

South Dakota Legislative Research Council

Issue Memorandum 97-7

THE CONSUMER PRICE INDEX AND THE IMPLICATIONS OF PROPOSED REVISIONS TO THE CONSUMER PRICE INDEX

Introduction

The most commonly used, broad based measure of changing prices in the United States economy is a statistic calculated by the United States Bureau of Labor Statistics (BLS)--part of the United States Department of Labor. This statistic is known as the consumer price index (CPI). The CPI is a measure of the average change in prices paid for a fixed market basket of goods and services. The CPI is based on the expenditure patterns of two groups, and as such, there is an index calculated for each group. The consumer price index for all urban consumers (CPI-U) represents about 80 percent of the total United States population. The consumer price index for urban wage earners and clerical workers (CPI-W) represents about 32 percent of the total United States population. The population used to compute the CPI-W is a subset of the population used to compute the CPI-U.¹

Background

The CPI has its roots in the World War I era. The CPI was developed by the Federal Government in order to establish cost-of-living

adjustments (COLA) for workers in the shipbuilding industry.² The CPI was first published as a national index in 1921. Since then the CPI has undergone several revisions and refinements in the way in which it is calculated.

The CPI is a measure of the average change in prices paid by urban consumers for a defined "market basket" of goods and services. The CPI has three major uses: (1) It is used as a measure of inflation--the rate of increase of prices in the national economy and as such is used by the President, Congress, and the Federal Reserve Board as a guide in making economic decisions; (2) It is used to make adjustments to other series of economic data so that these other series may be examined without the effect of inflation on prices (constant dollars); and (3) It is widely used to adjust payments, entitlements, contract payments, tax rates, and any number of other situations where price sensitivity is an issue.

The CPI-U is based upon the buying habits of most urban residents, including professional employees, self-employed, unemployed, retired, and poor

¹ CPI Detailed Report, Data for June 1995, page 5.

² Monthly Labor Report, December 1996, page 4.

persons, as well as urban wage earners and clerical workers. Farm families and persons in military service are the main groups not included in the CPI-U (or the CPI-W, for that matter). The CPI-W is based on the same broad population as the CPI-U, except the CPI-W is limited to the CPI-U population that meets the following criteria: (1) more than one-half of the household income must come from clerical or wage occupations; and (2) at least one of the household's members must have been employed for at least 37 weeks out of the previous 12 months.³

The CPI market basket consists of approximately 90,000 different items and is based on a three-year survey (1982, 1983, and 1984) of consumer expenditures around the country. Each year about 4,800 families were surveyed. The CPI covers a broad array of consumer expenditures. The Bureau of Labor Statistics has classified the elements in the consumer market basket into the following seven major groups:

1. Food and Beverages;
2. Housing;
3. Clothing;
4. Transportation;
5. Medical Care;
6. Entertainment; and
7. Other goods and services.

In addition to the national CPI as defined by either the CPI-U or the CPI-W, regional indices are published for the Northeast, North Central, South, and West. Also, indices for five major metropolitan

areas are published monthly--Chicago, Los Angeles, New York, Philadelphia, and San Francisco. Data for the following ten metropolitan areas are published every other month--Baltimore, Houston, Boston, Miami, Cleveland, Pittsburgh, Dallas, St. Louis, Detroit, and Washington, DC. On a semiannual basis data are published for Anchorage, Atlanta, Buffalo, Cincinnati, Denver, Honolulu, Kansas City, Milwaukee, Minneapolis-St. Paul, Portland, San Diego, and Seattle.

How the CPI is Constructed: A Brief Hypothetical Example

Suppose for the moment that rather than 90,000 different items, the CPI was constructed using only two items: pork chops and ground beef, and the market basket consisted of 16 pounds of pork chops and 20 pounds of ground beef, and that in the base measurement--for the example the base will be January of 1992--the price of pork chops was \$1.80 per pound and the price of ground beef was \$1.20 per pound. That would mean that the overall price of the market basket would be \$52.80 (16 pounds of pork chops at \$1.80 per pound (\$28.80) plus 20 pounds of ground beef at \$1.20 per pound (\$24.00)). **It is important to remember that the mix of the market basket does not change--always 16 pounds of pork chops and 20 pounds of ground beef.** This formula based on a fixed market basket is called the Laspeyres formula. The index for any period is the overall price of the market basket during that period divided by the overall price of the market basket in the base period. The following table shows how the CPI based on chicken and

³ CPI Detailed Report, Data for June 1995, page 5.

ground beef is derived--assuming that the CPI is computed quarterly.

TABLE 1: PORK CHOPS AND GROUND BEEF									
TIME PERIOD	QUANTITY OF PORK CHOPS	QUANTITY OF GROUND BEEF	PRICE OF PORK CHOPS	PRICE OF GROUND BEEF	OVERALL PRICE OF THE MARKET BASKET	INDEX	INFLATION, QUARTERLY	INFLATION, ANNUALLY	INFLATION, ANNUAL AVERAGE
Jan-92	16	20	\$ 1.80	\$ 1.20	\$ 52.80	1.000			
Apr-92	16	20	\$ 1.86	\$ 1.27	\$ 55.16	1.045	4.47%		
Jul-92	16	20	\$ 1.80	\$ 1.20	\$ 52.80	1.000	-4.28%		
Oct-92	16	20	\$ 1.82	\$ 1.21	\$ 53.32	1.010	0.98%		
Jan-93	16	20	\$ 1.82	\$ 1.22	\$ 53.52	1.014	0.38%	1.36%	
Apr-93	16	20	\$ 1.84	\$ 1.23	\$ 54.04	1.023	0.97%	-2.03%	
Jul-93	16	20	\$ 1.85	\$ 1.25	\$ 54.60	1.034	1.04%	3.41%	
Oct-93	16	20	\$ 1.83	\$ 1.26	\$ 54.48	1.032	-0.22%	2.18%	1.20%
Jan-94	16	20	\$ 1.84	\$ 1.26	\$ 54.64	1.035	0.29%	2.09%	
Apr-94	16	20	\$ 1.85	\$ 1.27	\$ 55.00	1.042	0.66%	1.78%	
Jul-94	16	20	\$ 1.85	\$ 1.27	\$ 55.00	1.042	0.00%	0.73%	
Oct-94	16	20	\$ 1.86	\$ 1.25	\$ 54.76	1.037	-0.44%	0.51%	1.27%
Jan-95	16	20	\$ 1.88	\$ 1.25	\$ 55.08	1.043	0.58%	0.81%	
Apr-95	16	20	\$ 1.86	\$ 1.27	\$ 55.16	1.045	0.15%	0.29%	
Jul-95	16	20	\$ 1.86	\$ 1.29	\$ 55.56	1.052	0.73%	1.02%	
Oct-95	16	20	\$ 1.88	\$ 1.29	\$ 55.88	1.058	0.58%	2.05%	1.04%
Jan-96	16	20	\$ 2.20	\$ 1.27	\$ 60.60	1.148	8.45%	10.02%	
Apr-96	16	20	\$ 2.25	\$ 1.25	\$ 61.00	1.155	0.66%	10.59%	
Jul-96	16	20	\$ 2.30	\$ 1.25	\$ 61.80	1.170	1.31%	11.23%	
Oct-96	16	20	\$ 2.35	\$ 1.22	\$ 62.00	1.174	0.32%	10.95%	10.70%

Some of the things that the above hypothetical table shows are:

1. The index for each time period is the price of the market basket in that time period divided by the price of the market basket in January of 1992.
2. The quarterly inflation rate is the percent change in the index from one quarter to the next quarter.
3. Annual inflation is the percent change in the index from one quarter to the same quarter in the previous year.
4. The annual average inflation rate is the percent change in the average of the quarterly indices from one year to average of the indices in the previous year.

Some Criticisms of the CPI

One criticism of the CPI as a measure of inflation is that inflation as measured over several periods is not the same as inflation as measured from period to period. In Table 1, the overall price of the market basket changed from \$52.80 to \$55.16 to \$52.80 during the January, April, and July 1992 quarters--and as such the index changed from 1.000 to 1.045 to 1.000. During that period, inflation as measured by the index was 4.47% from January to April, and -4.28% from April to July. Seemingly, the rate of inflation from January to July would be the sum of the two periods, which would be 0.19%. However, when looking at the index, there in fact was zero inflation from January to July. The simple reason for this is that percentage changes when not

measured against the same base are not additive. The simple solution to this alleged problem is to look at the changes in the index for the time periods in question, and not at the various rates of inflation during intervening periods of time.

There are more valid criticisms of the CPI--and those deal with the notion that BLS updates the composition of the market basket about once a decade. The first criticism of the fixed market basket is that it does not consider the consumer's ability to substitute between different components of

the market basket. This is known as the substitution bias. Going back to Table 1, the increase in the price of pork chops in January 1996 along with the stability in the price of ground beef probably would cause a number of consumers to purchase less pork chops and more ground beef. It seems to be a reasonable assumption that consumers can substitute ground beef for pork chops and maintain the same level of dietary satisfaction. That substitution effect and its impact on the CPI is illustrated in Table 2.

TABLE 2: PORK CHOPS AND GROUND BEEF: THE SUBSTITUTION EFFECT									
TIME PERIOD	QUANTITY OF PORK CHOPS	QUANTITY OF GROUND BEEF	PRICE OF PORK CHOPS	PRICE OF GROUND BEEF	OVERALL PRICE OF THE MARKET BASKET	INDEX	INFLATION, QUARTERLY	INFLATION, ANNUALLY	INFLATION, ANNUAL AVERAGE
Jan-95	16	20	\$ 1.88	\$ 1.25	\$ 55.08	1.043	0.58%	0.81%	
Apr-95	16	20	\$ 1.86	\$ 1.27	\$ 55.16	1.045	0.15%	0.29%	
Jul-95	16	20	\$ 1.86	\$ 1.29	\$ 55.56	1.052	0.73%	1.02%	
Oct-95	16	20	\$ 1.88	\$ 1.29	\$ 55.88	1.058	0.58%	2.05%	1.04%
Jan-96	14	23	\$ 2.20	\$ 1.27	\$ 60.01	1.137	7.39%	8.95%	
Apr-96	13	24	\$ 2.25	\$ 1.25	\$ 59.25	1.122	-1.27%	7.41%	
Jul-96	12	25	\$ 2.30	\$ 1.25	\$ 58.85	1.115	-0.68%	5.92%	
Oct-96	10	27	\$ 2.35	\$ 1.22	\$ 56.44	1.069	-4.10%	1.00%	5.81%

Table 2 shows that as pork chops increase in price along with stable ground beef prices, the consumer will react by changing consumption patterns--and as such the overall price of the market basket does not increase as greatly as the fixed BLS market basket. Given the consumer's ability to substitute between different items in the market basket, the fixed BLS market basket has a clear bias to overstate increases in the cost of living. In addition to the substitution bias, there is what is known as the outlet substitution bias. This happens when consumers switch to outlets that are

consistently lower priced, but the BLS market basket still consists of the same goods and services from the same outlets. BLS is conscious of these difficulties and acknowledges, "The CPI will need revisions as long as there are significant changes in consumer buying habits or shifts in population distribution or demographics."⁴

Technological improvements to items in the market basket present the conceptual difficulty of

⁴ CPI Detailed Report, Data for June 1995, page 9.

separating price changes into which portion of a price change is simply a price change, and which portion of a price change is due to improvements in the product. Today's pork chop is pretty much the same as any other pork chop back through time, but today's VCR, telephone, motor vehicle, lawn mower, etc., are hardly the same products that they were in previous years.

Overall, the CPI is estimated to overstate the rate of inflation by 1.1 percentage points per year with a reasonable range of overstatement between 0.8 and 1.6 percentage points per year.⁵

The CPI and the Cost-of-Living

BLS states that the CPI is frequently and mistakenly called a cost-of-living index, and "*The CPI is an index of price change only.*"⁶ BLS also points out that it is unlikely that the CPI is a precise measure of any individual's experience with respect to price changes. The reasons for this are offered in examples such as: (1) a person who does considerably more traveling than the average person in a period of rising gasoline prices will experience a greater increase in their cost-of-living than the average person; or (2) a family with a large vegetable garden that cans or freezes a significant amount of their produce will not experience price changes in those commodities to the degree that an average family would. These phenomena are why

⁵ Toward a More Accurate Measure of the Cost of Living by the Advisory Commission to Study the Consumer Price Index. The final report to the United States Senate Finance Committee, December 4, 1996.

⁶ CPI Detailed Report, Data for June 1995, page 4.

people sometimes question the validity of published indices. BLS explains: "A national average reflects all the ups and downs of millions of individual price experiences. It seldom mirrors a particular consumer's experience."⁷

Why then is the CPI so widely used as a cost-of-living index? The main reasons are: In spite of its shortcomings, it is still the best overall basis by which to gauge price changes in today's economy; and it is published monthly and is readily available.

Other Indices

BLS publishes a number of other statistics which may be indexed. The most popular series are: Employment and Unemployment, which also includes payroll data; Prices and Living Conditions, which includes the CPI as well as inventory, producer prices, and international prices; Compensation & Working Conditions, which includes collective bargaining, work stoppage, employee benefit, employment cost, and safety and health data; and Productivity and Technology statistics. In addition, as mentioned earlier, BLS data are also available on a selected regional basis. In addition to BLS over seventy other United States Government agencies collect and publish statistics on such areas as crime, health, agriculture, transportation, population characteristics, and so on.

Alternatives to the Commonly Used CPI

In order to arrive at an index that

⁷ CPI Detailed Report, Data for June 1995, page 5.

more precisely measures a particular group's experience with price changes, other indices have been used or suggested. Regional experience with price changes may be shown with BLS regional data. Also, the United States Department of Education publishes price indices for educational institutions. Further, there are at the present time, consideration of developing a CPI for the poor.

There is no limit to the specific regional or other group specific indices which could be developed. Nor is it necessary for BLS to gather and publish the data.

There is an underlying trade-off between using the CPI versus other more specific indices to define price changes. The trade-off is that as more specific indices are developed, the sample of the data to generate a more specific index is smaller, and as such, less statistically reliable. With respect to local area indices, BLS states: "These local area indexes are byproducts of the national CPI program. Each local index has a much smaller sample size than the national or regional indexes and is, therefore, subject to substantially more sampling and other measurement error. As a result, local area indexes are more volatile than the national or regional indexes, even though their long-term trends are similar."⁸

The CPI and the Federal Budget

The CPI and BLS have recently been caught in the political crossfire because the CPI affects

both what the federal government (and to a lesser extent state and local governments) takes in and pays out. A reduction of one percentage point in the CPI is estimated to save the federal government \$6 to \$10 billion per year--with a little more than half the savings in reduced benefit payments and the remainder in increased tax revenues.⁹ With a \$200 billion federal deficit, a \$6 to \$10 billion savings that can be accomplished simply by changing the way in which BLS does its arithmetic is an attractive alternative to budget cuts or tax increases.

The CPI and South Dakota

The South Dakota Codified Laws refer to the CPI in several instances. SDCL 21-3A-6 specified that if the court awards a judgment and the judgment is for periodic installments, the installment is increased each year by the percent increase in the CPI-W for the previous year.

SDCL 28-6-18 and SDCL 28-6-19 provide that the Department of Social Services may not increase the amount of spousal resources that are not considered in assets for long-term care of the other spouse by more than the annual increase in the consumer price index.

SDCL 34A-1-58 allows the Department of Environment and Natural Resources to adjust clean air fees upward according to the CPI.

⁹ "The Consumer Price Index, the Deficit, and Politics" by Janet Norwood, **Policy Bites No. 22**, a publication of the Urban Institute, March 1995.

⁸CPI Detailed Report, Data for June 1995, page 8.

SDCL 62-4-7 provides that in the event of a total disability, workers' compensation payments shall be increased by the percentage increase in the CPI-W for the previous calendar year--but may not exceed a three percent increase compounded annually.

Chapter 10-13 provides that the total amount of revenue payable from real property taxes within a taxing district may increase by no more than the lesser of three percent or the percent change in the CPI-W for the calendar year prior to the year in which the property taxes are payable.

Finally, Chapter 13-13 and Chapter 13-37 provide for increases in the per student allocation in state aid to education and state aid to special education to increase by an inflation factor equal to the lesser of the percent change in the CPI-W for the fiscal year two years prior to distribution or three percent.

Critics of the CPI contend that the CPI overstates the inflation by approximately one percentage point. And as mentioned earlier, the overstatement of the rate of inflation costs the Federal Government considerable sums of money each year. The single largest outlay of South Dakota's general funds based on the CPI involve state aid to education and state aid to special education. As previously mentioned, the CPI is estimated to overstate inflation by roughly one percentage point. **The FY1998 allocation of state aid to education and state aid to special education together totaled \$271.3 million. Had the increase in the per student allocation been one percentage point less,**

the FY1998 allocation for state aid to education and state aid to special education would have been \$266.1 million, or \$5.2 million less.

BLS offers guidelines to consider when using the CPI for escalation clauses. They are:

1. DEFINE the payment that is subject to escalation.
2. IDENTIFY the CPI index that is used, CPI-U or CPI-W, and area coverage--national or regional.
3. SPECIFY a reference period from which changes in the CPI will be measured--either a single month or an annual average.
4. STATE the frequency of adjustment--quarterly, semi-annually, or annually are the most common.
5. DETERMINE the formula for the adjustment calculation--usually proportional to the change in the CPI between two specific time periods.
6. PROVIDE a built-in method for handling situations that may arise because of major revisions to the CPI or the CPI base period. BLS provides timely notification of revisions or changes in the index base.¹⁰

Examination of the statutes cited in light of BLS guidelines show that South Dakota's statutes are not as precise as they could be.

Another issue related to changing the CPI, or even using the CPI in state programs such as state aid to education, is the unlawful delegation of legislative authority. In this instance, the amount of

¹⁰ BLS Fact Sheet 91-4, "How to use the Consumer Price Index for Escalation".

money that school districts will receive will be based upon decisions by those in BLS, not the South Dakota Legislature.

A Big Assumption

In spite of its shortcomings, the CPI is generally accepted as the best measure of general price increases experienced by the average American consumer. But what about South Dakota's school districts and the state aid to education formula? The state aid to education formula (for both general and special education) assumes that the cost to educate a student varies directly with the CPI-W. This is probably a good assumption, but given the fact that over three-fourths of school district expenditures in South Dakota are for salaries and benefits, it seems more likely that the cost to educate a student varies more directly with the salaries and benefits of school district employees--the greatest portion is, of course, attributable to classroom teachers. Perhaps consideration should be given to using an index relating more to the types of expenditures particular to school districts. Also, consideration could be given to the State of South Dakota calculating its own index for school district costs for use in the distribution of state aid to education.

The CPI and State Aid to Education--A Matter of Timing

The famous 2.7% increase in the per student allocation so frequently discussed during the 1997 Legislative Session was the percent increase in the CPI-W for the twelve-month period ending June

1996 over the twelve-month period ending June 1995. (See Appendix A.) This means that the state aid to education allocation for FY1998 was determined by: (1) inflation for FY1996; (2) average daily membership (ADM) (number of students) projections for FY1998; and (3) projections for property taxes payable for the second half of calendar year 1997 and the first half of calendar year 1998. This means that the CPI element of the state aid formula is one and one-half to two years out of sync with the ADM and property taxes payable elements of the state aid formula.

Another look at Appendix A shows that inflation for FY1997--used to determine state aid for FY1999--was 2.80%. This means that the index factor used in Chapters 13-13 and 13-37 will be 2.80%, and as such the per student allocations for state aid to education and state aid to special education will increase 2.80%. This means that the next session of the Legislature will once again be faced with the issue of whether to hold to the inflation rate, or allow an increase of 3% on the per student allocations.

Summary

Where did all this begin? The answer probably lies in the notion that so much of the federal deficit is due to various entitlement programs, and these entitlement programs have automatic COLAs. These automatic COLAs are driven by the rate of increase in the CPI. Since it is politically unpopular and difficult to reduce existing entitlement programs, the Congress and President have looked to

reducing the factor that drives the automatic COLA increases--namely the rate of inflation. Both the Congress and President have insulated themselves from the issue by (1) the creation of the "Advisory Commission to Study the Consumer Price Index," and (2) the ultimate revision to the CPI will be a work product of BLS. According to BLS, their findings and the implementation of changes in the CPI will be announced by the end of 1997. January of 1999 is the likely date for the first release of a revised CPI.

The discussion does not end with the impact on the federal government and the federal budget.

There will also be an impact on state and local programs that are driven by the CPI. Further, a change in the way inflation is computed and reported may impact the nation's financial markets.

Whether the motivation for changing the CPI comes from a desire to have an index that is a better gauge of cost-of-living changes or an index that is more friendly to the United States Treasury, changing the CPI will have far ranging effects. And the implications of those effects is not entirely known.

This issue memorandum was written by Dale Bertsch, Chief Analyst for Fiscal Research and Budget Analysis, for the Legislative Research Council. It is designed to supply background information on the subject and is not a policy statement made by the Legislative Research Council.
