarm sector of our economy than with agriculture as such.”²⁵

In addition, the estimates of net farm income value the farm products produced on the farm and consumed by the farm household at farm prices. There is some disagreement whether these products should be valued at farm prices or at retail prices. People in town have to buy their food at retail prices, so on the face of it, farm and nonfarm incomes would seem to be more nearly comparable if the food produced on the operator’s own farm were valued at retail prices too. Against this it may well be argued that a gallon of peas in the pod just picked from the farm garden by the farm wife, for example, is not at all comparable with the package of frozen peas ready to put in the pot purchased by the city housewife. For another example, however, eggs from the henhouse are just as ready to cook as eggs in the retail store, and usually fresher.

On the average, farmers get less than half the consumer’s retail food dollar. The USDA estimates that valuing the food that is included in farm income at retail prices would add a little more than \$100 to per capita farm income.²⁶

The allowance for the value of housing provided by the farm, including taxes, insurance, interest, maintenance, and depreciation, in recent years has been about \$300 per farm. Average nonfarm rental runs about \$600. Many farm homes, of course, do not have indoor toilets or baths and other facilities that are usually found in urban homes; but most of them provide more room, quiet, and seclusion than the average urban home. Perhaps the USDA allowance is too conservative.

A part of the difference between the average farm and nonfarm income results from the fact that a large part of the farm population is concentrated in the South where incomes and prices are generally

²³ To include them in the farm average is about like computing the average salary of professors by including numerous graduate students receiving part-time stipends, if these stipends were very small and the graduate students lived chiefly on other sources of income.

²⁴ E. W. Gross and N. M. Kofsky made this point clear in their article, “Measuring the Incomes of Farm People,” *Journal of Farm Economics*, XXXI: 4, Part 2, Nov. 1940, p. 1, 110. So do K. L. Bachman and R. W. Jones, *Sizes of farms in the United States*, USDA Tech. Bul. 1019, July 1950, p. 7, where they say that this “often gives rise to serious misconceptions,” and show that excluding these noncommercial farms raises the average operator’s net income 27 percent.

But Kofsky and Grove, in their later article, “The Current Income Position of Commercial Farmers,” Joint Committee Print, Policy for Commercial Agriculture, Nov. 22, 1957, pp. 79–90, overlook the matter, and conclude on the basis of United States average data that “the level of income per person on farms has averaged roughly one-half of the non-farm level.” By this they unwittingly give support to the “serious misconception.”

²⁵ *Economic Report of the President*, January 1959, p. 99.

²⁶ S. Doc. 13.

lower than in the North where industrial workers are concentrated. Income comparisons on a state or regional basis reveal about a 25 percent smaller difference between farm and nonfarm incomes than the straight United States averages quoted above.

The USDA estimates that adjustment to take these food and housing and location matters into account would increase per capita farm income about 30 percent.²⁷

INCOME PER FARM WORKER

Another answer concerning relative farm and nonfarm income is based on a comparison of income per farm worker²⁸ with the average annual wage per employed factory worker. These per worker income figures for 1958 were: farm \$2,129; factor, \$4,342. Conclusion: Income per farm worker is only about half as high as income per factory worker. Income per farm *operator* was \$2,990 in 1958. This is only about 69 percent as high as income per factory worker.

This situation appears to confirm the conclusion that is usually drawn from the per capita income figures given in the preceding section—that farm income is only about half as great as nonfarm income. But it is also misleading. The farm workers include the family workers, and the farm income includes a good deal of disguised partial unemployment, whereas the factory workers include only *employed* factory workers. The average farm worker's income data therefore understate the actual average income much as the per capita income data do, partly for the same reason and partly for different ones.

ALTERNATIVE MEASURES OF PARITY FARM INCOME

The USDA, well aware of the characteristics of the United States average farm income data given above, has discussed their use in parity income computations in the following terms:²⁹

The idea of parity income centers on the relation between incomes of farm people and incomes of nonfarm people. Generally, there are two basic approaches to the problem of determining parity income. One involves the maintenance of a historical income ratio which would provide for farmers' incomes and opportunities for a rising standard of living to grow at the same rate as others. The alternative approach would establish the standard of equal incomes or equal living standards as between farmers and others. Both approaches have appeared in the farm legislation relating to income parity. These alternatives lead to a wide range in results. Historical incomes ratios as between farm and nonfarm persons on which the two earlier parity income definitions were based indicate that incomes in agriculture in recent years were about at or above parity as compared with 1910-14. On the other hand, direct income comparisons tend to show that farm income falls far short of the nonfarm

²⁷ S. Doc. 18, p. 39.

²⁸ *The Farm Income Situation*, p. 40. This is total United States realized net farm income from farming, including government payments, divided by the total average number of persons engaged in agriculture during the year, including farm operators and other family workers (except those doing housework only) as well as hired workers.

²⁹ S. Doc. 18, p. 39.

level, although there are considerable questions as to the meaning of measures of this kind.

PARITY INCOME BASED ON HISTORICAL INCOME RATIOS

Table 10 (p. 485)—

shows the available data on income per person living on farms from all sources, nonfarm as well as farm, and income per person not living on farms, from 1910 to 1958, as published regularly by the Department. It should be noted that estimates of nonfarm income received by farm people, such as wages or salaries from nonfarm occupations, are not available prior to 1934. However, for purposes of indicating, in Table 11, at least roughly, how income ratios in recent years compared with the 1910-14 period, we have made an assumption that nonfarm income received by farm people in the 1910-14 period totaled \$1.5 billion annually. This assumption is based on the probability that poorer transportation in those days restricted nonfarm job opportunities to farm people as compared with recent years.

TABLE 11.—*Illustrative Per Capita Income Parity Ratios of Farm Population to Nonfarm Population, as Defined in Agricultural Legislation of 1936, 1938, and 1934-56*

Year	Ratio of per capita income of farm population to per capita income of nonfarm population		Year	Ratio of per capita income of farm population to per capita income of nonfarm population	
	Income to farm people from farming only (1938 legislation)	Income to farm people from all sources (1936 legislation)		Income to farm people from farming only (1938 legislation)	Income to farm people from all sources (1936 legislation)
1934.....	74	85	1946.....	159	149
1935.....	115	115	1947.....	150	144
1936.....	85	94	1948.....	162	163
1937.....	109	112	1949.....	122	124
1938.....	91	99	1950.....	128	128
1939.....	88	97	1951.....	139	136
1940.....	83	93	1952.....	125	127
1941.....	98	104	1953.....	116	121
1942.....	119	120	1954.....	116	121
1943.....	131	129	1955.....	102	111
1944.....	129	128	1956 ¹	98	108
1945.....	138	134			

¹ Tentative estimates; revised Mar. 5, 1957.

NOTE.—Assumes nonfarm income of farm population averaged \$1,500,000,000 in the base years 1910-14. No reliable estimate of such income is available for that period. For more recent data, see Table 11a.

(1) Ratios of per capita net income of the farm population from farming to per capita net income of the nonfarm population (1938 legislation). The data for 1956 indicate that the income ratio of farm people to nonfarm people was about the same as in the 1910-14 period, ranging from slightly above the pre-World War I base to slightly below, depending on whether or not income of the nonfarm population is adjusted to exclude nonfarm income received by farm people.

(2) Ratios of per capita net income of the farm population from all sources to per capita net income of the nonfarm population (1936 legislation). Assuming income from nonfarm sources averaged \$1.5 billion annually in 1910-14, this series indicates that the 1956 income ratio was 8 percent higher than in the 1910-14 period. However, a considerable range is actually involved, depending on the assumption made with respect to nonfarm income of farm people in the base period. If the size of that income is assumed to total \$2 billion for the 1910-14 average, which would imply approximately the same rate of farmers' participation in nonfarm activities as in recent years, the 1956 income ratio would be 2 percent lower than in the 1910-14 period. On the other hand, if farmers' participation in nonfarm activities was even less than first assumed, and nonfarm income was only \$1 billion for the 1910-14 average, the 1956 income ratio would be 20 percent higher.

The index or ratio which compares income of farm people from all sources with income of nonfarm people appears to be more appropriate as a measure of farm well-being than the ratio including only the income of farm people from farming. Nonfarm income is becoming increasingly important as a source of income to farm people and as a means of maintaining or increasing living levels.

It should be noted also that comparison of these ratios need not be limited to the 1910-14 base period. If for example, the last 10 years (1947-56) were considered as the base period, the ratio involving income per person on farms from farming would be 22 percent under the base average ratio, and the ratio involving income per person on farms from all sources some 15 percent lower. The parity price ratio for 1956 was also 15 percent under the 1947-56 average.

Finally, in considering the appropriateness of historical income ratios, the comparison can involve other series such as earnings in agriculture as compared with earnings in selected other occupations, which are shown in Table 12 from 1929 to 1956. For example, the ratio of hourly earnings in agriculture, after allowance for capital investment, to hourly earnings in manufacturing could be used in place of an income ratio.

TABLE 12.—Average Hourly Earnings in Agriculture and in Selected Industries, 1929-59

[Dollars]

Year	Workers in agriculture		Production workers in industry ²					Wholesale trade
	Realized return per hour to all farm labor and management ¹	Composite hired farm wage rate per hour	Manufacturing	Bituminous coal mining	Building construction	Class I railroads	Telephone	
1929.....	0.269	0.241	0.566	0.681				
1930.....	.172	.228	.552	.694				
1931.....	.093	.172	.515	.647				
1932.....	.055	.129	.446	.520				
1933.....	.106	.115	.442	.501				
1934.....	.172	.129	.632	.673	0.795			
1935.....	.203	.142	.550	.745	.815			0.648
1936.....	.232	.152	.556	.794	.824			.667
1937.....	.221	.172	.624	.856	.903		0.774	.698
1938.....	.187	.166	.627	.878	.908		.816	.700
1939.....	.199	.166	.633	.886	.932	0.730	.822	.715
1940.....	.200	.169	.661	.883	.958	.733	.827	.739
1941.....	.315	.206	.729	.993	1.010	.743	.820	.793
1942.....	.460	.268	.853	1.059	1.148	.837	.843	.860
1943.....	.610	.353	.961	1.139	1.252	.852	.870	.933
1944.....	.618	.423	1.019	1.186	1.319	.948	.911	.985
1945.....	.694	.472	1.023	1.240	1.379	.955	.962	1.029
1946.....	.858	.515	1.086	1.401	1.478	1.087	1.124	1.150
1947.....	1.010	.547	1.237	1.636	1.681	1.186	1.197	1.268
1948.....	.945	.580	1.350	1.898	1.848	1.301	1.248	1.359
1949.....	.803	.559	1.401	1.941	1.935	1.427	1.345	1.414
1950.....	.826	.561	1.465	2.010	2.031	1.572	1.398	1.483
1951.....	.920	.625	1.59	2.21	2.19	1.73	1.49	1.58
1952.....	.879	.661	1.67	2.29	2.31	1.83	1.59	1.67
1953.....	.874	.672	1.77	2.48	2.48	1.88	1.68	1.77
1954.....	.805	.661	1.81	2.48	2.60	1.93	1.76	1.83
1955.....	.764	.675	1.88	2.56	2.66	1.96	1.82	1.90
1956.....	.839	.705	1.98	2.31	2.80	2.12	1.86	2.01
1957.....	.778	.728	2.07	3.02	2.96	2.26	1.95	2.10
1958.....	.970	.757	2.13	3.02	3.10	2.44	2.05	2.17
1959 ³716	.798	2.22	3.25	3.22	2.54	2.18	2.24

¹ After allowance for capital investment. Derived in Table 10.² *Economic Report of the President*, January 1957, p. 149.³ Preliminary.

Data since 1956, and revisions of some data before 1956, from Murray Thompson, USDA.

DIRECT COMPARISONS, FARM AND NONFARM

The alternatives relating to direct standard of living or income comparisons between farm and nonfarm people present unusual and difficult problems of measurement and of interpretation. For example, the Agricultural Act of 1948 defined parity income, effective January 1, 1950, as " 'Parity,' as applied to income, shall be that gross income from agriculture which will provide the farm operator and his family with a standard of living equivalent to those afforded persons dependent upon other gainful occupation. 'Parity,' as applied to income from any agricultural commodity for any year, shall be that gross income which bears the same relationship to parity income from agriculture for such year as the average gross income from such commodity for the preceding 10 calendar years bears to the average gross income from agriculture for such 10 calendar years."

This Department has not been in a position to bring statistical meaning to this definition. The determination of equivalent standards of living involves much more than equivalent dollar incomes. A family's well-being depends not only on income but also on other factors such as the accumulation of assets and consumer goods over the years, the availability of adequate health and educational facilities, and such intangible factors as are involved in evaluating life in the country versus life in the city. It is noteworthy that indexes developed to measure changes in levels of living of farm operator families indicate that there has been persistent improvement each year in farm operator family level of living since 1951 despite declines in farm income during most of that period.

COMMERCIAL FAMILY FARM INCOME, BY AREAS

The preceding discussion has run in terms of national average incomes, with all the shortcomings of those incomes that have been pointed out. A more appropriate measure of farm income for our purposes is the average income for *commercial family farms*.

The USDA publishes another set of figures which show this income per commercial family farm, by types of farming in different areas. These figures are compiled differently from those given above. They do not show income per farm for the United States as a whole; they show income per commercial family farm for each of the 32 chief types of farming, separately for each of the relatively homogeneous areas shown in Figure 9.

The average net income per farm for the past few years is computed separately for each area, and published annually in tabular form.³⁰ The most recent data are given in Table 13. The unweighted average of these incomes was \$7,238 in 1958.³¹ This on the face of it looks like a pretty good income. It is about 75 percent higher than the average annual wage per employed factory worker in 1958.

TABLE 13.—*Net Farm Income, Specified Types of Commercial Farms, 1958, With Comparisons*

[Dollars]

Type and location of farm	Average			1955	1956	1957	1958 ¹
	1937-41	1947-49	1948-57				
Dairy farms:							
Central Northeast.....	960	3,892	4,029	4,248	4,179	4,641	4,810
Eastern Wisconsin.....	1,480	4,365	3,837	2,816	3,456	3,656	3,360
Western Wisconsin.....	1,236	3,284	3,146	2,434	2,978	3,286	3,341
Dairy-hog farms: Southeastern Minnesota.....	1,217	3,868	3,871	3,427	3,926	3,919	4,302
Corn Belt farms:							
Hog-dairy.....	1,642	5,639	5,796	4,419	5,108	6,339	7,448
Hog-beef raising.....	928	3,370	3,727	3,016	3,169	4,135	5,488
Hog-beef fattening.....	2,521	10,665	8,658	4,433	6,899	7,445	9,619
Cash grain.....	2,027	8,930	8,495	6,737	9,382	7,239	7,811
Poultry farms: New Jersey (egg-producing).....		5,975	3,875	3,273	2,326	2,127	2,693
Cotton farms:							
Southern Piedmont.....	495	1,565	1,776	2,207	1,570	1,529	2,473
Texas:							
Black Prairie.....	1,019	3,090	2,491	2,572	903	1,790	2,885
High Plains (non-irrigated).....	1,675	6,411	4,143	2,544	2,526	6,718	9,265
High Plains (irrigated).....		10,761	10,945	7,039	12,594	11,228	17,819
Mississippi Delta:							
Small.....		1,923	1,802	2,033	1,714	1,271	1,344
Large-scale.....		20,465	21,018	25,921	20,383	12,020	18,598
Peanut-cotton farms: Southern Coastal Plains.....		2,313	2,519	3,133	2,759	2,265	3,410
Tobacco farms:							
Kentucky, tobacco-livestock.....	1,192	3,334	3,365	2,850	3,200	2,873	3,414
North Carolina:							
Tobacco-cotton.....		3,208	3,338	3,550	3,674	2,290	3,394
Tobacco-cotton (large).....		3,923	4,158	4,463	4,944	2,779	4,430
Tobacco (small).....		2,354	2,618	2,885	2,970	2,021	2,667
Spring wheat farms:							
Northern Plains:							
Wheat-small grain-livestock....	872	6,323	5,007	6,090	6,930	4,053	6,867
Wheat-corn-livestock.....	1,127	5,972	4,310	2,547	3,278	5,332	7,104
Wheat-roughage-livestock.....	533	5,370	4,012	4,259	2,899	4,475	5,032
Winter wheat farms:							
Southern Plains:							
Wheat.....	1,174	10,016	7,050	4,914	3,764	5,923	12,446
Wheat-grain sorghum.....	1,092	9,433	4,302	1,647	2,332	5,178	11,465
Pacific Northwest:							
Wheat-pea.....	2,764	11,864	12,404	9,989	13,363	15,040	9,645
Wheat-fallow.....	2,026	12,776	12,469	6,664	7,637	14,785	12,107
Cattle ranches:							
Northern Plains.....	954	6,439	4,954	2,363	2,108	4,164	6,409
Intermountain region.....	2,892	8,665	8,039	4,625	5,728	8,382	13,115
Southwest.....		5,698	3,898	3,016	-1,245	4,873	9,242
Sheep ranches:							
Northern Plains.....	2,711	6,914	7,975	4,557	6,057	10,949	13,289
Southwest.....		5,224	4,380	3,294	723	6,062	11,328

¹ Preliminary.

SOURCE.—*Farm Costs and Returns*, ARS, USDA, Agr. Info. Bul. No. 176, revised August 1959.

³⁰ *Farm Costs and Returns; Commercial Family-Operated Farms by Type and Location*, ARS.

These farm cost and income data are not obtained by a survey of actual farms. They are synthetic figures, calculated by applying estimated changes in prices, yields, inputs, etc., to model type farms. They are estimates of the average costs and returns, not of all commercial family farms in each area, but of the type of farming specified in each area.

³¹ This unweighted average is not as accurate an average as if the data were weighted by the numbers of farms in the different types. These numbers are not available at present. I believe that this lack of accuracy is small compared with that of the other averages discussed in the preceding sections. In any case, national averages do not mean much because of the great diversity behind the averages, as shown later in this paper. I use them here only because they are used so much in national policy discussion. My chief point is made later with the diverse area data.

GOVERNMENT PRICE STATISTICS

495

But before we conclude from this that average net farm income for commercial family farms really was substantially higher than nonfarm income, we need to recognize that these net farm income figures include what is called the "charge for capital."²² Deducting this charge for capital from the net income leaves the return to the operator and his family for their labor and management only. This is done for the years 1954 to 1958 in Table 14.

TABLE 14.—Return to Operator and Family Labor, 1954-58

[Dollars]

	1954	1955	1956	1957	1958
Dairy farms:					
Central Northeast.....	2,551	2,984	2,758	2,887	2,844
Eastern Wisconsin.....	1,899	1,489	2,044	1,798	1,372
Western Wisconsin.....	1,493	1,553	2,033	2,040	1,997
Dairy-hog farms: Southeastern Minnesota.....	2,119	2,056	2,438	1,986	2,231
Corn & flax farms:					
Hog-dairy.....	4,729	2,689	3,345	3,991	5,061
Hog-beef raising.....	1,573	1,624	1,679	2,116	3,320
Hog-beef fattening.....	6,551	1,995	4,426	4,286	6,287
Cash grain.....	5,107	3,200	5,556	2,125	2,500
Poultry farms: New Jersey (egg-producing).....	-3,529	606	-703	-665	-239
Cotton farms:					
Southern Piedmont.....	680	1,521	756	567	1,479
Texas:					
Black Prairie.....	756	1,501	-260	294	1,287
High Plains (nonirrigated).....	2,912	929	880	4,222	6,542
High Plains (irrigated).....	9,460	3,563	9,054	6,449	12,536
Mississippi Delta:					
Small.....	1,197	1,627	1,233	649	649
Large-scale.....	11,012	19,798	12,133	2,360	2,820
Peanut-cotton farms: Southern Coastal Plains.....	1,804	2,760	2,444	1,844	2,664
Tobacco farms:					
Kentucky tobacco-livestock.....	2,517	1,906	2,251	1,477	2,021
North Carolina:					
Tobacco-cotton.....	1,889	2,513	2,606	1,067	2,081
Tobacco-cotton (large).....	1,419	2,580	3,034	618	2,145
Tobacco (small).....	1,843	2,354	2,430	1,410	2,014
Spring wheat farms:					
Northern Plains:					
Wheat-small grain-livestock.....	421	4,428	5,076	1,633	4,384
Wheat-corn-livestock.....	1,738	867	1,693	2,953	4,629
Wheat-roughage-livestock.....	1,244	2,678	1,190	2,339	2,702
Winter wheat farms:					
Southern Plains:					
Wheat.....	4,426	1,898	702	2,025	8,015
Wheat-grain sorghum.....	261	-1,454	-715	1,415	7,373
Pacific Northwest:					
Wheat-pea.....	10,459	3,915	6,489	6,152	3,559
Wheat-fallow.....	(1)	(1)	(1)	8,215	5,250
Cattle ranches:					
Northern Plains.....	979	95	-841	633	2,777
Intermountain Region.....	1,995	2,004	2,033	5,101	9,211
Southwest.....	-5,113	-2,174	-6,471	-1,701	2,068
Sheep ranches:					
Northern Plains.....	1,107	1,259	2,609	6,628	8,560
Southwest.....	-6,337	-3,821	-6,366	-3,004	1,530

¹ Not available.

SOURCE.—Ag. Inf. Bul. 176, ARS, USDA.

²² "This charge is the current value of land and buildings times the current interest rate on farm mortgages on this kind of property in the area plus estimated current value of working assets (machinery and equipment, livestock, and crops on hand January 1) times the interest rate on intermediate and short-term farm loans" (ARS, USDA, *Costs and Returns, Commercial Family-Operated Farms by Type and Size, 1930-1951*, Statistical Bulletin No. 197, November 1958, page 7).

"There are slight differences in our net farm income as presented in the various statistics on commercial farms and the net farm income released by AMS and given in figure 2, page 5, of AIB No. 176. Our farm series are based on owner-operated farms. Our net farm income therefore is the return to operator and family for their labor and management and for return on all capital or investment regardless of ownership. The net farm income used in figure 2 includes as expenditure interest on farm mortgage debt and net rent to nonfarm landlords" (letter from Wylie Goodsell, Assistant Chief of Costs, Income, and Efficiency Research Branch, USDA, December 17, 1959).

The charge for land and buildings in the charge for capital was computed differently before 1954, so the returns to operator and family labor before that date are not comparable with the returns for the years after 1954.

These labor and management returns are roughly comparable in concept with the United States average farm income data shown above, but they show the average net income for regular commercial family farms in the areas shown in Figure 9, separately by types of farming in the different areas, rather than for all "farms" as defined in the Census, for the United States as a whole.

The labor and management returns are also more clearly comparable with the earnings of employed factory workers than the net farm income figures given above; they both show the returns to labor, not including a charge for capital in either case.³³

Significance of the Return to Operator and Family Labor Data.—The simple United States average of the net farm incomes for commercial family farms in 1958 was \$7,238. The United States average "return to operator and family labor" after the charge for capital is deducted from the net farm income, shown in Table 14, was \$3,702.

This \$3,702 is about 24 percent higher than the United States average "farm" income from farming of \$2,990 for 1958. Neither series is perfect for showing average farm income, but the data given in the table show more nearly what most people have in mind when they talk about farm policy.

Two things need to be pointed out here. First, practically all the discussion about farm income is based on the United States average "farm" data which include all census "farms" and yield the average farm income figure for 1958 of \$2,990 just quoted. Not one man in a thousand who quotes these figures ever quotes these other more meaningful figures for commercial family farms (\$3,702 for 1958), perhaps because in most cases he does not know that they even exist.

It would be illuminating if average farm income from nonfarm as well as farm sources could be compared with the incomes of similar small business entrepreneurs in other sectors of the economy. But the author does not know of any such nonfarm data. Discussions of farm income policy, which usually means commercial family farm policy, will not be very accurate until they are based on commercial family farm income data.

The second point is of a different nature. It concerns the dispersion behind the United States average farm income data. Table 14 shows that there are wide differences among the average returns to operator and family labor in the different areas. In 1958, the average returns to operator and family labor ranged from —\$239 in New Jersey egg-producing poultry farms to \$12,536 in the irrigated High Plains cotton farms in Texas.³⁴

Furthermore, most of these differences persist over long periods of time, even in contiguous areas. There is great variation from year

³³The factory worker ordinarily would not have a "charge for capital" as such, but would have a return on his investments of his savings, comparable in some sense with a farm operator's return on his own savings invested in his farm.

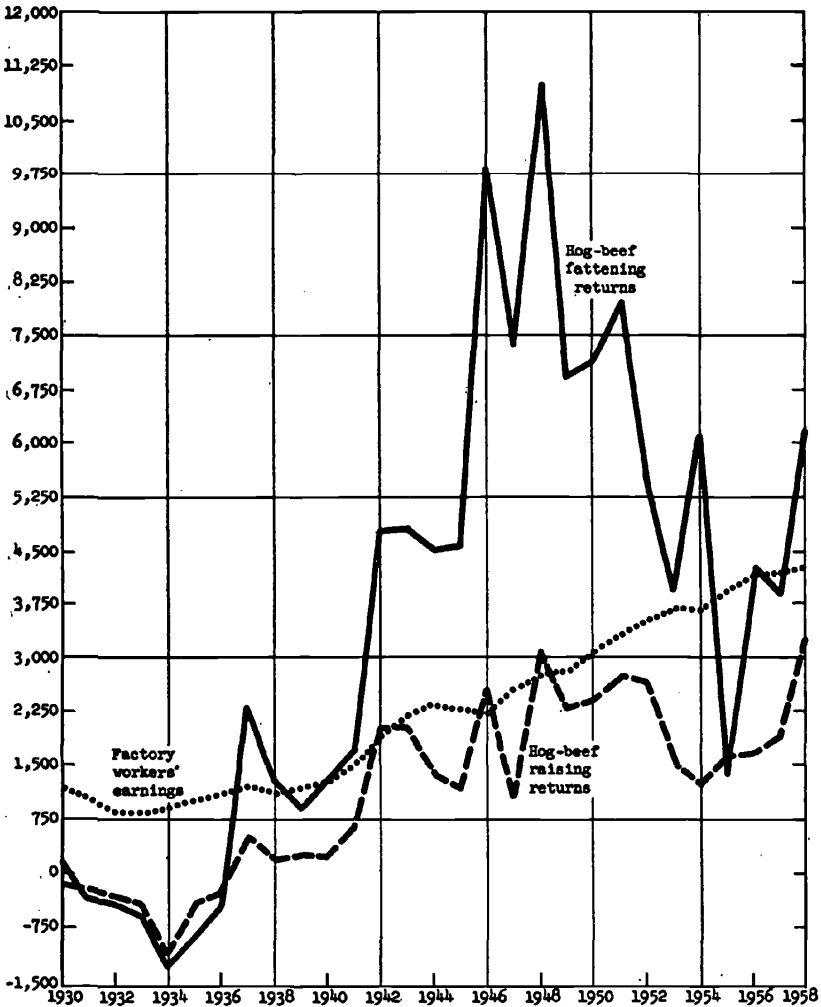
The factory workers' earnings are not perfect for comparison with the labor and management returns to the farm operator. The factory workers' earnings do not include returns to management as the farm returns series does. Also, factory workers are not strictly comparable with farm operators in some other respects. Ordinarily, they do not exercise much management; that is the prerogative of "the management." Furthermore, any income from other members of the family is not included in the factory workers' earnings, whereas they are included in the farm series if the other members of the family worked on the operator's farm, as they do in most cases. But the author does not know of any other authoritative series which is more nearly comparable with farmers' returns for labor and management than the earnings of factory workers.

³⁴The average net farm incomes in 1958, not shown in the table, ranged from \$1,344 for the small cotton farms in the Mississippi Delta to \$17,819 for the irrigated High Plains cotton farms in Texas.

to year due to weather and other such causes, but by and large the incomes in most of the different areas stay in about the same relation to each other year after year. The high areas remain high and the low areas remain low.

The compilation of parity income ratios by areas would show the economic status of farmers, not only for the United States as a whole but area by area. This would facilitate accurate identification of the problem areas within agriculture.

FIGURE 10



A MEASURE OF PARITY INCOME

The preceding discussion of parity farm income leads to the following comment: The economic status of farmers can be more accurately measured by income per farmer than by prices alone. Several measures of farm income are compiled by the USDA. The one that re-

ports the income of commercial family farms by type of farm in the chief producing areas could be compared with the incomes for comparable ability in other occupations. The ratios between the two, area by area and for the United States as a whole, could be used as income parity ratios.

Many problems would be involved in a shift from measures of parity prices to measures of parity incomes.³⁵

PARITY PRICES AS BASES FOR PRICE SUPPORTS

We are now ready to appraise parity prices in their present widespread use as bases for the price-support and storage operations of the CCC. These are tremendous operations, as shown earlier in this report, running into billions of dollars.

It is clear that parity prices are quite unsuited to this purpose. They are subject to the same disabilities as the parity ratio—they are based on the same out-of-date 1910-14 base, unrepresentative of "the kind of agriculture that is likely to prevail for some years ahead." Modernized parity mitigates this shortcoming to some extent, so far as the relations among the prices of farm products are concerned, but leaves the basic situation—that the indexes for farm products as a group remain on the 1910-14 base—unaffected. The use of a more up-to-date base would remove one of the obvious shortcomings of parity prices as bases for loan rates. But a more basic shortcoming would still remain.

Commodity loans and storage operations can be used to stabilize prices against year-to-year variations in supply, if the loan rates are set at or a little below long-run average premarket levels. These levels reflect long-run supply and demand. But parity prices, even on a recent base, are not suited to this job. They reflect only changes in supply (i.e., in the quantities that producers stand ready to bring to market at different prices) and do that very imperfectly, since parity indexes reflect only the *prices* of cost items, not their quantities. In addition, as a group, parity prices ignore changes in demand entirely. They therefore, leave out three-quarters of the picture.

The size of the accumulated CCC stocks and the cost of acquiring and maintaining them has amply demonstrated that loan rates cannot for long be set above the long-run market levels determined by demand and supply. Parity prices which reflect demand and supply so imperfectly are obviously not suitable as bases for loan rates. Their use for this purpose has cost billions of dollars, only part of which has gone to farmers, and has brought the farm program into disrepute.

What can be used instead that would be any better? The USDA is understandably reluctant to give up even such an inaccurate instrument as parity prices if the alternative would be to throw the determination of the loan rates each year to the wolves of pressure groups bearing down upon Congress.

An objective basis, however, is available. Recent-period moving averages of open market prices could be used. A 3-year moving average of this sort is already in effect for corn. A similar average is being considered for wheat. This procedure brings together the forces of demand and supply into one price figure which would be

³⁵ Some of these problems are discussed in *An Alternative Parity Formula for Agriculture*, Iowa State University Research Bulletin 476, February 1960.

close enough to the long-run free-market price to serve as the basis for loan rates to stabilize prices at about that level.

PROBLEMS IN THE APPROACH TO INCOME PARITY

The parity-price ratio, and the parity prices for individual farm products, are evidently inappropriate for the purposes for which they are being used. One reason for this is that they were developed on the basis of what has turned out to be an incorrect diagnosis of the agricultural problem in the first place.

It is incorrect to diagnose the agricultural problem as a price problem, ignoring quantities and costs. In reality, the agricultural problem is an income problem; and it is not a *total gross* agricultural income problem, but a *net per farmer* income problem. This net per farmer income problem requires quite different programs from those that might solve a price problem.

What is needed is to develop and use new and more appropriate measures to deal with the farm problem. Using more recent price bases would at least bring the existing price indexes more up to date. Replacing them by per farmer net income indexes or actual dollar figures would be better, although it would take more time to work out the problems involved. Some of these problems are outlined below.

1. WEIGHTS DERIVED FROM COMMERCIAL FARMS

The quantity weights used in the existing parity price indexes could be based upon commercial farms (classes I through VI) rather than upon all farms as defined in the Census. It would not include the part-time and residential and subsistence farms, which numbered 1,682,000 in 1954, roughly one-third of the total number of all farms, 4,782,000. Even with class VI included, these farms account for only about 3.5 percent of the value of total farm products sold, but for 35 percent of the expenditures by farm operators for living. They thus give an unrepresentatively large weight to family living in the parity index which is chiefly relevant to commercial farmers.

2. SEPARATE PARITY INDEXES

Consideration might well be given to computing separate parity indexes for some of the major farm products, in order to compare them with the single parity index now used for all farm products, measure their differences, and determine how great these differences are in relation to the costs of computing the separate indexes.

3. MORE RECENT BASES

The ancient 1910-14 bases now used in computing the parity price indexes could be replaced by bases that more closely represent "the kind of agriculture that is likely to prevail for some years ahead." New legislation would be required for this purpose.

To this end, the moving average of the most recent 10 years, already being used for the relations among the prices of individual farm products could be applied to the indexes for all farm products as a group. Alternative bases might be 1950-59 or 1955-59. This base then would apply both to the indexes of prices paid and to the indexes of prices received.

Parity prices on this base would be more useful as well as more representative of current conditions than parity prices on the present 1910-14 base. Most farmers are more interested in a measure of their economic status now compared with their average status over the past 10 years than they are their status in the horse-and-buggy 1910-14 period before most of them were born.

In principle, the weight bases could be the same as the price bases. But some features of this possible arrangement need to be considered.

a. If a moving average base, say for the past 10 years, were used both for prices and for weights, the index would not be an unequivocal price index. It would reflect changes in quantities as well as in prices.

Let us take the index of prices received as an illustration. Suppose that a drought or other disaster struck the country one year, and agricultural production declined 3 percent, as it did in 1947, and prices rose 17 percent, as they did then (although the drought was not the only reason why prices rose to that extent). The next year, the inclusion of 1947, when crop production was low, in the new 10-year average weights, would change the composition of the weights. The price index for 1948 therefore would reflect the change in the composition of the weights as well as the change in prices. Conceivably, prices from 1947 to 1948 might not change at all, but the price index would change because of the change in the composition of the weights for the different items in the price index.

This effect would be small, because the change in the composition of the weights for the 10-year moving average base would be only one-tenth as large as the change in the one year 1947. It might be considered preferable to have this small change each year rather than have the large one that takes place when the weight base is moved from one fixed period to the next (such as the 3-point decline that took place in January 1959 when the weight base for the index of prices paid was moved up from 1937-41 to 1955).

b. The weight base for the index of prices paid could not well be a recent moving average, for a very practical reason of cost. The quantities of the different goods and services purchased by farmers are determined by a survey, and surveys are expensive. A period of 18 years elapsed between 1937-41 and 1959, when weight data from the survey in 1955 permitted the most recent revision to be made. The cost of making a fresh survey every year, to include in a moving average base, would be prohibitive. B. R. Stauber of the USDA suggests that regular 5-year intervals between weight-base years would be a reasonable compromise between cost and obsolescence.⁸⁶ He further suggests that the revisions of the several major Government indexes be based on the same weight-base and price-base periods.⁸⁷ We endorse these suggestions,⁸⁸ with the proviso that the price-base periods for the agricultural indexes include 5 or 10 years, so as to average out most of the effects of the irregular variations in production and prices which result from irregular year-to-year variations in weather.

⁸⁶ B. R. Stauber, "The 1959 USDA Index Revisions and Some Related Policy Questions," *Journal of Farm Economics*, Proceedings, XL1: 5, December 1959, p. 1288.

⁸⁷ *Ibid.*, p. 1288.

⁸⁸ *Ibid.*, p. 1302, discussion by Geoffrey Shepherd.

4. MEASURES OF PARITY FARM INCOME

The fundamental difficulty with the existing price support programs is that they use indexes of price instead of indexes measuring value received on cost incurred, or net income. And the inaccuracy of parity price indexes as measures of economic status would remain, because they are only price indexes, not value-received and cost-incurred indexes, showing net income. Neither do they permit a breakdown by type of farming or economic producing areas to show the economic status of farmers in those areas separately.

One possibility would be to include efficiency modifiers for farm products as a group and for individual farm products in the parity formula. Separate parity indexes for individual farm products could also be included. These have been computed experimentally for cotton, as shown earlier in this report.

This would be a step toward the measurement of income. There is something to be said on psychological grounds for making progress a step at a time. But this step would result in only an approximation, and would involve difficult problems of how the gains from technology should be divided between producer and consumer. It might seem better to go to measures of income directly.

Indexes of gross and net income, by type of farming in different economic areas, would provide relatively accurate and detailed measures of farmers' economic status. The basic data for measures of this sort have been compiled for years by the ARS, USDA; they are published annually in bulletin form, but are not widely used. These measures could be refined and extended and used to replace the existing parity price indexes. These measures of net farm income, or measures of net returns to farm labor and management, area by area, could then be compared with the wages of industrial workers, or other nonfarm groups, with due allowance for differences in purchasing power and other intangibles, to provide measures of parity income with incomes in other occupations.

5. MOVING AVERAGE PRICE BASES FOR LOAN RATES

Many farmers are alarmed at the thought of using more recent bases, because that would reduce parity prices, which have been used as the bases for loan rates. These farmers fear that the loan rates would be lowered along with the parity prices. But experience with storage programs in recent years has demonstrated that parity prices are anachronisms, unsuited as bases for loan rates used with price stabilization programs.

More suitable bases would be recent moving averages of market prices, such as have been adopted for corn. These averages integrate the forces of demand and supply objectively into a single price figure, which is well suited to use as the basis for loan rates to attain the objective of smoothing out prices about their long-run market equilibrium level, without trying to raise that level.

This smoothing out of prices about their long-run market level is all that storage programs can do over the long run, and recent moving averages of market prices approximate this long-run equilibrium level closely enough to serve well as the bases for loan rates for this purpose.

Setting the loan rates about 10 percent below the moving average price would provide a high degree of stabilization yet still permit the

storage programs to recoup some of their costs from the sale of their stored products at (ideally) 20 percent above their cost of acquisition, in years of short crops.

The moving average would have one shortcoming, in that it would always be a few years behind the times. This could be overcome by developing an index of demand, projected into the future and used to adjust the moving average price up or down as needed.

If the level of loan rates thus determined would provide incomes too low to be deemed acceptable, the causes of those low incomes would need to be determined and rectified by means appropriate for those causes.

The replacement of percentages of parity prices by moving averages of open market prices as bases for loan rates, would reduce the natural objection which farmers now feel toward the use of recent bases which would reduce the level of parity prices. For that reduction then would not reduce the level of loan rates.