

THE CONSUMER PRICE INDEX
As Related to Other Consumer Statistics

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The Consumer Price Index, rather universally referred to as the CPI, is probably more widely used than any other consumer statistic. Its use for adjusting wages under Labor-Management contracts covering more than 4-million workers keeps it continually in the news and has done much toward a better understanding, on the part of technicians and laymen alike, of what the index measures. It would be safe to say that more has been written about the concepts and methods of the index since World War II than in all earlier years since its initiation shortly after World War I. On the other hand, general use and popular treatment of the index tend to conceal the exact nature of the measurement and frequently lead to its misuse.

On March 25, 1959, the Bureau released the February index which indicated that, "Consumer prices in United States cities declined 0.1 percent between January and February 1959. ...The Consumer Price Index in February was 123.7 (percent of the 1947-49 average), 1.0 percent higher than a year earlier." In accord with the usual schedule, this news release was followed about a week later, by the full report which included, in addition to more details for the U. S. city average, separate indexes for twenty large cities. The full report, copies of which are available on request from the Bureau, includes a brief description of the index and gives references to more complete technical reports. Historical data for the index are published regularly in the Monthly Labor Review. These charts (on display) show the trends in prices of all items and of the various component groups during recent years. Many articles dealing with price trends, as measured by the index, have been written. Some recent reports of this type which may interest you are:¹

The Consumer Price Index in the Current Price Situation. Speech by Ewan Clague, before the Milwaukee Control of the Controllers Institute of America, Milwaukee, Wisconsin, April 8, 1958. Reproduced by U. S. Department of Labor, Bureau of Labor Statistics.

The Consumer Price Index in the Business Cycle. Monthly Labor Review, June 1958, pp. 616-620. U. S. Department of Labor, Bureau of Labor Statistics.

¹Bureau of Labor Statistics' bulletins on Consumer Prices, 1953-58 and Retail Prices of Food, 1957-58 are being prepared for publication.

The Relationship of Prices to Economic Stability and Growth, 85th Congress, 2nd Session - Joint Committee Prints:

- (1) Compendium of Papers Submitted by Panelists Appearing Before the Joint Economic Committee - March 31, 1958.
- (2) Commentaries Submitted by Economists from Labor and Industry Appearing Before the Joint Economic Committee - October 31, 1958.

However, our discussion today is not concerned with current trends in consumer prices but with the use of the Consumer Price Index in conjunction with other consumer statistics.

Review of Essential Features of the CPI

Before discussing the analytical uses and limitations of the CPI in consumer economics research, it seems advisable to review some of the essential features of this index whose complete title is, "Index of Changes in Prices of Goods and Services Purchased by City Wage Earner and Clerical Worker Families to Maintain Their Level of Living."¹ The Bureau has prepared a short film which summarizes the index definitions and procedures more effectively than can be done by words alone.

(Show the 10-minute CPI film)

The film has presented the features of the CPI which govern its appropriate uses in analyses. It is important in evaluating its uses and limitations to remember that:

1. It measures price change only. The "market basket," i.e., the quantities of goods and services in the value weights are constant over relatively long periods of time. For example, the "market basket" in the current index relates to the 1952 level of living.

2. It represents families residing in urban places, i.e., incorporated places with populations of 2,500 or more and their suburbs. This excludes residents of villages and rural areas.

¹A description of the index is contained in BLS Bulletin 1140, "The Consumer Price Index: A Layman's Guide," which may be purchased for 20 cents at any Bureau of Labor Statistics regional office or from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. A more technical description of the index appears in BLS Bulletin 1168, "Techniques of Preparing Major BLS Statistical Series." Reprints of chapter 9, pertaining to the CPI, are available on request to the Bureau of Labor Statistics in Washington or at any of its regional offices located in Atlanta, New York, Chicago, San Francisco and Boston.

3. It represents families of two or more persons, whose head is employed as a wage or clerical worker. This excludes single consumers and families of self-employed, professional, or managerial workers, retired persons, domestic service workers, and families whose 1950 income after taxes was \$10,000 or more.

4. It is based on many different samples -- samples of cities, of families, of items, of stores and of other retail outlets. The dates at which prices are obtained are a sample of time.

5. It reflects the average experience of all families it represents. This may deviate widely from the experience of individual families or specific groups of families.

Let us now consider the CPI in relation to other consumer statistics.

The CPI and Income Data

Since the CPI shows the changes in purchasing power of the dollar in specified consumer (retail) markets, it may appropriately be used to measure changes in the purchasing power of average family income and, in conjunction with information on changes in personal taxes, to determine net spendable incomes of equivalent purchasing power at different dates. However, proper evaluation and interpretation of the effect of changes in purchasing power can only be made with reference to the appropriate income distributions of these dates.

Much of the recent popular literature on this subject has failed to make such analyses. For example, a recent article calling attention to the evils of inflation and the increasing tax burden, stated that an income of \$4806 was needed in 1957 to provide the equivalent purchasing power of a \$2,000 income in 1939. Since the CPI increased by 102 percent between 1939 and 1957 and the allowance for increased taxes is reasonable under the stated assumptions, the statistics seem to be correct. However, the article failed to point out that only about 26 percent of families had wage and salary incomes over \$2,000 in 1939, while about 50 percent of families had wage and salary incomes over \$4806 in 1957, and 23 percent had incomes over \$7,000 in that year. If this had been mentioned, the very pessimistic conclusions in the article would have been tempered.

Certainly, the problems caused by rising price levels and taxes for various groups of consumers in the population are serious, and evaluation of the effect of these factors on the nation's economy is important. But if interpretations of the effect of changes in consumer prices on the economic well-being of consumers are to be meaningful, they must be made in relation to the funds available for consumer spending.

The BLS has recognized the importance of relating the CPI to available data on income, and the monthly release of the index is accompanied by a release which shows the results of applying the index to current statistics on earnings of factory workers. These statistics include gross average weekly earnings of factory production workers and net spendable earnings which are obtained by deducting social security and Federal income taxes from gross weekly earnings. The net spendable earnings are calculated for a worker with 3 dependents and for a worker with no dependents. An index of "real" spendable earnings for each of these two types of workers, which compares the current buying power of spendable earnings with the buying power of spendable earnings during 1947-49, is obtained by adjusting the current spendable earnings for changes in the Consumer Price Index.¹ For example, in February 1959, the Consumer Price Index was 123.7 percent of the 1947-49 average. Gross average weekly earnings were \$87.16, and spendable earnings averaged \$78.52 weekly for a worker with 3 dependents, and \$71.03 for a worker with no dependents. "Real" spendable earnings for a worker with 3 dependents were 122.9 percent of the 1947-49 average. Thus, although prices have increased by 23.7 percent since 1947-49, spendable earnings for a worker with 3 dependents have increased by 51.9 percent, and there has been a gain of 22.9 percent in buying power of earnings of such factory workers.

Since the index measures changes in price of goods and services bought by wage and clerical worker families, the series on factory worker's earnings is one of the most appropriate income statistics to use in conjunction with the CPI to evaluate the effect of changes in purchasing power. The income statistic most appropriate for use with the CPI is the average annual income after taxes of urban wage and clerical worker families of the type covered by the index. Income data for these families are available from each of the Bureau's expenditure surveys conducted at irregular intervals since 1888. Tables which will appear for the first time, in a condensed version, in the forthcoming edition of Historical Statistics include the average income of city wage and clerical workers' families of two or more persons in these surveys, expressed in dollars of 1950 purchasing power, as well as in current dollars.

In these data, the income averages for 1917-19, 1934-36, and 1950 are for the index-type family, and the index is a continuous series over these years. Thus, the application of the index to the income averages provides a reliable measure of change in the buying power of average family income for these dates. For the two earlier periods, 1888 and 1901, the income data relate to the appropriate type of family, but the index for years prior to 1913 was based primarily on changes in retail food prices, supplemented by estimates of changes in prices of other items obtained from data from a variety of sources. It is, therefore,

¹For a complete description of these data see, "The Calculation and Uses of the Spendable Earnings Series," Monthly Labor Review, January 1959, pp. 50-54

a considerably less reliable indicator of change in the purchasing power of family income for these periods. For the most recent period included in these historical tables, 1934-36 to 1950, wage and clerical worker family income after taxes in large cities increased by 163 percent, while prices increased by 75 percent, leaving a net increase in buying power of 51 percent.¹

Since 1952, the CPI has been representative of price changes in all sizes of urban places. Family income data are published annually by the Bureau of the Census and the Federal Reserve Board. Although there are important differences in the definitions of the family used by the various agencies, separate data are available for urban places and for different occupational groups.² Since the population covered by the CPI represents about two-thirds of all city families, trends in the separate income series, in conjunction with the CPI will provide reasonable accurate estimates of change in the purchasing power of average family income for most general purposes. The CPI is not necessarily representative of the price experience of families other than those of urban wage and clerical workers, and thus an error of undefined magnitude occurs when it is used in conjunction with income data for such other groups as the self-employed, the retired, single consumers, farm families, etc.

A series on disposable personal income is a part of the National Income data regularly published by the U. S. Department of Commerce and estimates of per capita income for the United States and individual states have been derived from these data. These data relate not only to the income of consumers as defined in family surveys but also include income of non-profit institutions and private trust and welfare funds. They relate to all U. S. consumers and include, also, certain non-money income items, such as the net rental value of owner-occupied homes, which are not usually considered in evaluating the changes in purchasing power of consumer income. The "Implicit Price Deflator" developed by the National Income Division of the Department of Commerce from its Personal Consumption Expenditures Series is a more appropriate index to use in adjusting the per capita personal income data.

The National Income Division has also developed, for 1944 and subsequent years, estimates of Family Personal Income from which

¹ For a discussion of the effect of this increase in buying power on spending patterns see, Faith M. Williams, "Standards and Levels of Living of City-Worker Families," Monthly Labor Review, September 1956, in Reprint No. 2204.

² It should be recognized that the interagency differences in the definition of the family are more important in analyses of income level than in the measurement of trends in income.

averages and distributions may be obtained. The income-receiving unit in these estimates is more nearly that used in cross-section surveys, but the non-money items are included in the definition of income. Special analyses of these income data have provided separate estimates for families and individuals and for farm and nonfarm families.¹ For most purposes, the CPI may be used with the averages for nonfarm families to measure changes in the purchasing power of their incomes over recent years.

The CPI and Consumer Expenditures Data

There are two major types of statistics on consumer expenditures: (1) the time series of the Department of Commerce on aggregate personal consumption expenditures, with quarterly estimates (March, June, September and December) published monthly in summary form in the Survey of Current Business and annually by detailed type of products in the National Income Issue of that publication. (2) the large-scale, cross-section surveys of consumer expenditures, conducted at irregular intervals by BLS for urban consumers and by the Department of Agriculture for farm families. Data on expenditures for selected items have been collected from time to time by other Federal agencies, notably the Federal Reserve Board's Surveys of Consumer Finances, which provide information on expenditures for houses, automobiles and other consumer durable goods. Similar data have been provided by studies conducted by private agencies, but generally such private organization survey are limited to a few items or groups of commodities. The most recent extensive expenditure survey was that conducted by Alfred Politz Research, Inc. for Life Magazine in 1956, but this study also differed in important respects from earlier expenditure surveys.

The CPI and its component indexes are frequently used to eliminate the effect of price change from these data and thus to provide a measure of change in the level of "real" consumption. In the Department of Commerce time series data, the effect of population change may be approximated and removed by converting the aggregates to a per capita basis. While this accounts for the effects of the gross change in population, it should be recognized that it does not eliminate the effect of other related factors, such as the changing age distribution of the population over time. Such changes can have an important effect on the trends in consumer expenditures for some items, notably clothing and medical care. When using the CPI to adjust the time series data, the differences in the population coverage of the two sets of data, mentioned earlier in connection with our discussion of the national income data, are an important consideration. The inclusion in the time series of institutional consumers whose price experience is not

¹ Selma F. Goldsmith, Size Distribution of Personal Income, Survey of Current Business, Office of Business Economics, U. S. Department of Commerce, April 1958, pp. 10-19.

measured by the CPI may be a serious limitation in specific situations. For some classes of commodities, the inclusion in the time series of the value of goods and services received without money expense to the consumer makes the use of the component indexes for such goods and services inappropriate or highly questionable. One example of this problem is the treatment of medical care expenditures in the time series and in the CPI. The index weights are the dollar expenditures of city families for medical care, including the cost of health insurance premiums paid for by the family. This excludes the value (or cost to the insurance company) of care received under insurance plans and also premiums paid by employers or others outside the family. In contrast, the personal consumption expenditures series represents the value of medical care received by consumers as defined for that series. Use of the CPI medical care index with this category of the time series must be used with extreme caution. Similar and very much more complicated conceptual differences exist between the CPI housing indexes and the housing component of the Personal Consumption Expenditures series.¹

The CPI is appropriately used with the average expenditures of families of city wage and clerical workers obtained in the BLS expenditure surveys to estimate the trends in their "real" consumption.² Since they represent such a large proportion of all city consumers, the CPI can usually be used without undue risk with the all family averages published from these surveys. Larger errors of application may be expected when the index is applied to average expenditures of other types of consumers included in these studies, e.g. the older retired family, single consumers, etc.

Care should also be taken when using the CPI with the family expenditure data to reconcile differences in the definitions and classifications used in the two sets of data and in the same data at two different periods of time. For example, the CPI housing index since December 1952 has included a weight and prices for the purchase of a home in the current market at the rate of purchase prevailing in 1952. The expenditure studies include, as current housing expenditures of owners, their expenditures for interest on mortgages and expenses in connection with purchase and sale of property but include in the asset and liability accounts the down payments and principal payments of owners.

Since the expenditure surveys are made at such infrequent intervals, the CPI is often misused to estimate current family expenditures. As we have noted, the index measures only the change in prices and not the total change in expenditures. The

¹ For a detailed discussion of the limitations of the CPI for this purpose see, Sidney A. Jaffe, BLS Price Indexes and Deflation of Value Aggregates, Annual Meeting of the American Statistical Association, December 30, 1958.

² Williams, op. cit. Reprint No. 2204

current value weights in the index represent what it costs to buy the 1952 "market basket" of goods and services in the current markets. They do not reflect the changes in expenditures that result because of changes in income, family size and composition, manner of living, or shifts families make when prices of some commodities become too high relative to others. For some items and subgroups of goods and services where the changes in quantities are known or can be estimated from other data, the CPI item indexes can contribute to the estimate of current expenditures. In general, if estimates of current average family expenditures are needed, the most recent cross-section survey averages for various groups of goods and services may be adjusted by the percentage change in the per capita Personal Consumption Expenditure series for a comparable group, taking care, in so far as possible, to reconcile differences in definitions and classifications. This is a tedious procedure, but the validity of the resulting estimates of average current family expenditures will depend on the success with which this is done.

The CPI and Costs of Standard Budgets

Since the early years of this century, estimates of the costs of standard budgets for different types of families have been important statistical tools in social and economic research, in welfare legislation and administration, and in many other areas where a measure of income adequacy is needed. These budgets specify the quantities the kinds of goods and services required to maintain a family (or individual) of a carefully defined size and composition, at a specified level of living, with estimates of the cost of the budget at a specified time and place.

The most recent BLS budgets are the City Worker's Family Budget, developed in 1946-1947 and last priced in October 1951 in 34 large cities, and the Elderly Couple's Budget, developed in the Social Security Agency in 1947 and last priced by BLS in October 1950 in the same 34 large cities.

Thirteen states have minimum-wage budgets for working-women, most of which were developed prior to or immediately following World War II. Current costs for these budgets, if available, have usually been made on the basis of estimates of price changes since their original pricing.

Many budgets have been developed by state and local governments in connection with their public assistance programs. Generally, these are adaptations of the Federal agency budgets or are allowances more or less arbitrarily determined by the funds available for the program.

The most current budgets, generally comparable in design to the BLS budgets, are: Quantity and Cost Budgets for Two Income

Levels, prepared by the Heller Committee for Research in Social Economics of the University of California, and A Family Budget Standard prepared by the Community Council of Greater New York, formerly the Welfare and Health Council of New York City. The Heller Budgets were last published for the San Francisco Bay Area with September 1958 prices and the Community Council Budgets for New York City based on October 1958 prices.

The Bureau of Labor Statistics has not issued current estimates of the costs of its budgets because these quantity budgets were based on standards prevailing before World War II and are not representative of postwar standards. In lieu of current pricing of the standard budgets, the CPI is often used (but not by BLS) "to bring the budget up-to-date." Over short periods of time and for some individual segments of the budgets, e.g. rents, this may provide an acceptable estimate of current costs. Over long periods of time and for the budget as a whole, such procedures will not provide valid estimates of current costs. If, for rough estimates, the CPI is applied to the total, it should always be applied to the total for goods and services and not to the total budget costs. The total budget includes items, such as insurance and personal taxes, which are not covered by the CPI. The CPI is not a good estimate of the change in the cost of the budget goods and services because the index is based on a "market basket" of goods and services which represent the average purchases of all types of goods and services by all sizes and types of wage and clerical worker families. Thus, the weights used to combine the prices in the CPI differ in important respects from the budget weights which define the quantities of goods and services required by a specified size and type of family to maintain a specified level of living. In addition, the types and qualities of commodities specified for the budget may differ appreciably from those in the CPI. Thus, in periods when prices of different commodities are changing at different rates or in different directions, the CPI does not provide an acceptable measure of the change in standard budget costs.

These limitations apply when the CPI is used with the City Worker's Family Budget costs. They are very much more serious limitation when the index is applied to the budget for an elderly couple or to the workingwomen's budgets published by various states.

The CPI and Intercity Differences in Living Costs

Since the City Worker's Family Budget measured the cost of the same level of living for the same type of family in each of 34 large cities, it served as the basis for indexes of intercity differences in living costs.

Because the CPI for individual cities is based on the actual expenditure pattern of all wage and clerical families in the city, and the level of living described by these expenditures differs from city to city, the city indexes do not show whether living costs are higher or lower in one city than in another. Most serious users of the CPI understand this and do not misuse the CPI in this way. However, they often feel that the trend in the CPI city indexes can be used to bring the City Worker's Family Budget cost for the city up-to-date, and thus current intercity indexes of living costs can be provided. This kind of estimating assumes that the CPI provides a sound basis for estimating the current costs of the standard budget. Its limitations in this respect we have just discussed. Thus, intercity indexes of living costs obtained by this method are subject to the same qualifications as are the estimates of current budget costs.

We have now considered the CPI with respect to its uses and limitations in conjunction with other consumer statistics. Over the years, the CPI has been reviewed and evaluated by many experts in economic and statistical research. Their consensus has been that the CPI is "a satisfactory measure of what it sets out to measure and that it can be used with confidence for the purposes for which it was designed." An appropriate quotation to end our discussion this morning is one which appeared in the June 1956, Dun's Review. "Statistics are a distillation of experience, but they can be a heady liquor for the inept or intemperate user."