

## LONG TERM EFFECTS OF MONEY

I. Under what conditions is money neutral in the long run?

### II. Money and welfare

I. A simple model with money in the utility function

1. Microfoundations for the demand for money

2. The Fisher equation

3. Money (super)-neutrality

a) Basic result (Sidrauski)  $\text{Cor}(m, y) = 0$

b) Tobin: Portfolio model  $\text{Cor}(m, y) > 0$

c) Barro: Endogenous labor  $\text{Cor}(m, y) < 0$

Key insight: In the standard model, inflation may matter for long term real economic activity through its effect on real balances. Lower real balances make shopping more costly. As people spend more time managing their cash (taking trips to the bank) they end up working and producing less.

This channel does not seem to be quantitatively important (at least for moderate inflation).

II. Optimal rate of inflation

1. Friedman Lump sum taxes

Consumer surplus from money holdings

2. Since the actual cost of producing money is virtually zero,  $\text{MC} = \text{MB}$  dictates

$$R = 0 \Rightarrow p' = -r$$

Estimates of welfare cost of inflation range from 0.003 to 0.02 % of GDP

The results are not robust to the choice of the specification of the demand for money function

3. Phelps Positive optimal inflation tax (seignorage) in the presence of distortionary taxes

Tax smoothing

Intratemporal  $\text{cor}(T, s) > 0$

Intertemporal Random walk: Tax changes are unanticipated

R and p' should follow a RW

R and p' do seem to follow a RW in the real world. Does this imply that central banks decide their inflation policy based on public finance (optimal taxation) considerations? This does not seem plausible, there are other factors that make inflation follow a RW (e.g real output shocks)

### Seignorage

The inflation rate that maximizes inflation tax revenue is such that:  $\eta_R = -1$

The inflation Laffer curve

Other considerations: The Friedman rule obtains even under distortionary taxation in special cases

Money as an intermediate good

III. Other, (more plausible?) channels linking inflation to long term economic activity

a) Non-indexed tax systems and inflation

Feldstein estimates that going from 2% steady inflation to 0% would increase GDP by 1% permanently

b) Positive relationship between average level and variability of inflation

Inflation variability is harmful

c) Inflation greases the wheels of the labor market

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Downward rigidity in nominal wages.

Nominal cuts occur rarely. They are acceptable only when the firm's survival is at stake

Reason: concern about work moral and fairness

Empirical evidence: Workers in manufacturing

Surveys

Model: A subset of firms faces constraints in cutting wages,  $w$

$$w' = p' + x'$$

when  $w'$  is low then real wages are difficult to adjust as they may require a nominal cut

Key criticism

The authors look at the wrong time period (high inflation-nominal wage increases). If the macroeconomic environment were different (low inflation) microeconomic behavior would differ too (greater acceptance of nominal cuts).

Data from other periods (1920s, post civil war period: falling prices and fast growth)