BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Measurement Of Homeownership Costs In The Consumer Price Index Should Be Changed

The consumer price index is widely used to adjust wages and Federal transfer payments in response to price level changes. It also indicates the success of economic policy in maintaining price stability. Many people have charged that this index is not appropriate for these uses because of conceptual shortcomings in measuring homeownership costs.

GAO examines present and alternative measures of homeownership costs, the largest component of the consumer price index. The present method measures changes in the cost of purchasing, financing, and maintaining houses. Alternatives that measure changes in the monthly cost of consuming the services these houses provide (e. g., interest, taxes, insurance, maintenance) more accurately measure average changes in housing costs for all homeowners.

GAO recommends that the

--Bureau of Labor Statistics substitute a measure of the cost of consuming housing services for the existing homeownership component of the consumer price index and

--Congress provide the funds necessary for this modification.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This report evaluates alternative methods of measuring changes in homeownership costs in the consumer price index and recommends that the Bureau of Labor Statistics modify that index. We have undertaken this review because of widespread concern that the consumer price index does not accurately measure the rate of price change for some of its important uses. These uses include adjusting wages and Federal transfer payments in response to price changes and forming and evaluating public policy.

Copies of this report are being sent to the Secretary of Labor, the Commissioner for the Bureau of Labor Statistics, the Director, Office of Management and Budget, and the Chairmen of the relevant committees and subcommittees of the United States Senate and the House of Representatives.

Milton J. Socolar

Acting Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

MEASUREMENT OF HOMEOWNERSHIP COSTS IN THE CONSUMER PRICE INDEX SHOULD BE CHANGED

D I G E S T

Many economists, members of the Congress, and others have questioned whether the consumer price index (CPI) as presently constructed by the Department of Labor's Bureau of Labor Statistics (BLS) is an appropriate measure of the rate of price change for the uses to which it is put. In particular, they have charged that the present method of measuring homeownership costs does not accurately reflect the rate of price change experienced by homeowners in paying for their housing.

GAO determines the validity of these concerns, describes problems that may result from using the current method, and recommends two alternatives, one of which BLS should adopt to improve the CPI. GAO has not analyzed other alleged weaknesses of the CPI in this review.

COSTS OF CONSUMING HOUSING SERVICES MAY DIFFER FROM CPI HOMEOWNERSHIP COSTS

Homeownership costs have a relative importance of about 23 percent in the CPI. The present homeownership component of the CPI measures changes in the cost of purchasing, financing, and maintaining houses. Houses, however, are durable goods that yield housing services over a long period of time, and homeowners incur periodic costs in consuming these services. These costs are frequently calculated monthly and may be measured as either payments homeowners make--such as interest, taxes, insurance, maintenance--or as income they forgo--such as return on equity, depreciation, capital gain or loss. Because of its emphasis on these cost changes in buying and financing houses, the CPI homeownership component does not measure either the average change all homeowners experience or the change in cost for an average home-

owner (pp. 17-19). In addition, the present approach to measuring homeownership costs allows no logical determination of the weight assigned to expenditures on housing in calculating the overall CPI (pp. 19-20).

CURRENT METHOD OF MEASURING HOMEOWNERSHIP COSTS RAISES SERIOUS CONCERNS

The CPI is widely used to adjust wages and Federal transfer payments in response to price level changes. With respect to housing, this requires an unimpaired ability to pay the cost of consuming the same flow of housing services (p. 20).

Consequently, using the present CPI can create serious effects on the economy and the Federal budget if it suggests a rate of price change different from a revised index that would measure the cost of consumption. When the CPI is rising faster than an index of the cost of consumption, wages and Government payments tied to the CPI will increase more than necessary to maintain wage earners' and recipients' standards of living (pp. 20-21).

The CPI also indicates to policymakers and the public the success of economic policy in maintaining price stability, and it signals the need for policy action. Monthly announcements of the latest change in the CPI affect expectations of inflation and political pressures for changing or continuing economic policy. Therefore, forming rational macroeconomic policy requires that the information the CPI transmits reflect an appropriate measure of the rate of change of the price level as it applies to consumers (pp. 21-22).

USER COST AND NOMINAL OUTLAYS ARE AVAILABLE ALTERNATIVES

User cost and nominal outlays are two widely discussed conceptual approaches to measuring the cost of consuming housing services. User cost measures the full economic costs of consuming housing services. Nominal outlays includes only out-of-pocket expenses, not the full economic costs that homeowners incur. User cost refers to opportunity cost--the

value of the alternative that homeowners forgo by consuming the services their houses yield. Rental equivalence and a user cost index are two methods of measuring user cost (pp. 23-24).

Rental equivalence views the user cost as the rental income homeowners forgo by residing in their houses rather than renting them to others. Since there is no market transaction from which this value can be observed, rental equivalence attempts to infer this value from rents on similar properties (pp. 24-27).

A user cost index measures the user or opportunity cost to homeowners of consuming housing services by summing the various explicit and implicit costs that homeowners incur in providing shelter for themselves. Payments for mortgage interest, property taxes, property insurance, and maintenance and repairs are explicit components of a user cost index. Return forgone on equity invested in a house, depreciation, and capital gain or loss are implicit components. Capital gains enter the index as a negative cost because they offset other costs of consuming housing services (pp. 28-35).

Nominal outlays consist of monthly out-of-pocket expenses homeowners incur in consuming housing services. These include the explicit components of a user cost index and repayments of mortgage principal. Because implicit costs are not included, the nominal outlays approach does not measure the full economic cost of consuming housing services. The theoretical justification for measuring homeownership costs in the CPI as nominal outlays rests on the possibility that changes in short run out-of-pocket expenses are more important to households than long run gains in making their housing decisions (pp. 35-39).

CHANGES IN THE HOMEOWNERSHIP COMPONENT HAVE BEEN CONSIDERED FOR MANY YEARS

Early in the 1960s, a committee of the National Bureau of Economic Research recommended that BLS adopt rental equivalence

if an investigation confirmed the feasibility of creating an appropriate sample of rental housing units. Before the 1978 CPI revision, BLS proposed a user cost index for measuring homeownership costs. BLS did not incorporate this change into the revised CPI, however, because of opposition to changing the existing method of measurement by some users of the CPI and a lack of consensus about the best alternatives among economists who believed the existing method to be extremely inadequate (pp. 43-45).

BLS currently publishes five experimental measures of the CPI in which homeownership costs are measured by rental equivalence, user cost indexes, and nominal outlays. All five measures suggest lower rates of price change in 1979, ranging from 0.1 to 2.5 percent. In other years, in which mortgage interest rates did not increase so rapidly, however, there was often little difference between the rate of price change measured by the CPI and the rates measured by the experimental measures (pp. 45-48).

EITHER RENTAL EQUIVALENCE OR NOMINAL OUTLAYS WOULD IMPROVE CPI

A price index in which homeownership costs are measured as costs of consuming housing services is more appropriate than the present CPI, both for adjusting Government transfer payments in response to price level changes and for forming public policy. If the CPI were changed in this way, it would more accurately measure the changes in Government transfer payments needed to allow beneficiaries to consume the same market basket of goods and services, despite the rising costs of consumption. In addition, policy actions should be guided by an index that accurately reflects the average effects of price changes on consumers (pp. 51-52).

Both the rental equivalence and nominal outlays approaches to measuring the cost of consuming owner-occupied housing services have substantial merit. Substituting either

for the present method of measuring homeownership costs would result in a CPI more appropriate for its uses. On theoretical grounds, user cost is the best measure of the economic cost of consuming housing services, and GAO believes that rental equivalence is likely to be the best technique for measuring user cost. The nominal outlays approach also merits serious consideration. Changes in out-of-pocket expenses more directly affect homeowners' abilities to maintain their consumption levels of other goods and services than do changes in the rental income they forgo (pp. 52-55).

RECOMMENDATION TO THE SECRETARY OF LABOR

The Secretary of Labor should direct the Commissioner for the Bureau of Labor Statistics to amend the indexes of consumer prices it publishes by substituting a measure of the cost of consuming housing services for the existing homeownership component. Arguments favor both the rental equivalence and nominal outlays approaches (p. 56).

The Secretary of Labor may determine that the existence of long term contracts incorporating one version of the CPI, known as CPI-W, and a wide-spread desire among private sector groups to have available an index of consumer prices using the present approach to measure homeownership costs provide sufficient reasons for maintaining such an index. If the Secretary of Labor wishes to consider these factors, GAO recommends that the Secretary direct BLS to continue publishing CPI-W in its present form for a specified period of time and then revise its housing component as GAO recommends above.

RECOMMENDATIONS TO THE CONGRESS

If BLS requests additional funds to modify the homeownership component as GAO recommends, then GAO recommends that the Appropriations committees of the Congress consider the request favorably.

If BLS revises only the version of the CPI known as CPI-U, GAO recommends that the Congress rely on the revised CPI-U in the formation of economic policy and amend the necessary legislation to use the revised CPI-U, rather than CPI-W, as the index by which Social Security payments and Civil Service and other Government retirement pensions will be adjusted (p. 56).

AGENCY COMMENTS

Both the Bureau of Labor Statistics in the Department of Labor and the Office of Federal Statistical Policy and Standards in the Department of Commerce reviewed and commented on a draft of this report. BLS acknowledges its support for the concept of measuring homeowners' shelter costs by measuring the cost of consuming housing services. BLS believes that rental equivalence is a promising approach but that the nominal outlays measure GAO developed is less desirable than other alternatives.

The Office of Federal Statistical Policy and Standards agrees with many of GAO's conclusions and believes that this report is a useful contribution to a continuing discussion of alternative measures of homeownership costs. Although OFSPS recognizes widespread agreement about the merits of measuring the cost of consuming housing services, OFSPS does not take a position on GAO's specific recommendations because it believes that GAO has not fully specified its methodology (p. 57). GAO believes it has demonstrated the feasibility of its approach.

Contents

ABBREVIATIONS

BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BRAC	Business Research Advisory Council
CPI	Consumer price index
FHA	Federal Housing Administration
GAO	General Accounting Office
FHLBB	Federal Home Loan Bank Board
GNP	Gross national product
LRAC	Labor Research Advisory Council
OFSPS	Office of Federal Statistical Policy and Standards

(Abbreviations continued)

PCE	Personal consumption expenditure
PPI	Producer price index
PSRC	Price Statistics Review Committee

CHAPTER 1

INTRODUCTION

An index of changes in the level of prices in the economy can best be thought of as a composite measure of change in the prices of individual goods and services. The Federal Government regularly publishes several different price change indexes. Perhaps the one most well-known is the Consumer Price Index (CPI), published monthly by the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor. Changes in the CPI reflect a weighted average of changes in the prices of that index's individual components, each of which represents a category of consumer expenditures.

PRICE INDEXES HAVE IMPORTANT USES

Price indexes have many important uses. For one, they are used to convert the gross national product, disposable income, and other economic data from nominal to real values, thus making possible comparisons of real values across time periods. For another, both the private sector and the Government use price indexes to escalate levels of payments that are due over a period of time, in response to price level changes that affect the purchasing power of a nominally specified sum of money. This occurs frequently in wage agreements, Government transfer programs, and many other types of contract. Price indexes are also used in important ways to form public policy. For example, as price level indexes change, they indicate to both policymakers and the public the success or failure of economic policy in maintaining price stability and the consequent need for action.

All price indexes should accurately measure the rate of price change under the conditions of that index. These might be the items included in it or the population it covers. In addition, it is essential that an appropriate index be selected for each purpose. This is particularly true during periods of rapidly rising prices, because there is likely to be a far greater variance then among measured rates of price change than when prices are relatively stable. Since the level of many Government payments depends on the CPI, different possible constructions of this index can affect the size of the Federal budget substantially when prices are rising rapidly, although there might be little difference at other times.

OBJECTIVES, SCOPE, AND METHODOLOGY

Many economists, members of the Congress, and others have questioned whether the CPI as presently constructed is an appropriate measure of the rate of price change for some of the uses to which it is put. In particular, they have charged that the present method of measuring homeownership costs does not accurately reflect the rate of price change experienced by homeowners in paying for their housing. An appropriate measure of price change for most current uses of the CPI should record the ave-

rage change in the cost of consuming specified goods and services to all consumers under consideration during a designated time period. Because of the CPI's many uses, forming rational macroeconomic policy requires that the CPI transmit information accurately.

We undertook this review in response to these concerns about the adequacy of the method BLS presently uses in measuring homeownership costs. Our objectives in this review were to determine the validity of these concerns, to describe any problems that might result from using the current method, and, if we concluded that these concerns were valid, to recommend one or more alternatives that BLS should adopt to improve the CPI. We have not analyzed other alleged weaknesses of the CPI, such as the techniques for adjusting price changes for quality changes.

At the onset of this review, we obtained several BLS publications to familiarize ourselves with both the fundamental concepts of the CPI and the specific method used to measure homeownership costs. 1/ On several occasions, we received helpful clarification on technical points from economists in the BLS Office of Prices and Living Conditions. We used economic analysis and our professional judgment to assess the alleged conceptual drawbacks in the current treatment of homeownership costs that many others, including BLS, have suggested exist. From this analysis, we have concluded that a revised CPI homeownership component that measures changes in the cost of consuming housing services rather than purchasing, financing, and maintaining houses would be more appropriate than the present CPI for many uses to which the CPI is put. We have reviewed and evaluated three widely recognized alternatives, and we have concluded on the basis of our analysis that two flow-of-services approaches--rental equivalence and nominal outlays--have substantial merit as measures of homeownership costs. We have developed specific rental equivalence and nominal outlays measures that we believe are improvements over similar measures others have proposed.

Our review of other analyses of the measurement of homeownership costs during the past 20 years by BLS staff and other economists indicates widespread agreement that flow of services is a conceptually more appropriate technique than the one presently used. Before the most recent CPI revision, BLS even proposed an alternative measure but, ultimately, chose not to adopt it because of the lack of support for the specific proposal from labor and business advisory groups.

1/Among the most helpful of these were U.S. Department of Labor, Bureau of Labor Statistics, The Consumer Price Index: History and Techniques, Bulletin No. 1517 (1964), and The Consumer Price Index: Concepts and Contents over the Years, Report 517 (May 1978), and Walter Lane, "The Homeownership Component of the Consumer Price Index," Bureau of Labor Statistics, unpublished paper, August 1978.

We obtained written comments on a draft of this report from both BLS and the Office of Federal Statistical Policy and Standards in the U.S. Department of Commerce. Both supported flow of services without endorsing our specific recommendation. We also had informal discussions with the staff of the Congressional Budget Office and the Council of Economic Advisors.

CHAPTER 2

THE CONCEPTS AND USES OF THE CONSUMER PRICE INDEX

The CPI is defined as a monthly measure of the change in prices of goods and services that are customarily purchased by all urban consumers. Until the 1978 revision, the index included only urban wage earner and clerical worker families. This older index is now referred to as CPI-W. The new index, for all urban consumers, is referred to as CPI-U. We use CPI in a general way to mean CPI-U.

The pattern of consumers' expenditures, or their standard of living, in a given period is defined in the index and held constant. This defined and constant pattern provides the basis for price comparisons between months, years, quarters, or some other time periods, particularly between the current period and a reference or base period.

As an index number, the CPI equals 1 in the base period, by definition. The index is greater than 1 when prices are higher than in the base period, and it is lower than 1 when prices are lower than in the base period. The index is often multiplied by 100 for convenience in interpretation. In the base period, the index has a value of 100. A value of 105 means that prices in the current period are 5 percent higher than in the base period. A value of 98 means that the price level is 2 percent lower than the base.

The percentage change in the index between two periods that are not base periods is usually reported as the rate of price change during that interval. For example, if the CPI were 120 in one month and 125 in the next, the rate of price increase during the month interval between measurements would be reported as (125-120)/120, or 4.2 percent.

The annualized rate of price change is reported often and reflects the rate of price change that would occur in the current year if the current monthly rate of price change prevailed for each of the 12 months of the year. For example, a 4.2 percent rate of price increase compounded monthly represents a 63.8 percent annual rate of increase.

The base period for which the CPI is currently defined as equal to 100 is 1967. A more important period, however, is the period covered by the Consumer Expenditure Survey, because expenditures in that period determine the weights for each item. When we refer to either the reference period or the base period in this report, we are referring to this Survey period, not to the year in which the CPI has been arbitrarily set equal to 100.

THE CONCEPTS AND CONSTRUCTION OF THE CPI

Constructing the index begins by selecting a group of goods and services that are usually bought by the consumers, or the households, that constitute the population in the index. The goods and services selected and taken together generally represent a pattern of expenditure by the consumers sampled in the Consumer Expenditure Survey. 1/ The collection of goods and services, called items, is known as the market basket. The CPI actually defines a market basket for each of several geographical areas. The national CPI is built up from or aggregated over these geographical areas. Once the market basket has been defined, the index is calculated by assigning a weight to each item, sampling the prices of the items each month, adjusting the weights for changes in prices, and comparing the adjusted weights to those of the base period.

Expenditure weights

In the index population, the expenditure of the consumers on each item constitutes the weight of that item within the market basket. The expenditure weight reflects the relative importance of one item within the whole group of goods and services. For example, assume that the total expenditure by all consumers in the index population on all items is $1 million for the reference or base period and that $10,000 of this was spent on bread products. The $10,000 is the expenditure weight of bread products in the index. 2/ The ratio of the two figures gives the relative importance of bread products in the total index, which in this case is 1 percent. All expenditure weights are held fixed or constant for the reference period or base, and the full set of weights serves as a bench mark from which price comparisons can be calculated.

The standard of living of the index population is defined by the items chosen for pricing and the weights assigned to each

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1/The current index weighting pattern is based on the 1972-73 Consumer Expenditure Survey. Recently it has been decided to conduct the Survey on a continuing basis instead of just at the times when the CPI is revised.

2/In practice, the expenditure weight represents average expenditures by the index population. This figure is obtained by dividing the total expenditure by the index population of each market basket. The index is then constructed from the average expenditure weights and population weights calculated for purposes of finding the average for the national sample. Conceptually there is no difference between this construction and a definition of the expenditure weight as total expenditure. The latter, however, gives a more intuitive description.

item. The standard of living is held constant by keeping the weights fixed. Actually, the index defines a particular standard of living--the standard of living of the index population in the reference period. By holding the market basket fixed, we can measure the effect of price change on the reference period standard of living.

Pricing and index calculation

Until recently, the prices of items in the market basket were surveyed each month and the items were described in great detail, to ensure that they corresponded month to month. Called specification pricing, this method held the quality of items constant in the index.

For the 1978 index revision, an improved method called disaggregation was adopted. This method allows for more general descriptions of the items priced. The current price of each item is divided by its price in the previous month, thus giving a measure of price change called a price relative. The index is calculated from the expenditure weights and the price relatives in the following way.

The price relative is multiplied by the expenditure weight, producing the cost weight. For the base period, cost weight and expenditure weight are identical, of course. The cost weight in the current period represents the expenditure necessary to obtain the fixed base period quantity of an item or items in the market basket. The cost weights of all items are summed and then divided by the sum of base period expenditures. The figure that results is the index. A simplified version of the formula is as follows:

$$\text{index} = \frac{\Sigma[(\text{base period expenditure weight}) \times (\text{price relative})]}{\Sigma(\text{base period expenditure weight})}$$

where Σ denotes the sum of all items in the market basket.

If the reference period from which the CPI expenditure weights were derived were also the period for which the CPI was set equal to 100, then we could directly calculate the CPI as follows. The CPI would equal the ratio formed by summing the products created by multiplying each item's base period expenditure weight by the price change of that item since the reference period and then dividing by the sum of all base period expenditures. Alternatively, we could say the CPI equalled the ratio of the sum of current period cost weights to the sum of base or reference period cost weights. (For further discussion, see appendix V.) Either calculation would compare the current cost of purchasing a fixed market basket of goods and services with the cost of purchasing those items in the period from which the expenditure weights were derived. The additional step of adjusting for price change from 1967, the year for which the CPI is arbitrarily set equal to 100, to 1972-73, the period from

which expenditure weights were derived, is necessary to express the CPI in its conventional way as the ratio of current costs to 1967 costs.

The CPI as a buyers' price index

The definitions of the CPI and its method of construction clarify, rather specifically, the conceptual nature of the index and, therefore, what it can be used for. The items in the market basket and their relative weights represent a particular standard of living within a reference period. That is, the CPI, both conceptually and historically, is a measure of the prices paid for purchases of specific goods and services made by a specific group of consumers on a fixed market basket. In other words, the CPI is an index of prices paid by consumers. It has sometimes been called a buyers' price index.

That the CPI is not a cost of living index is widely recognized. A cost of living index would have to include a larger number of items that influence living costs but that are not included in the CPI, such as income taxes, financial assets, and almost everything that affects the consumers' level of satisfaction. A cost of living index would also have to account for substitution between goods as their relative prices change; it could not hold the market basket constant. A true cost of living index, as might be defined in the economic theory of the consumer, could theoretically be constructed, but this is not currently feasible. When relative prices change expenditure patterns, more frequent revisions of the CPI market basket would make the CPI a closer approximation of a cost of living index, but there is no easy way to tell how close. Conceptualizing the CPI as a buyers' price index can result in substantial controversy when durable goods, such as autos and houses, are included in the market basket, as we shall see more fully in chapter 3.

OTHER MEASURES OF PRICE CHANGE

The Federal Government publishes several other measures of price change. Among the most important are the implicit price deflators for gross national product (GNP) and its components and the producers price indexes (PPI), formerly called the wholesale price index. We discuss these in turn.

Implicit price deflators

The implicit price deflators for GNP and its components are published by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. BEA uses various measures of the rate of price change, often those developed by BLS for computing the CPI, to convert the value of goods and services produced from current to constant dollars. BEA then calculates the implicit deflators by dividing current dollar values by constant dollar values and then multiplying by 100. The overall implicit price deflator measures the change in the general price level of the economy, taking into account not only the consumption sector but

also the investment, Government, and foreign trade sectors. The overall index is a weighted average of its component indexes, each of which can be disaggregated into subcomponents.

The deflator most comparable to the CPI is the implicit price deflator for personal consumption expenditures (PCE), but it generally shows a rate of price change different from the CPI, resulting from differences in index concept, including different weights, and the different selection of items. The treatment of housing, too, differs substantially between the two indexes.

The implicit price deflators and the CPI differ conceptually in several ways. First, they refer to different population groups, the deflators covering individuals, as defined for the national income and product accounts, while the CPI covers urban consumers. 1/ More fundamental are the differences in index formulas and weighting patterns. The CPI, based on a Laspeyres index formula, uses base period expenditure patterns to weight price changes in individual market basket items. Based on a Paasche index formula, the implicit price deflators, on the other hand, are the ratio of current period expenditures to current expenditures valued in base year prices. This implies that the index weights correspond to current period quantities that change from period to period in response to relative price changes. The deflators do not measure the change in expenditure necessary to purchase the same market basket purchased previously. Instead, they measure the change in the cost of purchasing currently purchased quantities between the base period and the present time. These indexes, unlike the CPI, do not have fixed weights.

The BEA publishes other indexes for adjusting the national accounts. The chain price index uses previous period expenditure patterns to weight changes in prices between two periods. The fixed weight price index uses base period quantities to weight changes in price and is, therefore, conceptually similar to the CPI.

Producer price indexes

Another major set of price measures compiled by BLS are the producer price indexes. PPI represent the monthly changes in prices of a large number of industrial commodities that firms use to produce final goods and services. The indexes are based on surveys of actual commodity selling prices that are charged by a representative sample of firms. They are widely used in business contracts and market analyses. They are not very useful, however, as a general measure of either inflation or the effect of price change on consumers. Because they were designed to measure

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1/The populations on which the PCE and the CPI were based differed substantially before 1978, when the CPI was based on expenditures of urban wage earner and clerical worker families. Changing the CPI to cover all urban consumers reduced this difference somewhat.

changes in the prices of commodities used as inputs by firms, they do not reflect final goods prices paid by consumers. They do not adequately measure the general level of inflation, because they are not based broadly enough. They do not measure, for example, changes in the prices of services.

THE THREE MAIN USES OF THE CPI

No single measure is appropriate in every context, but at the present the CPI is used as a measure of price change in three broad ways: (1) as a deflator of economic data and values, (2) as an escalator of wage payments, contracts, and Government expenditures, and (3) as a signal to policymakers and the public of the success of economic policy actions and the performance of the economy.

The CPI as a deflator

Probably the most straightforward use of the CPI is as a deflator. Some measure of the effect of price changes on economic variables such as income and output is desirable. Most economic variables are measured in monetary units, such as dollars, rather than in physical terms, such as tons. The dollar as a standard unit has fixed nominal value (1 dollar is 1 dollar) and, therefore, when prices for goods increase, the real value of the dollar falls.

For comparisons over periods of time to be useful, units of measurement should be comparable. Therefore, expressing economic variables in real terms or in dollars of constant purchasing power is desirable. In general, dividing the current value of a price index into the current value of some other economic variable results in an expression of that variable in real terms. Adjusting economic data in this way makes it easier to compare data between time periods without the distorting effects of price change. In this context, the CPI measures the value of the dollar, or its purchasing power.

The CPI is an appropriate measure of price change for deflating some economic values. For example, BLS uses the CPI to deflate hourly and weekly earnings of production and nonsupervisory workers in data it publishes. The CPI would also be an appropriate deflator for retail sales of finished goods and some other data.

The CPI would be less appropriate as a deflator of data series on the entire economy, however, because the CPI measures only changes in prices paid by consumers. The GNP deflator is a broader measure of price change, because it also measures changes in prices businesses, the Government, and foreigners pay for goods and services they buy. Some accountants have suggested that adjusting accounting data for the effects of price change would result in a more realistic statement of a firm's financial condition and performance, but it is not clear that the CPI is the appropriate index for this purpose.

The CPI as an escalator

Using the CPI as a deflator is closely related to using it as an escalator. A major reason for constructing the CPI initially was to use it to adjust the wage payments of shipyard workers, and this use expanded substantially, particularly as levels of inflation increased in the 1970s. In addition, many types of legal contracts now contain escalator clauses. Indexing Government expenditures and social welfare programs has also increased the use of the CPI in the public sector. 1/

Wages are escalated in order to maintain a standard of living. When prices rise during the life of a labor contract, the old wage is too little to allow workers to purchase the same quantity of goods they were able to buy at the beginning of the contract. In other words, their real income falls. Even when nominal wages rise, if the price level rises faster than wages, workers are worse off than they were at the beginning of the contract period. The CPI provides a means of adjusting wage payments upward in response to price level changes, to maintain the real purchasing power of workers' wages. Escalator clauses or cost of living adjustments (known as COLA's) have become an integral part of many collective bargaining agreements.

Another form of escalation is the indexing of Federal expenditures and transfer payments. Some expenditures are tied directly to formulas by which they can be adjusted for the effects of rising consumer prices. Some of these formulas are based on changes in the CPI. Most of the indexed expenditures tied to the CPI are for certain retirement and disability programs under Social Security and for civil service, military, and other Federal retirement.

The CPI in the formation of economic policy

Perhaps the most important use of the CPI is in forming economic policy. As a measure of price change, the CPI indicates the success of economic policy in maintaining price stability and, consequently, the desirability of policy action. Conceptually correct and statistically accurate measurement of economic activity is fundamental to rational economic policymaking.

As measured by the CPI, the historically high rates of inflation of the 1970s have resulted in governmental action designed to restore price stability. Fiscal and monetary policies were adjusted in response to changes in the CPI, and mandatory wage and price controls and voluntary guidelines were invoked in attempts to reduce the rate of inflation.

1/See An Analysis of the Effects of Indexing for Inflation on Federal Expenditures, U.S. General Accounting Office, PAD-79-22, August 15, 1979, for a discussion of indexing.

As the most widely publicized measure of inflation, the CPI also influences public perceptions of policymakers and the economic environment. Analysts have increasingly recognized that the perceived rates of past and current price changes affect our expectations about inflation. Monthly announcements of changes in the CPI probably play a major role in forming these expectations. The expectations further influence individual behavior and, therefore, the effectiveness of economic policy.

CHAPTER 3

THE CURRENT METHOD OF MEASURING HOMEOWNERSHIP COSTS RAISES SERIOUS CONCERNS

Expenditure for housing is a large share of total consumer expenditure. Homeownership costs have a relative importance of about 23 percent in the CPI. Changes in housing costs therefore affect the overall level of the CPI significantly. The appropriate way to measure homeowners' housing costs and periodic changes in them in an overall index of consumer prices is disputed, however. In this chapter, we describe the treatment of homeownership costs in the CPI, discuss some of its conceptual shortcomings, and raise some concerns that result from the use of the present method.

Before 1953, there was no separate housing index within the CPI, although several types of housing expense, such as rent and utilities, were included in the market basket of goods and services. The expenditure weight for rent was the sum of rent payments made in the base period by members of the index population who rented and current maintenance payments made by people in the index population who owned homes. Current maintenance payments included mortgage interest, property taxes, insurance, repairs, and financing charges connected with buying and selling a house. Because home purchase costs and payments on mortgage principal were considered as savings rather than expenditures on consumer goods, they were not included in the CPI market basket. Periodic price changes were not calculated for homeowners' current maintenance items. Instead, it was assumed that price changes for these items were similar to rent changes, so that changes in rent costs determined the price relative for the rent component of the CPI.

In the 1953 revision of the index, the Bureau of Labor Statistics altered the way housing costs were included in the CPI, because of the increase in homeownership among urban wage earner and clerical worker families after World War II. BLS dropped the assumption that home purchases should be viewed as saving, while it broadened the definition of housing to include all expenses connected with acquiring and operating a home. A housing index was created. Although the homeownership component of the CPI has changed some since 1953, it is still basically the same.

THE HOMEOWNERSHIP COMPONENT OF THE CURRENT CPI MEASURES CHANGES IN THE COST OF ACQUIRING AND MAINTAINING HOUSES

The homeownership component of the CPI was designed to measure changes in the cost of acquiring and maintaining houses. This concept of measurement is often known as the asset price

approach and is also used for automobiles. BLS selected this approach in order to maintain the consistency of the CPI as a buyers' price index. Accordingly, although houses are long-lived assets, expenditure on home purchases is treated as a CPI market basket item having its own expenditure weight. Since people typically borrow money to buy houses and thereby commit themselves to paying a specific amount of interest, contracted mortgage interest--like expenditure for home purchase--is included as an item in CPI market baskets. The other group of items comprising the homeownership component are property taxes, property insurance, and maintenance and repair commodities and services.

Home purchase weight

The home purchase expenditure weight represents total expenditure on home purchases minus total receipts from the sale of homes by the index population during the reference period. The weight includes the total expenditure of people who only bought houses, the difference between purchase costs and sale receipts for those who both bought and sold houses, and the receipts, or or negative expenditures, of those who only sold houses. In addition, transaction or closing costs associated with all home purchases and sales are included in the home purchase expenditure weight.

In any given time period, only a relatively small proportion of homeowning index households actually purchase houses while the rest continue to reside in houses they bought before that time period. Home purchase activity fluctuates, however, so the expenditure weight for the cost of home purchases depends upon the level of home purchases during the reference period. In particular, this weight is influenced very heavily by the rate of purchase of new houses, because, with some minor exceptions, expenditures on purchases of existing houses are offset by what the sellers of the houses receive. 1/ Rather than relying just on 1 year, BLS has averaged data from the 6-year period 1968 through 1973 to derive a more accurate weight for home purchase costs in the current CPI. This also assures a larger sample, lessening the problem of the infrequency of home purchases.

Before the 1978 revisions in the CPI, the home purchase weight included all expenditures by the index population on home purchases but subtracted from the weight the amount received from

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1/Not all purchases offset all sales of existing homes, of course, in part because the households surveyed are only a sample, not the entire population. Even if the sample were the population, some transactions would not be offset, such as when investors buy houses to rent them to others rather than occupy them themselves. Furthermore, since closing costs on all transactions are included in the expenditure weight, the number of sales of existing houses influences this part of the weight.

sales only when the seller also purchased another home. In determining the expenditure weight in the current index, the amount people received who only sold homes in the reference period is subtracted from home purchase expenditures as well. This revised procedure eases computation of the weight and, by itself, makes the weight smaller. The expenditure weight, however, depends on the rate of new house purchases. During the 1968-73 reference period, this rate was quite high. Therefore, the relative importance of home purchase costs in the CPI actually increased after the 1978 revision, despite this methodological change.

Home purchase price relative

The cost weight is obtained by multiplying the home purchase expenditure weight by the home purchase price relative, as we described in chapter 2. The home purchase price relative has a significant impact on the overall CPI, because of the relatively large importance of the home purchase cost weight. The change in house prices is also one of two price relatives used to calculate the cost weight for contracted mortgage interest (as we shall see later in this chapter).

BLS calculates the home purchase price relative from data on recent housing transactions obtained from the Federal Housing Administration (FHA). The price data are sorted by market basket and house age and size (by square feet of living space), although many other elements of quality also differentiate houses. Within each market basket, houses are sorted into five age groups and three size groups, generating fifteen different cross-classifications or cells for each market basket. Each cell is assigned a cell weight that is based on home purchase expenditures during the reference period for houses in that cell. This classification method controls some elements of quality difference, so that over time a constant quality distribution of homes is priced.

Once the data are sorted, the price relative is calculated. The cell price relative in each cell is the ratio of the average price of living space per square foot in the current period to that of the previous month. The overall price relative is then calculated as a weighted average of the cell price relatives, each cell price relative being weighted by its corresponding cell weight. 1/

The sample of home purchases obtained from FHA data does not adequately represent the universe of home purchases. This weakens the home purchase price relative as an accurate measure of

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1/When the number of observations in a cell or market basket is not sufficient, the cells are collapsed into each other before calculating the weighted average price relative. This procedure is described fully in Walter Lane, "The Homeownership Component of the Consumer Price Index," Bureau of Labor Statistics, unpublished paper, August 1978.

house price changes. Only home purchases financed by mortgages insured by FHA are included in the sample. Since the FHA sets ceilings on the amounts for which it will insure mortgage loans, higher priced homes are not adequately represented in the sample. 1/ This may result in a biased estimate of house price changes if the purchase prices of houses that are too expensive to be financed by mortgages insured by FHA increase at a different rate from purchase prices of cheaper houses. The FHA data also do not contain sufficient information about variations in quality and locations within metropolitan areas to allow BLS to control for changes in these attributes, which may influence price changes between sampling periods. Despite these shortcomings, BLS judges the FHA data to be the best available for calculating the CPI.

Contracted mortgage interest weight

The expenditure weight for mortgage interest represents the total interest that borrowers in the index population contract to pay during the first half term of mortgages on homes purchased in the reference period. In 1964, BLS began limiting the contracted interest to the amount payable during the first half of mortgage terms, because, on the average, mortgage contracts appeared to remain in effect for only about half of their originally scheduled time. 2/ For all mortgage contracts made in the reference period, the interest rate, term, and amount borrowed are obtained from the Consumer Expenditure Survey. For each market basket, the total contracted interest payable in the half term on house purchase financing is calculated from the average interest rate, the average term, and the average amount borrowed. The calculations are made for both first and second mortgage loans, or deeds of trust.

Since the mortgage interest weight represents only interest contracted for by people who obtain mortgages to finance home purchases in the reference period, it depends heavily on the rate of home purchase within that time. In determining the contribution to the mortgage interest weight that is made by people who both buy one house and sell another during the reference period, we must remember that the interest obligation they are released from by repaying their old mortgage with the money they receive from selling their old house does not reduce their newly contracted interest obligation. Therefore, the mortgage interest weight, unlike the home purchase weight, is influenced as much by purchases of existing houses as by purchases of new ones.

1/The FHA sets different ceilings in different parts of the country. Currently, they range from $67,500 to $90,000.

2/Lane, p. 12. We know of no evidence that confirms that mortgage contracts still remain in effect for about half of their originally scheduled time.

Mortgage interest rate relative

The mortgage interest rate relative measures changes in the price of borrowing money in the form of a mortgage loan of a specified quality. Together with the home purchase price relative, the mortgage interest rate relative changes the cost weight for the mortgage interest component of the CPI between periods. BLS calculates each period's cost weight by multiplying the previous period's cost weight by both the ratio of current to previous period interest rates and the ratio of current to previous period home purchase costs.

BLS maintains that this method measures the total change in the interest cost of financing houses of constant quality at the same ratio of mortgage loan to purchase price as in the base period. 1/ The following example suggests a slight discrepancy. Suppose, for simplicity, that only one house were purchased in the base period. Say that it was bought at a price of $100,000 and financed by a 20 percent down payment and an $80,000 mortgage due to be repaid with 10 percent annual interest over 30 years. The expenditure weight for the interest that would be due during the first half term of the mortgage contract would be $111,696. Suppose, further, that between the base period and the current period the purchase price of a house of the same quality had risen to $125,000 while the prevailing interest rate for a 30-year 80 percent mortgage had risen to 11 percent. The current period cost weight would now equal the base period expenditure weight ($111,696) multiplied by both the ratio of current to base period interest rates (1.1) and the ratio of current to base period home purchase prices (1.25), or $153,582. This amount exceeds the base period expenditure weight by $41,886, or 37.5 percent, and represents the price increase of the mortgage interest component of the CPI. However, statistical tables show that the mortgage interest due during the first half term of a 30-year $100,000 mortgage (80 percent of $125,000) at 11 percent annual interest equals $155,208. This amount exceeds the base period expenditure weight by $43,512, or 39.0 percent, and exceeds the new cost weight by $1,626.

BLS calculates the mortgage interest rate relative from a sample obtained from a monthly survey of mortgage loans that is conducted by the Federal Home Loan Bank Board. The data contain the interest rates and other characteristics of mortgage loans made by many types of lending institutions. To control for differences in quality characteristics, BLS sorts the conventional mortgage loans present in the sample into cells according to the down payment percentage that is required and whether the mortgage is for a new or an existing home. Separate cells are designated for loans insured by FHA and by the Veterans Administration. In

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1/BLS Bulletin No. 1517, p. 76, and Helen Humes Lamale, "Housing Costs in the Consumer Price Index," Monthly Labor Review, 79 (April 1956), 444.

the base period, each cell is assigned a cell weight that reflects the value and distribution of mortgage loans during that time.

In each period, an average interest rate is computed for each cell in each market basket. Then an overall average interest rate is calculated by weighting each cell's average interest rate by its cell weight. This current weighted average interest rate is divided by the same value for the previous period, forming the mortgage interest rate relative. 1/

Special procedures for determining the expenditure weights and price relatives for the other items in the homeownership component of the CPI are generally not necessary. Property insurance, property taxes, and maintenance and repair goods and services are all purchased or paid for regularly, so there is no conceptual problem in including them in an index of consumer prices. Their expenditure weights represent base period expenditures on these items by members of the index population. Periodic price changes are measured in the way that BLS usually measures the price of goods and services, except for changes in property taxes. BLS calculates a property tax relative that controls for changes in house values from data on capital change and tax assessments, rates, and exemptions. The data are obtained from a special survey of owner-occupied houses conducted for this purpose.

THE HOMEOWNERSHIP COMPONENT SHOULD MEASURE CONSUMPTION COSTS

As a buyers' price index, the CPI measures changes in the purchase price of a fixed market basket of goods and services between two points in time. Many goods and nearly all services are consumed in the same time period in which they are purchased. The cost of consuming a market basket of these goods and services during a given time period is identical to its purchase price in that time period.

Durable goods, however, such as houses, cars, and appliances, are not wholly used up or consumed in the time period in which they are purchased. They are assets that continue to yield flows of service--houses yield housing services, cars yield transportation services, washing machines yield laundry services, and so on. During any given time period, some service is consumed and at some cost, but since the assets are not fully used up in that period, this consumption cost differs from the purchase cost.

1/This procedure differs from the formation of the home purchase price relative, in that the latter is formed at the cell level and then averaged across cells. For the mortgage interest rate relative, no cell relatives are calculated; instead, the overall relative is found after averaging the current interest rate across cells.

In fact, the services that durable goods provide can generally be obtained without purchasing the asset that generates the service. Renting or leasing a house is one example. Here, the rental price is the cost of consuming the service. When services are obtained from assets that the consumer has purchased previously, however, no periodic market transaction occurs. Therefore, the purchase price clearly does not measure the cost of consumption. It is not always clear what does. (In chapter 4, we discuss how the costs of consuming housing services in owner-occupied houses can be measured.)

Because purchasing durable goods is separate from consuming them, constructing a price index depends on whether it should measure changes in the prices of a market basket of items purchased or whether it should measure changes in the cost of consuming nondurable goods and services in that market basket as well as the flows of services yielded by the durable goods in that market basket. As it is presently constructed, the CPI treats durable goods as nondurables. The expenditure weight is determined in the reference period by the amount purchasers spend in that period for the durable goods in the market basket.

For example, people who consume housing services from houses they bought in previous periods are considered as having spent nothing on housing purchases in the reference period. The expenditure weight reflects only aggregate expenditure on home purchases in the reference period. In other words, the CPI measures changes in purchase prices, not changes in consumption costs. It does not measure either the average effect of price changes on consumers or the effect of price changes on an average consumer.

This distinction between purchase price and consumption costs is significant for the owner-occupied housing component of the CPI. Most people purchase houses infrequently, and in most time periods they consume housing services that they obtain from houses they purchased previously. Pricing homeownership cost with the asset price approach helps to measure changes in the cost of purchasing houses and financing mortgages to pay for them, but it is not appropriate for an index used as the CPI is primarily used, because changes in these costs may bear little relation to the cost of consuming housing services.

For at least four reasons, whether to include houses rather than owner-occupied housing services is more serious an issue than similar issues for other consumer durables. First, a simple dichotomy between durable and nondurable goods does not exist. Goods exist along a continuous scale of durability. Houses are the most durable, some yielding services for more than half a century. The distinction between purchasing an asset and purchasing or consuming a flow of services is more obvious for housing than for any other good.

Second, variations in the rate of purchase are greater for housing than for most other consumer durables. This is significant because of how the rate of asset purchase in the base period

influences expenditure weights. In the CPI, the expenditure weight for homeownership costs reflects not the average share of monthly budgets spent by households to consumer owner-occupied housing services but, rather, the average expenditure on new home purchasing and financing. An unusually high or low rate of new home purchase in the base period results in an unusually large or small expenditure weight for homeownership costs.

Third, very few people purchase houses outright. Buyers typically place a down payment of 20 percent or less. Consequently, homeowners commonly view their monthly house payment as their cost of housing. Buyers frequently buy other consumer durables on credit, but the frequency of all cash purchases for them is higher than for houses. Furthermore, loans obtained to purchase other consumer durables are often repaid before the goods are sold or wear out, so that owners make payments for only part of the time that they consume the services that the goods yield. Homeowners, on the other hand, generally make payments for nearly the entire time in which they are consuming owner-occupied housing services.

Fourth, treatment of housing costs is most significant in comparing the CPI with an index of consumption costs because for most people housing is their largest expense. Any change in the treatment of housing costs has a larger potential impact on the measured rate of change in the price level than a similar change in the treatment of other consumer durables.

MEASURING HOMEOWNERSHIP COSTS BY THE ASSET PRICE APPROACH RAISES SERIOUS CONCERNS

If an index based on purchase prices is used when an index based on consumption costs is more appropriate, the differences in index values may create problems. The rate of change of the cost of consuming housing services may differ greatly from the rates of change of house purchase prices and interest rates. Even if these rates of price change are the same, differences in weights for homeownership costs in the two indexes will cause differences in the measures of overall price change, if the rate of change for homeownership costs differs from the average rate of change of other prices. The asset price approach allows no logical determination of the weight for homeownership costs, because it compares expenditures on assets that will yield services for many years with expenditures on goods and services consumed immediately. Whether the expenditure weight for housing in an index that measures the cost of consuming a market basket of goods and services will be higher or lower than the current CPI weight for housing depends on the rate of new home purchase in the reference period.

It is widely believed that the cost of consuming housing services in at least the last few years has been rising less rapidly than the owner-occupied housing component of the CPI. The belief is that, because most home purchases are financed by

mortgage loans requiring fixed monthly payments throughout the life of the loan, these payments on existing mortgages (representing by far the largest share of out-of-pocket monthly housing costs for most homeowners) have not been affected by recent large increases in interest rates and house purchase prices. Indeed, homeowners are likely to feel that increases in the market value of their property make them better off, not worse.

Whether out-of-pocket expenses adequately measure the costs of consuming owner-occupied housing services--an issue we discuss in chapter 4--the possibility that measuring homeownership costs by the asset price approach causes the CPI to rise faster than measuring the cost of consumption has serious implications. They arise because of the widespread use of the CPI in escalation and indexing and because of the CPI's importance as an indicator of price stability and a signal of the need for policy action.

The rationale for cost of living adjustments in both private sector wage agreements and Government transfer programs is that they ensure that wage earners and transfer payment recipients can maintain their standard of living when prices rise. Wages and transfer payments must be adjusted upward enough to allow earners and recipients to consume the same market basket of goods and services from month to month, despite the rising costs of consumption. 1/ With respect to owner-occupied housing, maintaining a specified standard of living clearly requires an unimpaired ability to pay the cost of consuming the same flow of housing services, not the ability to pay the cost of purchasing and financing the asset that yields those services. Even if a homeowning household cannot afford to purchase and finance a house at current prices and interest rates, it can continue to live in the same house and maintain the same lifestyle as long as it can afford to pay the costs of consuming the housing services that the house yields. From the preceding economic analysis, we believe a price index that measures changes in the cost of consumption is, therefore, more appropriate than the current CPI as a tool for escalating wages and indexing Government payments.

Effects on indexed Federal expenditures

The effects of using the present CPI if it is rising more rapidly than a cost-of-consumption index can be serious. One

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1/Many wage earners and transfer payment recipients receive income from more than one source. Therefore, if their wages and transfer payments are adjusted for price level changes but their other income streams are not, they will not be able to consume the same market basket of goods and services when prices rise. Nonetheless, in this report we treat as appropriate an index that fully adjusts the wages or transfer payments under consideration rather than an index that also takes into account other, unadjusted income streams wage earners and transfer payment recipients receive.

effect is the impact on the Federal budget. Federal expenditures are related directly to the CPI. Various estimates have suggested that a 1 percent rise in the CPI triggers a direct increase of $1 billion to $2 billion in Federal transfer payments. Changes in the CPI also affect the Federal budget indirectly. A CPI that is rising faster than an index of the cost of consumption will cause Federal expenditures to exceed the amount necessary to maintain the standard of living of transfer payment recipients.

A similar situation exists for workers whose wage rates are escalated according to changes in the CPI. To the extent that changes in the CPI overstate increases in the costs of consuming a specified market basket of goods and services, escalated wage rates increase by more than is necessary for workers to maintain their standard of living. If an index of consumption costs were used in wage escalation and if that index were rising less rapidly than the current CPI, the workers' wages would not rise as much, and costs to the firms employing those workers would be less.

There is no certainty, however, that an index of the cost of consumption would rise more rapidly than the CPI in the next few years. Current changes in mortgage interest rates affect the CPI measure of homeownership cost more than they affect the cost of consuming owner-occupied housing services when interest rates fall as well as when they rise. When mortgage interest rates are falling, other things being equal, a cost-of-consumption index will show less rapidly rising (or more slowly falling) prices than the CPI. As expectations of inflation have increased in recent years, long term interest rates--such as mortgage rates --have risen. If, however, future fiscal and monetary policies reduce people's expectations of future inflation, we expect these interest rates will fall. Increases in Federal expenditures and wages to adjust for changes in the price level, therefore, would be larger when using an index of the cost of consumption than when using the CPI.

Effects on economic policy

The CPI is very important in economic policy. For policymakers and the public, it indicates the success of economic policy in maintaining price stability and it signals the need for policy action. Although the CPI is not a cost of living index, the widespread attention given to monthly announcements of the latest change in the index causes many people to interpret it as if it were. The announcements no doubt affect expectations of inflation and political pressure for changing or continuing economic policy.

Using a conceptually appropriate index as the measure of price change, especially one on which so much attention is focused, is therefore extremely important. Measuring homeownership costs with the asset approach may have the potentially serious consequence of creating political pressure to reduce the economy's growth rate for purposes of restoring price

stability at a time when present policies actually affect the ability of most people to maintain their standards of living far less than the CPI indicates.

Additionally, present measurement of homeownership costs hinders evaluation of the effectiveness of monetary policy. At present, changes in current mortgage interest rates have a very great effect on the CPI, even though homeowners' existing monthly payments are not affected by such changes. If the Federal Reserve Board were to follow a restrictive monetary policy to reduce the rate of inflation, interest rates would rise. An increase in mortgage interest rates would cause a large rise in the CPI, and this would suggest that monetary policy had not only been ineffective but had actually increased the rate of inflation. The same problem would occur in reverse if the Federal Reserve Board followed an expansive policy. A fall in the mortgage interest rate would cause the CPI to rise less rapidly (or, perhaps, to fall), suggesting that inflation was abating. Alternative ways of measuring homeownership costs might not cause such a serious problem, because changes in current mortgage interest rates would not affect the costs of consuming housing services so much.

CONCLUSIONS

Measuring homeownership costs in the present CPI by the asset price approach is based on an interpretation of the CPI as an index of the purchase prices of durable as well as nondurable goods, even though durable goods, once purchased, provide flows of services that are consumed over many time periods. Changes in purchase prices or financing costs of houses and other durable goods, however, may affect what it costs households to consume services that flow from durable goods acquired in previous periods differently from how they affect current acquisition costs of these goods.

Indexes of prices that consumers pay are appropriate and important measures for deflating economic data, escalating contractual payments, and signaling the performance of the economy. For escalating wages, indexing government transfer payments, and forming and evaluating public policy, however, an index that more closely measures consumption costs is more appropriate than the CPI as it is presently constructed. In the next chapter, we discuss some alternatives.

CHAPTER 4

ALTERNATIVE APPROACHES TO MEASURING HOMEOWNERSHIP COSTS ARE AVAILABLE

During the past 20 years, there have been many recommendations that BLS change its approach to measuring homeownership costs from asset price to flow of services in order to measure changes in the cost of consuming owner-occupied housing services between time periods. Several conceptual approaches to measuring the cost of consuming owner-occupied housing services are widely discussed. User cost and nominal outlays are two of these.

User cost measures the full economic costs of consuming owner-occupied housing services. Rental equivalence and a user cost index are two methods of measuring user cost. Rental equivalence attempts to infer the income that homeowners forgo when they reside in their own homes rather than rent them to others. It does this by observing rents on similar properties. A user cost index measures user cost by summing the various explicit and implicit costs that homeowners incur in providing shelter for themselves. Nominal outlays include only out-of-pocket expenses, not full economic costs, that homeowners incur in consuming housing services. In this chapter, we analyze these two methods of measuring user cost as well as a method of measuring nominal outlays.

THE THEORY OF USER COST

Measuring user cost is one way of determining the cost of consuming a flow of services generated by long-lived assets like houses. Economic theory defines the user cost of owner-occupied housing services as the value of the alternative forgone by consuming those services. That is, user cost refers to opportunity cost--the notion that the cost of an item purchased is determined by the value of what might have been purchased instead.

For most items in the CPI, the market price is a measure of opportunity cost, because the price represents the amount of money that consumers must relinquish to buy that item and, therefore, the amount they no longer have available for other purchases. But for owner-occupied housing services, there are no periodic market transactions, because homeowners, in effect, purchase the services from themselves. Nonetheless, there is an opportunity cost to this consumption, because homeowners are forgoing something of value when consuming owner-occupied housing services.

One way to view this opportunity or user cost is to recognize that homeowners can rent their houses to others so that, by living in their own houses, homeowners forgo rental income that they might otherwise earn. A second way to view user cost

is to consider how much homeowners spend each month--implicitly as well as explicitly--on housing services. This is an amount that they do not have available to spend on other items. These two views lead, respectively, to the rental equivalence and user cost index methods of measuring user cost.

Under a special set of circumstances--including no uncertainty, perfectly competitive markets, a proper interpretation of the opportunity cost of capital, and the existence of equilibrium in housing markets--economic theory suggests that both methods will yield the same measure of user cost. That is, observed rents on equivalent rental properties will equal the costs homeowners incur in providing shelter for themselves. 1/ In practice, however, these conditions do not usually exist. Therefore, an operational user cost index is likely to yield a measure of changes in homeownership costs different from rental equivalence. 2/

In an important paper on user cost, Dale A. Smith presents a useful analogy to the distinction between rental equivalence and a user cost index as methods of measuring user cost for owner-occupied housing services. 3/ Smith's analogy is about measuring a family's cost of consuming homegrown food. One way to measure this cost is to determine how much the family could have received if they had chosen to sell rather than eat the food; this approach is analogous to rental equivalence. A second way that is analogous to a user cost index is to add all the costs the family incurs in growing the food, including an implicit labor cost as well as explicit costs for seed, fertilizer, and so on.

RENTAL EQUIVALENCE IS ONE MEASURE OF USER COST

Many economists have recommended that the CPI homeownership component measure user cost by rental equivalence. To decide to buy and live in a particular house is to choose not only an asset in which to invest but also a flow of housing services to consume, even though these choices need not be made together. For example, some people own one house while living in another; still others

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1/A more complete discussion of user cost theory and the relationship between measures derived through rental equivalence and a user cost index can be found in Robert Gillingham's "Estimating the User Cost of Owner-Occupied Housing," Monthly Labor Review, 103 (February 1980), 31-35, and papers he cites.

2/Data yielded by current BLS experimental measures of homeownership costs discussed in chapter 5 support this contention.

3/Dale A. Smith, "The Flow of Services Approach to Estimating the Homeownership Component of the CPI," Bureau of Labor Statistics, unpublished paper, January 1975, pp. 45-48.

rent houses they do not own and consume the services these houses provide. Rental equivalence attempts to measure the cost of consuming owner-occupied housing services by distinguishing the two separate components of owning a dwelling and residing in it.

When a household, as asset owner, sells to itself the housing services the house yields each month by living in the house instead of selling the services to someone else to whom it might have rented the house, there is no market transaction with which to measure the cost of consuming those housing services. One interpretation of this cost is that it is the income the household forgoes when it resides in its house instead of renting it to others. Thus, the rental income the household does not earn but might have earned by renting its house is the opportunity cost the household pays to consume the housing services itself, because it measures the amount forgone to consume those services. In this method of measuring user cost, changes in the rental value of a house represent changes in the cost of homeownership.

Since we cannot observe periodic rental payments for owner-occupied houses, the rental income that is forgone must be estimated from the rental payments for equivalent housing services consumed in houses that are not owner-occupied. This can be accomplished by observing the rents paid for a sample of rental houses selected to represent the universe of owner-occupied houses. We can determine the base period expenditure weight for incorporation into the overall CPI by multiplying the average rent paid to consume the services the sample rental houses provide in the base period by the number of households in the Consumer Expenditure Survey sample who live in their own houses. 1/

Price relatives

Periodic price relatives should measure changes in the cost of consuming a constant quality of owner-occupied housing services. For rental equivalence, this implies determining the rental income forgone by owners of houses yielding the base period level of services. Since the level of services a given house yields usually declines with age, repeated measurements of rents paid for the base period sample of houses will not accurately calculate price relatives. 2/ One way to hold the quality level

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1/We can use the unweighted average rent as a measure of average rental income forgone only if owner-occupied houses of different values are represented in the same proportion in the rental house sample. If they are not, then we must differentially weight the observed sample rents in calculating a rent equivalent to the average rental income forgone by homeowners living in their own houses.

2/The level of housing services is measured in physical, not monetary, units. The price of a house may be rising for many reasons at the same time that the physical level of housing services the house yields is declining.

constant is to periodically replace elements of the rental house sample to maintain the base period quality level. Then we can compute price relatives by dividing the current average rent by the preceding period's average rent. A second way begins by assigning each house in the base period sample to a cell determined by quality and calculating the average base period cost of consuming housing services of each quality level. We can assign cell weights based on the proportion of houses in each cell. In subsequent periods, we can draw new samples of rental houses that are representative of owner-occupied houses, assign them to cells, calculate individual cell price relatives by comparing each cell's current average price with the preceding period's average price, and apply the cell weights to determine an overall price relative.

Income tax considerations

As a measure of the opportunity cost of living in one's own house, rental equivalence should consider the favorable tax treatment that income generated by owner-occupied housing receives in determining the cost of consuming owner-occupied housing services. Assets generate income streams, regardless of whether the flow of services they yield is sold in market transactions, but the income streams are generally not taxable if the assets are not financial and if the services are consumed by the assets' owners. Therefore, the rental income that homeowners are imputed as receiving from themselves as consumers of housing services flowing from houses they own is not taxable. If these homeowners rent their houses to others, the rental income they receive is taxable, although they can, of course, deduct their expenses (interest payments, maintenance and repairs, property taxes, property insurance and depreciation) from gross income received. The income forgone by residing in one's own house, which is the concept of the cost of consuming owner-occupied housing services measured by rental equivalence, is only the rental income that might have been received minus the additional income taxes that might have been paid. The base period expenditure weight for owner-occupied housing services should measure after-tax forgone income and price relatives should measure changes in this cost. Calculating after-tax forgone income requires knowing homeowners' marginal tax rates.

We recognize that the CPI has no provision for adjusting other prices for the deductibility of sales taxes from gross income in computing taxable income. Therefore, interpreting the cost of consuming owner-occupied housing as the rental income homeowners who live in their own houses forgo net of the income taxes they must pay on that income introduces a new relationship between the CPI and the income tax, while simultaneously establishing a more accurate measure of the opportunity cost of consuming owner-occupied housing services. 1/

1/The use of after-tax rather than pre-tax forgone rental income is particularly important in calculating the base period expen-

BLS must construct a rental equivalence sample

The sample of rental housing units that BLS currently uses to measure changes in rent costs may not be suitable for estimating homeownership costs by rental equivalence. The rent sample BLS uses represents rental dwelling units, not owner-occupied housing units. Most owner-occupied housing units differ substantially from many rental units. To implement rental equivalence in the CPI, enough rental units must be found similar to owner-occupied units in size, location, and quality to enable BLS to construct a sample that represents owner-occupied houses accurately. This at least requires augmenting the present sample with additional rental units similar to owner-occupied units to derive a sample that can be weighted to represent owner-occupied units. It may instead require creating a separate sample for rental equivalence.

It is sometimes alleged that the presence of rent controls in some urban areas and the potential introduction of them in others invalidates the use of rental equivalence in measuring homeownership costs, because house prices are not subject to rent control. This argument, at least in its relatively simplistic forms, is false, because rental equivalence is based on estimates of the rental income forgone by homeowners who live in their own homes, regardless of whether this income is controlled. Although house prices may be uncontrolled, the controlled rental price represents the opportunity cost to a homeowner of residing in one's own house. Changes in homeownership costs when costs are defined as rental equivalence are properly measured by changes in rents that homeowners can receive by renting to others. As long as the sample from which rental equivalence is determined includes enough controlled rental units to represent owner-occupied units that would be subject to controls if owners chose to rent them to others, then the rental equivalence measure of the cost of consuming housing services is not invalidated by the existence of rent controls on some rental units. 1/

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diture weight for the homeownership component, because accurately determining that figure requires comparing levels of expenditures on many items. If current tax laws remain unchanged, price relatives for owner-occupied housing services are not likely to be greatly affected by a decision on measuring rental equivalence as either after-tax or pre-tax forgone rental income.

1/By interfering with free market price determination, rent controls can affect the relationship between forgone rental income and the costs homeowners incur in providing themselves shelter that would be included in a user cost index. However, they do not invalidate rental equivalence as a measure of forgone rental income and, therefore, opportunity cost.

A USER COST INDEX IS AN ALTERNATIVE TO RENTAL EQUIVALENCE

A user cost index is an alternative to rental equivalence for measuring the user or opportunity cost of consuming a flow of owner-occupied housing services. Unlike rental equivalence, which measures opportunity cost as rental income forgone, a user cost index measures this concept by summing the explicit and implicit costs homeowners incur in providing shelter for themselves.

Index components

Economic theory provides a sound basis for determining the components of a user cost index. 1/ By definition, the monthly user cost of consuming a flow of housing services consists of the costs a homeowner incurs in holding a house for a month, less any increase in the value of the house during that month. 2/

Since wealth invested in one's house could, as an alternative, be invested in another asset, part of this monthly cost is the opportunity cost of capital, the return that could have been earned during that month through alternative investment. Most homeowners have some equity in their houses but do not own them outright. Therefore, their capital costs consist of both an explicit element--interest paid on their mortgage or deed of trust--and an implicit element--forgone return on equity that could be invested elsewhere. In a world of neutral taxation, perfectly competitive markets, and no uncertainty, the rates of return from investment in all assets are equal. A homeowner's opportunity cost of capital equals the interest rate multiplied by the value of the house. Since there is only one interest rate, there is no ambiguity in measuring costs.

In the real economy, however, differential tax policy toward alternative investments, monopoly power, and uncertainty result in a variety of yields on investment in different assets. Consequently, one must choose appropriate interest rates in measuring this portion of user cost. Like others who have studied user cost indexes, we include mortgage interest payments and forgone return on equity as separate components of a user index, because one may want to use different interest rates to value these two elements of user cost.

Changes in asset value are part of the opportunity cost of owning an asset and consuming the services it yields, because,

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1/The papers by both Gillingham, pp. 31-33, and Smith, pp. 13-14, and the work they cite discuss the theoretical justification for the user cost index we analyze in this report.

2/If house value declines during a month, then the decline in value is added to the cost of holding the house during that month in computing user cost.

at least in the long run, they influence the asset owner's wealth and ability to consume other goods and services. Increases in house value during a month reduce user cost, while decreases have the opposite effect. Since changes in house value are usually realized--converted into liquid assets--infrequently, this portion of user cost is implicit and must be estimated from sale prices of similar houses.

The change in market value of a specific house between two points in time represents the combined effects of two separate components of a user cost index--depreciation and capital gain or loss. Depreciation refers to the loss in asset value because of aging and wear and tear in a house that is not offset by maintenance and repair, while capital gain and loss refer to the pure price effect of a change in value of an asset of unchanged quality. Depreciation enters a user cost index as a positive cost, as mortgage interest payments and return forgone on equity do, while capital gain enters as a negative cost, offsetting other costs of consuming owner-occupied housing services.

In summary, the components of a user cost index include mortgage interest, property taxes, property insurance, and maintenance and repairs, which are paid explicitly, and forgone return on equity, depreciation, and capital gain or loss, which are paid implicitly. Implementing a user cost index requires determining base period expenditures for each component and calculating monthly cost changes for the entire index. Determining base period expenditure weights is straightforward for property taxes, property insurance, and maintenance and repair. Complications arise with mortgage interest and the implicitly paid components of the index.

Base period expenditure weights

In determining the base period expenditure weight for the mortgage interest component of a user cost index, it is important to choose an appropriate interest rate. One possibility is to multiply the amount of outstanding mortgage debt in the base period, as determined from the Consumer Expenditure Survey, by the average base period mortgage interest rate. 1/ Mortgage interest would then measure the base period cost of obtaining the base period level of mortgage debt. An alternative method would calculate actual base period mortgage interest payments from data on the size, age, and interest rate of mortgage loans outstanding in the base period. This measure might either exceed or fall below the base period cost of obtaining the base period level of mortgage debt, depending on whether, on average, outstanding base period debt had been acquired at higher or lower

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1/There is, of course, more than one mortgage interest rate at any point in time. We assume here that a method exists for determining an "average" base period rate by appropriately weighting the several rates actually observed.

interest rates than those prevailing in the base period. If actual mortgage interest payments are used, then the base period expenditure weight will not be overly dependent on the average base period mortgage interest rate.

Another important question concerns the calculation of forgone return on equity. One view considers the interest rate used for this calculation to be a residual rate of return on equity. This implies that the forgone return on equity component of user cost equals the difference between the market valuation of housing services yielded and the sum of all other costs incurred in homeownership. This view maintains that since there are potential rental opportunities for owner-occupied houses such that rental income forgone is a measure of homeowners' opportunity cost, consistency requires that a residual rate of return be used in measuring user cost through a user cost index. If the forgone return on equity is viewed as a residual, then the choice of methods for determining the base period expenditure weight for mortgage interest will not affect the total weight for homeownership costs. This is because the weight for the forgone return on equity will adjust, ensuring that the weight for the user cost index equals the market valuation of housing services.

However, since the market valuation of owner-occupied housing services cannot be explicitly observed, data on rental equivalence are needed if we are to calculate residual rates of return on homeowners' equity. Therefore, there is no advantage in measuring user cost through a user cost index rather than through rental equivalence, if a homeowner's forgone return on equity depends on the potential rental value of the house.

Consequently, the alternative view is to use an interest rate that homeowners might obtain on investment in other assets --such as government securities or thrift institution savings accounts--to calculate the opportunity cost of equity invested in their own houses. The base period level of the interest rate selected would be multiplied by the total equity in owner-occupied houses, as determined by the Consumer Expenditure Survey, to calculate the base period expenditure weight for the forgone return on equity component of a user cost index. Theoretically, the most appropriate interest rate corresponds to the asset that homeowners actually consider to be their alternative to investment in their houses. In practice, the choice of an interest rate will likely be somewhat arbitrary.

As a result, there is no reason to anticipate any correspondence between user cost measured through rental equivalence and the same concept measured by a user cost index, if the forgone return on equity is no longer a residual rate of return. Both approaches, however, remain valid measures of opportunity cost. One measures the market value forgone by not selling housing services. The other measures the cost to homeowners of producing those services.

Measuring the base period expenditure weights for the capital gain or loss and depreciation components of a user cost index presents less serious problems. Since capital gain or loss measures the price change of a house of constant quality between time periods, it can be estimated from data on transaction prices and quality characteristics of houses sold in the base period. 1/ If the choice of base period is likely to greatly influence the expenditure weight for capital gain--as happens for the home purchase weight in the current CPI--then the capital gain expenditure weight can be derived from an extended sample of housing transactions. Estimating depreciation can be made relatively simple by assuming that depreciation of the market value of a house as it ages is a constant percentage of that value. BLS could estimate a value for the depreciation and, in the process, test the validity of the assignment.

Price relatives

Each period's price relative is a comparison of the current cost of consuming the base period level of housing services with that cost in the previous period. There is no need to compute price relatives for individual components of the user cost index, because the item being priced in the CPI is owner-occupied housing services. Price relatives are calculated in each period beyond the base period by first determining the expenditure necessary in the current period to consume a constant level of housing services and then dividing by the expenditure necessary in the previous period. This calculation requires determining the cost homeowners would incur in each period for each component of user cost and summing these figures to obtain a total user cost.

There are two approaches one can use to determine expenditures homeowners currently incur in consuming the base period level of owner-occupied housing services. One approach is first to directly measure expenditures for each component of a user cost index in each period as would be done in the base period and then to adjust for differences from the base period in the level of services consumed. The other is first to compute the ratio of the current price to the previous period price for each component and then multiply that ratio by the base period level of expenditure for that component. 2/ Although the second approach is the

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1/By observing transaction prices during the base period--perhaps a year--and adjusting for differences in quality, one can measure the monthly rate of change of a house of a designated quality.

2/In the first period following the base period, this implies multiplying by the base period level. In subsequent periods, this implies multiplying by the base period level adjusted for price changes in intervening periods.

method usually used in the CPI to measure price changes, it may be necessary to use the first for some components of a user cost index to accurately measure costs homeowners incur.

Changes in house value, as well as changes in property tax and property insurance rates per dollar of house value, will affect property tax and insurance costs. Therefore, to determine current costs homeowners would incur for these two components in consuming the base period level of housing services, one must measure the ratios of current period property tax rates, property insurance rates, and constant quality house values to their respective base period levels. Current period property tax costs will equal base period costs multiplied by both the ratio of current to base period house value and the ratio of current to base period average tax rates. A similar calculation will yield current period property insurance costs. 1/

One way to calculate current costs homeowners incur for maintenance and repair is by observing price changes for goods and services widely used for maintenance and repair of houses in the base period. Although housing services, rather than paint brushes or plumbers' wages, is the item to be priced, changes in the prices of goods and services used for maintenance and repair can be used as proxies for changes in this component of homeowners' user cost. Current maintenance and repair costs would then be found by multiplying the base period expenditure level for maintenance and repair by an average ratio of current to base period prices of goods and services used for maintenance and repair.

A potential disadvantage to this approach is that its result may overstate the current cost of providing the base period level of maintenance and repair. This can happen if new goods and services introduced since the base period can provide the same amount of maintenance and repair more cheaply. An alternative approach is to measure current maintenance and repair expenditures directly from monthly household surveys. The difficulty in this, however, lies in controlling for changes in the quality level from the base period.

Changes in house value from period to period represent the combined effect of capital gain or loss and depreciation. Measuring the cost homeowners incur for these components of user cost almost certainly requires periodically computing current average rates of price change for houses similar in quality to those sampled in the base period. 2/ Separate values for depreciation and capital gain or loss can be found by assuming that

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1/This calculation assumes implicitly that to consume housing services at the base period level requires maintaining property insurance equal to the same percentage of house value as in the base period.

2/This cost is negative, of course, if the value of houses increases during the period under consideration.

the depreciation rate is a constant percentage of house value and adding the depreciation to the change in house value to find the capital gain or loss.

The largest portion of user cost--the opportunity cost of capital invested in housing--is also the one for which calculating the current cost to find price relatives for owner occupied housing services is the most complex. The complexities arise because mortgage payments and forgone return on equity are separate components of the user cost index. Changes in either the amount of capital invested in one's house--that is, in the market value of the house--or in interest rates will obviously affect the opportunity cost of capital. But, in addition, if the interest rate used to compute the return on equity forgone by investment in housing differs from the interest rate used to compute debt cost (which is generally the mortgage rate), then changes in the share of housing financed by debt and equity (the debt/equity ratio) will also affect the opportunity cost of capital. This will happen regardless of whether mortgage interest costs are determined by the current rate or an average of past rates constructed to reflect the rate homeowners actually pay. 1/

Computing the current opportunity cost of capital on the basis of a constant debt/equity ratio simplifies the calculations, although it is not a logically necessary step for maintaining the CPI as a fixed-weight measure of constant quality price change. 2/ This simplification makes it possible to calculate the current level of equity and mortgage debt associated with base period housing by multiplying the base period levels by the ratio of current to base period house values. 3/ Then,

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1/If the forgone return on equity is calculated as a residual, changes in the debt/equity ratio should not affect user cost.

2/At first glance, it might seem necessary to estimate cost on the basis of the base period debt/equity ratio, because the interest required on a mortgage of a given amount often varies according to the percentage of purchase price that the mortgage represents. However, if the CPI market baskets are changed to include owner-occupied housing services, rather than contracted mortgage interest, then it is no longer necessary to keep the condition of the mortgage constant. Changes in tax laws or interest rate ceilings on certain types of savings deposits, for example, may enable homeowners to reduce their cost of consuming a fixed level of housing services by altering their debt/equity ratios. A CPI that measures changes in the cost of consuming flows of services should reflect these effects.

3/Calculating the ratio of current to base period house value for this purpose would resemble calculating price relatives for the home purchase component of the current CPI. That is, data on the base period and current housing transactions would be divided into cells according to quality levels, and the rate of price change adjusted for quality change would be computed.

return forgone on invested equity can be found by multiplying the level of equity by the current value of the interest rate used as a measure of the available return on alternative investments. Similarly, mortgage payments can be readily found if the current mortgage interest rate is used, by multiplying the current rate by the calculated current level of mortgage debt.

If the interest rate used to compute mortgage interest cost is an average of rates homeowners actually pay on the stock of existing mortgages, new and old, then calculating current period mortgage cost is more complicated. It is necessary first to compute an average interest cost in each period. Accurately computing this value may require sampling households in each period to find out the current distribution of interest rates on existing mortgages. But it may also be possible to obtain a reasonable approximation of average interest rates from data on current mortgage interest rates and the base period age distribution of mortgages, if we assume that distribution remains roughly constant. The accuracy of this approximation depends on how little this assumption distorts reality. 1/

Computing price relatives for the opportunity cost of capital that take into account changes in the debt/equity ratio as well as house value and interest rates requires knowing the debt/equity ratio in each pricing period. Therefore, the only reasonable way to find the opportunity cost of capital incurred in each period to consume the base period level of housing services is to survey households for current data in each period and then to adjust these data for changes in the level of services consumed from the base period. That is, base period houses would be assigned to cells according to quality, an average cost of capital for each cell would be formed, and each cell would be assigned a weight to compute the average base period cost for all homeowners. Then, houses would be similarly assigned in each pricing period, rates of price change for each cell would be calculated, and cell weights would be applied to calculate an overall measure of price change. The final step requires multi-

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1/BLS has monthly data on current mortgage interest costs, and one can learn the base period age distribution of mortgages from the Consumer Expenditure Survey. Therefore, in each period beyond the base period, it is possible, by assuming an unchanged age distribution, to approximate the average interest rate homeowners pay in that period. However, this assumption may distort reality too much to enable us to obtain a reasonable approximation. Most mortgages are obtained at the time the houses are purchased. Therefore, variations in rates of home purchase will alter the age distribution of mortgages. For instance, there will be more 1-year-old mortgages in the year following a year of heavy house turnover and new construction than in the year following a year of low turnover and new construction. Also, interest rate cycles that influence the rate of refinancing houses will also affect the age distribution of mortgages.

plying this rate of change by the base period level of expenditure to compute the current cost of capital to consume the base period level of housing services. This figure is then added to current costs of other components of the user cost index, so that one can find an overall price relative by dividing current costs by previous period costs.

Additional considerations

Two additional considerations are worth noting--the volatility of the capital gains component and the tax treatment of homeownership costs. BLS data suggest that the monthly change in house value often varies considerably. This volatility in the capital gains component can result in volatility in the entire user cost index, particularly during periods of rapidly rising house values. And, since homeownership costs represent a large share of total consumer expenditures, volatility in the overall CPI is also a likely result. Such rapid monthly changes may obscure longer term effects and diminish the usefulness of the CPI as an indicator of trends in the price level.

The imputed income generated by owner-occupied housing is not taxable, and this influences a rental equivalence measure of user cost. Additionally, mortgage interest and property tax payments are deductible from gross income in computing taxable income. Therefore, a more accurate measure of these components of a user cost index would be the amount homeowners pay net of any income tax savings they achieve. This distinction is very significant in that calculating base period expenditure weights using after-tax rather than pre-tax costs will substantially reduce the weight for homeownership costs. The distinction is less important in calculating price relatives, unless the relevant tax laws change.

NOMINAL OUTLAYS IS AN ALTERNATIVE TO USER COST

Nominal outlays is an alternative approach to user cost in measuring the cost of consuming owner-occupied housing services. Nominal outlays consist of monthly out-of-pocket expenses homeowners incur in consuming housing services. Because implicit costs such as forgone return on equity, depreciation, and capital gain or loss are not included in nominal outlays, this approach does not measure the full economic costs of consuming housing services. Nonetheless, a measure of nominal outlays is a flow-of-services measure, because it measures costs associated with consuming a flow of services rather than costs of acquiring assets that yield services. The base period expenditure weight represents base period spending on consumption and is, therefore, directly comparable to base period spending on other goods and services. Price relatives measure changes in monthly costs experienced by all consumers of owner-occupied housing services.

The theoretical justification for measuring homeownership cost in the CPI as nominal outlays--which are acknowledged not to

be a measure of full economic costs--rests on the possibility that changes in short run out-of-pocket expenses are more important to households than long run gains that may not be readily realizable in making their housing decisions. 1/ Since increases in explicit housing costs affect a household's ability to consume other goods and services more directly and immediately than increases in implicit costs do, an index that measures changes in nominal outlays rather than full economic costs may be more appropriate for some uses of the CPI. 2/

Outlays components
and expenditure weights

Although nominal outlays and user cost are separate concepts, out-of-pocket expenses--payments for mortgage interest, property taxes, property insurance, and maintenance and repair--that are included in a user cost index are also components of nominal outlays. An additional component of nominal outlays is repayment of mortgage principal. 3/ Although these repayments are merely household wealth transfers and do not represent part of the economic cost of consuming housing services, they belong in a nominal outlays measure because they are part of the monthly expenses households incur in consuming these services. In practice, including or excluding principal repayments is likely to have little effect on housing price relatives, although there will be an effect on the base period expenditure weight.

The base period expenditure weight for owner-occupied housing services according to the nominal outlays approach reflects total out-of-pocket expenses homeowners incur in the base period in consuming these services. Derivation of this weight requires determining and summing base period expenditures for each component of nominal outlays. This presents no major conceptual or empirical problems for property tax, property insurance, and maintenance and repair expenses. For mortgage interest and principal payments, we must again decide whether the base period expenditure weight should represent homeowners' average actual expenses or the expenses they would incur if all existing mortgages were obtained

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1/Richard Ruggles, among others, has expressed this view; in analyzing BLS proposals for changing the treatment of owner-occupied housing in the CPI, he made this point in favor of the nominal outlays approach (March 19, 1976, letter to W. John Layng, BLS Assistant Commissioner for Prices and Living Conditions).

2/An alternative way in which one can view nominal outlays is as a modified user cost index. If difficulties in measuring forgone return on equity and capital gain or loss are too serious to allow confident construction of a user cost index, then nominal outlays might be a suitable approximation. In this view, the nominal outlays approach no longer measures a separate concept but instead approximates user cost.

3/Smith, pp. 7-8.

in the base period. Although either definition might be used in a user cost index, actual base period expenses are the better measure of nominal outlays, because outlays measures cost solely as out-of-pocket expenses that are not available in the short run for consuming other goods and services. Therefore, base period survey data on actual mortgage payments provide the information for the weight for the mortgage interest and principal payments components of nominal outlays.

Price relatives

Each period's price relative is a comparison of the current nominal outlays households incur in consuming the base period level of housing services with the nominal outlays incurred in the previous period. Nominal outlays resembles a user cost index with respect to the concept of a price relative in that there is no need to compute price relatives for individual components. This is because the item being priced in the CPI is owner-occupied housing services. Price relatives are calculated in each period beyond the base period by first determining the nominal outlays incurred in the current period in consuming a constant level of housing services and then dividing by the outlays incurred in the previous period. This calculation requires determining households' expenditures on each component of nominal outlays in each period and summing these figures to obtain total nominal outlays.

The same two approaches we described in discussing user cost indexes are available for determining nominal outlays that households currently incur in consuming the base period level of owner-occupied housing services. In one, we can directly measure each component of outlays incurred in each period, as would be done in the base period, and then adjust for differences from the base period in the level of services consumed in calculating the rate of price change. In the other, we can compute the ratio of the current price to the previous period price for each component and then multiply by the previous period level of outlays for that component. 1/

Although this second approach may be feasible for the property tax, property insurance, and maintenance and repair components of nominal outlays, it is probably not a realistic way to compute current period mortgage interest and principal payments. There is no simple way to measure price changes for mortgage costs. One cannot simply multiply the previous period level of mortgage costs by the ratios of current to previous period house value and current to previous average interest rate being paid on mortgages. This is because changes in the debt/equity ratio are also important in comparing current to previous period nominal outlays incurred

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1/In the first period following the base period, this implies multiplying by the base period level. In subsequent periods, this implies multiplying by the base period level adjusted for price changes in intervening periods.

in consuming owner-occupied housing services. 1/ Hypothetically, if average house values rise by 10 percent from one period to the next but no housing transactions occur and no homeowners refinance their existing mortgage debt, then there would be no change in nominal outlays. 2/ The increase in house value is offset by the reduction in debt/equity ratio. If, instead, households had increased the size of their mortgages to maintain the previously existing debt/equity ratio, then there would have been a 10 percent increase in the mortgage interest component of nominal outlays.

As a result, the most reasonable way to find current period mortgage interest and principal costs is from periodic surveys of homeowners. Since surveying is necessary for these components, it is probably worth while to find current costs of the other components of nominal outlays in this way at the same time. Of course, since the CPI is a fixed-weight index, it is necessary to adjust for quality changes in order to measure changes in the cost of consuming the base period level of services. This adjustment would take place by assigning houses that had been sampled in both the base and subsequent periods into cells according to quality, computing the rate of change from the previous period in nominal outlays spent to consume owner-occupied housing services of each quality level, and applying cell weights to calculate an overall price relative.

Additional considerations

One potential concern about the nominal outlays measure we have described is that decisions by homeowners to alter their distribution of costs of consuming housing services between

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1/ In the section on user cost indexes, we discussed the possibility of making the simplifying assumption of a constant debt/equity ratio. As long as the interest rate used to estimate the return forgone on equity approximates the average mortgage interest rate, this assumption will not greatly distort an estimate of the current period opportunity cost of capital. Any overstatement of either mortgage interest cost or return forgone on equity will be offset by an understatement of the other. However, it is less reasonable to use this assumption in conjunction with nominal outlays, because return forgone on equity is not included in a nominal outlays measure of housing costs.

2/ There would, of course, be an increase in user cost as measured by a user cost index, because homeowners would be forgoing a greater potential return. (In a world of perfectly competitive markets, there would also be, after a period of adjustment, an increase in user cost as measured by rental equivalence, because the potential rental value of houses would also rise.) However, as long as homeowners absorb this cost as greater forgone return rather than as additional current out-of-pocket expenses, there is no change in nominal outlays.

explicit mortgage interest payments and implicit forgone return on equity will influence the price of consuming owner-occupied housing services although there is no change in economic cost. For instance, if homeowners respond to rising house values by increasing their indebtedness--spending some of their capital gain or investing it in other assets--there would be a one-time increase in housing price during the pricing period in which they begin making higher mortgage payments. 1/ If homeowners do not realize these capital gains and if they continue making the same mortgage payment, there is no change in the price they pay to consume housing services.

Nonetheless, the nominal outlays measure we have described is an appropriate way to measure changes in out-of-pocket expenses homeowners incur in consuming housing services. Although increases in out-of-pocket expenses and decreases in capital gain from the previous period both represent increases in user cost, there is an important distinction between the two for most homeowners. Only the former reduces the ability of most homeowners to consume other goods and services during the current pricing period. An outlays measure must measure rates of change of actual out-of-pocket expenses, because the justification for using nominal outlays rather than user cost rests on the possibility that changes in the out-of-pocket expenses are more important than the full economic costs of consuming housing services for some uses of the CPI.

Therefore, the alternative to the procedure we have described--maintaining the debt/equity ratio at the base period level--is not appropriate. If that procedure were followed, each period's outlays would represent the out-of-pocket expenses homeowners would incur in each period if they maintained their base period debt/equity ratio. In that case, an apparent increase in the price level would result from an increase in house value unaccompanied by an increase in out-of-pocket expenses, because the greater house value and constant debt/equity ratio imply a larger mortgage and greater monthly explicit costs. A measure that responds in this way to increases in house value would be unsuitable for measuring changes in out-of-pocket expenses incurred in consuming housing services.

The deductibility of mortgage interest and property tax payments from gross income in computing taxable income is important in determining homeownership costs by nominal outlays. The correct measures to use in both the base and subsequent periods for determining outlays incurred in consuming owner-occupied housing services are the outlays for mortgage interest and property tax net of any income tax savings they cause. This consid-

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1/This statement is true for certain only if the interest rate on the new, larger mortgage is at least as high as the rate on the old mortgage. If the new rate is lower, then the periodic mortgage payments might be smaller even though the amount borrowed is greater.

eration will substantially reduce the base period expenditure weight for owner-occupied housing services, but it may not have a large effect on price relatives as long as there are no major changes in the relevant tax laws.

CONCLUSIONS

Both the rental equivalence and the nominal outlays measures we have described have substantial merit as measures of homeowners' housing costs. Substituting either one for the asset price approach currently used would substantially improve the CPI. For several important uses of the CPI, an index that more closely measures consumption costs is more appropriate than the CPI as it is presently constructed.

User cost is a measure of the full economic costs of consuming owner-occupied housing services. Rental equivalence is more likely than a user cost index to provide sound measures of user cost and is, therefore, the approach that BLS should adopt if it chooses to measure the cost of consuming a flow of housing services by user cost. The only interest rate that is not arbitrary and that might be used in a user cost index to estimate return forgone on equity is a residual rate of return determined by the difference between the market value of housing services yielded and the sum of all other costs incurred in homeownership. If a residual rate of return is used, there is no advantage to a user cost index, because the rental income forgone must be estimated before the forgone return on equity can be computed. If a different interest rate is used, such as the rate obtainable by investing in an alternative asset, then one can use a user cost index to compute homeownership costs without first estimating rental equivalence, but the values obtained will arbitrarily depend on the choice of interest rate.

Although nominal outlays is not a measure of full economic cost, the concept it measures--out-of-pocket expenses incurred in consuming owner-occupied housing services--may be more appropriate than user cost for some uses of the CPI. This is because changes in nominal outlays may affect homeowners' abilities to maintain their consumption levels of other goods and services more directly and immediately than changes in their forgone rental income. Therefore, we believe that the nominal outlays measure we have described is suitable for the CPI and that both that measure and rental equivalence are superior to the asset price approach that BLS currently uses for measuring homeownership costs.

CHAPTER 5

PREVIOUS ANALYSES OF THE HOMEOWNERSHIP COMPONENT HAVE RECOMMENDED CHANGES

The method of measuring homeownership cost in the CPI has remained substantially the same since 1954, but the possibility of changing to a flow-of-services measure has been examined in depth on several occasions. The BLS staff and outside economists have recommended substantial changes, and after considerable attention by the Congress and the media, BLS has recently begun publishing experimental versions of flow-of-services pricing. In this chapter, we review considerations for change in the 1960s and 1970s, and we describe the experimental measures BLS is now using.

THE PRICE STATISTICS REVIEW COMMITTEE RECOMMENDED CHANGES IN THE 1960s

Significant discussion of the shortcomings of asset price approach to measurement of homeownership costs in the CPI and the possibility of employing alternative measures date to early in the 1960s. The Subcommittee on Economic Statistics of the Joint Economic Committee reviewed comprehensively the price statistics compiled by the Federal Government. During the hearings, the Price Statistics Review Committee (PSRC) of the National Bureau of Economic Research, headed by George Stigler of the University of Chicago, recommended a number of changes in the CPI, including some pertaining to the treatment of housing and other durable goods.

PSRC examined specific issues in measuring homeownership costs in the CPI then current and also conceptual changes in the treatment of housing. PSRC recommended that base period expenditure weights for consumer durables be determined from buying patterns observed over several years, because rates of purchase sometimes vary substantially from year to year. Base period expenditures for housing may be particularly atypical, because home purchases by individual households are infrequent and because macroeconomic conditions greatly influence the rate of housing construction. BLS has adopted this recommendation for computing the home purchase base period expenditure weight. PSRC also recommended that all sales and purchases of houses be included in determining the base period home purchase expenditure weight. In the 1960s, the value of houses sold in the base period was subtracted from the value of houses purchased only when people who sold houses also purchased them. This was later changed to be consistent with the PSRC recommendation.

Stigler's Committee also recommended that BLS alter its method of calculating changes in the mortgage interest component of the CPI, because it did not "reflect changes in the actual

costs incurred by the average consumer from month to month or year to year." PSRC recommended pricing the changes in the average interest rate on all outstanding mortgages and giving parallel treatment to other interest costs. 1/

In responding to this recommendation, BLS Commissioner Ewan Clague upheld the existing measurement of mortgage interest costs. He stated that while BLS recognized that monthly mortgage interest payments represent a fixed element in a household's cost of living, the CPI measures "how much more it would cost today than in the base year to buy the index market basket and not how much more it costs the average family to live." Therefore, he argued, since the CPI is a measure of price changes of goods and services purchased currently, it is not valid to hold mortgage interest costs constant for existing homeowners. 2/

The relationship between the CPI and a cost of living, or welfare, index was a major issue at the hearings. PSRC acknowledged the serious difficulties in producing an overall cost of living index but recommended, nonetheless, that the CPI be moved in that direction for appropriate use in escalating wages and forming and evaluating economic policy. Accordingly, PSRC suggested that BLS modify the treatment of durable goods in revising the CPI.

In particular, PSRC recommended that BLS investigate the possibility of creating a sample of rental housing units representative of owner-occupied units. It recommended that if such a sample could be created, BLS replace the asset price measure of homeownership costs with a rental equivalence measure of the user cost of consuming owner-occupied housing services. It also recommended further exploration of user cost indexes for measuring the costs of consuming services yielded by other durable goods--and by houses, if rental equivalence proved not to be feasible--but it stopped short of recommending that user cost indexes be adopted.

Clague disagreed with both the PSRC recommendation that rental equivalence be used in measuring homeownership costs and the view that the CPI should more closely resemble a cost of living index. He argued that pricing flows of services rather than the durable goods that yield the services could be justified not in a price index but only in a measure of the cost of living. He argued further that creating a hybrid of a price index and a cost of living index would lead to ambiguity and subjectivity and would not be suitable for the uses of the CPI.

1/Joint Economic Comm., Government Price Statistics Hearings, Part 1, 87th Cong., 1st Sess. 47 (1961).

2/Ibid., Part 2, p. 598.

BLS PROPOSED A USER COST INDEX IN THE 1970s THAT WAS NOT ADOPTED

Not surprisingly, in light of Commissioner Clague's views, BLS made no major conceptual changes in the measurement of homeownership costs in the 1964 revision of the CPI, although it continued to research issues that had been raised by PSRC and others. The BLS staff eventually concluded that "the concept, as well as the way housing is viewed by consumers, both suggest that computing an estimate of monthly cost for living in an owner-occupied home is the correct computation for the housing component in the revised CPI." 1/ They considered rental equivalence, a user cost index, and a modified user cost index that was similar to a measure of nominal outlays before narrowing the focus by concentrating on developing a user cost index.

BLS proposed the creation of a user cost index to measure average monthly housing costs for all homeowners, not merely recent home purchasers. The components of this proposed index were mortgage interest, property taxes, property insurance, and maintenance and repairs, as well as return forgone on equity and capital gain or loss, net of depreciation. Although these components are the same as those included in the generalized user cost index discussed in chapter 4, there are some important differences between the index proposed by BLS and the index in chapter 4 in measuring base period expenditure weights and price relatives for some components.

BLS did not propose to divide the opportunity cost of capital into separate components for mortgage interest and return forgone on home equity. The proposed base period expenditure weight would have equalled the base period value of the owner-occupied housing stock multiplied by a weighted average base period mortgage interest rate.

This interpretation of base period expenditures has several drawbacks. The share of the expenditures represented by mortgage interest payments measures the base period cost of obtaining the base period level of mortgage debt. An alternative would be to measure homeowners' actual base period mortgage payments. In addition to more accurately measuring the share of household expenditures spent on interest, this method has the advantage that it does not make the expenditure weight overly dependent on the base period mortgage interest rate, a rate paid only by those who obtain mortgages in the base period. Also, the proposed expenditure weight overstates actual base period expenditures on mortgage interest by not considering the deductibility of interest payments from gross income in computing taxable income.

1/"Treatment of Owner-Occupied Housing in the Revised Consumer Price Index," U.S. Department of Labor, Bureau of Labor Statistics, mimeo, January 13, 1976, p. 5.

If a market, rather than residual, interest rate is used to measure base period return forgone on equity, the most appropriate interest rate to use is one that corresponds to the asset that homeowners consider to be their alternative to investment in their houses. The index BLS proposed would have used the interest rate on mortgages, although a more appropriate rate might be the rate on government securities or thrift institution savings accounts.

By proposing not to divide capital costs into separate mortgage interest and forgone return on equity components, BLS simplified the measurement of price relatives for the opportunity cost of capital. BLS proposed adjusting the base period expenditure weight in each period for the change in house value and the change in mortgage interest rate from the previous period. But, as we discussed in more detail in chapter 4, this calculation is more complicated if one allows the debt/equity ratio in house value to change from period to period and if one measures mortgage interest costs as the amount homeowners actually pay. These complications imply that the only reasonable way to find the opportunity cost of capital incurred in each period to consume the base period level of housing services is to survey households for current data in each period and then to adjust these data for changes in the level of services consumed from the base period.

BLS did not propose to measure separate values for capital gain or loss and depreciation. The base period expenditure weight for the component proposed to measure both effects was to be computed as a weighted average of house price changes in both the base and past periods, because there are often substantial short run variations in the rate of house price change. House price data collected in each period would have been used to calculate house price indexes adjusted for quality changes, and these changes would have been used to estimate changes in the capital gain or loss net of depreciation component. The exact methodology for these calculations was not specified.

Determining base period expenditure weights is straightforward for property taxes, property insurance, and maintenance and repair. However, the description of the BLS proposal leaves unclear whether the price relatives for property taxes and insurance in the proposed index would have accounted for changes in house value between periods. Price relatives in a user cost index should account for these changes, because the market basket item to be held constant is the level of housing services consumed--not, for instance, a dollar-specified level of insurance coverage. BLS proposed to measure price changes for the maintenance and repair component by measuring changes in the prices of goods and services used in maintenance and repair. This may be an effective proxy for changes in the cost of maintenance and repair, although it is not logically necessary in maintaining a fixed-weight price index because, again, the market basket item is owner-occupied housing services, not specific maintenance and repair goods and services.

As part of its proposal, BLS estimated the weights that would have been assigned to the components of the proposed user cost index for the 1964 revision based on a 1960-61 base period. Substituting this index for the existing homeownership cost component would have reduced the percentage of the total index weight carried by homeownership costs from 14.3 to 9.7 percent. BLS calculated the annual percentage rate of change of homeownership costs as measured by the user cost index between 1964 and 1974, showing that in most years user cost would have found that homeownership costs rose less rapidly than the asset price method suggested. In those 10 years, the actual CPI homeownership component rose 90.2 percent, while the user cost index that was proposed would have shown that homeownership cost rose an estimated 62.9 percent. There was far less difference, however, in changes in the overall CPI. The actual CPI rose 66.0 percent during this period while the CPI revised according to the BLS proposal would have risen 62.1 percent. The calculations made by BLS also showed far greater year-to-year variation in rates of price change for the proposed user cost index than for the actual homeownership component of the CPI.

BLS circulated its proposed revision of the measurement of homeownership costs for comments. Among its reviewers were economists from the academic community and private research organizations, the Subcommittee on Economic Statistics of the Economic Policy Board, and the Business Research Advisory Council and Labor Research Advisory Council (BRAC and LRAC) of BLS.

Academic economists indicated generally that they preferred a flow-of-services approach for measuring homeownership costs to the asset price approach. Some even suggested that flow of services be used for other consumer durables as well. Many economists argued in favor of rental equivalence; others indicated drawbacks with this method. There was no consensus for any specific method of pricing the flow of owner-occupied housing services and no strong support for the specific method BLS had proposed.

The Subcommittee on Economic Statistics of the Economic Policy Board, chaired by a member of the President's Council of Economic Advisers, strongly supported adopting a flow-of-services approach in pricing housing and other durable goods. This group argued that it is appropriate that the CPI measure the cost of consuming the services of durable goods in estimating the effect of price changes on the cost of consuming a fixed base period market basket of goods and services. They did not agree about the best method to price owner-occupied housing services, but they raised the issue of whether including appreciation in the value of a house in a user cost index--as in the proposal by BLS --confounds investment return with user cost.

The Price Committee of BRAC recognized and expressed concern over the treatment of homeownership costs in the CPI, but it found unacceptable the revision BLS had proposed. This Committee urged BLS to further research a method of measuring homeownership costs that would not implicitly count the investment on houses.

The Price Committee of LRAC provided the only significant support for maintaining the asset price approach to measuring homeownership costs. It argued that introducing a flow-of-services approach would be inconsistent in a buyers' price index designed to measure purchase prices rather than consumption costs and inconsistent with the asset price approach used for other consumer durables. It raised specific objections to the user cost index that BLS had proposed. The Committee alleged that the choice of index components was subjective, that some components could not be precisely measured, and that lack of experience with such an index might result in unforeseen implications.

Faced with a lack of support for adopting the revision proposed by BLS, BLS Commissioner Julius Shiskin announced in April 1977 that treatment of homeownership costs in the 1978 revision of the CPI would not change substantially. BLS decided to continue studying other possible measures of homeownership costs to incorporate in subsequent revisions.

BLS IS CURRENTLY EXPERIMENTING WITH ALTERNATIVE MEASURES OF HOMEOWNERSHIP COSTS

In 1979, both the Congress and the media focused attention on the measurement of homeownership costs in the CPI. In response, BLS in January 1980 began publishing five alternative experimental measures of the monthly rate of change of homeownership costs. BLS also calculated what the monthly change in the overall CPI would have been throughout 1979 and what the annual change from 1968 through 1978 would have been if each experimental measure had been substituted for the actual CPI homeownership component.

The experimental measures include rental equivalence, user cost index, and nominal outlays

Known as X-1 through X-5, the experimental measures attempt in different ways to measure the cost of consuming flows of owner-occupied housing services. X-1 is based on rental equivalence, X-2 and X-3 are user cost indexes, and X-4 and X-5 are measures of nominal outlays.

Rental equivalence, as we have shown, attempts to measure homeownership cost as the income homeowners forgo when they choose to reside in their own homes rather than rent those homes to others. The base period expenditure weight for X-1 is, therefore, an estimate of the base period rental value of the entire stock of owner-occupied houses. The estimate is derived from a question asked of sampled homeowners as part of the 1972-73 Consumer Expenditure Survey. It does not take into account any aggregate effect on the housing market that would occur if all homeowners attempted to rent their houses simultaneously.

The price relative for X-1 is the same as the price relative for rent in the CPI and is based on the monthly price change of a sample of rental housing units. For this reason, this price relative is not an appropriate measure of the rate of change of rental income that homeowners who live in their own houses forgo. BLS readily acknowledges this. To measure the appropriate rate of price change accurately, BLS would need to sample rents for a special sample of rental housing units chosen as representative of owner-occupied housing units. Such a sample does not exist. Nonetheless, X-1 provides a good estimate of the weight appropriately assigned to the homeownership cost component of the CPI and a fairly close estimate of its rate of price change.

X-2 is identical to the user cost index that BLS originally proposed to incorporate in the 1978 CPI revision. It does not take into account that most homeowners at any point in time are paying mortgage interest based on contracts written in previous periods. X-3 does take this into account. The base period expenditure weight for mortgage interest in X-3 is the amount of interest actually paid in the base period by all homeowners, rather than the amount of interest they would have paid if the entire base period mortgage debt had been acquired at an average base period interest rate. In determining the price relative for the mortgage interest component, BLS holds the base period age distribution of mortgages constant and calculates a weighted 15-year moving average mortgage interest rate. The resulting price relatives are smaller in absolute value as current interest rates rise and fall than the price relatives for a user cost index like X-2, which measures changes in the current cost of acquiring mortgages. The other components of the user cost index are the same in X-3 and in X-2.

X-4 and X-5 are similar in principle to a measure derivable by the nominal outlays approach we discussed in chapter 4, but they differ in some details. Base period expenditure weights for X-4 and X-5 are derived from homeowners' base period expenditures on mortgage interest, property taxes, property insurance, and maintenance and repairs. The measures differ appropriately from user cost measures X-2 and X-3 by not including capital gains net of depreciation and return forgone on equity, because these do not represent current outlays for owner-occupied housing services. BLS does not include mortgage principal repayment in deriving weights for either X-4 or X-5, although we might logically expect repayment to be part of a nominal outlays measure. Neither X-4 nor X-5 incorporates the tax deductibility feature of mortgage interest and property tax payments.

X-4 and X-5 differ from each other only in their treatment of mortgage interest. The base period expenditure weight for mortgage interest is calculated in X-4 the same way as it is in X-2. That is, the weight is based on the cost of obtaining the total outstanding mortgage debt at base period interest rates. X-5 resembles X-3 in that the base period expenditure weight is

based on the amount of mortgage interest actually paid by homeowners in the base period. The price relative for mortgage interest for X-4 is determined from changes in current interest costs; the price relative for mortgage interest for X-5 is determined from changes in the 15-year weighted moving average of interest costs. The weights are determined by the base period age distribution of mortgages. Because this age distribution is unlikely to remain constant over time, even X-5 does not appropriately measure the actual mortgage interest expenses of homeowners beyond the base period.

The experimental measures affect both the weight and rates of price change for homeownership costs

The relative importance of homeownership costs in the CPI would be reduced if any of the experimental measures proposed by BLS were substituted for the present homeownership component. The reductions range from slightly over one-third for X-1 to more than three-fifths for X-5. Since the weight for homeownership in the current CPI is affected heavily by the rate of new house purchase in 1968-73, the reference period for housing, the weights for X-1 to X-5 might have exceeded the actual housing component's weight if the reference period had been a time of slow rather than rapid growth in the housing stock.

Of the five experimental measures, only X-1 and X-5 suggest that homeownership costs rose less rapidly in 1979 than the CPI implies, although all five suggest less rapidly rising homeownership costs in 1978. X-2 and X-4 are influenced heavily by changes in current interest rates. Because interest rates rose rapidly in the second half of 1979, X-2 and X-4 suggest much more rapidly increasing homeownership costs than is suggested by their counterpart user cost index and nominal outlays measures, X-3 and X-5, which take into account the fixed interest rate in most mortgage contracts. During earlier periods of interest rate decline, X-2 and X-4 rose less rapidly--or fell more rapidly--than X-3 and X-5.

X-5 most closely resembles a measure of the average outlays by households in consuming owner-occupied services. According to X-5, homeownership costs in 1979 rose by only 11.2 percent, rather than the CPI's officially recorded 19.8 percent. During 1978, when house prices and interest costs rose less rapidly than they did later in 1979, X-5 rose by 5.3 percent, while the official CPI showed a 12.4 percent increase in homeownership costs. But during the period from 1968 through 1977, X-5 suggested approximately the same rate of price increase as the official CPI on average, although in several years one or the other rose substantially more rapidly. It is doubtful that a nominal outlays index that included the repayment of mortgage principal and took into account the tax deductibility of mortgage interest and property tax payments would have suggested a

significantly different rate of price change from X-5, although their base period expenditure weights might have differed. Since the relative importance of homeownership costs with X-5 is less than 40 percent as great as in the present CPI, changes in homeownership costs, no matter how large, would have a far smaller influence on the overall CPI.

X-1 shows by far the most year-to-year and month-to-month stability in the rate of change of homeownership costs. Measuring rental equivalence, it is based, as we have stated, on the CPI rent index for all rental housing units and, therefore, is not necessarily an accurate estimate of rental income that homeowners who reside in their own houses forgo. It seems probable, however, that a rental equivalence measure based on an appropriate sample of rental housing units representative of owner-occupied units would still show more stability than the user cost index or nominal outlays measure, because of the less direct relationship between changes in mortgage interest rates and changes in rents. During the period in 1979 when interest rates rose rapidly, X-1 showed the lowest increase in homeownership costs. But when interest rates fall, X-1 has suggested far larger increases in homeownership costs than most other measures imply, particularly the ones affected heavily by changes in current interest rates (X-2 and X-4).

The long run influence of the experimental measures on the overall CPI is small

The effect of adopting one of the experimental measures of BLS would be far smaller on the overall CPI than on the homeownership component alone. During 1979, the CPI rose 13.3 percent. Substituting X-1 for the homeownership component, the CPI would have risen only 10.8 percent, a difference of 2.5 percent. Substituting any of the other measures would have resulted in differences in the CPI of only 0.1 to 2.0 percent. Interestingly, substituting any of these measures would have reduced the CPI's rate of increase, even though X-2, X-3, and X-4 all implied that homeownership costs rose faster than the CPI implied. This is because of the vastly reduced weight assigned homeownership cost with X-2, X-3, and X-4.

The effect on the overall CPI of adopting any one of the five measures would have been even smaller over a longer period that included all phases of business cycles and years in which interest rates fell as well as rose than in the atypical year 1979. For 1968 through 1977, for example, all the CPI's constructed by using X-1 through X-5 rose at rates very close to the rate for the actual CPI. For all the experimental measures except X-3, the difference from the rate of change of the actual CPI was less than 1 percent in at least 8 of 10 years. In some years, one or more of the experimental measures implied an overall rate of price change greater than that shown by the CPI.

X-5, the measure that best estimates average outlays by households in consuming owner-occupied housing services, is even closer to the actual CPI. The largest deviation during any year in this period between increases in the actual CPI and a CPI modified to include X-5 was 0.6 percent. In 3 of 10 years, a price index including X-5 increased more than the actual CPI.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS, AND AGENCY COMMENTS

CONCLUSIONS

We conclude that the present measuring method is not appropriate for some uses of the CPI. It causes significant problems, particularly during periods of rapidly rising prices. Alternative methods of measuring homeownership are available. We have described and analyzed them in this report, and we have also discussed previous recommendations for changing the CPI as well as current BLS experiments with alternative methods.

Changes in the price level of the economy can be measured in many ways. The CPI is designed to measure the price level for goods and services typically purchased by urban consumers. More specifically, it represents the current cost of purchasing a fixed market basket of goods and services relative to the cost of purchasing that market basket in a designated base or reference period. The market basket weights are determined by base period expenditure patterns.

The CPI does not compare relative costs of consuming a fixed market basket of goods and services, because some goods are durable and are consumed gradually over many time periods. When viewed as assets yielding flows of services that are consumed periodically, durable goods are considered as investments. The average cost to households who consume specified flows of service yielded by assets purchased at different points in time differs from what it costs them to acquire new assets to produce the services. The CPI, however, includes durable goods themselves as items in the market basket, not the periodic flows of service they yield. Therefore, it does not measure either the average effect of price changes on household consumption costs or the effect of price changes on the consumption costs of an average consumer.

A flow of services approach is more appropriate than the asset price approach

We do not question the correctness of the CPI in measuring changes in purchase costs, but we do raise serious questions about the appropriateness of using an index of purchase prices in some ways in which the CPI is currently used. An index that bases housing prices on flow of services rather than an asset price approach would be more appropriate in adjusting Government transfer payments, such as Social Security, in response to changes in the price level. The purpose of indexing is to enable recipients to maintain their standards of living by increasing payments to them as consumer prices rise. Maintaining a specified standard of living requires an unimpaired ability to consume

at the same level of satisfaction. Therefore, changes in the cost of consuming owner-occupied housing services are far more important than changes in the purchase and financing costs of acquiring a new house. This is particularly true for households receiving retirement pay, through Social Security or Government pensions, because few of them are likely to purchase new houses. To index various Government transfer programs, the Government should use a modified CPI that prices owner-occupied housing costs from a flow-of-services approach.

A modified CPI in which owner-occupied housing costs are priced from a flow-of-services approach is also more appropriate than the present CPI as an indicator of price stability and the need for economic policy action. Such an index would more closely measure the average rise in the cost of maintaining a designated base period pattern of consumption. When house prices and interest rates rise, the homeownership component of the present CPI overstates the average increase in household housing expenses. Consequently, monthly CPI announcements suggest an exaggerated effect of current and past policies on the ability of households to maintain their standards of living. Policy actions should be guided by an index that accurately reflects the experience of average households. This could be accomplished by using flow of services to price housing.

Other examinations of the homeownership component of the CPI have concluded that owner-occupied housing should be weighted and priced from a flow-of-services approach. Early in the 1960s the Stigler Committee recommended that the asset price approach to measuring homeownership costs be abandoned in favor of flow of services. BLS also recommended changing to flow of services before the last revision of the CPI, although the change was not made.

Some object that changing this component of the CPI introduces an inconsistency into it, because the prices of all other consumer durables included in it are measured by the asset price approach. Even if no changes are made in pricing other consumer durables, however, the flow-of-services treatment for owner-occupied housing is appropriate because of the irregularity of home purchases, the tendency to pay for houses gradually, and the large share of household incomes devoted to housing. Arguments in favor of the flow-of-services measure for housing might also justify it for automobiles, but it is not necessary to delay modifying the homeownership component while analyzing pricing methods for automobiles or other consumer durables.

Substitution of either rental equivalence or nominal outlays would improve the CPI

Both the rental equivalence and nominal outlays approaches to measuring the cost of consuming owner-occupied housing services have substantial merit. Substituting either for the asset price approach would result in an index more appropriate for its uses.

On theoretical grounds, user cost is the best measure of the true economic cost of consuming a flow of housing services. Rental equivalence is likely to be the best technique for measuring user cost. Therefore, rental equivalence merits serious consideration.

The nominal outlays approach, which measures the current out-of-pocket expenses associated with consuming a flow of housing services, does not measure true economic costs because it ignores implicit costs and unrealized changes in asset value. Nonetheless, this approach also merits serious consideration, because current monthly housing outlays may be more appropriate for some important uses of the CPI. The justification for this contention is that changes in out-of-pocket housing expenses more directly affect homeowners' abilities to maintain their consumption levels of other goods and services than do changes in the rental income they forgo.

Suppose, for instance, that as a result of demographic events, such as a change in the age distribution of the population or a large immigration, there is an increase in the demand for housing services, causing an increase in both market and rental values of houses. Since homeowners could now receive higher rental payments, their economic costs of continuing to consume the services their own houses provide rather than renting these houses to others would be higher. A rental equivalence measure would record this as an increase in the cost of the owner-occupied housing services component of the CPI.

However, this type of cost increase has no deleterious effect on resident homeowners. Although their economic costs in the form of forgone rental income may have risen, if they were to rent these houses to others, they would receive an increase in income exactly equal to the increase in their costs. Increases in forgone rent do not require households either to reduce their expenditures on other goods and services while spending the same amount of money per month or to increase their monthly expenses to continue consuming other goods and services at the same level.

Since a nominal outlays measure would show no increase in the cost of the owner-occupied housing services component of the CPI in this example, this approach might be more appropriate than rental equivalence for two important uses of the CPI. 1/ The purpose of cost-of-living adjustments is to adjust wages and

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1/If the debt/equity ratio is held constant, then the resulting cost measure will rise in this example, the same as a rental equivalence measure. However, a true measure of out-of-pocket expenses, such as the outlay measure we described in this report, will not hold that ratio constant, although not doing so allows homeowners to alter their nominal housing outlays by increasing or decreasing that ratio.

transfer payments to ensure that the same standard of living can be maintained during a period of rising prices. This implies that these payments must rise by enough to allow recipients to consume the same market baskets of goods and services each month, despite rising consumption costs. In this example, no increase is necessary to enable these homeowners to continue to consume the same goods and services and to maintain the same standard of living. Indeed, their wealth has increased because of the appreciation of the value of their houses.

As an indicator of the success or failure of economic policy to maintain price stability and as a signal of the need for policy action, it is important that the CPI measure the effect of present policies on the ability of people to maintain their standards of living. Consequently, for this purpose also, a nominal outlays measure of homeownership costs may be more appropriate because changes in nominal outlays more immediately and directly influence homeowners' abilities to maintain their standards of living. 1/

In a third major use of the CPI, as a deflator of economic values and data, rental equivalence clearly appears to be the most appropriate measure of the cost of consuming owner-occupied housing services. However, there is no a priori reason that the index used for that purpose need be the same index that receives the most publicity as a measure of the rate of inflation and that the Congress uses for indexing Government payments and forming economic policy.

Another point that has been raised against the adoption of rental equivalence is that the CPI should measure "what people think is their cost of living, not something out of an economics textbook." 2/ If few homeowners are likely to view their monthly costs as the rental income they forgo, then using rental equivalence in the CPI may lead to an index that is not trusted as a measure of the rate of inflation. This argument can, however, be overstressed. It is important to measure actual prices, not just perceived ones. We believe that it is a view that BLS should consider and evaluate in choosing a flow-of-services approach for the CPI's homeownership component.

Although the BLS experimental measure X-5 resembles an appropriate measure of nominal outlays, it overstates the weight for homeownership costs by not taking into account the deductibility of mortgage interest and property taxes from gross income in calculating Federal income tax liability. It also understates the weight by not including repayment of principal as part of

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1/This is true in part because of transaction costs associated with the realization of capital gains.

2/Letter from Otto Eckstein, Harvard University, to Julius Shiskin, then Commissioner for the Bureau of Labor Statistics, U.S. Department of Labor, January 6, 1976.

housing outlays; this understatement is likely to be smaller than the overstatement from the tax laws. Most importantly, X-5 unnecessarily assumes that the age distribution of mortgages is fixed by the base year age distribution in calculating price relatives. An appropriate nominal outlays measure calculates mortgage interest costs each month from a sample of households, allowing the age distribution of mortgages to be whatever it is at that time.

BLS should amend CPI-U as quickly as possible

Arguments in favor of the flow-of-services approach are so strong that BLS and the Congress should act as quickly as possible to implement a change in the CPI even though substantial change is somewhat complicated. Parties to the numerous contracts that tie the level of various types of payment to the level of the CPI presumably entered into their agreements understanding what the CPI measures and reasonably expecting no precipitous changes in the definition or construction of the CPI during the life of their contracts. To minimize disruptions in changing the CPI, then, a measure of price change based on the current treatment of homeownership costs must continue for a considerable time. This can best be accomplished by BLS continuing to determine the rate of change of the CPI as presently defined for some time after it begins publishing monthly data for a revised CPI that uses nominal outlays or rental equivalence to measure homeownership costs.

BLS calculates both a measure of price change for urban wage earner and clerical worker families, CPI-W, and the index for all urban households, CPI-U. When BLS expanded the population coverage of the CPI as part of the last revision, it agreed in response to labor union requests to continue publishing CPI-W for use as a wage escalator. That these two indexes are available could ease the introduction of the flow-of-services approach to measuring homeownership costs. Because CPI-W and CPI-U differ in population coverage, expenditure weights for many goods and services also differ. The distinction between CPI-W and CPI-U could be extended to include different treatments of homeownership costs. By adopting the flow-of-services approach in CPI-U while maintaining the asset price approach in CPI-W, BLS could enable users to choose between two very distinct indexes. The CPI-U would be appropriate in forming economic policy while the labor unions that prefer the asset price approach would have opportunity to bargain for the continued use of CPI-W in wage agreements.

Changing the treatment of homeownership costs in the index used to adjust Social Security payments for inflation may lead to budgetary savings, particularly if the change is implemented when mortgage interest rates are rising rapidly. Balancing the budget is not the purpose in changing the CPI, however. When interest rates decline, the modification we suggest might even yield an index that rises more rapidly (or falls less slowly)

than the present CPI. Nonetheless, the CPI should use a flow-of-services approach in measuring change in the cost of consuming owner-occupied housing services because this method most accurately measures changes in the cost of consuming a fixed market basket of goods and services.

RECOMMENDATION TO THE SECRETARY OF LABOR

Based on our conclusions, we recommend that the Secretary of Labor direct the Commissioner for the Bureau of Labor Statistics to amend indexes of consumer prices published by BLS by substituting a flow-of-services approach to measuring the cost of consuming owner-occupied services for the present method of measuring homeownership costs. Arguments favor both the rental equivalence and the nominal outlays approaches as we have described them in this report, and using either one would substantially improve these indexes. In setting a date for this change, the Secretary and the Commissioner should take into account both the time that BLS will need to construct the revised indexes and the time that users will need to adjust to them.

The Secretary of Labor may determine that the existence of long term contracts incorporating CPI-W and a widespread desire among private sector groups to have available an index of consumer prices using the present approach provide sufficient reasons for maintaining such an index. We recommend that if the Secretary of Labor wishes to consider these factors, the Secretary direct BLS to continue publishing CPI-W in its present form for a specified period of time and then revise its owner-occupied housing component as we recommend above. In this way, existing contracts would not be affected and an orderly transition would be made to an improved CPI-W.

RECOMMENDATIONS TO THE CONGRESS

If the Bureau of Labor Statistics requests additional funds for the purpose of modifying the homeownership components of the CPI as we have recommended, then we recommend that the Appropriations committees of the Congress consider the request favorably.

If BLS revises CPI-U but continues to publish CPI-W in its present form, we recommend that the Congress rely on the revised CPI-U in forming economic policy and amend the legislation, if necessary, to use the revised CPI-U as the index by which Social Security payments, Civil Service and other Government retirement pensions, and other entitlement and transfer programs indexed in the CPI are adjusted. Provisions for adjusting the benefit levels of these programs are contained in many laws. We would be glad to assist congressional committees in preparing appropriate legislation.

AGENCY COMMENTS AND OUR EVALUATION

Both BLS and the Office of Federal Statistical Policy and Standards (OFSPS) in the U.S. Department of Commerce reviewed and commented on a draft of this report. In general, BLS agrees with our recommendation that the CPI should be changed and that homeowners' shelter costs should be measured on a flow-of-services basis. Although comments by BLS addressed only our recommendation, meetings with BLS officials indicated that there is general agreement regarding the concerns we raised in chapter 3 about the continued use of the present CPI. We believe that adopting either of our suggested approaches--rental equivalence or nominal outlays--could substantially improve the CPI.

According to its comments, BLS views rental equivalence as a promising approach but states that the nominal outlays approach as we have discussed it appears to be less desirable than other alternatives. BLS believes that our nominal outlays measure has a less appropriate conceptual basis than an outlays measure it has previously prepared. In general, we believe that our proposed nominal outlays approach has more merit and that its drawbacks are far less serious than BLS recognizes. We believe that the conceptual basis is appropiate and that the measure represents an improvement over X-5, the experimental measure it most closely resembles. Appendix II contains our detailed response to the comments of BLS on this proposal.

The nominal outlays approach might be preferable to rental equivalence for reasons we have suggested earlier in this chapter. Regardless of this disagreement over the relative merits of specific proposals, we believe that the important issue is that BLS promptly reach a decision and change the homeownership component of the CPI to measure changes in the cost of consuming owner-occupied housing services. Given the interest BLS had in modifying the homeownership component before the latest CPI revision, its research efforts since then on putting other approaches into effect, and its acknowledged continued support for using a flow-of-services measure, we urge that BLS move in this direction.

OFSPS agrees with many of our conclusions. It believes that the report contains a useful discussion of the perceived problems of the current CPI homeownership component and is a useful contribution to a continuing discussion of various measures. OFSPS recognizes widespread agreement about the merits of the flow-of-services concept but does not take a position on our specific recommendations because it believes that methods should be more clearly defined and the measures should be tested empirically.

OFSPS also believes that an effort should be made to identify specific indexes needed for policy actions for which the CPI is not appropriate, primarily policies related to indexing Government payments and taxes. Although OFSPS acknowledges that

this approach is probably more costly and time consuming than simply changing the homeownership component of the CPI, it believes that there will be a greater payoff in the long run from defining what kind of index is needed for each use. We agree with OFSPS that, in the long run, it may be worth while to develop a set of appropriate indexes rather than to continue using a single index for different programs and populations.

In this report, we recommend that an index developed to measure the effect of price level changes on the beneficiaries of specific Federal programs should take precedence over an overall CPI in adjusting payment levels in response to price level changes. However, we believe that adopting a flow-of-services approach to measuring homeowners' housing costs in the CPI will yield an index more appropriate than the current CPI for adjusting payments to price level changes. We believe that BLS should make this change while further research into the development of a set of indexes continues. Appendix IV contains a detailed response to the comments of OFSPS.

APPENDIX I

U. S. Department of Labor

Commissioner for
Bureau of Labor Statistics
Washington, D.C. 20212

SEP 8 1980

Mr. Gregory J. Ahart
Director
Human Resources Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Ahart:

This is in reply to your letter to the Secretary of Labor requesting comments on the draft GAO report entitled, "Measurement of Homeownership Costs in the Consumer Price Index Should be Changed." The Bureau of Labor Statistics response is enclosed.

The Bureau appreciates the opportunity to comment on this report.

Sincerely yours,

Janet L. Norwood

JANET L. NORWOOD
Commissioner

Enclosure

APPENDIX I

U.S. Bureau of Labor Statistics Response to The Draft General Accounting Office Report Entitled "Measurement of Homeownership Costs in the Consumer Price Index Should be Changed"

RECOMMENDATION:

"Based on these conclusions we recommend that BLS amend its indexes of consumer prices by substituting a flow-of-services approach to measure the cost of consuming owner-occupied services for the present method of measuring homeownership costs. Arguments exist in favor of both the rental equivalence and the nominal outlays approaches as we have described them and the use of either would substantially improve these indexes. In setting a date for this change, BLS should take into account both the lead time which they need to be able to construct the revised indexes and the time which users will need to adjust to them."

RESPONSE:

The Bureau of Labor Statistics (BLS) has on many occasion publicly stated its preference for a flow-of-services measure of the cost of shelter for homeowners into the Consumer Price Index (CPI), provided such a measure were proven to be operationally feasible. We do not agree, however, with GAO's recommendation that a "nominal outlays" approach, as defined by GAO, is a viable method for constructing a shelter cost measure for homeowners. The GAO proposes a new alternative which appears to us to be far less desirable than the other existing alternatives.

APPENDIX I

BASIS FOR RESPONSE:

For approximately seven years, staff of the Bureau of Labor Statistics have been researching the feasibility of utilizing a flow-of-services approach to measure the cost of shelter for homeowners in the CPI. The BLS staff recommended that a flow-of-services approach be implemented in the revised CPI, which was introduced in January 1978. Bureau staff papers suggested that (1) rental equivalence may, after testing, prove to be a more operational flow-of-services approach than user cost, and (2) if a rental equivalence measure is not operationally feasible, a "modified user cost" approach, which focuses on the user cost components which are most easily related to monthly, cash transactions, could be introduced.* The latter conclusion recognized, however, that a modified user cost measure--a measure which might be characterized as "monthly outlays"--has an adequate conceptual rationale because of its relationship to a full user cost measure.

The BLS concluded several years ago that rental equivalence was a promising approach to measuring shelter costs in the CPI and that empirical testing should be undertaken. Consequently, we welcome the GAO endorsement of this approach. Unfortunately from the Bureau's point of view, however, the GAO report gives equal endorsement to a new alternative approach which appears, insofar as we understand it, to have both conceptual and empirical difficulties.

*Two papers, which deal in more detail with both of the conclusions, are attached. It should be noted that the Monthly Labor Review article by Robert Gillingham was written in 1976. A third paper, which summarizes current BLS research on housing, is also attached.

APPENDIX I

The criteria whereby the GAO concludes that its new nominal outlays approach is a viable measure of shelter costs for the CPI are quite puzzling. On the one hand, the draft report contends that the GAO proposed nominal outlays is a flow-of-services approach. If this were true, the proposed new measure could be expected to behave in a fashion which is at least roughly similar to the other flow-of-services measures--rental equivalence and full user cost. On the other hand, the draft report concludes that its proposed measure can be expected to behave differently from a rental equivalence measure and that the difference in movement may make its proposed approach a better index component for escalation purposes. Very briefly, the GAO nominal outlays measure does not appear to be a flow-of-services measure at all. It is subject, even from a conceptual standpoint, to movements which are erratic and very different from the rental equivalence and user cost measures, which are theoretically equivalent to each other. We also do not understand the GAO conclusion that its proposed measure may form the basis for a better escalator. We do not see how the escalation problem with which GAO is concerned will be solved, nor even necessarily ameliorated, by the use of its approach. The remainder of our comments will examine each of these concerns in more detail.

The GAO Proposal as a Flow-of-Services Cost Measure

To the best of our knowledge, the previous research on measuring the opportunity cost of consuming the flow of services of a durable

good has focused on only two alternative measures--user cost and rental equivalence. The GAO has made a completely different proposal, but unfortunately, the draft report does not explain how the GAO nominal outlays proposal is in fact a flow-of-services measure. Furthermore, the report does not explore the relationship between the nominal outlays approach and the two widely recognized flow-of-services measures.

Basically, the draft report proposes to measure several categories of actual expenditures which are related to home ownership but not necessarily to the cost of consuming shelter services. Among these categories is a combined category for mortgage interest and principal repayment. The report proposes that, for a given house, changes in actual expenditures be used to move the index for this component. Thus, any change in the level of this expenditure implies a change in housing costs, regardless of how the change came about. Two examples, as well as variations on them, of how this approach could work should demonstrate the kind of difficulties which could occur.

(1) A household with a $10,000 mortgage at 6 percent amortized over 20 years refinances its mortgage and obtains a $50,000 mortgage at 10 percent amortized over 30 years. The "mortgage payment" index for this household will increase by 612 percent as the monthly payment increases from $71.64 to $438.79.

(2) A household liquidates an alternative investment, such as a life insurance policy, and pays off its mortgage. Alternatively, the household reaches the end of the amortization period. In both these cases the mortgage payment index for this household will decrease by 100 percent.

These results are seriously misleading since the cost of consuming the flow of services is unchanged in both examples. Furthermore, the refinancing practices in these two examples are not unusual. The first type of refinancing is often used as a means to obtain the resources to finance, e.g., a college education or an alternative investment. The second type of refinancing would result when a household concludes that investment in its own home--the one which it occupies--is superior to an alternative investment which it previously held. One of the major difficulties with the GAO proposal is that the above two possibilities are not extreme and their incidence need not "cancel out" or disappear in the averaging process, especially if one focuses on a subset of the population, such as the elderly. Furthermore, the relative probabilities of these types of refinancing are likely to be related to the household's position in the life cycle. Thus, for example, if older households pay off their mortgages, the "nominal outlays CPI" for elderly owners would decrease substantially relative to the CPI for older renters. Conversely, if an elderly household (having previously paid off the mortgage) undertakes a new mortgage

arrangement to provide it with cash to cope with higher prices, its housing index would suddenly spurt upward. Averaging the indexes for these groups to obtain an average CPI for escalating, e.g., social security recipients, could yield anomolous results with substantial built-in inequities.

The GAO proposal can give misleading signals in another important way. During a period of high interest rates, households who otherwise would refinance and increase their mortgagesmight hold off until mortgage interest rates decreased. During the subsequent period of declining interest rates, the GAO proposed nominal outlays index could show a substantial increase over the same period during which interest rates declined. Presumably, such as result would seriously confuse attempts to analyze the efficacy of stabilization policies.

We do not wish to imply that there is no alternative to using either rental equivalence or full user cost in a CPI (ideally) based on service flows. As we point out above, the BLS suggested its own modified user cost approach which was based, at least indirectly, on monthly cash outlays. The modified user cost approach is subject to its own limitations--most notably the fact that the incomplete nature of the measure makes the treatment of mortgage interest somewhat arbitrary and also more important in its empirical effect. However, if a conceptually complete flow-of-services measure is not operationally feasible, then a modified user cost approach could represent an improvement over the current treatment of shelter costs

APPENDIX I

The major difference between the BLS suggestion for an "outlays" measure and the GAO proposal is in the manner in which the index would be moved over time. The BLS approach would hold constant the percentage of house value which is financed. Thus, it would not include as price changes any changes in outlays which stemmed from refinancing. In addition to this technical difference, the GAO approach would require the development and maintenance of a new, monthly, household survey, a survey which would be costly and time-consuming.

GAO Proposal as an Input into Escalation

The draft report concludes that, to the extent that the GAO proposed nominal outlays approach leads to a measure which differs from a more traditional flow-of-services measure, it is likely to be a better measure for escalation. The escalation "problem" with which the GAO, among others, is concerned is that, in general, only part of a household's total income is escalated. For example, a household's wage income might be escalated while its interest income is not. In this example, whether or not escalation of wage income leaves the household's real total income unchanged depends on what happens to interest income. This "problem" is especially prevalent in escalating the incomes of homeowners since a homeowner household receives a return on its housing investment which is not escalated and may change at a slower or faster rate than living costs. The problem is complicated by the fact that this income is comprised of both income in kind and capital gains components. When only part of

a homeowner's income stream is escalated, it is impossible to develop an escalation formula such that when income subject to escalation is changed at the formula rate total income will change at the same rate as the cost of living. Despite this fact, part of the GAO support for its proposal stems from a desire to approximate this objective more nearly. (It should be noted that this objective is left implicit in their analysis.)

Unfortunately, the draft report provides no reason to conclude that adoption of its proposal will more nearly achieve this objective. The draft report provides no examples of when the GAO proposed nominal outlays approach leads to more appropriate escalation rates, nor does it attempt an analysis of the conditions under which the proposed nominal outlays approach yields a better escalator, again in terms of the objective specified above. Without such an analysis, the conclusion that the nominal outlays approach would yield a better escalator is unwarranted.

GAO'S RESPONSE

TO COMMISSIONER NORWOOD

According to its comments, BLS, like GAO, favors measuring homeowners' shelter costs by flow of services. We believe, however, that by concentrating its comments on the details of one of the two approaches to measuring the costs of consuming housing services that we believe has merit, BLS pays insufficient attention to our overall recommendation that BLS amend its indexes of consumer prices.

There appears to be general agreement between BLS and GAO about the concern we raised in chapter 3 about the continued use of the present CPI. Regardless of any disagreement over the relative merits of specific proposals, we believe that the important issue is that BLS promptly reach a decision and change the homeownership component of the CPI to measure changes in the cost of consuming owner-occupied housing services. Given the interest BLS had in modifying the homeownership components before the latest CPI revision, its research efforts since then on putting other approaches into effect, and its acknowledged continued support for using a flow-of-services measure, we urge that BLS move in this direction.

In developing alternative approaches to measuring the costs of consuming housing services, we have specified fairly detailed versions of both rental equivalence and nominal outlays measures. In its comments, BLS raises several concerns about our proposed measure of nominal outlays. We believe that this measure has more merit and fewer weaknesses than BLS recognizes. Moreover, we believe that, in several ways, both our rental equivalence and nominal outlays measures represent improvements over the experimental measures that they most closely resemble, X-1 and X-5, and that BLS should seriously consider our analysis in deciding how to implement the flow-of-services concept.

Among the concerns BLS raises about our proposed measure of nominal outlays are the following:

1. This measure is not a flow-of-services measure.
2. Our proposal is entirely new and outside the scope of previous research.
3. It is inconsistent to argue both that our proposed measure is a flow-of-services measure and that it may behave differently from other flow-of-services measures.
4. A valid nominal outlays approach should hold constant the percentage of house value that is financed by debt.
5. During a period of declining interest rates, our nominal outlays measure might be increasing.
6. There is no basis for concluding that our nominal outlays measure might be more appropriate for adjusting wages and Federal payments in response to price level changes.

We will briefly discuss each of these in turn.

1. Although we readily acknowledge that our nominal outlays measure, or anyone else's, is not a measure of full economic costs, it is a flow of services measure because it measures costs homeowners incur periodically in consuming owner-occupied housing services. The critical distinction in categorizing measures of homeownership costs is between measures of costs homeowners incur in consuming services--no matter how those costs are defined--and measures of costs homeowners incur in purchasing and financing a house.

2. For many years, some economists have argued that the CPI homeownership component should measure changes in nominal outlays on the grounds that changes in short run out-of-pocket expenses are more important to households than long run gains that may not be readily realizable in making their housing decisions (see pp. 35-36). Two of the five experimental CPI's BLS currently publishes measure changes in homeownership costs as changes in nominal outlays. We believe that our nominal outlays measure is a step forward in the development of appropriate measures of changes in out-of-pocket expenses.

3. We see no reason that all flow-of-services measures will be roughly similar in all circumstances. This view is supported by the experimental measures BLS publishes. An examination of the rates of change in homeownership costs measured by the experimental measures shows tremendous variations among the measures, in part because the current rate of change of mortgage interest rates affects some measures more directly than others.

4. Although we recognize that changes by homeowners in their debt/equity ratio can change our measure of their housing cost without any corresponding change in economic cost, we believe that an outlays measure should measure actual outlays. If the debt/equity ratio is kept constant at the base period level, homeowners' measured nominal outlays would rise, implying an increase in the price of housing services, whenever house values rise. This price increase would occur even though homeowners' actual out-of-pocket expenses and their ability to consume other goods and services during the pricing period would be unchanged.

5. We believe that the appropriately weighted average of all mortgage interest rates homeowners pay may rise during a time in which the current mortgage interest rate is falling. This result will occur as long as the current period interest rate falls from its value in the previous period but remains above the average rate on all existing mortgages. This result, which would also occur with experimental measures X-3 and X-5, does not appear to us to be troublesome because it is simply a reflection of the experience of homeowners on average. In this situation, even though current home purchasers are able to obtain financing more cheaply than home purchasers in the previous period, the average interest paid by all homeowners--current consumers of owner-occuped housing services--has risen.

6. The nominal outlays approach might be more appropriate than rental equivalence for escalation because changes in out-of-pocket housing expenses more directly affect homeowners' abilities to maintain their consumption levels of other goods and services than do changes in the rental income they forgo. Although we believe that rental equivalence is the best measure of economic cost, we remain concerned about the implication of rental equivalence for escalation. Increases in measured housing costs that result from increases in forgone rent do not require households either to reduce their expenditures on other goods and services while spending the same amount of money per month or to increase their monthly expenses to continue consuming other goods and services at the same level.

APPENDIX III

UNITED STATES DEPARTMENT OF COMMERCE
Office of Federal Statistical Policy and Standards
Washington, D.C. 20230

AUG 20 1980

Mr. William J. Anderson
Director
General Government Division
U. S. General Accounting Office
441 G Street, N. W.
Washington, D. C. 20548

Dear Mr. Anderson:

Thank you for the opportunity to review the draft GAO report, "Measurement of Homeownership Costs in the Consumer Price Index Should be Changed," before it is issued in final form. The recommendations presented in the report have important implications for statistical policymaking in the Federal government as well as for users of the Consumer Price Index (CPI) throughout the nation.

The Office of Federal Statistical Policy and Standards agrees with many of the conclusions contained in the report. The rapid escalation of prices of many goods and services in the economy has made divergent price index movements associated with different concepts and measures particularly important. In the present CPI, this has been especially true for durable items such as owner-occupied housing.

All of us concerned with statistics produced by the Federal government recognize that this concern is not new. The staff of the Bureau of Labor Statistics (BLS) in the early 1970's did research on alternative measures of the homeownership components of the CPI that are consistent with the concept recommended in the GAO report. The concept concerns the measurement of the value of the flow of services from a durable good. Throughout the mid-1970's, meetings involving BLS statisticians, representatives of other statistical agencies, statistical policy groups, advisory councils and other users of the CPI were held to discuss the concept and alternative measures. There was widespread agreement about the merits of the flow of services concept, but the overriding factor governing the final decision to leave the measure basically unchanged was the fact that there was no generally accepted methodology for developing the alternative measures.

Because of the greatly heightened interest in the homeownership component of the CPI, the BLS recently started monthly publication of five experimental homeownership component measures. We strongly supported this action as a means of stimulating public discussion so that analysts inside and outside government can begin to assess the utility of alternative concepts and measures. The GAO report is a useful contribution to that discussion.

The report contains a useful discussion of the perceived conceptual and measurement problems of the current and experimental measures of the homeownership component of the CPI. In response to these problems, an alternative measure is proposed. However, the methodology for developing the proposed GAO measure has not been fully specified, thus there are a number of unanswered questions. For example, it is suggested that income tax savings from homeownership-related tax deductions would be subtracted in the proposed base period weight. Are these tax savings also considered in measuring relative prices? Consideration of the tax deductibility of homeowners' mortgage interest and property tax payments is probably important to a consumer evaluating the merits of buying versus renting a home. However, the measurement problems are immense and are not resolved in the report. Although there is conceptual appeal for including the tax consideration in the measure, it is not clear that the tax impact would be statistically significant in measuring relative price changes.

A second question concerns the measurement of price relatives. The report states that comparing the nominal outlay for housing in one period with the outlays in another period, after adjustments for quality change, is the appropriate price relative measure. We agree that quality change must be taken into account when comparing prices of items over time. However, it is not clear that the methodology currently used in the CPI to make quality adjustments to home purchase prices over time is tranferable to the proposed relative price measure as is suggested in the report. It also appears that the fixed weight concept used in the CPI is violated in this proposed measure. The owner-occupied housing services expenditure weight is defined as "household expenditures in the base period on property taxes, property insurance, maintenance and repairs, and mortgage payments." (We assume an adjustment for tax deductions is also intended to be included in the weight). If period to period changes in the levels of these expenditure items are measured to estimate "price relatives," how are the estimates adjusted to remove quantity changes? This type of adjustment is also necessary to maintain the fixed weight concept of the CPI.

Before we can take a position on the specific recommendations contained in the report, the methodology must be clearly defined and the measure should be tested empirically. The additional information is necessary to assess the merits of the proposed measure relative to the other alternatives.

The introductory comments in the report raise a much broader issue that is important to the concepts and measures used in the CPI. It is recognized that "One aspect of the appropriate use of price indexes is that each index should accurately measure the rate of price change under the conditions (items included, population covered, etc.) of that index.... However, many economists question whether the CPI as presently constructed is an appropriate measure for the uses to which it is put." The report acknowledges that such questions are not limited to the CPI but that there are also appropriate and inappropriate uses of the Implicit Deflator for the GNP and the Producer Price Index.

Because some uses of the CPI, as it is currently measured, are considered appropriate, we believe the proper question at this time is not how to change the CPI but rather what other indexes are needed and for what purposes. For example, we feel that the CPI serves as an indicator to policymakers and the public of the success or failure of economic policy to maintain price stability for consumer goods. In this case, the focus is on price changes for a fixed bundle of goods, not on the effects of price changes on the "average" consumer. The latter issue which is the chief argument in the draft report for changing the CPI identifies the need for an index that might be called a "cost-of-consumption" index. It is debatable that changing to a "cost-of-consumption" index, which would follow the proposed GAO measure of nominal outlays, would accurately provide information concerning price stability. As many have pointed out, replacing the CPI with a hybrid of a price index and a cost-of-living (or more likely cost-of-consumption) index would lead to ambiguity and subjectivity and would yield an index not suitable for many of the uses now served by the CPI.

As an alternative to immediately changing the concepts and measures used to develop the CPI, we feel an effort should be made to identify the specific indexes needed to serve as indicators on the need for policy actions when the CPI is not appropriate. At least one such need is an index intended to measure the effect of inflation, as a "cost-of-consumption" index might do, rather than measuring the rate of inflation, as the CPI is designed to do. Many of the identified needs for a new index are related primarily to public policies for such programs as indexation of welfare transfer payments, Social Security payments and restructuring personal and business income taxes.

A necessary first step in the development of the index is to clarify the policy goals. Subsequent steps can then be debated and researched on whether indexes can be constructed which would be appropriate, what their costs might be, and what methodological problems need to be solved. Specifics of the debate and research will depend on whether the policy objectives are very general or quite specific, whether the needs are to measure inflation, or measure the effects of inflation, and whether measurements are needed on the overall economy or for particular segments of the household and business sectors.

This approach is probably more costly and time consuming than simply changing the homeownership component of the CPI. However, it would more nearly deal with the real issues in a very complex situation by defining what kind of index is needed for each use. Such an approach should have greater long-run payoff. Since small changes in an index used to adjust some of the Federal programs can have a substantial impact on the Federal budget, it may be more economical to fund and staff the development of appropriate indexes than to continue using a single index for very different programs and populations.

Sincerely,

JOSEPH DUNCAN
Director

GAO'S RESPONSE

TO DIRECTOR DUNCAN

OFSPS believes that GAO's report contains a useful discussion of the perceived problems of the current CPI homeownership component and is a useful contribution to a continuing discussion of various measures. OFSPS does not take a position on our specific recommendations because it believes that we have not fully specified our methodology.

A specific concern of OFSPS is our suggestion that mortgage interest and property tax payments be considered net of any income tax savings they produce in computing both nominal outlays and a user cost index. OFSPS says that although we clearly propose to consider these tax savings in computing base period expenditure weights, we leave unclear whether we propose considering them in measuring relative prices.

Price relatives compare the current cost--either user cost or out-of-pocket expenses--of consuming the base period level of housing services with that cost in the previous period. We intend that each period's cost, not just the base period's, would be computed net of any income tax savings so that consistent definitions of cost would be used in computing price relatives. We agree with OFSPS that there may be little difference in measuring changes in homeownership cost whether mortgage interest and property tax payments are defined net of income tax savings or not. However, the substantial difference in the base period expenditure weight that homeownership costs would receive depending on the treatment of income tax savings may significantly influence changes in the overall price level, if the rate of change of homeownership costs differs from the average rate of change of the prices of other items in the CPI market basket.

OFSPS believes that the method currently used in the CPI to make quality adjustments to home purchase prices over time may not be transferable to the nominal outlays measure we have suggested. OFSPS is concerned that our measure may not maintain the fixed weight nature of the CPI. As a result of these comments, we have clarified our description of the calculation of price relatives for both user cost indexes and our nominal outlays measure. Briefly, we propose to divide housing services into cells according to quality in each pricing period, to calculate rates of change of the cost of consuming housing services of each quality level, and to weight each cell price relative by a weight determined from the base period distribution to calculate the overall price relative. In this way, the price relative measures the change in the cost of consuming the base period level of housing services, which maintains the fixed weight nature of the CPI.

OFSPS believes that an effort should be made to identify specific indexes needed for policy actions for which the CPI is not appropriate and that the long run payoff from such an effort

would exceed the benefits of simply changing the homeownership component of the CPI. We agree with OFSPS that, in the long run, it may be worth while to develop a set of appropriate indexes rather than to continue using a single index for different programs and populations. However, we believe that improvements in the CPI, such as the changes we have recommended in the homeownership component, should not be delayed until this effort is completed. BLS should adopt a flow-of-services approach for measuring homeownership costs while research into the development of a set of indexes continues.

APPENDIX V

CPI INDEX CALCULATION

In chapter 2, the CPI calculation formula is represented as:

$$\text{index} = \frac{\Sigma[(\text{base period expenditure weight x price relative})]}{\Sigma(\text{base period expenditure weight})}$$

where Σ is the summation over all items.

This is based on the simple algebraic Laspeyres-type formula for computing the CPI:

$$I_i = \frac{\Sigma(p_o q_o)(p_i/p_o)}{\Sigma(p_o q_o)} \times 100$$

where

I_i = index value in period i,

p_o = price in period o of an item in the market basket,

p_i = price in period i of an item,

q_o = the quantity of an item in period o,

$p_o q_o$ = the expenditure in the base period on an item, and

Σ = summation over all items.

The cost weight for period i for an item in the numerator of the formula above is:

$$(p_o q_o)(p_i/p_o) = p_i q_o$$

This represents the expenditure necessary in the current period i to obtain the fixed level base period quantity (q_o) of an item. Thus the index is a ratio of current to base period cost weights.

The cost weights in successive periods are obtained merely by "updating" the previous cost weight with the new price relative. For example, in period i + 1:

$$(p_o q_o)(p_i/p_o)(p_{i+1}/p_i) = (p_{i+1} q_o).$$

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