

Inflation Expectations

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Objectives

What happens when monetary policy affects inflation expectations?

In this section you will learn:

1. how monetary policy affects **nominal and real interest rates** in the short and medium run
2. why monetary policy is **neutral** in the medium run but not in the short run

The Key Issue

The Fed controls the **nominal** interest rate.

But spending decisions (*C* and *I*) depend on the **real** interest rate.

Real interest rate = nominal rate – inflation.

When the Fed changes the nominal rate, it also changes inflation expectations.

Raising the nominal rate may not raise the real rate.

Nominal vs Real Interest rates

Nominal interest rate: i

- ▶ the relative price of **money** at $t+1$ vs t
- ▶ give up 1 dollar at t
- ▶ receive $(1+i)$ dollars at $t+1$

Real interest rate: r

- ▶ the relative price of **goods** at $t+1$ vs t
- ▶ give up 1 unit of consumption at t
- ▶ receive $(1+r)$ units at $t+1$

Real Interest Rate

$$1 + r_t = (1 + i_t)P_t/P_{t+1} \quad (1)$$

or approximately

$$r_t = i_t - \pi_t \quad (2)$$

where $\pi_t = P_{t+1}/P_t - 1$ is the inflation rate.

Intuition

No inflation:

- ▶ Save \$1 today. Receive $\$(1 + i)$ tomorrow.
- ▶ Purchasing power increases by factor $1 + r = 1 + i$

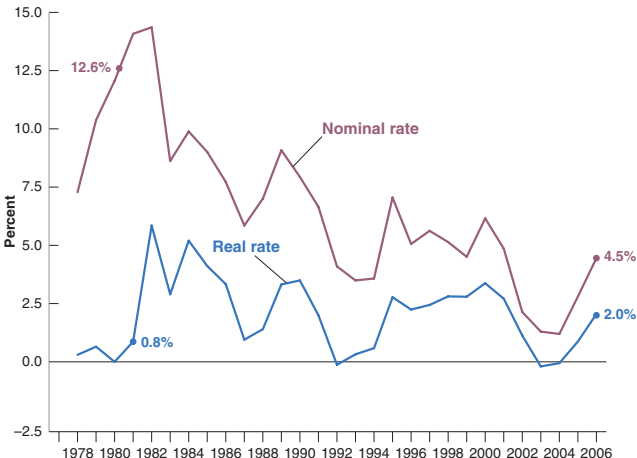
With Inflation:

- ▶ Value of $\$(1 + i)$ received tomorrow is reduced
- ▶ If $\pi = i$, purchasing power unchanged
- ▶ If $\pi > i$, saved money loses value over time.

Questions:

- ▶ If $r = 0$, then $i =$
- ▶ If $i = 0$, then $r =$
- ▶ What is the real interest rate of money?

Nominal and Real Rates Can Diverge



1981:

- ▶ high nominal i
- ▶ 0 real interest rate

2006:

- ▶ low nominal i
- ▶ positive real interest rate

The point:
Nominal and real rates
often diverge

Deflation and Depressions

One reason why deflation is dangerous:

- ▶ it drives up real interest rates
- ▶ even when nominal rates hit 0

Great Depression example (1931)

- ▶ $i = 3.1\%$
- ▶ $\pi^e = -9.2\%$
- ▶ $r = 12.3\%$
- ▶ monetary policy cannot keep real interest rates low

This is one reason why some trend inflation is useful.

Model with Inflation Expectations

The Model

We add inflation expectations to the model

Short run: IS/LM

Medium run: AS/AD

We resolve an old confusion:

Does loose monetary policy raise or lower interest rates?

Short-run IS/LM Model

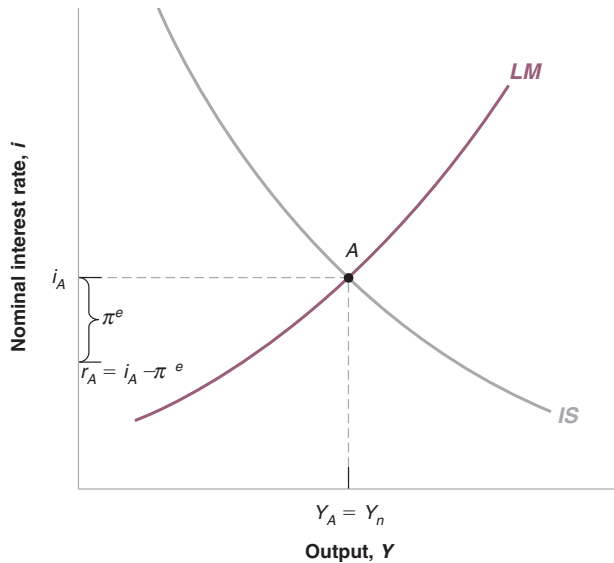
$$IS : Y = C(Y - T) + I(Y, i - \pi^e) + G \quad (3)$$

$$LM : M/P = YL(i) \quad (4)$$

Note:

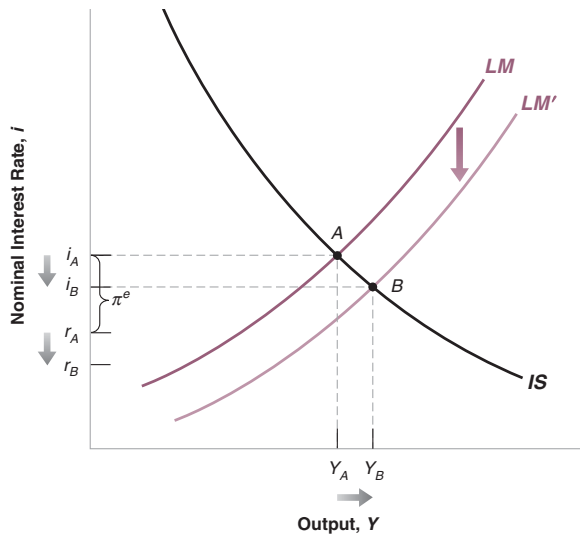
1. demand for goods depends on $r = i - \pi^e$
2. expected inflation matters, not realized inflation
3. money demand depends on the nominal rate i [why?]

IS/LM Model



Expected inflation shifts IS.

Inflation Expectations as Policy Tool



If loose monetary policy leads to higher π^e , what happens?

Medium-run Analysis

Now we look at a longer time horizon where prices had time to adjust.

Assume a constant money growth rate.

Assume that the economy eventually settles into a “**steady state**”

- ▶ steady state: equilibrium where all real, per capita variables are constant over time

M/P is constant over time (steady state)

Inflation equals money growth: $\pi = g(M)$

Medium-run Model

Assume constant money growth, $g(M)$

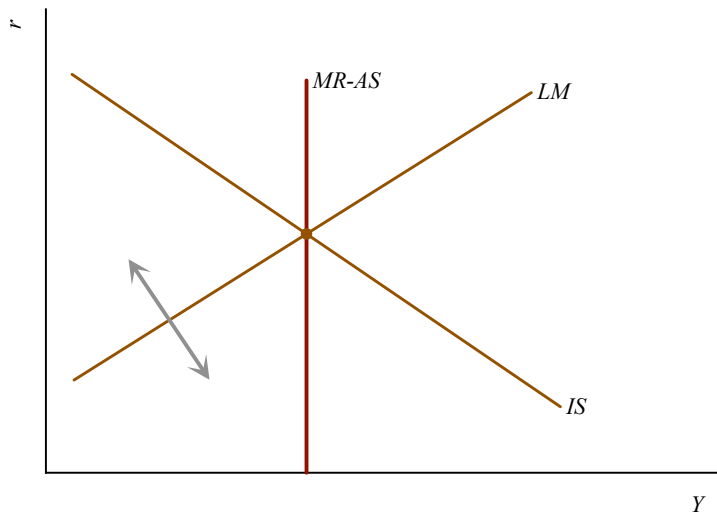
Inflation (expectations) adjust: $\pi^e = \pi$, $P = P^e$

Then we have:

1. IS: $Y = C(Y - T) + G + I(Y, r)$
2. LM: $M/P = Y \times L(r + \pi)$
3. AS: $Y = F\left(\frac{P}{P^e} \frac{1}{1+m}, z\right) = F\left(\frac{1}{1+m}, z\right)$
4. Constant M/P : $\pi = g(M)$

Endogenous: $Y, r, \pi, M/P$

Medium-run graph



M/P adjusts (shifting LM) to support the equilibrium r .

Medium-run Analysis

AS with $P^e = P$ fixes $Y = Y_n$:

$$F\left(\frac{1}{1+m}, z\right) = \mathbf{Y}_n \quad (5)$$

With $Y = Y_n$ IS determines r :

$$Y_n = C(Y_n - T) + G + I(Y_n, \mathbf{r}_n) \rightarrow r_n$$

LM only determines real money balances:

$$M/P = Y_n L(r_n + g(M))$$

Policy Analysis

Increase in money growth $g(M)$

Fiscal expansion $G \uparrow$

Medium-run Results

“Classical dichotomy”

- ▶ real variables are determined in the real sector
- ▶ nominal variables are determined by monetary policy

The **real** interest rate is independent of monetary policy.

Transition Short to Medium Run

Start from $Y = Y_n$ with $r = r_n$.

$g(M) \uparrow$ permanently.

Medium run:

- ▶ Real variables (Y, r) unchanged.
- ▶ Inflation rises.

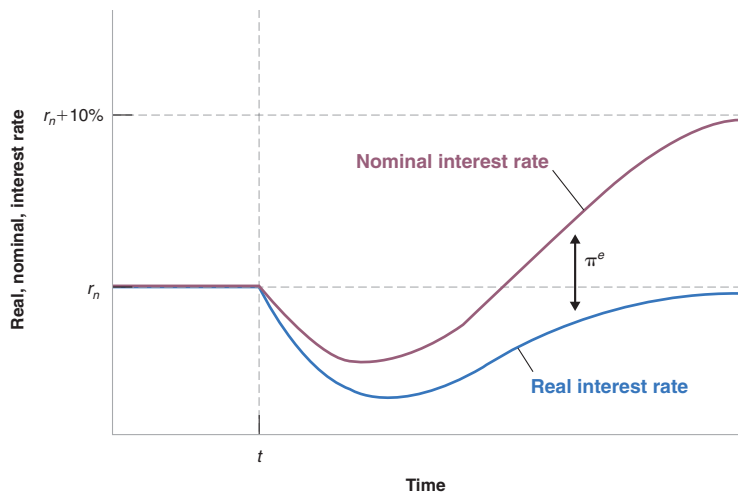
Short run:

- ▶ monetary expansion lowers i (LM shifts right) with fixed π^e : $r \downarrow$
- ▶ LM shifts right. $Y \uparrow$, $\pi \uparrow$

Transition:

- ▶ inflation expectations rise over time
- ▶ inflation erodes $M/P \implies i \uparrow \implies r \uparrow$
- ▶ This continues until $Y = Y_n$ and r returns to original level.

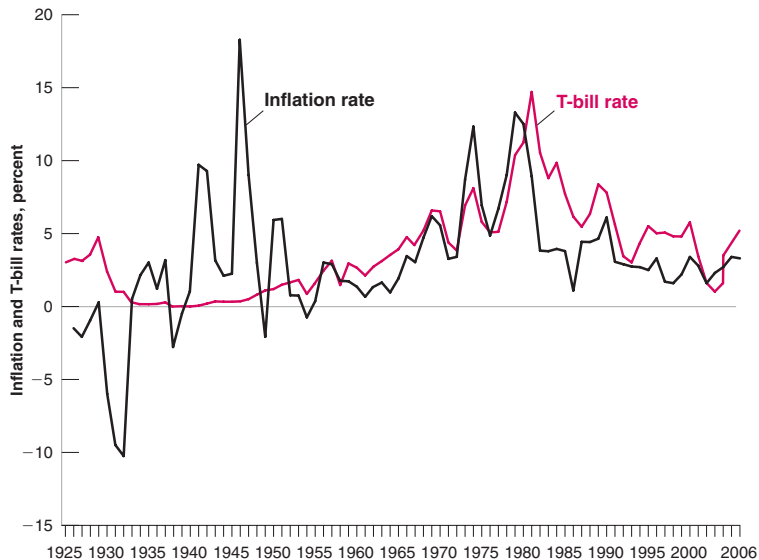
Permanent Increase in Money Growth



i initially falls, but eventually rises.

r initially falls, but eventually returns to r_n

Fisher Effect



Medium run:

Real interest rate is independent of money growth (inflation)

Conclusions

1. The Fed controls the long-run nominal interest rate but not the real interest rate
2. Fisher hypothesis: in the end, inflation just raises prices.
3. Inflation expectations are as important as interest rates.
This opens up an entirely new set of monetary policy tools.
“Forward guidance”

Questions for Review

1. Imagine the Fed could credibly commit to an inflation target of 2%.
 - 1.1 Would you expect to see a stable Phillips curve?
 - 1.2 Would this render the Fed very powerful?
2. Suppose you are the Fed chair at the tail end of the 1970s high inflation period. You want to bring inflation down without causing a big recession (a la 1981).
 - 2.1 What could you do?
 - 2.2 How could Congress help?
3. Why is NAIRU an important indicator for the Fed?

Reading

Blanchard and Johnson (2013), ch. 14

References I

Blanchard, O. and D. Johnson (2013): *Macroeconomics*, Boston: Pearson, 6th ed.