

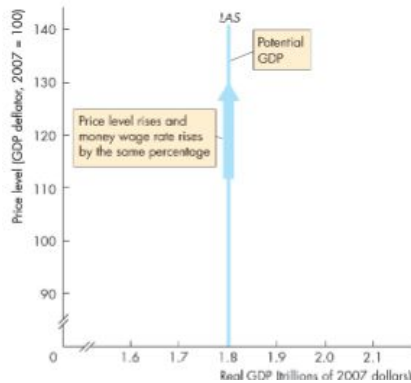
CHAPTER 10: Aggregate Supply and Demand

Quantity Supplied and Supply

- Quantity of real GDP supplied is total quantity that firms plan to produce during period
- **Aggregate Supply:** relationship between the quantity of real GDP supplied and price level

Long Run Aggregate Supply

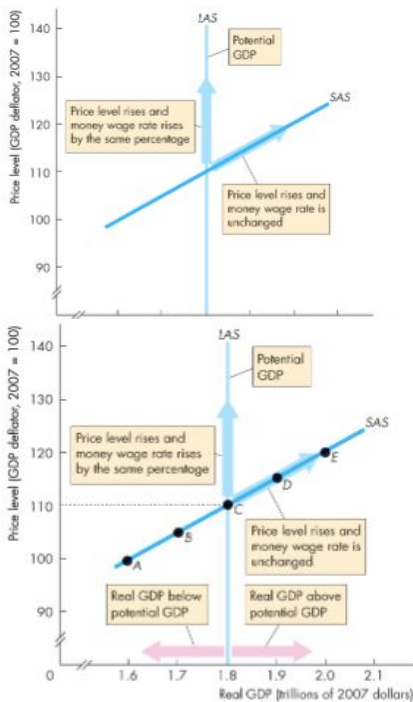
- LAS: relationship between quantity of real GDP supplied at price level when real GDP equals potential GDP



- Potential GDP is independent of price level
- LAS vertically at potential GDP
- Quantity of real GDP supplied is potential GDP
- As price level rises and money wages rate changes by the same percentage, the quantity of real GDP supplied remains at potential GDP

Short Run Aggregate Supply

- SAS: relationship between quantity of real GDP supplied and price level when the money wage rate price of other resources and potential GDP remain constant



- Rise in price level with no change in money wage and other factors prices increase the quantity of real GDP remain constant
- SAS is upward sloping
- Quantity of real GDP supplied increases if the price level rises
- Rise in price level with no change in the money rate includes firms to increase production

- With a given money wage rate the SAS curve cuts the LAS curves at potential GDP
- Price level is 110
- As price level falls below 110 quantity of real GDP supplied decreases along SAS curve
- As price level rises above 110 quantity of real GDP supplied increases along the SAS curve exceeds potential GDP

Changes in Aggregate Supply

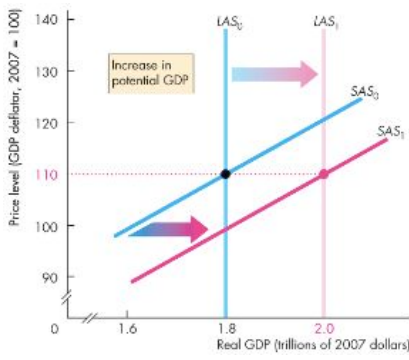
- Aggregate supply changes if an influence on production plans other

than the price level changes

- The influences include
 - Changes in potential GDP
 - Changes in money wage rate

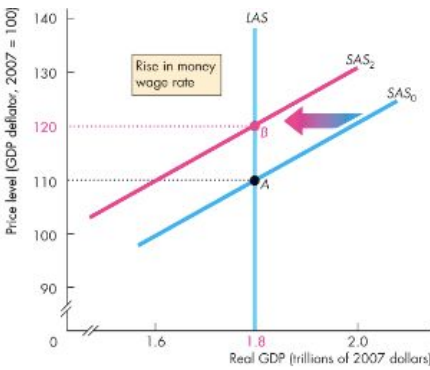
Changes in Potential GDP

- When potential GDP increases both LAS and SAS curves shift rightward



Potential GDP increases if:

- Full employment quantity of labour increases
- Quantity of capital (physical/human) increases
- Advance in technology occurs
 - LAS curve shifts rightward
 - SAS curve shifts along with the LAS curve



Changes in Money Wage Rate

- Rise in money wage rate
- SAS supply decreases and SAS curve shifts leftward
- LAS does not change

Aggregate Demand

- Quantity of real GDP demand - (Y) is total amount of final goods and services produced in Canada that people, businesses, governments and foreigners plan to buy
- Quantity is sum of consumption expenditures - C
- Investment - I
- Government Expenditure- G
- Net Exports- X-M (export - import)

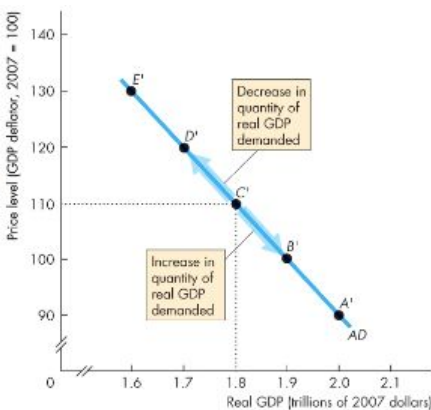
$$Y = C + I + G + X - M$$

Buying Plans depend on many factors and some of the main ones are

1. Price level
2. Expectations
3. Fiscal policy and monetary policy
4. The world economy

The Aggregate Demand Curve

- **Aggregate demand:** relationship between the quantity of real GDP demand and price level
- AD plots quantity of real GDP demand against price level



- As price level changes quantity of real GDP demands moves along the AD curve
- Slopes downward for two reasons
 - Wealth effect
 - Substitution effect

Wealth Effect

- Rise in price level decreases the quantity of real wealth (money, stocks etc)
- To restore real wealth, people increase saving and decreasing spending
- Quantity of real GDP demand decrease
- A fall in price level, increases the quantity of real wealth and increases quantity of real GDP demand increase

Substitution Effect

Intertemporal Substitution Effect:

- Rise in price level, decreases the real value of money and raises the interest rate
- When interest rate rises, people borrow and spend less, quantity of real GDP demanded decreases
- Fall in price level increases the real value of money and lowers interest rate
- When interest rate falls people borrow and spend more, quantity of real GDP demand increases

International Substitution Effect:

- A rise in the price level increases the price of domestic goods relative to foreign goods
- Imports increase and exports decrease, which decrease the quantity of real GDP demand
- A fall in the price level increase the quantity of real GDP demanded

Changes in Aggregate Demand

- A change in any influence on buying plans other than the price level changes aggregate demand
- The main influence on aggregate demand are
 - Expectations
 - Fiscal policy and monetary policy
 - The world economy

Expectations

- Expectations about future income, future inflation and future profits change aggregate demand
- Increases in expected future income increase people's consumption today and increase aggregate demand
- A rise in the expected inflation rate makes buying goods cheaper today and increases aggregate demand
- An increase in expected future profits boosts firms' investment which increases aggregate demand

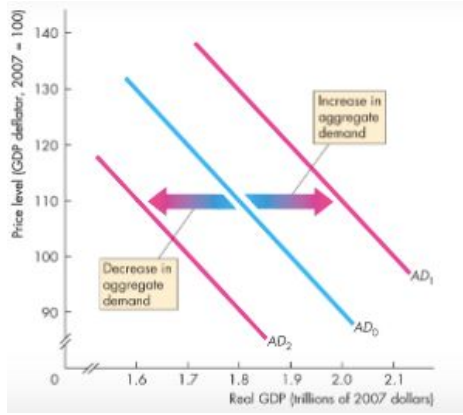
Fiscal Policy and Monetary Policy

- **Fiscal Policy:** governments attempt to influence the economy by setting and changing taxes, making transfer payments and purchasing goods and services
- A tax cut or an increase in transfer payments increases households' disposable income- aggregate income minus taxes plus transfer payments
- An increase in disposable income increase consumption expenditure and increase aggregate demand
- Because government expenditure on goods and services is on component of aggregate demand, an increase in government expenditure increase aggregate demand
- **Monetary policy:** change in interest rates and the quantity of money in the economy
- An increase in the quantity of money increases buying power and increases aggregate demand
- A cut in interest rates increases expenditure and increases aggregate demand

The World Economy

- The world economy influences aggregate demand in two ways

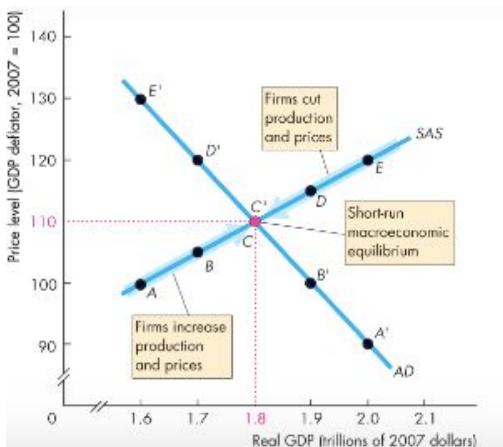
- A fall in foreign exchange rate lowers the price of domestic goods and services relative to foreign goods and services which increases exports, decrease imports and increases aggregate demand
- An increase in foreign income increases the demand for canadian exports and increases aggregate demand



- When aggregate demand increases the AD curve shifts rightward
- When aggregate demand decrease the AD curve shifts leftwards

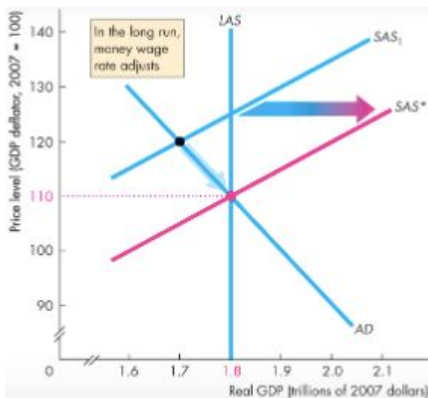
Explaining Macroeconomic Trends and Fluctuations

Short Run Macroeconomics Equilibrium: occurs when the quantity of real GDP demand equals the quantity of real GDP supplied at the point of intersection of the AD curve and the SAS curve



- If real GDP is above equilibrium GDP, firms decrease production and lower prices
- If real GDP is below equilibrium GDP, firms increase production and raise price
- These changes bring a movement along the SAS curve towards equilibrium
- In short run equilibrium real GDP can be greater than or less than potential GDP

Long Run Macroeconomics Equilibrium: occurs when real GDP equals potential GDP-when the economy is on its LAS curve



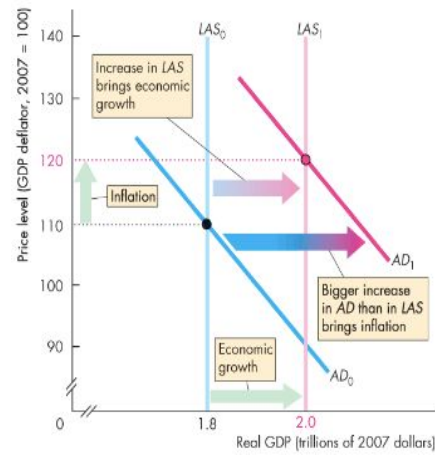
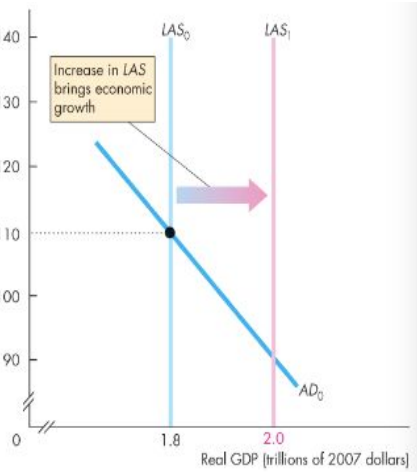
- Occurs at the intersection of the AD and LAS curves
- Initially the economy is at below full employment equilibrium
- In long run the money wage falls until the SAS curve passes through the long run equilibrium point

Economic Growth in the AS-AD Model

- quantity of labour grows, capital is accumulated and technology advances, potential GDP increases
- LAS curve shifts rightward

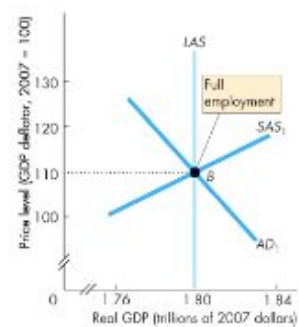
Illustrates Inflation

- The quantity of money grows faster than potential GDP, aggregate demand increases by more than long-run aggregate supply
- The AD curve shifts faster than the LAS curve
- Inflation and economic growth occur

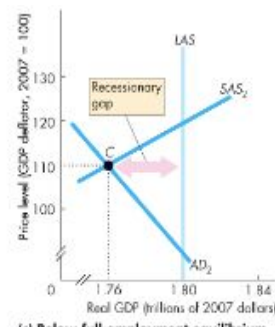


The Business Cycle in the AS-AD Model

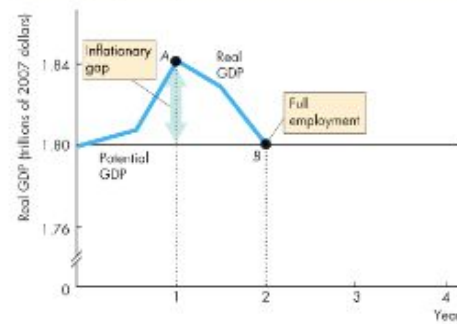
- The business cycle occurs because aggregate demand in the short-run aggregate supply fluctuate, but the money wage does not change rapidly enough to keep real GDP at potential GDP
- Above full employment equilibrium: real GDP exceeds potential GDP
- Full employment equilibrium: real GDP equals potential GDP
- Below full employment equilibrium: potential GDP exceeds real GDP



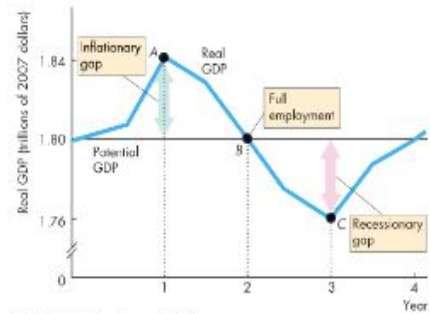
- A and D illustrate full employment equilibrium
- The amount by which potential GDP exceeds real GDP is called inflationary gap
- B and D illustrate full employment equilibrium



(c) Below full-employment equilibrium



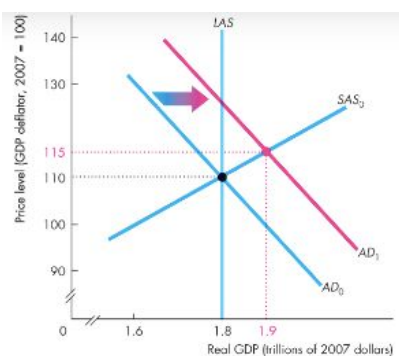
- C and D illustrate below full employment equilibrium
- When real GDP is less than potential GDP the gap is called a recessionary gap
- D shows how as the economy moves from one short run equilibrium to another real GDP fluctuates around potential GDP in a business cycle



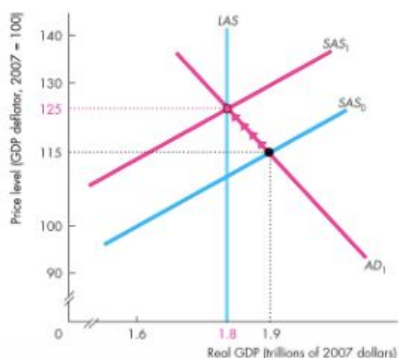
(d) Fluctuations in real GDP

Fluctuations in Aggregate Demand

- Shows the effects of an increase in aggregate demand
- An increase in aggregate demand shifts the AD curve rightward
- Firms increase production and the price level rises in the short run

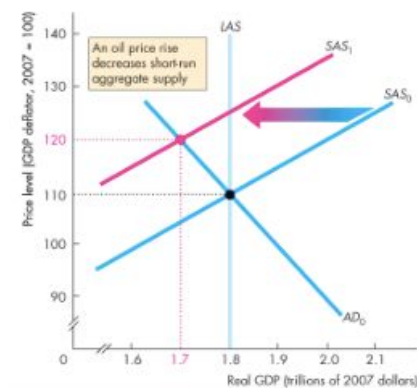


(a) Short-run effect



- At short run equilibrium there is an inflationary gap
- The money wage rate begins to rise and the SAS curve starts to shift leftward
- The price level continues to rise and real GDP continues to decrease until it equals potential GDP

(b) Long-run effect



Fluctuations in Aggregate Supply

- Shows the effects of a rise in the price of oil
- SAS curve shifts leftward
- Real GDP decreases and the price level rises
- Economy experiences stagflation

Macroeconomics Schools of Thought

The Classical View

- A classical macroeconomist believes that the economy is self regulating and always at full employment
- The term “classical” derives from the name of the founding school of economics that includes Adam Smith, David Ricardo and John Stuart Mill
- A new classical view is that business cycle fluctuations are the efficient responses of a well-functioning market economy that is bombarded by shocks that arise from the uneven pace of technological change

The Keynesian View

- A keynesian macroeconomist believes that left alone the economy would rarely operate at full employment and that to achieve and maintain full employment, active help from fiscal policy and monetary policy is required
- The term “keynesian” derives from the name of one of the twentieth century's most famous economists, John Maynard Keynes
- A new Keynesian view holds that not only is the money wage rate sticky but also are the prices of goods sticky

The Monetarist View

- A monetarist is a macroeconomist who believes that the economy is self regulating and that it will normally operate at full employment, provided that monetary policy is not erratic and that the pace of money growth is kept steady
- Term “monetarist” was coined by an outstanding twentieth-century economist, Karl Brunner, to describe his own views and those of Milton Friedman

CHAPTER 11: Expenditure Multipliers

Fixed Prices and Expenditure Plans

- Keynesian model describes the economy in the very short run when prices are fixed
- Because each firm's price is fixed for the economy as a whole:
 1. The price level is fixed
 2. Aggregate demand determines real GDP

Expenditure Plans

- The components of aggregate expenditure sum to real GDP
- Two of the components of aggregate expenditure, consumption and imports are influenced by real GDP
- So there is a two-way link between aggregate expenditure and real GDP

Two-Way link Between Aggregate Expenditure and Real GDP

- An increase in real GDP increases aggregate expenditure
- And increase in aggregate expenditure increases real GDP

Consumption and Saving Plans

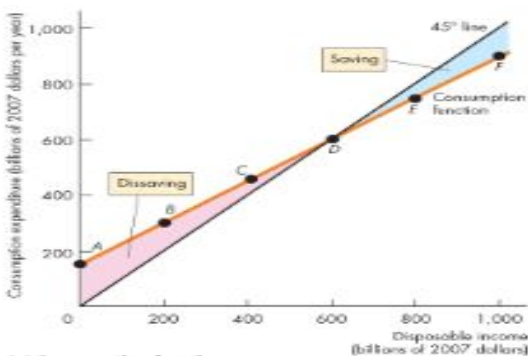
- Consumption expenditure is influence by many factors but the most direct one is disposable income
- **Disposable income:** is aggregate income or real GDP, Y , minus net taxes, T
- Call disposable income YD

$$YD = Y - T$$

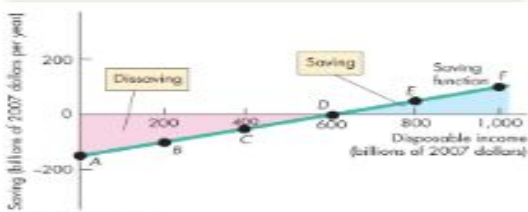
- Disposable income, YD is either spent on consumption goods and services, C , or saved, S

$$YD = C + S$$

- The relationship between consumption expenditure and disposable income, other things remain the same, is the **consumption function**
- The relationship between saving and disposable income is the **saving function**



(a) Consumption function



(b) Saving function

	Disposable income	Planned consumption expenditure	Planned saving
(billions of 2007 dollars)			
A	0	150	-150
B	200	300	-100
C	400	450	-50
D	600	600	0
E	800	750	50
F	1,000	900	100

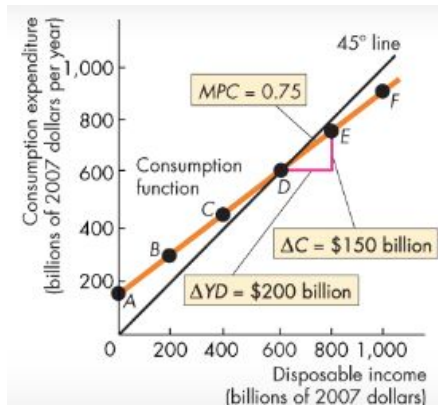
When consumption expenditure exceeds disposable income, saving is negative (dissaving).

When consumption expenditure is less than disposable income, there is saving.

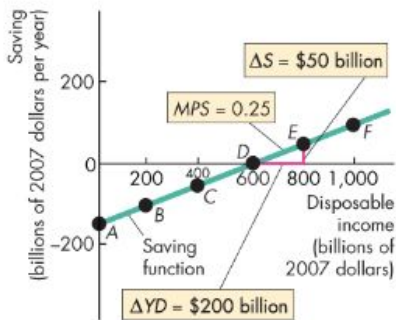
Marginal Propensities to Consume and Save

- The marginal propensity to consume (MPC) is the fraction of a change in disposable income spent on consumption
- Calculated as the change in consumption expenditure, ΔC , divided by the change in disposable income, ΔYD , that brought it about

$$MPC = \Delta C \div \Delta YD$$



- MPC is the slope of the consumption function
- Along this consumption function when disposable income increases by \$200 billion, consumption expenditure increased by \$150 billion
- The MPC IS 0.75



- The marginal propensity to save (MPS) is the fraction of a change in disposable income that is saved
- It is calculated as the change in saving, ΔS , divided by the change in disposable income, ΔYD , that brought it about

$$MPS = \Delta S \div \Delta YD$$

- MPS is the slope of the saving function
- Along this saving function, when disposable income increase by \$200 billion saving increases by \$50 billion
- MPC IS .25

- The MPC plus the MPS equals 1

$$\Delta C + \Delta S = \Delta YD$$

- Divide this equation by ΔYD to obtain

$$\Delta C/\Delta YD + \Delta S/\Delta YD = \Delta YD/\Delta YD \text{ or } MPC + MPS = 1$$

Consumption as a Function of Real GDP

- Disposable income changes when either real GDP changes or net taxes change
- If tax rates don't change, real GDP is the only influence on disposable income, so consumption expenditure is a function of real GDP
- We use this relationship to determine real GDP when the price level is fixed

Import Function

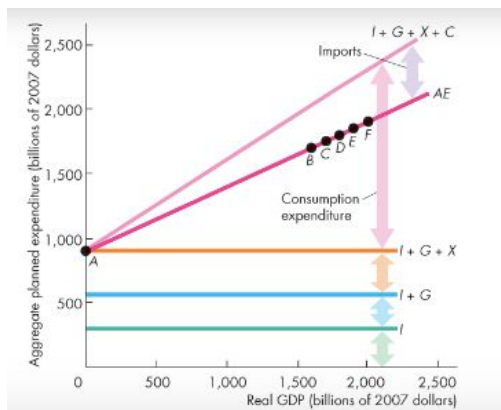
- In the short run, canadian imports are influenced primarily by canadian real GDP
- The marginal propensity to import is the fraction of an increase in real GDP spent on imports
- If an increase in real GDP of \$100 billion increase imports by \$25 billion the marginal propensity to import is 0.25

Real GDP with a Fixed Price Level

- When the price level is fixed, aggregate demand is determined by aggregate expenditure plans
- Aggregate planned expenditure: planned consumption expenditure plus planned investment plus planned government expenditure plus planned exports minus planned imports
- Planned consumption expenditure and planned imports are influenced by real GDP
- When real GDP increases, planned consumption expenditure and planned imports increase
- Planned investment plus planned government expenditure plus planned exports are not influenced by real GDP

Aggregate Planned Expenditure

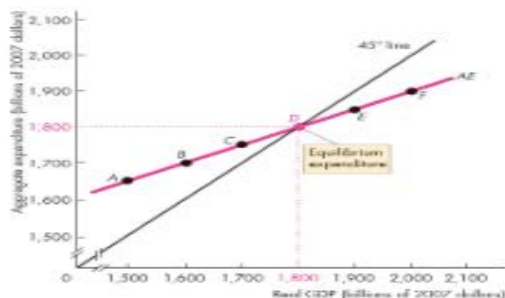
- The relationship between aggregate planned expenditure and real GDP can be described by an aggregate expenditure schedule
- The aggregate expenditure schedule lists the quantity of aggregate expenditure planned at each quantity of real GDP
- Relationship also described by an aggregate expenditure curve: a graph of the aggregate expenditure schedule



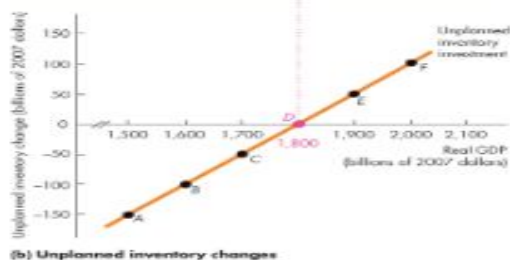
- AE is built from components
- Consumption expenditure minus imports, which varies with real GDP, is induced expenditure
 - The sum of investment, government expenditure and exports, which does not vary with real GDP, is autonomous expenditure
 - Consumption expenditure and imports can have an autonomous component

Actual Expenditure, Planned Expenditure and Real GDP

- Actual aggregate expenditure is always equal to real GDP
- Aggregate planned expenditure may differ from actual aggregate expenditure because firms can have unplanned changes in inventories



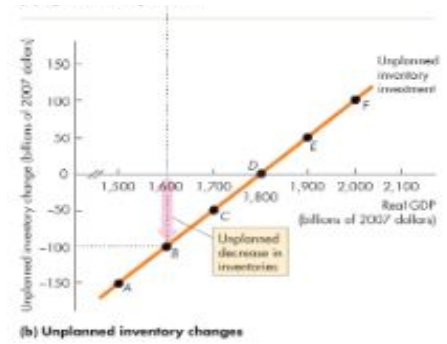
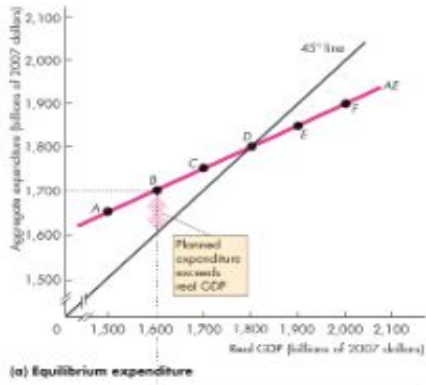
(a) Equilibrium expenditure



(b) Unplanned inventory changes

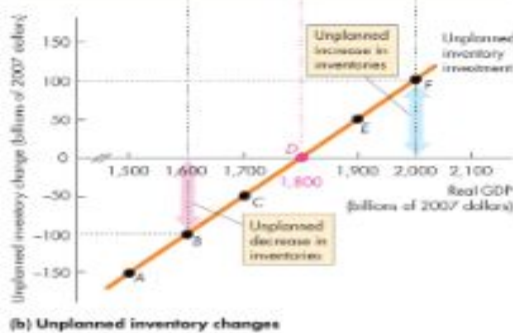
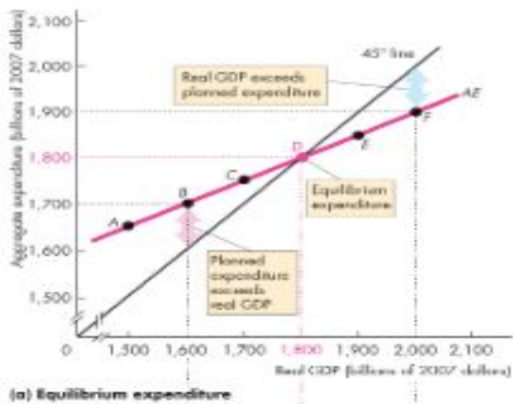
Equilibrium Expenditure

- Level of aggregate expenditure that occurs when aggregate planned expenditure equals real GDP
 - Equilibrium occurs at the point at which the AE curve crosses the 45° line in part (a)
 - Equilibrium occurs when there are no unplanned changes in inventory investment in part (b)



Convergence to Equilibrium

- If aggregate planned expenditure exceeds real GDP (the AE curve is above the 45° line)
 - Firms have unplanned decrease in inventories
 - To restore inventories, firms hire workers and increase production
 - Real GDP increases
- If aggregate planned expenditure is less than real GDP (the AE curve is below the 45° line)
 - Firms have an unplanned increase in inventories
 - To reduce inventories firms fire workers and decrease production
 - Real GDP decrease
- If aggregate planned expenditure equals real GDP (the AE curve intersects the 45° line)
 - Firms have no unplanned change in inventories
 - So firms maintain their current production
 - Real GDP remains constant

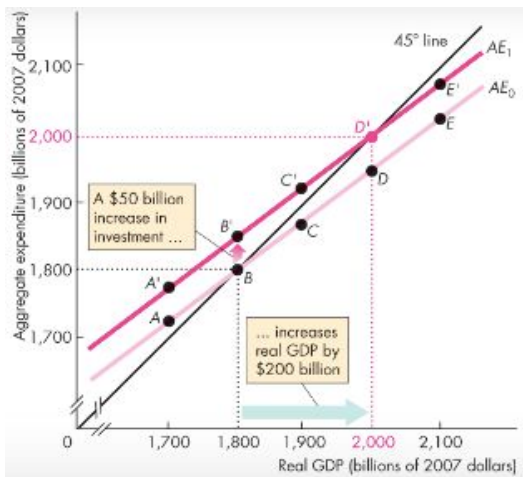


The Multiplier

- When autonomous expenditure changes so does equilibrium expenditure and real GDP
- But the change in the equilibrium expenditure is larger than the change in autonomous expenditure
- The multiplier is the amount by which a change in autonomous expenditure is magnified or multiplied to determine the change in equilibrium expenditure and real GDP

The Basic Idea of the Multiplier

- An increase in investment (or any other component of autonomous expenditure) increase aggregate expenditure and real GDP
- The increase in real GDP leads to an increase in induced expenditure
- The increase in induced expenditure leads to a further increase in aggregate expenditure and real GDP
- So real GDP increases by more than the initial increase in autonomous expenditure



- Investment increases by \$50 billion
- Firms experience an unplanned decrease in inventories
- So firms increase production to restore inventories
- Real GDP increases \$200 billion

Why is the Multiplier Greater than 1

- An increase in autonomous expenditure induced further increases in aggregate expenditure

The Size of the Multiplier

- Equals change in equilibrium expenditure divided by the change in autonomous expenditure

The multiplier and the Slope of the AE curve

- The slope of the AE curve determines the magnitude of the

multiplier:

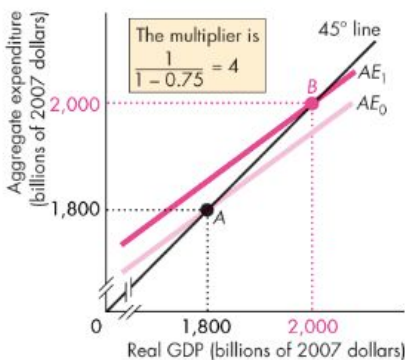
$$\text{Multiplier} = 1 \div (1 - \text{slope of AE curve})$$

- If the change in real GDP is ΔY , the change in autonomous expenditure is ΔA , and the change in induced expenditure is ΔN , then

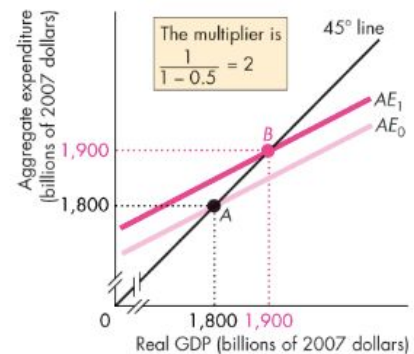
$$\text{Multiplier} = \Delta Y \div \Delta A$$

Imports and Income Taxes

- Both imports and income taxes reduce the size the multiplier
- (a) with no taxes or imports the slope of AE curve is 0.75 and multiplier is 4
- (b) with taxes and imports the slope of the AE curve 0.5 and the multiplier is 2



(a) Multiplier is 4



(b) Multiplier is 2

The Multiplier Process

- The MPC determines the amount of induced expenditure at each round as aggregate expenditure moves towards equilibrium expenditure

Business Cycle Turning Points

- Turning points in the business cycle - peaks and troughs- occur when autonomous expenditure changes
- An increase in autonomous expenditure brings an unplanned decrease in inventories which triggers an expansion
- A decrease in autonomous expenditure brings an unplanned increase in inventories which triggers a recession

Adjusting Quantities and Prices

- Real firms don't hold their price constant for long
- When firms have an unplanned change in inventories they change production and prices
- The AS-AD model explains the simultaneous determination of real GDP and the price level

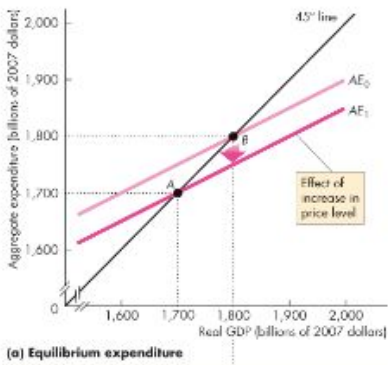
- The two models are related

Aggregate Expenditure and Aggregate Demand

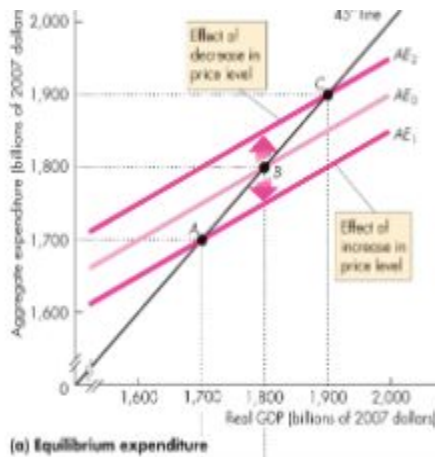
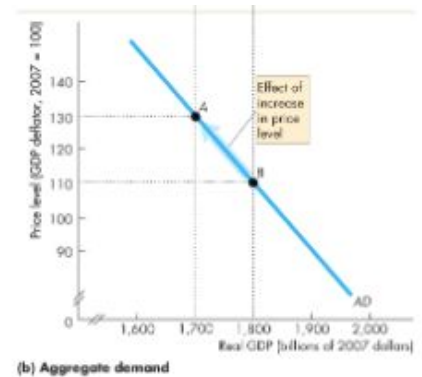
- The aggregate expenditure curve is the relationship between aggregate planned expenditure and real GDP, with all other influences on aggregate planned expenditure remaining the same
- The aggregate demand curve is the relationship between the quantity of real GDP demanded and the price level with all other influences on aggregate demand remaining the same

Deriving the Aggregate Demand Curve

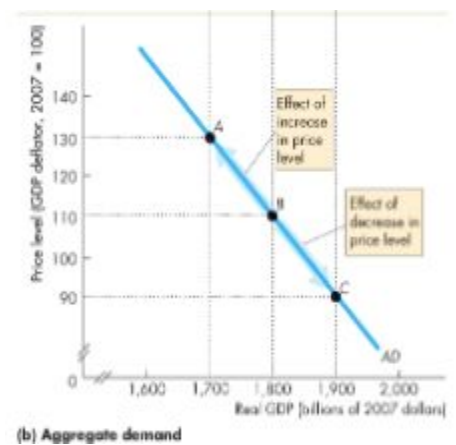
- When the price level changes a wealth effect and substitution effects change aggregate planned expenditure and change the quantity of real GDP demand



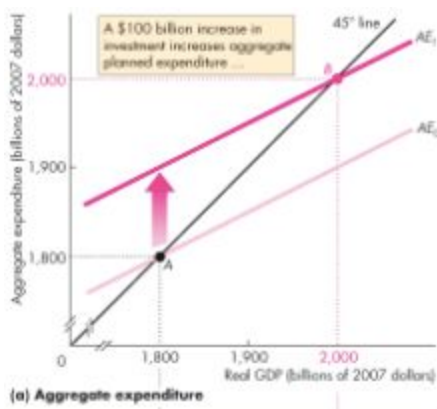
- The effects of a change in the price level on the AE curve, equilibrium expenditure and the quantity of real GDP demand
 - A rise in price from 110 to 130 shifts the AE0 downward to AE1 and decreases equilibrium expenditure from \$1800 billion to \$1700 billion
 - The same rise in the price level that lowers equilibrium expenditure brings a movement along the AD curve from point B up to point A



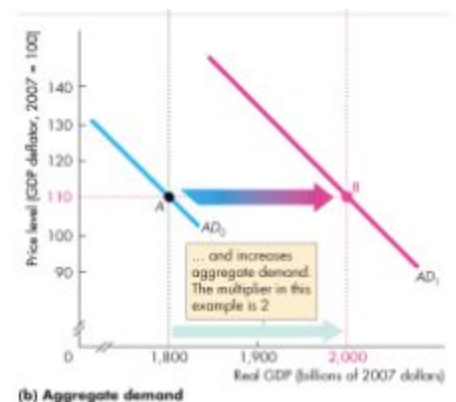
- A fall in price level from 110 to 90 shifts the AE curve from AE0 upward to AE2 and increases equilibrium expenditures from \$1800 to \$1900 billion
 - The same fall in the price level that increase equilibrium expenditure brings a movement along the AD curve to from point B down to point C
 - Points A,B,C on the AD curve correspond to the equilibrium expenditure points A, B, C at the intersection of AE curve and the 45 line



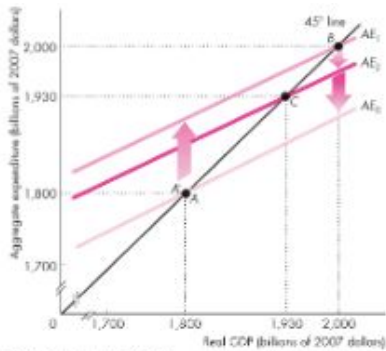
Changes in Aggregate Expenditure and Aggregate Demand



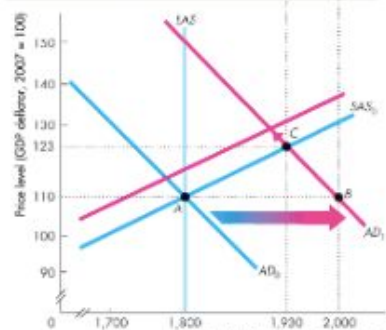
- The effects of an increase in investment
 - The AE curve shifts upward and the AD curve shifts rightward by an amount equal to the change in investment multiplied by the multiplier



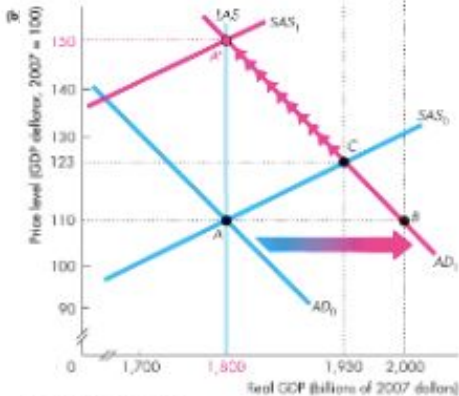
Equilibrium Real GDP and the Price level



(a) Aggregate expenditure



(b) Aggregate demand



(b) Aggregate demand

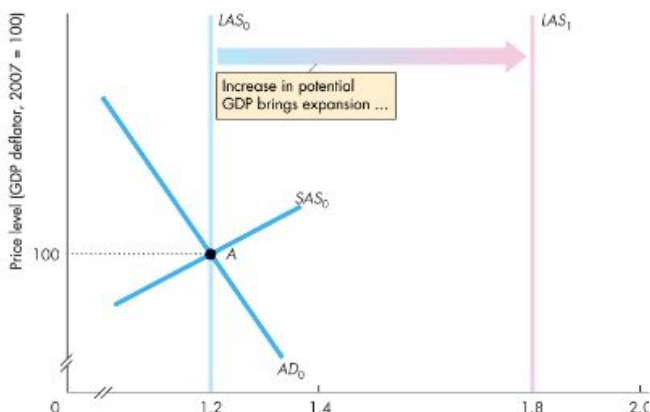
- Shows the effect of an increase in investment in the short run when the price level changes and the economy moves along its SAS curve
- The increase in investment shifts AE curve upward and shifts AD rightward
- With no change in the price level real GDP would increase to \$2000 billion at point B
- But the price level rises the AE shifts downward equilibrium expenditure decreases to \$1930 billion
- As price level rises real GDP increases along the SAS curve to \$1930 billion
- The multiplier in the short run is smaller than when the price level is fixed
- At point C there is no inflationary gap, the money wage rate starts to rise and the SAS curve starts to shift leftward

- The money wage rate continues to rise and the SAS curve continues to shift leftward until real GDP equals potential GDP
- In the long run the multiplier is zero

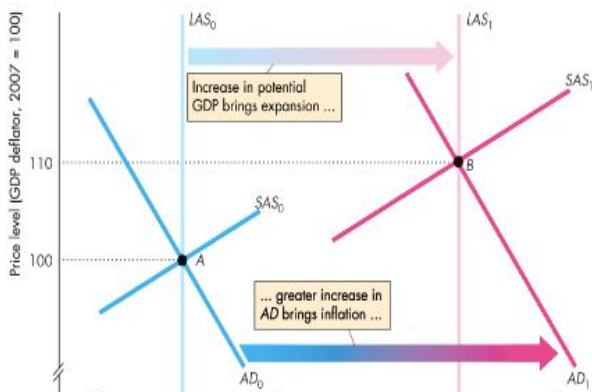
CHAPTER 12: The Business Cycle, Inflation and The Phillips Curve

Mainstream Business Cycle Theory

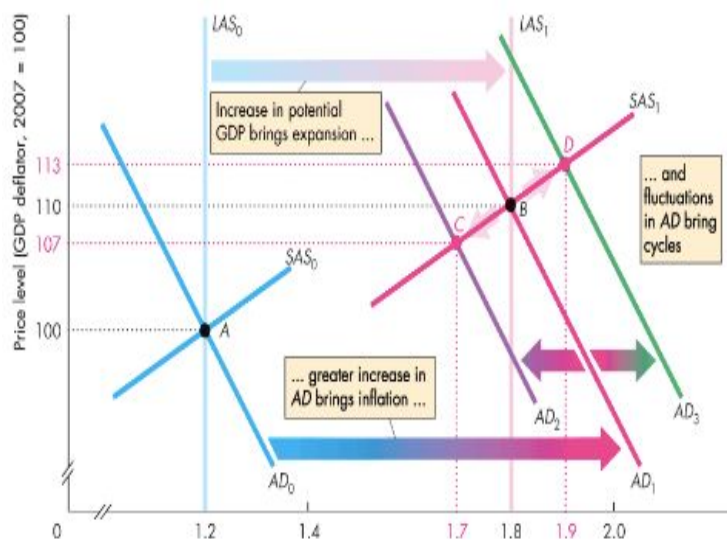
- Because potential GDP grows at a steady pace while aggregate demand grows at a fluctuating rate, real GDP fluctuates around potential GDP



- Initially potential GDP is \$1.2 trillion and the economy is at full employment at point A
- Potential GDP increases to \$1.8 trillion and the LAS curve shifts rightward
- During expansion, aggregate demand increases and usually by more than potential GDP



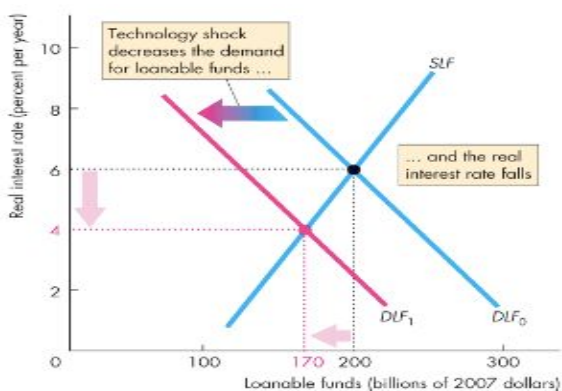
- The AD curve Shifts to AD_1
- Assume that during this expansion the price level is expected to rise to 110 and that the money wage rate was set on that expectation
- The SAS shifts to SAS_1
- The economy remains at full employment at point B
- The price level rises as expected from 100 to 110



- If aggregate demand increases more slowly than potential GDP, the AD curve shifts to AD_2
- The economy moves to point C
- Real GDP growth is slower; inflation is less than expected
- If aggregate demand increase more quickly than potential GDP, the AD curve shifts to AD_3
- The economy moves to point D
- Real GDP growth is faster; inflation is higher than expected
- Economic growth, inflation & business cycle arise from the relentless increase in potential GDP, faster (on average) increase in aggregate demand, and fluctuation in pace of aggregate demand growth

The RBC Mechanism

- Two effects follow from a change in productivity that gets an expansion or a contraction going:
 1. Investment demand changes
 2. The demand for labour changes



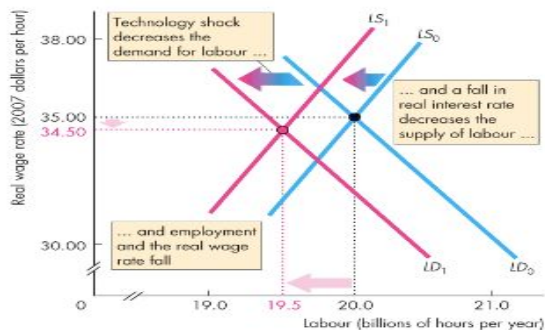
(a) Loanable funds and interest rate

- Shows effects of a decrease in productivity on investment demand
- A decrease in investment demand, which decreases the demand for loanable funds
- The real interest rate falls and the quantity of loanable funds decreases

The Key Decision: when to work?

- To decide when to work, people compare the return from working in the current period with the expected return from working in a later period

- The when to work decision depends on the real interest rate. The lower the real interest rate the smaller is the supply of labor today
- Many economists believe that this intertemporal substitution effect is small, but RBC theorists believe that it is large and the key feature of the RBC mechanism



(b) Labour and wage rate

- Effects of a decrease in productivity on the demand for labour
- As the real interest rate falls the supply of labour decreases
- Employment and the real wage rate decreases

What Happened to money

- Real things not nominal things or money cause the business cycle
- A change in money does not change real resources and only changes the price level

Cycles and Growth

- The shock that drives the business cycle in RBC theory is the same that drives growth: technological change

Criticisms and Defence of RBC Theory

1. The money wage rate is sticky and to assume otherwise is at odds with clear fact
2. Intertemporal substitution is too weak a force to account for large fluctuations in labour supply and employment with small real wage rate changes
3. Productivity shocks are as likely to be caused by changes in aggregate demand as by technological change

Defenders of RBC theory claim that

1. RBC theory explains the macroeconomic facts about the business cycle and is consistent with the facts about economic growth. RBC theory is a single theory that explains both growth and cycle
2. RBC theory is consistent with a wide range of microeconomic evidence about labour supply decisions, labour demand and investment demand decisions and information on the distribution of income between labour and capital

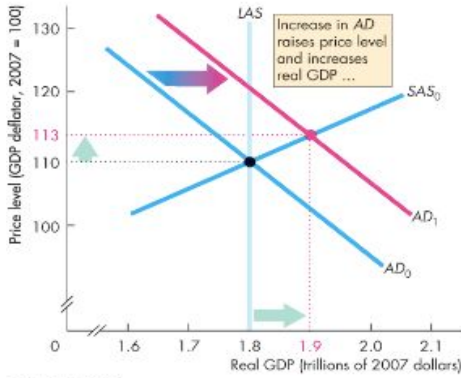
Inflation Cycles

- In the long run inflation occurs if the quantity of money grows faster than potential GDP
- In the short run many factors can start an inflation and real GDP and the price level interact
- To study these interactions we distinguish two sources of inflation
 - Demand pull inflation
 - Cost push inflation

Demand Pull inflation

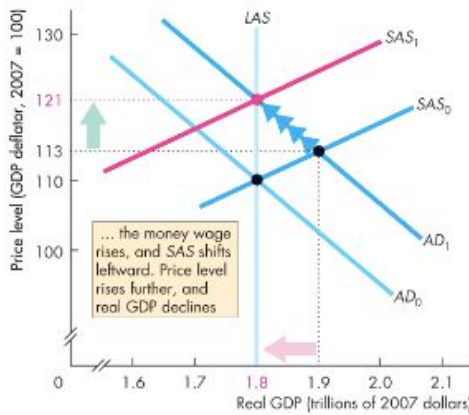
- An inflation that starts because aggregate demand increases is called demand pull inflation
- Begin with any factor that increases aggregate demand
- I.e cut in interest rate, an increase in the quantity of money,

Initial Effect of an Increase in Aggregate Demand



a) Initial effect

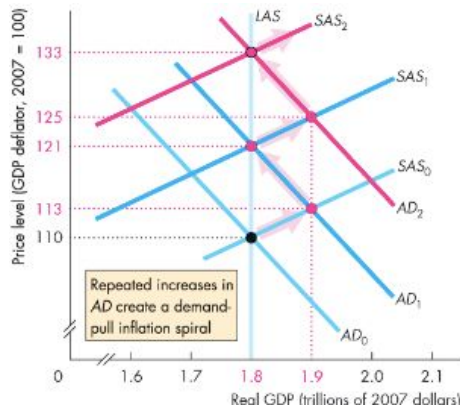
- Start of a demand pull inflation
- Starting from full employment an increase in aggregate demand shifts the AD curve rightward
- The price level rises, real GDP increases and an inflationary gap arises
- The rising price level is the first step in demand pull inflation



(b) The money wage adjusts

Money Wage Rate Response

- Money wage rate rises and the SAS curve shifts leftward
- The price level rises and real GDP decreases back to potential GDP

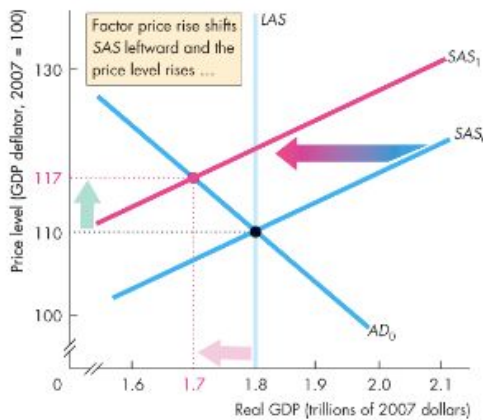


Demand Pull Inflation Process

- Demand in pull inflation spiral
- Aggregate demand keeps increasing and the process just describer repeats indefinitely
- Several factors can increase aggregate demand to start a demand pull inflation but only an ongoing increase in the quantity of money can sustain it
- Demand pull inflation occurred in canada in the 1960s

Cost Push Inflation

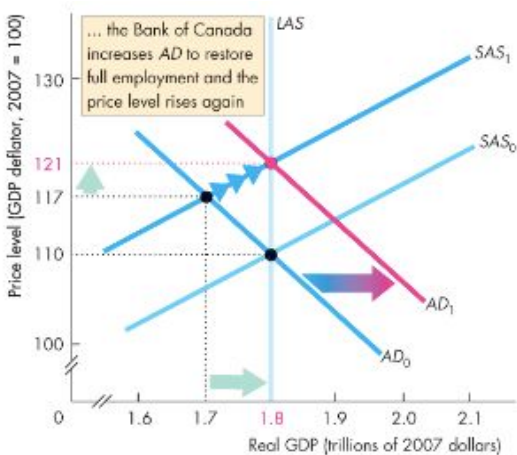
- An inflation that starts with an increase costs
- Two main sources of increase costs
 1. An increase in the money wage rate
 2. An increase in the money price of raw materials such as oil



(a) Initial cost push

Initial Effect of a decrease in Aggregate Supply

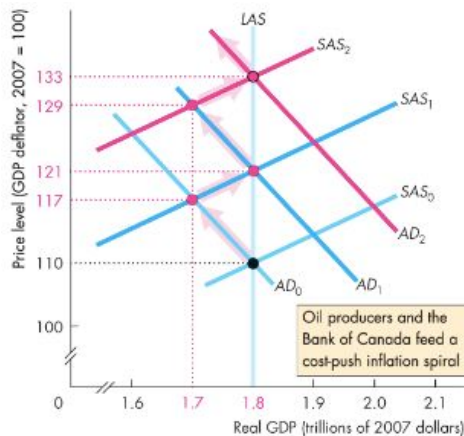
- Start of cost push inflation
- If oil producers cut production and raise the price of oil short-run aggregate supply decreases and the SAS curve shifts leftward
- Real GDP decreases and the price level rises



(b) The Bank of Canada responds

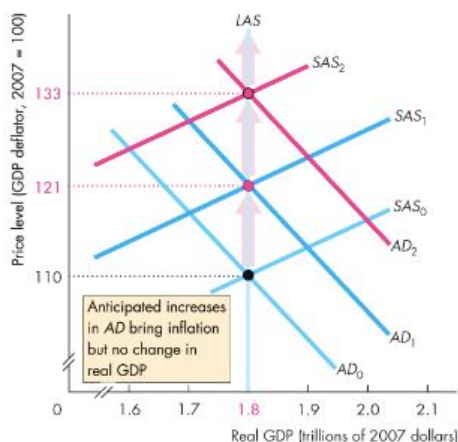
Aggregate Demand Response

- The initial increase in costs creates a one time rise in the price level not inflation
- To create inflation aggregate demand must increase
- That is the bank of Canada must increase the quantity of money persistently
- The bank of Canada stimulates aggregate demand to counter the higher unemployment
- Real GDP increases and the price level rises again



Cost push inflation Process

- If oil producer raise the price of oil to try to keep its relative price higher and the bank of Canada responds by increasing the quantity of money a process of cost push inflation continues
- The combination of a rising price level and a decreasing real GDP is called stagflation
- Cost-push inflation occurred in Canada during the 1970s when the Bank responded to the OPEC oil price rise by increasing the quantity of money



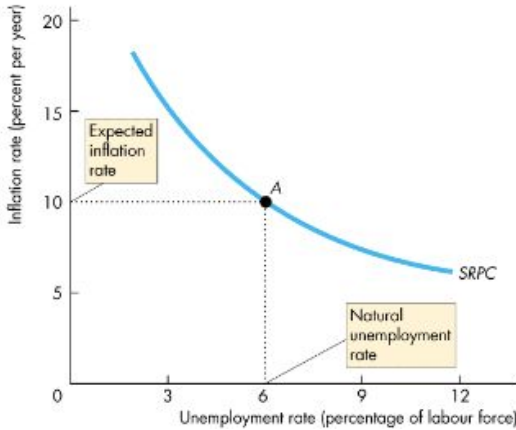
Expected inflation

- Aggregate demand increases but the increase is expected so its effect on the price level is expected
- The money wage rate rises in line with the expected rise in the price level
- The price level rises as expected and real GDP remains at potential GDP
- The process repeats

The Phillips Curve

- Shows relationship between the inflation rate and the unemployment rate

Short Run Phillips Curve



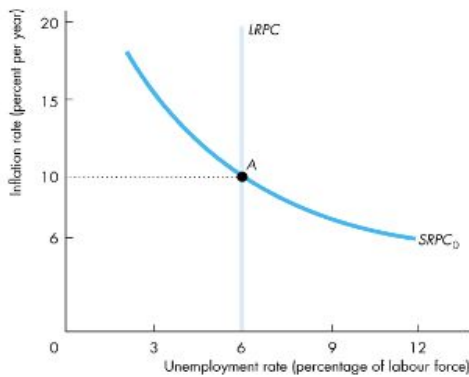
- Shows the tradeoff between inflation rate and unemployment rate, holding constant

- The expected inflation rate
- The natural unemployment rate

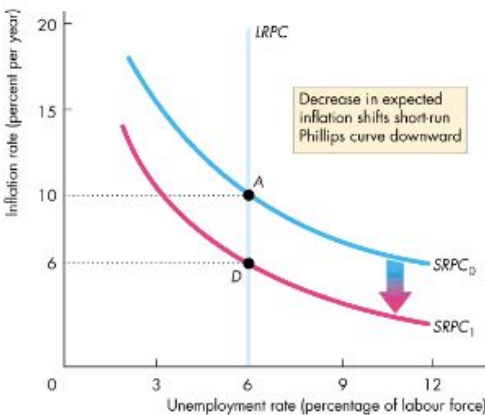
- Downward sloping curve
- Passes through the natural unemployment rate and the expected inflation rate
- With a given expected inflation and natural unemployment rate:
 - If the inflation rate exceeds the expected inflation rate the unemployment rate decreases
 - If the inflation rate is below expected inflation rate the unemployment rate increases

Long Run Phillips Curve

- Relationship between inflation and unemployment when the actual inflation rate equals the expected inflation rate
- Vertical at natural unemployment rate
- Change in inflation rate is expected so the unemployment rate remains at the natural unemployment rate



(a) A change in expected inflation

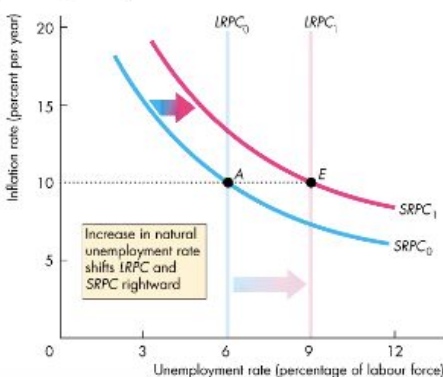


- The SRPC intersects the LRPC at the expected inflation rate - 10% a year in the figure

Change in Expected Inflation

- In expected inflation falls to 6% a year
- SRPC shifts downward by an amount equal to the fall in the expected inflation rate

(a) A change in expected inflation



(b) A change in natural unemployment

Change in the Natural Unemployment Rate

- Shifts both long and short run

CHAPTER 14: Monetary Policy

The Monetary Policy Instrument

- A variable that the Bank of Canada can directly control or closely target
 1. The quantity of money (monetary base)
 2. The price of Canadian money on the foreign exchange market (exchange rate)
 3. The opportunity cost of holding money (short term interest rate)
- the bank of Canada can set any of these three variable but it cannot set all three
- the value of two of them are the consequence of the value at which the third one is set
 1. if the bank decreased the quantity of money both the interest rate and the exchange rate would rise
 2. If the bank raised the interest rate the quantity of money would decrease and the exchange rate would rise
 3. If the bank lowered the exchange rate the quantity of money would increase and the interest rate would fall

The overnight Loans Rate

- The bank of Canada's choice of policy instrument (the same choice made by most other major central banks) is a short term interest rate
- Given this choice the exchange rate and the quantity of money to find their own equilibrium values
- The Bank of Canada target is the overnight loans rate: interest rate on overnight loans that chartered banks make to each other

Hitting the overnight loans rate target

- Once an interest rate decision is made the bank of Canada achieves its targets by using two tools:
 - Operating band
 - Open market operation

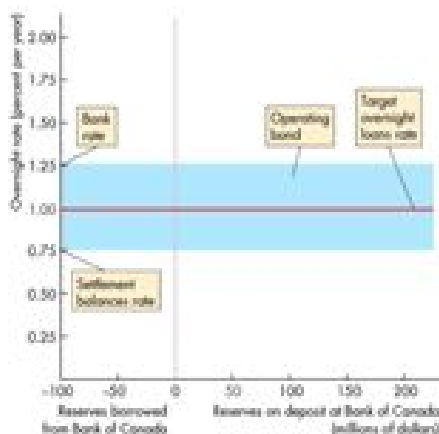
Operating Band

- Target overnight loans rate plus or minus 0.25 percentage points so the operating band is 0.5 percentage points wide
- The bank creates the operating band by setting:
 1. Bank rate: the interest rate that the bank charges big banks on loans is set at the target overnight loans rate plus 0.25 percentage points
 2. Settlement balance rate: interest rate that the bank pays on reserves, is set at the target overnight loans rate minus 0.25 percentage points

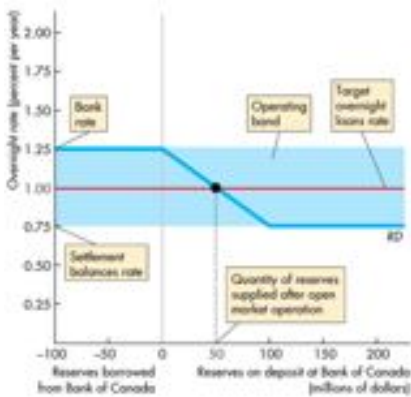
The Market for Reserves

- The x-axis measures the quantity of bank reserves held at the bank of Canada
- The y-axis measures the overnight loans rate
- The red line shows the target for the overnight loans rate
- Bank rate is set at target overnight loans rate plus 0.25%
- Settlement balances rate is set at target overnight loans rate minus 0.25%
- The blue bar is the banks operating band for the actual overnight loans rate

rate



- The overnight loans rate cannot exceed bank rate b/c if it did a bank could make a profit by borrowing from the bank of Canada and lending to another bank
- All banks can borrow from the bank of Canada at bank rate so no bank is willing to pay more than the bank rate to borrow reserves
- The overnight loans rate cannot fall below the settlement balances rate
- If it did a bank could make a profit by borrowing from another bank and increasing its reserves at the bank of Canada
- All banks can earn the settlement balances rate so no bank will lend at a rate below that level



- the banks demand for reserves is the curve RD
- If the overnight loans rate equals bank rate or settlement balances rate, banks are indifferent between borrowing and lending reserves
- Demand curve is horizontal at bank rate and settlement balances rate
- If overnight rate lies between bank rate and the settlement balance rate, banks are willing to borrow and lend to one another at the overnight loans rate
- Overnight loans rate is the opportunity cost of holding reserves so the higher the overnight loans rate the fewer are the reserves demanded
- The banks open market operations determine the actual quantity of reserves in the banking system

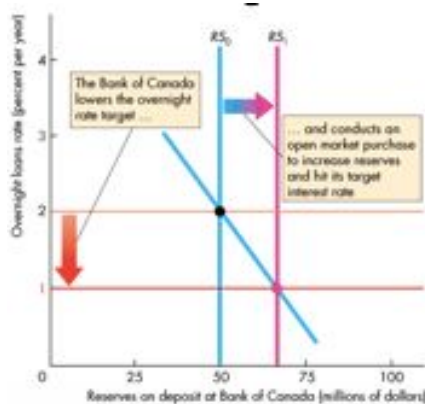
- Equilibrium in the market for reserves – where the quantity of reserves demanded equals the quantity supplied- determines the actual overnight loans rate
- The bank uses open market operation to keep the overnight loans on target

Quick Overview

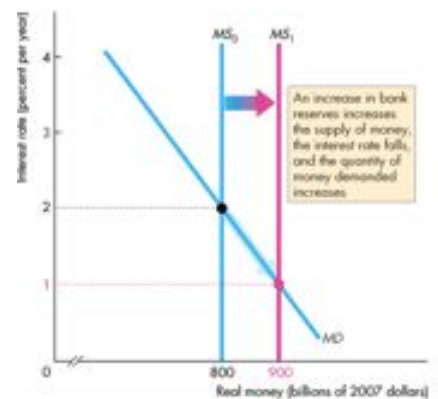
- When the bank of Canada lowers the overnight loans rate
 1. The bank buys securities in an open market operation
 2. Other short term interest rates and the exchange rate fall
 3. The quantity of money and the supply of loanable funds increase
 4. The long term real interest rate falls
 5. Consumption expenditure, investment and net exports increase
 6. Aggregate demand increases
 7. Real GDP growth and inflation rate increase
- When the Bank of Canada raises the overnight loans rate the ripple effects go in the opposite direction

The Bank of Canada Fights Recessions

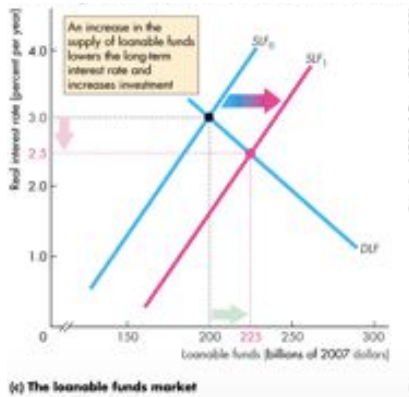
- If inflation is low and the output gap is negative the bank lowers the overnight loans rate target
- An increase in the monetary base increases the supply of money
- The short term interest rate falls



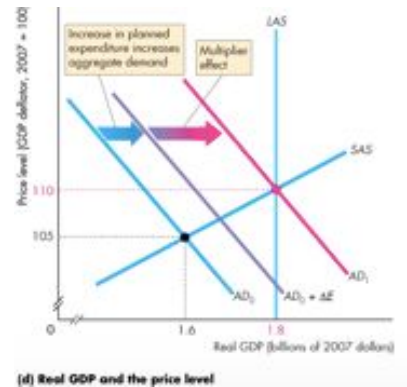
(a) The market for bank reserves



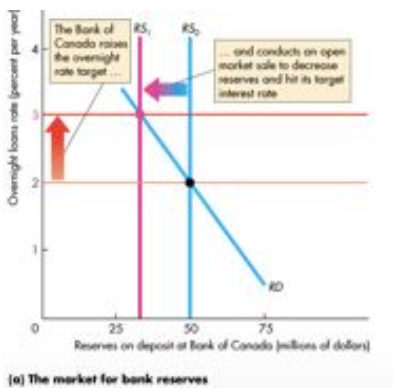
(b) Money market



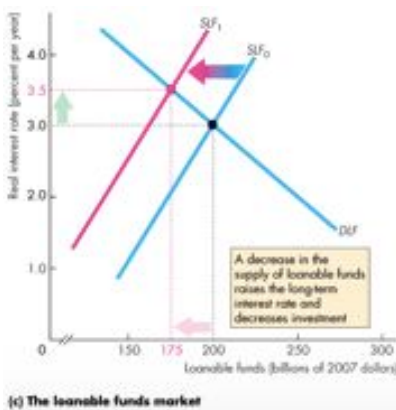
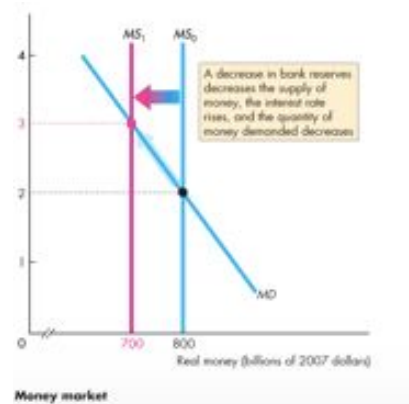
- The increase in the supply of money increases the supply of loanable funds
- The long term real interest rate falls
- Investments increases
- The fall in the real interest rate increases aggregate planned expenditure
- The multiplier increases aggregate demand
- Real GDP increases and closes the recessionary gap



The Bank of Canada Fights Inflation



- If inflation is too high and the output gap is positive
- The bank of Canada raises the overnight loans rate target
- A decrease in the monetary base decrease the supply of money
- The short term interest rate rises



- The decrease in the supply of money decreases the supply of loanable funds
- The long term real interest rate rises
- Investment decreases
- The rise in real interest rate decreases aggregate planned expenditure
- The multiplier decreases aggregate demand
- Real GDP decreases and closes the inflationary gap

