

### Consumer Price Index: Concept

A consumer price index shows the cost for a consumer to attain a given level of well-being.

Goal: Find the minimum cost of attaining a particular indifference curve.

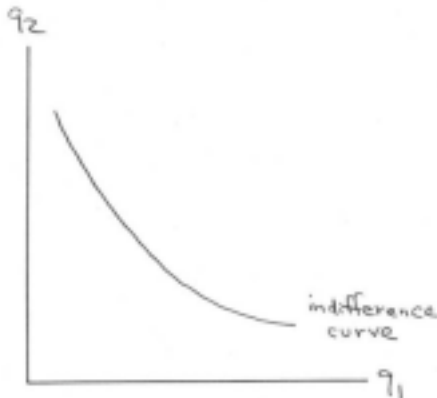
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### Two-Good Model

Consider a two-good model. For good  $i$ , the price is  $p_i$ , and the quantity demanded is  $q_i$ . Figure 1 shows an indifference curve.

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Figure 1: Indifference Curve



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### Cost

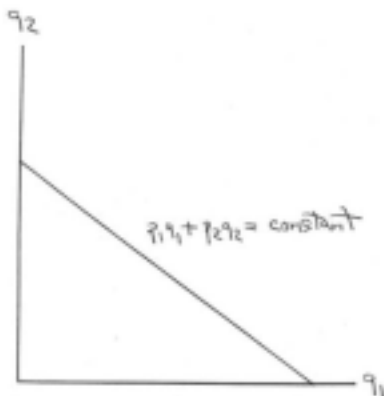
The total cost of a market basket of goods is

$$c = p_1q_1 + p_2q_2.$$

An isocost line is a straight line along which cost is constant (figure 2). The relative price of the two goods determines the slope  $-p_2/p_1$  of the isocost line.

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Figure 2: Isocost Curve



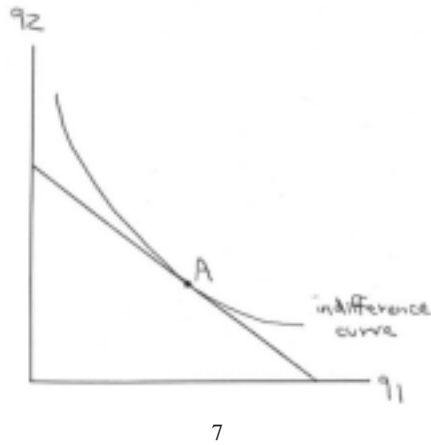
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### Minimum Cost

Where an isocost line is tangent to the indifference curve is the market basket that minimizes the cost of attaining the indifference curve (figure 3).

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Figure 3: Cost Minimization



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### Uniform Inflation?

If all goods rise in price at exactly the same rate, the accurate measurement of inflation is trivial.

If the relative prices of goods change, then inflation can be mismeasured. Some goods rise in price faster than others. The proper measure of inflation is a weighted average of the different rates of inflation, using budget shares as weights.

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### Consumer Price Index: Measurement

In practice, the measurement of the consumer price index is different from the concept: the consumer price index shows the cost of a particular market basket of goods.

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### Overstatement of Inflation: Substitution Bias

If the market basket is kept fixed, then the measurement of inflation is overstated.

The consumer can substitute for goods that have especially risen in price, so the increase in cost to keep well-being constant is less than the increase in cost of the fixed market basket.

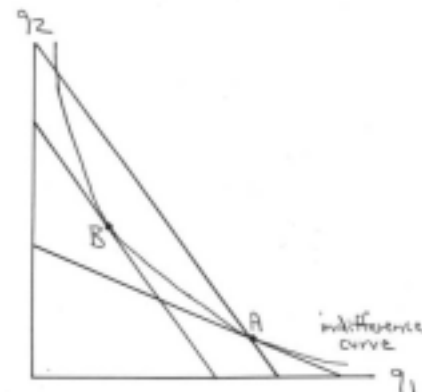
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In figure 4, market basket A is cost-minimizing for the original prices.

If  $p_1$  rises, then an isocost line becomes steeper. Market basket B is now cost-minimizing. The cost of market basket A is higher: the parallel isocost line through A has higher cost. Substituting good 2 for good 1 reduces the cost.

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Figure 4: Substitution Bias



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### No Substitution, No Overstatement

For a consumer with “fixed-coefficients” utility (right-angle indifference curve, figure 5), there is no possibility of substitution.

The cost of the fixed market basket measures inflation accurately.

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Figure 5: Fixed-Coefficients Utility



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### Magnitude of Substitution Bias

The degree of substitution bias results from the combination of two factors:

- How much are relative prices changing?
- How great is the substitution among goods?

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### Infrequent Change in the Market Basket

Until recently, the market basket of goods used to compute the consumer price index has been changed infrequently, once every ten years.

Keeping the market basket constant increases the substitution bias.

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### Eliminating Substitution Bias

One eliminate substitution bias by continuously updating the market basket of goods purchased.

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### Inflation-Indexing of Revenue and Expenditure

Much revenue and expenditure by the federal government is indexed to inflation:

- income-tax brackets;
- social-security benefits.

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### A Political Problem

Many politicians would like to reduce social-security benefits. When the baby boomers retire, social-security spending will increase yet more. How can the spending be afforded?

However politicians do not want to admit to reducing social-security benefits.

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### Economic Research on Inflation

Some economists argue that the consumer price index has overstated inflation by perhaps one *per cent* per year [1]. Consequently, indexing social-security benefits to inflation causes the real benefit to rise by one *per cent* per year.

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### A Political Solution

Accepting this argument provides a political solution to the spending problem. The federal government no longer indexes social-security benefits by the rate of inflation, but only by the rate of inflation less one-half *per cent*.

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### Proper Approach

If inflation is indeed overstated, then to reduce the rate of increase in social-security benefits is perhaps appropriate.

However the proper approach would be to measure inflation accurately.

To reduce the rate of increase in benefits by one-half *per cent* per year is arbitrary and suggests political opportunism.

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### Implausible Overstatement?

Baker [1] argues that a one *per cent* overstatement of inflation is implausible.

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### Growth of Real Income

The overstatement of inflation would imply a great understatement of the increase in real incomes and the standard of living.

Baker estimates that forty years ago half the nation's families would have lived below the poverty line, contrary to popular opinion. Furthermore, extrapolating the past rapid income growth forecasts very high real incomes in the next generation.

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### Long-Run Economic Growth

Similarly, long-run real economic growth would be understated.

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### Invalidation of Quantitative Economic Research

Economic theory deals with real amounts. One real variable affects another real variable.

If inflation is mismeasured, then real magnitudes are mismeasured. Consequently quantitative economic research about the long run must be invalid.

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### Retail-Outlet Substitution Bias

Wal-Mart charges less than Macy's, so the consumer saves money.

The measurement of the CPI assumes that the lower cost at Wal-Mart does not represent a reduction in the cost of living. Instead, the loss of the amenities offered at Macy's exactly offset the lower price at Wal-Mart.

The economists arguing that inflation is overstated say that the lower price at Wal-Mart does represent a reduction in the cost of living and an increase in well-being.

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### References

- [1] Dean Baker. The overstated CPI—can it really be true? *Challenge*, 39(5):26–33, September-October 1996.

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