
Unemployment rate (%)
28
24
20
16
12
8
4
1928
1930
1932
1934
1936
1938
1940
Keynes

Let's review our voyage to date:

We have analyzed:

- Measuring economic activity
- Aggregate production functions and distribution
- Classical AS and AD (flexible w and p)
- Financial macro (including money)
- Open-economy macro

We now move on to

- Business cycles, Keynesian economics, and the IS-LM model

What picture do you have in mind when you think of business cycles?

"Note that the pattern of cycles is irregular. No two business cycles are quite the same. No exact formula, such as might apply to the revolutions of the planets or of a pendulum, can be used to predict the duration and timing of business cycles. Rather, in their irregularities, business cycles more closely resemble the fluctuations of the weather." (Paul Samuelson)

Understanding business cycles

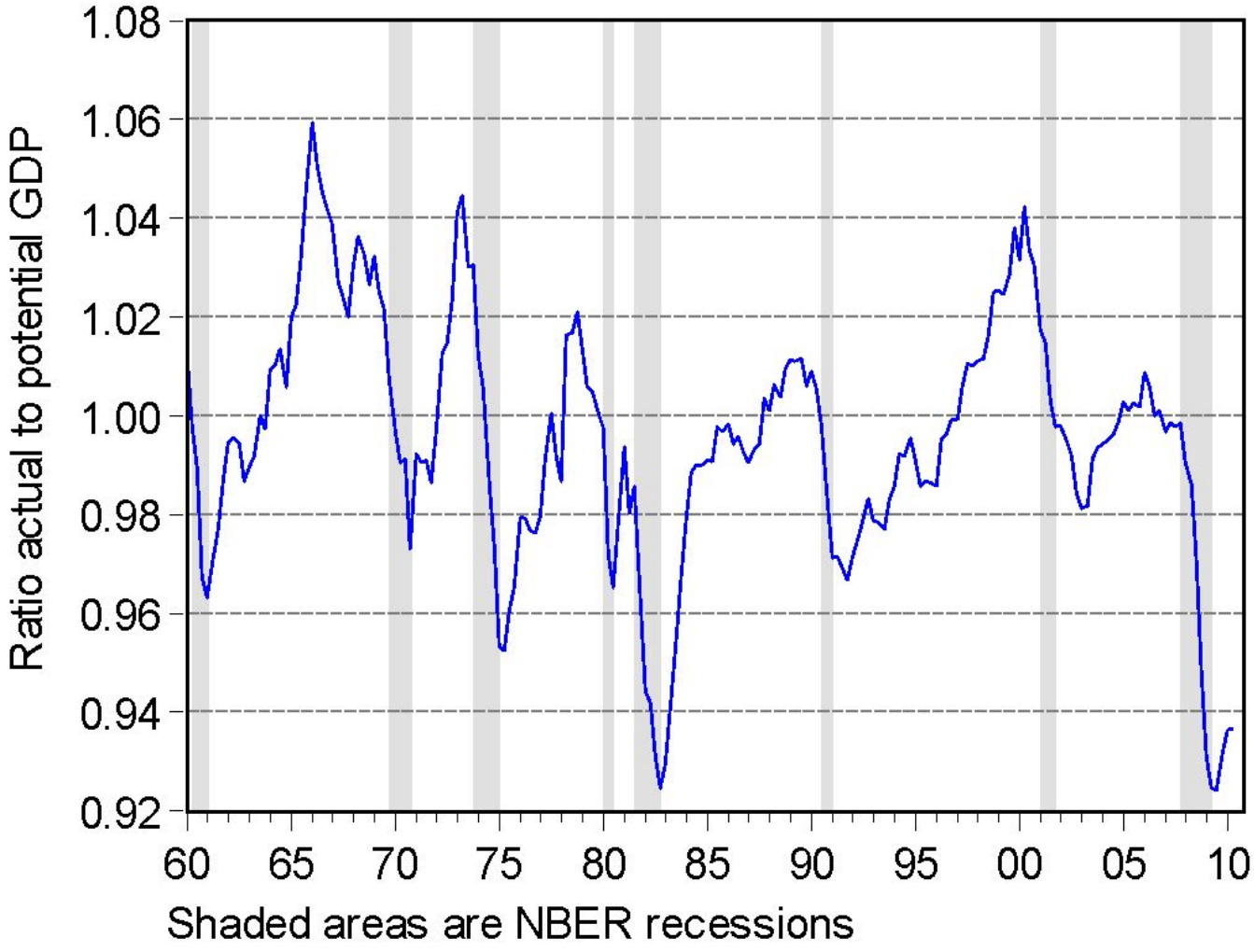
Major elements of cycles

- short-period (1-3 yr) erratic fluctuations in output
- pro-cyclical movements of employment, profits, prices
- counter-cyclical movements in unemployment
- appearance of "involuntary" unemployment in recessions

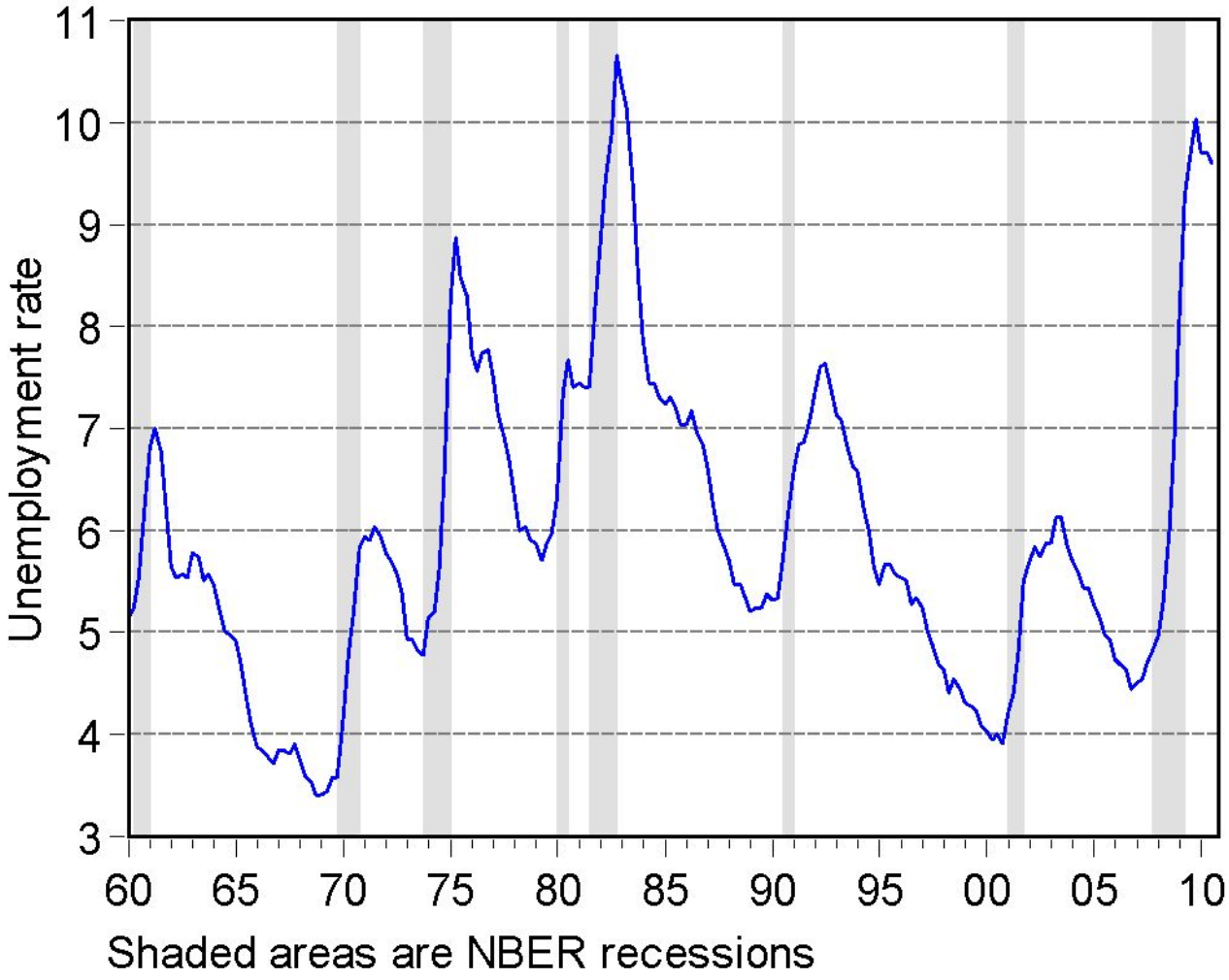
Historical trends

- lower volatility of output, inflation over time (until 2008)
- movement from stable prices to rising prices since WW II

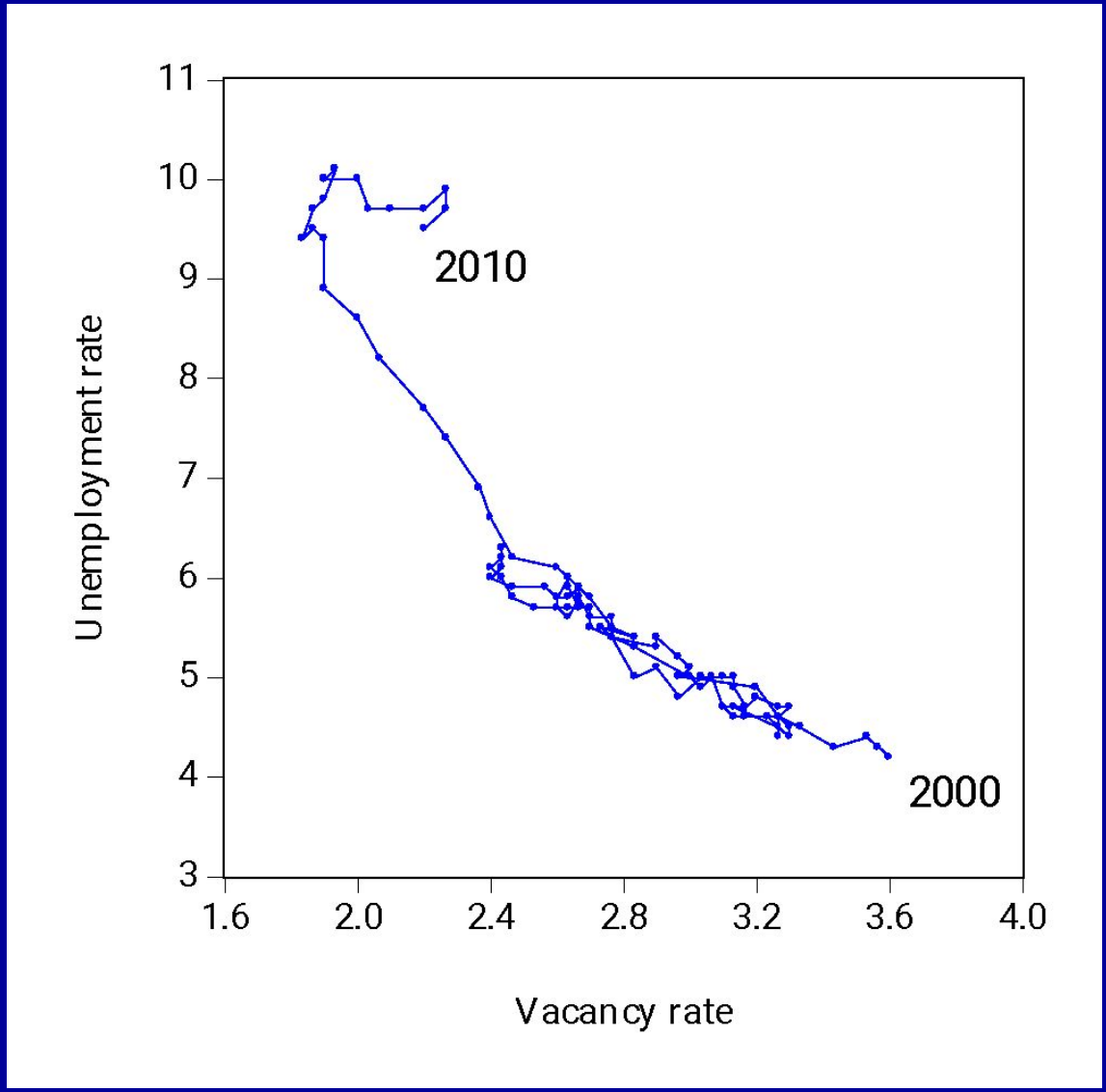
Output gap and recessions



Unemployment and recessions



Unemployment and vacancies (2000-2010)



So what's the big problem for economics?

Many economists worry that there are no firm "microeconomic foundations" for Keynesian business cycle theory.

What should we do?

- throw out the theory?
- live with this inadequacy?

Alternative Schools of Macroeconomics			
		Frictions in market institutions?	
		Market clearing and perfect competition	Market frictions: sticky prices and wages; imperfect competition
Frictions in indiv-idual decision making?	Rational consumers and profit maximizers		
	Bounded rationality, behavioral economics		

Alternative Schools of Macroeconomics

		Frictions in market institutions?	
		Market clearing and perfect competition	Market frictions: sticky prices and wages; imperfect competition
Frictions in individual decision making?	Ultra-rational	Classical model; Neoclassical growth; new classical macro; real business cycles	
	Bounded rationality		

This has been the approach up to now.

We now move to a different set of assumptions/observations

Alternative Schools of Macroeconomics			
		Frictions in market institutions?	
		Market clearing and perfect competition	Market frictions: sticky prices and wages; imperfect competition
Frictions in indiv-idual decision making?	Ultra-rational	Neoclassical (Solow, Arrow-Debreu); new classical macro; real business cycles	Neo-Keynesian (menu costs and contract theory); structuralism
	Bounded rationality	Original Keynes; monetarist?	Mainstream Keynesian

Major approaches to business cycles

Classical: market clearing: supply-side cycles with vertical AS curve:

- Real business cycles: major active classical species today

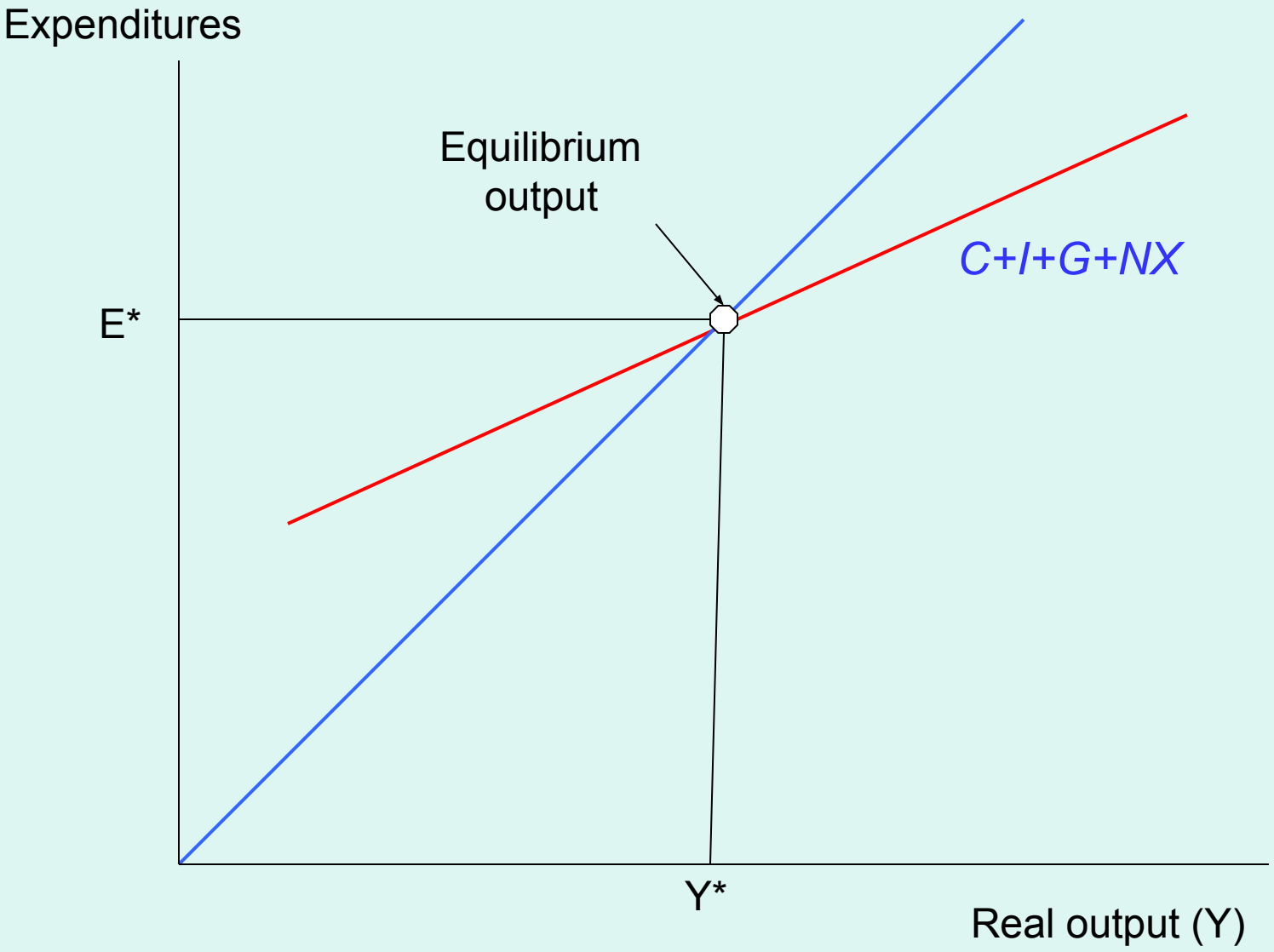
Keynesian and offshoots: non-market clearing with non-vertical AS

- Essential to have non-classical AS
- Fixed or sticky p and w
- AD shifts affect output and employment
- Underlying theory incompletely understook – active area of research

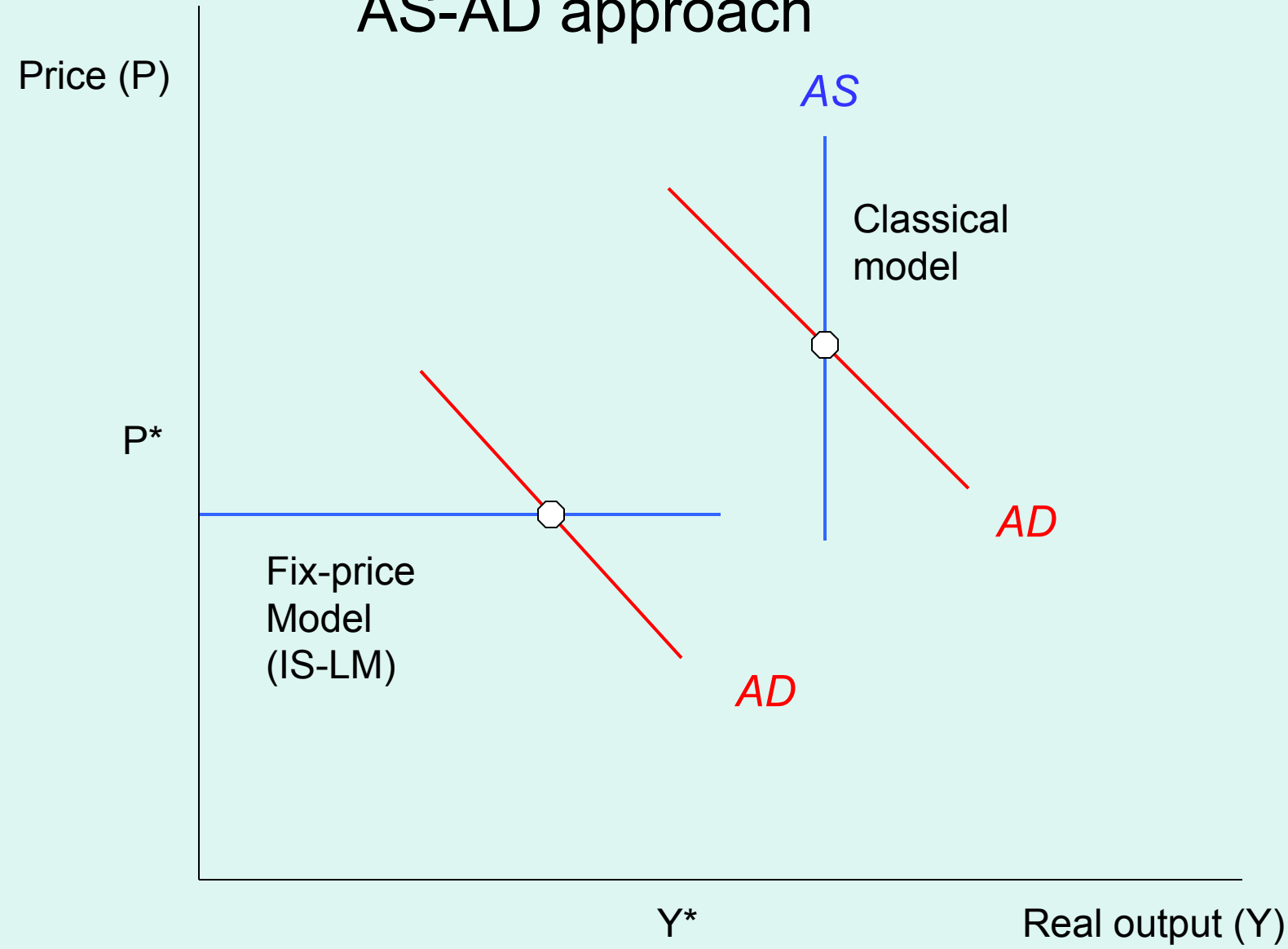
Basic models in Keynesian approach

- "Keynesian cross" (Econ 116)
- AS-AD (Econ 116)
- IS-LM (Econ 122)
- Mankiw's dynamic model (later)
- Open-economy in short run: Mundell-Fleming (later in course)

Keynesian Cross Diagram:
Output where planned expenditure equals output



AS-AD approach



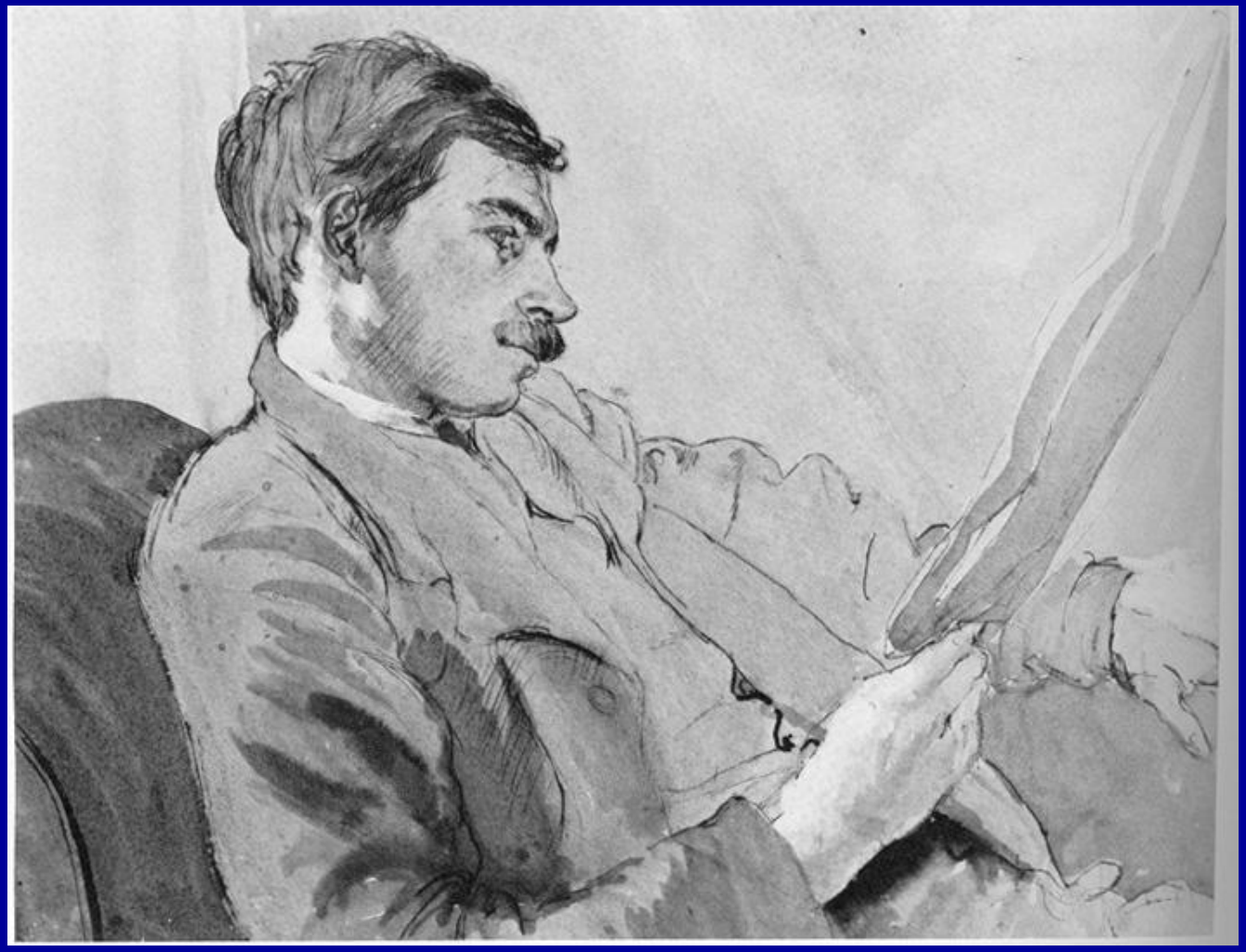
IS-LM model

The major tool for showing the impact of monetary and fiscal polices, along with the effect of various shocks, in a short-run Keynesian situation.

Key assumptions

- Fixed prices (P=1)
- Unemployed resources (Y < potential Y = Mankiw's natural Y)
- Closed economy (not essential and will be considered later)

The Founder of Macroeconomics



Gwendolen Darwin Raverat

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Keynes on Why macroeconomics is difficult
or
Why the models are so confusing!

Professor Planck, of Berlin, the famous originator of the Quantum Theory, once remarked to me that in early life he had thought of studying economics, but had found it too difficult! Professor Planck could easily master the whole corpus of mathematical economics in a few days. But the amalgam of logic and intuition and the wide knowledge of facts, most of which are not precise, which is required for economic interpretation in its highest form is, quite truly, overwhelmingly difficult.

("Biography of Marshall," Economic Journal, 1924)

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UNOFFICIAL ECONOMIC ADVISER TO GREAT BRITAIN: John Maynard Keynes in His Study in Bloomsbury

MR. KEYNES HAS A PLAN

Where are we?

We are now attempting to understand the basic features of business cycles.

Aggregate supply (AS) in this model is real simple: a horizontal AS curve with p=1.

AD relies on the IS-LM model, which is a very simple two-market model of the determinants of AD.

The two markets are

- goods (IS)
- financial (LM)

IS curve (expenditures)

Basic idea: describes equilibrium in goods market

Finds Y where planned I = planned S or planned expenditure = planned output

Basic set of equations:

1. $Y = C + I + G$
2. $C = a + b(Y-T)$
3. $T = T_0 + \tau Y$ [note assume income tax, τ = marginal tax rate]
4. $I = I_0 - dr$ [note i = r because fixed P]
5. $G = G_0$

which gives the IS curve:

$$Y = \frac{a - bT_0 + G_0 + I_0 - dr}{1 - b(1- \tau)}$$

$$Y = \mu [A_0 - dr]$$

where

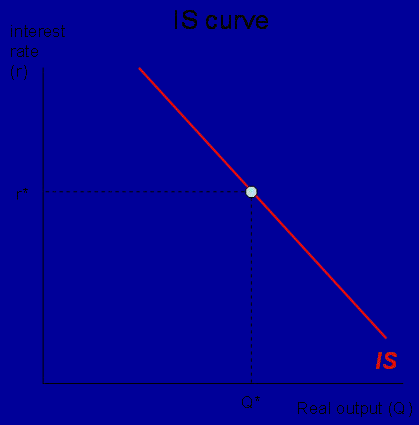
A_0 = autonomous spending = $a - bT_0 + G_0 + I_0$

μ = multiplier = $1/[(1 - b(1- \tau)]$

or in terms of solving for the interest rate:

$r = (A_0 - Y/\mu) / d$

which we graph as the IS curve.



LM curve (financial markets)

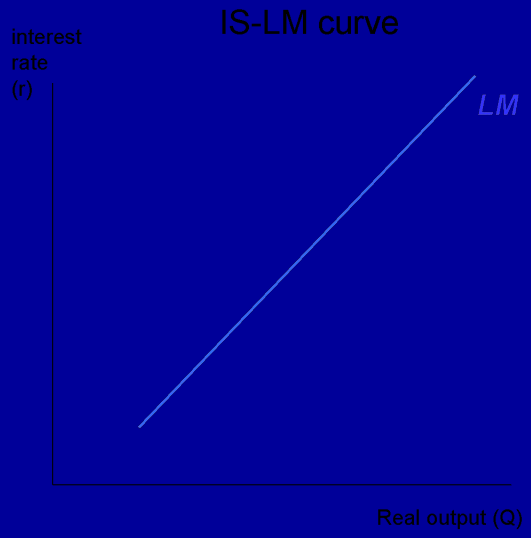
- The LM curve represents equilibrium in financial markets, or where the supply and demand for money are equilibrated.
- Ms determined by the central bank

  $M^s = M_0$
- Standard interest-elastic demand for money:*

  $M^d = L(i, Y) = kY - hi$
- Equilibrium in the money market is $M^d = M^s$
- This leads to LM curve:

  $i = (kY - M_0)/h$
- Not the best way to understand financial markets;

will consider alternative approach later.



* Note that interest rate is nominal rate here to reflect the difference between the interest rate on bonds and that on money.

Summary of IS-LM

1. $Y \equiv C + I + G$
2. $C = a + b(Y-T)$
3. $T = T_0 + \tau Y$
4. $I = I_0 - dr$
5. $G = G_0$
6. $M^s = M_0$
7. $M^d = L(i, Y) = kY - hi = kY - hr$ [r = i because zero inflation]

All this yields

$$Y^* = \frac{h\mu}{d\mu k + h} A_0 + \frac{d\mu}{d\mu k + h} M_0$$

where

A_0 = autonomous spending = $a - bT_0 + G_0 + I_0$

μ = expenditure multiplier at constant r = $1/[(1 - b(1- \tau)]$

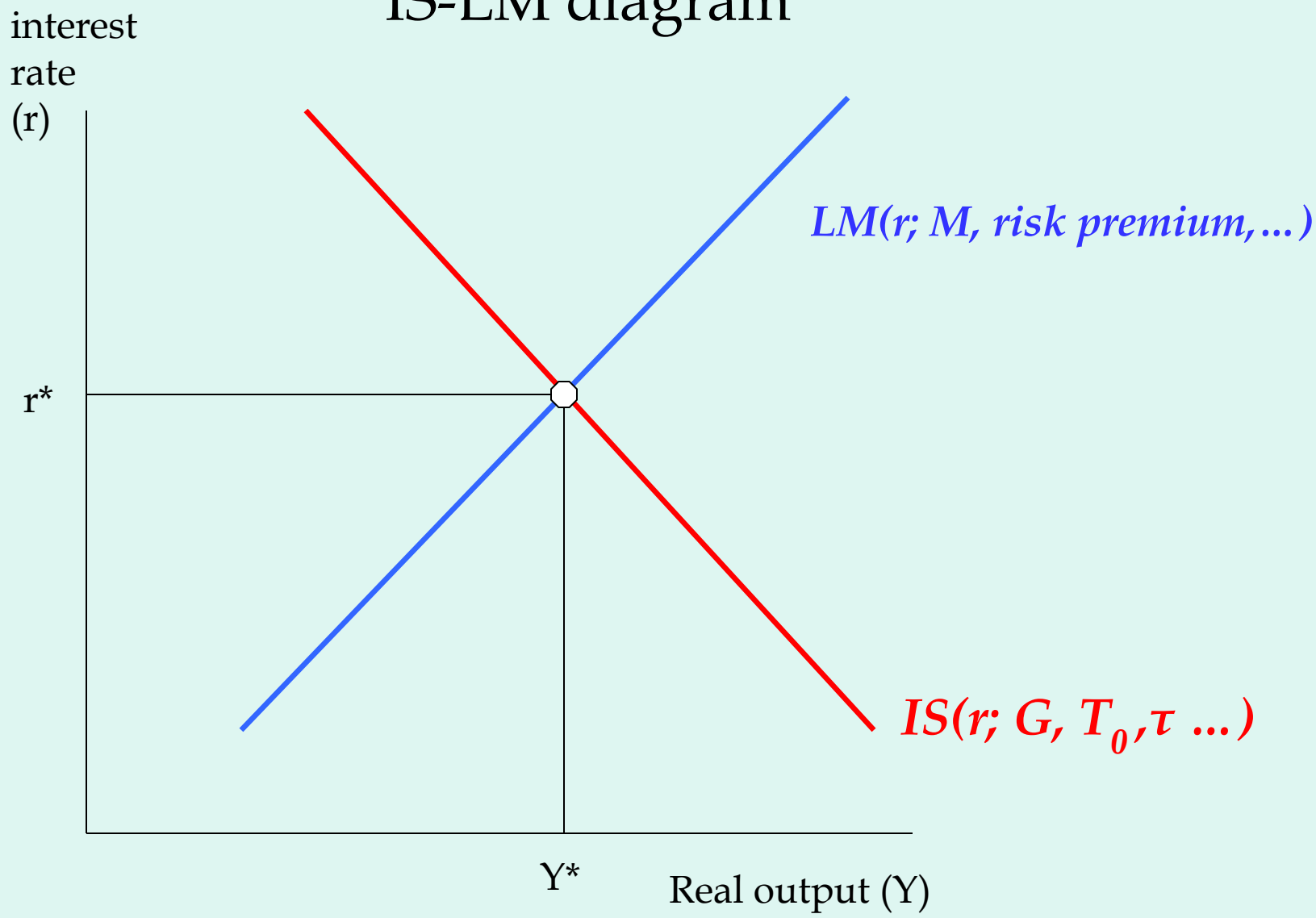
Overall Macroeconomic Equilibrium

- We now are looking for equilibrium of both markets. That is, when both goods market and money market are in equilibrium.
- Closed economy and zero inflation (so i=r)
- This is the solution or intersection of IS and LM.

$$Y^* = \frac{h\mu}{d\mu k + h} A_0 + \frac{d\mu}{d\mu k + h} M_0$$

- Impact of fiscal and monetary policy function of the different parameters. Easiest to understand using the IS-LM diagram.

IS-LM diagram



SOME BASICS OF THE IS-LM MODEL

- Have two major kinds of shocks in business cycles:
  - IS: investment, consumption, foreign trade, …
  - LM: financial markets, monetary policy, exchange rates,…

- Because of monetary reaction, expenditure multiplier is almost surely less than standard Keynesian multiplier due to crowding out.
  - Proof: IS-LM multiplier = $\mu/[d\mu k/h + 1] < \mu$ = simplest multiplier

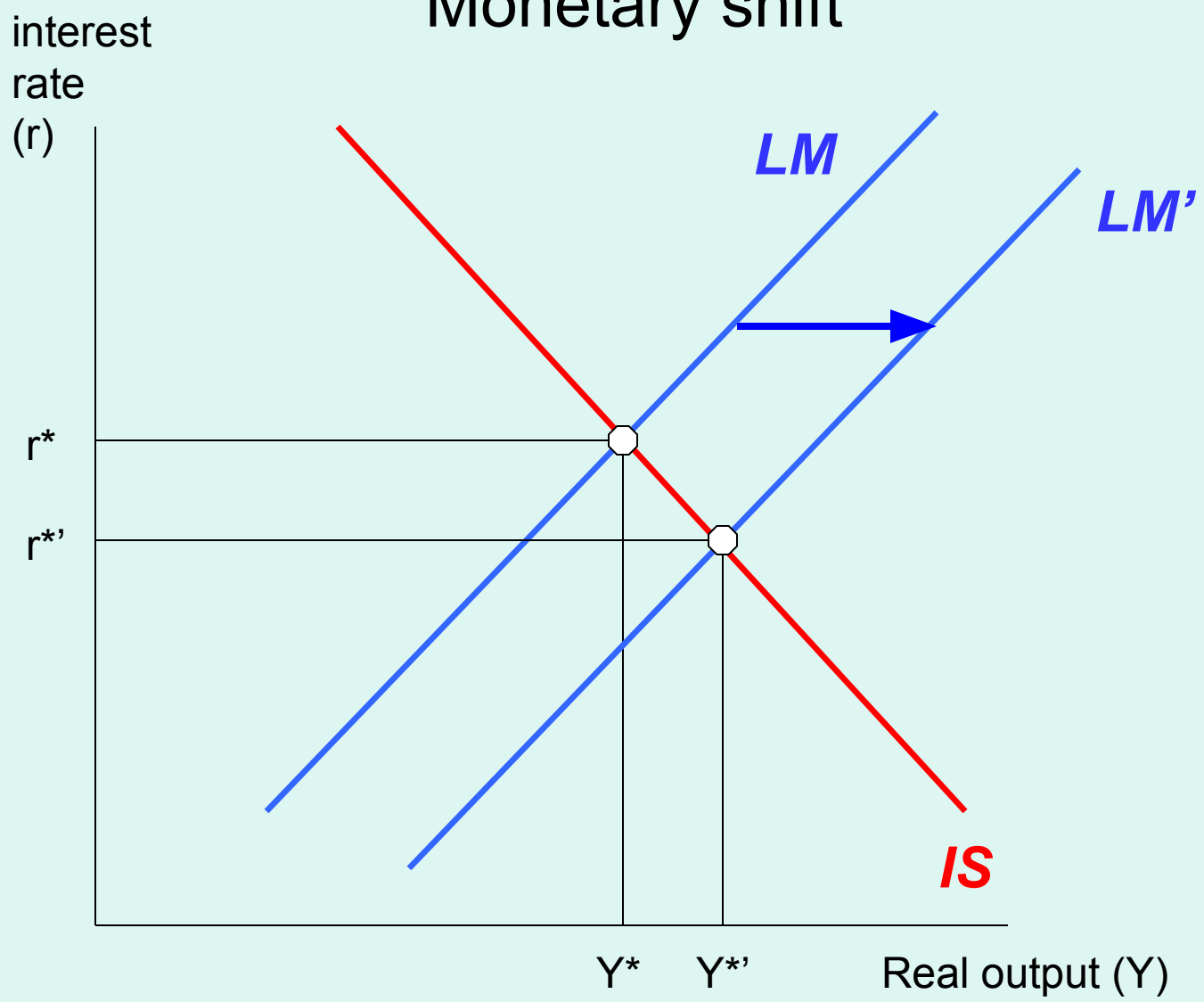
- Can usually diagnose shock by the relative movements of output and interest rates (compare Vietnam War and 1979-82 on next slide)

Now several interesting cases

Case 1. A change in monetary policy

Note: by a monetary policy, we here mean a change in the money supply (such as an open market operation), leading to a shift in the LM curve.

Monetary shift



More on financial issues…

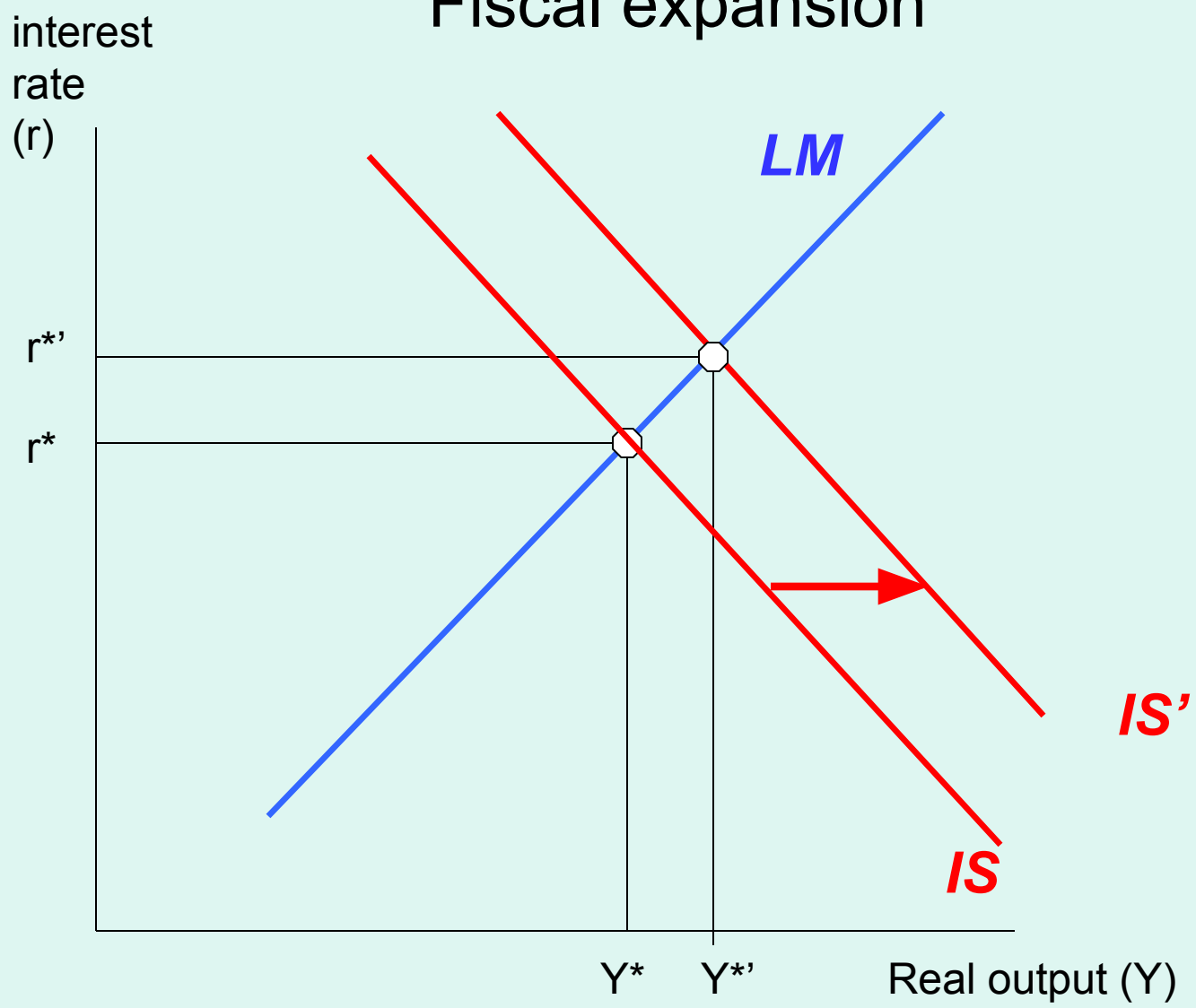
Case 1A. A monetary crisis that increases risk premiums

- This important case will be covered next time when we do the Great Depression (and today's Great Recession).

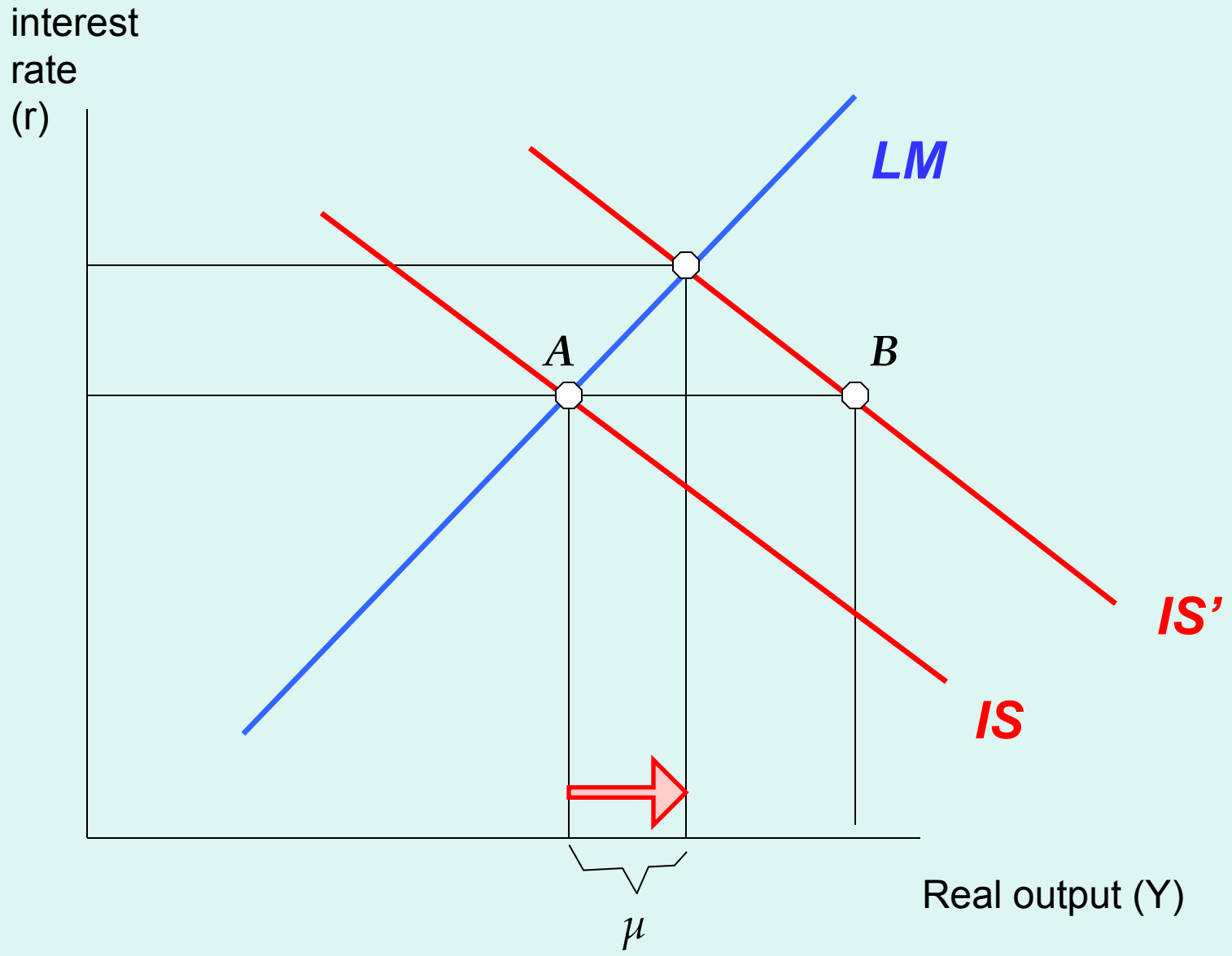
Case 2. What are the effects of fiscal policy?

A fiscal policy shift is change in purchases (G) or in taxes (T), holding LM curve constant. See Figure.

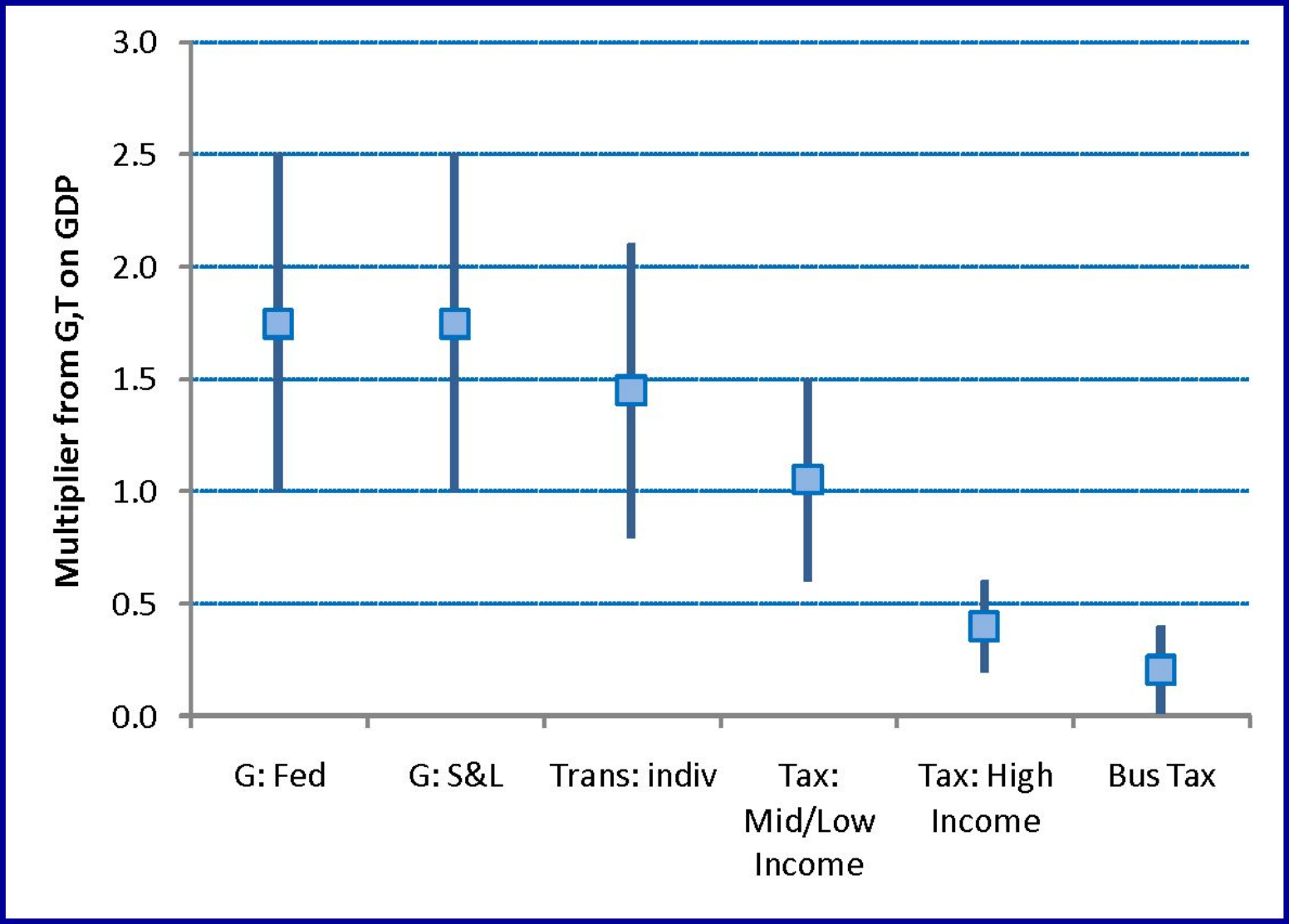
Fiscal expansion



What is the multiplier?



Multiplier Estimates by the CBO

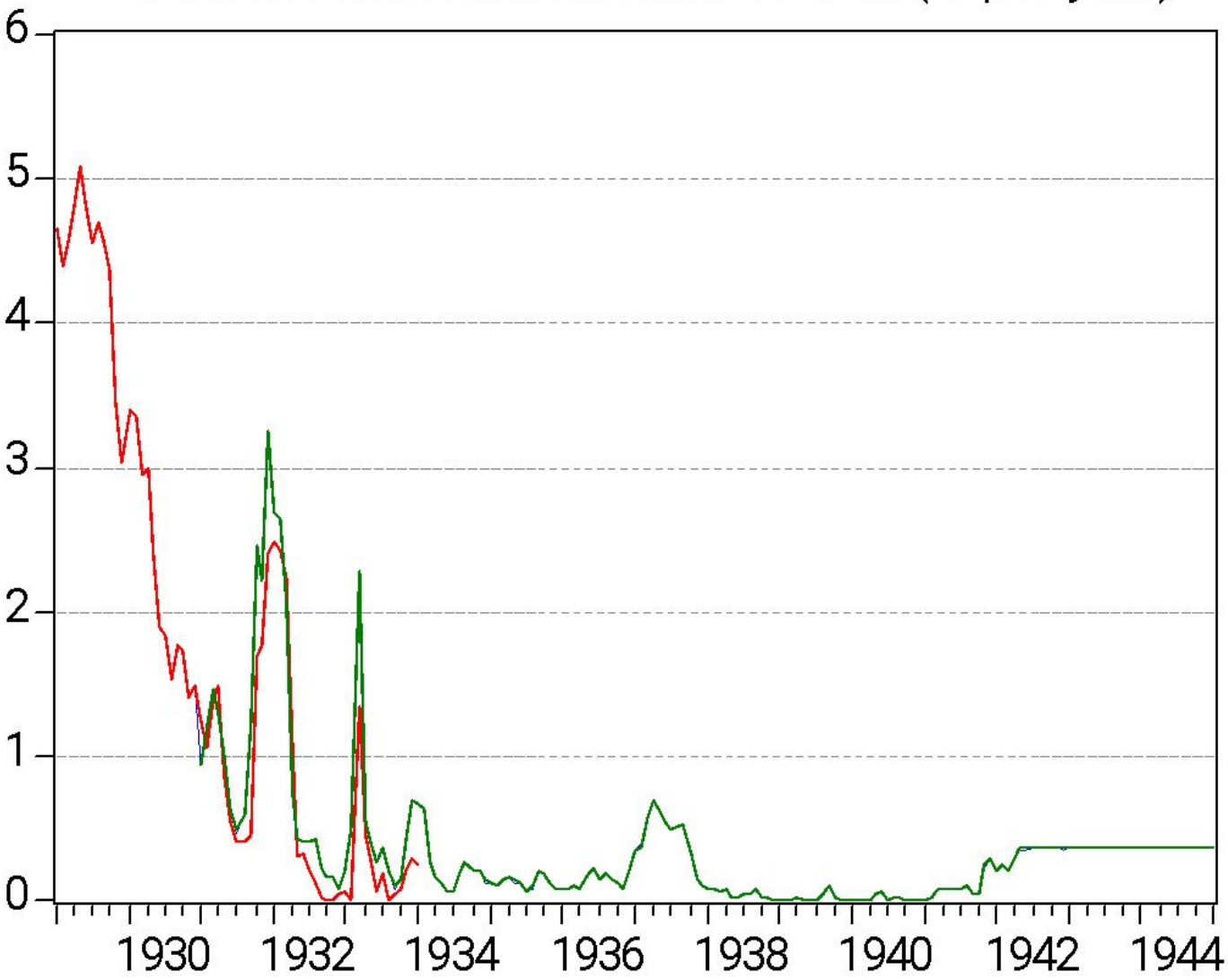


Congressional Budget Office, *Estimated Impact of the ARRA,* April 2010

Case 2b. The liquidity trap.

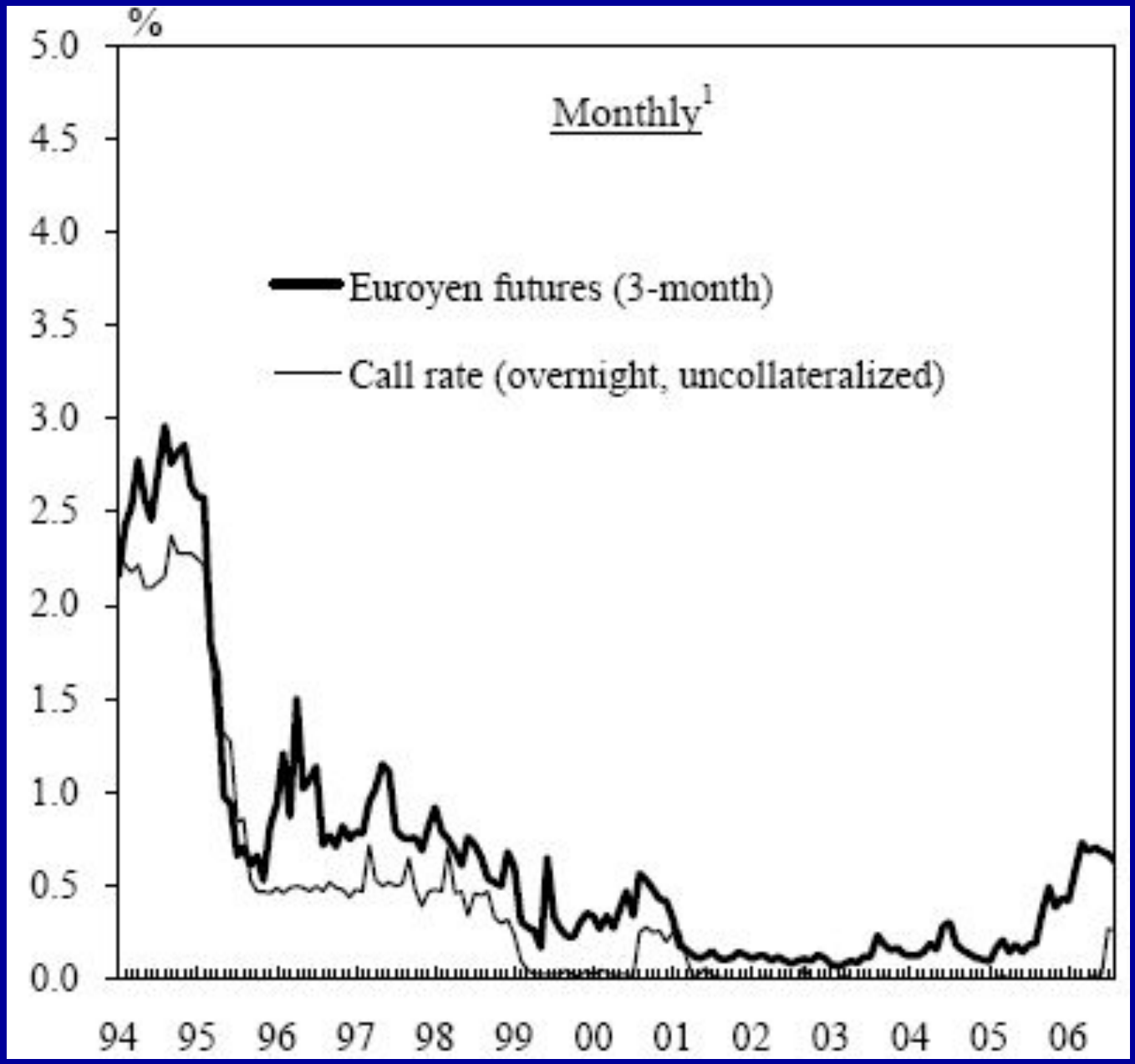
Today, this is taken to be where nominal interest rate is zero.

- The US in the mid-1930s
- Japan over last decade
- US in 2009-2010



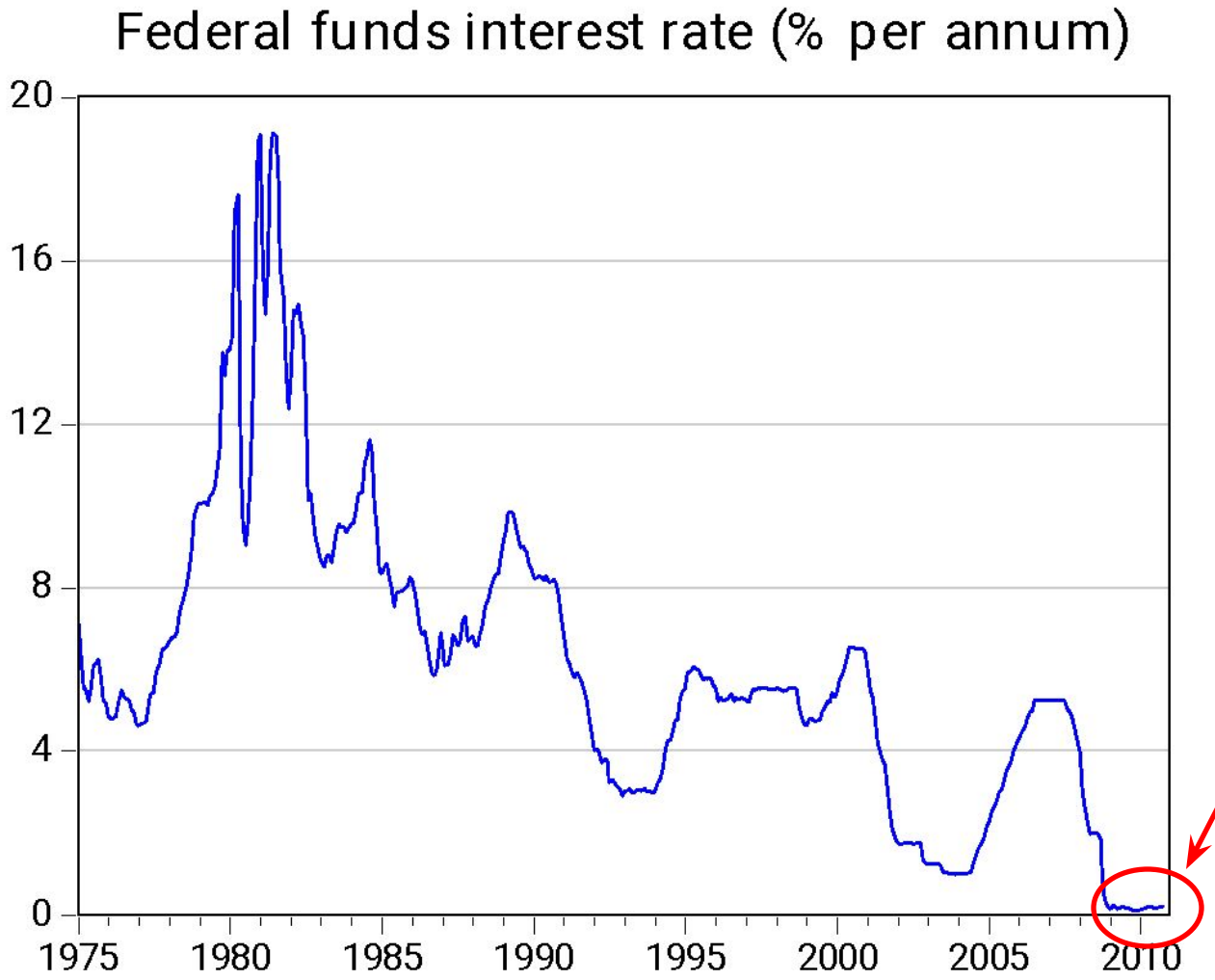
Liquidity trap in US in Great Depression

Japan short-term interest rates, 1994-2006



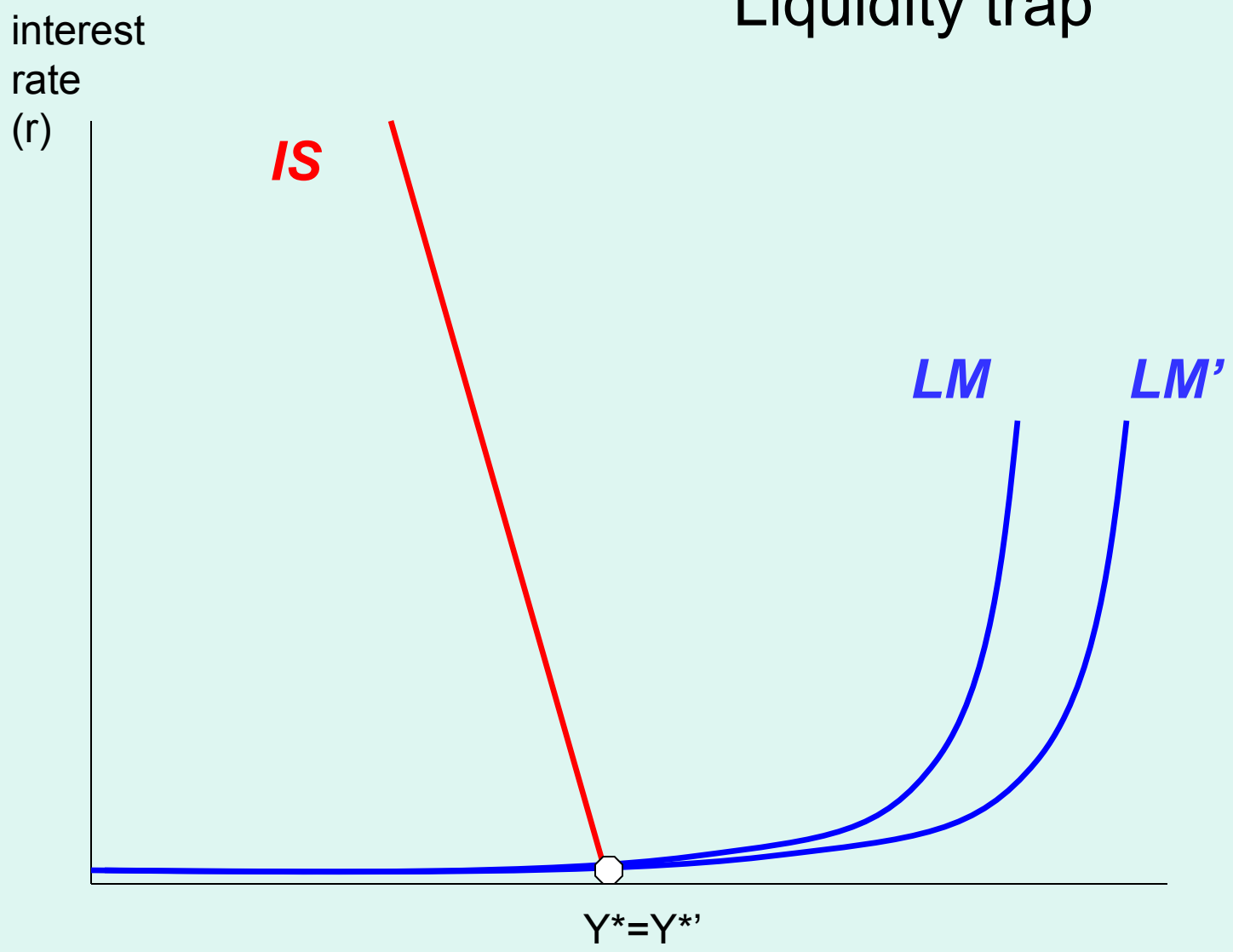
Liquidity trap from 1999 to early 2006

US today



Policy has hit the "zero lower bound" this year.

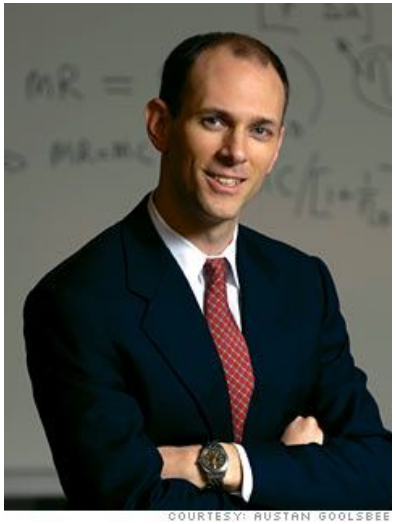
Liquidity trap



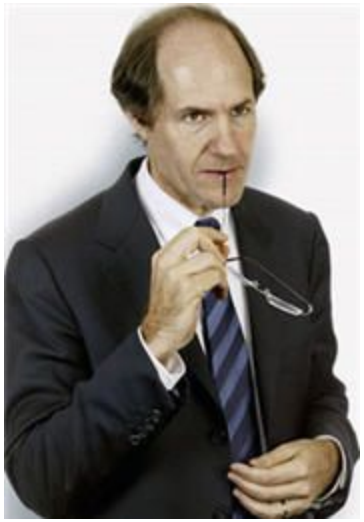
Heavy hitters in the Obama administration

Outgoing CEA head
Christina Romer

Economics czar
Larry Summers



New CEA head
Austan Goolsbee



Regulation: Cass Sunstein

Departed budget: Peter Orszag

Can you see why macroeconomists emphasize the importance of fiscal policy in the current environment?

"Our policy approach started with a major commitment to fiscal stimulus. Economists in recent years have become skeptical about discretionary fiscal policy and have regarded monetary policy as a better tool for short-term stabilization. Our judgment, however, was that in a liquidity trap-type scenario of zero interest rates, a dysfunctional financial system, and expectations of protracted contraction, the results of monetary policy were highly uncertain whereas fiscal policy was likely to be potent."

Lawrence Summers, July 19, 2009

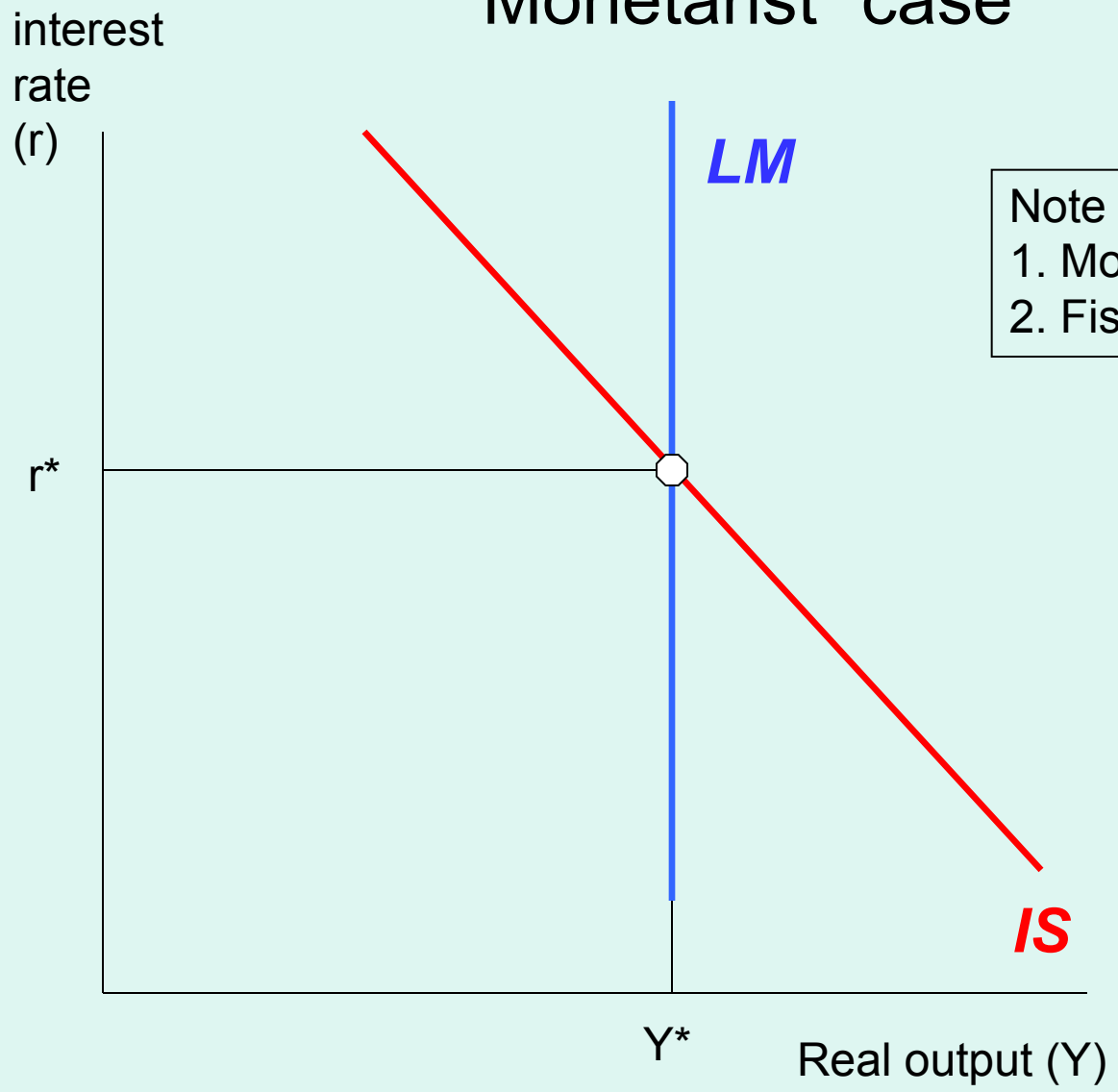
Case 3. Monetarism

- The monetarist regime: "Only money matters for output determination." (Milton Friedman).

- We can go back to quantity theory of money and prices:
  $PY = VM$

- In monetarism view, velocity is constant . This would lead to a *vertical LM curve:*
  $M^d = kY - 0i$
- Hence, equilibrating supply and demand for M yields:
  $Y = M^s/k$

“Monetarist” case

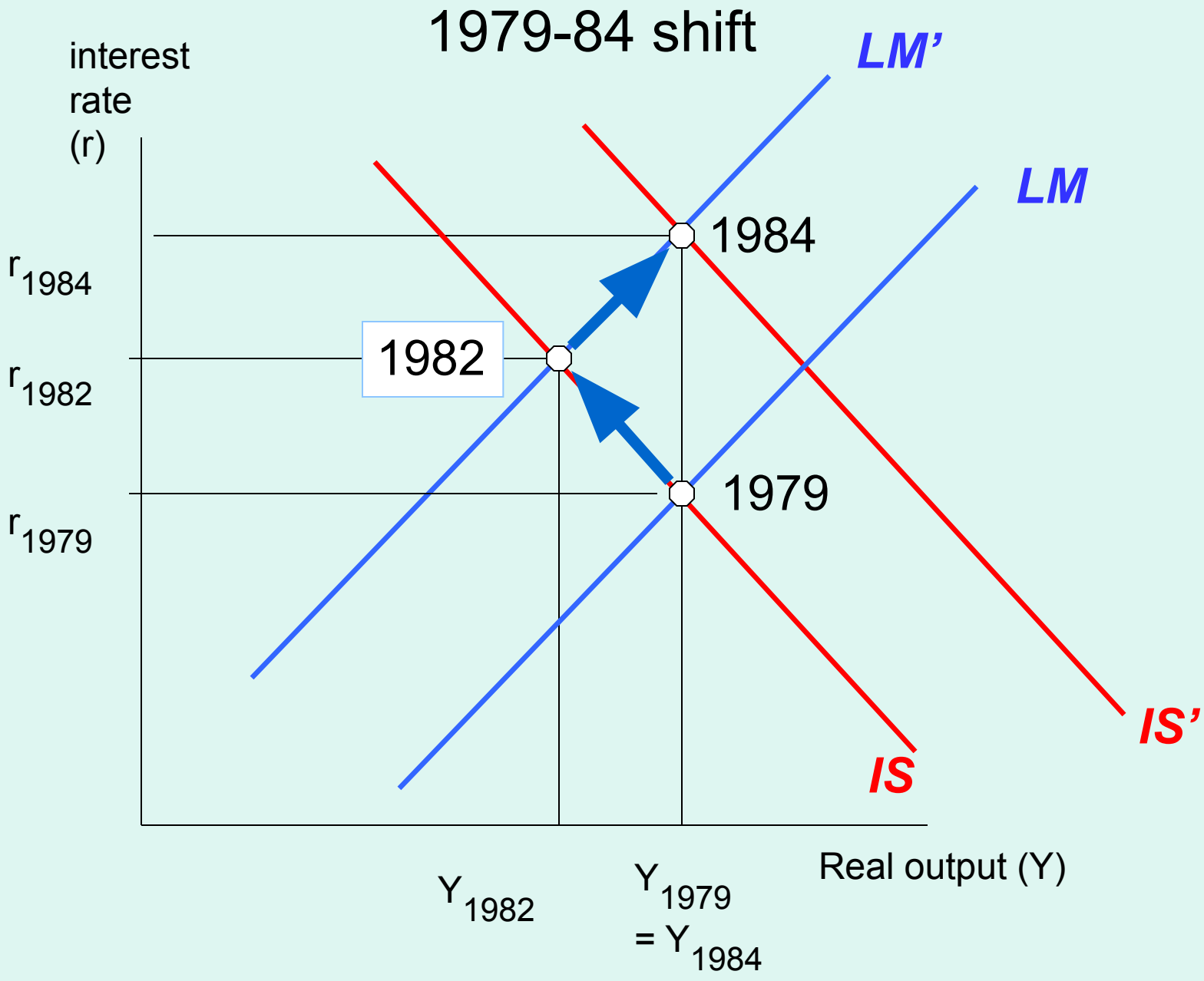


Note impacts of:
1. Monetary policy
2. Fiscal policy

Important historical cases

Case 4. Changing the fiscal-monetary mix to stimulate or depress investment

- A depressing example of tight money and loose fiscal
  - New Fed chairman Volcker moved to tighten money and wring inflation out of economy (1979 on)
  - New President Reagan launched supply-side tax policies, military buildup, leading to high deficits (1981 on)
  - How did this affect fiscal-monetary mix


1979-84 shift
interest rate (r)
LM'
LM
1984
1982
1979
r_{1984}
r_{1982}
r_{1979}
IS'
IS
Real output (Y)
Y_{1982}
Y_{1979} = Y_{1984}

Important historical cases

Pro-growth policies

- The opposite would be to tighten fiscal policies and loosen monetary policies.
- Make sure you understand how this would increase investment and increase the growth in potential output.

Summary on IS-LM Model

This is the workhorse model for analyzing short-run impacts of monetary and fiscal policy

Key assumptions:

- Fixed or rigid prices
- Unemployed resources

Now on to analysis of Great Depression in IS-LM framework.