Inflation Expectations

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Objectives

What happens when monetary policy affects inflation expecations?

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

Spending decisions (C and I) depend on the **real** interest rate

But the Fed controls the **nominal** interest rate

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

The real rate may not move the way the Fed wants.

Nominal vs Real Interest rates

- **Nominal** interest rate:
  - the relative price of **money** at $t+1$ vs t
  - give up 1 dollar at t and receive $(1+i)$ dollars at $t+1$
- **Real** interest rate:
  - the relative price of **goods** at $t+1$ vs t
  - give up 1 unit of consumption at t and receive $(1+r)$ units at $t+1$

Real Interest Rate

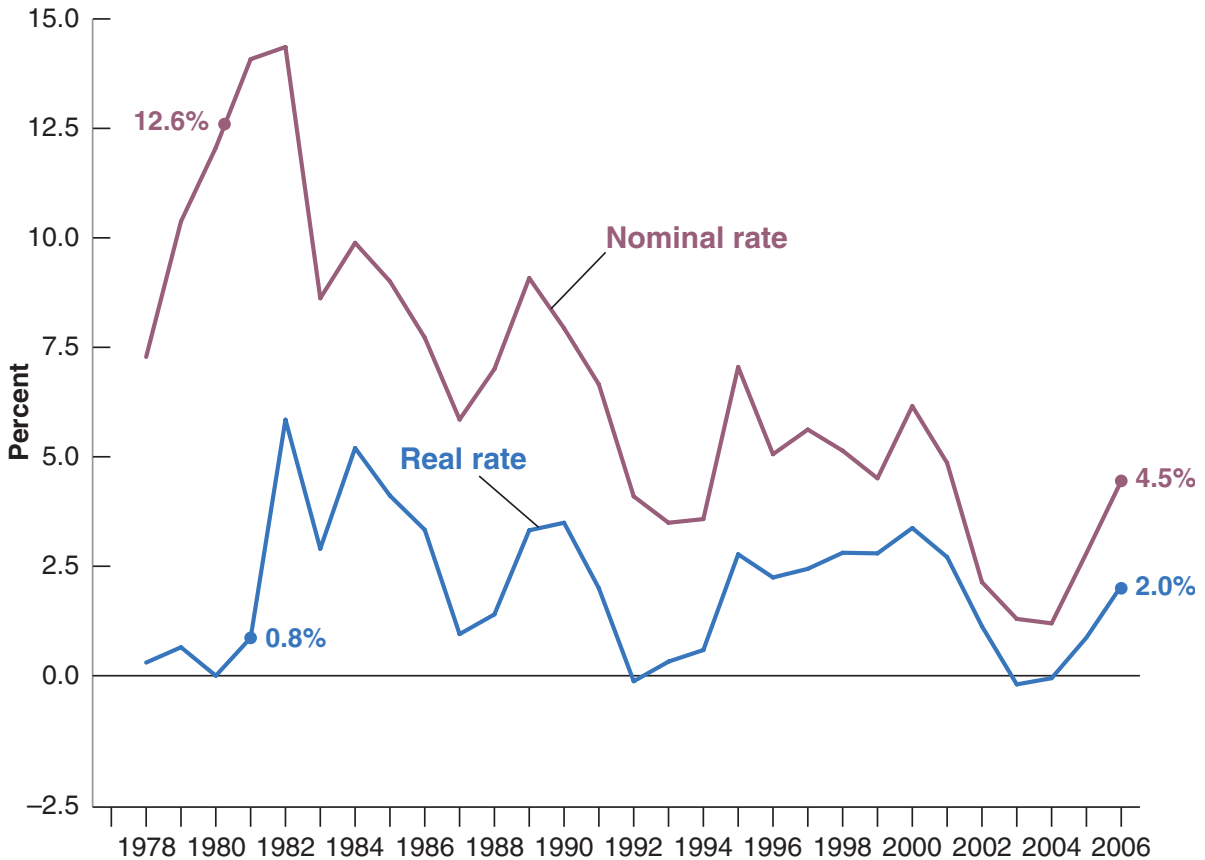
$$1 + r_t = (1 + i_t)P_t/P_{t+1} \tag{1}$$

or approximately

$$r_t = i_t - \pi_t \tag{2}$$

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

Nominal and Real Rates Can Diverge



1981: high nominal / 0 real interest rate

2006: low nominal / 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

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

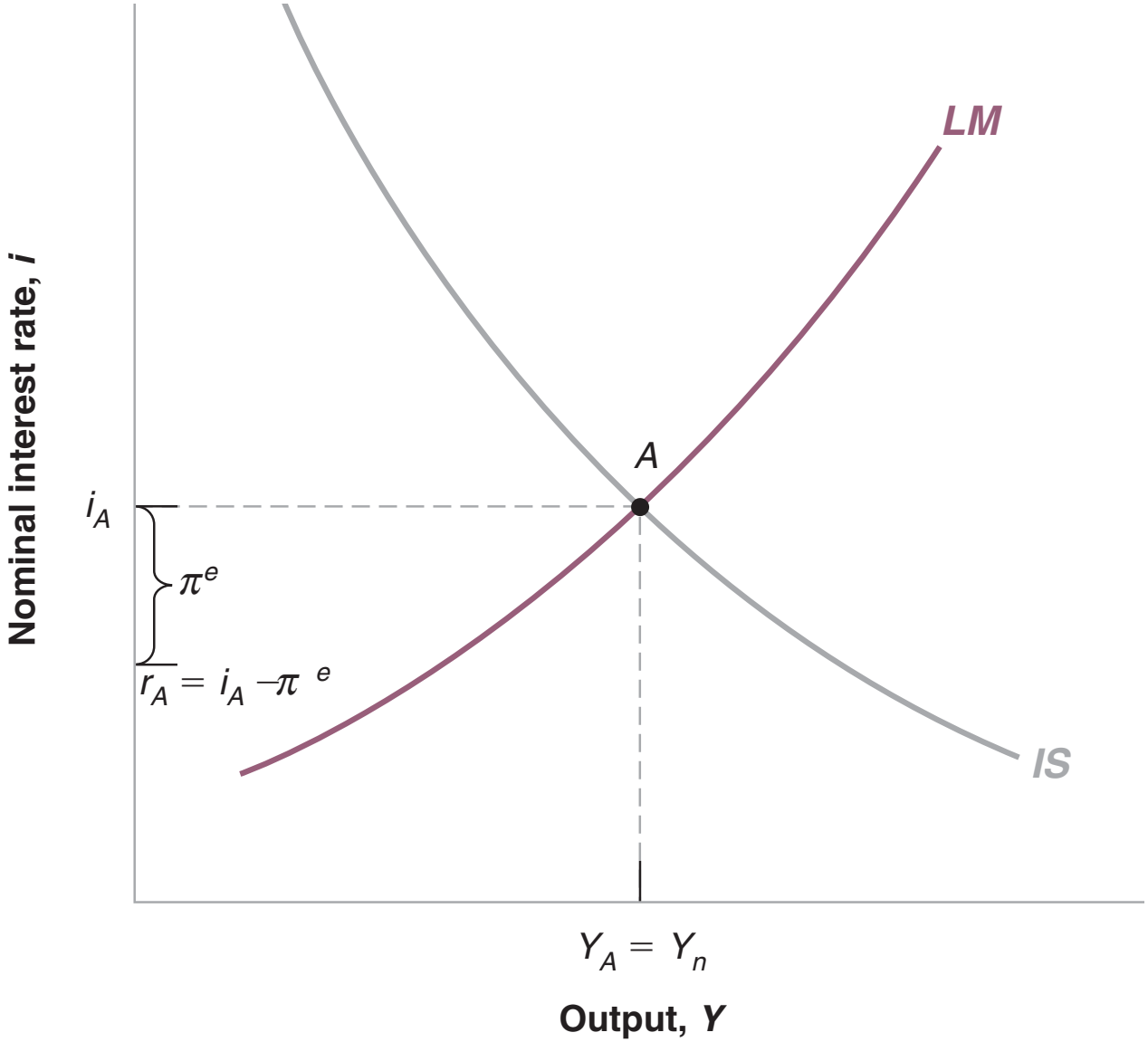
$$IS: Y = C(Y-T) + I(Y, i-\pi^e) + G \tag{3}$$

$$LM: M/P = YL(i) \tag{4}$$

Note:

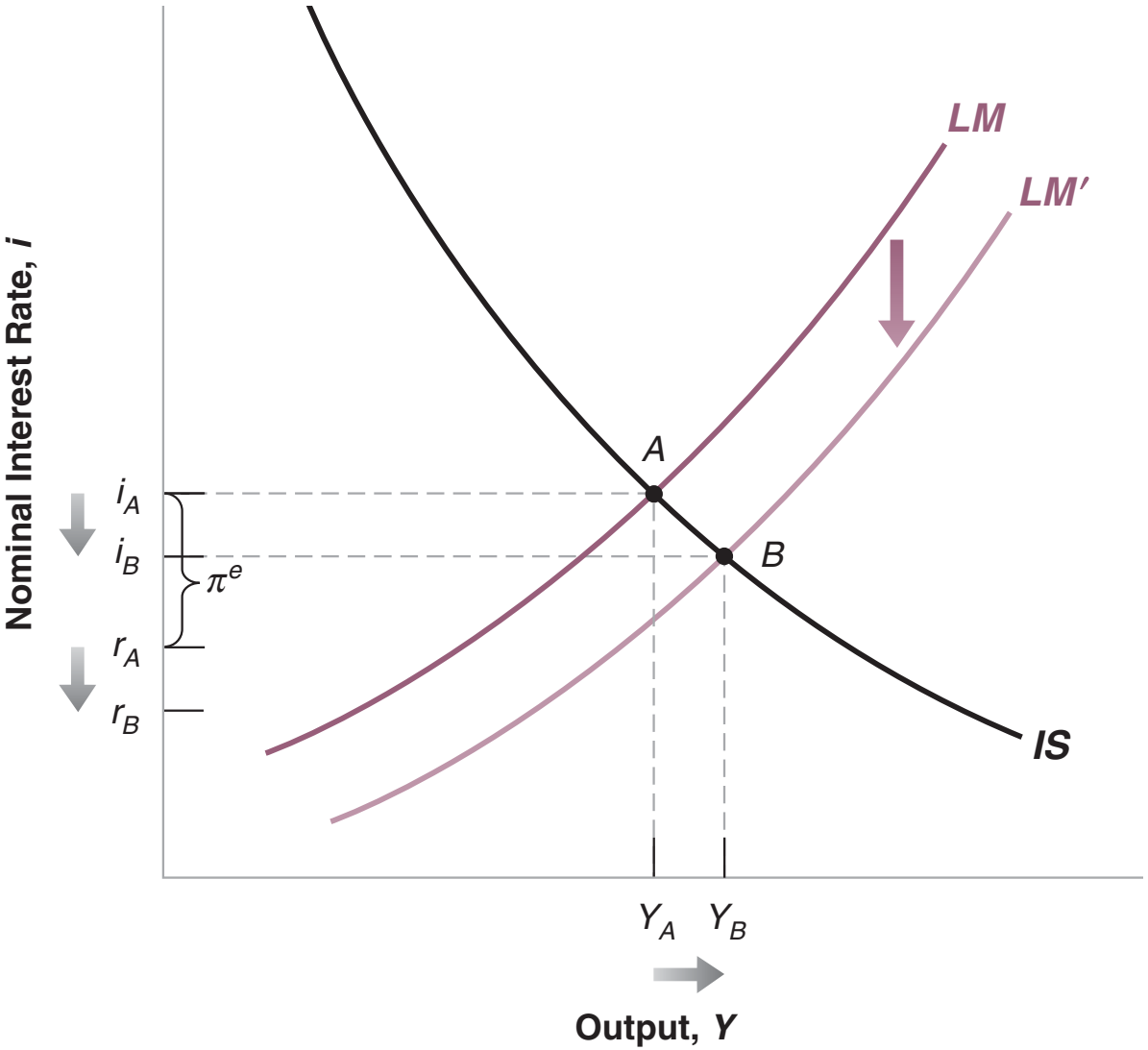
1. demand for goods depends on $r = i - \pi^e$
2. expected inflation matters, not realized inflation
3. money demand depends on i [why?]

IS/LM Model



Expected inflation now shifts IS

Short-run Analysis



Short run: take π^e as fixed.
Monetary policy works.

Faster money supply growth.
LM shifts out.
$Y \uparrow$

Medium-run Analysis

- Inflation (expectations) adjust: $\pi^e = \pi$, $P = P^e$
- Assume a constant money growth rate
- Inflation equals money growth: $\pi = g(M)$
  M/P is constant over time

Medium-run Model

1. correct expectations: $\pi = \pi^e$ and $P = P^e$
2. IS: $Y = C(Y - T) + G + I(Y, r)$
3. LM: $M/P = YL(r + \pi)$
4. AS: $Y = F\left(\frac{P}{P^e}\frac{1}{1+m,}z\right) = F\left(\frac{1}{1+m}, z\right)$
5. money growth determines inflation: $g(M) = \pi$

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

Medium-run Analysis

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

$$F\left(\frac{1}{1+m}, z\right) = Y_n \tag{5}$$

With $Y = Y_n$ IS determines r:

$$Y_n = C(Y_n - T) + G + I(Y_n, r_n) \rightarrow r_n$$

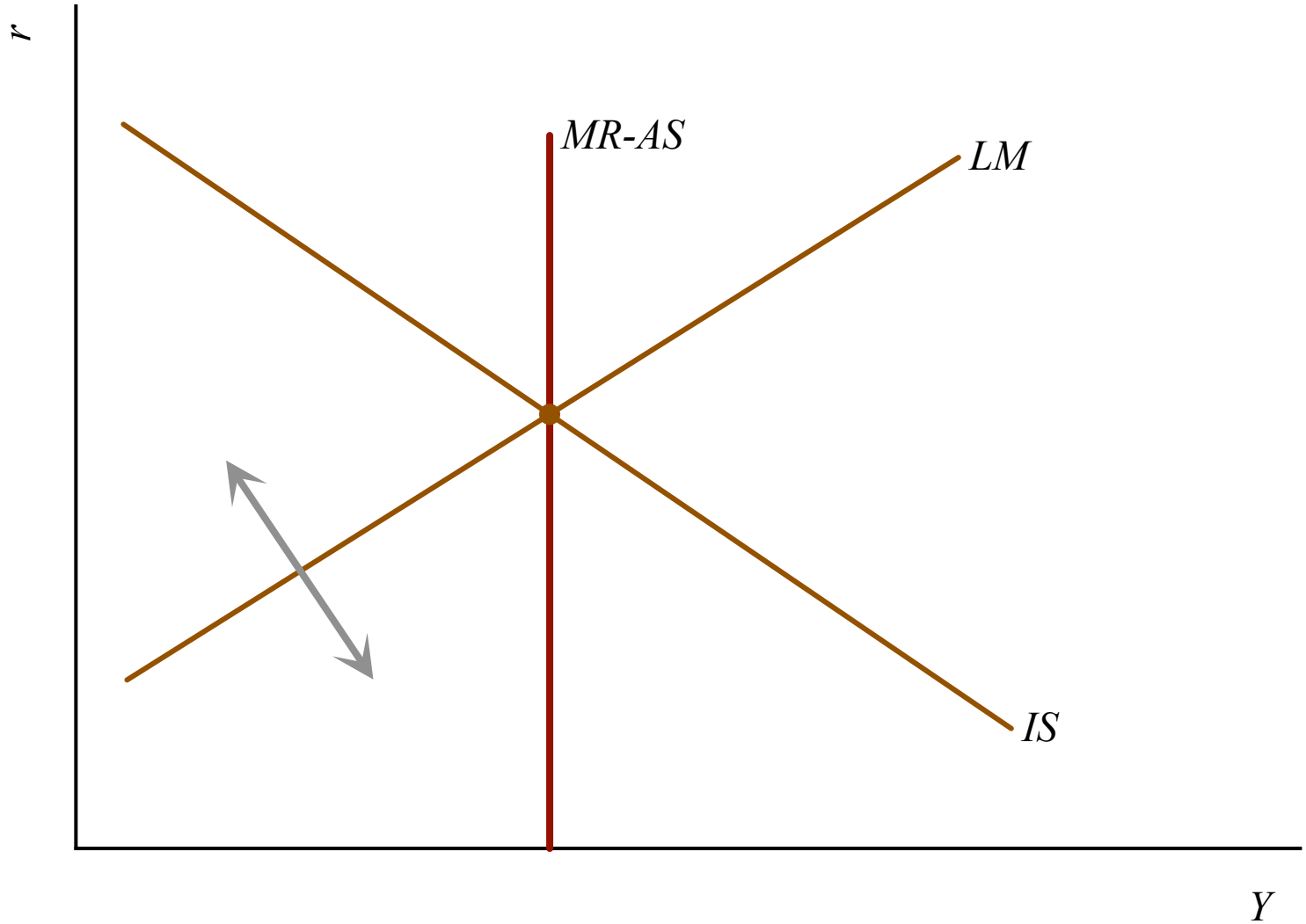
$\pi = g(M)$

$i = r_n + \pi = r_n + g(M)$

LM determines real money supply:

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

Medium-run graph



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

Fisher Hypothesis

Money is neutral and cannot affect M/P or Y

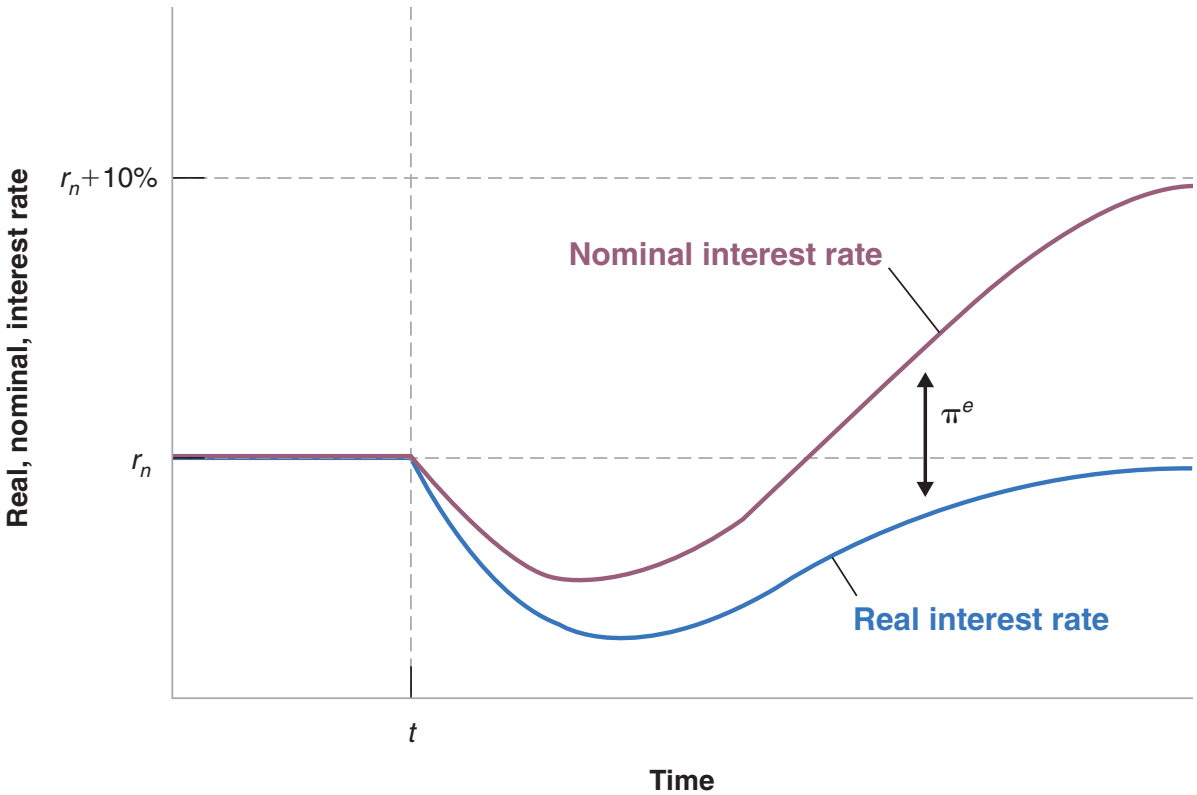
A 10% increase in money growth eventually leads to

- a 10% increase inflation
- a 10% increase in the nominal interest rate
- no change in the real interest rate

Transition Short to Medium Run

- Start from $Y = Y_n$ with $r = r_n$.
- $g(M) \uparrow$ permanently.
- Short run:
  - monetary expansion lowers i (LM shifts right)
  - with fixed π^e: $r \downarrow$
  - AD shifts right. $Y \uparrow$, $\pi \uparrow$
- Transition:
  - as long as $Y > Y_n$: π keeps rising
  - inflation erodes $M/P \implies i \uparrow \implies r \downarrow$
- This continues until $Y = Y_n$

Increase in Money Growth

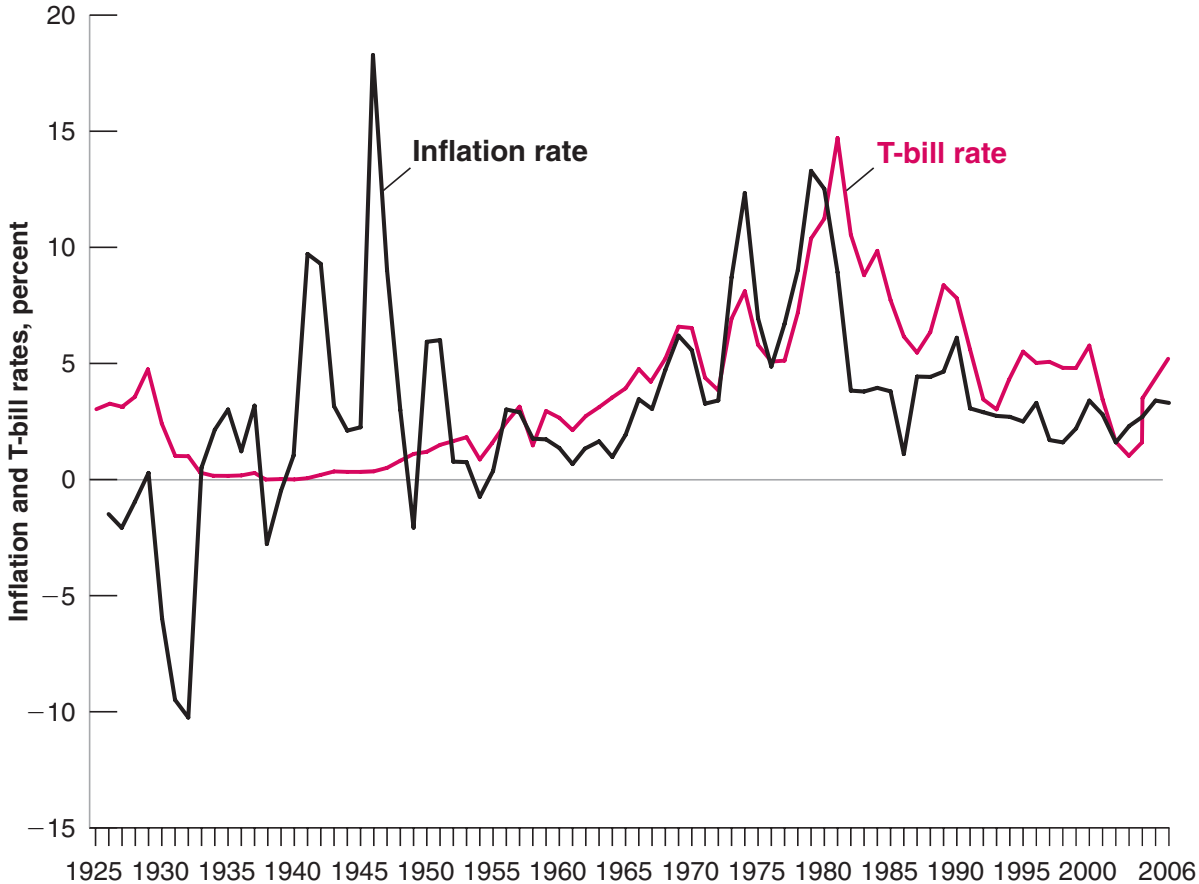


Permanent increase in money growth

i initially falls, but eventually rises

r initially falls, but eventually returns to r_n

Evidence



Short run: money growth reduces the real interest rate

Medium run: real interest rate is independent of money growth (inflation) (Fisher effect)

Reading

Blanchard and Johnson (2013), ch. 14

References I

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