Measuring Inflation

\[ \eta_{\text{Method}_1} > \eta_{\text{True}} > \eta_{\text{Method}_2} \]

The Problem

- The **inflation rate** measures how the prices of goods and services - measured in pictures of George Washington or your favorite national hero - change over time.
- If we had a simple one-crop agricultural economy, there would be no problem.
- In the real world, we must also deal with changes in **relative prices**, so that the measurement of the inflation index is more complicated.

An Example

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Last Year's Consumption</th>
<th>Last Year's Price</th>
<th>This Year's Consumption</th>
<th>This Year's Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pizza</td>
<td>10</td>
<td>$8</td>
<td>5</td>
<td>$12</td>
</tr>
<tr>
<td>Hamburgers</td>
<td>15</td>
<td>$4</td>
<td>26</td>
<td>$5</td>
</tr>
</tbody>
</table>

Pizza up 50%
Hamburger up 25%
Measuring Inflation

An Example

Data on Pizza and Hamburgers

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<tr>
<th>Commodity</th>
<th>Last Year's Consumption</th>
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So let’s weight Pizza and Hamburger by relative consumption.

Pizza up 50%
Hamburger up 25%

Calculations based on the two basic market baskets: consumption this year and consumption last year give different estimates of the inflation rate.

<table>
<thead>
<tr>
<th>Market Basket</th>
<th>Cost Using Last Year’s Prices</th>
<th>Cost Using This Year’s Prices</th>
<th>Calculated Inflation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Year</td>
<td>$140.00</td>
<td>$195.00</td>
<td>39%</td>
</tr>
<tr>
<td>This Year</td>
<td>$144.00</td>
<td>$190.00</td>
<td>32%</td>
</tr>
</tbody>
</table>

Last Year (at last year’s prices) = 10($8)+15($4) = $140
This Year (at last year’s prices) = 5($8)+26($4) = $144

Method 1: how much more does last year’s consumption cost this year than it did last year?
Method 2: how much more does this year’s consumption cost than it would have last year?

η = 39%
η = 32%
Additional Problems

• Quality Changes
  • This year, Miller's Pizzeria has increased the amount of cheese on each of its pizzas.
  • A day in the hospital, for instance, is not the same as a day in the hospital 40 years ago

Additional Problems

• Quality Changes
  • New Products
  • Miller's Pizzeria has broadened its product line to include the Blonde Vermonter, made with ham and apple slices.
  • How do you account for the introduction of new goods?

Additional Problems

• Quality Changes
  • New Products
  • New Outlets
  • Last year, you had to drive 50 miles to Miller's pizzeria. This year, it opened a store just down the street. While the prices are the same, the full cost including travel cost is down substantially.

Additional Problems

• Quality Changes
  • New Products
  • New Outlets
  • Substitution
  • If some prices rise by more than others, consumers are likely to substitute the cheaper good for the more expensive one. How should we account for this substitution?

Additional Problems

• Quality Changes
  • New Products
  • New Outlets
  • Substitution
  • Buying Cheap
  • When the Uptons go out for dinner, they either get a pizza or two hamburgers, depending on which costs less.

Big Night on the Town

Data on Pizza and Hamburgers

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Cost up 25%
The Boskin Report

- Failure to adjust for the substitution effect overstated the inflation rate by 0.4% a year.
- Failure to adjust for new products and improved quality overstated the inflation rate by 0.6% a year.
- Failure to adjust for new outlets overstated the inflation rate by 0.1% a year.

Conclusion

\[ \eta_{Method_1} > \eta_{True} > \eta_{Method_2} \]
Measuring Inflation

The GDP Deflator

Based on basket of all goods in GDP

GDP Deflator vs CPI

$r_{CPI,GDP}=0.95$

Producer Price Index

$r_{CPI,PPI}=0.95$

End

Data are from Statistical Appendix of Economic Report of the President

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