

MACROECONOMICS

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PowerPoint® Slides by Ron Cronovich

SEVENTH EDITION

CHAPTER 11

Aggregate Demand II: Applying the *IS-LM* Model

In this chapter, you will learn:

- how to use the *IS-LM* model to analyze the effects of shocks, fiscal policy, and monetary policy
- how to derive the aggregate demand curve from the *IS-LM* model
- several theories about what caused the Great Depression

Equilibrium in the *IS-LM* model

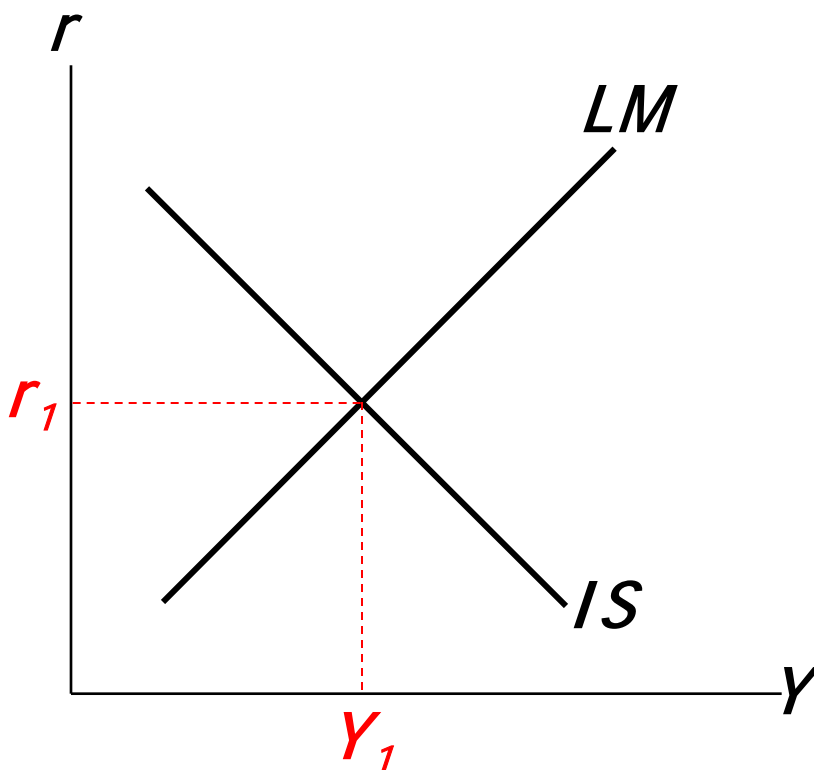
The *IS* curve represents equilibrium in the goods market.

$$Y = C(Y - \bar{T}) + I(r) + \bar{G}$$

The *LM* curve represents money market equilibrium.

$$\bar{M} / \bar{P} = L(r, Y)$$

The intersection determines the unique combination of Y and r that satisfies equilibrium in both markets.



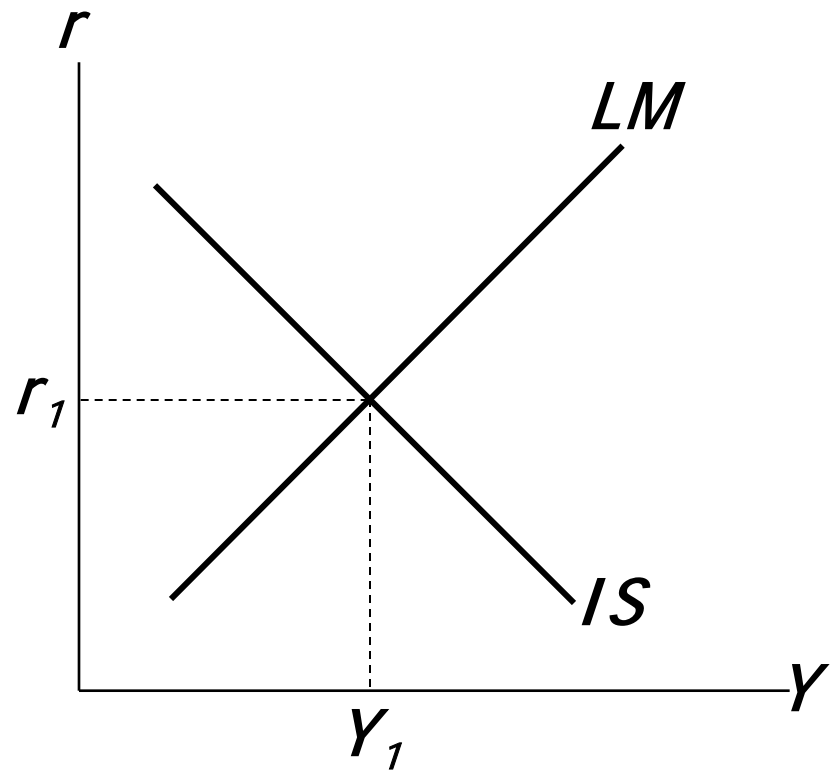
Policy analysis with the *IS-LM* model

$$Y = C(Y - \bar{T}) + I(r) + \bar{G}$$

$$\bar{M}/\bar{P} = L(r, Y)$$

We can use the *IS-LM* model to analyze the effects of

- fiscal policy: ***G*** and/or ***T***
- monetary policy: ***M***



An increase in government purchases

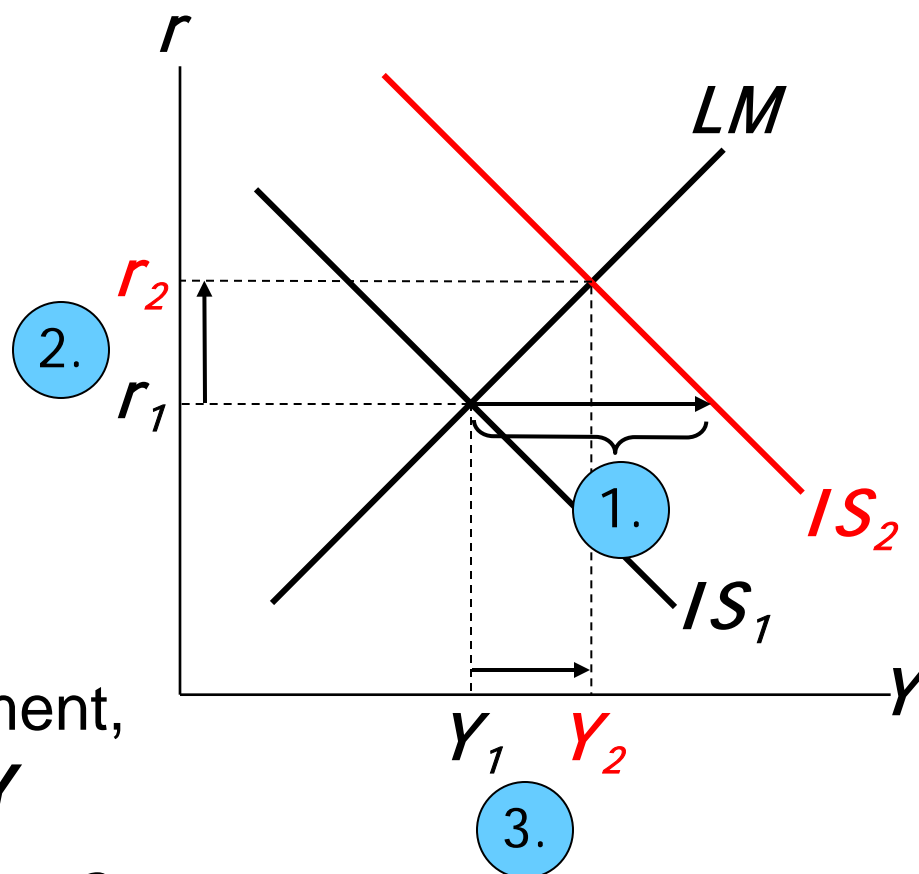
1. IS curve shifts right

by $\frac{1}{1-MPC} \Delta G$

causing output & income to rise.

2. This raises money demand, causing the interest rate to rise...

3. ...which reduces investment, so the final increase in Y is smaller than $\frac{1}{1-MPC} \Delta G$

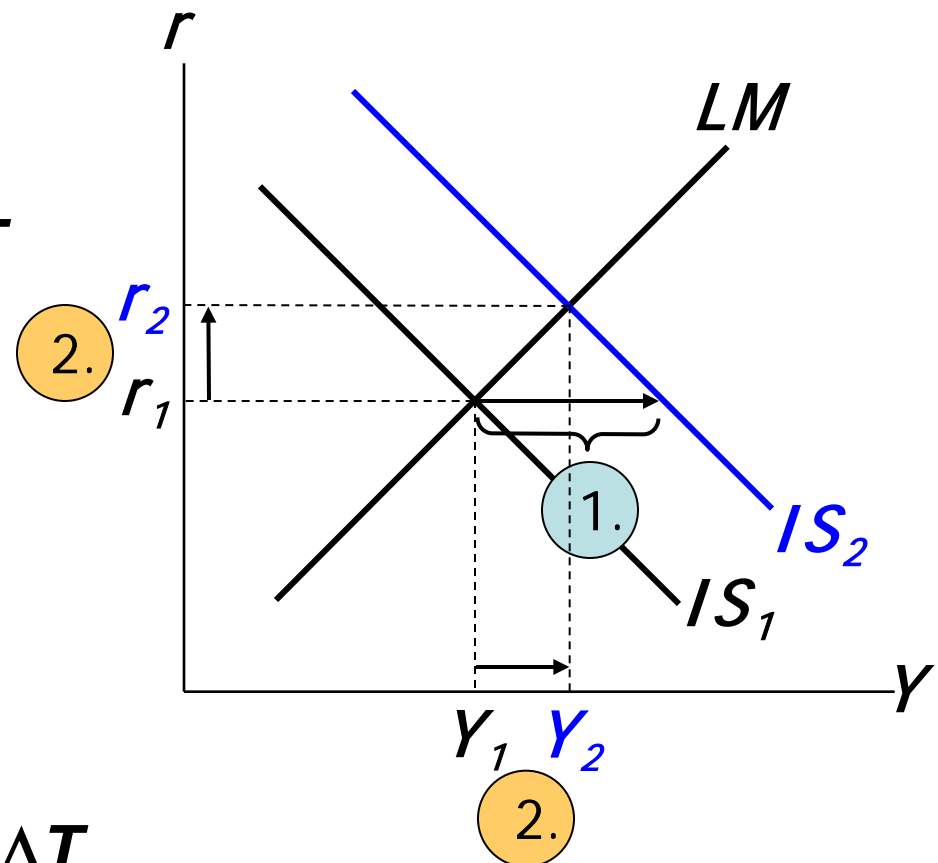


A tax cut

Consumers save $(1-MPC)$ of the tax cut, so the initial boost in spending is smaller for ΔT than for an equal ΔG ... and the IS curve shifts by

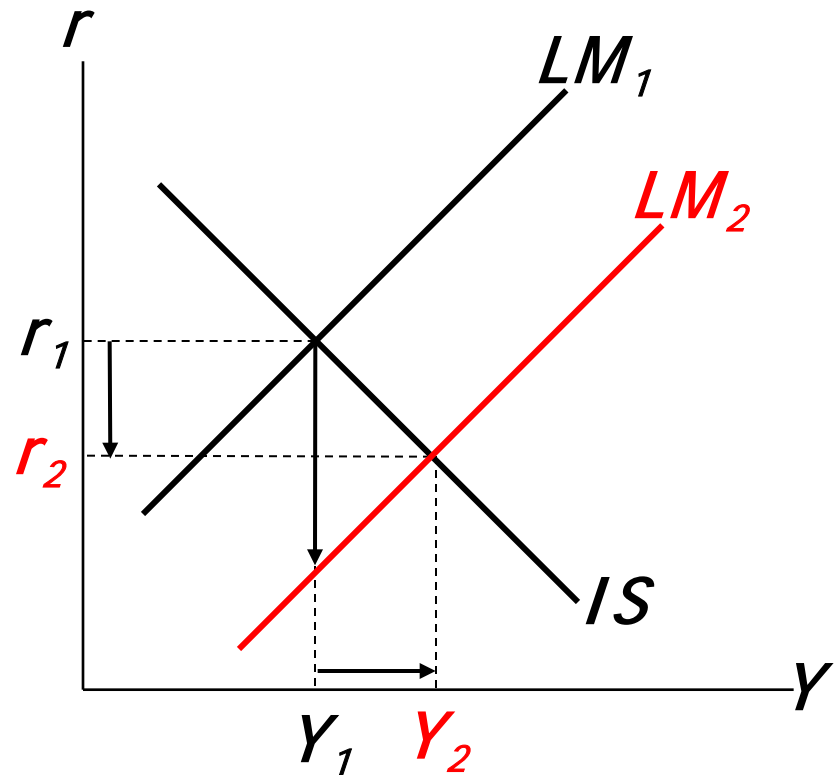
1.
$$\frac{-MPC}{1-MPC} \Delta T$$

2. ...so the effects on r and Y are smaller for ΔT than for an equal ΔG .



Monetary policy: An increase in M

1. $\Delta M > 0$ shifts the LM curve down (or to the right)
2. ...causing the interest rate to fall
3. ...which increases investment, causing output & income to rise.



Interaction between monetary & fiscal policy

- Model:
Monetary & fiscal policy variables (M , G , and T) are exogenous.
- Real world:
Monetary policymakers may adjust M in response to changes in fiscal policy, or vice versa.
- Such interaction may alter the impact of the original policy change.

The Fed's response to $\Delta G > 0$

- Suppose Congress increases G .
- Possible Fed responses:
 1. hold M constant
 2. hold r constant
 3. hold Y constant
- In each case, the effects of the ΔG are different...

Response 1: Hold M constant

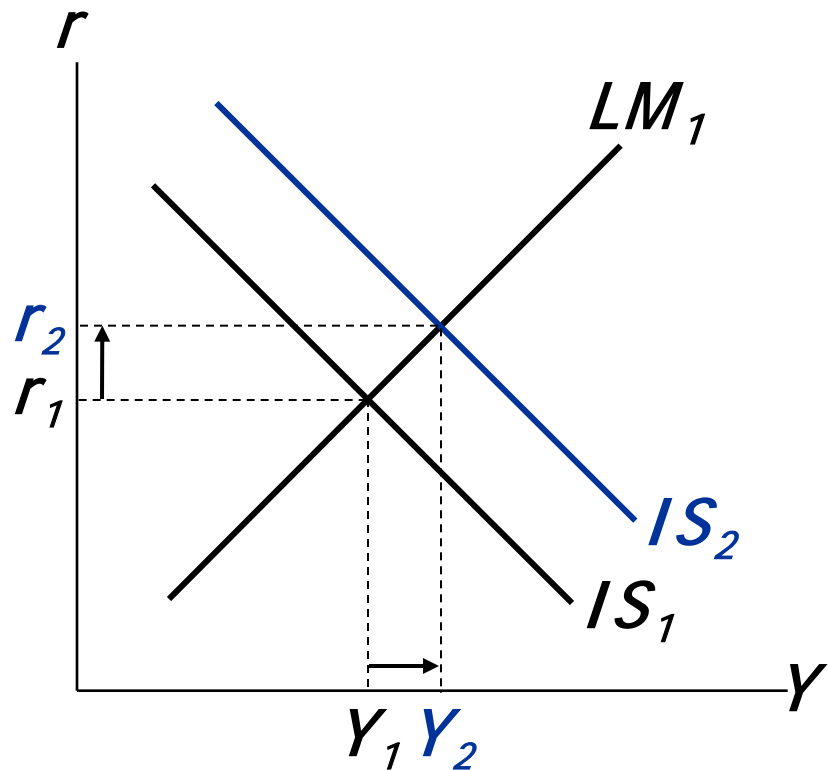
If Congress raises G ,
the IS curve shifts right.

If Fed holds M constant,
then LM curve doesn't shift.

Results:

$$\Delta Y = Y_2 - Y_1$$

$$\Delta r = r_2 - r_1$$



Response 2: Hold r constant

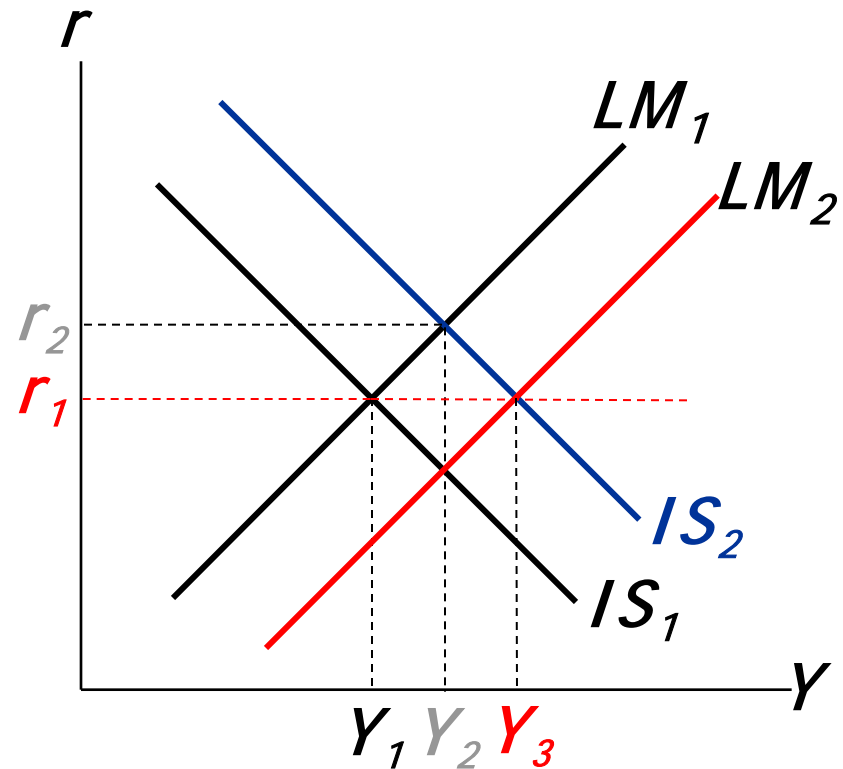
If Congress raises G ,
the IS curve shifts right.

To keep r constant,
Fed increases M
to shift LM curve right.

Results:

$$\Delta Y = Y_3 - Y_1$$

$$\Delta r = 0$$



Response 3: Hold Y constant

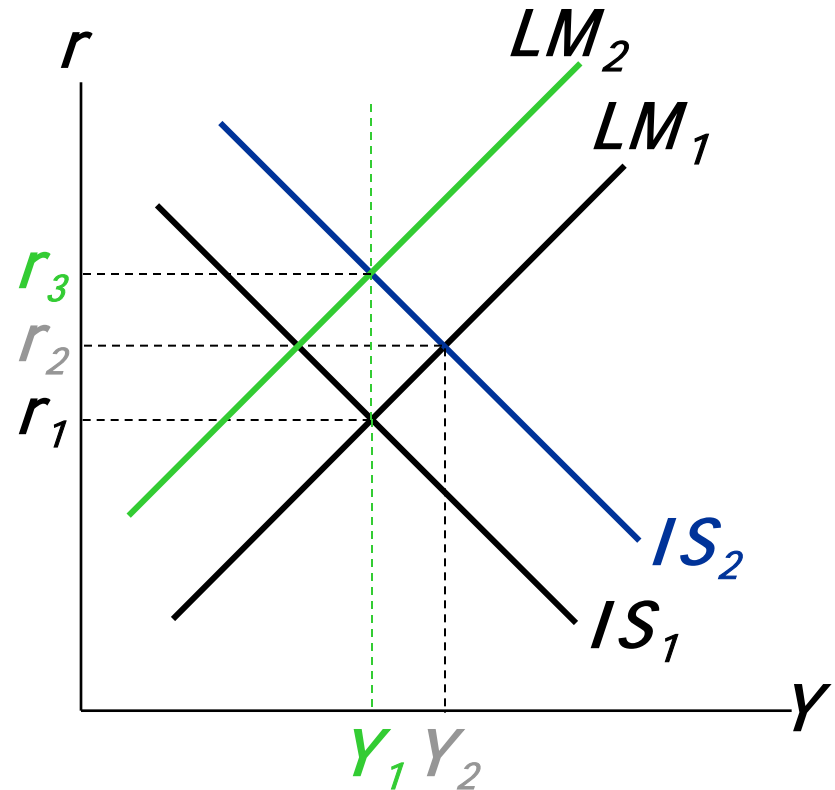
If Congress raises G ,
the IS curve shifts right.

To keep Y constant,
Fed reduces M
to shift LM curve left.

Results:

$$\Delta Y = 0$$

$$\Delta r = r_3 - r_1$$



Estimates of fiscal policy multipliers

from the DRI macroeconometric model

<i>Assumption about monetary policy</i>	<i>Estimated value of $\Delta Y/\Delta G$</i>	<i>Estimated value of $\Delta Y/\Delta T$</i>
Fed holds money supply constant	0.60	−0.26
Fed holds nominal interest rate constant	1.93	−1.19

Shocks in the *IS-LM* model

***IS* shocks:** exogenous changes in the demand for goods & services.

Examples:

- stock market boom or crash
 - ⇒ change in households' wealth
 - ⇒ ΔC
- change in business or consumer confidence or expectations
 - ⇒ ΔI and/or ΔC

Shocks in the $IS-LM$ model

LM shocks: exogenous changes in the demand for money.

Examples:

- a wave of credit card fraud increases demand for money.
- more ATMs or the Internet reduce money demand.

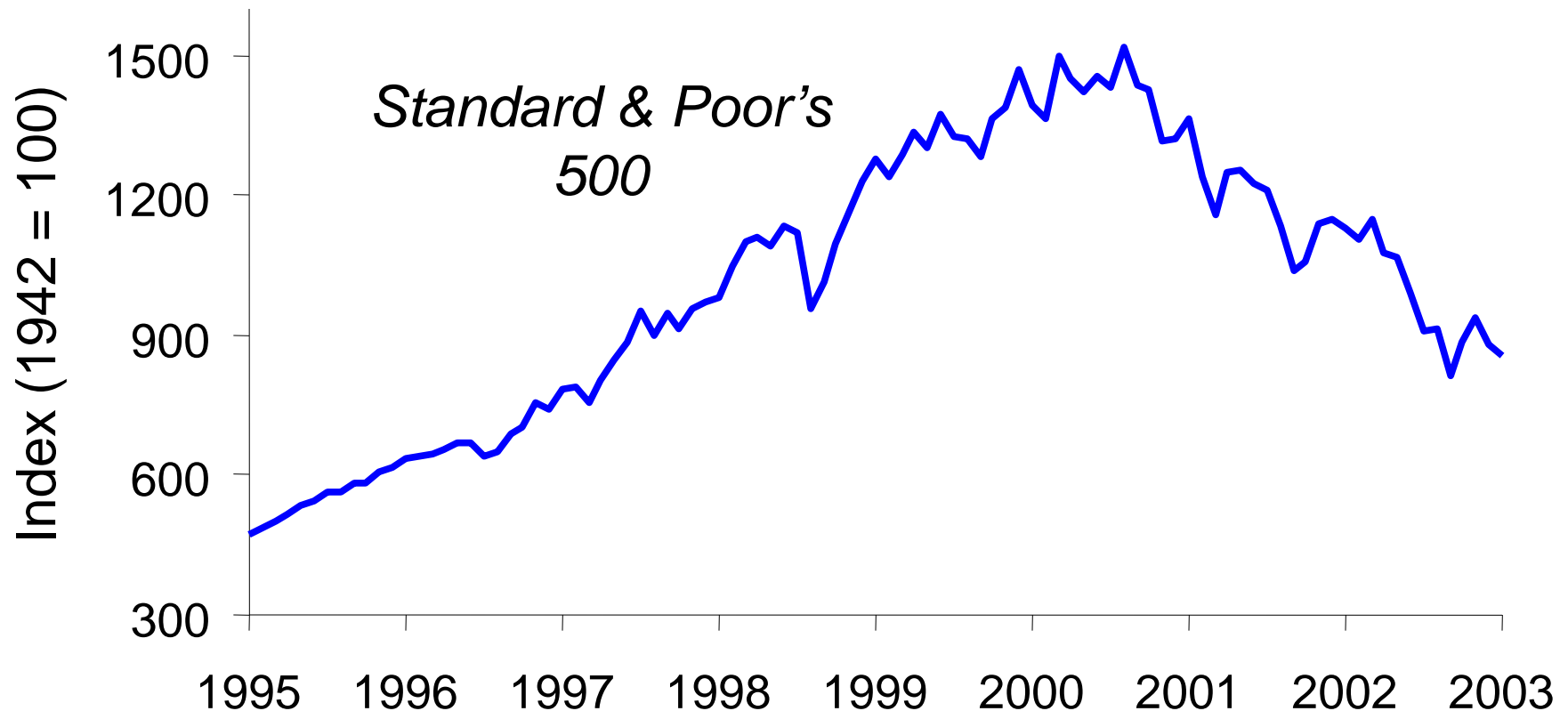
CASE STUDY:

The U.S. recession of 2001

- During 2001,
 - 2.1 million jobs lost, unemployment rose from 3.9% to 5.8%.
 - GDP growth slowed to 0.8% (compared to 3.9% average annual growth during 1994-2000).

CASE STUDY: The U.S. recession of 2001

Causes: 1) Stock market decline $\Rightarrow \downarrow \mathbf{C}$



CASE STUDY:

The U.S. recession of 2001

Causes: 2) 9/11

- increased uncertainty
- fall in consumer & business confidence
- result: lower spending, IS curve shifted left

Causes: 3) Corporate accounting scandals

- Enron, WorldCom, *etc.*
- reduced stock prices, discouraged investment

CASE STUDY:

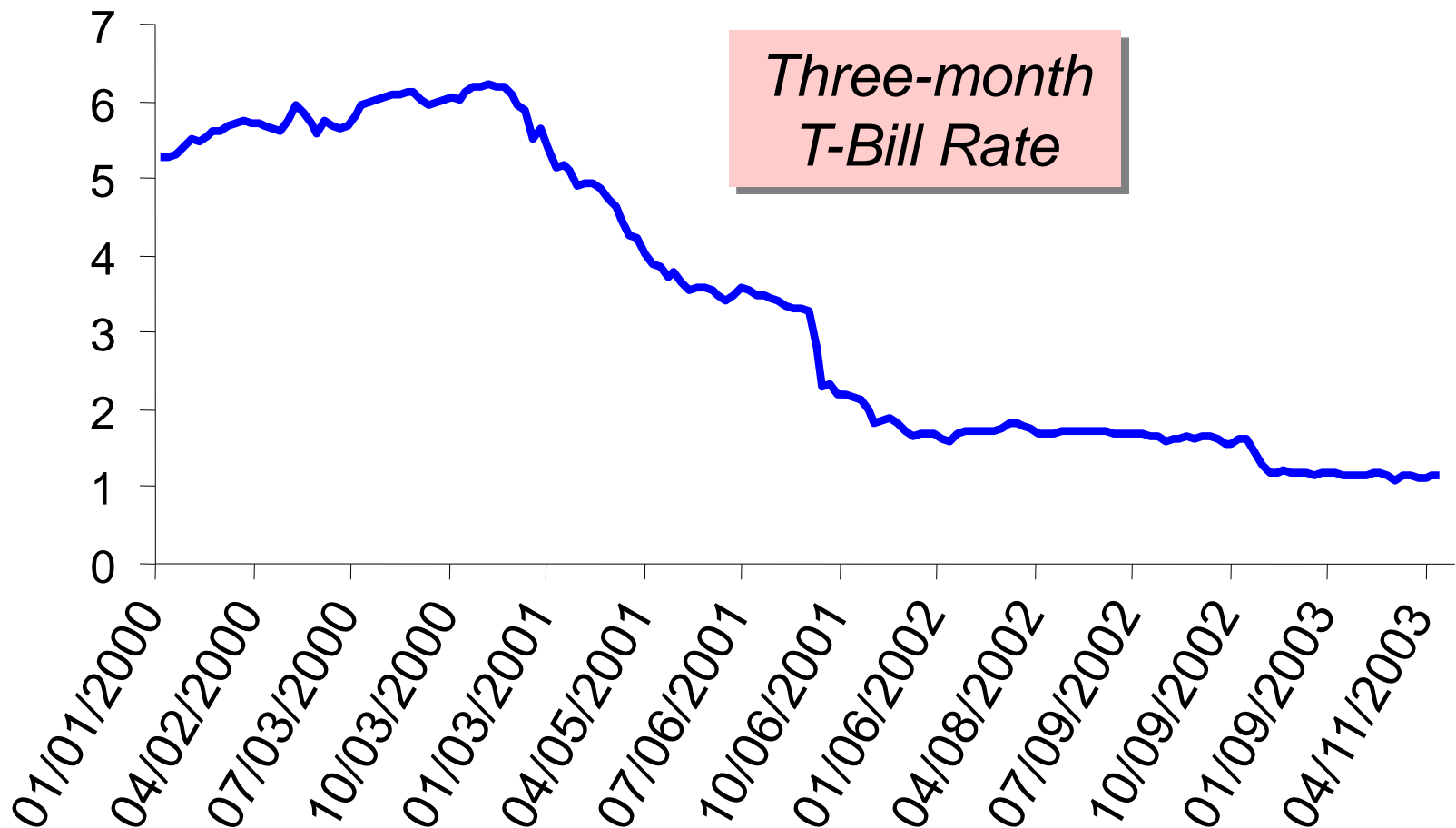
The U.S. recession of 2001

- Fiscal policy response: shifted IS curve right
 - tax cuts in 2001 and 2003
 - spending increases
 - airline industry bailout
 - NYC reconstruction
 - Afghanistan war

CASE STUDY:

The U.S. recession of 2001

- Monetary policy response: shifted LM curve right



What is the Fed's policy instrument?

- The news media commonly report the Fed's policy changes as interest rate changes, as if the Fed has direct control over market interest rates.
- In fact, the Fed **targets** the *federal funds rate* – the interest rate banks charge one another on overnight loans.
- The Fed changes the money supply and shifts the *LM* curve to achieve its target.
- Other short-term rates typically move with the federal funds rate.

What is the Fed's policy instrument?

Why does the Fed target interest rates instead of the money supply?

- 1) They are easier to measure than the money supply.
- 2) The Fed might believe that LM shocks are more prevalent than IS shocks. If so, then targeting the interest rate stabilizes income better than targeting the money supply.
(See end-of-chapter Problem 7 on p.337.)

IS-LM and aggregate demand

- So far, we've been using the *IS-LM* model to analyze the short run, when the price level is assumed fixed.
- However, a change in P would shift *LM* and therefore affect Y .
- The **aggregate demand curve** (*introduced in Chap. 9*) captures this relationship between P and Y .

Deriving the AD curve

Intuition for slope
of AD curve:

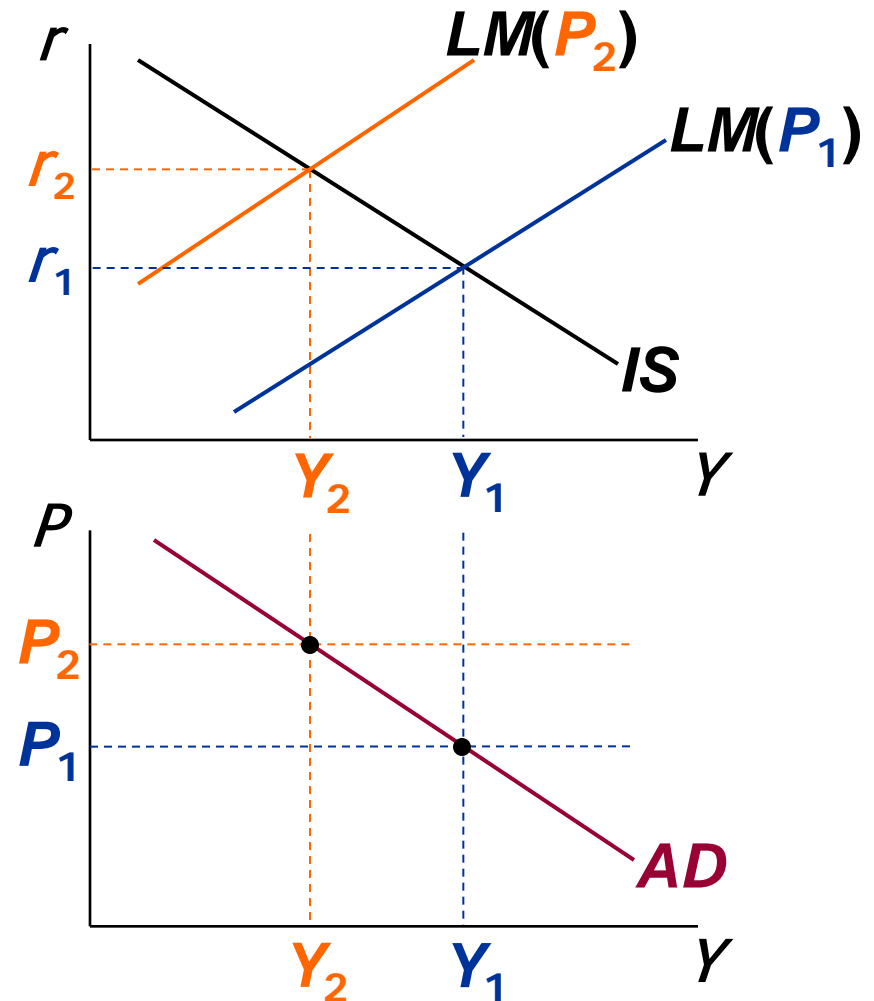
$\uparrow P \Rightarrow \downarrow (M/P)$

$\Rightarrow LM$ shifts left

$\Rightarrow \uparrow r$

$\Rightarrow \downarrow I$

$\Rightarrow \downarrow Y$



Monetary policy and the AD curve

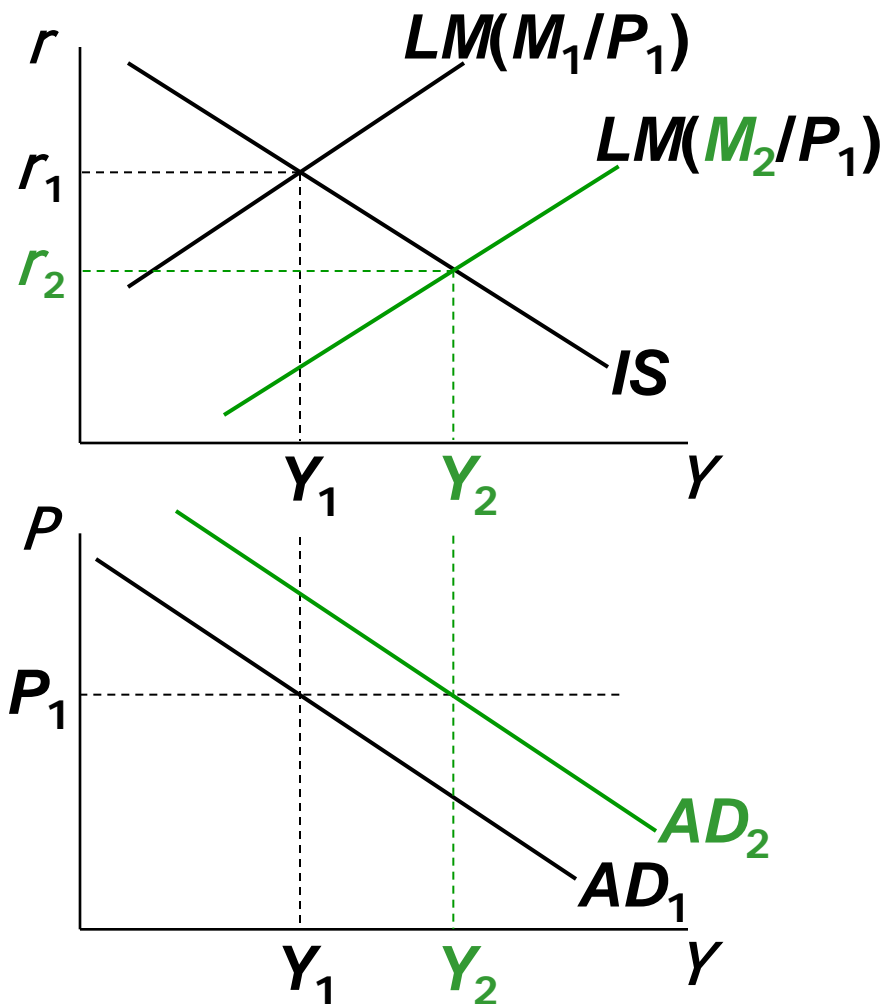
The Fed can increase aggregate demand:

$\uparrow M \Rightarrow LM$ shifts right

$\Rightarrow \downarrow r$

$\Rightarrow \uparrow I$

$\Rightarrow \uparrow Y$ at each value of P



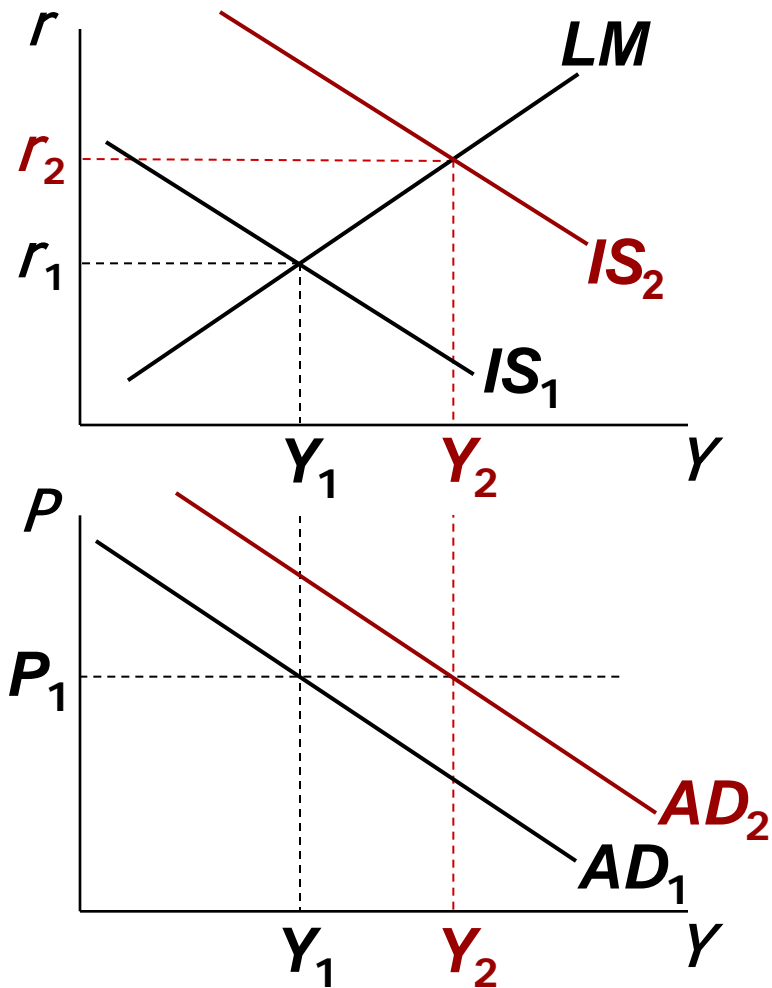
Fiscal policy and the AD curve

Expansionary fiscal policy ($\uparrow \mathbf{G}$ and/or $\downarrow \mathbf{T}$) increases agg. demand:

$\downarrow \mathbf{T} \Rightarrow \uparrow \mathbf{C}$

$\Rightarrow IS$ shifts right

$\Rightarrow \uparrow \mathbf{Y}$ at each
value of \mathbf{P}



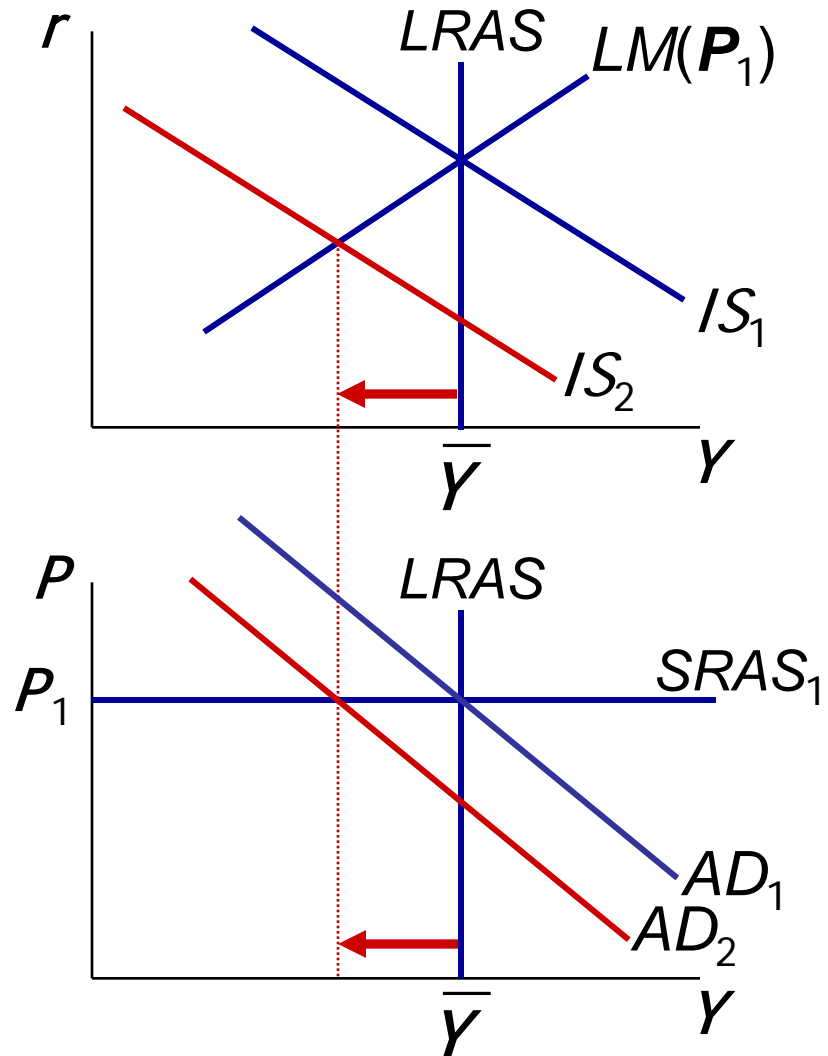
IS-LM and AD-AS in the short run & long run

Recall from Chapter 9: The force that moves the economy from the short run to the long run is the gradual adjustment of prices.

In the short-run equilibrium, if	then over time, the price level will
$Y > \bar{Y}$	rise
$Y < \bar{Y}$	fall
$Y = \bar{Y}$	remain constant

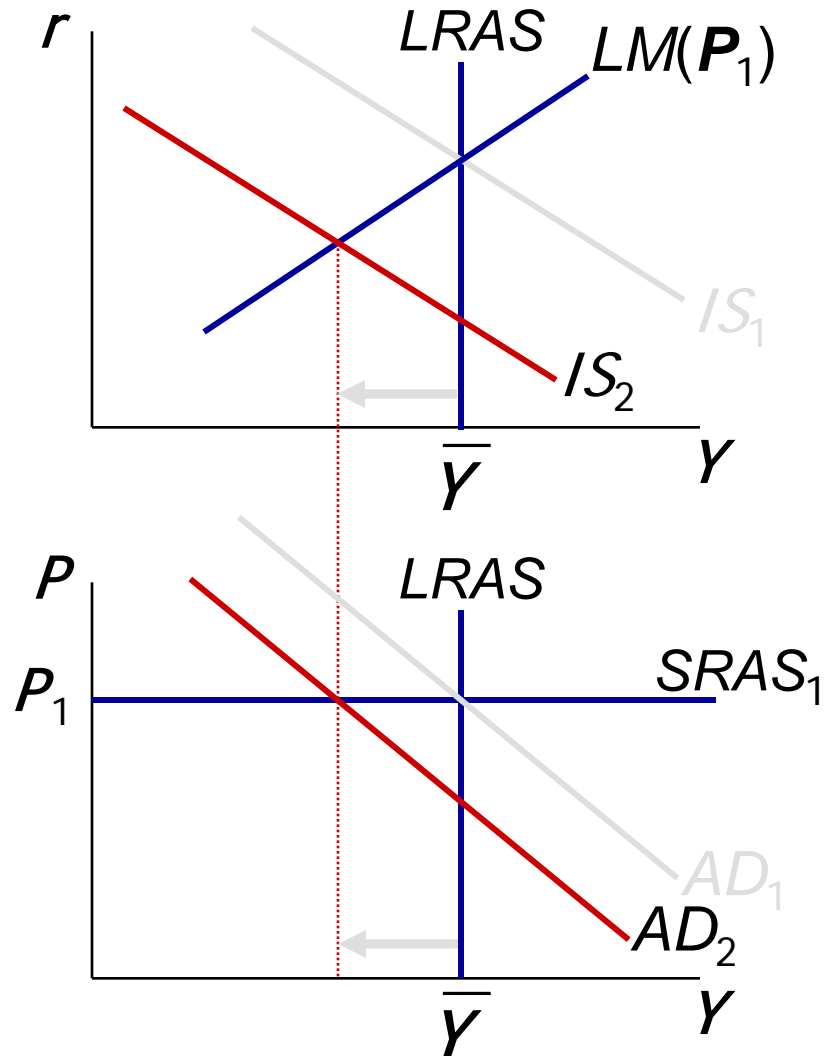
The SR and LR effects of an IS shock

A negative IS shock shifts IS and AD left, causing Y to fall.



The SR and LR effects of an IS shock

In the new short-run equilibrium, $Y < \bar{Y}$

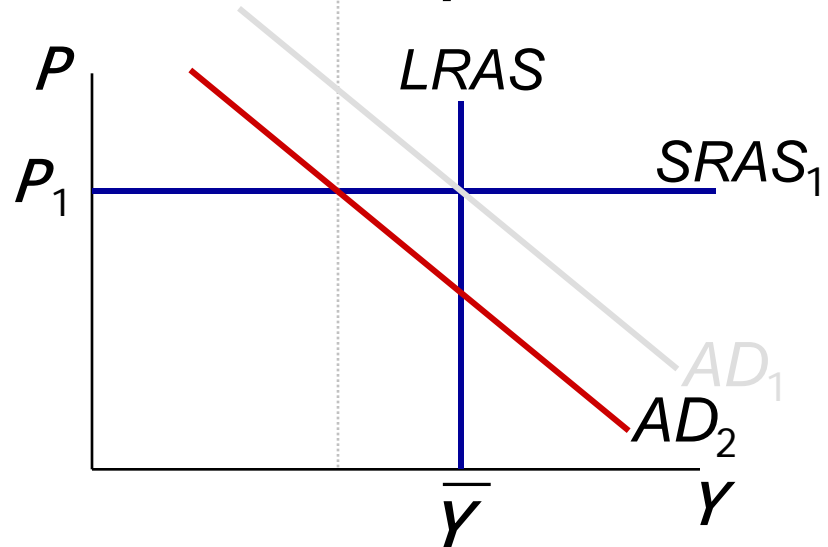
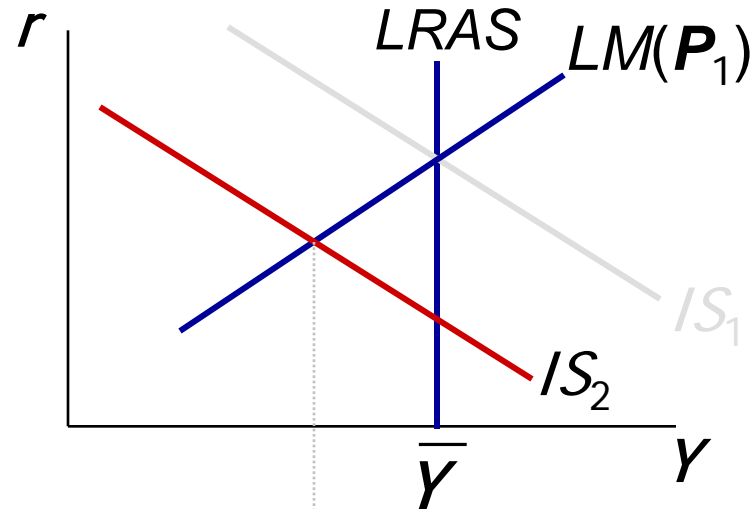


The SR and LR effects of an IS shock

In the new short-run equilibrium, $Y < \bar{Y}$

Over time, P gradually falls, causing

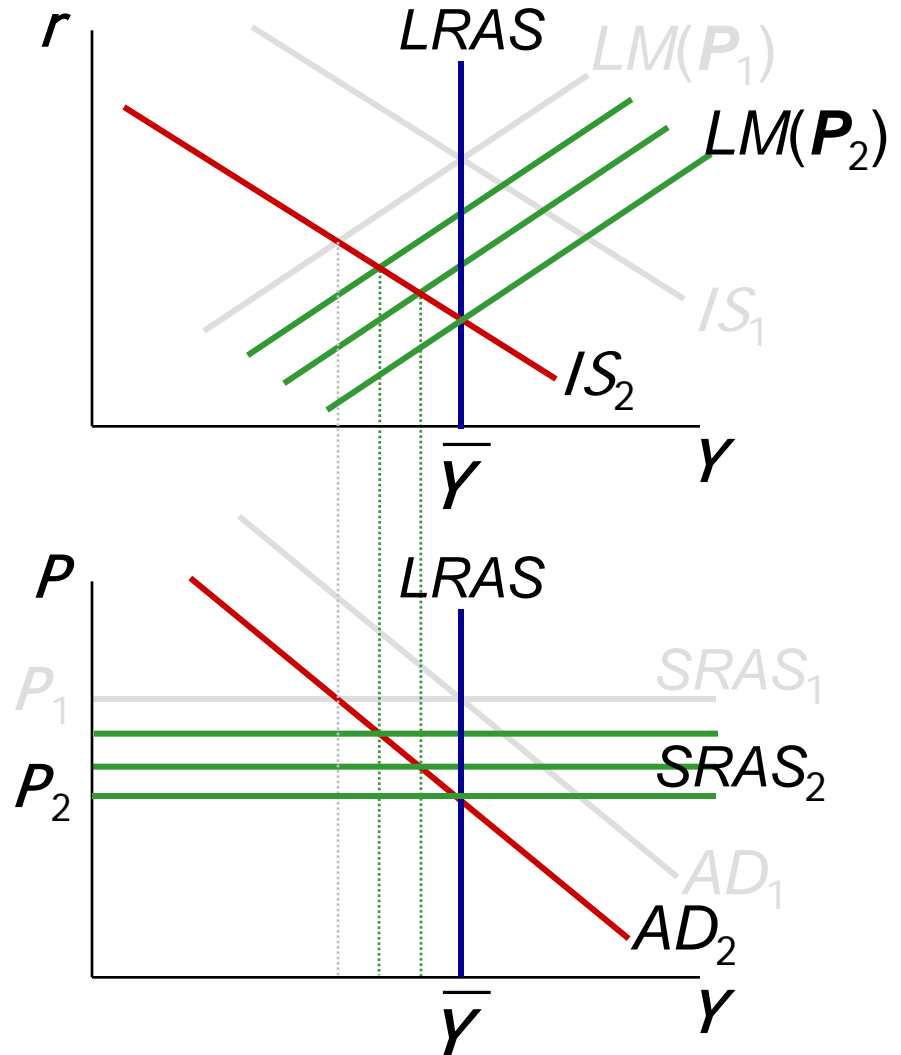
- $SRAS$ to move down
- M/P to increase, which causes LM to move down



The SR and LR effects of an $/S$ shock

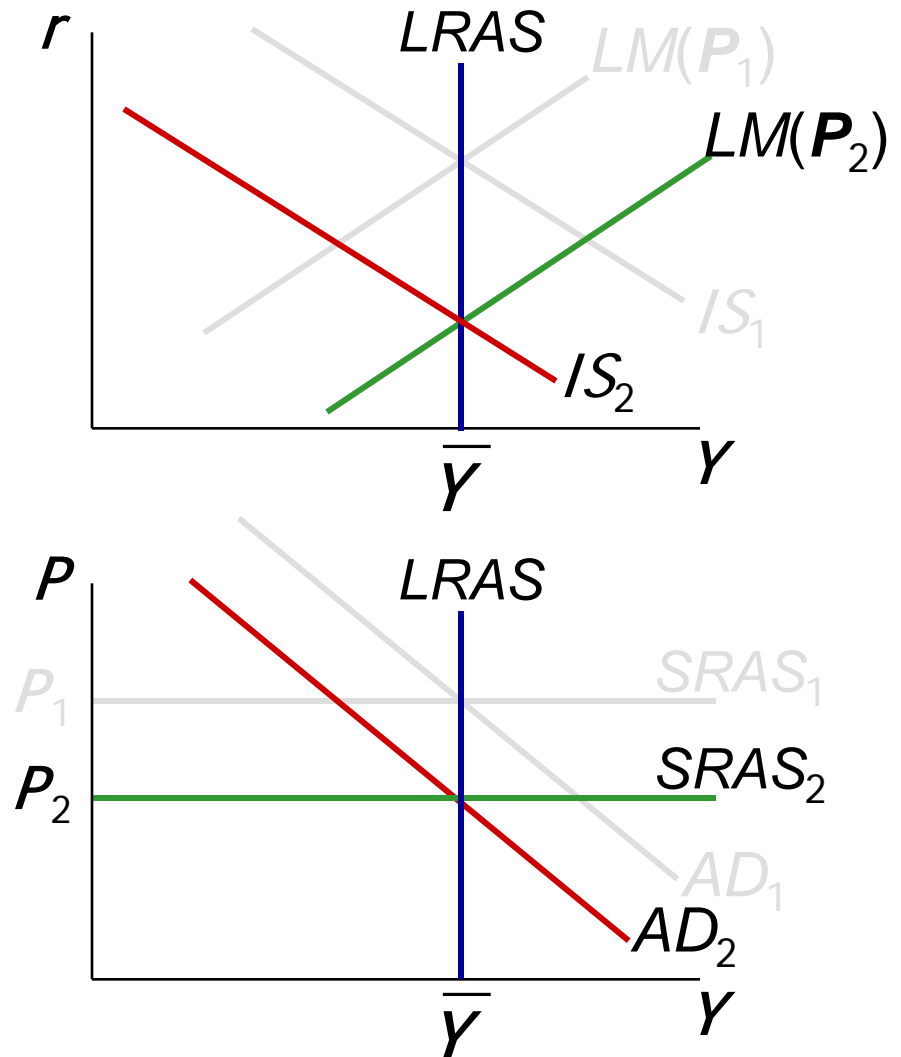
Over time, P gradually falls, causing

- $SRAS$ to move down
- M/P to increase, which causes LM to move down

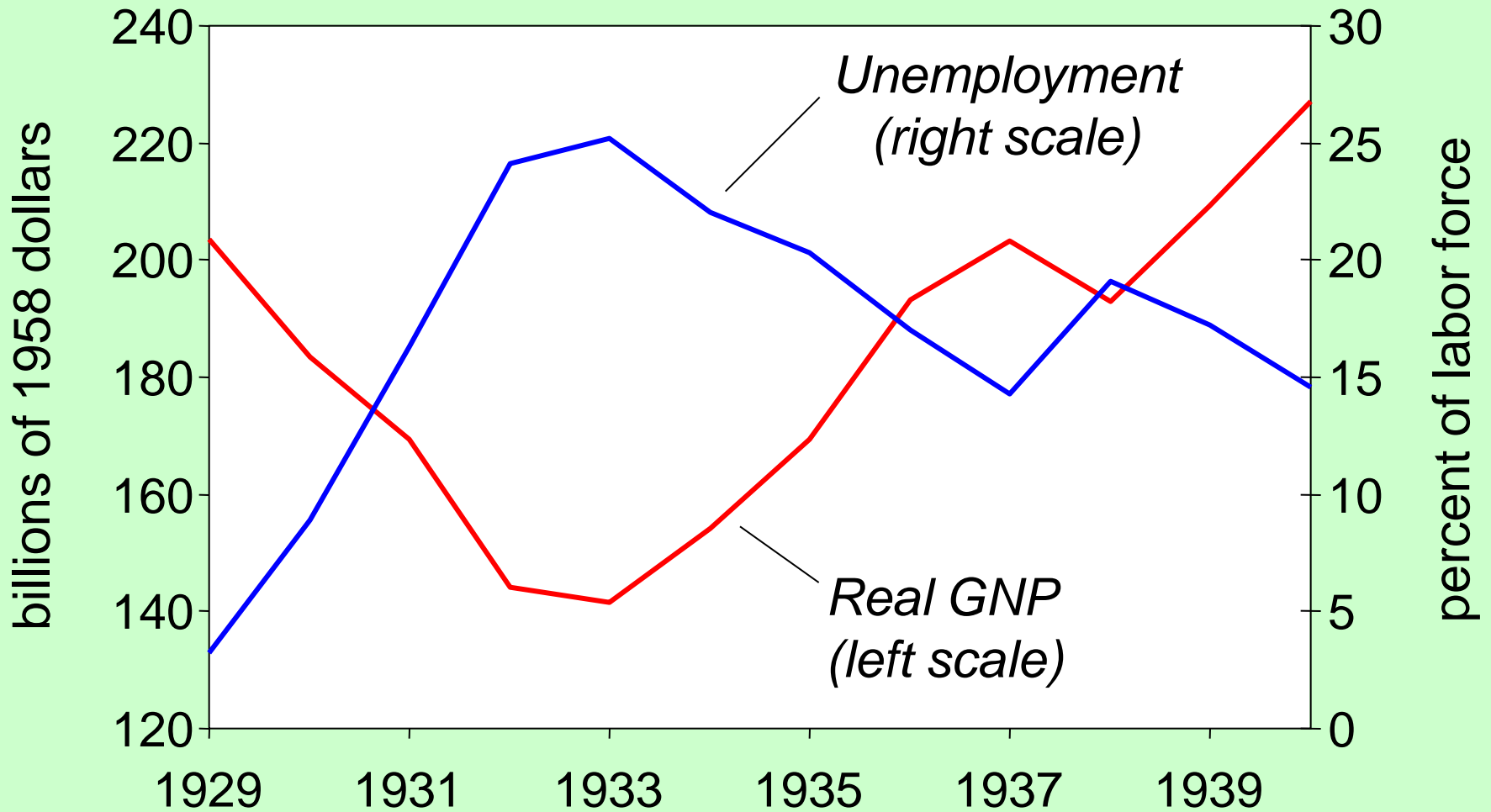


The SR and LR effects of an IS shock

This process continues until economy reaches a long-run equilibrium with $Y = \bar{Y}$



The Great Depression



THE SPENDING HYPOTHESIS:

Shocks to the IS curve

- asserts that the Depression was largely due to an exogenous fall in the demand for goods & services – a leftward shift of the IS curve.
- evidence:
output and interest rates both fell, which is what a leftward IS shift would cause.

THE SPENDING HYPOTHESIS:

Reasons for the $/S$ shift

- Stock market crash \Rightarrow exogenous $\downarrow C$
 - Oct-Dec 1929: S&P 500 fell 17%
 - Oct 1929-Dec 1933: S&P 500 fell 71%
- Drop in investment
 - “correction” after overbuilding in the 1920s
 - widespread bank failures made it harder to obtain financing for investment
- Contractionary fiscal policy
 - Politicians raised tax rates and cut spending to combat increasing deficits.

THE MONEY HYPOTHESIS:

A shock to the LM curve

- asserts that the Depression was largely due to huge fall in the money supply.
- evidence:
 $M1$ fell 25% during 1929-33.
- But, two problems with this hypothesis:
 - P fell even more, so M/P actually rose slightly during 1929-31.
 - nominal interest rates fell, which is the opposite of what a leftward LM shift would cause.

THE MONEY HYPOTHESIS AGAIN:

The effects of falling prices

- asserts that the severity of the Depression was due to a huge deflation:
P fell 25% during 1929-33.
- This deflation was probably caused by the fall in *M*, so perhaps money played an important role after all.
- In what ways does a deflation affect the economy?

THE MONEY HYPOTHESIS AGAIN:

The effects of falling prices

- The stabilizing effects of deflation:
- $\downarrow P \Rightarrow \uparrow (M/P) \Rightarrow LM \text{ shifts right} \Rightarrow \uparrow Y$
- **Pigou effect:**
 - $\downarrow P \Rightarrow \uparrow (M/P)$
 - $\Rightarrow \text{consumers' wealth } \uparrow$
 - $\Rightarrow \uparrow C$
 - $\Rightarrow IS \text{ shifts right}$
 - $\Rightarrow \uparrow Y$

THE MONEY HYPOTHESIS AGAIN:

The effects of falling prices

- The destabilizing effects of expected deflation:

$$\downarrow E\pi$$

$\Rightarrow r \uparrow$ for each value of i

$\Rightarrow I \downarrow$ because $I = I(r)$

\Rightarrow planned expenditure & agg. demand \downarrow

\Rightarrow income & output \downarrow

THE MONEY HYPOTHESIS AGAIN:

The effects of falling prices

- The destabilizing effects of unexpected deflation:
debt-deflation theory

↓ **P** (if unexpected)

⇒ transfers purchasing power from borrowers to lenders

⇒ borrowers spend less,
lenders spend more

⇒ if borrowers' propensity to spend is larger than lenders', then aggregate spending falls, the IS curve shifts left, and **Y** falls

Why another Depression is unlikely

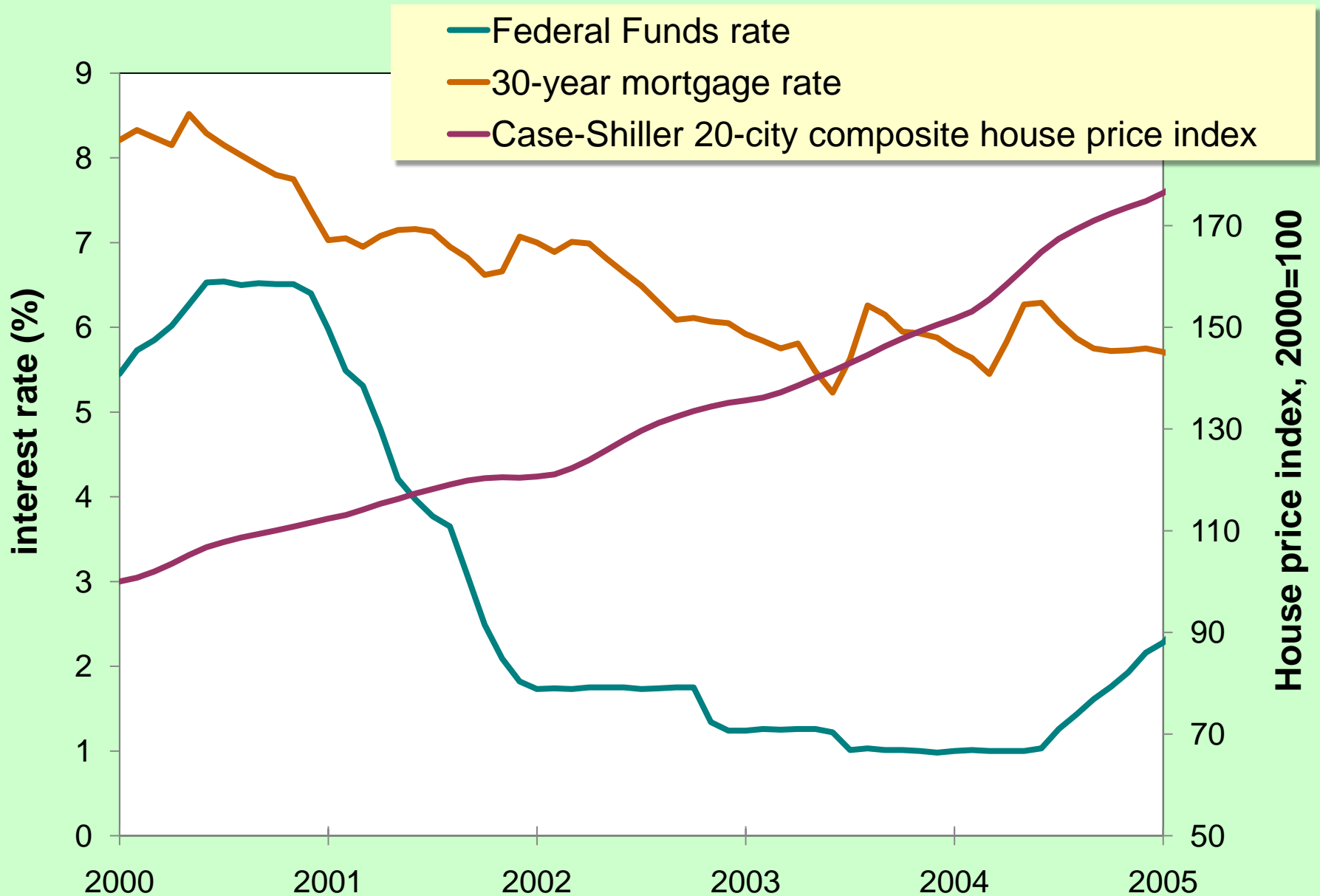
- Policymakers (or their advisors) now know much more about macroeconomics:
 - The Fed knows better than to let ***M*** fall so much, especially during a contraction.
 - Fiscal policymakers know better than to raise taxes or cut spending during a contraction.
- Federal deposit insurance makes widespread bank failures very unlikely.
- Automatic stabilizers make fiscal policy expansionary during an economic downturn.

CASE STUDY

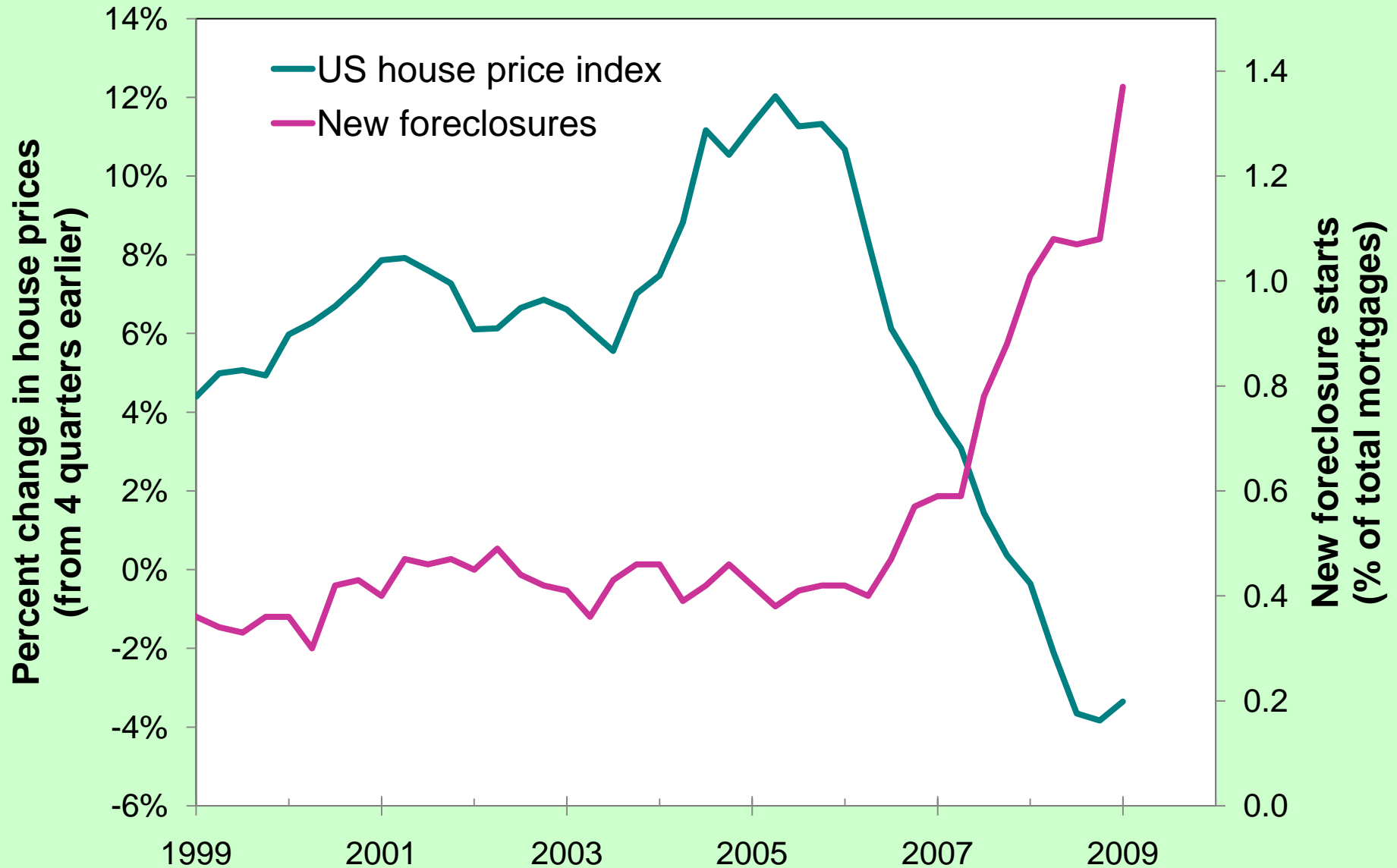
The 2008-09 Financial Crisis & Recession

- 2009: Real GDP fell, u-rate approached 10%
- Important factors in the crisis:
 - early 2000s Federal Reserve interest rate policy
 - sub-prime mortgage crisis
 - bursting of house price bubble, rising foreclosure rates
 - falling stock prices
 - failing financial institutions
 - declining consumer confidence, drop in spending on consumer durables and investment goods

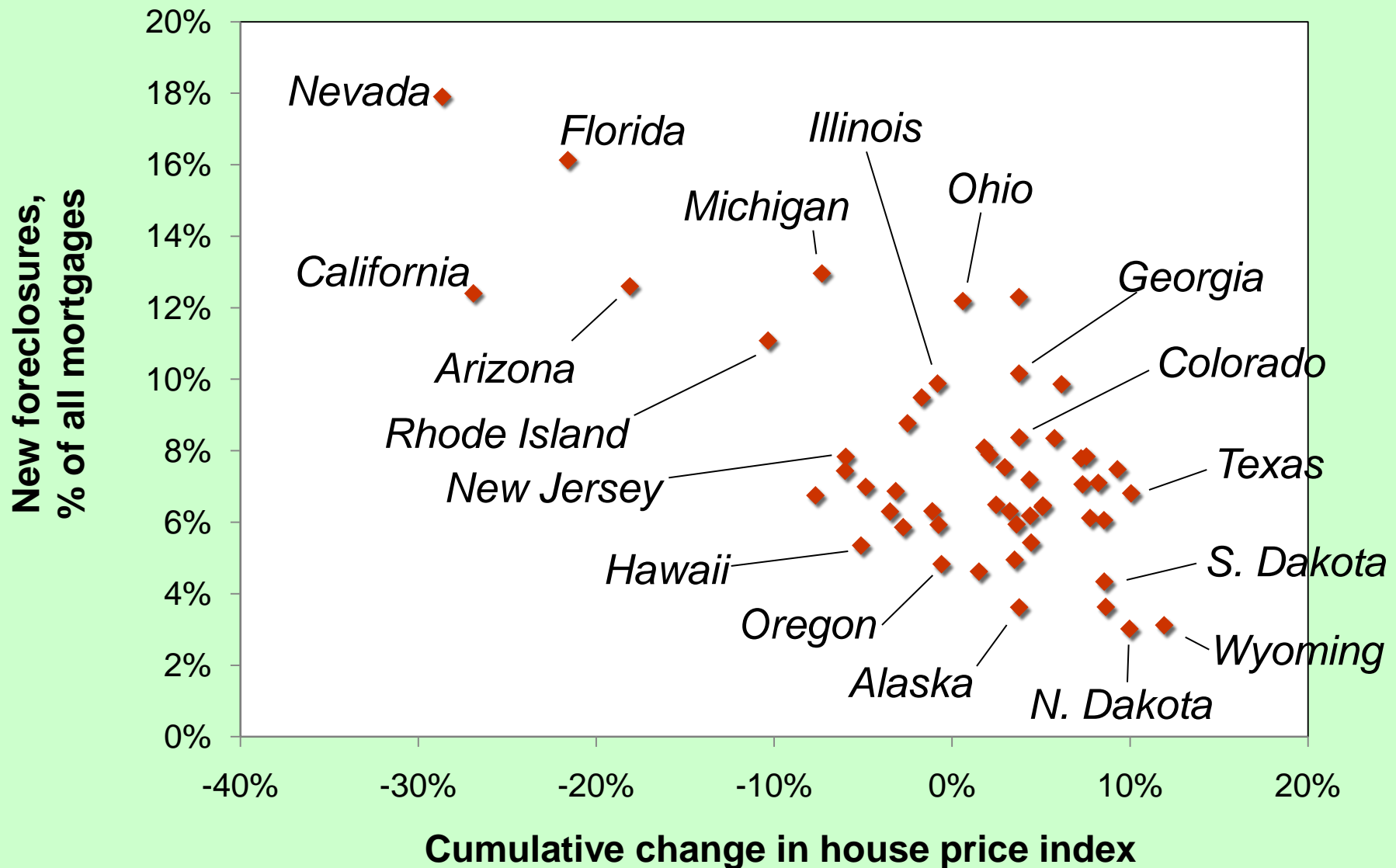
Interest rates and house prices



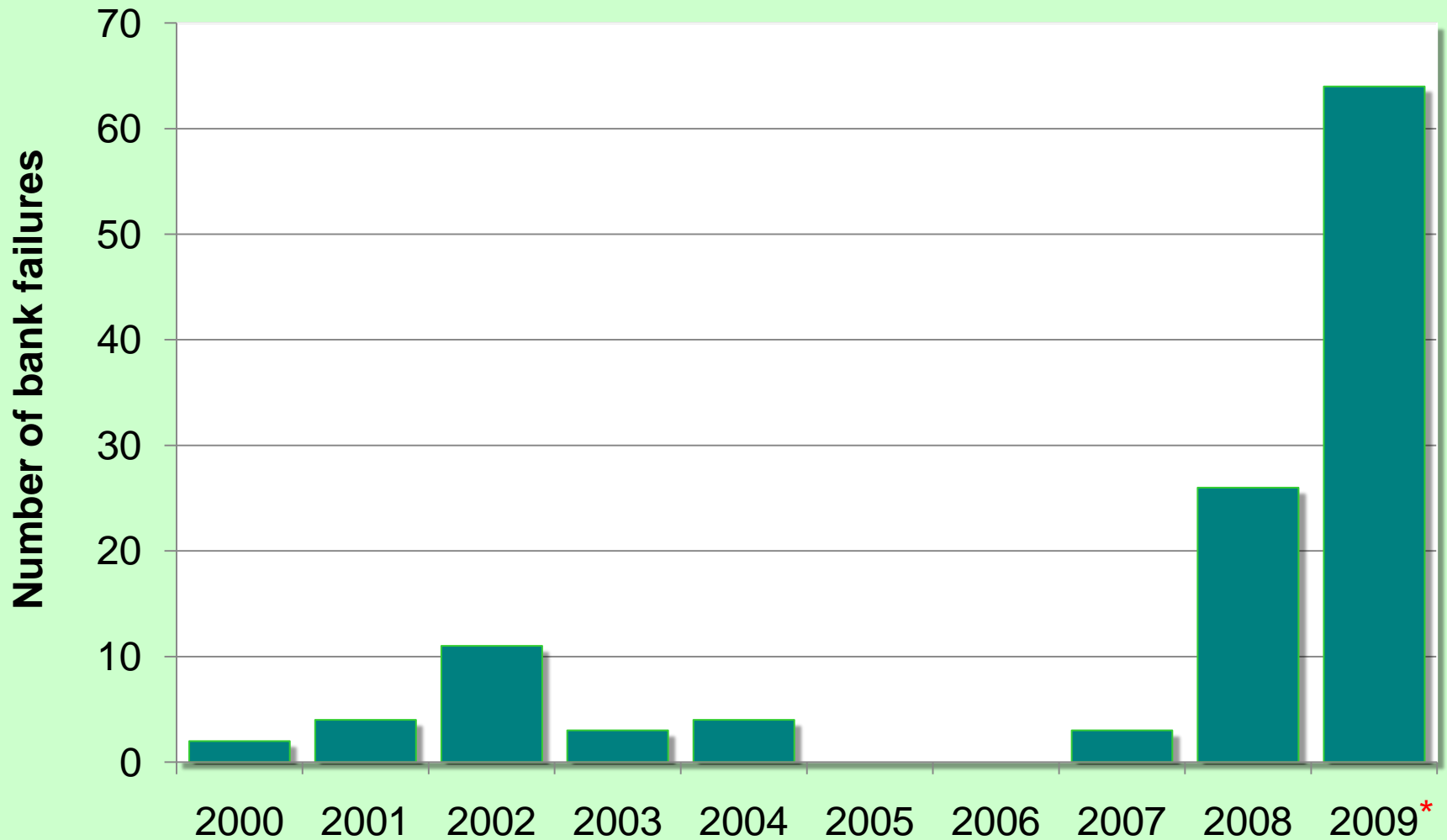
Change in U.S. house price index and rate of new foreclosures, 1999-2009



House price change and new foreclosures, 2006:Q3 – 2009Q1



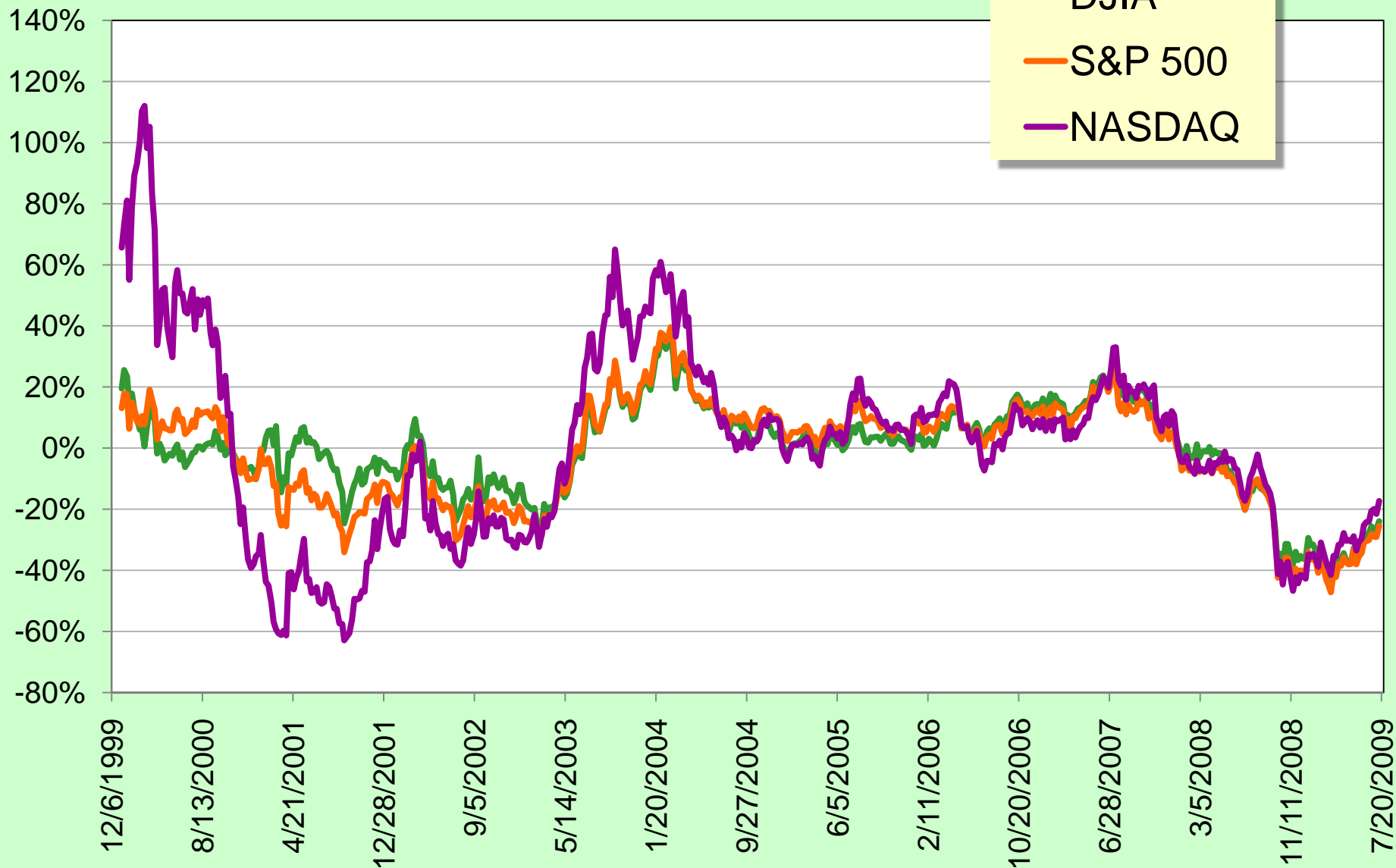
U.S. bank failures by year, 2000-2009



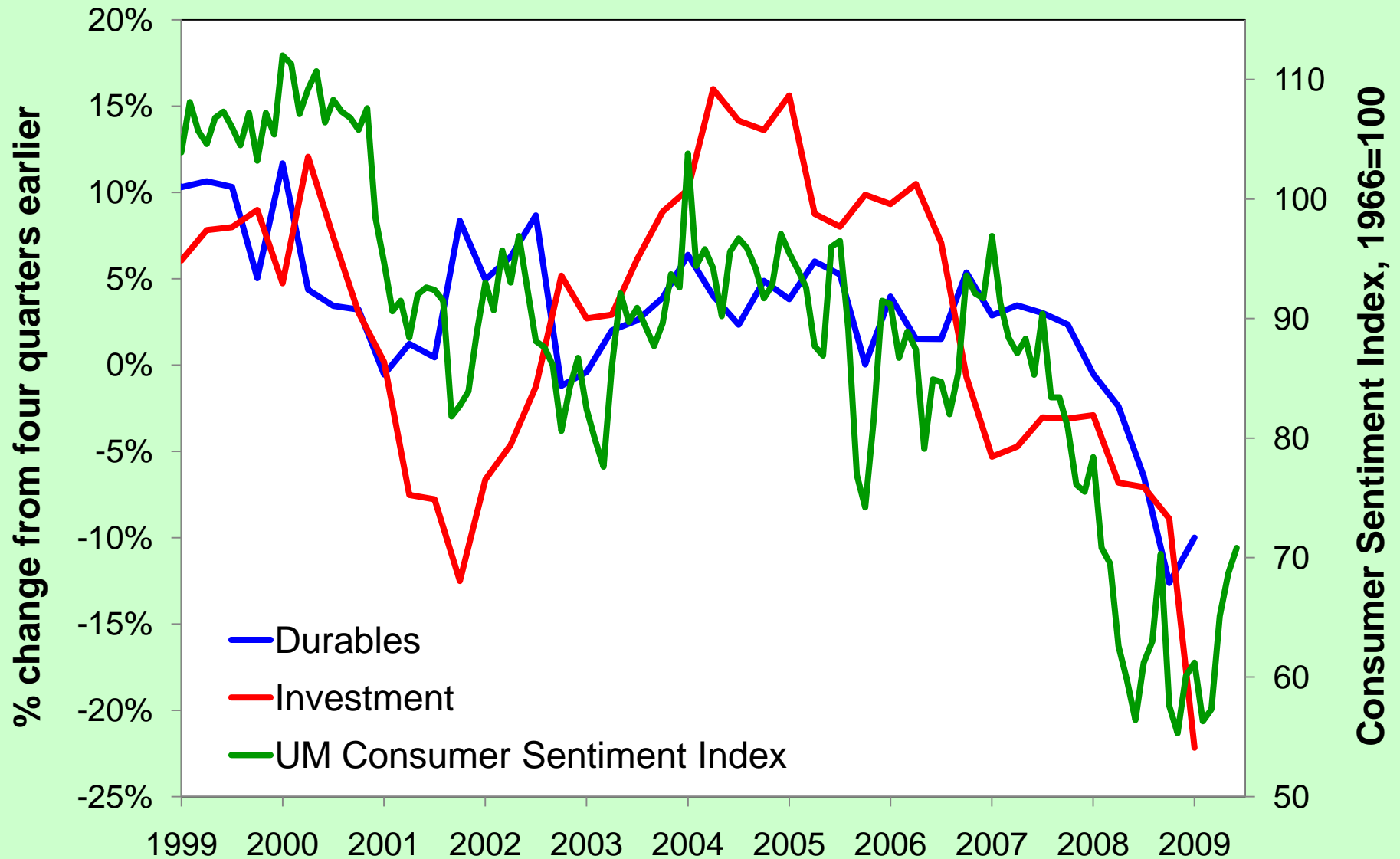
** as of July 24, 2009.*

Major U.S. stock indexes

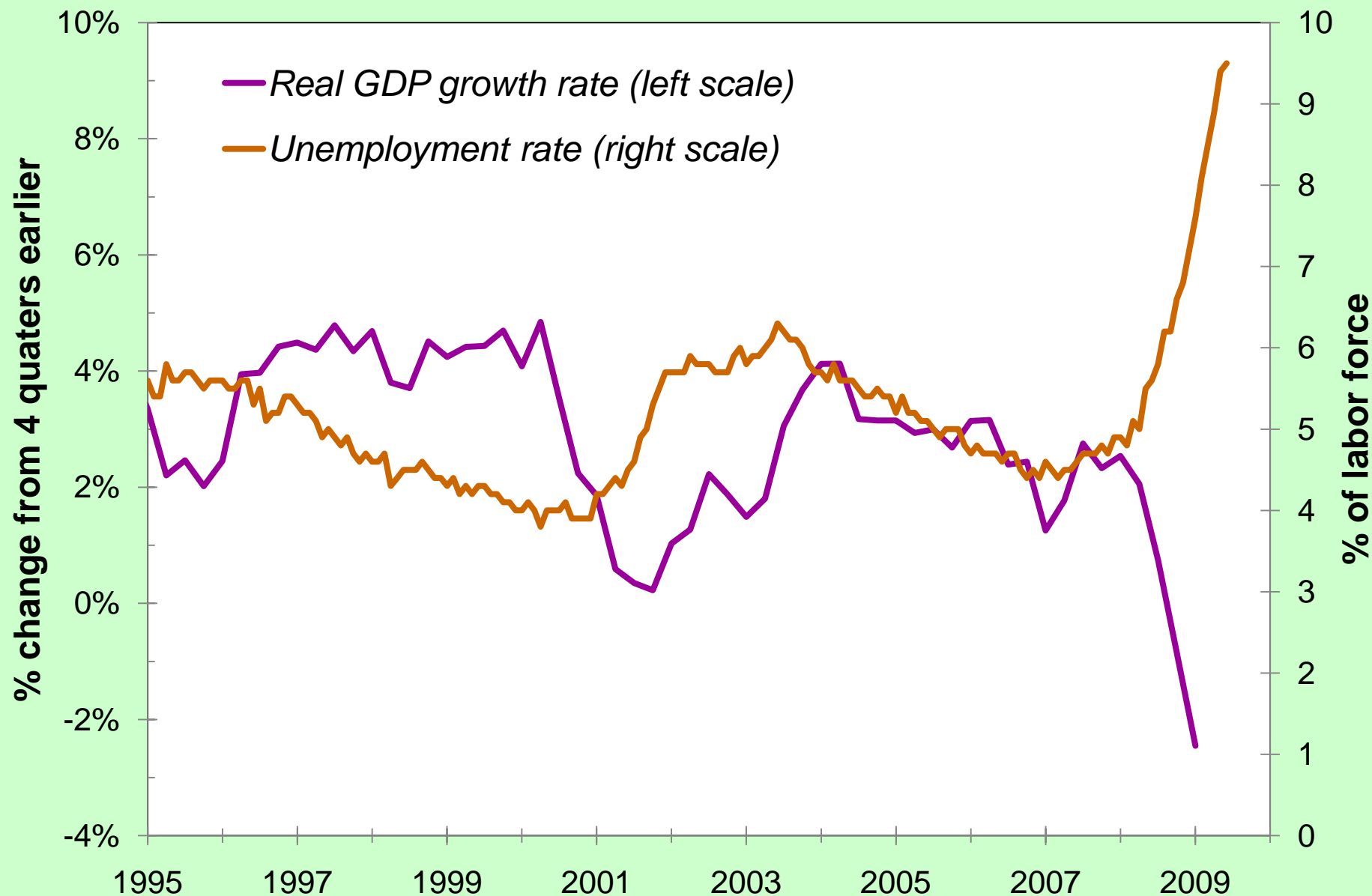
(% change from 52 weeks earlier)



Consumer sentiment and growth in consumer durables and investment spending



Real GDP growth and Unemployment



Chapter Summary

1. *IS-LM* model

- a theory of aggregate demand
- exogenous: ***M***, ***G***, ***T***,
P exogenous in short run, ***Y*** in long run
- endogenous: ***r***,
Y endogenous in short run, ***P*** in long run
- *IS* curve: goods market equilibrium
- *LM* curve: money market equilibrium

Chapter Summary

2. *AD* curve

- shows relation between P and the *IS-LM* model's equilibrium Y .
- negative slope because
$$\uparrow P \Rightarrow \downarrow (M/P) \Rightarrow \uparrow r \Rightarrow \downarrow I \Rightarrow \downarrow Y$$
- expansionary fiscal policy shifts *IS* curve right, raises income, and shifts *AD* curve right.
- expansionary monetary policy shifts *LM* curve right, raises income, and shifts *AD* curve right.
- *IS* or *LM* shocks shift the *AD* curve.