# Apparel Prices and the Hulten/Bruegel Paradox

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# ABSTRACT

While the CPI may have overstated inflation in the mid-1990s by about one percent per year, as concluded by the Boskin Commission, it does not make sense to extrapolate that rate of bias backwards over long periods of time. The "Hulten-Bruegel paradox" shows that any such exercise in backward extrapolation yields levels of real consumption two or four centuries ago that are implausibly low, barely providing an average household with a pound of potatoes per day, with nothing left over for clothing or shelter. The paradox raises the possibility that at some point in the past price index bias, at least for some important products, may have been zero or negative rather than positive.

This paper studies apparel prices over the long period 1914-93, developing new price indexes based on data from the Sears catalog for the entire period 1914-93. The research is based on roughly 10,000 exact comparisons for a matched model index of many different types of apparel, and on a much smaller number of observations on the prices and quality characteristics for a hedonic price index of womens' dresses.

The Sears matched-model indexes do not exhibit a consistent negative or positive drift relative to the CPI. For womens' apparel the drift is always negative but for mens' apparel there is a turnaround, from negative before 1965 to positive thereafter. Both the matched-model indexes and the CPI rise less rapidly for womens' apparel than for mens' apparel, which would be consistent with the hypothesis that price changes accompanying model changes (and thus linked out of both the Sears matched-model index and of the CPI but not in the hedonic index) are more frequent for womens' apparel, since models change more frequently.

The hedonic price index for womens' dresses always increases faster than the matched-model index. It also increases faster than the CPI for dresses in each time interval except for 1965-75. To the extent that the Sears hedonic and matched model indexes are based on the same data, so that systematic differences between catalog market shares and pricing policies are not relevant, the results provided here may offer a nice complement to past research on computer prices, which also found that price changes were contemporaneous with model changes. Just as hedonic price indexes for computers almost always drop faster than matched-model indexes for computers, we have found the opposite relationship for apparel prices, although presumably for the same reason. The results in this paper raise the possibility that price indexes for goods subject to frequent fashion or taste changes may incorporate a significant downward bias.

Further research is required to study whether this difference between hedonic and matched model indexes for apparel is systematic across types of apparel or is limited to womens' dresses. Any systematic tendency for hedonic indexes to increase faster than the Sears matched-model indexes and than the CPI would provide evidence of a downward bias in the CPI for apparel in the past, thus helping to explain the Hulten-Bruegel paradox.



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## *I. Introduction*

Numerous economists have speculated about the implications for estimates of long-term economic growth of bias in official price indexes. In an important recent example, Nordhaus (1997) speculated that, when plausible rates of upward price index bias are extrapolated backwards for two centuries, the increase in real wages from 1800 to 1992, which in the official data is by a factor of 13 to 18, might have been by a factor of 40 with a low estimate of price index bias (0.5 percent per year) or by a factor of 190 with a higher estimate of bias (1.4 percent per year).

### Hulten and Bruegel

Nordhaus' conference discussant, Charles Hulten, pointed out the implausibility of this thought experiment; the high bias estimate implies (in my own numerical example that makes Hulten's point with different numbers than his) that median household income in the year 1800 was $143 in 1992 prices, or $0.39 per day, enough to buy a mere 1.3 pounds of potatoes per day for the household, with nothing left over for shelter, clothing, or anything else.[1]

But why stop there? I like to think that the "Hulten paradox" should be

1. 1992 current-dollar median household income was $30,786 and the 1992 price of a pound of white potatoes was $0.31. *Statistical Abstract of the United States*, 1994, Tables 707 and 763, respectively. Extrapolating backwards a growth rate of real wages of 2.8 percent per year yields a ratio of real wages in 1992 divided by the year 1800 of 216. ($30,786/216 = $142.50)

renamed the "Bruegel paradox," after the landmark painter Pieter Bruegel the elder (1525-1569). Even if we assume that the then-unavailable official estimates would register no increase in the real wage from 1569 to 1800, when we extrapolate Nordhaus' high bias estimate back to the last year of Bruegel's life, we find the implication that the real wage should have increased from 1569 to 1992 by a factor of 5482, making median *annual* household income in the earlier year equal to $5.59, enough to buy exactly 0.8 ounces of potatoes per day, with nothing left over for food or shelter.[2] Yet the happy burghers in Bruegel paintings often look overfed, content, well-clothed, and with solid-looking houses in the background.

## The Application to Apparel

Clearly, the low 1800 or 1569 levels of the standard of living implied by Nordhaus' backwards extrapolation of inflation bias estimates fail a basic credibility test, implying that something must be wrong with the exercise. To arrive at substantially higher alternative estimates of real household income in 1569 or 1800, the Hulten/Bruegel paradox implies that, whatever the "true" upward CPI bias for 1995-96 as investigated by the Boskin commission, the

2. The factor of 5482 equals the factor of 216 implied by the high-bias estimate (a bias of 1.4 percent per year added to the official growth rate of real wages of 1.4 percent per year), multiplied by an additional factor of 25.3 to take account of a 1.4 percent bias in the 231 years from 1569 to 1800.

bias in some past era must have been smaller, or zero, or even of the opposite (negative) sign.

Could the CPI bias (or, more generally, the bias in official price indexes, including the national accounts deflators developed by the BEA and by others like William Shaw, Simon Kuznets and John Kendrick before them) have been zero or negative at some prior date? That is a very large topic that requires data-intensive research. I believe that the payoff to such research may be greatest for two categories of consumer expenditure, shelter and apparel, for three reasons that apply to both of these categories of expenditure. First, there is prima-facie evidence, reviewed below for apparel (and equally true for structures) that raw (non-quality-adjusted) price data for a given type of apparel sold in mail-order catalogues increase far more over the 1914-93 period than the CPI. Second, food, clothing, and shelter are the "big three" items of consumer expenditure and have a sufficient weight to "matter" in arriving at an eventual resolution of the Hulten/Bruegel paradox. Third, apparel is one of the three main areas where critics have suggested that the CPI may incorporate a downward bias (the others being housing and autos, see Wynne and Sigalla 1994, pp. 10-11). Among the reasons suggested for the downward bias in apparel is the strong seasonal pattern in clothing styles and prices, leading to possible inaccuracy in linking prices for old styles sold at low close-out prices with new styles sold at high initial prices. In suggesting that "style" goods are a souce of the bias problem, Wynne-Sigalla cite the difference between the 1967-87 CPI inflation rate of 6.0 percent for "infants' and

"toddlers'" apparel with those for mens' and boys' apparel (3.4 percent) and womens' and girls' apparel (2.9 percent).

## The Prima Facie Evidence for Apparel

Between 1914 and 1993 the CPI implies that apparel prices on average rose by a factor of 7.6 between 1914 and 1993 (an average annual growth rate of 2.6 percent per annum). However, a quick glance at any Sears catalog in the era prior to World War I reveals prices that seem much too low to be consistent with the CPI. Cotton percale house dresses, trimmed with braid and ruffles, could be purchased fo $0.98 and a taffeta silk jacket for $6.75. Men's all-wool pants were $1.35, an all-wool suit was $4.50, and an all-wool overcoat was $7.00.

The impression that the catalog prices have increased far more than the 1993/1914 price ratio of 7.6 for the CPI can be quantified. Taking the median dresses (ranked from most to least expensive) sold by Sears in 1993 and the median sold in 1914, the 1993/1914 price ratio is 32.7. For the two most expensive the ratio is 27.4, while for the two least expensive the ratio is 59.5. It might seem easy to dismiss this discrepancy between the CPI increase and the median increase in catalog dress prices by arguing that quality has increased commensurately, in fact an inspection of the photos in the catalogs suggests that, if anything, quality was higher in the earlier era, with higher quality fabrics (silk, cashmere) and more decorative elements (ruffles, braids,

etc.).

## An Opportunity to Compare Hedonic vs. Matched-Model Indexes

As we shall see, matched-model indexes developed from catalog data do not stray far from the overall rate of price increase registered by the CPI. But hedonic price indexes increase much more rapidly. This discrepancy is familiar to investigators who have studied computer prices, but there it operates in the opposite direction. For computers, matched-model indexes greatly understate the rate of price decline for new computers, as price reductions occur when new models are introduced, and prices are not commensurately reduced on old models (indicating a disequilibrium in the market).[3] The same phenomenon could be operating with apparel, but in the opposite direction. Price increases may occur when new models are introduced, implying that price indexes based on matching models to eliminate quality differences may miss some or even most of price increases over time.

Matched-model indexes may be flawed in the study of historical changes of apparel prices, due to price increases that occur at the same time as model changes but are linked out in the construction of the matched-model index or of the CPI. And indeed this is a criticism of an earlier version of this research

3. For an exception in which the matched model indexes mimick the rate of price change of the hedonic indexes, see Aizcorbe, Corrado, and Doms (2000).

which was limited to matched-model indexes.[4] However, for the long period prior to the late 1980s, when the BLS introduced hedonic price techniques into the CPI for apparel, the CPI is subject to the same criticism.[5] Both the CPI and catalog matched model indexes may understate the true rate of quality-adjusted price increase. If our hedonic regression results consistently display a faster rate of price increase than matched model indexes from the same catalog data, then this would support the view based on the raw (quality-unadjusted) comparisons cited above that the CPI may understate secular inflation in apparel prices, thus helping to explain the Hulten/Bruegel paradox.

## Other Aspects of this Research

Part of the goal of this research is to determine if for important product groups like apparel and shelter that there is any case to be made for a downward bias in the CPI over any significant period of time. Another goal is simpler and more direct, to create a complementary study of price changes to that of Rees (1961), who carried out detailed studies of apparel prices from catalogs as well as for other products (e.g., shelter prices from newspaper

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4. Exactly this point is made by Moulton and Moses (1997, pp. 317-18) in their critique of the Boskin Commission: "Gordon [in matched-model comparisons] measures year-to-year price changes only for apparel items that remain identical from year to year. Many BLS studies find that price change tends to occur when new varieties or fashions are introduced. Gordon's method of analysis would exclude these price increases; in essence, it attributes any price increases associated with the introduction of new fashion lines entirely to quality improvement. In BLS teminology, the price changes would be `linked out.'"

5. Further discussion of possible bias in the CPI for apparel is contained in Armknecht and Weyback (1989) and Liegey (1993). Recent experiments with hedonic price indexes for

advertisements). Rees covered the period 1890-1914, that is, the years between the establishment of the WPI and of the CPI. The coverage in this paper of apparel prices for 1914 to 1947 complements the study by Rees and sheds new light on his results, since his study was based entirely on matched-model methodology and did not make any use of hedonic regression techniques.

The research in this paper is quite unbalanced, with much more evidence on matched-model indexes than on hedonic indexes. A great deal of data has been collected for matched-model indexes for most types of apparel covered by the CPI over the entire period 1914-93. Our hedonic study is thus far limited to womens' dresses, and comparisons of the hedonic indexes with matched-model indexes and with the CPI are thus also limited to womens' dresses. Nevertheless, sufficiently dramatic differences emerge from running hedonic regressions on the same data used to develop matched model indexes that we are able to discuss implications for broader issues in price measurement. As will become evident, collecting data from the catalogs for matched-model indexes is an entirely separate activity from collecting data for hedonic price indexes for the same products from the same catalog volumes — even though the data and samples are identical, data collection still differs

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apparel are described in Liegey (1994).

significantly in the details that are recorded.

## II. General Issues that Arise in the Use of Catalog Price Indexes

In my past work on price measurement, an important preliminary step has been to discuss advantages and disadvantages of using mail-order catalogs as a supplementary source of price index numbers to be compared with official price indexes like the CPI. This comparison of advantages and disadvantages needs to be put in perspective by two sets of factors. First, for many durable goods examined in my book (Gordon, 1990), price indexes based on *Consumer Reports* were so clearly superior in the extent of industry coverage and attention to the collection of true transaction prices that, whenever available, *Consumer Reports* indexes were used in preference to catalog indexes. Second, the emphasis in this paper is more on differences in methodology to extract alternative matched model vs. hedonic indexes from the same data than it is on differences in implied price changes between catalog indexes and the official CPI. Thus differences in the validity of catalogs vs. the official CPI are less important.

Nevertheless, it is worthwhile to review the advantages and disadvantages of catalog data, especially for this study of apparel that goes back to 1914. Here we are unaided by any potential "help" from *Consumer Reports* — that magazine started only in 1936 and has provided virtually no coverage of apparel that might even remotely compare with its outstanding coverage of most consumer durable goods. Also, price and quality data

provided by *Consumer Reports* are rarely in a form that allows hedonic regressions to be run, unlike the ample provision of data in the catalogs for at least some types of apparel.

## Advantages of Catalog Price Data

Among the most important advantages of catalog price indexes are the following:

1. Most important, specifications and illustrations published in catalogs allow closer control for changes in quality than in the official price indexes. The continuity of item codes from one catalog to the next is often helpful in following a particular item, and there is usually a long list of specifications that can be checked to insure that the models being compared are absolutely identical. In the CPI exact specifications are not available and accessible over any kind of long historical period. The consistency of specification listings in catalogs also makes them preferable to newspaper advertisements as a data source.

2. The matched-model methodology used to compare catalog items over time insures that price comparisons are included only for items that are absolutely identical in every dimension reported in the catalog specification. In contrast, since 1978 the CPI has not been based on published specifications, and even before 1978 — the time period most relevant for this study — the CPI

made direct comparisons between nonidentical goods if both fell within the same specification description.[6]

3. Related to the first two advantages is the fact that catalog price indexes can in principle be replicated by anyone with access to a library containing historical catalog volumes. In contrast, there is no way that CPI indexes at either the lower or upper level can be replicated by anyone except BLS employees. As a practical matter, for historical periods several decades in the past, original source data for the CPI may not be available at all.

4. The selection of products and individual models sold in catalogs responds automatically to the needs of the marketplace. It has always been true that "space to items always having been allotted on the basis of sales" (Hendrickson 1979, p. 249). This gives catalog price indexes two inherent advantages over the CPI, especially prior to the introduction of the current CPI sampling framework in 1978. First, for products sold in a large number of models or varieties, "it seems reasonable 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" (Ress, 1961b, p. 141). There is no such

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6. This statement about the CPI comes from Rees (1961b), who states "the BLS makes direct comparisons between nonidentical goods if both fall within the same specification." Triplett (1971, p. 186, Table 6.1) quotes a study showing that for nonfood items in the CPI in April, 1966, more than half of all product substitutions were handled by direct comparison of prices of the old and new model, and well under one percent were handled by an "explicit size or quality adjustment."

assurance that product indexes are sales weighted across models within a product cateogry in the CPI, at least prior to 1978.

Second, products tend to be introduced into the catalogs soon after they become marketable, in contrast to the CPI which often has introduced new products many years after they become commercially important. This factor, which is crucial for durable goods like room air conditioners (introduced into the Sears catalog in 1952 but not in the CPI until 1964), is presumably less important for apparel. Prior to 1978 the CPI adhered to fixed specifications over a long period of time, which could lead to a disproportionate weight for obsolete items.[7]

5. Prices printed in the catalogs are actual transaction prices. If retail and wholesale outlets that compete with catalog firms price items at varying discounts, catalog houses must adjust their published prices to remain

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7. As reported by Rees (1961b, pp. 141-2), " . . . 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 were were unable to find any variety of an item in the catalogs . . . whose quality was as low as that specified by the BLS." Rees further reports (p. 142) that rigid adherence to BLS specifications would require excluding a large fraction of the observations that can be collected from the catalogues, in one case reducing the sample by a factor of ten.

competitive (occasionally in the past few decades speciality catalogs for particular products advertising sale prices would be mailed between the issuance of the bi-annual catalogs — since these interim sale catalogs are not collected by libraries, we cannot use them in this research).

6. Since postage and shipping costs, credit charges, and taxes (except for Federal excise taxes when applicable) are not included in the published catalog prices, the services provided with each item are held constant. In contrast, the CPI may reflect a changing mix of services (e.g., some full-service department stores eliminated free delivery in the 1970s under pressure from discount-store competition). CPI and catalog indexes can differ due to the inclusion in the CPI of state and local sales taxes.

## Disadvantages of Catalog Price Data

The case against catalog price indexes takes two forms. First, there are clear disadvantages of relying on catalogs. Second, criticisms can be offered of the advantages listed above.

1. The most serious problem in the use of catalog prices is the possibility of a systematic difference in the secular growth rates of the same product sold by catalog and non-catalog outlets, due, for instance, to differential growth in the efficiency of catalog operations or changes in pricing policies. Regarding efficiency, for any comparison with the CPI catalog prices include payment for

warehouse and distribution sevices and would have a slower secular rate of increase than prices of retail competitors if the growth of efficiency in the provision of these services by catalog houses had been relatively rapid compared to the services provided by retail stores. It is hard to believe that such a bias could be important, since innovations in warehouse technology are likely to have been adopted by non-catalog competitors, and indeed Wal-Mart has outpaced Sears in warehouse and distribution efficiency over the past several decades.

In fact it seems to be the catalog merchants who were more efficient than standard retailers in the early decades of the twentieth century and less efficient in the later decades. Model-by-model price comparisons for consumer appliances in my book (Gordon, 1990, pp. 422-23) between the Sears catalog and *Consumer Reports* indicated that the catalog models tended to be at the lower end of the price range in the early postwar period but drifted toward the middle of the price range over time. Such behavior is consistent with a change in pricing strategy by Sears in the late 1960s and early 1970s ("we're selling last year's goods at next year's prices"). This evidence, if applicable to apparel as well as to consumer appliances, would predict that Sears catalog price indexes for apparel would drift upwards relative to the "true" universe of prices that should be compared with the CPI.

Another criticism of the preceding section on advantages of catalog price indexes concerns reproducability, where we need to distinguish two issues.

First, an unambiguous advantage of a catalog pirce index is that *in principle* it can reproduced by anyone with access to the same cataloguies. Second, we would not claim that any such reproduction would necessarily yield an identical index, because subjective decisions must inevitably be made in situations where models change without an overlap period, or when only a subset of available information is used in order to economize on research time. The methods used to develop the catalog indexes were, however, designed to minimize subjective decisions, since the actual data collection was carried out by a succession of research assistants.

## Weighing the Advantages and Disadvantages

In the goal of finding alternative sources of price data to compare with official price indexes, particularly for earlier decades when the official methodology was not as refined as it is today, catalog price indexes are no panacea. Even if catalog prices are fully corrected for quality change, they may not accurately reflect the unobserved true quality-corrected price index for all suppliers, because of differences between catalog firms and all firms in the gorwth of efficiency or in the evolution of pricing policies. In comparisons of catalog prices with the CPI for apparel, there is the problem that the selection of models or types of apparel sold through catalogs may be different from those sold by other outlets, e.g., if catalogs typically sell more items which are small or lightweight in order to minimize shipping costs. We might also expect that

the product mix sold in catalogs would be more heavily wegihted to standard utilitarian items and less heavily to fashion goods. This difference could make the catalog indexes behave differently than the closest comparable CPI strata indexes, although there is no presumption for the direction of the drift.

Further, catalog prices may not adequately control for all types of quality change. Some changes may be introduced without being explicitly acknoweldged in the printed catalog descriptions. Indeed, catalog indexes based on the matched-model method are as vulnerable as the CPI to deleting price change that occurs when new models are introduced. Matched model indexes based on catalog prices or in the CPI may be biassed downward if the timing of price increases typically coincides with the introduction of new models (in the apparel case) or biassed upward if improvements in performance-price ratios coincide with the introduction of new models (as for computers and other electronic goods).

## *III. The Methodology of This Research*

A close analogue to this study is the catalog price index for 36 clothing items developed by Rees (1961a) for the period 1890-1914. Rees's study differs from the approach taken here, not only that he was comparing with the WPI since the CPI did not yet exist, but also in that he did not attempt to match catalog price indexes with WPI indexes on an item-by-item basis, but rather used catalog prices and expenditure survey weights to construct a completely new index that might be compared with the overall WPI for clothing and for home furnishings. Because Rees made no attempt to compare identical items, his index might differ from the WPI due to a different selection of items and the earlier introduction of new items. In contrast, the drift in the catalog/CPI ratios recorded in this paper relates to identical items within the limits of feasibility in matching catalog products with CPI strata indexes for apparel.

For any given investment of research resources, there is a trade-off between the number of different catalogs consulted for a given product and the numer of separate products that can be included. An initial decision (in Gordon, 1990, and carried over to this paper) was made to limit this study only to Sears, the largest catalog house, and thus to allow time to copy data for additional varieties and products. This procedure is supported by Rees' conclusion (1961b) that the Sears and Wards catalogs gave similar results in his research. Sears' catalog sales in the 1970's were triple Wards' and equal to Wards' sales and the sales of the next three catalogs combined. To allow time

to copy prices for more products, prices were copied only from one catalog per year (spring-summer), even though two catalogs were published annually. This decision has the disadvantage that the resulting indexes may understate the degree of short-run flexibility in the catalog prices.

## Timing

Since the primary purpose of this study is a comparison of the catalog prices with CPI indexes for the same apparel products and time periods, a decision was required on the choice of time periods for that comparison. The catalog data in this study were collected from the Chicago-area edition of the Sears, Roebuck spring-summer general catalog. According to a Sears official, however, prices are set long in advance of catalog distribution. Since the spring-summer catalog went to press in October of the previous year, and final price decisions were made in October, the most closely comparable CPI indexes would be those for October of the year previous to the date printed on the catalog. However, another interpretation is that the correct BLS index is that of the following spring, contemporaneous with the period during which the catalog prices are in effect, because aspects of Sears' pricing strategy were forward looking. For instance, in some past periods, Sears purchased futures in goods like cotton and rubber to cover anticipated sales in the following six months. They also owned parts of corporations supplying them with products

and arranged to buy forward at a price established for conditions of the following six months.

While in some early stages of the research on the 1990 book, BLS prices in year *t-1* were compared with prices in the spring-summer catalog for year *t* , in the end, both were compared in year *t*. It might have been preferable to use monthly BLS indexes for, say, September or October of the year prior to the date on the catalog, but monthly data for BLS commodity indexes were not as complete as for annual data. This choice to adopt contemporaneous pricing is made partly because it is probably more accurate and also to simplify the presentation of the results. Slight inaccuracies may be introduced on the timing of major cyclical movements in prices, such as those in the Great Depression, but there is unlikely to be any effect on the measured rate of change of the Sears/CPI ratios over periods of a decade or more.

## *IV. Matched-Model Catalog Indexes for Apparel, 1914-93*

Which products are chosen for study? For the apparel matched-model indexes the approach is straightforward. Historical CPI strata indexes are available for broad groupings, e.g., "women's separates and sportswear." We turned to the Sears catalog and selected virtually every category of apparel that corresponded to each CPI stratum description. Table 1 lists the 39 separate apparel categories for which Sears catalog matched-model indexes were constructed, the average number of annual price comparisons carried out for each category, and the CPI strata with which groups of categories were compared. The table is divided into three sections, corresponding to the three intervals of the 1914-93 period for which research was carried out at separate stages.

## Method of Comparison

Price comparisons for each pair of years are facilitated by Sears' policy of carrying several models in each product category. Changes in specifications usually affect only a subset of models in any one year, so for almost every product at least a few identical models are available for a price comparison between a pair of years. Because model changes occur at irregular intervals, the number of price comparisons of identical models for any given product may be on the order of seven for a series of years and then collapse to two or three in a year of substantial model changes. Price changes for models that are discontinued, newly introduced, or subject to quality change are imputed to the price changes of models that remain completely unchanged in a given comparison of prices in years $t$ and $t-1$. In the subsequent comparison of prices in $t+1$ and $t+2$, a different set of models is covered, perhaps including one or more models newly introduced in year $t+1$ and excluded in the previous comparison of $t$ with $t+1$.

Thus each pair of years is treated separately and the list of models is allowed to change annually. This aproach allows much more frequent model changes than in the CPI as it was constructed prior to 1978, when CPI field agents were required to find prices for models according to a detailed description that might well have become obsolete. Extra models can be included that appear and disappear between major CPI revisions. Ideally, this

approach should lead to the inclusion of more models per product than in the CPI.

The matched model indexes were developed by comparing all identical models in every pair of adjacent years. For a comparison to be made, the adjacent-year observations had to have the same serial number (subject to qualifications below), the photo or drawing depicting the model must have been identical, and the description of the model must have been identical. Identical catalog numbers do not always ensure that two models are identical, just as dissimilar catalog numbers do not necessarily signify differences between models. Therefore the determining criterion for the direct comparison of models relied heavily on the match of product descriptions. Nevertheless, the model numbers are very useful for quickly spotting models that are likely to be identical or for spotting changes in characteristics in the set of models available for two adjacent years.

The lowest-level observation for the catalog matched-model price indexes is the log change in price between two adjacent years for a given model that has been determined by the above process to have remained identical across the two years. Then these price changes are aggregated. Log price changes (e.g., for an identical dress in two adjacent years) are aggregated into log product price changes for a product category (e.g., "womens' dresses") by applying an equal weight to each model in any given pair of adjacent years.

The absence of model-by-model sales data necessitates the use of equal weights for each model of a given product. Some response to market sales is incorporated to the extent that the mix of models that Sears carries for a given product responds to the relative volume of sales.

Product price changes are aggregated into subgroup price indexes, where the subgroup refers to the lowest level of aggregation available in the CPI. The subgroups for apparel refer to the "CPI products" listed in the middle column of Tables 1 and 5. Equal weights are applied to each product in forming subgroup price indexes. Then subgroup price indexes are aggregated into groups and totals, using the appropriate CPI weights for each subgroup.

The indexes created in this paper have the advantage that they are open to public inspection and can be reproduced by anyone with access to a library that holds back issues of the Sears catalog. As stated above, the catalog indexes are subject to the same problem as any specification index, including those compiled by BLS. Any price change that occurs upon the introduction of a new model is deleted. If manufacturers typically postpone price increases during the life of a model for the occasion of a new model introduction, then deletion causes the exclusion of major price changes and leads to a downward secular bias in price indexes. If, on the other hand, quality improvements in new models tend to be introduced with no change in price, the deletion technique causes the exclusion of reductions in "true price" and leads to an

upward secular bias.

The new catalog price indexes for apparel cover 39 types of women's, men's, girls' and boys' apparel over part or all of the period 1914-93, covering the years from the beginning of the CPI in 1914 to the date when Sears discontinued publication of its general catalog in 1993. Details on the types of apparel are shown separately for 1914-47, 1947-65, and 1965-93 in Tables 1A, 1B, and 1C. The sum of matched-model comparisons in Tables 1 and 2 is 10,385, an average of 52 per year during 1914-47 (for a total of 1719), an average of 146 per year during 1947-65 (for a total of 4432), and 151 per year during 1965-93 (for a total of 4234).

## Matched-Model Results, 1914-47

For the 1914-47 period the matched-model indexes cover 37 types of womens' and mens' apparel, as shown in Table 1A. There are an average of 1.5 model comparisons each year for each of the 37 product groups. Separate catalog price indexes and comparisons with the CPI are displayed in Tables 2 and 3 for womens' and mens' apparel; the comparison for each is with the total CPI apparel index before 1935, since the CPI began to break out separate aggregates for womens' and mens' apparel only in that year. Figures 1 and 2 plot the numbers listed in Tables 2 and 3.

For womens' apparel the 1914-47 annual growth rate of the Sears matched model index is 1.69 percent per year, considerably slower than the

CPI increase of 2.87 percent per year, implying growth rate of the Sears/CPI ratio of -1.18 percent per year. The difference is similar for mens' apparel, 1.74 percent per year for Sears vs. 3.10 percent for the CPI, implying a growth rate of the Sears/CPI ratio of -1.36 percent per year.

A striking aspect of the results is that much of the decline in the Sears/CPI ratio occurs during a single pair of years, 1934-35. The most obvious explanation would be a major mistake in transcribing the Sears prices, so we have double-checked and triple-checked the 1934-35 comparisons. Here are some sample prices for this pair of years for particular closing items classified as identical by our matched-model procedure:

| | *1934* | *1935* |
|---|---|---|
| Mens' Suits | 13.50 | 11.95 |
| Mens' Union Suits | 0.79 | 0.59 |
| Mens' work socks | 0.17 | 0.12 |
| Mens' wool pants | 4.85 | 4.45 |
| Mens' "Chieftan" overalls | 0.88 | 0.77 |
| Womens' silk slips | 1.98 | 1.69 |
| Womens' cotton hosiery | 0.33 | 0.25 |
| Womens' washfast house dresses | 0.95 | 0.49 |
| Women's rayon glovers | 0.98 | 0.59 |
| Women's rayon pajamas | 1.00 | 0.59 |

It is possible that Sears changed its pricing policy relative to the rest of the marketplace in 1935, but it is also possible that the CPI missed a shift in the availability of discount outlets during the Great Depression — perhaps an early example of "outlet substitution bias."

## Matched Model Results, 1947-93

Tables 2 and 3 provide postwar data on the Sears matched-model indexes and a comparison with the CPI for womens' and mens' apparel, and Tables 4 and 5 cover girls' and boys' apparel. The following in-text table provides a summary of growth rates of the Sears and CPI indexes over the entire 1947-93 period and various subperiods. Various patterns can be picked up from the results. First, there is a consistent downward drift in the Sears/CPI ratio for womens' apparel in all periods but the last, 1978-93. Second, there is a distinct turnaround in the drift of the Sears/CPI ratio for mens' apparel from negative over 1914-65 to positive during 1965-93, with a small overall negative drift over the entire period. Third, there is a consistent tendency for the inflation rate in women's apparel to be a smaller positive rate or larger negative rate than for mens' apparel, and this difference is consistently more pronounced for the Sears indexes than for the CPI. This finding is consistent with the view that matched-model indexes "link out" more quality change for womens' apparel which are subject to more frequent model changes. Averaging together womens' and mens' apparel for 1914-93 with girls' and boys' apparel for 1978-93, the Sears indexes increase less than the CPI during 1914-78 and by more during 1978-93, and the overall drift in the Sears/CPI ratio for the entire period is rougly -1.0 percent per year. The annual data presented in Tables 2, 3, 6, and 7 are also displayed in Figures 1-4.

| | **1914-47** | **1947-65** | **1965-78** | **1978-93** | **1914-93** |
|---|---|---|---|---|---|
| Womens' Sears | 1.68 | -1.83 | 2.49 | 2.37 | 1.15 |
| Womens' CPI | 2.87 | 0.24 | 3.57 | 2.39 | 2.30 |
| Womens' Sears/CPI | -1.19 | -2.07 | -1.08 | -0.02 | -1.15 |
| Mens' Sears | 1.74 | 0.21 | 5.34 | 3.55 | 2.33 |
| Mens' CPI | 3.10 | 1.00 | 3.97 | 2.89 | 2.72 |
| Mens' Sears/CPI | -1.36 | -0.79 | 1.37 | 0.67 | -0.39 |
| Total Sears | 1.71 | -0.70 | 3.51 | 3.34 | 1.77 |
| Total CPI | 3.43 | 0.53 | 3.77 | 2.89 | 2.72 |
| Total Sears/CPI | -1.72 | -1.22 | -0.25 | 0.44 | -0.95 |

## *V. Hedonic Price Indexes for Womens' Dresses*

The methodology of hedonic price indexes is by now sufficiently familiar that this section will be limited to those factors unique to the estimation of hedonic indexes for apparel. Thus far only womens' dresses have been examined. The choice of variables is limited to those provided in the catalogs, which differ from year to year. Womens' dresses are complex products and many of their features are visible only in photos (e.g., decorative items, pockets, belts, etc.) With a limited sample size, only a few explanatory variables could be included.

Womens' dresses were chosen as the first apparel item to be studied with the hedonic regression technique, in addition to the many apparel products already studied with the matched-model approach, because the catalog contains more annual price quotations for womens' dresses than for any other single apparel product. Indeed, the sample sizes for the hedonic study of womens' dresses are much larger than the sample on which the matched model indexes for dresses is based (only 0.9 matches during 1914-47 and only 3.3 matches during 1965-93). Nevertheless, we should recognize at the outset that few commodities are subject to as rapid or profound changes in consumer taste as womens' dresses. Throughout its history, the Sears catalog has been a follower rather than leader in the world of fashion. Perhaps the unobserved

coefficient on the "fashion component" of Sears dresses remained relatively constant, although it could also be argued that catalog technology was the "new economy" of 1914 and that Sears made high fashion available at modest prices in its early years but in its later years became dowdy and unfashionable (see catalog photos).[8] This would suggest that the long-term increase in Sears prices would overstate the rate of price increase for any given apparel product in the economy as a whole.

The list of variables is displayed in Table 8. Of these the most important is weight, which proxies the quality of fabric, amount of fabric, complexity of construction, presence of linings, etc., and would be expected to have a positive coefficient. The only other variable that can be quantified from the catalog descriptions is the median size offered, which would also be expected to have a positive coefficient. In addition several dummy variables were included to indicate the presence or absence of knit or synthetic fabrics. Also in the earlier years, when Sears tended to sell fancier and more elaborate dresses, it was possible also to include dummy variables for the presence of silk or wool fabrics. In the postwar years Sears did not sell silk or wool dresses. Thus the regressions include two variables expressed as logs of actual values (weight and

8. The catalog photos are from 1902 rather than 1914 since I have a hard copy of that earlier year and can reproduce the photos more easily than using the 1914 microfilms.

median size) and the rest expressed as 0,1 or 0,1,2 dummy variables.

As in any study in which the primary question is long-term price trends, there is a tradeoff between collecting more data for any given year and skipping some years, as contrasted with collecting less data for any given year and including more years. As a compromise data were collected at five-year intervals from 1914 to 1993.[9] By copying data for only every five years, instead of every year, enough time was saved in order to allow copying of data for literally every dress sold by Sears in every covered year. An unfortunate omission is that the Sears catalog did not report the weight of womens' dresses between 1925 and 1934, and this precluded doing regressions for these years, e.g., 1930, since weight was the most important explanatory variable.

Table 9 exhibits the mean values of price and of the explanatory variables. We note that mean price jumps around from year to year but on average in 1993 was 13.3 times the average in 1914 ($63.52 versus $4.75). Recall above that the ratio for the median price was 32.7, indicating that the mean of the 1914 distribution was skewed upward by relatively expensive dresses. Weight drifted downwards over the years from an average of 1.66 pounds in 1914 to 0.93 pounds in 1980 (the jump back to 2.15 pounds in 1993 is an anomaly discussed below). The balance between natural and synthetic fabrics changed from 100 percent natural during 1914-20 to more

9. Data were also collected annually from 1970 to 1993. Results on annual data are not yet finished and are not reported in this paper.

than half synthetic after 1971. Sample size varied substantially and reached its maximum in the 1955-65 period (this is also evident in the large number of matched model comparisons in Table 1B).[10] In 1990-93 there was a sharp change in composition to higher-weight dresses with 85 percent synthetic fabrics.

As discussed in the context of mainframe computers by Gordon (1989), there is a tradeoff between two extremes in running hedonic price regressions on long time-series of data. One extreme would be to run separate regressions on every pair of years. This has the advantage of allowing the regression coefficients on characteristics like weight to shift as market and production conditions change, and the disadvantage that it minimizes sample size. The opposite extreme would be to run a single regression on all the data for all the

10. The number of observations in the bottom line of Table 10 is the number actually entered into the regressions reported there for each pair of years. The number of observations in Table 9 is the total number of dresses recorded in each single year. When the number in Table 10 is smaller than in Table 9, this indicates that some of the observations were unusable due to missing information. An improved reconciliation of these two sets of sample size indicators will be provided in the next version of the paper.

years. This has the advantage of maximizing sample size and the disadvantage that it forces coefficients on characteristics to remain the same over a sample period of 79 years.

In the case of apparel, there is the additional consideration that fabrics changed over time — silk disappeared and synthetics appeared, and so an approach that allowed for changing coefficients seemed essential. There were sufficient data to base the estimated coefficients on each successive pair of years. Looking at the regression coefficients, those on weight are almost always highly significant, with an average estimated elasticity of 0.60. The coefficients on wool are always positive (except for 1960-65) and for rayon negative, although most of these coefficients are not significant.

The implied hedonic price index for womens' dresses is displayed in Table 11 and in Figure 5. The following in-text table summarizes the growth rates of the three indexes for womens' dresses over key intervals. We stop in 1985 in order to avoid basing conclusions on the hedonic index for 1990 and 1993, including as they do very small samples. As is evident in Figure 5, the hedonic index always grows faster than the matched-model index, especially

| | **1914-45** | **1945-65** | **1965-75** | **1975-85** | **1914-85** |
|---|---|---|---|---|---|
| Sears Hedonic | 3.39 | 3.60 | 4.50 | 4.15 | 3.71 |
| Sears Matched Model | 1.38 | -2.09 | 2.74 | 3.74 | 1.01 |
| CPI | 2.42 | 0.75 | 4.97 | 1.72 | 2.22 |
| Hedonic/MM | 2.01 | 5.69 | 1.76 | 0.41 | 2.70 |
| Hedonic/CPI | 0.97 | 2.85 | -0.47 | 2.43 | 1.49 |

during the 1946-65 interval. During all intervals except 1965-75, the hedonic index also grows faster than the CPI.

The hedonic index raises several questions deserving further study. In the table above the period 1985-93 has been omitted because of the small sample size and turnaround in the secular decline in weight, suggesting the possibility of a change in definition of weight. In further research we shall experiment with different groupings of data. Instead of estimating five-year price changes from a single regression of observations five years apart, we can compare these results with those obtained from a single regression combining

six years of annual data (i.e., every year between 1980 and 1985, inclusive). We shall also attempt to carry out a hedonic regression analysis of some other types of apparel, particularly to study the issue of whether the slower growth rate of prices for womens' than for mens' apparel, evident in the results of Tables 2 and 3, holds for hedonic indexes as well.

## *Conclusion*

This paper develops new price indexes for apparel based on data from the Sears catalog for the entire period 1914-93, beginning in the first year of the CPI and ending in the last year of the general Sears catalog. The research, which is based on roughly 10,000 exact comparisons for the matched model index and a much smaller number of observations on the prices and quality characteristics of womens' dresses, leads to several conclusions and numerous questions for further research.

The Sears matched-model indexes do not exhibit a consistent negative or positive drift relative to the CPI. For womens' apparel the drift is always negative but for mens' apparel there is a turnaround, from negative before 1965 to positive thereafter. Both the matched-model indexes and the CPI rise less rapidly for womens' apparel than for mens' apparel, which would be consistent with the hypothesis that price changes accompanying model changes are more frequent for womens' apparel, since models change more frequently.

The hedonic price index for womens' dresses always increases faster than the matched-model index. It also increases faster than the CPI for dresses in each time interval except for 1965-75. To the extent that the Sears hedonic and matched model indexes are based on the same data, so that systematic differences between catalog market shares and pricing policies are not relevant, the results provided here may offer a nice complement to past research on computer prices, which also found that price changes were contemporaneous with model changes. Just as hedonic price indexes for computers almost always drop faster than matched-model indexes for computers, we have found the opposite relationship for apparel prices, although presumably for the same reason.

Much remains to be done. Just as in my book on durable goods prices, I believe that puzzles about price behavior over long intervals may be narrowed down, if not solved, by inspection of "closely similar models" in the raw data several decades apart. This cannot be done retrospectively for the CPI, but catalog data are ideally suited for this kind of supplementary study. How much did standard types of womens' and mens' apparel, as depicted in the catalog, differ in 1914, 1945, 1965, 1980, and 1993, and do the raw price changes for goods than seem to be "roughly similar" support the matched-model indexes, the hedonic approach, the CPI, or none of these? Precisely when and how do the matched-model indexes "miss" positive price changes that are captured by the hedonic indexes. This alternative approach may have

some potential for rapid payoff with fewer research resources than have been invested thus far.

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**TABLE 1A**

**Sears Products and Corresponding CPI Products - Apparel 1914-47**

| Sears Product | Years Excluded | CPI Products | Comparisons Per Year |
|---|---|---|---|
| Women's Apparel | | Women's and Girl's Apparel | 26.0 |
| Coats | --- | Wool Apparel | 1.7 |
| Skirts | --- | | 1.3 |
| Dresses | --- | Rayon and Silk Apparel | 1.2 |
| Slips | 1926-47 | | 1.6 |
| Panties | --- | | 0.8 |
| Hosiery | --- | | 1.0 |
| Pajamas | 1914-29 | | 1.0 |
| Dresses | --- | Cotton Apparel | 0.9 |
| Housedresses | --- | | 1.5 |
| Nightgowns | --- | | 0.6 |
| Unionsuits | --- | | 1.6 |
| Hosiery | --- | | 1.0 |
| Bloomers | 1927-47 | | 0.4 |
| Slips | --- | | 0.6 |
| Hats, wool | --- | Other Apparel | 1.9 |
| Gloves | --- | | 1.8 |
| Girdles | --- | | 1.6 |
| Brassieres | --- | | 1.8 |
| Rubbers | --- | Footwear | 1.8 |
| Street Shoes | --- | | 1.9 |
| Men's Apparel | | Men's and Boy's Apparel | 26.1 |
| Suits | --- | Wool Apparel | 2.0 |
| Trousers | --- | | 1.8 |
| Sweaters | 1914-22 | | 1.4 |
| Overcoats | 1931-46 | | 0.5 |
| Socks | --- | Rayon Apparel | 0.9 |
| Overcoats | --- | Cotton Apparel | 1.7 |
| Overalls | 1946-47 | | 1.6 |
| Shirts, work | --- | | 0.9 |
| Shirts, business | --- | | 1.0 |
| Pajamas | 1946-47 | | 1.6 |
| Unionsuits | --- | | 2.1 |
| Socks | --- | | 1.0 |
| Hats, wool | --- | Other Apparel | 2.1 |
| Neckties | --- | | 1.8 |
| Rubbers | --- | Footwear | 1.9 |
| Street Shoes | --- | | 1.9 |
| Work Shoes | --- | | 1.9 |

**TABLE 1B**

**Sears Products and Corresponding CPI Products - Apparel (1947-1964)**

| Sears Products | Years Excluded | CPI Products | Sears Comparison per Year |
|---|---|---|---|
| Women's Apparel | … | Women's Apparel | 99.4 |
| Bathrobes | 1947-48, 1963-64 | Underwear, nightwear, hosiery, and accessories | 3.9 |
| Brassieres | … | | 19.8 |
| Camisoles | 1947-49, 50-52, 63-65 | | 2.0 |
| Hosiery | … | | 13.2 |
| Panties | … | | 29.9 |
| Slips | 1947-48 | | 9.5 |
| Jackets | 1947-48 | Coats and Jackets | 4.4 |
| Jeans | 1953-54 | Separates and Sportswear | 5.3 |
| Pants | … | | 5.9 |
| Skirts | 1947-49 | | 2.4 |
| Dresses | 1948-49, 60-61, 63-64 | Dresses | 3.1 |
| Men's Apparel | | Men's Apparel | 146.8 |
| Bathrobes | 1960-61 | Furnishings and special clothing | 2.3 |
| Belts | … | | 5.8 |
| Coveralls | … | | 3.7 |
| Pajamas | 1947-48 | | 3.4 |
| Shorts | 1947-55 | | 1.4 |
| Socks | 1964-65 | | 16.5 |
| Swimming Trunks | 1947-48, 49-50, 53-55 | | 2.4 |
| Undershirt | … | | 10.6 |
| Underwear | 1947-48 | | 20.1 |
| Jeans | 1947-48 | Dungarees, Jeans, and Trousers | 10.3 |
| Pants | … | | 12.4 |
| Dress Shirts | … | Shirts | 11.1 |
| Shirts | … | | 13.4 |
| Blazers | 1962-63 | Suits, sport coats, coats, and jackets | 1.8 |
| Jackets | … | | 10.7 |
| Rainwear | … | | 12.6 |
| Suits | 1947-48, 62-64 | | 8.1 |

**TABLE 1C**

**Sears Products and Corresponding CPI Products - Apparel 1965-93**

| Sears Products | CPI Products | Comparison Per Year |
|---|---|---|
| Women's Apparel | Women's Apparel | 57.9 |
| Bathrobes | Underwear, nightwear, hosiery, and accessories | 3.3 |
| Bras | | 9.3 |
| Camisoles | | 2.4 |
| Hosiery | | 7.7 |
| Panties | | 9.3 |
| Slips | | 6.1 |
| Jackets | Coats and Jackets | 4.7 |
| Jeans | Separates and Sportswear | 4.4 |
| pants | | 4.1 |
| Skirts | | 3.4 |
| Dresses | Dresses | 3.3 |
| Men's Apparel | Men's Apparel | 93.3 |
| Bathrobes | Furnishings and special clothing | 3.1 |
| Belts | | 4.8 |
| Coveralls | | 5.2 |
| Pajamas | | 5 |
| Jumpsuits | | 3.2 |
| Shorts | | 3.1 |
| Socks | | 8.3 |
| Swimming Trunks | | 2.4 |
| Undershirts | | 8.1 |
| Underwear | | 10.8 |
| Jeans | Dungarees, Jeans, and Trousers | 7.5 |
| Pants | | 5.7 |
| Dress Shirts | Shirts | 4.4 |
| Shirts | | 7.8 |
| Blazers | Suits, sport coats, coats, and jackets | 3.7 |
| Jackets | | 6.8 |
| Rainwear | | 4.5 |

**TABLE 2**

**Matched-Model Apparel Price Indexes (1980 = 100), 1914-93**

| WOMEN'S APPAREL | | | | |
|---|---|---|---|---|
| YEAR | SEARS | CPI | SEARS/CPI | OBSERVATIONS |
| 1914 | 52.2 | 22.5 | 2.32 | 27 |
| 1915 | 54.4 | 22.9 | 2.37 | 30 |
| 1916 | 80.0 | 25.2 | 3.18 | 28 |
| 1917 | 92.1 | 30.2 | 3.04 | 28 |
| 1918 | 115.3 | 40.9 | 2.82 | 30 |
| 1919 | 148.1 | 54.2 | 2.73 | 31 |
| 1920 | 195.0 | 64.5 | 3.02 | 30 |
| 1921 | 123.6 | 49.7 | 2.49 | 28 |
| 1922 | 104.7 | 40.4 | 2.59 | 27 |
| 1923 | 97.1 | 40.6 | 2.39 | 28 |
| 1924 | 94.8 | 40.1 | 2.36 | 23 |
| 1925 | 92.6 | 39.4 | 2.35 | 31 |
| 1926 | 89.5 | 38.8 | 2.31 | 31 |
| 1927 | 84.0 | 37.9 | 2.22 | 29 |
| 1928 | 80.0 | 37.4 | 2.14 | 31 |
| 1929 | 75.3 | 37.0 | 2.04 | 28 |
| 1930 | 75.2 | 36.2 | 2.07 | 30 |
| 1931 | 69.9 | 32.9 | 2.12 | 27 |
| 1932 | 57.0 | 29.2 | 1.95 | 30 |
| 1933 | 54.6 | 28.1 | 1.94 | 28 |
| 1934 | 64.7 | 30.8 | 2.10 | 28 |
| 1935 | 51.6 | 31.1 | 1.66 | 26 |
| 1936 | 53.4 | 31.5 | 1.70 | 25 |
| 1937 | 53.2 | 33.0 | 1.61 | 26 |
| 1938 | 52.1 | 32.8 | 1.59 | 24 |
| 1939 | 52.2 | 32.4 | 1.61 | 23 |
| 1940 | 55.7 | 32.6 | 1.71 | 26 |
| 1941 | 57.2 | 34.1 | 1.68 | 27 |
| 1942 | 66.0 | 39.4 | 1.67 | 24 |
| 1943 | 67.0 | 39.1 | 1.71 | 26 |
| 1944 | 74.1 | 44.3 | 1.67 | 22 |
| 1945 | 75.0 | 46.7 | 1.61 | 26 |
| 1946 | 81.2 | 50.2 | 1.62 | 23 |
| 1947 | 90.9 | 58.1 | 1.56 | 23 |

**TABLE 2 (cont'd.)**

**Matched-Model Apparel Price Indexes (1980 = 100), 1914-93**

**WOMEN'S APPAREL**

| YEAR | SEARS | CPI | SEARS/CPI | OBSERVATIONS |
|---|---|---|---|---|
| 1948 | 87.3 | 61.6 | 1.42 | 57 |
| 1949 | 86.6 | 58.2 | 1.49 | 85 |
| 1950 | 80.8 | 56.2 | 1.44 | 83 |
| 1951 | 86.8 | 60.5 | 1.43 | 95 |
| 1952 | 84.5 | 59.8 | 1.41 | 90 |
| 1953 | 72.2 | 59.1 | 1.22 | 89 |
| 1954 | 74.1 | 58.6 | 1.26 | 114 |
| 1955 | 71.3 | 58.1 | 1.23 | 106 |
| 1956 | 71.5 | 58.5 | 1.22 | 101 |
| 1957 | 68.9 | 58.8 | 1.17 | 109 |
| 1958 | 68.9 | 58.7 | 1.17 | 127 |
| 1959 | 68.3 | 59.0 | 1.16 | 135 |
| 1960 | 68.8 | 59.3 | 1.16 | 118 |
| 1961 | 67.7 | 59.5 | 1.14 | 142 |
| 1962 | 67.9 | 59.4 | 1.14 | 79 |
| 1963 | 65.8 | 59.9 | 1.10 | 101 |
| 1964 | 64.6 | 60.2 | 1.07 | 82 |
| 1965 | 65.4 | 60.7 | 1.08 | 91 |
| 1966 | 65.6 | 61.9 | 1.06 | 100 |
| 1967 | 69.3 | 64.7 | 1.07 | 89 |
| 1968 | 71.1 | 68.6 | 1.04 | 87 |
| 1969 | 73.1 | 72.3 | 1.01 | 88 |
| 1970 | 73.4 | 75.0 | 0.98 | 91 |
| 1971 | 73.5 | 77.8 | 0.95 | 58 |
| 1972 | 73.9 | 79.6 | 0.93 | 58 |
| 1973 | 76.1 | 82.3 | 0.92 | 46 |
| 1974 | 82.2 | 87.3 | 0.94 | 47 |
| 1975 | 85.7 | 89.4 | 0.96 | 47 |
| 1976 | 80.1 | 91.9 | 0.87 | 48 |
| 1977 | 86.1 | 94.7 | 0.91 | 42 |
| 1978 | 90.4 | 96.6 | 0.94 | 61 |
| 1979 | 96.4 | 98.3 | 0.98 | 43 |
| 1980 | 100.0 | 100.0 | 1.00 | 44 |
| 1981 | 107.3 | 101.3 | 1.06 | 50 |
| 1982 | 116.8 | 102.4 | 1.14 | 39 |
| 1983 | 123.9 | 104.3 | 1.19 | 48 |
| 1984 | 129.2 | 105.7 | 1.22 | 59 |
| 1985 | 134.4 | 109.7 | 1.23 | 72 |
| 1986 | 133.3 | 108.8 | 1.23 | 77 |
| 1987 | 134.9 | 115.5 | 1.17 | 32 |
| 1988 | 137.1 | 120.1 | 1.14 | 32 |
| 1990 | 124.4 | 128.0 | 0.97 | 37 |
| 1991 | 118.7 | 132.9 | 0.89 | 34 |
| 1992 | 127.6 | 135.5 | 0.94 | 44 |
| 1993 | 129.0 | 138.2 | 0.93 | … |

**TABLE 3**

**Matched-Model Apparel Price Indexes (1980 = 100), 1914-93**

**MEN'S APPAREL**

| YEAR | SEARS | CPI | SEARS/CPI | OBSERVATIONS |
|---|---|---|---|---|
| 1914 | 24.3 | 16.9 | 1.44 | 28 |
| 1915 | 24.3 | 17.3 | 1.41 | 27 |
| 1916 | 29.1 | 19.0 | 1.53 | 26 |
| 1917 | 32.9 | 22.8 | 1.44 | 29 |
| 1918 | 42.7 | 30.8 | 1.38 | 26 |
| 1919 | 53.5 | 40.9 | 1.31 | 25 |
| 1920 | 63.8 | 48.7 | 1.31 | 23 |
| 1921 | 47.3 | 37.5 | 1.26 | 21 |
| 1922 | 45.8 | 30.5 | 1.50 | 26 |
| 1923 | 41.4 | 30.6 | 1.35 | 28 |
| 1924 | 42.6 | 30.3 | 1.41 | 27 |
| 1925 | 41.0 | 29.7 | 1.38 | 28 |
| 1926 | 39.4 | 29.2 | 1.35 | 26 |
| 1927 | 37.4 | 28.6 | 1.31 | 25 |
| 1928 | 40.1 | 28.2 | 1.42 | 22 |
| 1929 | 39.4 | 27.9 | 1.41 | 27 |
| 1930 | 40.4 | 27.3 | 1.48 | 30 |
| 1931 | 37.1 | 24.8 | 1.49 | 27 |
| 1932 | 29.1 | 22.0 | 1.32 | 29 |
| 1933 | 28.0 | 21.2 | 1.32 | 30 |
| 1934 | 32.8 | 23.3 | 1.41 | 30 |
| 1935 | 23.6 | 23.5 | 1.00 | 27 |
| 1936 | 24.5 | 23.8 | 1.03 | 27 |
| 1937 | 25.0 | 25.1 | 1.00 | 28 |
| 1938 | 23.4 | 25.0 | 0.94 | 28 |
| 1939 | 23.6 | 24.5 | 0.96 | 29 |
| 1940 | 27.5 | 25.0 | 1.10 | 29 |
| 1941 | 25.6 | 26.2 | 0.98 | 26 |
| 1942 | 29.4 | 30.5 | 0.96 | 22 |
| 1943 | 31.0 | 32.0 | 0.97 | 25 |
| 1944 | 31.4 | 33.5 | 0.94 | 24 |
| 1945 | 31.4 | 34.9 | 0.90 | 21 |
| 1946 | 32.7 | 39.6 | 0.82 | 22 |
| 1947 | 43.2 | 47.0 | 0.92 | 52 |

**TABLE 3 (cont'd.)**

**Matched-Model Apparel Price Indexes (1980 = 100), 1914-93**

**MEN'S APPAREL**

| YEAR | SEARS | CPI | SEARS/CPI | OBSERVATIONS |
|---|---|---|---|---|
| 1948 | 41.8 | 49.6 | 0.84 | 95 |
| 1949 | 41.4 | 48.2 | 0.86 | 95 |
| 1950 | 40.1 | 48.0 | 0.84 | 118 |
| 1951 | 44.5 | 51.9 | 0.86 | 126 |
| 1952 | 43.1 | 52.2 | 0.83 | 121 |
| 1953 | 42.8 | 51.8 | 0.83 | 132 |
| 1954 | 42.8 | 51.5 | 0.83 | 130 |
| 1955 | 40.7 | 50.9 | 0.80 | 131 |
| 1956 | 41.1 | 51.8 | 0.79 | 141 |
| 1957 | 41.0 | 52.6 | 0.78 | 137 |
| 1958 | 41.7 | 52.4 | 0.80 | 138 |
| 1959 | 43.2 | 52.3 | 0.83 | 133 |
| 1960 | 43.9 | 53.3 | 0.82 | 141 |
| 1961 | 44.2 | 53.9 | 0.82 | 127 |
| 1962 | 45.1 | 54.2 | 0.83 | 121 |
| 1963 | 45.3 | 54.9 | 0.82 | 128 |
| 1964 | 45.4 | 55.7 | 0.81 | 126 |
| 1965 | 44.9 | 56.3 | 0.80 | 135 |
| 1966 | 45.9 | 57.8 | 0.79 | 177 |
| 1967 | 48.7 | 60.0 | 0.81 | 152 |
| 1968 | 51.5 | 63.3 | 0.81 | 118 |
| 1969 | 55.0 | 67.4 | 0.82 | 128 |
| 1970 | 56.3 | 70.2 | 0.80 | 118 |
| 1971 | 58.3 | 72.2 | 0.81 | 102 |
| 1972 | 60.1 | 73.1 | 0.82 | 90 |
| 1973 | 64.0 | 75.8 | 0.84 | 77 |
| 1974 | 70.3 | 81.8 | 0.86 | 73 |
| 1975 | 79.9 | 85.3 | 0.94 | 69 |
| 1976 | 78.4 | 88.2 | 0.89 | 82 |
| 1977 | 87.1 | 92.3 | 0.94 | 88 |
| 1978 | 89.9 | 94.3 | 0.95 | 92 |
| 1979 | 92.3 | 95.7 | 0.96 | 78 |
| 1980 | 100.0 | 100.0 | 1.00 | 86 |
| 1981 | 109.7 | 105.4 | 1.04 | 86 |
| 1982 | 120.7 | 109.5 | 1.10 | 82 |
| 1983 | 126.3 | 112.2 | 1.13 | 62 |
| 1984 | 132.2 | 114.3 | 1.16 | 91 |
| 1985 | 136.0 | 117.7 | 1.16 | 110 |
| 1986 | 134.6 | 119.1 | 1.13 | 106 |
| 1987 | 131.5 | 123.6 | 1.06 | 51 |
| 1988 | 134.4 | 128.7 | 1.04 | 60 |
| 1990 | 142.2 | 137.8 | 1.03 | 70 |
| 1991 | 142.2 | 142.2 | 1.00 | 63 |
| 1992 | 155.4 | 144.6 | 1.07 | 72 |
| 1993 | 153.2 | 145.4 | 1.05 | … |

**TABLE 4**

**Matched-Model Apparel Price Indexes (1980 = 100), 1978-93**

| GIRL'S APPAREL | | | | |
|---|---|---|---|---|
| **YEAR** | **SEARS** | **CPI** | **SEARS/CPI** | **OBSERVATIONS** |
| 1978 | 88.8 | 95.3 | 0.93 | 21 |
| 1979 | 95.9 | 96.6 | 0.99 | 22 |
| 1980 | 100.0 | 100.0 | 1.00 | 24 |
| 1981 | 107.5 | 103.6 | 1.04 | 18 |
| 1982 | 116.5 | 103.6 | 1.12 | 18 |
| 1983 | 129.4 | 104.6 | 1.24 | 19 |
| 1984 | 134.3 | 104.6 | 1.28 | 21 |
| 1985 | 141.8 | 107.6 | 1.32 | 22 |
| 1986 | 145.2 | 106.4 | 1.37 | 21 |
| 1987 | 141.2 | 112.2 | 1.26 | 12 |
| 1988 | 151.7 | 117.4 | 1.29 | 6 |
| 1990 | 126.7 | 125.9 | 1.01 | 14 |
| 1991 | 139.0 | 133.3 | 1.04 | 16 |
| 1992 | 153.2 | 138.0 | 1.11 | 15 |
| 1993 | 157.9 | 137.5 | 1.15 | … |

**TABLE 5**

**Matched-Model Apparel Price Indexes (1980 = 100), 1978-93**

| BOY'S APPAREL | | | | |
|---|---|---|---|---|
| **YEAR** | **SEARS** | **CPI** | **SEARS/CPI** | **OBS** |
| 1978 | 87.1 | 90.1 | 0.97 | 29 |
| 1979 | 95.2 | 94.2 | 1.01 | 30 |
| 1980 | 100.0 | 100.0 | 1.00 | 27 |
| 1981 | 106.8 | 105.0 | 1.02 | 29 |
| 1982 | 116.8 | 108.1 | 1.08 | 25 |
| 1983 | 120.1 | 112.0 | 1.07 | 19 |
| 1984 | 121.5 | 113.9 | 1.07 | 29 |
| 1985 | 123.3 | 116.7 | 1.06 | 28 |
| 1986 | 125.1 | 117.1 | 1.07 | 27 |
| 1987 | 127.0 | 115.7 | 1.10 | 8 |
| 1988 | 127.8 | 119.2 | 1.07 | 2 |
| 1990 | 128.3 | 121.4 | 1.06 | 20 |
| 1991 | 131.8 | 125.4 | 1.05 | 17 |
| 1992 | 140.9 | 129.0 | 1.09 | 19 |
| 1993 | 138.5 | 131.0 | 1.06 | … |

**TABLE 6**

**Matched-Model Apparel Price Indexes (1980 = 100), 1914-93**

| ALL APPAREL | | | | |
|---|---|---|---|---|
| **YEAR** | **SEARS** | **CPI** | **SEARS/CPI** | **OBSERVATIONS** |
| 1914 | 36.6 | 16.5 | 2.22 | 55 |
| 1915 | 37.4 | 16.8 | 2.22 | 57 |
| 1916 | 50.0 | 18.5 | 2.70 | 54 |
| 1917 | 57.1 | 22.2 | 2.57 | 57 |
| 1918 | 72.6 | 30.0 | 2.42 | 56 |
| 1919 | 92.2 | 39.8 | 2.32 | 56 |
| 1920 | 116.6 | 47.4 | 2.46 | 53 |
| 1921 | 79.0 | 36.5 | 2.16 | 49 |
| 1922 | 71.2 | 29.7 | 2.40 | 53 |
| 1923 | 65.2 | 29.8 | 2.19 | 56 |
| 1924 | 65.3 | 29.5 | 2.21 | 50 |
| 1925 | 57.5 | 28.9 | 1.99 | 59 |
| 1926 | 61.0 | 28.5 | 2.14 | 57 |
| 1927 | 57.5 | 27.8 | 2.07 | 54 |
| 1928 | 58.1 | 27.5 | 2.11 | 53 |
| 1929 | 56.0 | 27.2 | 2.06 | 55 |
| 1930 | 56.6 | 26.6 | 2.13 | 60 |
| 1931 | 52.3 | 24.2 | 2.16 | 54 |
| 1932 | 41.9 | 21.5 | 1.95 | 59 |
| 1933 | 40.1 | 20.7 | 1.94 | 58 |
| 1934 | 47.3 | 22.7 | 2.09 | 58 |
| 1935 | 35.9 | 22.9 | 1.57 | 53 |
| 1936 | 37.2 | 23.1 | 1.61 | 52 |
| 1937 | 37.4 | 24.2 | 1.55 | 54 |
| 1938 | 35.9 | 24.1 | 1.49 | 52 |
| 1939 | 36.0 | 23.8 | 1.52 | 52 |
| 1940 | 40.2 | 24.0 | 1.68 | 55 |
| 1941 | 39.2 | 25.1 | 1.56 | 53 |
| 1942 | 45.2 | 29.4 | 1.54 | 46 |
| 1943 | 46.8 | 30.6 | 1.53 | 51 |
| 1944 | 49.6 | 32.8 | 1.51 | 46 |
| 1945 | 49.9 | 34.5 | 1.44 | 47 |
| 1946 | 53.0 | 37.8 | 1.40 | 45 |
| 1947 | 64.3 | 51.2 | 1.26 | 75 |

**TABLE 6 (cont'd.)**

**Matched-Model Apparel Price Indexes (1980 = 100), 1914-93**

| ALL APPAREL | | | | |
|---|---|---|---|---|
| **YEAR** | **SEARS** | **CPI** | **SEARS/CPI** | **OBSERVATIONS** |
| 1948 | 61.8 | 54.3 | 1.14 | 152 |
| 1949 | 61.4 | 51.7 | 1.19 | 180 |
| 1950 | 58.4 | 50.8 | 1.15 | 201 |
| 1951 | 64.0 | 54.8 | 1.17 | 221 |
| 1952 | 62.0 | 54.4 | 1.14 | 211 |
| 1953 | 57.2 | 53.9 | 1.06 | 221 |
| 1954 | 57.9 | 53.4 | 1.08 | 244 |
| 1955 | 55.3 | 53.0 | 1.04 | 237 |
| 1956 | 55.5 | 53.5 | 1.04 | 242 |
| 1957 | 54.4 | 54.0 | 1.01 | 246 |
| 1958 | 55.0 | 53.9 | 1.02 | 265 |
| 1959 | 55.6 | 54.0 | 1.03 | 268 |
| 1960 | 56.6 | 54.5 | 1.04 | 259 |
| 1961 | 56.9 | 54.8 | 1.04 | 269 |
| 1962 | 57.6 | 54.9 | 1.05 | 200 |
| 1963 | 57.0 | 55.5 | 1.03 | 229 |
| 1964 | 56.7 | 55.9 | 1.01 | 208 |
| 1965 | 56.7 | 56.3 | 1.01 | 226 |
| 1966 | 57.4 | 57.3 | 1.00 | 277 |
| 1967 | 60.8 | 59.6 | 1.02 | 241 |
| 1968 | 63.5 | 63.0 | 1.01 | 205 |
| 1969 | 66.9 | 66.7 | 1.00 | 216 |
| 1970 | 67.9 | 69.4 | 0.98 | 209 |
| 1971 | 69.4 | 71.5 | 0.97 | 160 |
| 1972 | 70.9 | 72.9 | 0.97 | 148 |
| 1973 | 74.3 | 75.4 | 0.99 | 123 |
| 1974 | 81.2 | 80.9 | 1.00 | 120 |
| 1975 | 89.4 | 83.9 | 1.07 | 116 |
| 1976 | 86.2 | 86.3 | 1.00 | 130 |
| 1977 | 86.2 | 89.8 | 0.96 | 130 |
| 1978 | 89.5 | 91.9 | 0.97 | 153 |
| 1979 | 94.5 | 94.5 | 1.00 | 121 |
| 1980 | 100.0 | 100.0 | 1.00 | 130 |
| 1981 | 108.3 | 103.8 | 1.04 | 136 |
| 1982 | 118.4 | 105.5 | 1.12 | 121 |
| 1983 | 125.2 | 107.7 | 1.16 | 110 |
| 1984 | 130.0 | 109.2 | 1.19 | 150 |
| 1985 | 136.2 | 112.2 | 1.21 | 182 |
| 1986 | 135.6 | 112.6 | 1.20 | 183 |
| 1987 | 134.5 | 117.8 | 1.14 | 83 |
| 1988 | 137.9 | 123.0 | 1.12 | 92 |
| 1990 | 130.8 | 132.0 | 0.99 | 107 |
| 1991 | 137.2 | 137.0 | 1.00 | 97 |
| 1992 | 146.7 | 140.0 | 1.05 | 116 |
| 1993 | 147.6 | 141.8 | 1.04 | … |

**TABLE 7**

**Comparison of Sear/CPI Ratio (1980 = 1.0)**

| Year | Women's Apparel | Men's Apparel | All Apparel |
|---|---|---|---|
| 1914 | 2.32 | 1.44 | 2.22 |
| 1915 | 2.37 | 1.41 | 2.22 |
| 1916 | 3.18 | 1.53 | 2.70 |
| 1917 | 3.04 | 1.44 | 2.57 |
| 1918 | 2.82 | 1.38 | 2.42 |
| 1919 | 2.73 | 1.31 | 2.32 |
| 1920 | 3.02 | 1.31 | 2.46 |
| 1921 | 2.49 | 1.26 | 2.16 |
| 1922 | 2.59 | 1.50 | 2.40 |
| 1923 | 2.39 | 1.35 | 2.19 |
| 1924 | 2.36 | 1.41 | 2.21 |
| 1925 | 2.35 | 1.38 | 1.99 |
| 1926 | 2.31 | 1.35 | 2.14 |
| 1927 | 2.22 | 1.31 | 2.07 |
| 1928 | 2.14 | 1.42 | 2.11 |
| 1929 | 2.04 | 1.41 | 2.06 |
| 1930 | 2.07 | 1.48 | 2.13 |
| 1931 | 2.12 | 1.49 | 2.16 |
| 1932 | 1.95 | 1.32 | 1.95 |
| 1933 | 1.94 | 1.32 | 1.94 |
| 1934 | 2.10 | 1.41 | 2.09 |
| 1935 | 1.66 | 1.00 | 1.57 |
| 1936 | 1.70 | 1.03 | 1.61 |
| 1937 | 1.61 | 1.00 | 1.55 |
| 1938 | 1.59 | 0.94 | 1.49 |
| 1939 | 1.61 | 0.96 | 1.52 |
| 1940 | 1.71 | 1.10 | 1.68 |
| 1941 | 1.68 | 0.98 | 1.56 |
| 1942 | 1.67 | 0.96 | 1.54 |
| 1943 | 1.71 | 0.97 | 1.53 |
| 1944 | 1.67 | 0.94 | 1.51 |
| 1945 | 1.61 | 0.90 | 1.44 |
| 1946 | 1.62 | 0.82 | 1.40 |
| 1947 | 1.56 | 0.92 | 1.26 |
| 1948 | 1.42 | 0.84 | 1.14 |
| 1949 | 1.49 | 0.86 | 1.19 |

**TABLE 7 (cont'd.)**

**Comparison of Sear/CPI Ratio**

| Year | Women's Apparel | Men's Apparel | All Apparel |
|---|---|---|---|
| 1950 | 1.44 | 0.84 | 1.15 |
| 1951 | 1.43 | 0.86 | 1.17 |
| 1952 | 1.41 | 0.83 | 1.14 |
| 1953 | 1.22 | 0.83 | 1.06 |
| 1954 | 1.26 | 0.83 | 1.08 |
| 1955 | 1.23 | 0.80 | 1.04 |
| 1956 | 1.22 | 0.79 | 1.04 |
| 1957 | 1.17 | 0.78 | 1.01 |
| 1958 | 1.17 | 0.80 | 1.02 |
| 1959 | 1.16 | 0.83 | 1.03 |
| 1960 | 1.16 | 0.82 | 1.04 |
| 1961 | 1.14 | 0.82 | 1.04 |
| 1962 | 1.14 | 0.83 | 1.05 |
| 1963 | 1.10 | 0.82 | 1.03 |
| 1964 | 1.07 | 0.81 | 1.01 |
| 1965 | 1.08 | 0.80 | 1.01 |
| 1966 | 1.06 | 0.79 | 1.00 |
| 1967 | 1.07 | 0.81 | 1.02 |
| 1968 | 1.04 | 0.81 | 1.01 |
| 1969 | 1.01 | 0.82 | 1.00 |
| 1970 | 0.98 | 0.80 | 0.98 |
| 1971 | 0.95 | 0.81 | 0.97 |
| 1972 | 0.93 | 0.82 | 0.97 |
| 1973 | 0.92 | 0.84 | 0.99 |
| 1974 | 0.94 | 0.86 | 1.00 |
| 1975 | 0.96 | 0.94 | 1.07 |
| 1976 | 0.87 | 0.89 | 1.00 |
| 1977 | 0.91 | 0.94 | 0.96 |
| 1978 | 0.94 | 0.95 | 0.97 |
| 1979 | 0.98 | 0.96 | 1.00 |
| 1980 | 1.00 | 1.00 | 1.00 |
| 1981 | 1.06 | 1.04 | 1.04 |
| 1982 | 1.14 | 1.10 | 1.12 |
| 1983 | 1.19 | 1.13 | 1.16 |
| 1984 | 1.22 | 1.16 | 1.19 |
| 1985 | 1.23 | 1.16 | 1.21 |
| 1986 | 1.23 | 1.13 | 1.20 |
| 1987 | 1.17 | 1.06 | 1.14 |
| 1988 | 1.14 | 1.04 | 1.12 |
| 1990 | 0.97 | 1.03 | 0.99 |
| 1991 | 0.89 | 1.00 | 1.00 |
| 1992 | 0.94 | 1.07 | 1.05 |
| 1993 | 0.93 | 1.05 | 1.04 |

Table 8

| Variable Name | Purpose | Values |
|---|---|---|
| KNIT | This variable was included because the manufacturing process for knit apparel can differ from that of woven apparel. The tailoring process for knit apparel is often more expensive than that for apparel manufactured from woven material. | 1-Indicates that the article in question is a knit good<br><br>0-Indicates that the article in question is not a knit good |
| SYNTH | This variable was included to describe fabric composition. (Note: This variable is never concurrently present with the COMPOS variable) | 1=Indicates item is composed of fully synthetic material<br>0=Indicates the item is composed of fully natural material |
| COMPOS | This variable was included because one of the most prominent quality attributes of an article of clothing is the material it is composed of .<br>(Note: This variable is never concurrently present with the SYNTH variable) | 1-Indicates the item is fully synthetic (i.e. 100% nylon)<br><br>2-Indicates the item is 'semi-synthetic' (i.e. 50% cotton/50% polyester)<br><br>3-Indicates the item is fully natural (i.e. 100% cotton) |
| WEIGHT | This variable was included because the weight of an item of apparel can be interpreted to represent the amount of materials used in the production of the good. Hence, it can be assumed to have a direct and significant impact on the final price of the good. | The weight of the dress, in ounces, as listed in the Sears catalog. |
| MEDSIZE | This variable represents the median size of the range of sizes a particular dress is offered in the Sears catalog. | The median size of the dress, calculated from the list of sizes available for a particular dress in the Sears catalog. |
| YEAR | This variable represents the year a data sample is taken from. | Can take on the values of 0 or 1. |

*It should be noted that the presence or absence of certain variables in the regression equation changes on a year to year basis, depending upon the presence or absence of the related characteristics in the sample of dresses.

**TABLE 9**

| Year | Mean Price | Mean Weight | % Composed of Knit | % Composed of Cotton | Observations |
|---|---|---|---|---|---|
| 1914 | 4.75 | 1.66 | 0.00 | 69.69 | 33 |
| 1920 | 18.32 | 1.79 | 0.00 | 43.59 | 39 |
| 1925 | 8.83 | 1.55 | 0.00 | 43.33 | 59 |
| 1930 | 9.79 | 1.33 | 0.00 | 49.97 | 50 |
| 1935 | 2.84 | 1.17 | 2.22 | 62.22 | 46 |
| 1940 | 3.30 | 1.14 | 0.00 | 34.61 | 52 |
| 1945 | 5.93 | 1.50 | 0.00 | 10.00 | 20 |
| 1950 | 6.01 | 1.43 | 0.00 | 41.00 | 39 |
| 1955 | 7.37 | 1.51 | 2.00 | 60.00 | 50 |
| 1960 | 10.65 | 1.15 | 3.00 | 51.00 | 100 |
| 1965 | 11.91 | 1.20 | 3.80 | 36.53 | 52 |
| 1970 | 15.75 | 1.45 | 24.00 | 4.00 | 25 |
| 1975 | 21.05 | 1.03 | 68.00 | 8.00 | 25 |
| 1980 | 23.92 | 0.93 | 100.00 | 0.00 | 25 |
| 1985 | 46.52 | 1.04 | 24.00 | 8.00 | 25 |
| 1990 | 45.69 | 1.83 | 39.47 | 13.16 | 38 |
| 1993 | 63.52 | 2.15 | 6.45 | 6.45 | 31 |

## TABLE 10

**Hedonic Regressions of Women's Dresses from the Sears Catalog**

| | 1914-20 (1) | 1920-25 (2) | 1925-27 (3) | 1927-35 (4) | 1935-40 (5) | 1940-45 (6) | 1945-50 (7) | 1950-55 (8) | 1955-60 (9) | 1960-65 (10) | 1965-70 (11) | 1970-75 (12) | 1975-80 (13) | 1980-85 (14) | 1985-90 (15) | 1990-93 (13) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetate Lining | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.079 | 0.077 | -0.282 | -0.340 |
| Wool | 0.487* | 0.486* | 0.399 | 0.505* | 0.377 | 0.352 | 0.131* | 0.036* | 0.017 | -0.079* | ... | ... | ... | ... | ... | ... |
| Cotton | -0.081 | -0.287 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Polyester | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | -0.006 | 0.042* | 0.024* | ... | ... |
| Rayon | ... | ... | ... | ... | ... | ... | -0.294* | -0.288 | ... | -0.426 | -0.435* | ... | ... | ... | ... | ... |
| Alpaca Lining | ... | 0.199 | 0.219 | 0.125 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Weight | 0.372* | 0.595* | 0.399* | 0.627* | 0.754 | 0.851* | -0.203* | -0.004* | 0.237* | 1.236* | 1.287* | 1.531* | 0.079* | 0.936* | -0.255* | 1.226* |
| 1914 | 1.377* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 1920 | ... | -0.705* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 1925 | ... | ... | -0.147* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 1927 | ... | ... | ... | -0.247* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 1935 | ... | ... | ... | ... | 0.149* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 1940 | ... | ... | ... | ... | ... | 0.621* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 1947 | ... | ... | ... | ... | ... | ... | 0.063* | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 1950 | ... | ... | ... | ... | ... | ... | ... | 0.024* | ... | ... | ... | ... | ... | ... | ... | ... |
| 1955 | ... | ... | ... | ... | ... | ... | ... | ... | 0.269* | ... | ... | ... | ... | ... | ... | ... |
| 1960 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.364* | ... | ... | ... | ... | ... | ... |
| 1965 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.043* | ... | ... | ... | ... | ... |
| 1969 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.407* | ... | ... | ... | ... |
| 1978 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.079* | ... | ... | ... |
| 1980 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.224* | ... | ... |
| 1985 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.255* | ... |
| 1990 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.476* |
| $R^2$ | 0.669 | 0.317 | 0.164 | 0.581 | 0.894 | 0.967 | 0.585 | 0.394 | 0.074 | 0.523 | 0.593 | 0.532 | -0.001 | 0.815 | 0.905 | 0.389 |
| F-Ratio | 15.154 | 2.923 | 2.214 | 8.196 | 53.415 | 167.586 | 8.342 | 3.717 | 1.289 | 4.731 | 6.831 | 3.272 | 0.999 | 8.056 | 13.772 | 2.111 |
| Observations | 71 | 97 | 109 | 95 | 96 | 70 | 57 | 87 | 148 | 150 | 76 | 50 | 50 | 50 | 63 | 69 |

* Significance Level of 99%

**TABLE 11**

## Comparison of Price Indices

### WOMEN'S DRESSES

| Year | CPI | Sears Matched Model | Long-Term Hedonic Index |
|---|---|---|---|
| 1914 | 21.4 | 57.4 | 9.0 |
| 1915 | 21.6 | 59.8 | |
| 1916 | 22.0 | 88.0 | |
| 1917 | 24.2 | 101.3 | |
| 1918 | 29.1 | 127.0 | |
| 1919 | 39.3 | 163.0 | |
| 1920 | 52.1 | 214.7 | 35.6 |
| 1921 | 62.0 | 136.1 | |
| 1922 | 47.8 | 115.3 | |
| 1923 | 38.9 | 106.9 | |
| 1924 | 39.0 | 104.4 | |
| 1925 | 38.6 | 101.9 | 17.6 |
| 1926 | 37.8 | 98.5 | |
| 1927 | 37.3 | 92.4 | 15.2 |
| 1928 | 36.4 | 88.0 | |
| 1929 | 36.0 | 82.9 | |
| 1930 | 35.5 | 82.7 | |
| 1931 | 34.8 | 76.9 | |
| 1932 | 31.7 | 62.7 | |
| 1933 | 28.1 | 60.1 | |
| 1934 | 29.6 | 71.2 | |
| 1935 | 29.9 | 56.8 | 11.9 |
| 1936 | 30.0 | 58.7 | |
| 1937 | 30.9 | 58.5 | |
| 1938 | 30.3 | 57.3 | |
| 1939 | 30.4 | 57.4 | |
| 1940 | 30.4 | 61.3 | 13.8 |
| 1941 | 31.4 | 62.9 | |
| 1942 | 37.8 | 72.6 | |
| 1943 | 39.4 | 73.7 | |
| 1944 | 43.2 | 81.5 | |
| 1945 | 45.5 | 82.5 | 25.6 |
| 1946 | 46.4 | 89.3 | |
| 1947 | 53.0 | 102.9 | |
| 1948 | 57.3 | 100.0 | |
| 1949 | 49.3 | 101.1 | |
| 1950 | 44.6 | 87.5 | 27.3 |
| 1951 | 47.9 | 83.6 | |
| 1952 | 48.0 | 82.4 | |
| 1953 | 48.0 | 80.1 | |

**TABLE 11 (cont'd)**

**Comparison of Price Indices**

**WOMEN'S DRESSES**

| Year | CPI | Sears Matched Model | Long-Term Hedonic Index |
|---|---|---|---|
| 1954 | 48.1 | 76.2 | |
| 1955 | 48.4 | 73.3 | 28.0 |
| 1956 | 48.8 | 81.7 | |
| 1957 | 49.1 | 73.0 | |
| 1958 | 49.4 | 68.2 | |
| 1959 | 50.7 | 64.6 | |
| 1960 | 50.9 | 61.7 | 36.6 |
| 1961 | 51.0 | 67.3 | |
| 1962 | 51.2 | 53.8 | |
| 1963 | 51.6 | 53.3 | |
| 1964 | 52.6 | 56.4 | |
| 1965 | 53.5 | 60.0 | 52.7 |
| 1966 | 53.5 | 60.0 | |
| 1967 | 61.0 | 64.7 | |
| 1968 | 68.1 | 65.3 | |
| 1969 | 74.8 | 55.4 | |
| 1970 | 78.9 | 70.8 | 55.0 |
| 1971 | 77.8 | 70.8 | |
| 1972 | 79.3 | 70.8 | |
| 1973 | 82.8 | 72.6 | |
| 1974 | 85.8 | 76.0 | |
| 1975 | 87.9 | 78.9 | 82.6 |
| 1976 | 91.0 | 83.0 | |
| 1977 | 94.3 | 87.2 | |
| 1978 | 96.6 | 95.6 | |
| 1979 | 100.0 | 100.0 | |
| 1980 | 100.0 | 100.0 | 100.0 |
| 1981 | 100.1 | 100.0 | |
| 1982 | 97.4 | 100.9 | |
| 1983 | 100.7 | 100.9 | |
| 1984 | 105.4 | 107.2 | |
| 1985 | 107.5 | 118.8 | 125.1 |
| 1986 | 106.2 | 118.8 | |
| 1987 | 117.9 | 99.3 | |
| 1988 | 124.9 | 101.3 | |
| 1990 | 130.5 | 101.3 | 161.5 |
| 1991 | 135.4 | 115.4 | |
| 1992 | 135.1 | 115.4 | |
| 1993 | 137.7 | 102.9 | 259.9 |

**FIGURE 1**

**Comparison of Price Indices of Women's Apparel**
**( 1980 = 100 )**

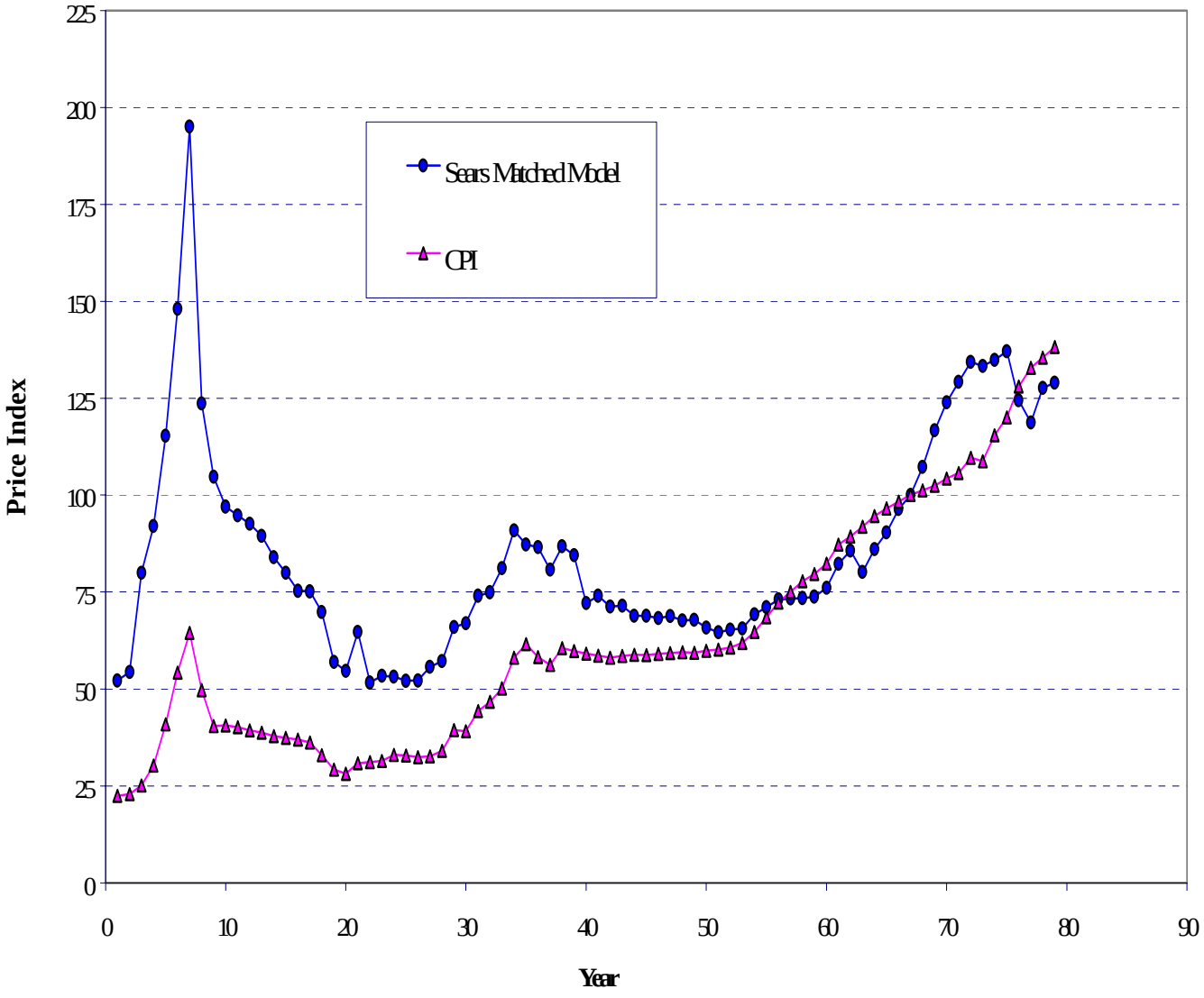


**FIGURE 2**

**Comparison of Price Indices of Men's Apparel**
**( 1980 = 100 )**

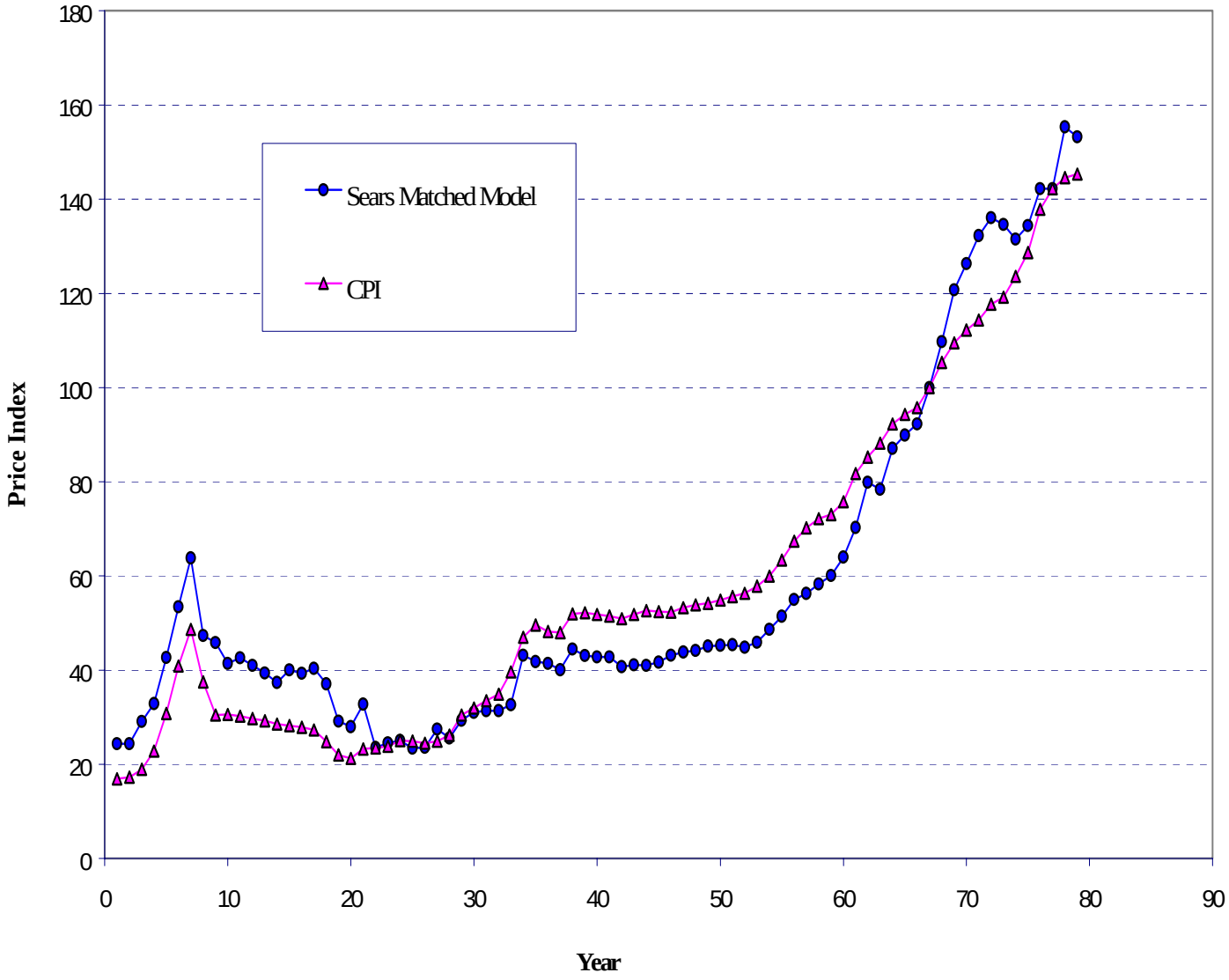


**FIGURE 3**

**Comparison of Price Indices for All Apparel**
**( 1980 = 100 )**

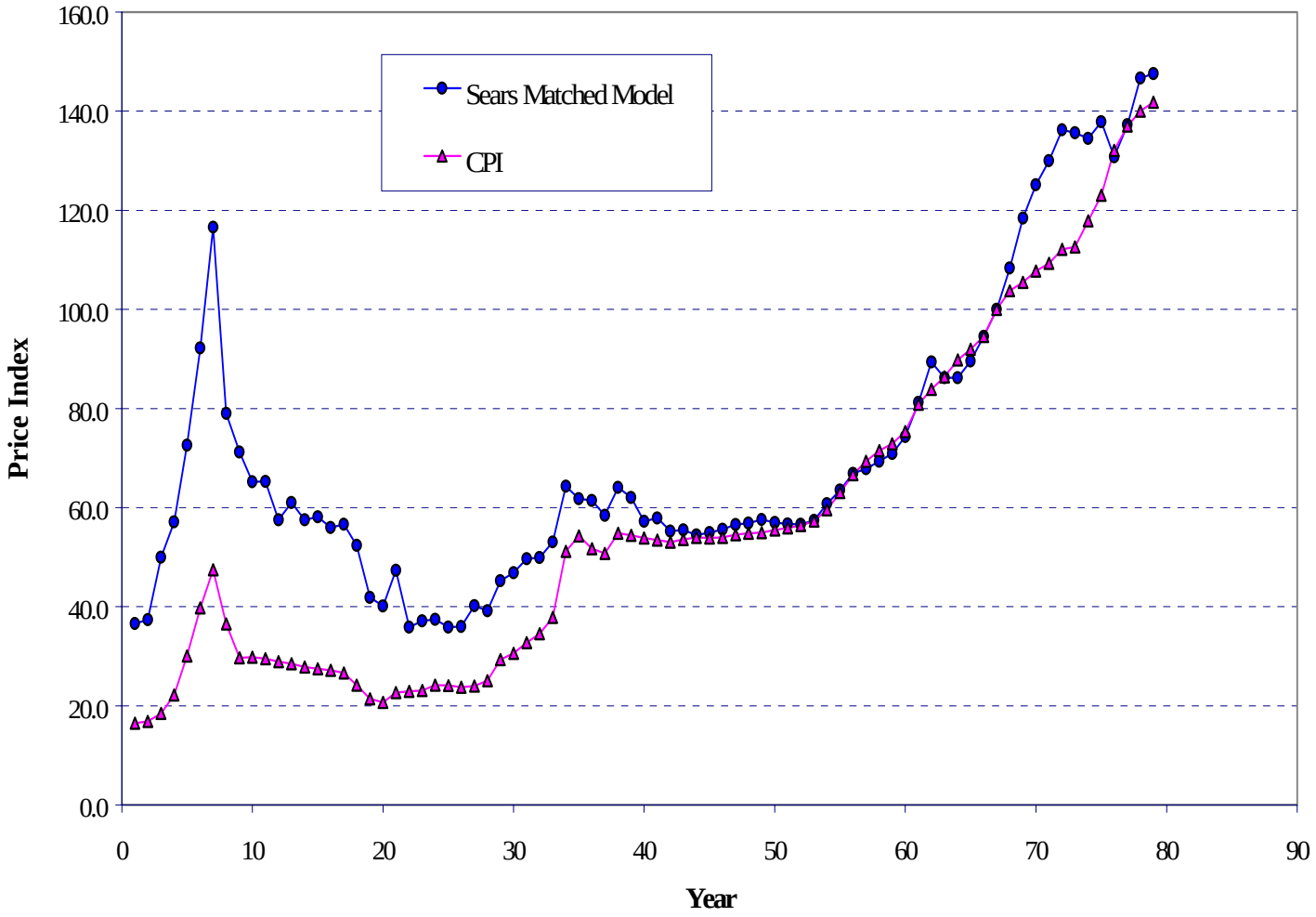
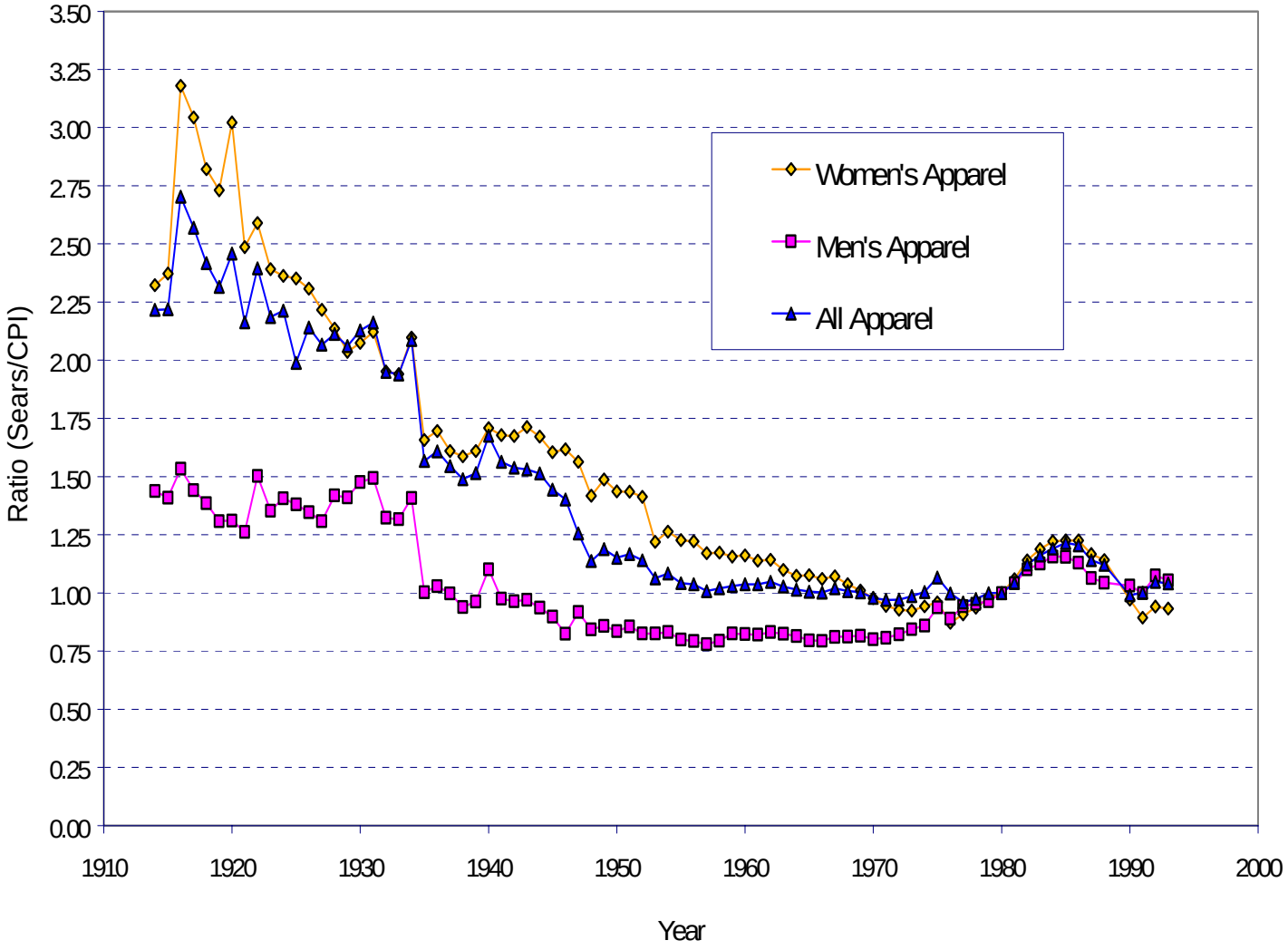


**FIGURE 4**

## Comparison of Sears/CPI Ratio



**Comparison of Price Indices for Women's Dresses**