

# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

## Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics



## Business Cycles in the Classical Model

- The real business cycle theory
  - Two key questions about business cycles
    - What are the underlying economic causes?
    - What should government policymakers do about them?
  - Any business cycle theory has two components
    - A description of the types of shocks believed to affect the economy the most
    - A model that describes how key macroeconomic variables respond to economic shocks

10-2

## Business Cycles in the Classical Model

- Real business cycle (*RBC*) theory (Kydland and Prescott)
  - Examples of real shocks:
    - Shocks to the production function
    - Shocks to the size of the labor force
    - Shocks to the real quantity of government purchases
    - Shocks to the spending and saving decisions of consumers (affecting the *IS* curve or the *FE* line)
  - Nominal shocks are shocks to money supply or demand (affecting the *LM* curve)

10-3

## RBC Theory

- The largest role is played by shocks to the production function, which the text has called supply shocks, and *RBC* theorists call *productivity shocks*
- Examples of productivity shocks
  - Development of new products or production techniques
  - Introduction of new management techniques
  - Changes in the quality of capital or labor
  - Changes in the availability of raw materials or energy
  - Unusually good or bad weather
  - Changes in government regulations affecting production
- Most economic booms result from beneficial productivity shocks; most recessions are caused by adverse productivity shocks

10-4

# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

## RBC Theory

- The recessionary impact of an adverse productivity shock
  - Real wage, employment, output, consumption, and investment decline, while the real interest rate and price level rise
  - So an adverse productivity shock causes a recession (output declines), whereas a beneficial productivity shock causes a boom (output increases); but output always equals full-employment output

10-5

## RBC Theory

Real business cycle theory and the business cycle facts

- The *RBC* theory is consistent with many business cycle facts
  - If the economy is continuously buffeted by productivity shocks, the theory predicts recurrent fluctuations in aggregate output, which we observe
  - The theory correctly predicts procyclical employment and real wages
  - The theory correctly predicts procyclical average labor productivity
    - If booms weren't due to productivity shocks, we would expect average labor productivity to be countercyclical because of diminishing marginal productivity of labor

10-6

## RBC Theory

- Are productivity shocks the only source of recessions?
  - Critics of the *RBC* theory suggest that except for the oil price shocks of 1973, 1979, and 1990, there are no productivity shocks that one can easily identify that caused recessions
  - One *RBC* response is that it doesn't have to be a big shock; instead, the accumulation of many small shocks can cause a business cycle

10-7

## Fiscal Policy Shocks in the Classical Model

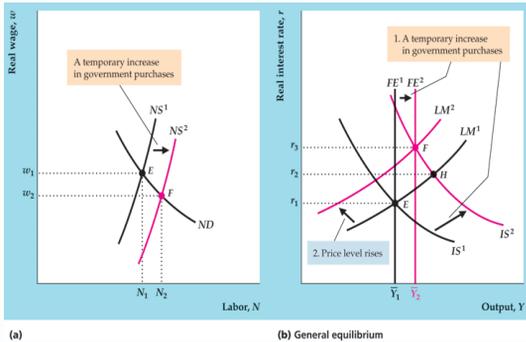
The effects of a temporary increase in government expenditures

- The current or future taxes needed to pay for the government expenditures effectively reduce people's wealth, causing an income effect on labor supply
  - The increased labor supply leads to a fall in the real wage and a rise in employment
  - The rise in employment increases output, so the *FE* line shifts to the right
  - The temporary rise in government purchases shifts the *IS* curve up and to the right as national saving declines

10-8

# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

**Figure 10.4** Effects of a temporary increase in government purchases



10-9

## Fiscal Policy Shocks in the Classical Model

The effects of a temporary increase in government expenditures

- Assume shift of the *IS* curve is bigger than shift of *FE* line
  - Prices must rise to shift the *LM* curve up and to the left to restore equilibrium
- Rise in employment means average labor productivity declines
  - Helps match data better
  - Without fiscal policy the *RBC* model shows a correlation between output and average labor productivity that is too high
  - So adding fiscal policy shocks to the model increases its ability to match the actual behavior of the economy

10-10

## Fiscal Policy Shocks in the Classical Model

- Should fiscal policy be used to dampen the cycle?
  - Classical economists oppose attempts to dampen the cycle, since prices and wages adjust quickly to restore equilibrium
  - Besides, fiscal policy increases output by making workers worse off, since they face higher taxes
  - Instead, government spending should be determined by cost-benefit analysis
  - Also, there may be lags in enacting the correct policy and in implementing it
    - So choosing the right policy today depends on where you think the economy will be in the future
    - This creates problems, because forecasts of the future state of the economy are imperfect
  - It's also not clear how much to change fiscal policy to get the desired effect on employment and output

10-11

## Unemployment in the Classical Model

- In the classical model there is no unemployment; people who aren't working are voluntarily not in the labor force
- In reality measured unemployment is never zero, and it is the problem of unemployment in recessions that concerns policymakers the most
- Classical economists have a more sophisticated version of the model to account for unemployment
- Workers and jobs have different requirements, so there is a matching problem
- It takes time to match workers to jobs, so there is always some unemployment

10-12

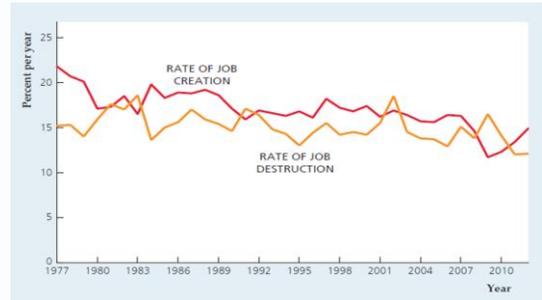
# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

## Unemployment in the Classical Model

- Unemployment rises in recessions because productivity shocks cause increased mismatches between workers and jobs
- A shock that increases mismatching raises frictional unemployment and may also cause structural unemployment if the types of skills needed by employers change
- So the shock causes the natural rate of unemployment to rise; there's still no cyclical unemployment in the classical model

10-13

**Figure 10.5** Rates of job creation and job destruction



Source: Data from U.S. Census Bureau, Business Dynamic Statistics, [www2.census.gov/ces/bds/firm/bds\\_f\\_all\\_release.xls](http://www2.census.gov/ces/bds/firm/bds_f_all_release.xls).

10-14

## Unemployment in the Classical Model

- The worker match theory can't explain all unemployment
  - Many workers are laid off temporarily; there's no mismatch, just a change in the timing of work
  - If recessions were times of increased mismatch, there should be a rise in help-wanted ads in recessions, but in fact they fall
- So can the government use fiscal policy to reduce unemployment?
  - Doing so doesn't improve the mismatch problem
  - A better approach is to eliminate barriers to labor-market adjustment by reducing burdensome regulations on businesses or by getting rid of the minimum wage

10-15

## Money in the Classical Model

- Monetary policy and the economy
  - Money is neutral in both the short run and the long run in the classical model, because prices adjust rapidly to restore equilibrium
  - Monetary nonneutrality and reverse causation
    - If money is neutral, why does the data show that money is a leading, procyclical variable?
      - Increases in the money supply are often followed by increases in output
      - Reductions in the money supply are often followed by recessions

10-16

# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

## Money in the Classical Model

- If money is neutral, why does the data show that money is a leading, procyclical variable?
  - The classical answer: Reverse causation
    - Just because changes in money growth precede changes in output doesn't mean that the money changes cause the output changes
    - Example: People put storm windows on their houses before winter, but it's the coming winter that causes the storm windows to go on, the storm windows don't cause winter
    - Reverse causation means money growth is higher because people expect higher output in the future; the higher money growth doesn't cause the higher future output
    - If so, money can be procyclical and leading even though money is neutral

10-17

## Money in the Classical Model

- Why would higher future output cause people to increase money demand?
  - Firms, anticipating higher sales, would need more money for transactions to pay for materials and workers
  - The Fed would respond to the higher demand for money by increasing money supply; otherwise, the price level would decline

10-18

## The Misperceptions Theory and the Nonneutrality of Money

Introduction to the misperceptions theory

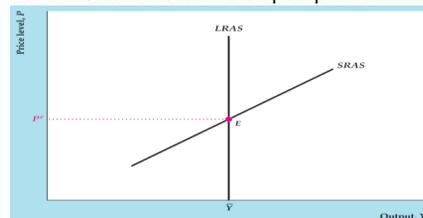
- In the classical model, money is neutral since prices adjust quickly
  - In this case, the only relevant supply curve is the long-run aggregate supply curve
  - So movements in aggregate demand have no effect on output
- But if producers misperceive the aggregate price level, then the relevant aggregate supply curve in the short run isn't vertical
  - This happens because producers have imperfect information about the general price level
  - As a result, they misinterpret changes in the general price level as changes in relative prices
  - This leads to a short-run aggregate supply curve that isn't vertical
  - But prices still adjust rapidly

10-19

## The Misperceptions Theory and the Nonneutrality of Money

The misperceptions theory is that the aggregate quantity of output supplied rises above the full-employment level when the aggregate price level  $P$  is higher than expected

- This makes the AS curve slope upward



10-20

# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

## The Misperceptions Theory and the Nonneutrality of Money

Example: A bakery that makes bread

- The price of bread is the baker's nominal wage; the price of bread relative to the general price level is the baker's real wage
- If the relative price of bread rises, the baker may work more and produce more bread
- If the baker can't observe the general price level as easily as the price of bread, he or she must estimate the relative price of bread
- If the price of bread rises 5% and the baker thinks inflation is 5%, there's no change in the relative price of bread, so there's no change in the baker's labor supply
- But suppose the baker expects the general price level to rise by 5%, but sees the price of bread rising by 8%; then the baker will work more in response to the wage increase

10-21

## The Misperceptions Theory and the Nonneutrality of Money

- Generalizing this example, if everyone expects prices to increase 5% but they actually increase 8%, they'll work more
  - So an increase in the price level that is higher than expected induces people to work more and thus increases the economy's output
  - Similarly, an increase in the price level that is lower than expected reduces output
- The equation

$$Y = \bar{Y} + b(P - P^e)$$

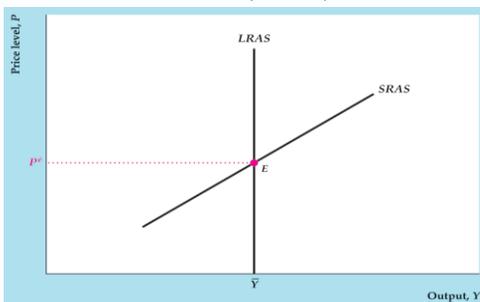
summarizes the misperceptions theory

- In the short run, the aggregate supply (SRAS) curve slopes upward and intersects the long-run aggregate supply (LRAS) curve at  $P = P^e$

10-22

**Figure 10.7** The aggregate supply curve in the misperceptions theory

$$Y = \bar{Y} + b(P - P^e)$$



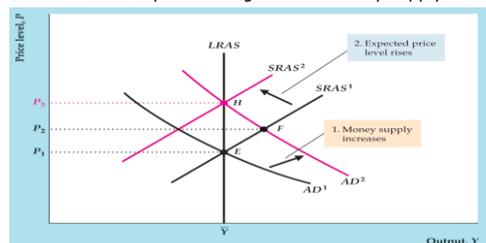
10-23

## The Misperceptions Theory and the Nonneutrality of Money

Monetary policy and the misperceptions theory

- Because of misperceptions, unanticipated monetary policy has real effects; but anticipated monetary policy has no real effects because there are no misperceptions

Unanticipated changes in the money supply



10-24

# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

## The Misperceptions Theory and the Nonneutrality of Money

Monetary policy and the misperceptions theory

- Initial equilibrium where  $AD^1$  intersects  $SRAS^1$  and  $LRAS$ 
  - Unanticipated increase in money supply shifts  $AD$  curve to  $AD^2$
  - The price level rises to  $P^2$  and output rises above its full-employment level, so money isn't neutral
  - As people get information about the true price level, their expectations change, and the  $SRAS$  curve shifts left to  $SRAS^2$ , with output returning to its full-employment level
  - So unanticipated money isn't neutral in the short run, but it is neutral in the long run

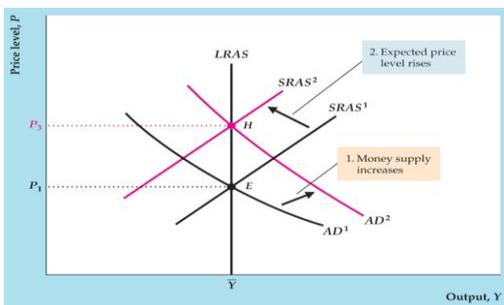
10-25

## The Misperceptions Theory and the Nonneutrality of Money

- Do the data support the misperceptions theory?
- Robert Barro found support for the misperceptions theory
  - His results suggested that output was affected only by unanticipated money growth
- But others challenged these results and found that both anticipated and unanticipated money growth seem to affect output
- Anticipated changes in the money supply
  - If people anticipate the change in the money supply and thus in the price level, they aren't fooled, there are no misperceptions, and the  $SRAS$  curve shifts immediately to its higher level
  - So anticipated money is neutral in both the short run and the long run

10-26

**Figure 10.9** An anticipated increase in the money supply



10-27

## The Misperceptions Theory and the Nonneutrality of Money

Rational expectations and the role of monetary policy

- If the public has rational expectations, the Fed won't be able to surprise people in response to the business cycle; only random monetary policy has any effects
- So even if smoothing the business cycle were desirable, the combination of misperceptions theory and rational expectations suggests that the Fed can't systematically use monetary policy to stabilize the economy

10-28

# Chapter 10 Lecture - Classical Business Cycle Analysis: Market-Clearing Macroeconomics

## The Misperceptions Theory and the Nonneutrality of Money

- Are price forecasts rational?
  - Many statistical studies suggest that people don't have rational expectations
    - But people who answer surveys may not have a lot at stake in making forecasts, so couldn't be expected to produce rational forecasts
    - Instead, professional forecasters are more likely to produce rational forecasts
    - Keane and Runkle, using a survey of professional forecasters, find evidence that these forecasters do have rational expectations
    - Croushore used inflation forecasts made by the general public, as well as economists, and found evidence broadly consistent with rational expectations, though expectations tend to lag reality when inflation changes sharply

10-29

## The Misperceptions Theory and the Nonneutrality of Money

Rational expectations and the role of monetary policy

- The only way the Fed can use monetary policy to affect output is to surprise people
- But people realize that the Fed would want to increase the money supply in recessions and decrease it in booms, so they won't be fooled
- The rational expectations hypothesis suggests that the public's forecasts of economic variables are well-reasoned and use all the available data

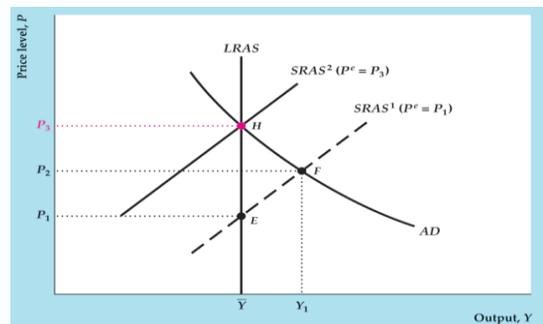
10-30

## The Misperceptions Theory and the Nonneutrality of Money

- Are price forecasts rational?
  - But if you subtract actual inflation rates from nominal interest rates, you'll find negative realized real interest rates around the time of the oil price shocks
  - In fact, the real interest rate was as low as negative 5 percent at one point
  - So making bad inflation forecasts has expensive consequences in financial markets

10-31

## The misperceptions version of the AD-AS model



10-32