19

Appraisal of the Parity Price Indexes

The present parity price indexes and ratios may 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 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 INDEXES WITH REFERENCE TO USES FOR WHICH 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.[1]

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

[1] B. Ralph Stauber, Nathan M. Koffsky, and C. Kyle Randall, The Revised Price Indexes, *Agricultural Economics Research*, USDA, Bur. Agr. Econ., April, 1950, p. 53.

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 per cent, for 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.

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. The 1959 revision includes the prices for 55 farm products, which are weighted by the quantities marketed in 1953–57, and represent 93 per cent of total farm marketings in 1953–57. The largest single item omitted is farm forest products.[2]

This coverage of 93 per cent is close enough to 100 per cent 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 per cent of farmer expenditures in 1955. The weights are given in Table 19.1.

The most important fields not covered in the family living part of the parity index are medical, dental, and hospital expenses, which

[2] 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, Dec., 1959, pp. 13–14, 21.

TABLE 19.1

PARITY INDEXES: RELATIVE IMPORTANCE OF COMPONENT INDEXES, 1955 AND JUNE 15, 1961*

Commodity Group	Relative Importance			
	Old index		1959 revision	
	1955	June 15, 1961	1955[1]	June 15, 1961
	per cent	*per cent*	*per cent*	*per cent*
Living (total)	50.74	48.49	39.50	38.99
Food	17.06	16.08	13.40[2]	13.46[2]
Clothing	16.31	16.04	6.34	6.47
Autos and auto supplies	3.94[3]	3.81[3]	5.63	5.54
Household operation	4.54	4.26	5.77	5.70
Household furnishings	3.36	3.15	3.99	3.58
Building materials, house	5.53	5.15	4.37	4.24
Production (total)	35.98	34.16	50.90	49.18
Feed	7.13	5.82	12.80	11.04
Livestock	....	....	4.60	4.78
Motor supplies	....	....	8.39	8.25
Motor vehicles	7.00[4]	7.13[4]	4.38[4]	4.68[4]
Earm machinery	4.72	5.39	5.21	5.95
Equipment and supplies	5.31[5]	5.07[5]	3.66	3.42
Fertilizer and lime	1.83	1.66	4.11	3.70
Building and fencing materials	8.13	7.88	5.20	5.26
Seed	1.86	1.21	2.55	2.10
Total Commodities	86.72	82.65	90.40	88.17
Interest	3.46	5.11	.96	1.48
Taxes	9.82	12.24	2.04	2.75
Commodities, Interest, and Taxes	100.00	100.00	93.40	92.40
Cash wage rates	....	....	6.60	7.60
Commodities, Interest, Taxes, and Cash Wage Rates	....	....	100.00	100.00

* Data shown indicate the contribution of each component to the determination of the parity indexes reflecting the relative importance of the product of percentage weights times component price indexes. Source: Crop Reporting Board, SRS, USDA, "Agricultural Prices," Sept., 1961, Suppl. No. 1.

[1] Same as index weights.

[2] Includes tobacco.

[3] Autos only. Auto supplies in Old Index are carried under "Household operation."

[4] Includes tractors.

[5] Includes motor supplies.

TABLE 19.2

INDEXES OF PRICES PAID FOR COMMODITIES USED IN PRODUCTION, UNITED STATES, AND TYPES OF FARMING AREA *

[1947–49 = 100]

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

* Source: *Policy for Commercial Agriculture*, Joint Committee Print, 1957, p. 516.

† Prices paid for production items, interest, taxes, and wages as published in monthly Agricultural Prices.

‡ Prices paid, including taxes (but not interest), and wages to hired labor as published in *Farm Costs and Returns*, ARS, USDA, Agr. Infor. Bul. No. 158.

§ Not available.

in 1955 amounted to $1,444 million or 7.2 per cent of all farm family living expenditures. Others were personal insurance and recreation which accounted for 2.6 and 2.1 per cent, 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 per cent of all production expenditures.[3]

This coverage appears less adequate than the coverage of the index of prices received.

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 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.

In 1960, prices paid for goods and services on all except the poultry farms were higher than in 1947–49. Lower average prices paid on the poultry farms were due to the reduction in price of feed — the major item of expense on these farms. (This pulled the index of price paid down to 83.) The largest increase in average prices paid was on the cash-grain farms in the Corn Belt — 38 per cent[4] (i.e. to an index of 138).

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 per cent. 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

[3] *Ibid.*, p. 21.
[4] "Farm Costs and Returns," USDA, Agr. Bul. 230, June, 1961, p. 8.

exactly doubled from 1935 to 1953, but on Central Northeast dairy farms it rose only 36 per cent. The use of labor declined at different rates in 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 19.2, 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 19.2 indicates that all the special prices-paid indexes for the different types of farms shown from 1947–49 to 1955, ranged from a 4 per cent decline for sheep ranches in the Southwest to an increase of 26 per cent for wheat-pea farms in Washington and Idaho. This is a total range of 30 percentage points. The rise in the United States index during the same period was 14 per cent.

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 per cent in the Southwest to 25 per cent in the northern Great Plains and Intermountain areas. Similarly, the increases since 1947–49 for cotton farms range from only 1 per cent for irrigated operations in the high plains of Texas to some 12 per cent 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:[5] "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."

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 by considering the case of cotton. Estimates for cotton are quoted from a USDA report on cotton.[6]

> An index representing the composite average price 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 reinstitution 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.[7] 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 19.3 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

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[5] "Possible Methods of Improving the Parity Formulas," Senate, 85th Cong., S. Doc. 18, 1957.

[6] "Report on Various Methods of Supporting the Price of Cotton," 85th Cong., 1st sess., S. Doc. 12, 1957, pp. 13–16.

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

TABLE 19.3

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

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

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." [8] 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

[8] "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.

TABLE 19.4

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

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, 50 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 report[9] considered several different more recent periods, and computed their effects on the average level of prices. Their figures are shown in Table 19.4. 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.

If 1947–56 were 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 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

[9] *Ibid.*

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

The present parity price indexes were designed originally 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.[10] 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 79, for example, as it was in July, 1962, that ratio is regarded as indicating that the prices received by farmers are too low; some regard a parity ratio of 79 as indicating that the prices of farm products are 21 per cent too low. Some farm programs are being proposed with the objective of raising the prices of farm products to 100 per cent 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

[10] 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,* Feb., 1959.

product. This ratio for corn, for example, was 65 in July, 1962. 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 in the preceding chapter.

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, as well as prices, should be taken in account. Price supports also need to be set with reference to quantities as well as to prices.

An illustration of this 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 per cent, from $983 to $960. Even income from farming alone declined only about 14 per cent. 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. These estimates are presented and discussed below.[11]

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

[11] The next four paragraphs are quoted from S. Doc. 18, p. 26 (see footnote #8).

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 19.5 and Figure 19.1.

According to these preliminary calculations, which can only be considered indicative of the general trend, farmers, as a group, used some 23 per cent 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 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 per cent in 1955. If the adjustment for efficiency were to reflect only the improvement since 1945, the parity prices would be reduced some 10 per cent. 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 per cent.

TABLE 19.5

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†	Index of Total Farm Outputs‡	Index of Selected Farm Inputs per Unit of Total Farm Outputs§
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

*Source: S. Doc. 18, p. 27.
† Preliminary. Based on estimated inputs of total farm labor, land, buildings, machinery, fertilizer and lime, combined on basis of average 1947–49 cost rates.
‡ Published regularly on a 1947–49 basis.
§ Preliminary index of selected inputs divided by index of total farm output.

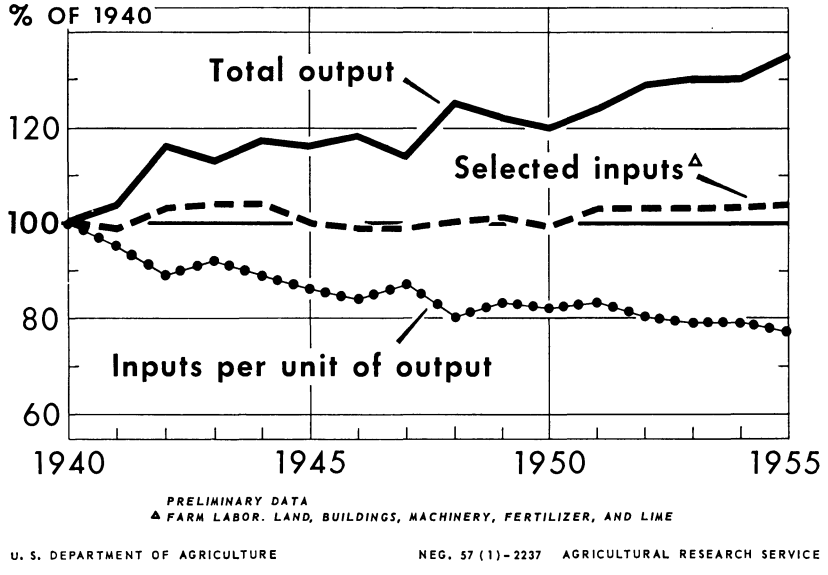

Fig. 19.1 — Farm inputs per unit of output, indexes, annually, 1940–55.

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, as follows:[12]

> *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 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.

[12] *Ibid.*, pp. 15, 16.

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.

The results of these calculations using the year 1945 as a base are given in Figure 19.2. In general, there has been a sharp decrease in inputs per bale and they were 30 per cent 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 19.2 indicates that the quantity of inputs per bale of cotton has decreased at an average rate of about 3 per cent per year from 1945 to 1955. Figure 19.3 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 subtstanially during the 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.

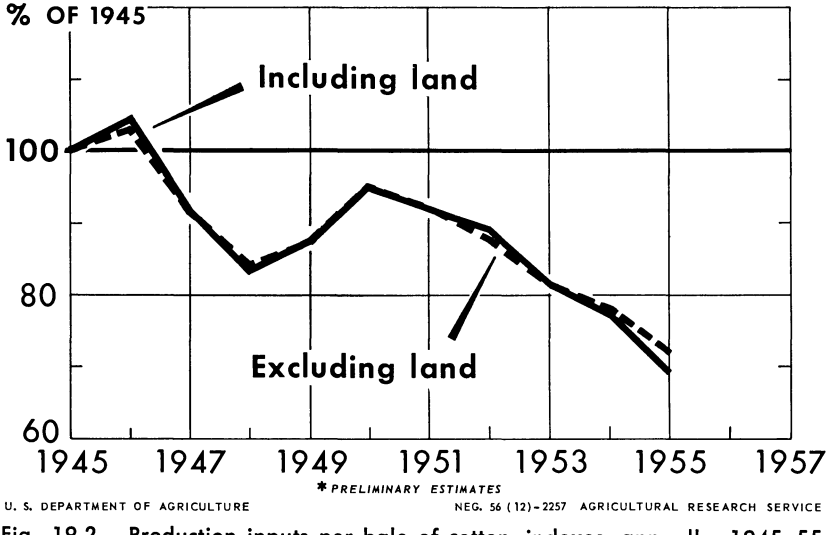

Fig. 19.2 — Production inputs per bale of cotton, indexes, annually, 1945–55.

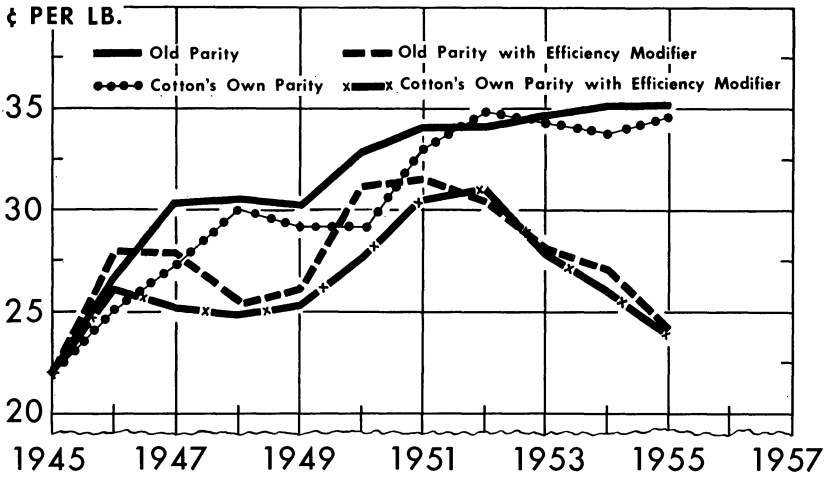

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Fig. 19.3 — Alternative parity prices of cotton, annually, 1945–55.

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 per cent.

PARITY PRICES AS BASIS FOR PRICE SUPPORTS

We may now 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 in the preceding chapter, 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.