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Staff Paper 2

ALTERNATIVE RETAIL PRICE INDEXES FOR SELECTED NONDURABLE GOODS, 1947-59¹

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I. PURPOSES AND METHODS

The construction of a price index involves an extremely large number of decisions in the selection and processing of the data to be used. Different investigators, even when working within the same basic framework of concepts, will inevitably make some of these decisions differently. Each can defend his decisions as reasonable, and few ever explore the consequences of making different decisions. In evaluating the movement of a price index, it is important to know which of these decisions have large effects on the behavior of the final index and which do not. This knowledge cannot be deduced in the abstract. It depends in large part on the variances in price movements among places, outlets, commodities, and varieties of commodities.

Information about the effects of some important decisions can be obtained by reviewing the choices made in processing the data collected for an established price index and inquiring into the consequences of altering these choices. Some valuable studies following this approach as applied to the Consumer Price Index have been made available to the Price Statistics Review Committee by the Bureau of Labor Statistics. Many of the crucial decisions, however, are made in the selection of items to be included in the index, in the setting up of specifications for these items, and in the collection of data. The effects of such decisions can be tested only by the collection of additional data not already incorporated in the index in any way.

This paper presents comparisons between components of the established retail indexes and new item indexes based on prices collected from mail-order catalogs. The comparisons are designed to test the effects of decisions made in selecting particular varieties of a commodity from among the large number of varieties on the market, and the effects of decisions on when to introduce new commodities or new varieties of a commodity into an index. In general the paper will not contend that the indexes based on mail-order data are superior

¹The work underlying this paper was done while I was a Fellow of the Center for Advanced Study in the Behavioral Sciences, Stanford, California. I am heavily indebted to Don A. Proudfoot, Jr., and Edward Murphy, of Stanford University, who collected and processed the data. D. M. Tooker, of the Los Angeles branch of Sears, Roebuck, and Company and the staff of the Oakland Branch of Montgomery Ward and Company were of great help in enabling us to complete our collection of mail-order catalogs. The Division of Prices and Cost of Living of the Bureau of Labor Statistics made available unpublished histories of specifications for a number of items in the Consumer Price Index, and the Agricultural Price Statistics Branch, Agricultural Estimates Division, Agricultural Marketing Service, made available unpublished tabulations of prices paid by farmers for particular items. In this connection, we are especially indebted to Sidney A. Jaffe of BLS and B. R. Stauber of AMS. The members of the Research Group in Labor Economics and Industrial Relations at the University of Chicago made helpful comments on an earlier draft.

to the corresponding components of the official indexes; it is clear in many cases that they are not. Rather the paper suggests that where the differences among alternative indexes are large, it will pay to concentrate attention and research on the improvement of the indexes, and where the differences among alternative indexes are small, problems in methodology that seem important in the abstract can safely be neglected in practice. For such a suggestion to be helpful, it is of course necessary to be able to generalize about the kinds of situations in which large differences among alternative indexes can be expected to occur.

The new indexes for particular commodities presented here were constructed from Sears Roebuck and Montgomery Ward catalogs for the years 1947-59. Since the work was done in California, the catalogs we were able to assemble were Los Angeles catalogs for Sears and Oakland catalogs for Ward. Indexes based on these data will be compared with national item indexes that are components of the Consumer Price Index and the Index of Prices Paid by Farmers for Family Living (hereafter called simply the BLS and AMS indexes). The absolute level of prices in California is higher for some items, especially bulky items such as mattresses, than it is for the country as a whole. However, we do not believe that there are appreciable differences in the movement of prices on this account; at any rate we have not been able to detect any.

Mail-order catalogs have several advantages for the inexpensive collection of large bodies of historical price data. Price quotations are accompanied by reasonably full descriptions of the items and by photographs or drawings in most cases. These usually provide the information, at least for major features of the item, called for in BLS specifications. The continuity of catalog numbers from one catalog to the next is often helpful in following a particular item. Most important, the prices given in the catalogs are those at which many transactions actually take place, and are not the starting point for bargaining or discounts.²

There is a problem in the determination of the period during which catalog prices are in effect. Special sales and in some cases price increases may be announced shortly after the catalogs are issued, and we have no collection of such announcements. Changes in the proportion of all sales made through special sales catalogs and changes in the difference between general catalog and sales catalog prices could introduce bias into our indexes. The general catalogs themselves do not show an exact date of issue. We compare the Spring catalog prices with the March indexes of BLS and AMS and the Fall and Winter catalog prices with the September official indexes. There is considerable internal evidence in the study, especially during the period of the Korean war, that this dates the catalog prices too late, for the official indexes lead at a number of turns. However, the alternative of comparing Spring catalogs with December indexes and Fall catalogs with June would have produced opposite discrepancies and would have made it impossible to include some seasonal items.

² For other recent uses of mail-order catalogs to construct price indexes, see Meyer L. Burstein, "The Demand for Household Refrigeration in the United States," in A. C. Harberger, ed., *The Demand for Durable Goods* (Chicago, 1960), and Albert Rees with the assistance of Donald P. Jacobs, *Real Wages in Manufacturing, 1890-1914* (Princeton University Press for NBER, in press).

Our collection of catalogs was missing one catalog from each mail-order house, fortunately not for the same date. Because of the differences in price levels between Chicago and California, we did not use Chicago catalogs to fill the gaps. Rather we have interpolated the data for the missing periods.³

The items considered in the study are confined to nondurable goods because the problems of pricing durable goods are discussed in several other staff papers.⁴ The selection of nondurable goods for study was a judgment selection, and not in any sense a random sampling operation. The following considerations influenced the selection: (1) We wanted to study a wide variety of nondurable goods, including clothing, house furnishings, and other items, and including products of the textile, leather, and rubber industries. (Food and tobacco, of course, cannot be priced from mail-order catalogs.) (2) We wanted to include items that were in both the AMS and BLS indexes, insofar as possible. (3) We wanted some items that were little affected by innovation or technological change during the period of the study, and others that were greatly affected. (4) We wanted to omit items with radical year-to-year changes in style, such as women's street dresses, since these are almost impossible to follow in the catalogs (and, it might be added, extremely difficult to follow by any other procedure as well). Of the list originally selected on these criteria, all the items have been studied except men's dress shoes, the only item made of leather. The very large number of varieties of this item in the catalogs and the great complexity of the BLS specifications for it caused us to leave it until last, and we did not get to it because of limitations of time and budget.

The three sets of indexes compared in the study are constructed on three quite different principles. The BLS indexes are based on the selection of one or sometimes two narrowly specified varieties of an item, which are priced at several outlets in each of 19 cities. For furniture and apparel items, an average of about 4 quotations per item is obtained in the larger cities.⁵ Since the average for smaller cities may be lower, 76 quotations per item is probably close to the maximum for most of the item indexes. BLS prices are, of course, collected in the field by agents of the Bureau. Data for clothing and furniture items are obtained both from department stores and from specialized clothing and furniture stores.

In contrast to the BLS indexes, the AMS data refer to a much broader range of specifications. For example, in Axminster rugs

³ The missing catalogs are Spring 1948 for Sears, and Spring 1953 for Ward. After considerable experimentation, we evolved the following rule for interpolation: Where in the house with the missing catalog the price change for a full year (Fall to Fall) is in the same direction as in the house with all catalogs present, and where, in addition, in the latter house the price change is in the same direction in both subperiods (Fall to Spring and Spring to the following Fall), we divide the price change in the first house among the subperiods in the same proportions as that in the second house. In all other cases, the price change in the first house was distributed equally between the two subperiods. The experimentation referred to above consisted of assuming that data were missing which in fact we had, and seeing what interpolation rule reproduced them most closely.

⁴ Strictly speaking, we stray outside the area of nondurable goods by including mattresses, a product of the furniture industry. However, mattresses have certain characteristics of nondurable goods and have not been studied in any of the studies of durable goods.

⁵ There are 46 cities in all in the CPI. However, the published item indexes are based only on the 19 cities priced in the months of March, June, September, and December. The average number of observations per item reported above is as of 1955 from BLS Bulletin 1182, p. 15. The average refers to cities in size classes A1, A2, and B (cities of over 240,000 population), of which there are 11 among the 19 cities included in the item indexes. The number of observations per city may be lower for the other 8 cities. My impression is that about four outlets are visited in such cities for these items, and not all of these will always have an item in stock to meet specifications.

AMS specifies only the size (9'×12') and that the rug be seamless. BLS specifies in addition the fiber content, the number of rows to the inch, the number of ply, the backing, and that the pattern be current. AMS quotations are collected by mail from a large number of outlets in each of the States. These quotations are weighted together to produce a national average price. As of September 1949 there were 2,428 reports for one of the items considered in this study, men's work socks.⁶

The average prices reported by AMS are in effect unit values rather than specification prices. Such unit values are subject to upward or downward drift relative to a specification price index if there is a change in the average quality of the item bought by farmers or change in the composition of the outlet sample. This of course does not mean that all the AMS indexes are affected by such a drift or that they are all inferior to the corresponding BLS indexes. Detailed discussion of this issue will be reserved for the following sections.

The AMS data as we received them consisted of quarterly average prices paid for particular items, based on samples of independent stores for 1947-53 and of independent and chain stores combined for 1953-59. We have used the data for March and September of each year. These have been converted into indexes on the base 1947-49=100; the data for 1954-59 have been changed in level to that of the first segment of the data by use of the one year overlap in 1953.⁷

Our own indexes based on mail-order catalogs differ in several respects from both of the other sets. Obviously, we have a much smaller number of outlets—that is, two. Our data are confined to one state, California. Our procedure on specifications differs from that of both government agencies. Every price comparison we make refers to a detailed specification at a level of detail similar to that of BLS; we compare a Fall 1947 price with a Spring 1947 price for an identical specified-in-detail item sold by the same outlet. However, we make such comparisons for as many different varieties of the item as possible, within a broad over-all definition of the item not unlike that of AMS. In some cases, this gives us a very large number of price comparisons between two adjacent dates. The largest number of such observations in any of our indexes is 89 (women's rayon and nylon panties, Fall 1954 to Spring 1955), a number probably not appreciably different from the average number of observations behind a given BLS item index for a similar item. The period-to-period change in the price of an item is estimated as the average of the changes for all the detailed varieties of the item, and these average changes are multiplied together to form a chain index. Our final item indexes can thus be described as unweighted specification chain indexes covering a broad range of specifications. If the weighting process is viewed as applying to the major varieties of an item, rather than to the most detailed varieties, then there is a kind of weighting implicit in our procedure. The weight assigned to any major variety of an item will be equal to the number of detailed varieties for which we can make comparisons, which in turn will depend in large part on the number of such varieties present in the catalogs. It seems rea-

⁶ See *Major Statistical Series of the U.S. Department of Agriculture*, Agriculture Handbook No. 118, vol. I, p. 36.

⁷ This is the same procedure used by AMS in constructing the index of prices paid by farmers, except that AMS uses an overlap of one observation only—that of March 1953. See *Major Statistical Series of the U.S.D.A.*, p. 33.

sonable to assume that the number of different detailed varieties in the catalog will be greatest where the volume of sales is greatest, so that we probably weight the major varieties of an item in rough proportion to their importance.

In constructing the indexes shown in the paper, we have combined the data from the two houses, Sears and Ward, by pooling them; that is, we have averaged together all price changes regardless of which house they came from. The same specified-in-detail item will be counted twice if we have observations for it from both houses. Our worksheets and work charts also contain separate item indexes for the two houses, which we constructed to reveal special problems that might be indicated by major discrepancies of movement between the indexes for the two houses.

When new varieties of an item appear in the catalog, they are always linked in to our index; that is, we use only the price changes from the first catalog in which they appear to the second and subsequent catalogs. We almost never make deliberate direct comparisons between the prices of nonidentical goods; the few minor exceptions to this rule are noted in the presentation of the item indexes. This rule is probably more rigid in our indexes than in the BLS indexes, since the BLS makes direct comparisons between nonidentical goods if both fall within the same specification. For an item like mattresses, where there can be some appreciable range of qualities within the specification, this could lead to differences between the indexes. The BLS defends its practice by arguing that the change from one variety to another could be accompanied by a price change unrelated to the quality difference between them. The direct comparisons assume that quality changes within specifications are of negligible importance, and the direct comparisons therefore reveal true price changes. Our procedure assumes that the price movements of the continuous varieties in the sample are the best measure of the true price changes for the discontinuous ones over the interval of the change. This would be a mistaken assumption where sellers followed a deliberate policy of disguising price rises by changes in product characteristics that cost or were worth less than the price rise. We may also, of course, make inadvertent comparisons between nonidentical varieties if the catalogs do not disclose the nature of the change in what seems to be the same specific item.

The particular specified-in-detail items included in the BLS indexes seem to be chosen with two primary criteria in mind. First, there is an attempt to get an item of the quality likely to be bought by the population covered by the CPI—wage earners and lower income salaried workers. Second, there is an effort to choose varieties of an item whose style will be reasonably stable over a period of years, rather than those most subject to whims of fashion. Our own coverage of specified-in-detail items will, of course, be restricted to those that are offered to the customers of mail-order houses; it does not seem probable that these are, on the whole, in a very different income range than the CPI index population. If this is correct, then it seems probable to us that the selection of specified-in-detail items for the CPI is often at too low a quality level for the index population, probably because the index population moved up to better qualities after the item was specified. In a number of cases we were unable to find any variety of an item in the catalogs of either house whose quality was

as low as that specified by BLS. These cases will be noted in the presentation of the item indexes in the next section.

Our item indexes include more of the unstable, fashion-influenced varieties of an item than the corresponding BLS indexes. However, such varieties are underrepresented in number (not necessarily in importance in total sales) in our indexes simply because it is harder to collect data for them. Thus in the case of women's panties, we can easily make comparisons from period to period for the stable, untrimmed styles. The more and fancier the lace trimming, the smaller the probability that the same variety will be present in successive catalogs.

In addition to our general indexes based on catalog data, we have also computed wherever possible indexes from the catalogs that conform to the BLS specifications for the item in question as they stood at the date of each observation. In some cases, no such index could be constructed, because it was clear that for some periods no items in the catalog would meet the specifications. At other times, we have deliberately gone outside the strict boundaries of the specifications to produce a continuous index that conforms more closely to the specifications than our general index. Even where we regard an observation as conforming to specifications, it may not do so strictly because of some feature not made explicit in the catalog descriptions. The indexes conforming to BLS specifications are based on many fewer observations than the general mail-order indexes and, therefore, their movement is not as smooth. For example, the general index for men's cotton work shirts is based on more than sixty observations in some years; the index for this item conforming to specifications is never based on more than six. In Section II the indexes conforming to specifications will be presented where they seem to have some value, especially where they help to explain differences between our general indexes and the BLS indexes.

Our mail-order indexes do not include sales taxes, though the index for tires includes federal excise taxes. Since the BLS indexes include both sales and excise taxes, this could be a source of minor discrepancies between the two sets of indexes. In general, we would expect indexes including sales taxes to rise somewhat more than those excluding them.

II. THE ITEM INDEXES

This section presents our item indexes for selected nondurable goods and compares them with the most closely corresponding AMS and BLS indexes. The plan of presentation is to begin with the items that have had the smallest changes in technology or style over the period and proceed toward those where changes have been most important. This means that items with similar uses such as men's cotton socks and men's nylon stretch socks will not be discussed together; the first is a stable item and the second a new item during the period.

1. MEN'S COTTON WORK SHIRTS

For this item styles were very stable during the period; several styles appear in the catalogs without change over the whole period. There was also a large number of specific varieties in the catalogs, so that our indexes are based on many observations. The BLS specifications call throughout for cotton chambray shirts in regular sizes (14 to 17 neck), medium heavy weight (3.90 yd./lb., or about 4.5 oz. to the

sq. ft. in the gray). Our index includes heavier chambrays (5.5 oz.), extra large sizes, and several other cotton fabrics such as covert, poplin, twill, and denim (but not flannel).

The movements of the indexes for cotton work shirts are shown in Table 1 and Chart 1. Despite the considerable differences in the definition of the item, the movements of our index and the BLS index are extremely similar, though those of our index have a somewhat larger

TABLE 1.—Men's Cotton Work Shirts
[1947-49=100]

Date	Sears and Ward				BLS	AMS
	All varieties		Conforming varieties			
1947—S ¹	106.4		106.0		105.0	101.5
F ¹	96.8		90.3		100.0	98.3
1948—S.....	99.4	² (10)	102.4	³ (1)	103.4	103.1
F.....	106.6	(32)	111.3	(2)	103.0	105.2
1949—S.....	98.6	(28)	98.6	(2)	97.8	98.8
F.....	92.1	(42)	91.5	(4)	93.3	93.0
1950—S.....	92.1	(45)	92.6	(4)	95.1	94.0
F.....	95.0	(50)	94.8	(4)	96.6	99.4
1951—S.....	104.5	(66)	102.2	(6)	102.5	108.9
F.....	111.6	(68)	110.5	(6)	105.3	106.3
1952—S.....	98.6	(67)	94.7	(6)	100.9	104.2
F.....	97.2	(66)	93.3	(5)	98.1	101.5
1953—S.....	98.1	³ (61)	92.2	³ (5)	96.1	102.0
F.....	99.1	(68)	92.9	(5)	96.4	100.4
1954—S.....	98.9	(65)	92.7	(5)	96.1	101.5
F.....	98.4	(64)	93.5	(5)	92.6	101.5
1955—S.....	97.7	(64)	93.0	(5)	92.1	101.6
F.....	97.3	(69)	92.5	(5)	94.2	102.0
1956—S.....	98.0	(68)	93.3	(4)	95.7	104.7
F.....	105.0	(65)	96.7	(4)	101.7	106.8
1957—S.....	105.9	(61)	98.3	(4)	102.2	110.0
F.....	105.6	(62)	99.0	(4)	102.7	111.1
1958—S.....	105.1	(63)	95.9	(3)	102.9	112.1
F.....	104.8	(64)	94.3	(4)	102.9	112.6
1959—S.....	104.3	(49)	93.9	(4)	101.9	112.6
F.....	104.4	(68)	94.4	(5)	102.6	114.2

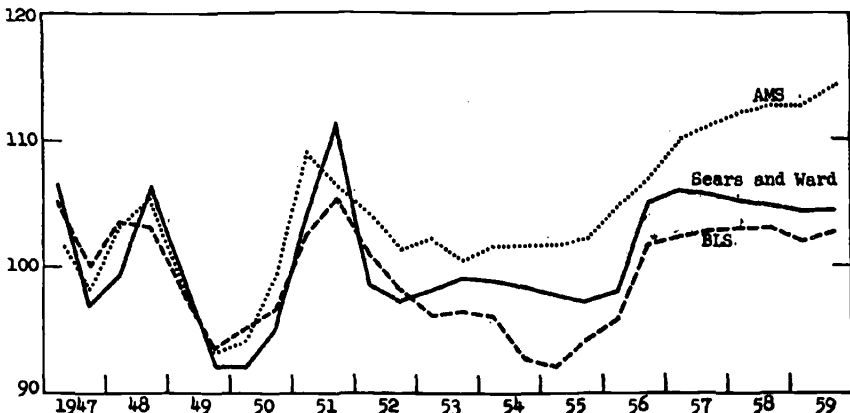
¹ The letters "S" and "F" stand for Spring and Fall. The Spring AMS and BLS data are for March, the Fall for September.

² The numbers in parentheses are the number of observations of price changes between the date shown and the preceding date.

³ Includes number of observations of full year price change where a catalog was missing.

CHART 1

Men's Cotton Work Shirts (1947-49 = 100)



amplitude, especially during the Korean War. The Fall 1959 levels are within 2 index points of each other, and the maximum difference at any time is about 6 points. The AMS index lies close to the other two at most times. After 1956 it shows an upward drift not present in the other two indexes, and by Fall 1959 it is about 10 points higher than the mail-order index. At all times, the level of prices paid by farmers is higher than the mail-order price of any shirt meeting BLS specifications, though below that of the most expensive shirts in the mail-order index. It seems probable that the upward drift in the AMS index in recent years results from a shift toward heavier or more expensive cotton fabrics.

We also computed an index from mail-order data conforming to the BLS specifications; this is shown in Table 1 but not charted. It deviates more from the BLS index than does our general mail-order index. The conforming index drops substantially more than the others from 1951 to 1952, and is at a lower level at almost all later dates. Because of the rather small number of observations behind this index (never more than six) it is probably less reliable than the main mail-order index. For an item like cotton work shirts, where there have been few major changes in the item during the period, the additional observations provided by broadening the range of specifications would seem to be a good (and inexpensive) substitute for a broad sample of outlets in removing random fluctuation from the index.

2. MEN'S COTTON SOCKS

The heading "Men's Cotton Socks," which is used for one of the published BLS item indexes, is broad enough to cover both work socks and dress socks. We have computed separate mail-order indexes, shown in Table 2, for these two kinds of cotton socks. Chart 2 com-

TABLE 2.—Men's Cotton Socks

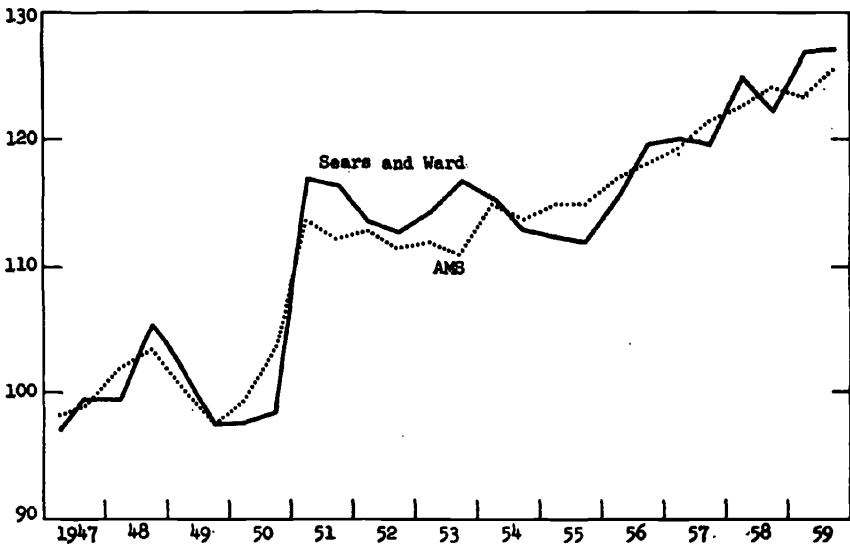
[1947-49=100]

Date	Sears and Ward		BLS	AMS (work)
	Dress	Work		
1947-S	104.7	97.0	102.7	98.1
F	98.5	99.4	103.2	98.9
1948-S	100.3	99.4	100.8	101.9
F	106.3	105.3	100.8	103.3
1949-S	100.1	101.8	95.6	100.4
F	90.1	97.4	96.6	97.4
1950-S	90.4	97.6	96.2	99.3
F	90.9	98.4	98.7	103.3
1951-S	103.0	116.9	105.8	113.7
F	104.2	116.5	107.7	112.2
1952-S	95.3	113.5	107.4	112.6
F	96.1	112.7	104.0	111.5
1953-S	97.0	114.3	103.9	111.9
F	98.3	116.8	104.5	111.1
1954-S	97.4	115.3	106.7	114.8
F	95.1	113.0	105.9	113.7
1955-S	95.3	112.3	105.8	114.8
F	94.9	112.0	106.5	114.8
1956-S	95.6	115.2	108.6	117.0
F	98.0	119.5	109.8	118.1
1957-S	101.1	120.0	110.4	119.3
F	102.6	119.4	108.6	121.5
1958-S	104.6	124.9	108.9	122.6
F	101.5	122.3	108.6	124.1
1959-S	101.2	126.8	108.9	123.3
F	102.9	126.9	109.1	125.6

For notes 1, 2, 3, see Table 1.

CHART 2

Men's Cotton Work Socks (1947-49 = 100)



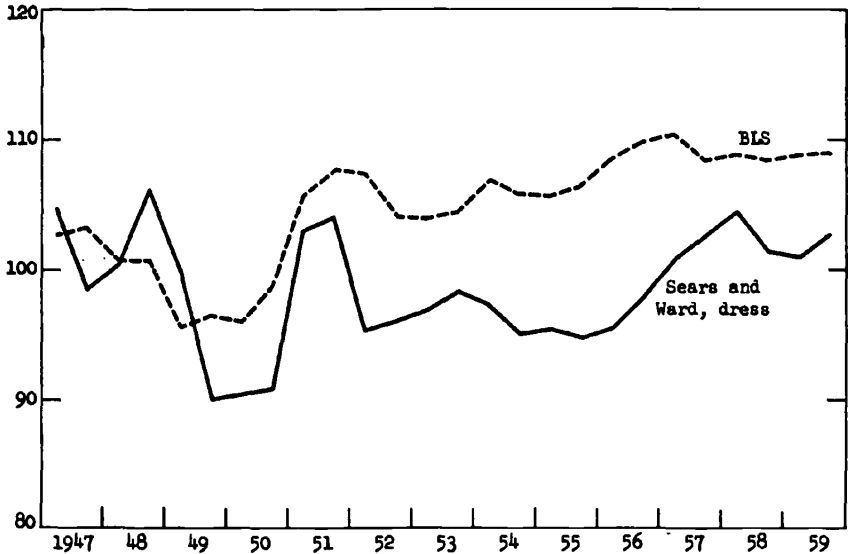
compares our index for cotton work socks with the AMS index for cotton work socks. There is somewhat more fluctuation in our series, but the trends and the major movements of the two series are extremely similar. This close agreement seems to be related to the great stability in the physical characteristics of the item. There are a number of styles for which we have continuous observations covering the entire period. There is also close agreement in the price levels of the AMS and mail-order series. In fall 1959 the average price paid by farmers was 33.3 cents; the average of all the catalog prices was 31.8 cents.

Chart 3 compares our series for dress socks with the BLS series for men's cotton socks. The major difficulty in this comparison is that the BLS series is not confined to dress socks. From 1948 to 1950 the series includes only work socks; for 1950 to 1953 it appears to include both dress and work socks, and for 1953 to 1959 it includes only dress socks. Despite this, the general trend of the BLS series is quite similar to that of our dress sock series. The BLS series is consistently somewhat higher except during the base period. Much of the difference arises after the Korean War, when the BLS series falls less than our dress sock series; this behavior is similar to that of the two series for work socks, and undoubtedly results from the inclusion of work socks in the BLS series at this time. Nevertheless, we have been unable to approximate the BLS series more closely by combining our series for dress socks and work socks, either by averaging or by linking.

A mail-order series following the BLS specifications was constructed, but is of little value. After 1953 it rests largely on a single observation in each period. The principal difficulty in following the

CHART 3

Men's Cotton Socks (1947-49 = 100)



BLS specifications occurs because the BLS specifies two-ply socks. Almost all of the cotton dress socks in the catalogs are four-ply, a few are six-ply. The only two-ply sock is sometimes described as a work sock. Perhaps the BLS prices two-ply cotton dress socks largely in specialized workingmen's stores rather than in department stores and general men's furnishing stores.

The frequent changes in BLS specifications in the early part of the period are somewhat hard to understand for an item such as cotton socks where styles are very stable. For many purposes our dress sock series might be regarded as superior series. The number of observations in this series declines markedly toward the end of the period as cotton socks are increasingly replaced by nylon stretch socks, spun nylon socks, and various blends of natural and synthetic fibers. We discuss one of these newer items, nylon stretch socks, later in this section.

3. MATTRESSES, 54-INCH WIDTH

The price indexes for mattresses are shown in Table 3. Chart 4 compares the BLS, AMS, and mail-order indexes for innerspring mattresses, and Chart 5 compares the AMS and mail-order indexes for felted cotton mattresses. This last item was dropped from the AMS index in the January 1959 revision, but data are available for it through 1959.

The general trend of the three indexes for innerspring mattresses is very similar. The Fall 1959 levels of the BLS and mail-order indexes are only a point apart; the AMS index lies five points lower than the mail-order index. The BLS index shows smaller dips than ours in 1949 and 1955, and is generally more stable. The AMS index rises much less than the other two during the Korean War and in

TABLE 3.—Mattresses, 54-Inch Width
[1947-49=100]

Date	Innerspring construction			Felted cotton	
	Sears and Ward	BLS	AMS	Sears and Ward	AMS
1947—S ¹	107.1	101.1	105.0	107.0	111.4
F ¹	98.5	98.0	99.1	98.1	102.9
1948—S.....	105.6	101.4	100.3	104.5	101.1
F.....	100.9	100.8	101.1	102.5	100.1
1949—S.....	98.3	100.8	98.8	96.6	95.2
F.....	89.6	98.6	95.7	91.3	89.3
1950—S.....	91.8	99.1	96.2	89.8	88.0
F.....	96.8	107.8	101.1	94.5	93.8
1951—S.....	123.4	119.7	112.9	139.1	107.8
F.....	125.1	120.3	113.7	150.9	109.6
1952—S.....	116.6	120.3	113.2	122.8	110.5
F.....	118.6	117.3	112.4	122.8	109.6
1953—S.....	116.1	112.7	110.9	124.4	107.4
F.....	116.0	111.4	110.6	118.9	108.5
1954—S.....	111.5	111.0	109.1	112.7	103.8
F.....	109.7	111.6	110.9	111.2	105.1
1955—S.....	107.2	111.7	109.3	96.7	105.6
F.....	103.4	111.7	110.9	97.8	104.7
1956—S.....	105.4	110.3	109.8	97.8	104.2
F.....	108.2	114.7	111.4	98.0	103.8
1957—S.....	114.5	117.5	112.9	101.8	104.2
F.....	115.0	119.7	114.5	101.8	105.1
1958—S.....	119.8	119.5	112.7	101.8	104.7
F.....	119.2	119.1	113.2	103.6	103.8
1959—S.....	120.9	119.5	113.2	103.6	103.8
F.....	119.2	120.3	114.2	102.8	104.7

For notes 1, 2, and 3, see Table 1.

CHART 4

Mattresses, Innerspring, 54-inch width (1947-49 = 100)

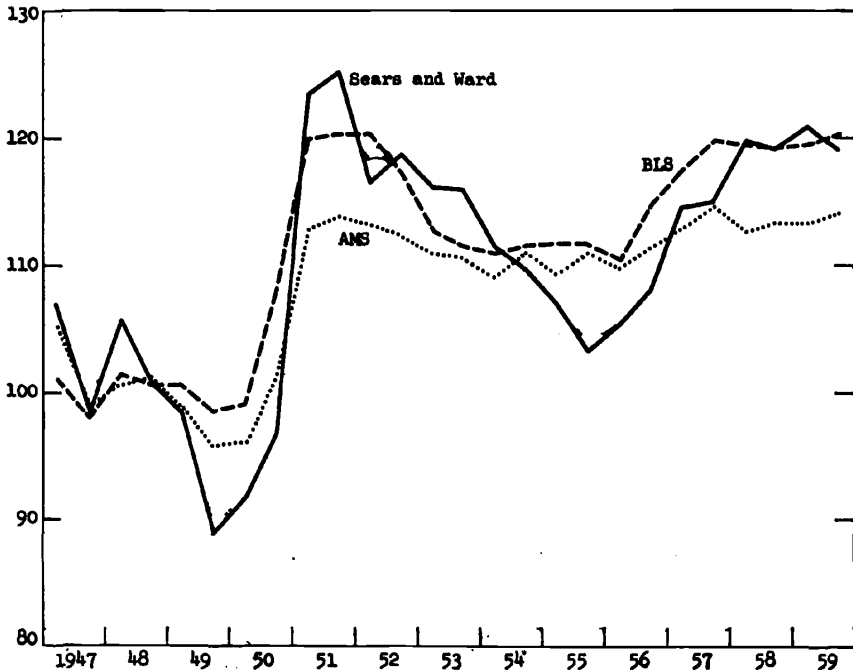
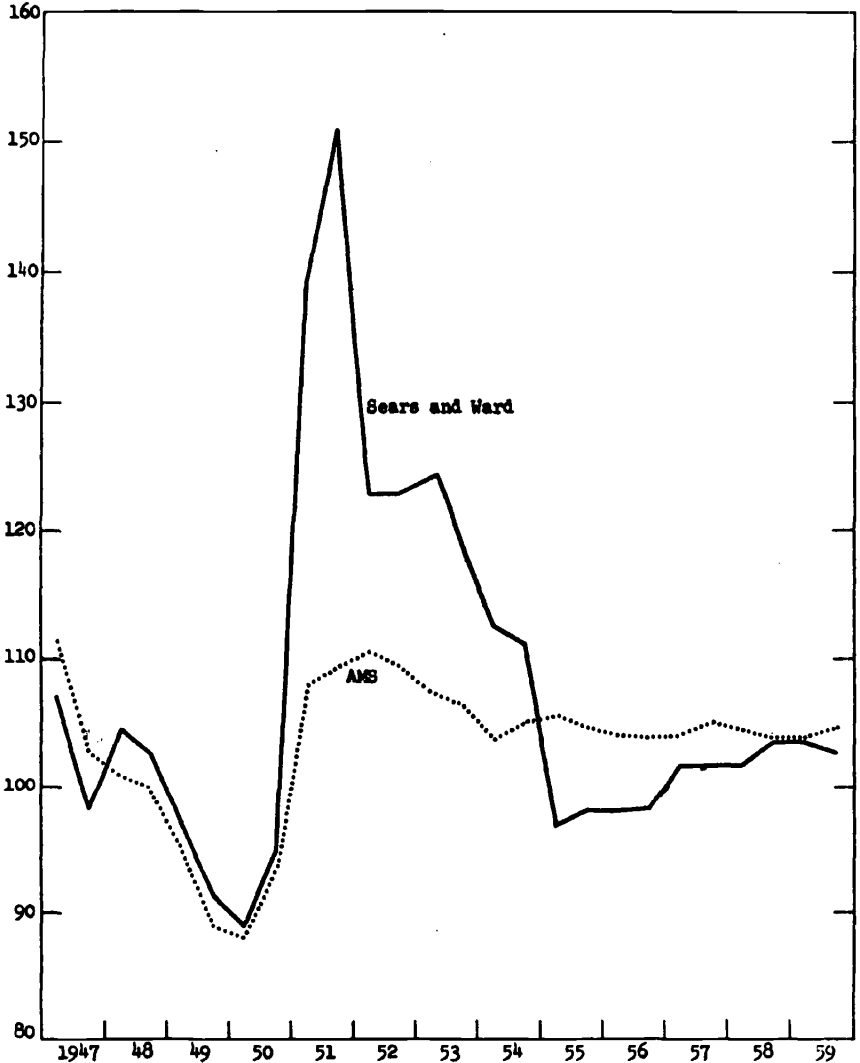


CHART 5

Mattresses, Felted Cotton, 54-inch (1947-49 = 100)



1956-58. It is characteristic of the AMS indexes we have examined that they do not rise as much as the others in the Korean War period, or fall as much afterward. Two possible explanations of this behavior suggest themselves. The AMS outlet sample was confined to independent stores until 1953, and perhaps independent stores in small communities were able to sell off old stock acquired at lower costs without taking more than a normal markup. A more probable explanation is that farmers, confronted with very sharply rising prices for many items, responded in part by trading down—that is, by shifting to lower qualities. The fall of prices a few years later would

then be accompanied by a return to the more usual qualities. Such behavior could have contributed to the rise of the parity ratio in 1951 if corresponding effects were smaller on the side of prices received, either because commodities were specified more narrowly or because there was less possibility of year-to-year quality variation.

We prepared an index of innerspring mattresses from Sears and Ward data following the BLS specifications, but have not presented it here. It is similar to the general mail-order index, but falls more sharply from 1952 to 1954, and rises more from 1956 to 1958. Much of the time this index is based on only one observation, and at one point no observations meet the specifications completely. The principal quality change in innerspring mattresses over the period was a gradual increase in the number of coils. This increase is reflected in the BLS specifications, but with a lag, so that just before each change in specifications it becomes very difficult to get observations for mattresses that otherwise met the specification with as few coils as the maximum permitted by BLS. In Spring 1954, when the permitted range was 209-231 coils, there was only one item in the two catalogs that met the specification, and for this we could get no price change observation from Fall 1953.

Our series for felted cotton mattresses is very close to the AMS index as a measure of change over the whole period, but differs widely in intervening movement. The failure of the AMS index to rise as much as mail-order prices during the Korean War noted in the discussion of innerspring mattresses, appears in an exaggerated form in the series for felted cotton mattresses. The sharp rise in the mail-order prices of felted cotton mattresses is undoubtedly due in part to the rise in the wholesale price of raw cotton, which reached 136 percent of its 1947-49 average in the Spring of 1951. Raw cotton is a more important component of cost for these mattresses than for most cotton products. However, we do not know why the mail-order prices of felted cotton mattresses should have risen more than the price of raw cotton.

The other major difference between the series shown in Chart 5 is the drop in our index from Fall 1954 to Spring 1955, which does not appear in the AMS index. Since our index rests on only two observations at this point, it may well be in error. Both houses seem to have made sweeping changes in the specific items in their lines at this time. The average of the mail-order prices in Fall 1959 was \$26.65, somewhat higher than the average price paid by farmers, \$23.20.

In general, mattresses of all felted cotton are considerably cheaper than the innerspring mattresses, though the most expensive of them cost more than the least expensive innersprings. The average price paid by farmers for innerspring mattresses in September 1959 was \$43.10, almost \$20.00 more than the average for felted cotton. It seems probable that the latter are bought by low-income groups and might have to be included in a pricing program for either urban or rural areas if a special price index for low-income groups were to be constructed. It is interesting to note that the price rise for felted cotton mattresses is less than that for innersprings according to both the AMS indexes and ours. This contrasts with the findings for food reported in Staff Paper No. 7, where the items with negative income elasticities tended to have larger than average price rises. The

effect of rising incomes on mattress purchases seems to have a more important quality than quantity dimension. Between 1924-29 and 1955, the quantity weight for mattresses in the index of prices paid by farmers actually fell. However, felted cotton mattresses had the full weight in 1924-29, about half the weight in 1937-41, and none of it in 1955.⁸ The same phenomenon can be seen very clearly in the budget studies for urban consumers. In large cities in the West in 1950, the average price paid for mattresses was under \$20.00 for families with incomes under \$2,000, and rose to \$73.61 for families with incomes of \$10,000 and over; the quantity purchased remained quite constant over the income range at 0.1 to 0.2.⁹ The mattresses in the catalogs in 1950 that met the BLS specifications ranged in price from \$25.95 to \$29.95 in the Spring, and \$26.95 to \$32.95 in the Fall. This corresponds roughly to the average price paid for mattresses in large cities in the West in the income range of \$2,000 to \$5,000. Since the average city wage and clerical worker family had an income in this range in 1950, the BLS seemed to be specifying an item at this date that was appropriate to the group it sought to represent.

During the period covered by this paper, foam rubber mattresses began to appear in the mail-order catalogs, at prices typically higher than the highest priced innerspring mattresses carried by mail-order houses. We could not construct a price series for foam rubber mattresses, because they were too often sold only in combination with a box spring.

4. RUGS AND CARPETS, WOOL AND WOOL-RAYON BLENDS

Both AMS and BLS price Axminster rugs; BLS prices broadloom carpets in addition. The two BLS series are labeled "rugs, wool Axminster" and carpets, wool broadloom" in the bulletins that present the item indexes. However, the rug series has included a 50-percent wool, 50-percent rayon blend pile as an alternate specification since 1953, and the carpet series included a 50-percent wool, 50-percent rayon blend pile as an alternate specification for 1951-58. Broadloom carpet was deleted from the CPI in December 1947 and not restored until March 1953. However, it was retained for test pricing and the published item indexes are continuous.

Table 4 presents our series for rugs and carpets together with the BLS and AMS series. The series for carpets are shown in Chart 6. The mail-order series rises more during the Korean War and remains above the BLS series thereafter, the difference narrowing gradually to about 8 points by the end of the period (the vertical scale of Charts 6 and 7 is twice that of our other charts because of the large price rise in these items in 1950-51). Except for this difference in level, the two series are remarkably similar after 1952, even in their small movements. The difference between the two series at the peak in 1951 is somewhat exaggerated by the lack of precise correspondence in timing. The peak quarterly level of the BLS index is 146.0 in June 1951; this date is of course not included in the series as we present it in Table 4.

⁸ See *Agricultural Economics Research*, April-July 1959, p. 62.

⁹ *Study of Consumer Expenditures, Incomes, and Savings, Urban U.S., 1950*, Vol. XIII, p. 107, University of Pennsylvania, 1957. When we use data from the 1950 survey of consumer expenditures, we will use the data for large cities in the West, since our price data come from this region, and the CPI is heavily weighted by large cities. The survey data of interest to us are not averaged over all cities and regions.

TABLE 4.—Rugs and Carpets, Wool and Wool-Rayon Blends

[1947-49=100]

Date	Carpets, broadloom		Axminster rug, 9 x 12 ft.		
	Sears and Wards	BLS	Sears and Ward	BLS	AMS
1947—S ¹ -----	95.9		95.9		95.1
F ¹ -----	92.9	² (7)	93.5	² (6)	98.0
1948—S-----	99.4	³ (8)	99.7	³ (5)	99.4
F-----	101.8	(8)	101.3	(5)	103.8
1949—S-----	108.6	(9)	107.2	(8)	102.5
F-----	101.5	(11)	102.9	(10)	98.6
1950—S-----	103.7	(11)	103.8	(9)	99.2
F-----	112.9	(18)	119.2	(13)	109.8
1951—S-----	155.6	(13)	142.5	(10)	126.2
F-----	177.5	(10)	126.7	(9)	132.2
1952—S-----	140.9	(9)	120.4	(6)	129.5
F-----	127.9	(11)	114.4	(7)	125.0
1953—S-----	130.6	³ (11)	118.1	³ (6)	123.4
F-----	132.7	(7)	117.8	(3)	120.8
1954—S-----	130.7	(15)	113.1	(7)	116.4
F-----	126.0	(16)	111.6	(7)	118.6
1955—S-----	124.4	(11)	113.6	(4)	117.9
F-----	128.0	(16)	114.8	(8)	117.6
1956—S-----	129.0	(17)	119.5	(7)	118.2
F-----	133.0	(17)	118.0	(7)	118.7
1957—S-----	139.0	(15)	123.3	(6)	119.0
F-----	134.2	(11)	126.8	(4)	116.8
1958—S-----	134.2	(10)	127.8	(4)	114.8
F-----	132.6	(7)	123.6	(4)	112.0
1959—S-----	134.2	(6)	125.2	(3)	109.4
F-----	135.0	(7)	128.5	(3)	108.2

For notes 1, 2, 3, see Table 1.

CHART 6

Carpets, Broadloom (1947-49 = 100)

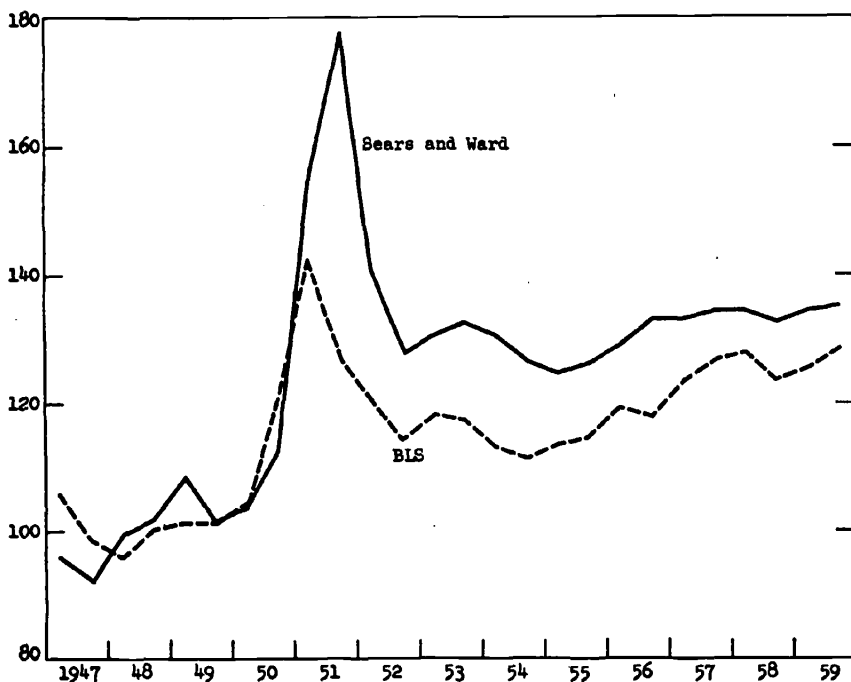
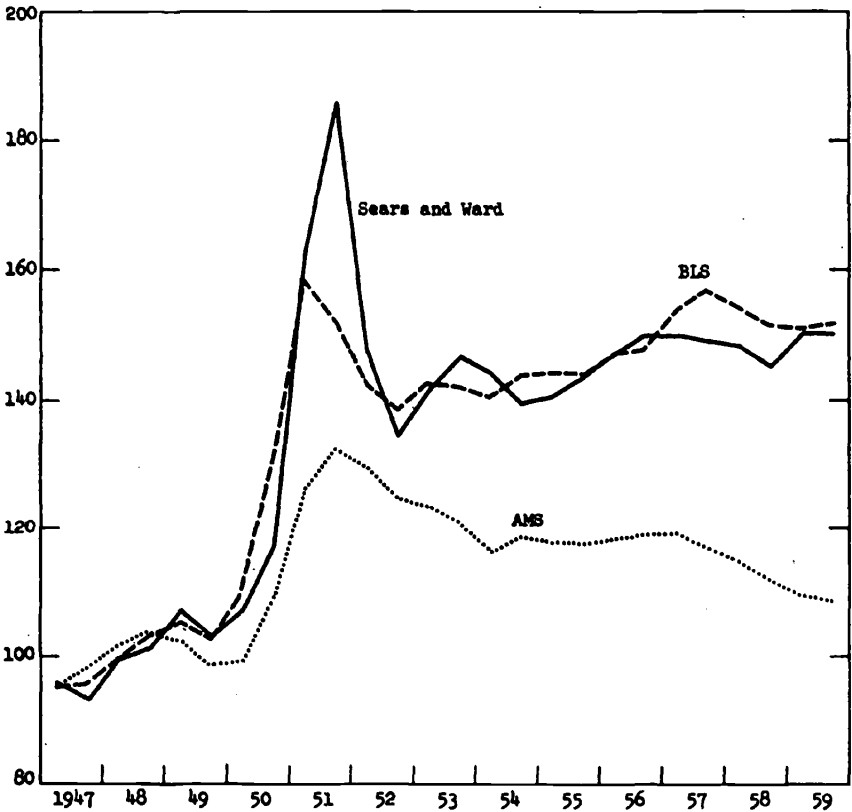


CHART 7

Rugs, Axminster, 9 x 12 (1947-49 = 100)



There is a BLS series for rayon broadloom carpeting beginning December 1952 and ending in 1960. In 1960 this was replaced by a series on nylon broadloom carpeting. The September 1959 level of the index for rayon carpeting was 87.6 on a December 1952 base, although the price of wool and wool blend carpeting had been rising over this period. We collected data for rayon and nylon carpeting, but did not have enough observations to construct an index for either item. We were also unable to construct an index for wool carpeting meeting BLS specifications.

In the case of wool Axminster rugs, our index is again very close to the BLS index (Chart 7). The chart again overstates the difference between the 1951 peaks; the BLS index stood at 162.0 in June 1951. The agreement in level after 1952 is closer than in the case of carpets, though the agreement in movement is not quite as close. The AMS index follows a completely different course from the other two indexes. It rises less than half as much in 1950-51, and falls almost continuously thereafter, ending more than 40 points below the other indexes. The reason for this behavior is not hard to find. The AMS specification is simply "rug, 9' x 12', Axminster, seamless" with nothing at all said about the pile fiber. It seems highly probable that the

respondents to the AMS inquiries were reporting the prices of all-wool Axminster rugs before 1951, and thereafter began to report wool-rayon blends with increasing frequency. This inference is supported by comparing the levels of the AMS average prices with the catalog prices. In Fall 1950 the average price paid by farmers for an Axminster rug was \$75.2. This is roughly in the middle of the price range for all-wool rugs in the catalogs; the average catalog price is \$78.67 and the range is from \$49.95 to \$123.00. In Fall 1959 the average price paid by farmers was slightly lower than it had been nine years before—\$73.8. The lowest priced 9'×12' all-wool Axminster in the catalogs was \$99.00. However, a wool-rayon blend 9'×12' Axminster was offered for \$78.00.

A price series that makes direct comparisons between all-wool rugs and wool-rayon blends does not seem very useful, since neither the costs of production nor the satisfactions offered to consumers would be similar for the two items. The blend might be just as satisfactory at first, but would surely not wear as long. This seems to be a case in which the looseness of AMS specifications deprives the series of any meaning. Nor can it be argued that specification of fiber content would be impossible in a mail survey; respondents would surely be able to state whether they were reporting the price of all-wool rugs or of blends.

We constructed an index for Axminster rugs that comes closer to meeting the BLS specifications than the main mail-order series, but have not shown it here. This series is confined throughout to rugs with 4,700 tufts or fewer per square foot. It is at a slightly higher level than the main mail-order series after 1952; its Fall 1959 level is 158.7. Otherwise, the two series are very similar. At a number of points the series just described is based on only one observation per period. Our inability to follow BLS specifications for rugs at all precisely arises from difficulties similar to those encountered in the case of innerspring mattresses. There is an increase in 1956 in the number of rows to the inch called for in the specifications from $4\frac{2}{3}$ to $5\frac{2}{3}$ (from approximately 3,000 to approximately 4,600 tufts). It is only by slightly exceeding the limit set in 1956 during the whole period that we can assemble enough quotations to make a continuous index.

5. WOMEN'S RAYON AND NYLON PANTIES

Both AMS and BLS collect data for women's rayon panties. We have prepared mail-order indexes for this item, and in addition for women's nylon panties and for rayon and nylon combined (Table 5 and Charts 8 and 9).

Let us consider first the three indexes for rayon panties shown in Chart 8. Except in 1947-48, there is extremely close agreement between the AMS index and the mail-order index based on a full range of styles. They never differ by more than 4 points after 1948, and seldom by more than 2. However, the BLS index lies consistently above the other two after 1947; the difference becomes substantial in 1951-52 because the BLS index never falls appreciably below the level reached in Spring 1951.

The divergence of the BLS index from the other two is not explained by the mail-order index conforming to BLS specifications. This index could be prepared with little difficulty and is never based

TABLE 5.—Women's Rayon and Nylon Panties

Date	Rayon (1947-49=100)				Nylon, Sears and Ward (Fall 1948=100)	Rayon and nylon, Sears and Ward (1947-49=100)
	Sears and Ward		BLS	AMS		
	All varieties	Conforming varieties				
1947-S ¹	111.4	104.0	99.4	112.6		111.4
F ¹	96.2 ² (13)	95.3 ³ (3)	100.5	102.5		⁴ 96.2
1948-S.....	101.7 ² (37)	106.5 ³ (5)	103.4	102.4		101.7
F.....	104.8 (41)	109.0 (5)	106.4	100.3	100.0	104.8
1949-S.....	97.0 (37)	98.4 (5)	102.0	93.8	90.3 ² (2)	96.9
F.....	88.9 (45)	86.8 (6)	90.7	88.3	85.2 (6)	89.1
1950-S.....	88.7 (40)	87.3 (6)	90.7	85.9	79.2 (10)	87.8
F.....	89.8 (47)	87.3 (3)	95.1	91.0	85.1 (8)	89.6
1951-S.....	98.3 (55)	95.2 (4)	100.4	97.2	90.0 (7)	97.8
F.....	95.7 (66)	95.8 (4)	100.7	94.0	84.1 (7)	94.9
1952-S.....	92.4 (61)	92.4 (6)	100.3	90.1	76.8 (8)	91.1
F.....	90.0 (64)	87.8 (7)	99.7	87.6	73.6 (18)	88.4
1953-S.....	89.8 ³ (51)	87.3 ³ (6)	100.1	86.7	74.0 ³ (20)	88.4
F.....	90.3 (51)	87.6 (6)	101.0	86.4	72.6 (25)	88.2
1954-S.....	89.9 (47)	86.5 (6)	100.4	87.2	70.2 (22)	87.1
F.....	89.1 (55)	86.8 (5)	99.3	87.2	63.6 (20)	84.3
1955-S.....	89.1 (63)	86.8 (6)	98.8	87.1	62.1 (26)	83.7
F.....	88.2 (64)	86.4 (6)	98.1	87.6	59.8 (16)	82.4
1956-S.....	88.8 (50)	86.4 (6)	98.3	87.1	58.9 (26)	82.5
F.....	89.8 (48)	87.2 (6)	99.6	87.5	57.8 (23)	82.7
1957-S.....	87.4 (51)	85.5 (6)	99.2	87.6	57.6 (14)	80.9
F.....	87.4 (41)	85.5 (4)	99.0	87.8	57.6 (20)	80.3
1958-S.....	88.6 (53)	89.9 (6)	99.9	87.2	56.1 (25)	81.0
F.....	86.7 (47)	87.7 (5)	99.8	87.1	54.5 (20)	79.2
1959-S.....	86.2 (47)	91.7 (5)	100.0	88.6	54.2 (17)	78.8
F.....	87.1 (44)	92.9 (5)	97.7	89.8	87.0 (19)	80.6

For notes 1, 2, 3, see Table 1.

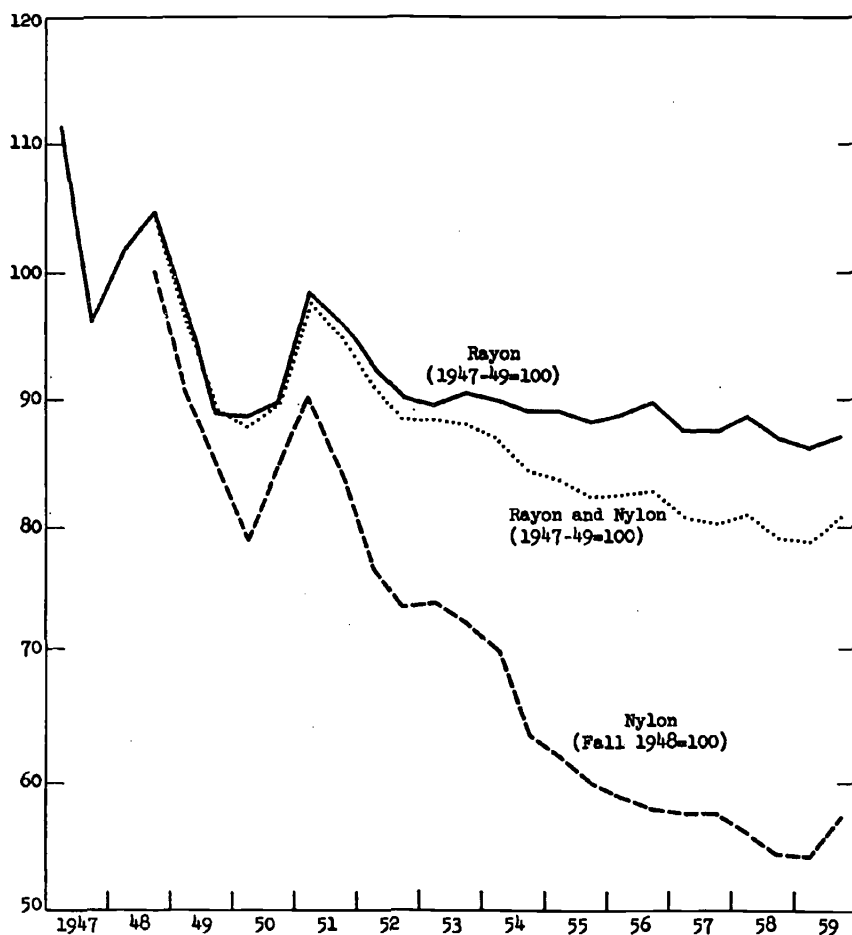
⁴ The number of observations for this column is the sum of the numbers for columns 1 and 5.

on fewer than three observations per period. It is shown in Table 5, but not charted. It is confined to untrimmed styles and, before 1952, is based on flare-leg and band-leg styles, excluding briefs. For 1952 and later, it is based only on briefs. The main mail-order index includes all styles at all times. From its peak in 1951 to Spring 1953 the conforming mail-order index falls almost as much as the all-items index. Its behavior is like that of the AMS series rather than the BLS series. It should also be noted that in the mail-order indexes, the declines are not averages of highly divergent movements in which the price reductions happen to outweigh the advances. Rather, a substantial decline takes place in the price of almost every style considered individually. We are unable to explain the failure of the BLS index to reflect this decline.

Chart 9 compares the movement of the main mail-order series for rayon panties with those for nylon and for nylon and rayon combined. Nylon panties first appear in the catalogs in Fall 1948, and thereafter gradually represent an increasing proportion of the items offered. By 1953, we have about half as many observations for nylon as for rayon, a proportion that holds roughly constant thereafter. The absolute price level of nylon panties is always higher. In Fall 1959 the range of Sears' price is \$0.333 to \$1.35 for rayon, and \$0.84 to \$1.65 for nylon. Only 2 of 29 rayon styles were above \$1.00; only one of 13 nylon styles was below \$1.00. However, the price of nylon panties fell markedly relative to rayon, as shown by the chart. This relative fall is large enough to pull the index for nylon and rayon combined substantially below the index for rayon alone.

CHART 8

Women's Rayon and Nylon Panties
(Sears and Wards)



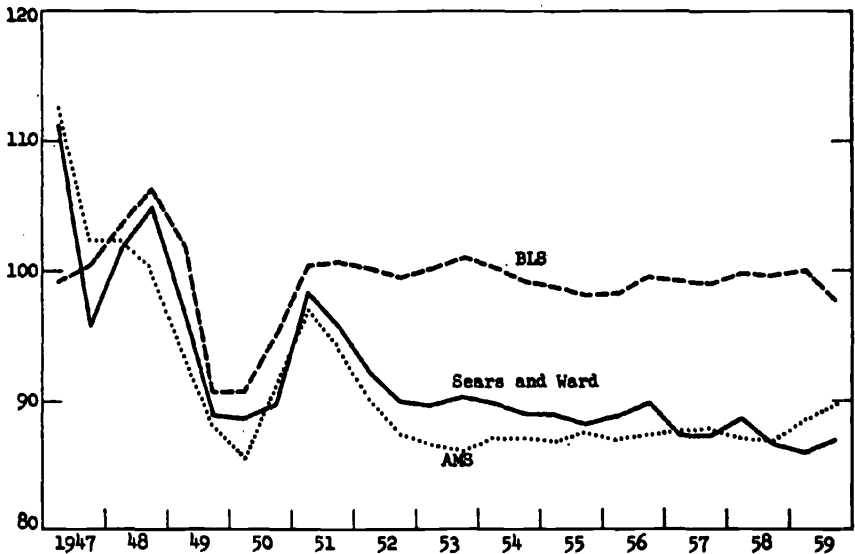
As early as 1950, nylon panties accounted for a substantial portion of expenditures on panties of all fabrics, especially in the higher-income classes. In the income class \$4,000 to \$5,000 the expenditure on nylon panties for women and girls 16 and over was roughly one-third that on rayon panties; thus in large cities in the West it was \$2.25 for rayon and \$0.76 for nylon. In the South, the proportion of nylon was somewhat higher and in the North somewhat lower.¹⁰ It should be remembered that these data were not tabulated until long after 1950.

It can be argued that by ignoring the growing importance of nylon panties, BLS understated the price decline for panties in general over the period. This argument would not be valid, however, if the BLS adequately represented the introduction of nylon in its other series for women's underclothing. Current specifications call for nylon

¹⁰ *Survey of Consumer Expenditures, 1950, Vol. XIV, pp. 151-224.*

CHART 9

Women's Rayon Panties
(1947-49 = 100)



slips and nightgowns; the titles of these item indexes in earlier BLS bulletins suggest that the nightgown was changed from rayon to nylon quite recently, and that for the slip nylon and rayon shared the weight until recently.

6. MEN'S SWEATERS

AMS does not price men's sweaters; BLS prices men's wool coat sweaters. From the catalogs, we have priced a full range of styles of men's wool and orlon sweaters. The indexes for this item are shown in Table 6 and Chart 10. Since BLS does not price sweaters in the Spring, the data are for Fall of each year.

Our main mail-order index for wool sweaters includes pullover, sleeveless sweaters, coat sweaters with zippers or with collars, and stout sizes. The BLS index is confined to 5- or 6-button coat sweaters in regular sizes, for most of the period collarless. This difference in the coverage of styles produces a substantial divergence in the indexes; our main index falls substantially more than the BLS index after the Korean War and remains below thereafter. Our index conforming to the BLS specifications is somewhat more volatile in its movements than the BLS index because of the thinness of the sample, but its general trend is close to that of the BLS index. This seems to be a case in which the BLS has specified a particular style whose price movements are noticeably different from those of the item as a whole. Although the collarless coat sweater may well be the single style most often bought by workingmen, the large number of styles available suggests that no one can represent more than some fairly small fraction of the total market.

In Fall 1950, each house had one sweater that met the BLS specifications; both were priced at \$3.94. This is a lower price than the

TABLE 6.—Men's Wool and Orlon Sweaters

[Fall of each year]

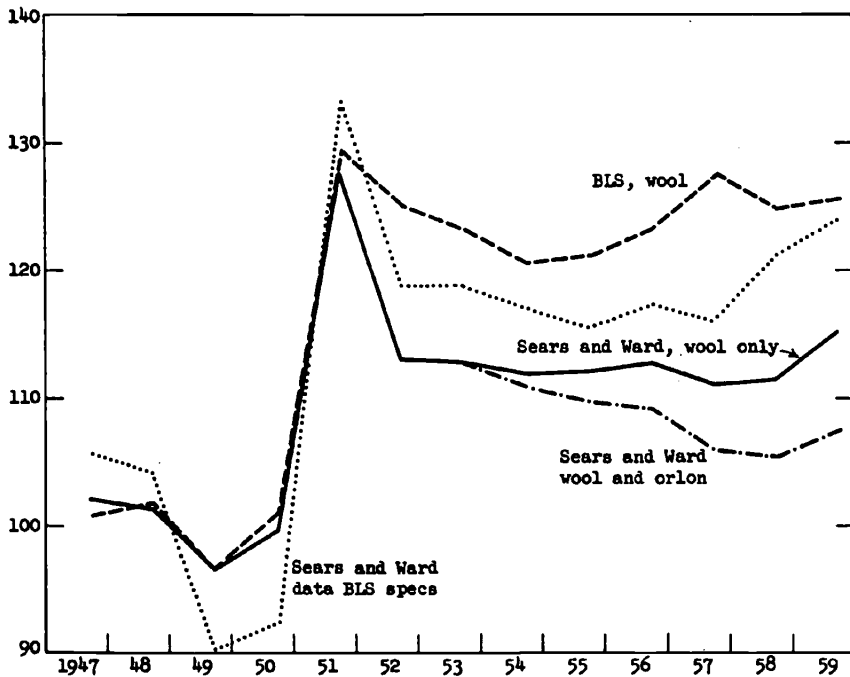
Date	Sears and Ward				BLS, wool (1947-49=100)
	Wool (1947-49=100)		Orlon (1953=100)	Wool and orlon (1947- 49=100)	
	All varieties	Conforming varieties			
1947.....	102.1	105.6		102.1	100.7
1948.....	101.4 ¹ (15)	104.3 ¹ (4)		² 101.4	101.7
1949.....	96.6 (19)	90.1 (2)		96.6	96.6
1950.....	99.6 (17)	92.4 (2)		99.6	101.2
1951.....	127.7 (13)	133.2 (2)		127.7	129.3
1952.....	113.0 (20)	118.7 (2)		113.0	124.9
1953.....	112.9 (21)	118.8 (4)	100.0	112.9	123.3
1954.....	112.1 (22)	117.3 (4)	87.4 ¹ (2)	111.0	120.7
1955.....	112.2 (25)	115.8 (3)	77.0 (3)	109.7	121.2
1956.....	112.8 (23)	117.4 (3)	74.8 (8)	109.3	123.2
1957.....	111.2 (21)	116.2 (3)	69.8 (9)	106.0	127.5
1958.....	111.5 (22)	121.5 (1)	68.7 (13)	105.6	125.0
1959.....	115.0 (15)	124.2 (1)	69.0 (15)	107.5	125.6

¹ Numbers in parentheses are number of price change observations between the year shown and the preceding year.

² The number of observations for this column is the sum of the number for cols. 1 and 3.

CHART 10

Men's Sweaters (1947-49 = 100)
(Fall of each year)



average price paid in 1950 by men and boys 16 and over for wool sweaters in any income or city size class in the West. The average price paid in large cities at incomes of \$4,000-\$5,000 was \$8.13.¹¹ The low price of the sweaters meeting specifications is due to a change in the specifications in 1949 from flat knit to rib knit. Some of the flat knit sweaters meeting the 1948 specifications sold in 1950 at about the average prices paid by consumers in western cities. In 1951 the specification was again revised to permit a knit other than rib (interlock knit) as an alternate specification.

Beginning in 1953, orlon sweaters and wool-orlon blends appear in the catalogs. After 1954, these include coat sweaters that would meet BLS specifications except for the fiber. Our index for orlon sweaters is shown in Table 6, but not charted. The price of orlon sweaters falls 31 percent from 1953 to 1959, a period in which the price of wool sweaters was stable or slightly rising. The absolute price level of orlon sweaters was generally above that of corresponding wool sweaters until the end of the period; however, they have certain advantages that enabled them to increase their share of the market. In particular, they are mothproof and do not need to be blocked after washing. The number of price change observations for orlon sweaters gradually increased after 1953, while the number for all wool tended to decrease, so that by 1959 the two fibers were equally represented. When we combine the observations for wool and orlon, we get an index that lies seven points below our main all-wool index by 1959, and 18 points below the BLS index for all-wool coat sweaters.

As in the case of women's nylon panties, it can be argued that BLS makes no error in not reflecting the introduction of orlon in men's sweaters provided that orlon is adequately represented in some appropriate total. However, we have found no evidence of any introduction of orlon in men's clothing prior to September 1959, when specifications were issued for suburban coats and jackets that could (but need not) have orlon pile linings. According to the mail-order catalogs, orlon and orlon blends were also being used in such men's items as socks, long-sleeved sport shirts, robes, and suits. The case of girls' orlon sweaters will be considered next.

7. GIRLS' SWEATERS

Girls' sweaters have not been priced by AMS; they have been priced by BLS each Fall since 1952. The item index begins with December 1952, and the item was included in the CPI beginning in January 1953. The prices referred to wool cardigans until the Fall of 1954, although the published item indexes are called "girls' orlon sweaters" throughout in recent BLS bulletins.

Table 7 and Chart 11 compare our mail-order indexes with the BLS index.

The transition from wool to orlon for girls' sweaters was amazingly swift and complete. In 1952 there were no girls' orlon sweaters in the catalogs; by 1956 there were no wool sweaters left except for matched sets and athletic award sweaters, which we did not price. The method of handling this transition differs in the three indexes. Our main mail-order index includes only wool until 1953, both wool and orlon in 1953-55, and only orlon after 1955. The orlon sweaters

¹¹ *Survey of Consumer Expenditures, 1950, vol. XV, p. 181.*

TABLE 7.—*Girl's Wool and Orlon Sweaters*¹

[Fall of each year]

Year	Sears and Ward (Fall 1952=100)		BLS, cardigans (December 1952=100)
	All vari- eties	Conforming varieties	
1952.....	100.0	100.0	-----
1953.....	100.0	100.0	100.6
1954.....	97.1	100.0	99.8
1955.....	96.9	99.0	91.1
1956.....	83.1	96.4	89.5
1957.....	83.1	96.0	85.4
1958.....	84.4	93.5	82.6
1959.....	84.1	94.8	81.5

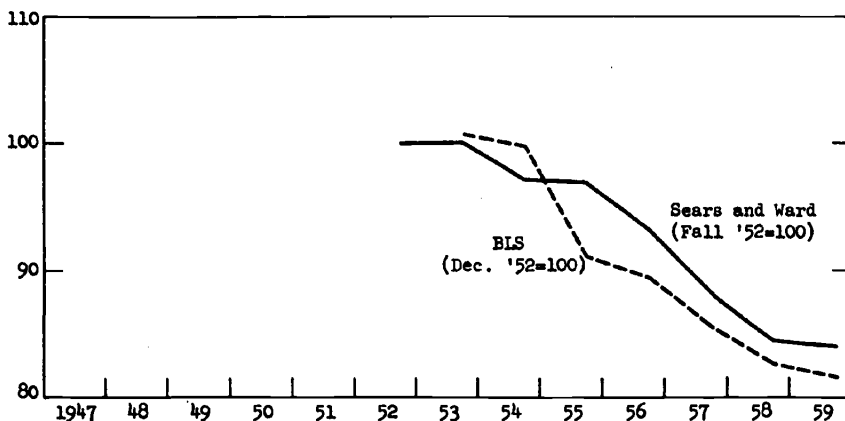
¹ For the timing of changes from wool to orlon, see text.

² See note 1 to Table 6.

For notes 1 and 2, see Table 1.

CHART 11

Girl's Sweaters, Wool and Orlon
(Fall of each year)



are linked in, so that direct price comparisons between wool and orlon are never made. In the index of items conforming to BLS specifications, we link in orlon when the BLS specifications change in Fall 1954. This means we use 1954-55 as our first price change observation for orlon, rather than 1953-54 as in the main series. For the 1953-54 price change, seven of the observations in the main mail-order series refer to wool and two to orlon; for 1954-55 seven refer to wool and four to orlon. For the cities included in the item indexes, BLS made the transition from wool to orlon in December 1954, the second pricing of the orlon specification.¹² Thus the introduction of orlon does not affect the 1954 BLS figure shown in Table 7, which is for September. The BLS transition was made not by linking, but by a direct comparison of the prices of comparable orlon and wool sweaters.¹³ Had we used the same method, we would have gotten a

¹² This and some of the other information on BLS procedures above is based on a letter to Don A. Proudfoot, Jr., from Arnold E. Chase, Chief, Division of Prices and Cost of Living, August 8, 1960.

¹³ Letter to George J. Stigler from Sidney A. Jaffe, Assistant Chief, Division of Prices and Cost of Living, September 16, 1960.

result very different from that in any of the indexes shown in the table, for in the Fall of 1954 the catalog prices of girls' orlon sweaters were still above those of the most nearly comparable wool sweaters. Perhaps this is because the mail-order houses carried wool sweaters of lower than average quality.

Considering the sharply different ways in which they handle the principal problem, the indexes shown stay very close to one another. The deviant is our index for comparable items. This is confined to classic (untrimmed) cardigans, while the main mail-order index includes pullovers, shrugs, trimmed cardigans, and other cardigan styles, such as cardigans with brass buttons or with collars. We cannot be certain that the prices of classic cardigans fell less than those of other styles; with so few observations in the conforming index, its stability could be due to chance factors.

Girls' orlon sweaters are clearly a case in which BLS responded promptly and effectively to a change in the nature of the goods on the market. A cynic might add that this change was so sudden and drastic that it had little choice.

8. MEN'S NYLON STRETCH SOCKS

Nylon stretch socks were introduced into the CPI in June 1956; they have not been priced by AMS. They first appeared in the mail-order catalogs in Spring 1953. Table 8 and Chart 12 show the price history of this item.

The BLS specifications include only solid color rib knit socks without clocking. Our main series includes flat knit socks and socks with patterns and clocking. To get the series conforming with BLS specifications, we have followed the 1956 specifications during the period before they were issued. The number of price change observations in the main series is often substantially less than the total number of varieties in the catalogs, since the patterned socks often appear in one catalog only. Nevertheless, the number of observations increases rapidly from 1953 to 1955; after Spring 1955, it is only slightly lower than for men's cotton dress socks, with which nylon stretch socks are largely competitive, and for some periods it is higher.

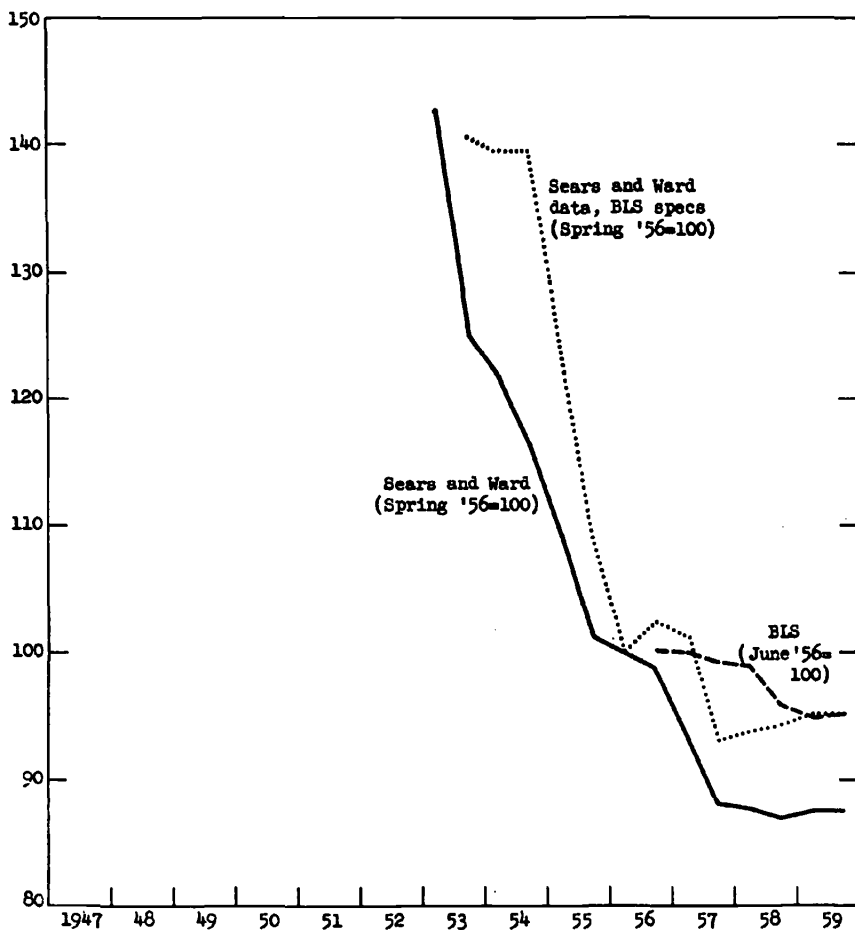
The BLS series and our conforming series have exactly the same overall decline from their 1956 base date to Fall 1959, though the

TABLE 8.—Men's Nylon Stretch Socks

Date		Sears and Ward (Spring 1956=100)		BLS (June 1956=100)
		All varieties	Conforming varieties	
1953	S	142.6	140.5	
	S	125.1	140.5	
	F	121.7	139.5	
1954	S	115.9	139.5	
	S	109.4	123.6	
	F	101.2	109.4	
1955	S	100.0	100.0	
	S	98.7	102.3	100.2
	F	93.2	101.2	100.1
1957	S	88.2	93.0	99.3
	S	87.8	93.8	99.0
	F	87.0	94.2	95.8
1959	S	87.3	95.1	95.0
	F	87.3	95.1	95.1

For notes 1 and 2, see Table 1.

CHART 12
Men's Nylon Stretch Socks



time paths are somewhat different. The more erratic movement of our conforming series is undoubtedly related to the small number of observations underlying it. The mail-order series for all varieties falls substantially more than the other two series in 1956-57, suggesting that the price of the simpler styles stabilized before that of patterned socks. The most striking feature of the two mail-order series is, of course, the very sharp decline in prices before 1956; that is, before the item was included in the CPI. For the more inclusive series, the decline is almost 30 percent from Spring 1953 to Spring 1956; for the rest of the period it is only 13 percent. The contrast is even sharper for the conforming series. The largest fall in the main series rests on a single observation. However, the general magnitude of the fall is confirmed by the conforming series, where the number of observations is somewhat larger for the periods of greatest price decline.

With the advantage of hindsight, one can say that the BLS should have included nylon stretch socks in the CPI earlier than it did, so as to catch more of the price decline. However, at the time the price was falling most rapidly, the item may not have seemed important enough to include. A more extensive discussion of the issues raised by cases of this kind will be reserved for Section III.

9. BLANKETS: WOOL, ORLON, AND ACRILAN

Blankets are another item for which BLS collects prices and AMS does not. The BLS series and several mail-order series are shown in Table 9 and Chart 13. Blanket prices are collected by BLS only in Fall and Winter, so that the comparisons are confined to one observation per year.

The published BLS item index is still called "blankets, wool," although in September 1958 the specifications were broadened to permit the pricing of acrilan blankets in any outlet at the discretion of the agent. Direct price comparisons are not made between wool and acrilan. The inclusion of acrilan does not affect the movement of the BLS index from September 1957 to September 1958; the first effects appear in the movement for the last year shown here, 1958 to 1959.

The first column of Table 9 shows our basic mail-order series for wool blankets. This covers a range of sizes and weights from 66 x 84 inches (a single bed size) to 108 x 90 and from 2¾ to 6 pounds. It includes both solid colors and plaids or other patterns, and blankets bound on two and on four sides. Of course, in every price comparison these features are the same at both dates. Except in 1946, the BLS series is confined to solid color blankets bound on two ends. At any one time, a rather narrow range of weights is specified (e.g., 3¾ to 4¼ pounds) and at most times a particular size. After 1956, two different sizes meet the BLS specifications, 72 x 90 and 80 x 90.

The main difference between our series for wool blankets and the BLS series is the sharper rise in ours in 1950-51. This difference

TABLE 9.—Blankets: Wool, Orlon, and Acrilan

[Fall of each year: 1947-49=100 except as noted]

Year	Sears and Ward				BLS, wool and acrilan ¹
	Wool	Orlon and acrilan (fall 1955=100)	Wool and synthetic		
			All varieties	Conforming varieties ²	
1947.....	100.0	-----	100.0	97.3	99.3
1948.....	95.8 ³ (13)	-----	³ 95.8	96.5 ³ (4)	98.8
1949.....	104.2 (7)	-----	104.2	106.2 (2)	100.7
1950.....	103.1 (12)	-----	103.1	102.9 (2)	108.1
1951.....	167.7 (9)	-----	167.7	145.9 (2)	145.6
1952.....	141.5 (8)	-----	141.5	126.1 (2)	122.7
1953.....	141.1 (11)	-----	141.1	118.0 (2)	124.9
1954.....	140.0 (16)	-----	140.0	118.0 (2)	122.6
1955.....	140.6 (15)	100.0	140.6	122.5 (2)	122.4
1956.....	140.7 (11)	83.8 ³ (2)	137.2	114.9 (1)	122.9
1957.....	139.7 (11)	78.3 (6)	133.4	118.9 (3)	127.8
1958.....	140.7 (11)	74.2 (9)	130.7	116.8 (4)	124.5
1959.....	138.7 (14)	74.7 (7)	129.8	116.4 (8)	122.4

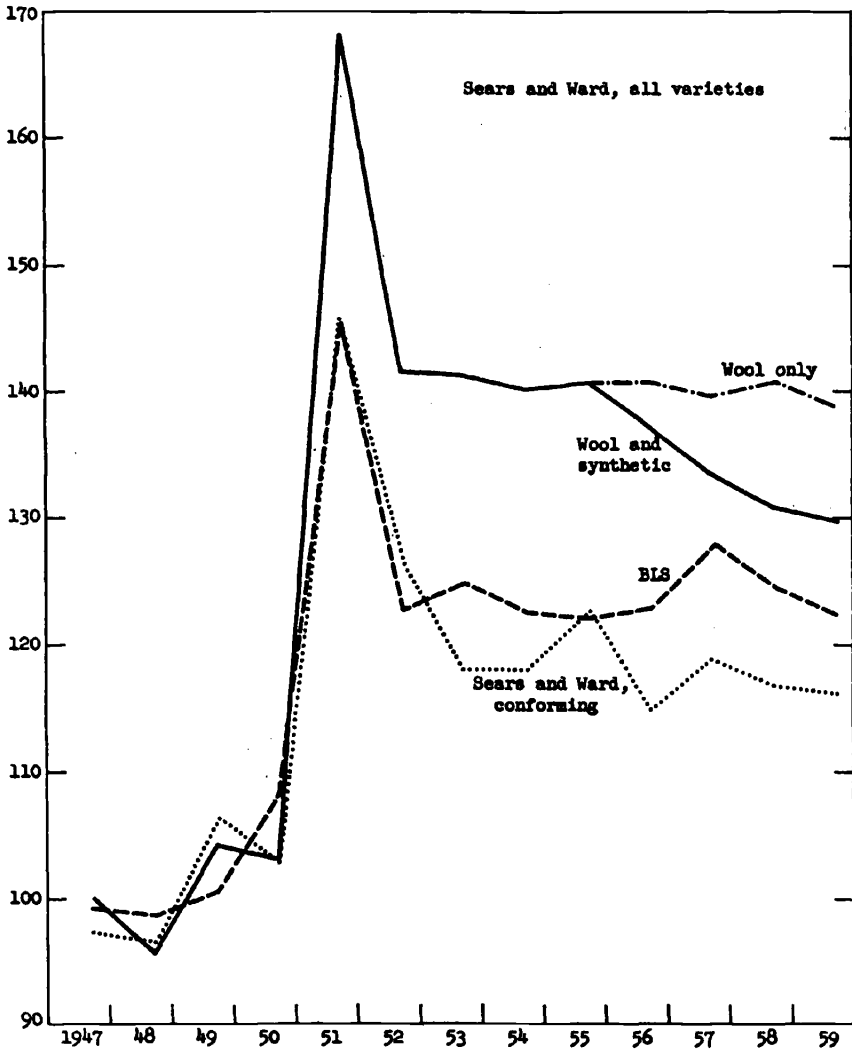
¹ Wool only, 1947-57; wool and acrilan, 1958-59.

² Numbers in parentheses are number of price change observations from the preceding year to the year shown.

³ Number of observations for the column is the sum of the number in cols. 1 and 2.

CHART 13

Blankets: Wool, Orlon and Acrilan
(Fall of each year. 1947-49=100)



results not from the broader range of specifications we use, but from the procedures used by BLS to handle a change in its weight specification. Column 4, the conforming mail-order series, follows these procedures and behaves very much like the BLS series in 1950-51. The BLS weight specification changes from 4 to $4\frac{1}{4}$ pounds in 1950 to $3\frac{1}{2}$ to $3\frac{3}{4}$ pounds in 1951. There was no overlap in pricing; instead the lighter blankets were compared directly with the heavier ones on a price-per-pound basis. Our data suggests that this procedure understates the rise in the price of blankets during the Korean War. This can be seen not only from the main mail-order series, but

also from an alternative version of the conforming series not shown in Table 9. In this version we follow the BLS specifications throughout, except that we price both 3½- and 4-pound blankets in 1950 and 1951, and use the average change in their price (rather than the change in the price per pound of blankets in different weights) to get the 1950-51 movement. This alternative conforming index rises from 102.9 in 1950 to 161.6 in 1951, or almost as much as the main mail-order index.

Our only price change observation for a 4-pound blanket for 1950-51 is an increase of 37 percent. This is slightly less than the increase obtained by comparing prices per pound, and much less than the increase for 3½-pound blankets. Reasoning from the cost side, one would assume that the price of heavy blankets would rise more than that of light ones, since the price of wool was the most sharply rising cost, and should be a more important part of retail cost for heavier blankets. However, the price per pound of 4-pound blankets is slightly higher than that of 3½-pound blankets in both years, perhaps because other quality differences are associated with weight. It is also possible that the differential price behavior arose on the demand side. Consumers may have responded to the sharp rise in prices by buying lighter blankets; this could have checked the price rise for heavier blankets and contributed to their temporary disappearance from the market. The catalog prices of blankets meeting the BLS specification in 1950 were near the center of the range of prices paid by consumers in Western cities as reported in the Survey of Consumer Expenditures.

After 1951 there is little trend in either the BLS series or our series for wool blankets. Both drop slightly, ours by a somewhat larger amount. In both series, there is a tendency for the width of bindings to increase over the period, and for nylon to replace rayon as a binding fabric after 1957. We have made direct comparisons between blankets that differed only in binding width or fabrics in all cases. The BLS has done so in most cases; the periods when BLS did not make such direct comparisons are for the most part periods when we had no occasion to do so.

The second column of Table 9 shows our price index for orlon and acrilan blankets. The price of these synthetic blankets fell 25 percent from their first appearance in 1955 to the last observation in 1959. Both orlon and acrilan are brand names for acrylic fibers; the two are made by different manufacturers. So far as we are aware they have similar characteristics, but were introduced at first for somewhat different applications. Orlon tended to dominate in clothing applications, and acrilan in blankets and carpets. This seems to have resulted in a preference for acrilan in blankets that made the catalog prices of acrilan blankets about 6 percent higher than the prices of similar orlon blankets in 1957 (this comparison is based on the price per pound of blankets of the same size, but differing in weight by ¼ pound). At one point in the index we have nevertheless made a direct comparison between an acrilan blanket (1955) and an otherwise identical orlon blanket (1956) without any adjustment for the difference in price between the two brands of fiber observed in 1957. If we had made such an adjustment, our index for orlon and acrilan blankets would have fallen even more than it does; the 1956 level would be 81.7 (1955=100) and all subsequent values would be lower by about the same amount. The BLS index never includes any orlon blankets.

To get a continuous series for orlon and acrilan blankets it was necessary on a few occasions to make comparisons on a per pound basis between blankets of somewhat different weights. We have seen in the case of wool blankets in 1950-51 that this procedure does not always give reliable measures of price change. However, it should cause less difficulty in a period when prices were changing slowly than one in which they were changing rapidly.

When we combine our series for wool, orlon, and acrilan blankets for 1955-58, we get a series that falls rather steadily relative to the series for wool blankets alone. In 1958 the number of observations for synthetic blankets is almost as large as for wool blankets. The combined index is 10 points below the index for wool blankets only at this point. In 1958-59 the fall in the relative price of synthetic blankets halted; in fact synthetics rose slightly in price while the price of wool blankets fell. It was precisely at this point that BLS introduced acrilan blankets into its index, missing the entire fall in their relative price as shown by the mail-order data. Even in 1958-59 acrilan blankets were being introduced into the BLS index at the discretion of the agent, and there is reason to feel that they were still underrepresented. Agents may often have switched to acrilan only where they could no longer get quotations for wool. Materials furnished to the Price Statistics Review Committee by BLS on the pricing of blankets in Cincinnati show that in 1958-59 there were three wool blankets and one acrilan blanket being priced in that city. The ratio of wool to acrilan in the mail-order observations at this time was two to one. Like the mail-order data, the Cincinnati data show a rise in the relative price of acrilan blankets after their introduction to the CPI. However, the Cincinnati data are based on the substitution of one acrilan blanket for another within the same outlet, and probably overstate the true rise. We can summarize by noting that the BLS index for 1955-59 is much more like our index for wool blankets only than like our index for wool and synthetic blankets combined, despite the introduction of acrilan into the BLS index in 1958.

10. AUTOMOBILE TIRES, FOUR-PLY, 6.00X16 AND 6.70X15

We have left until last the item that has given us the most difficulty: automobile tires. It is the only item for which no price series we have been able to construct from mail-order data bears more than a faint resemblance to any official price series, and for which we are therefore generally unable to analyze reasons for differences among the series.

The price indexes for tires are shown in Table 10 and Chart 14. The mail-order series includes both of the most popular sizes during the period, 6.00 x 16 and 6.70 x 15, the second size coming into the series in 1949. The other series shown make a complete transition from the 16-inch to the 15-inch size at a particular date—the BLS series in Spring 1953 and the AMS series in Fall 1955. The mail-order series includes both tube type and tubeless tires, and tires with cotton, rayon, and nylon cord for all dates at which tires of these kinds were offered in the catalogs. It is nevertheless a much narrower index than we might have constructed, since it excludes six-ply tires, whitewall tires, snow tires and the many other sizes of tires that were on the market during all or part of the period.

TABLE 10.—Automobile Tires, Four-Ply, 6.00 x 16 and 6.70 x 15

[1947-49=100]

Date	Sears and Ward ¹	BLS ²	AMS ³
1947—S	112.1	104.6	106.4
F	100.1	94.7	95.7
1948—S	101.2	99.0	99.5
F	97.1	103.2	102.0
1949—S	97.5	103.5	102.0
F	92.0	95.8	94.5
1950—S	92.5	102.4	98.2
F	94.1	120.9	115.1
1951—S	119.9	130.6	128.9
F	120.0	130.6	130.8
1952—S	113.8	130.9	127.0
F	108.3	129.3	123.3
1953—S	107.9	130.0	122.6
F	107.5	129.4	120.8
1954—S	110.1	132.4	123.3
F	104.5	114.8	120.1
1955—S	105.1	123.1	122.6
F	111.2	127.7	117.6
1956—S	112.8	129.5	118.9
F	115.4	129.7	118.9
1957—S	116.6	127.5	118.2
F	111.9	131.8	113.9
1958—S	109.6	133.2	115.1
F	108.5	134.8	108.5
1959—S	110.9	136.7	108.2
F	107.0	122.9	106.1

¹ 6.00 x 16, 1947-48; 6.00 x 16 and 6.70 x 15 combined, 1949-59.² 6.00 x 16, 1947-52; 6.70 x 15, 1953-59.³ 6.00 x 16, 1947-Spring 1955; 6.70 x 15, Fall 1955-1959.⁴ See note 1, Table 1.⁵ See note 2, Table 1.⁶ See note 3, Table 1.

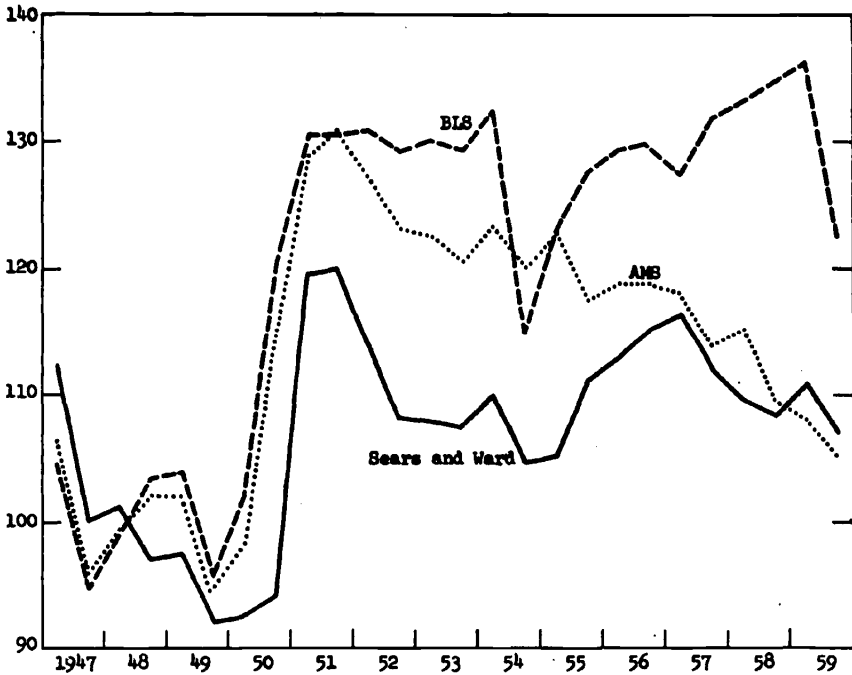
The BLS specified cotton cord tires until Fall 1950. From Fall 1950 through Spring 1955 it specified tires with cotton or rayon cord; in 1955 it permitted rayon or nylon cord for two months only—too briefly to affect the series shown here. After 1955, rayon cord was specified. Beginning in Spring 1959 the BLS series includes tubeless tires; this affects only the movement between the two dates shown in 1959. The AMS series specifies only four-ply tires of a particular size. All the series include federal excise taxes; the BLS series includes as well a charge for mounting, which is not part of the mail-order price. The mail-order series is based on a very small number of observations in the earliest part of the period because during the immediate postwar shortages of tires, the mail-order houses sold almost all of their available supply through their retail stores.

The mail-order series rises less than the others during the Korean War and falls much more rapidly after it. The AMS also shows a fall in the period after 1951, but the BLS index does not. Since the AMS series fails to rise in 1955-57 as the other series do, it ends the period at very much the same level as the main mail-order series.

It can easily be determined that the differences among the series are not the result of different handling of the change from 16-inch to 15-inch tires. We have constructed separate mail-order indexes for the two sizes, and these behave very much like the mail-order index for the combined sizes. At the time of the BLS transition to 6.70 x 15 tires (Spring 1953) our index for 6.00 x 16 tires alone was only 0.2 point different from the combined index for the two sizes. Thereafter it fell less, ending at 112.8 in Fall 1959 as compared with 107.0 for the combined index. If we had eliminated 6.00 x 16 tires in 1953,

CHART 14

Automobile Tires, 4 Ply, 6.00 x 16 and 6.70 x 15
(1947-49 = 100)



our index would therefore have diverged more sharply still from the BLS index. The 6.70 x 15 size accounts for one of the eight observations in the period ending Spring 1949. By 1953, it accounts for half the observations and by Fall 1959 for thirteen of sixteen.

The AMS index introduces 6.70 x 15 tires by linking in June 1955. This linking had been performed by AMS and was incorporated in the data as we received them. The average price paid by farmers for tires in Spring 1955, was \$23.0; in Fall it was \$22.1. These prices are considerably higher than the catalog prices of all but premium quality tires at this time; prices in this range were usually tubeless nylon-cord tires, and were probably not the volume leaders. The AMS price is also somewhat higher than the average price paid by farmers for automobile tires as reported in the 1955 survey of the farmer's expenditures. This survey shows an average expenditure of \$19.62 for automobile tires, including recapping.¹⁴ It is hard to know how recapping entered into the quantity measure. If a "recap" job was counted as a tire purchased, the average price is biased downward. If it is not counted in quantity, but is counted in expenditure, the average price is biased upward.

We attempted to construct a mail-order series conforming to BLS specifications, but it was based on very few observations. Later in-

¹⁴ *Farmers Expenditures*, Volume III, Part 11 of the 1954 Census of Agriculture, p. 21. The figure shown was computed from total quantity purchased and total expenditures.

spection of the work sheets revealed serious errors in following the BLS specifications; we did not have time to reconstruct the series. Because the tire series includes some items whose characteristics change very little over the whole period, we can learn a good deal by examining the prices of these items at the beginning and the end of the period. One such item is the Ward's Riverside DeLuxe or Air Cushion DeLuxe tire, 6.70 x 15. This is a first line tire, introduced at \$14.40 in Spring 1949. At that time the cord was not specified, which undoubtedly means that it was cotton. In Spring 1959, the same item had rayon cord and sold at \$14.62. The same quality tire in the 6.00x16 size was introduced at \$12.95 in Fall 1947 and sold in Spring 1959 for \$13.45. Again, the cord is unspecified at the beginning of the period and is rayon at the end. Even if we make no allowance for the improvement in the cord, the price rise for these items is much less than that shown in the BLS index. For the 6.70x15 size, the price rise for 1949-59 is less than 1 per cent, while the BLS index rose 32 per cent. For the 6.00x16 size, the price rise for 1947-59 was less than 4 per cent while the BLS index rose 44 per cent. These items seem to meet BLS specifications, except of course for size during portions of the period. The direct comparisons suggest that the mail-order index does not contain serious errors from the possible drift of a chain index.

Our best hypothesis about the divergence among the tire indexes has to do with discounting. Many tire sales take place at discounts from list prices, either in the form of trade-in allowances on old tires, or cash discounts if the buyer has no trade in. Such discounts would be especially important in periods of falling prices, like that following the Korean War. Mail-order sales cannot involve discounts, but must be kept competitive with actual prices that do. The BLS specifications first instructed agents to deduct cash discounts in September 1953. They first instructed agents to deduct cash discounts and trade-in allowances in August 1954. This presumably accounts for the very sharp drop in the BLS series in the Fall of 1954; apparently discounted prices were compared directly with previous undiscounted prices. This produces an error in short-run movement, but corrects earlier errors in the long-run trend. From Fall 1954 to Spring 1957, the movements of the BLS and mail-order series are quite similar, though the rise in BLS prices is a bit more abrupt. After Spring 1957 a new divergence occurs for which we have no explanation. The BLS series continues to rise, while the other two fall appreciably.

III. CONCLUSIONS

This paper has examined alternative price indexes for eleven different nondurable goods. This is not a very large sample from which to draw conclusions, and the conclusions offered below must be regarded as tentative. Nevertheless, the work needed to prepare alternative indexes is time consuming, and there is little likelihood that a larger body of such comparisons will be available in the near future. The conclusions that follow therefore seem worthy of some attention as the best that can be offered at this time.

1. Where there has been considerable stability in the physical characteristics of commodities over time, as in the cases of work shirts and work socks, the indexes constructed from mail-order data (two out-

lets in one region of the country) turn out to be surprisingly good approximations of indexes based on much larger samples of outlets and areas. Thus our index for work socks closely approximates one based on about 2,400 outlets. This suggests that too large an amount of resources may be devoted to maintaining large outlet and area samples for some commodities, and that an improvement of the official indexes could be obtained within a fixed budget by reducing the size of outlet samples and increasing the size of samples of items or varieties. We also observe that for stable items, the indexes based on all varieties of the item are often closer approximations to the BLS indexes than the indexes based only on the varieties conforming to BLS specifications. This suggests that to some extent, large samples of varieties and large samples of outlets may perform the same role, that of smoothing out random or erratic fluctuations possible in series based on small samples. If it is cheaper to sample several varieties in one outlet rather than one variety in several outlets (and we suspect that it sometimes is) this again suggests a possible gain from the reallocation of resources devoted to the price statistics programs.

2. Where there are few changes in the physical characteristics of an item, the AMS indexes, despite their loose methods of specification, give results very close to those of true specification indexes. Indeed, there seem to be cases where loose specification combined with consistency in procedures over time, as in the AMS indexes, produce results superior to those of rigid specifications in which frequent changes are made. If we were to accept the mail-order indexes as a benchmark (and it is, of course, doubtful that we should), we would conclude that the AMS series performs better than the BLS series for women's rayon panties and for automobile tires. On the other hand, the loosely specified AMS indexes are subject to serious error when there are important changes in the characteristics of goods or when there are very sharp changes in the price level of the item. In general, one expects these problems to result in an upward bias in the AMS indexes from failure to catch quality improvement. In this study, however, the principal instance of bias in an AMS index turns out to be failure to catch quality deterioration in the case of Axminster rugs. The conclusion that AMS should specify fiber content for this item seems inescapable. There is some possibility that AMS has failed to catch quality upgrading in work shirts in recent years. A much more important upward bias in an AMS index (automobiles) is reported in Staff Paper No. 3. Several of the AMS indexes discussed here fail to reflect the full rise in prices during the Korean War or the full fall thereafter, as measured by specification indexes. This suggests strongly that there was temporary substitution of lower qualities in the face of a sharp rise in prices.

3. The extreme narrowness of the BLS specifications and their uniformity over the whole country in most cases produces a need for very frequent changes in the specifications, and makes it very difficult for BLS to make available histories of the specifications and procedures used. The absence of published information on the history of specifications greatly reduces the usefulness of the published BLS item indexes. In a number of cases, the titles of item indexes as published seem inexcusably misleading: "wool blankets" for a series that includes acrilan and "girls' orlon sweaters" for a series that includes

wool. These misimpressions could be removed by the use of footnotes to the titles of item indexes.

4. Despite the frequent changes in BLS specifications, they often lag behind the changes in the goods offered on the market to such an extent that nothing to meet specifications can be found in the mail-order catalogs. Since the catalogs do not always give enough information to make it certain that a variety meets specifications, we have followed the rule of assuming that it does unless it is clear that it does not. Physical examination of the catalog merchandise would undoubtedly have revealed more cases in which the specifications could not be met. We are completely convinced that this problem does not arise because the quality level of the catalog merchandise is not that bought by the BLS index population. In every case we have examined, the average prices paid by middle income urban consumers as shown in the Survey of Consumer Expenditures were well within the price range of varieties offered in the catalogs. Rather the problem arises because the BLS often specifies what the index population was buying yesterday, and not what it is buying today. The resulting attrition in the number of observations collected makes the CPI much less reliable simply from the point of view of sampling error than it appears to be from the size of the outlet sample. The problem under discussion need not arise from any sudden change in the item priced. In two cases, carpets and innerspring mattresses, we encountered such problems simply through quality change along very old dimensions (number of tufts per square foot and number of coils).

The impressions on this point arising from this study are entirely consistent with those arising from two other kinds of evidence. One of these is observations made in the field when we were privileged to accompany a BLS agent in her pricing. The second is the material furnished to the Price Statistics Review Committee by BLS giving the history of the pricing of certain items in particular cities and showing the effect of alternative methods of processing the data collected. These histories with alarming frequency show the entry "nothing to meet specifications" in two or three outlets out of four, and sometimes the item priced in the remaining outlets will not be identical at the two dates compared, and substantially different prices will be compared directly. A broader range of specifications would reduce the influence of such direct comparisons of nonidentical items on the movement of the index.

5. The problem of changes in specifications blends imperceptibly into the even more important problem of the handling of new items. We have followed the rule of considering a commodity as an item if BLS publishes a separate item index for it. Thus we have treated men's nylon stretch socks as an item, and women's nylon panties as a variety of an item broader than that defined in the BLS item index. It is clear, however, that any line drawn between the new variety and the new item will necessarily be arbitrary.

In a number of cases, we have found that the introduction of a new item into the CPI took place quite some time after its first appearance in the mail-order catalogs. This in turn may have been after its appearance in specialty shops or department stores, since it is easier in a store than in a mail-order house to take a chance on stocking a small quantity of a new item. The high cost of producing and dis-

tributing catalogs and the need for streamlining order-filling and warehousing operations militates against experimentation in offering catalog merchandise. In all of the cases of new items or major new varieties we have examined, there was a substantial decline in the price of the new variety relative to the old. In every case except that of girls' orlon sweaters the BLS index missed all or most of this relative price decline. The circumstances of the case of girls' sweaters suggest that BLS was forced by the suddenness of the change in the goods on the market to depart from its ordinary procedures.

At this point one must consider the argument that introducing new goods into the price index "too soon" may overrepresent them and cause a price index that is biased downward. This argument is certainly correct if the whole weight of an item is shifted to a new variety while it is still in its infancy, and the price decline of a small but growing fraction of sales of an item is treated as a price decline for the item as a whole. This is not the procedure we have followed here. New varieties have been included in the item indexes with a weight equal to their numerical importance as a fraction of all varieties. It would have been better to weight each variety by its sales, but this information was not available.

In principle, we believe that a system that weights varieties by their current importance in the market understates the true extent of price declines for two reasons. First, it fails to take account of the fact that at their high initial prices, these varieties are preferred to the old varieties by those who buy them. Second, it fails to take account of the fact that part of the growth in importance of new varieties is caused not by the fall in their relative price, but by the growth and transmission of knowledge about them, and that at any time in this growth process there are consumers who would prefer the new variety at its current price if they had adequate information.

The objection is sometimes raised against the argument of the preceding paragraph that there are also people who regard old products as worth more than they cost and people who lack relevant information about old products. This is true, but both circumstances are much more likely for new products that result from substantial technological change. An alternative way of looking at the price decline or welfare gain implicit in the introduction of a new product is to consider the price before the innovation of getting the particular bundle of services or attributes embodied in the innovation. Thus before the introduction of acrilan blankets it might have been possible at some considerable cost to treat wool blankets so that they were permanently mothproof and free from shrinkage. The difference in cost between a wool blanket so treated and an acrilan blanket is not reflected if the acrilan blanket is linked into the index at the time of its appearance. This does not mean that we are advocating any procedure that would measure this implicit price decline, for we know of none that is operational. It does mean, however, that the early introduction of new items with current weights, instead of creating a downward bias as is sometimes suggested, does not fully correct the upward bias inherent in present procedures—at least on one reasonable interpretation.

An objection closely related to the one just considered is that there are some people to whom the new product is less attractive than the old, or for whom it has serious disadvantages. For example, it is

pointed out that many synthetic fabrics do not resist cigarette burns as well as natural fabrics. If such disadvantages cause the old product to remain on the market alongside the new, a system of current weights gives full recognition to them. It is difficult to imagine many cases in which the old product disappears completely despite substantial advantages, particularly if it is produced by a competitive industry. When a new product greatly increases its share of the market over a short period, as was true of all the new products considered in this study, it is hard to argue that on the whole its disadvantages outweigh its advantages.

The arguments advanced above are applicable to changes in varieties that arise from changed composition or techniques of production rather than from changes in style. The fact that in any period people prefer the goods considered stylish in that period raises the classic index number problem, which we have sought to evade in this study by omitting the goods most subject to style change.

The danger in introducing new varieties early is that resources will be wasted collecting data on what prove later to be ephemeral goods. We believe that BLS agents are in close enough touch with the market so that this error would not be committed very often in a procedure where agents had more discretion in the selection of varieties. At any rate, the error almost never seems to be made now, and there is something to be said for a procedure in which offsetting errors are about equally likely. We have noticed only one case in the items considered in this study in which the BLS introduced a new variety and then quickly retracted it (in a change involving technology rather than style). This was the brief broadening of the tire specifications to permit nylon cord tires in the summer of 1955. Nor is it clear that this broadening was a mistake; while rayon cord tires have retained a virtual monopoly in the original equipment market, the mail-order catalogs suggest that nylon cord has remained important on the replacement market. It is only the replacement market that is represented by the BLS index for tires, since the original tires are part of the price of the car and are thus included in the BLS item index for new automobiles.

6. Apart from the problem of new varieties, there are several cases in which the BLS indexes based on a narrow range of varieties behave somewhat differently from indexes based on a broader range. We count here only the cases in which a mail-order index based on BLS specifications lies close to the BLS index, supporting the view that the scope of varieties included is the source of the original difference. These cases are women's rayon panties, men's nylon stretch socks, and men's sweaters. In all three cases, the broader indexes rose less than the narrowly specified ones. This is too small a sample to permit any conclusion on the general effect of narrow specifications on the movement of the CPI, except in the case of new varieties.