The Optimal Inflation Rate

• The private cost of holding money is $r_N$
• Economic Efficiency requires setting $PC=SC$.

$SC = 0$

\[ r_N = r_R + \eta_e = 0 \]

\[ \eta_e = -r_R < 0 \]

\[ \eta_e = \frac{\Delta M}{M} - \frac{\Delta Y}{Y} \]

\[ \frac{\Delta M}{M} = \frac{\Delta Y}{Y} - r_R < 0 \]
The Optimal Inflation Rate

\[ \eta_e = -r_R < 0 \]
\[ \eta_e = \frac{\Delta M}{M} - \frac{\Delta Y}{Y} < 0 \]
\[ \frac{\Delta M}{M} = \frac{\Delta Y}{Y} - r_R < 0 \]

Conclusion

• A 1% inflation rate costs \( \cong $250 \text{ million} \)
• Concentrate on price stability

Uncertainty Costs

• Suppose next year's inflation rate is equally likely to be three, six, or nine percent.

\[ P(3\%) = \frac{1}{3} \]
\[ P(6\%) = \frac{1}{3} \]
\[ P(9\%) = \frac{1}{3} \]

Production

• The CEO of Acme Widgets must price the product a year in advance.

\[ P(3\%) = \frac{1}{3} \]
\[ P(6\%) = \frac{1}{3} \]
\[ P(9\%) = \frac{1}{3} \]

Production

• If the inflation rate turns out to be exactly six percent, the right price would be $1.00 each.
Optimal Inflation

Production

• If the inflation rate turns out to be 3%, he will have overpriced.

• If the inflation rate turns out to be 9%, he will have under priced.

• If the inflation rate turns out to be exactly six percent, the right price would be $1.00 each.

• If the inflation rate turns out to be nine percent, widgets would be priced 3% too low. He will sell more, but make less money.

• If the inflation rate turns out to be only three percent, widgets will be priced 3% too high and both demand and profits will suffer.

If the uncertainty can be ended, Acme can make more money.

At 3%, \( \pi = $70 \)

At 6%, \( \pi = $100 \)

At 9%, \( \pi = $70 \)

Suppose

\[
P(0\%) = \frac{1}{3} \]

\[
P(6\%) = \frac{1}{3} \]

\[
P(12\%) = \frac{1}{3} \]

Extra Uncertainty

At 0%, \( \pi = $50 \)

At 6%, \( \pi = $100 \)

At 12%, \( \pi = $50 \)
Suppose
\[ P(0\%) = \frac{1}{3} \]
\[ P(6\%) = \frac{1}{3} \]
\[ P(12\%) = \frac{1}{3} \]

At 0%, \( \pi = $50 \)
At 6%, \( \pi = $100 \)
At 12%, \( \pi = $50 \)

\[
E(\pi) = \frac{1}{3} \cdot $50 + \frac{1}{3} \cdot $100 + \frac{1}{3} \cdot ($50) = $67
\]

Moral: the greater the uncertainty, the greater the chance you have made a mistake that costs you money.

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