

Defining the rate of underlying inflation

Overall measures of price increase reflect both a core rate of inflation residing in the economy and the short-run effects of uncontrollable external shocks; many statistics have been developed to net out the shock component, but none has won universal acceptance

DAVID W. CALLAHAN

Few political, economic, or social problems arouse greater emotional intensity today than inflation. It affects everyone, either adversely or positively. Inflation redistributes income and wealth, reallocates resources, and adds uncertainty to all long-range financial planning.

The magnitude of the impact will obviously depend on the level of the inflation. From 1960 through 1973, the United States experienced an average annual rate of inflation of 3.3 percent as measured by the Consumer Price Index (CPI). During 1974–80, price increases accelerated to an annual rate of 9.3 percent (10.1 percent if you exclude 1976). The prospect of recurrent double-digit inflation has given price stability high national priority.

Efforts to identify and define inflation have produced a new economic term—the “underlying” (or core, or base, or residual) rate of inflation—which appears in newspapers, in economic literature, in testimony before Congress, and in presidential speeches. That term, and the concept it represents, are the focus of this article.

I will not attempt to define the “true” underlying rate of inflation. My intent is simply to eliminate some confusion as to the meaning of the phrase.

The widespread usage of the term underlying rate of inflation would imply a consensus of understanding. It is cited so often without any explanation that we dare

not ask what it means for fear of showing our ignorance. In truth, the presumption that the meaning of underlying rate of inflation has become common knowledge is only half correct.

There are two components to the definition—the concept, and the measurement thereof. There appears to be fairly strong agreement as to the concept, inasmuch as the term is somewhat self-explanatory. Theoretically, the underlying rate of inflation is the long-run trend of price levels inherent in the existing economic structure. How do we measure this concept? We now go from the world of conceptual unanimity to widespread disagreement on the appropriate measurement of the rate. There is almost a one-to-one correspondence between the number of economists who have addressed this topic and the number of different measures proposed.

Some suggested barometers

There are basically two schools of thought on the measurement of the long-run trend of price levels. Some define it as the amount of inflation that would be observed if we could eliminate the effects of all short-run exogenous (or uncontrollable) “shocks,” such as OPEC price increases or severe weather conditions. Others equate it to the long-run trend in the costs of the factors of production. Depending on the definition of “shocks,” these two approaches could ultimately converge to the same estimate, despite methodological differences.

Most of the proposed measures of the underlying rate

David W. Callahan is an economist in the Office of Prices and Living Conditions, Bureau of Labor Statistics.

of inflation using the inflation-excluding-shocks approach are in terms of a modified CPI: All Items less food; All Items less food and energy; All Items less food, energy, (home) financing, taxes, and insurance; All Items less food, energy, financing, taxes, and insurance, and used cars. Some suggested measures have tended toward the CPI: All Items less everything for which prices are going up faster than the average! Other analysts suggest that different government statistics would be more appropriate barometers. Alternatives include the Producer Price Index (PPI) for finished consumer goods less food and energy; the nonfarm gross domestic product deflator; personal consumption expenditures less food and energy; unit labor costs; and myriad variations of these measures.

The common element among all of these is the exclusion from some existing comprehensive measure of inflation of all of the items whose prices are considered to be uncontrollable in the short run in the normal context of the free market mechanism—or, to put it another way, those items for which the price is not simply a function of production decisions for a given level of demand, costs of production, and profit margins. The uncontrollable (or shock) aspect usually arises on the supply side. Food supplies depend on the weather. OPEC sets oil supply levels and prices. (Again, we are talking about the short run; the United States still imports approximately one-third of domestic consumption, and almost all domestically produced oil now goes at world prices.) The money supply is “determined” by the Federal Reserve Board, affecting mortgage interest rates and other costs of borrowing. And, to cite one more example, the available stock of used cars and houses depends on decisions made by current owners.

Deciding which components to exclude obviously entails some subjective analysis. This is why so many permutations of the same measure have appeared over the last decade. Also, the number of shock items to be excluded is not static. Long-run adjustments resulting from changes in technology or consumption patterns could eliminate or diminish the price level impact of possible supply interruptions. It is conceivable that, someday in the (probably rather distant) future, alternative energy sources and weather control would allow the deletion of food and energy from the list of shock items; these two components are almost universally excluded from contemporary measures of the underlying rate of inflation.

On the other hand, the approach that defines the rate as the trend in the costs of production “builds up” an estimate using specific micro data weighted together. Probably the most widely publicized measure of this type was developed by Dr. Otto Eckstein of Data Resources, Inc., and was presented to the Joint Economic Committee in early 1980.¹ The Data Resources defini-

tion of “core” inflation, which I will use as an example of the production costs approach, is based on the combined estimates of unit labor cost trend (with a weight of 0.65) and capital cost trend (with a weight of 0.35). While there are many underlying factors and relationships implicit in the model, the labor cost component is essentially a function of the unemployment rate, price expectations, and productivity. Capital costs depend on the prime interest rate, current high-grade corporate bond rates, and price expectations.

Why the measures differ

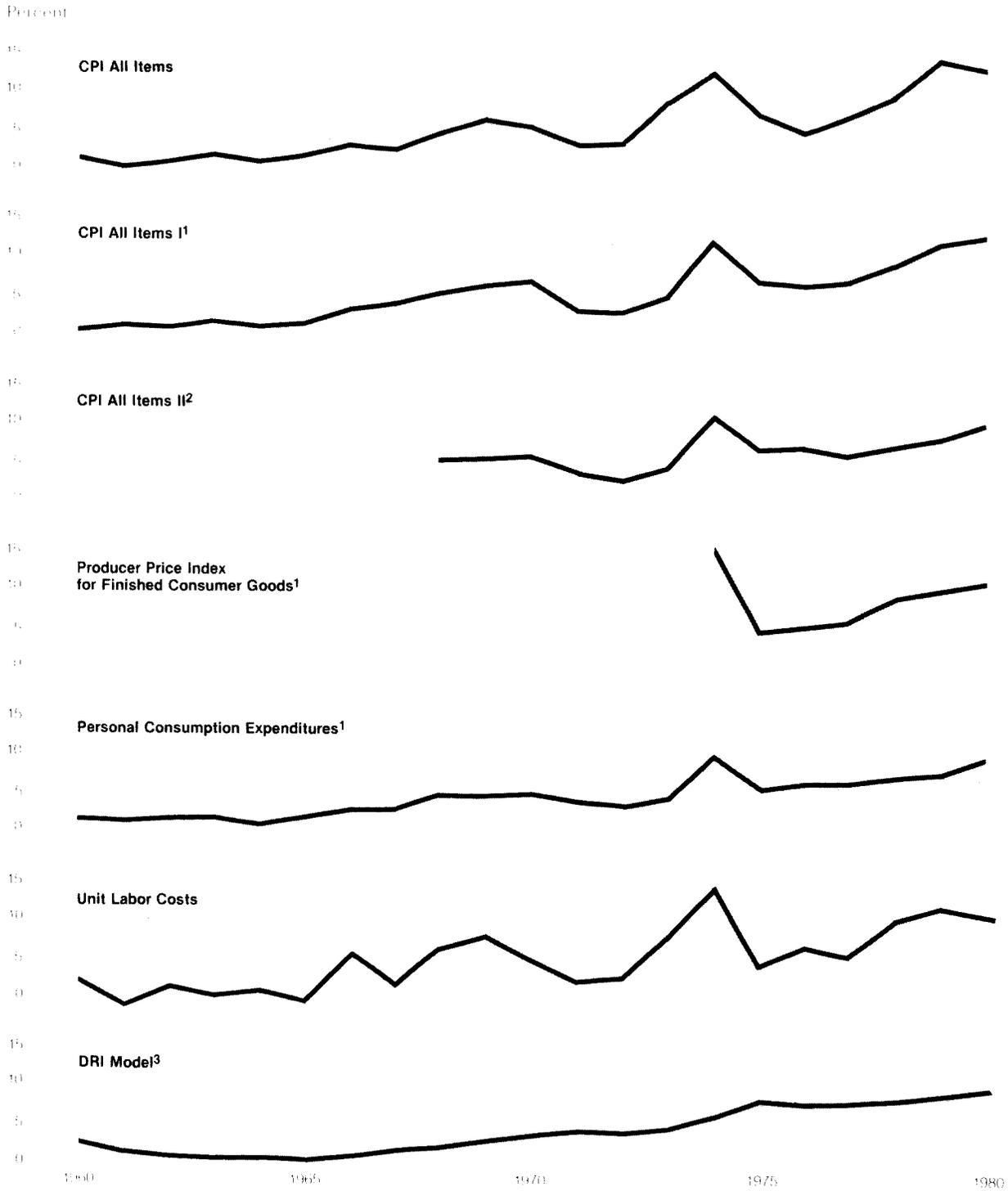
What are the differences, if any, among these measures of the underlying rate of inflation? Within the group of estimates using the inflation-less-shocks approach, variations occur because of differences in the overall measure of inflation selected and in the items defined as shocks. These same factors will also cause the differences between cost-of-production and inflation-less-shocks estimates, but it is much more difficult to associate the source of the variance with a specific factor.

However, as I mentioned earlier, the costs-of-production approach could, theoretically, be equivalent to the inflation-less-shocks approach in the short run if the following conditions existed: (1) the list of shocks were perfectly defined; (2) demand levels and profit margins were exogenously fixed; and, (3) all adjustments were instantaneous (or at least consistent between models) so that no time lag discrepancies arose. The first assumption of perfect knowledge would exclude every item with an “external” supply constraint from the selected overall measure of inflation. The second condition assumes that the costs of production are the only determinants of price, and the third prerequisite for equality between approaches simply assumes away temporal differences inherent in the two methodologies. Of course, there is an additional assumption that the measures of overall inflation and the costs of production are also perfect.

That’s the theory; what about the reality? Table 1 presents six of the more widely accepted measures of the underlying rate of inflation. These annual percentage increases are contrasted graphically with the most frequently used measure of overall inflation—the CPI—in chart 1.

As the chart shows, there are significant differences at any time among some or all of the estimates of the underlying rate of inflation, and between these measures and the CPI. This is understandable in the context of the earlier discussion of technical variation among the models. However, there is very little statistical difference in the long-run trend line among the measures, including the CPI.² This can largely be attributed to the one homogeneous characteristic: Today’s shock inflation

Chart 1. Some alternative measures of the underlying inflation rate compared with the CPI, 1960-80



¹ Excludes food and energy.

² Excludes transit, rent, taxes, and insurance; home purchases; food, energy, and used cars.

³ Data from *Survey of Current Business*.

Note: A more complete description of each of the above measures may be found in the footnotes to Table 1.

Table 1. Annual percent change in alternative measures of the underlying rate of inflation and in the CPI, 1960-80

Year	CPI All Items	CPI All Items I ¹	CPI All Items II ²	Producer Price Index for finished consumer goods ¹	Personal consumption expenditures ³	Unit labor costs ⁴	DRI model ⁵
1960	1.5	0.8	.....	.....	1.6	2.2	2.8
1961	0.7	1.5	.....	.....	1.3	1.0	1.7
1962	1.2	1.1	.....	.....	1.6	1.1	1.0
1963	1.6	1.8	.....	.....	1.8	0.3	0.8
1964	1.2	1.2	.....	.....	1.1	1.0	.7
1965	1.9	1.5	.....	.....	1.8	.2	.5
1966	3.4	3.3	.....	.....	2.8	5.7	.9
1967	3.0	3.9	.....	.....	3.1	1.7	1.4
1968	4.7	5.1	5.0	.....	4.6	6.0	1.7
1969	6.1	6.1	5.1	.....	4.5	7.8	2.7
1970	5.5	6.6	5.6	.....	4.7	5.0	3.8
1971	3.4	3.1	3.7	.....	4.0	2.0	4.0
1972	3.4	3.0	2.7	.....	3.2	2.7	3.9
1973	8.8	4.7	4.2	.....	4.3	7.6	4.2
1974	12.2	11.3	10.7	14.9	9.5	13.7	5.7
1975	7.0	6.7	6.2	4.9	5.6	4.0	7.5
1976	4.8	6.1	6.4	5.1	6.0	6.3	7.4
1977	6.8	6.4	5.9	5.7	6.0	5.1	7.4
1978	9.0	8.5	6.5	8.5	6.8	9.5	7.8
1979	13.3	11.3	7.8	9.7	7.1	10.9	8.1
1980	12.4	12.1	9.4	10.4	9.1	10.3	8.9

¹ Excludes food and energy. Covers the period December to December.
² Excludes financing, taxes, and insurance, home purchase, food, energy, and used cars. Covers the period December to December.
³ Excludes food and energy. Covers the fourth quarter to fourth quarter period.
⁴ Data are for the private business sector, on an all-persons basis. Covers the fourth quarter to fourth quarter period.
⁵ Data are from the Data Resources, Inc. model, and represent the weighted combination of estimated trends in unit labor costs and capital costs.
 Note: Dash indicates data not available.

becomes a part of tomorrow's underlying rate of inflation because of the almost total interdependence and circularity of our economic system. Current shock inflation will impact future price levels both directly and indirectly. The direct effects occur through an increase in the costs of production for all industries that use one of the shock factors as an input.

The indirect effects result largely from the influence of "price expectations." Labor unions negotiate for wage increases commensurate with the overall inflation measured during the previous period(s), regardless of the role of shocks. Nonunion wages are closely tied to those of union workers. Depending on the competitive position of the specific industry or company, businesses have tended to grant wage demands when confident

that all or most of the costs can be passed to the customer through increased prices. And, long-term interest rates are also extremely sensitive to inflationary trends. These factors help to trigger a succession of reactions and adjustments rippling through the economy which will affect all measures of the underlying rate of inflation in future periods.

EACH OF THE ESTIMATES presented in table 1 has been referred to as "the" underlying rate of inflation at one time or another by such groups as the Cost of Living Council, the Council of Economic Advisers, the Council on Wage and Price Stability, analysts preparing the *Economic Report of the President*, and various other policymakers. Which of these measures, if any, should be used in the determination of U.S. economic planning goals? In the short run, a measure that segregates the level of inflation inherent in the economic structure from the overall inflation rate can be a very valuable tool. It can be particularly useful when predicting the degree of inflation for the next period, allowing us to adjust our economic policies accordingly.

The choice of an appropriate short-run measure of the underlying rate will be determined by the needs and some subjective decisions of the individual user. However, the choice of a measure becomes moot in the long run. All shocks are absorbed, all adjustments have been made, and the underlying rate of inflation coincides with the long-term trend in the measure of overall inflation. □

----- FOOTNOTES -----

ACKNOWLEDGMENT: The author thanks John Wetmore, Jesse Thomas, Craig Howell, and Andrew Clem of the Office of Prices and Living Conditions, Bureau of Labor Statistics, for their assistance in the preparation of this article.

¹ *Tax Policy and Core Inflation: A Study Prepared for the Use of the Joint Economic Committee, Congress of the United States*, Apr. 10, 1980, 96th Cong., 2d sess.

² All of the long-run trend lines for the time series listed in table 1 are positively sloped except the Producer Price Index for finished consumer goods less food and energy. This is because PPI data for this particular series do not begin until 1974, which happens to be the year of the maximum observed value for the series. If the prior periods' observations were below the 1974 level (which is the case for all of the other series), the acceleration in 1974 would also result in a positively sloped trend line.