

## The Inflation and Unemployment Trade-Off

Chapter 15

## Some Basics about Inflation

- **Inflation** is a continuous rise in the price level.
- It is measured using a price index.

## The Distributional Effects of Inflation

- There are individual winners and losers in an inflation.
- The composition of the winners and losers from an inflation changes over time.

## The Distributional Effects of Inflation

- The winners are those who can raise their prices or wages and still keep their jobs or sell their goods.
- The losers in an inflation are those who cannot raise their wages or prices.

## The Distributional Effects of Inflation

- Unexpected inflation redistributes income from lenders to borrowers.
- People who do not expect inflation and who are tied to fixed nominal contracts are likely lose in an inflation.

## Expectations of Inflation

- Expectations play a key role in the inflationary process.
  - **Rational expectations** are the expectations that the economists' model predicts.
  - **Adaptive expectations** are those based, in some way, on what has been in the past.
  - **Extrapolative expectations** are those that assume a trend will continue.

## Productivity, Inflation, and Wages

- Changes in productivity and changes in wages determine whether inflation may be coming.
- There will be no inflationary pressures if wages and productivity increase at the same rate.

7

## Productivity, Inflation, and Wages

- The basic rule of thumb:

$$\text{Inflation} = \text{Nominal wage increases} - \text{Productivity growth}$$

8

## Demand-Pull and Cost-Push Inflation

- **Demand-pull inflation** – inflation that occurs when the economy is at or above potential output.
- It is generally characterized by excess demand for goods and workers.

9

## Demand-Pull and Cost-Push Inflation

- **Cost-push inflation** – inflation that occurs when the economy is below potential output.
- Producers who raise their prices believe that they will sell their goods and workers who raise their wages believe they won't lose their jobs.

10

## Theories of Inflation

- The **quantity theory** emphasizes the connection between money and inflation.
- The **institutional theory** emphasizes market structure and price-setting institutions and inflation.

11

## Quantity Theory of Money

- The quantity theory of money is summarized by the sentence:
- Inflation is always and everywhere a monetary phenomenon.

12

## Equation of Exchange

- **Equation of exchange** – the quantity of money times velocity of money equals price level times the quantity of real goods sold.

$$MV = PY$$

- $M$  = Quantity of money
- $V$  = income velocity of money
- $P$  = price level
- $Y$  = real output
- $PY$  = the economy's nominal output

13

## Equation of Exchange

- Converting to percentage changes,
  - the percentage change in money supply plus the percentage change in velocity equals the percentage change in price plus the percentage change in real output:

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$$

- $\% \Delta$  means "percentage change in"

14

## Equation of Exchange

- **Velocity of money** – the number of times per year, on average, a dollar is exchanged to generate a dollar's worth of income.
- Income velocity is constant, so  $\% \Delta V = 0$ .

15

## Equation of Exchange

- Rewriting the equation of exchange as

$$\% \Delta M - \% \Delta Y = \% \Delta P$$

- If real income growth is about 2.5%, then if money supply increases 6% per year, then inflation will be 3.5%:

$$6\% - 2.5\% = 3.5\%$$

16

## Money's Role in Inflation

- The quantity theory appeared to break down in Canada in the late 1980s and early 1990s.
- The relationship between money and inflation didn't hold.

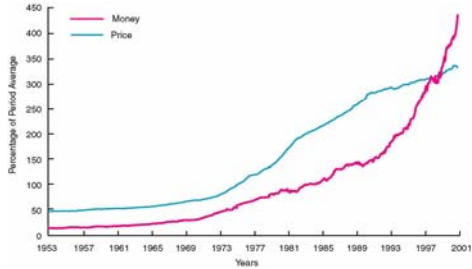
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## Money's Role in Inflation

- The relationship between money and inflation broke down because of:
  - Technological changes
  - Changing regulations in financial institutions.
  - Increasing global interdependence of financial markets.

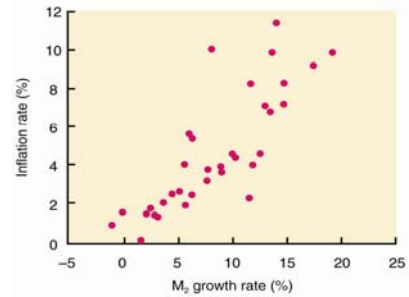
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## Inflation and Money Growth in Canada



19

## Inflation and Money Growth in Canada



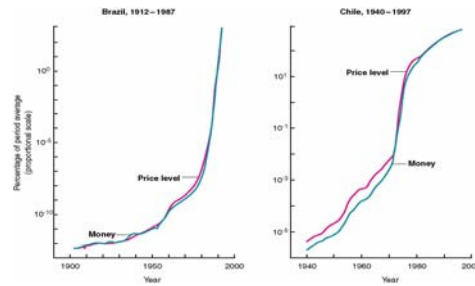
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## Inflation and Money Growth

- The empirical evidence that supports the quantity theory of money is most convincing in Brazil and Chile.

21

## Price Level and Money in Brazil and Chile



22

## Inflation Tax

- Central banks in nations such as Argentina and Chile are not as politically independent as in developed countries.
- Their central banks sometimes increase the money supply to keep the economy running.

23

## Inflation Tax

- When their governments run a budget deficit and try to finance it domestically, their central banks often must buy the bonds to finance that deficit.
- In essence, the increase in money supply is caused by the government deficit.

24

## Inflation Tax

- Financing the deficit by expansionary monetary policy causes inflation.

25

## Inflation Tax

- The inflation works as a kind of tax on individuals, and is often called an ***inflation tax***.
- It is an implicit tax on the holders of cash and the holders of any obligations specified in nominal terms.

26

## Inflation Tax

- Central banks have to make a monetary policy choice:
  - Ignite inflation by bailing out their governments with an expansionary monetary policy.
  - Do nothing and risk recession or even a breakdown of the entire economy.

27

## Policy Implications of Quantity Theory

- Supporters of the quantity theory oppose an activist monetary policy.
  - Monetary policy is powerful, but unpredictable in the short run.
  - Because of its unpredictability, monetary policy should not be used to control the level of output in an economy.

28

## Policy Implications of Quantity Theory

- Quantity theorists favour a monetary policy set by rules, not by discretionary monetary policy.
- A monetary rule takes money supply decisions out of the hands of politicians.

29

## Policy Implications of Quantity Theory

- In Canada, in 1991 the Bank of Canada announced targets for the inflation rate based on the CPI.
- Canadian monetary policy is aimed at maintaining a low and stable inflation of between one and three percent.

30

## Policy Implications of Quantity Theory

- Many central banks use monetary regimes or feedback rules.
  - New Zealand has a legally mandated monetary rule based on inflation.
  - The U.S. Federal Reserve does not have strict rules governing money supply, but it works hard to establish credibility that it is serious about fighting inflation.

31

## Institutional Theory of Inflation

- Supporters of institutional theories of inflation accept much of the quantity theory.
- While they agree that money and inflation move together, they have different causes and effects.

32

## Institutional Theory of Inflation

- According to the quantity theory, the direction of causation moves from left to right:

$$MV \Rightarrow PY$$

33

## Institutional Theory of Inflation

- Institutional theories see it the other way round.
- Increases in prices forces government into positions where it must increase money supply or cause unemployment.

$$MV \Leftarrow PY$$

34

## Institutional Theory of Inflation

- Therefore, the source of inflation is the price-setting process of firms.
  - Firms find it easier to raise prices than to lower them.
  - Firms do not take into account the effect of their pricing decisions on the overall price level.

35

## Focus on Price-Setting Decisions of Firms

- Any increase in firms' wages, rents, taxes, and other costs are simply passed on to consumers in the form of higher prices.
- This works so long as the government increases the money supply so that demand is there to buy the goods at the higher prices.

36

## Focus on Price-Setting Decisions of Firms

- Whether the firm selects this price-raising strategy depends on the state of the labour market.
- If the labour market is tight, the firm knows that it will lose workers if it doesn't raise wages.

37

## Price-Setting Strategies

- The state of the labour market plays a key role in firms' decisions whether to give in to workers' demands for higher wages.
- That is why economists look at unemployment to measure inflationary pressures.

38

## Changes in the Money Supply Follow Price-Setting by Firms

- One group pushes up its nominal wage or price, and other groups respond by doing the same.
- The first group finds its relative wages or prices have not increased, so they raise them again.
  - And the process begins anew.

39

## Changes in the Money Supply Follow Price-Setting by Firms

- At this point, government has two options:
  - Increase money supply, thereby ratifying the inflation.
  - Refuse to ratify the inflation, thereby causing unemployment to rise.

40

## Insider/Outsider Model and Inflation

- The *insider-outsider model* is an institutionalist story of inflation where insiders bid up wages and outsiders are unemployed.

41

## Insider/Outsider Model and Inflation

- *Insiders* are business owners and workers with good jobs with excellent long-run prospects; *outsiders* are everyone else.

42

### Insider/Outsider Model and Inflation

- If markets were purely competitive, wages, profits, and rents would be pushed down to competitive equilibrium levels.

43

### Insider/Outsider Model and Inflation

- Insiders don't like this, so they develop sociological and institutional barriers to prevent competition from outsiders.
- Barriers include unions, laws restricting the firing of workers, and brand recognition.

44

### Insider/Outsider Model and Inflation

- Outsiders must take dead-end, low-paying jobs or try to run marginal businesses that pay little return per hour worked.
- Outsiders are the first to be fired and their businesses are the first to fail in a recession.

45

### Insider/Outsider Model and Inflation

- The economy is only partially competitive – the invisible hand is thwarted by social and political forces.
- Insiders push to raise their nominal wages to protect their real wages while outsiders suffer.

46

### Policy Implications of Institutional Theory

- The quantity theorists have a simple solution for stopping inflation – just cut the growth of the money supply.

47

### Policy Implications of Institutional Theory

- The institutional theorists agree with this prescription, but they argue that is not only inefficient but unfair.
- It causes unemployment among those least able to handle it.

48



## Policy Implications of Institutional Theory

- They favour contractionary monetary policies used in combination with an incomes policy to directly slow down inflation.
- **Incomes policy** – places direct pressure on individuals and businesses to hold down their nominal wages and prices.

49

## Policy Implications of Institutional Theory

- Formal incomes policies have been out of favour for a number of years.
- Informal incomes policies exist in many European nations.

50

## Inflation and Unemployment: The Phillips Curve

- The AD/AS model expresses a tradeoff between inflation and unemployment.
  - A low unemployment rate is generally accompanied by high inflation.
  - A high unemployment rate is generally accompanied by low inflation.

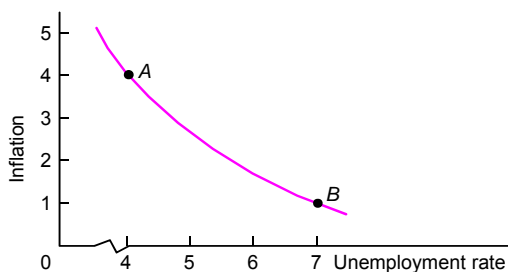
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## Inflation and Unemployment: The Phillips Curve

- The tradeoff can be represented graphically in the short-run Phillips Curve.
- **Short-run Phillips Curve** – a downward-sloping curve showing the relationship between inflation and unemployment when expected inflation is constant.

52

## Hypothesized Phillips Curve



53

## History of the Phillips Curve

- In the 1950s and 1960s, whenever unemployment was high, inflation was low and vice versa.
- The tradeoff between unemployment and inflation seemed relatively stable during this time.

54

## History of the Phillips Curve

- In the 1960s, the short-run Phillips Curve began to play an important role in discussions of macroeconomic policy.

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## History of the Phillips Curve

- Conservatives generally favoured contractionary monetary and fiscal policy that meant high unemployment and low inflation.
- Liberals generally favoured expansionary monetary and fiscal policy that meant low unemployment and high inflation.

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## Breakdown of the Phillips Curve

- In the early 1970s, the relationship between inflation and unemployment began breaking down.
- Unemployment was high, but so was inflation.

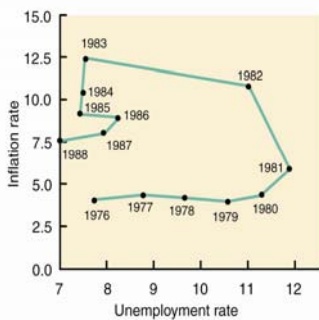
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## Breakdown of the Phillips Curve

- This phenomenon was termed **Stagflation** – the combination of high and accelerating inflation and high unemployment.

58

## Breakdown of the Phillips Curve



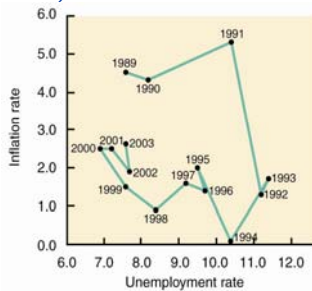
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## Questions About the Phillips Curve (1981-2002)

- Inflation fell substantially after the early 1980s.
- A Phillips-Curve-type relationship began to reappear beginning in 1986.
- Both inflation and unemployment remained relatively low in the mid- to late-1990s.

60

## Questions About the Phillips Curve (1981-2002)



61

## Long-Run and Short-Run Phillips Curves

- The continually changing relationship between inflation and unemployment has economists somewhat perplexed.
- Expectations of inflation have been incorporated into the analysis by distinguishing between short-run and long-run Phillips curves.

62

## Importance of Inflation Expectations

- **Expectations of inflation** – the rise in the price level that the average person expects.
- Expectations of inflation do not change along a short-run Phillips curve.

63

## Importance of Inflation Expectations

- **Long-run Phillips curve** – a vertical curve at the unemployment rate consistent with potential output.
- It shows the relationship between inflation and unemployment when expectations of inflation equal actual inflation.

64

## Importance of Inflation Expectations

- When expectations of inflation are higher, the same level of unemployment will be associated with a higher level of inflation.

65

## Importance of Inflation Expectations

- It makes sense to assume that the short-run Phillips curve moves up or down as expectations of inflation change.

66

## Importance of Inflation Expectations

- The only sustainable combination of inflation and unemployment rates on the short-run Phillips curve is at a point where it intersects the long-run Phillips curve.

67

## Moving Off the Long-Run Phillips Curve

- If government decides to increase aggregate demand, this pushes output above its potential.
- Demand for labour goes up, pushing wages higher than productivity increases.

68

## Moving Off the Long-Run Phillips Curve

- Workers are initially satisfied that their increased wages will raise their standard of living.
- But if productivity does not go up, inflation will wipe out their wage gains.

69

## Moving Back onto the Long-Run Phillips Curve

- Workers ask for more money when they find their initial raise did not keep up with unexpected inflation.
- This can result in a wage-price spiral.

70

## Moving Back onto the Long-Run Phillips Curve

- If unemployment is lower than the target level of unemployment, inflation and the expectation of inflation will increase.
- The short-run Phillips curve will shift up.
- The short-run Phillips curve will continue to shift up until output is no longer above potential.

71

## Moving Back onto the Long-Run Phillips Curve

- If the cause of inflation is expectations of inflation, any level of unemployment is consistent with the target level of unemployment.

72

## Stagflation and the Phillips Curve

- Expectational inflation can be eliminated if aggregate demand falls.
- Lower aggregate demand results in unemployment above the target rate.
- Higher unemployment puts downward pressure on wages and prices, shifting the short-run Phillips curve down.

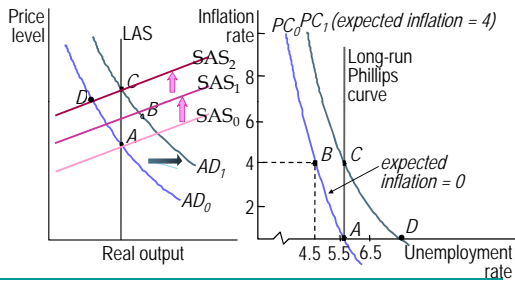
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## Stagflation and the Phillips Curve

- Economists believe that the stagflation of the late 1970s and early 1980s was caused when government tried to lower inflation with contractionary aggregate demand policy.
- This resulted in unemployment, along with inflation.

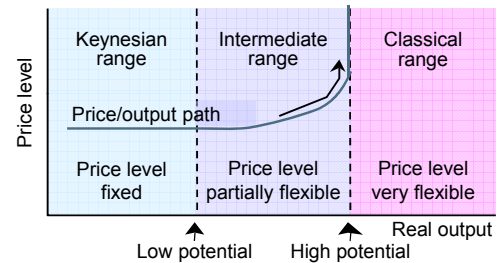
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## Inflation Expectations and the Phillips Curve



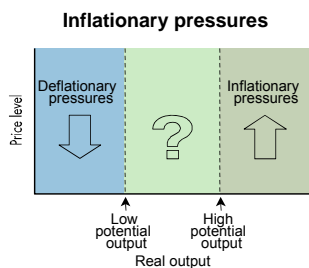
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## The Price/Output Path



76

## Inflation/Growth Trade Off



77

## Quantity Theory and the Inflation/Growth Trade-Off

- Quantity theorists are much more likely to err on the side of preventing inflation.
- For them, erring on the low side pays off by stopping any chance of inflation.
- It also builds credibility for the Bank of Canada.

78

## Quantity Theory and the Inflation/Growth Trade-Off

- Quantity theorists justify erring on the side of preventing inflation by arguing that there is a high cost associated with igniting inflation.
- Inflation undermines the economy's long-run growth and hence its future potential income.

79

## Quantity Theory and the Inflation/Growth Trade-Off

- Quantity theorists argue that there is no long-run trade-off between inflation and unemployment.

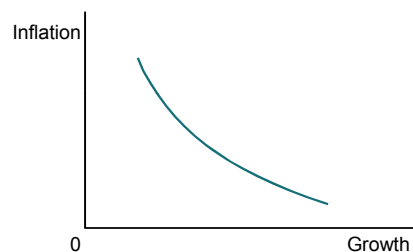
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## Quantity Theory and the Inflation/Growth Trade-Off

- Quantity theorists believe low inflation leads to higher growth:
  - It reduces price uncertainty, making it easier for businesses to invest in future production.
  - It encourages businesses to enter into long-term contracts.
  - It makes using money much easier.

81

## Growth/Inflation Trade-Off



82

## Institutional Theory and the Inflation/Growth Trade-Off

- Supporters of the institutional theory of inflation are less sure about a negative relationship between inflation and growth.

83

## Institutional Theory and the Inflation/Growth Trade-Off

- Institutional theorists agree that increases in the price level have the potential of generating inflation.
- They agree that high accelerating inflation undermines growth.
- They do not agree that all price level increases start an inflation.

84

## Institutional Theory and the Inflation/Growth Trade-Off

- If inflation does get started, the government has tools that will get rid of inflation relatively easily.

85

## Institutional Theory and the Inflation/Growth Trade-Off

- This was highlighted in the debate about monetary policy in early 2000.
- Quantity theorist argued that inflation was just around the corner, and unless government instituted contractionary aggregate demand policy, the seeds of inflation would be sown.

86

## Institutional Theory and the Inflation/Growth Trade-Off

- Other economists argued that the institutional changes in the labour market had reduced the inflation threat and that more expansionary policy was needed.
- The Bank of Canada deftly sailed between these two positions.

87

## The Inflation and Unemployment Trade-Off

End of Chapter 15