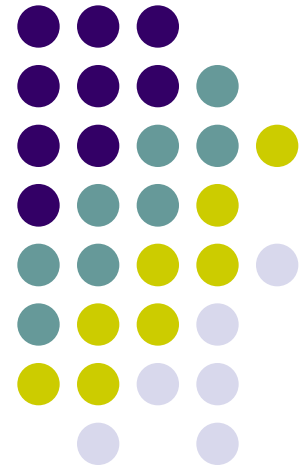


# Economics 2.1

## Inflation

**Level 2 Revision 2009**





# Inflation vs Price Rises

- Prices rise (and fall) all of the time due to the forces of supply and demand
- Going to the supermarket and finding that tomatoes are \$7.99 a kilo may mean that it is winter not that there is massive inflation.
- Inflation is a persistent rise in the **general** level of prices
- This means that prices are rising across most (but not necessarily all) markets in an economy.



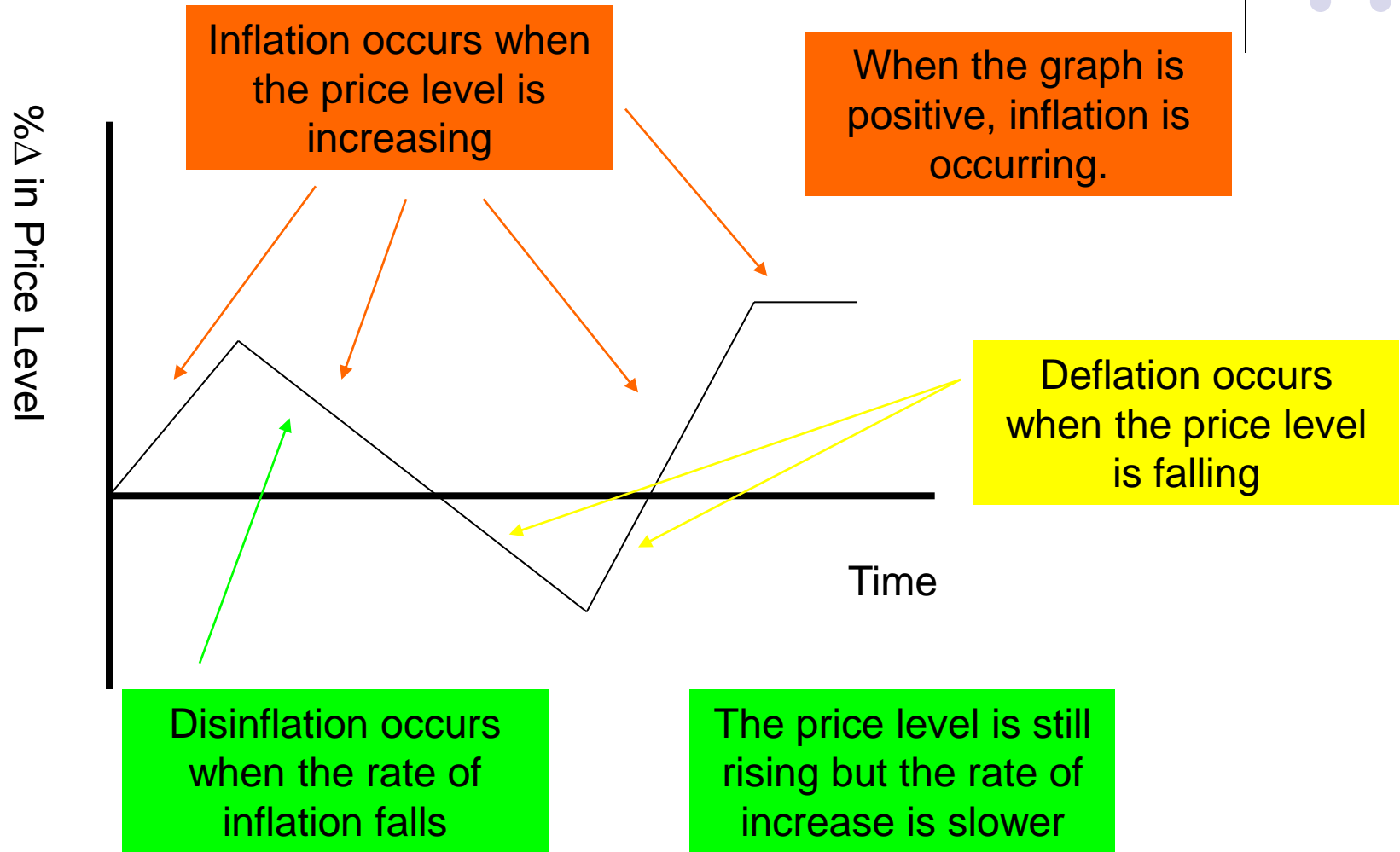
# Example

Product	Quantity purchased	Year 1 Price	Expenditure Year 1	Year 2 Price	
A	4	10	40	12	48
B	3	5	15	3	9
C	5	15	75	17	85
D	4	7.50	30	5	20
<b>Total Expenditure</b>			160		162

Overall prices have increased. Inflation has occurred.



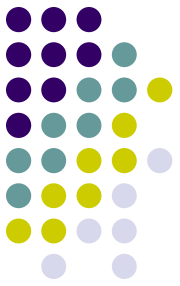
# Inflation, Disinflation, Deflation



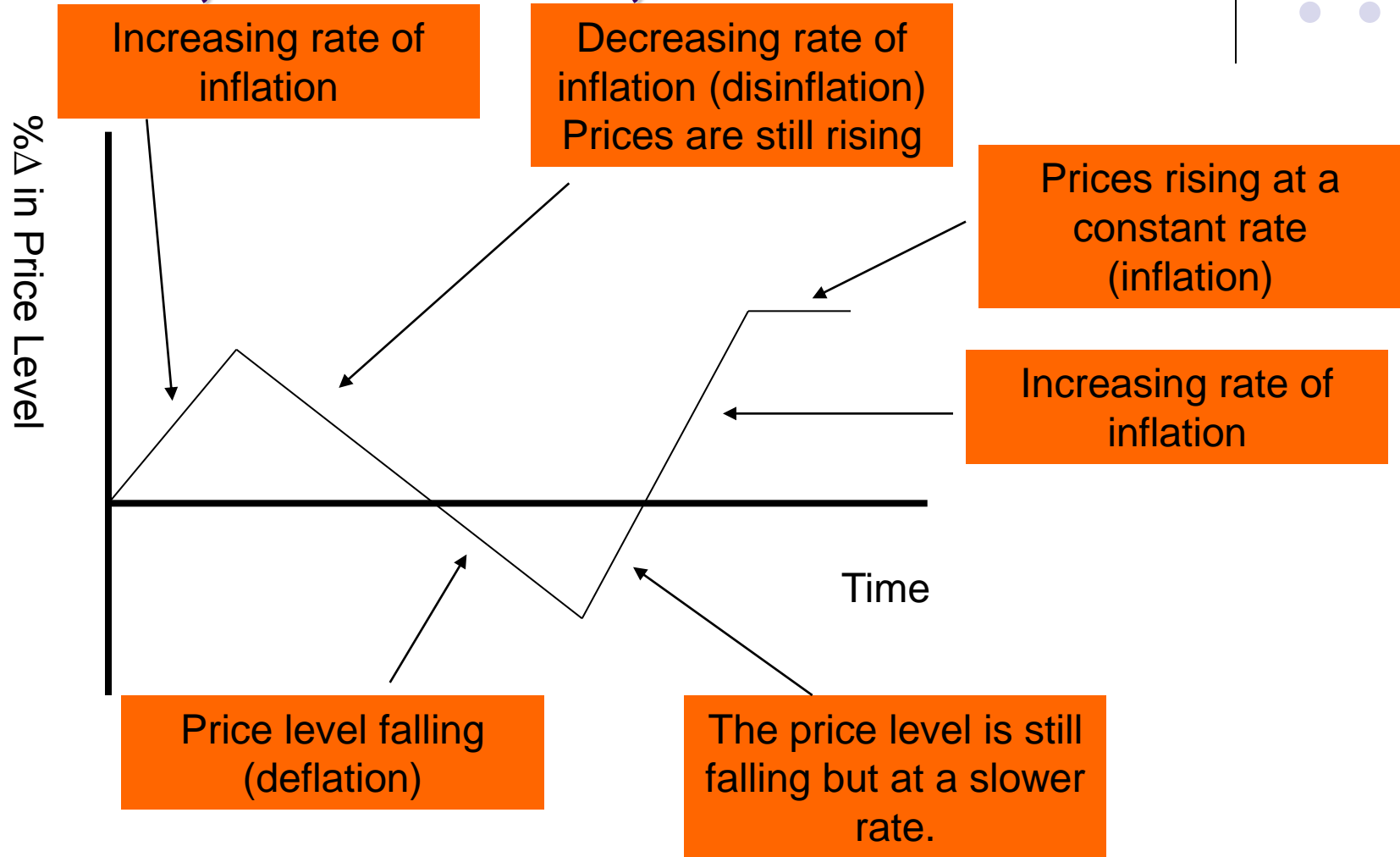
# Inflation, Disinflation, Deflation



- Inflation occurs when the general price level is rising
- Disinflation is when prices are still rising but are rising at a slower rate (still has inflation in it)
- Deflation is when the general price level is falling.



# Inflation, Disinflation, Deflation



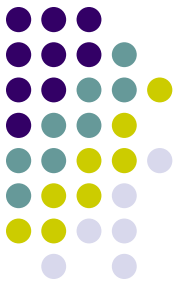


# How is inflation measured?

- The official measure of inflation in New Zealand is the percentage change in the CPI

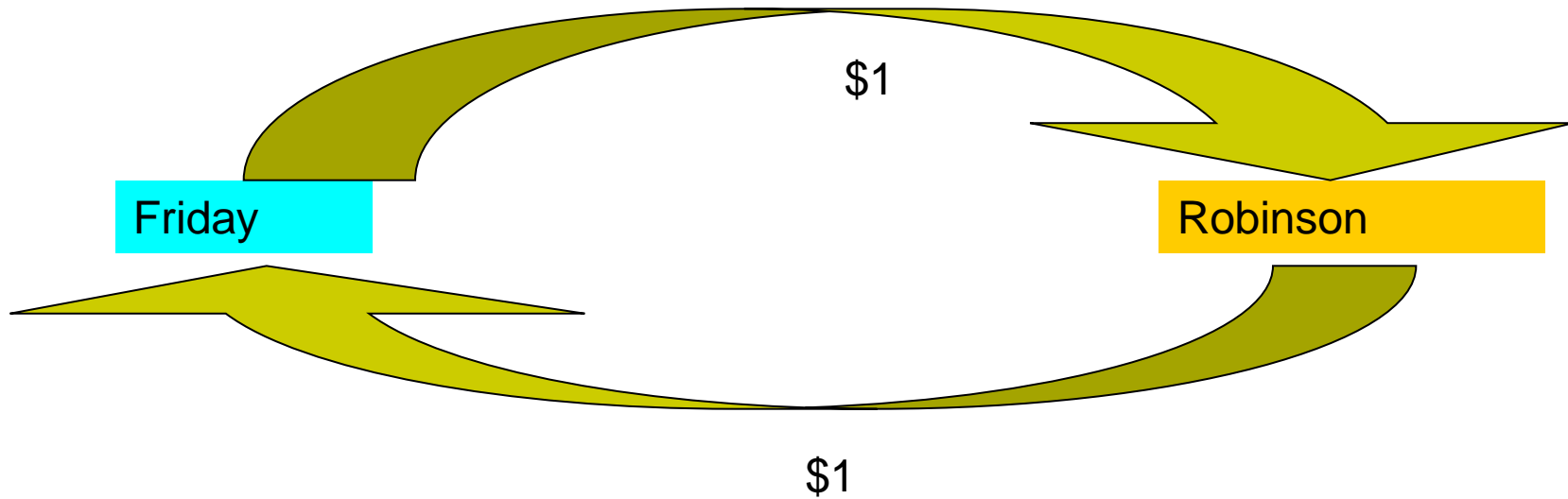
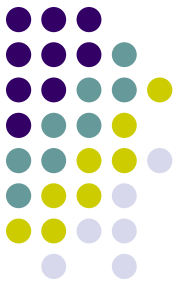
$$\text{CPI} = \frac{\text{Change in the Index Number}}{\text{Original Index Number}} \times 100$$

# Simple Example of Quantity Theory of Money



- Robinson Crusoe and Friday live on a desert island.
- They have one single \$1 coin as currency.
- Friday catches fish, Robinson collects coconuts.
- Each day Friday buys one coconut off Robinson, paying \$1. Robinson then buys one fish off Friday who charges him \$1.

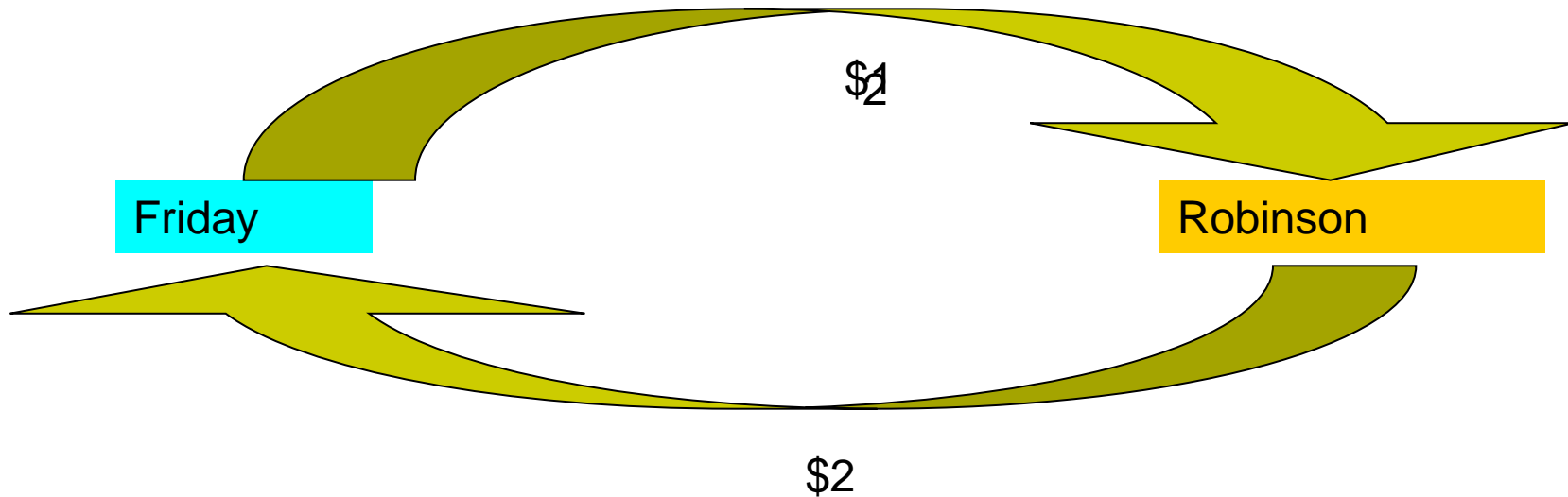




Money Supply X Number of Transactions = Price Level X Output

$$MT=PQ$$

# What if Friday finds another \$1 coin?



Money Supply X Number of Transactions = Price Level X Output

$$MT=PQ$$



# Quantity Theory of Money

- This is known as the quantity theory of money
- If we assume the amount of output is fixed, then the number of transactions must also be fixed:

$$MT = PQ$$

- If the money supply increases, then the price level must increase to compensate

# Crude Quantity Theory of Money



- The crude quantity theory of money estimates the number of transactions using the velocity of circulation ( $V$ )
  - The velocity of circulation is the number of times a unit of money goes round the circular flow
- $$MV = PQ$$
- If  $V$  and  $Q$  are constant, then ceteris paribus any increase in the money supply will cause an increase in the price level (i.e. cause inflation)

# Sophisticated Quantity Theory of Money



- The sophisticated version of this theory recognises that while  $V$  and  $Q$  are not fixed they are predictable
- Therefore an increase in the money supply need not be inflationary if it is offset by an increased level of output



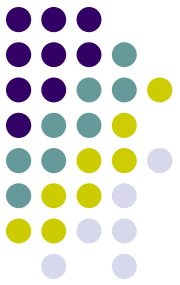
# Aggregate Demand (AD)

- AD is the total quantity of all goods and services (national output)
- that all consumers are willing and able to purchase
- at a range of prices in a given time period

# Demand, Market Demand and Aggregate Demand



- Individual Demand
  - Demand by **one** consumer for **one** product
- Market demand
  - Demand by **all** consumers for **one** product
- Aggregate Demand
  - Demand by **all** consumers for **all** products

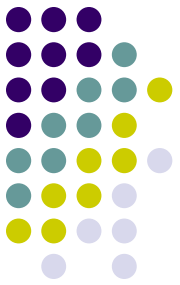


# Components of AD

- $AD = C + I + G + (X-M)$ 
  - ❖ C – Consumption spending by households on final goods and services.
  - ❖ I – Investment spending. Spending by firms on capital goods.
  - ❖ G – Government Spending. Spending by the government on final goods and services
  - ❖  $(X - M)$  – Net exports. Export receipts less import payments.

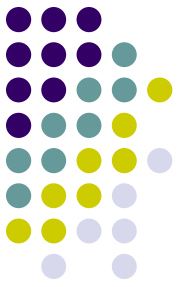


# Aggregate Supply (AS)



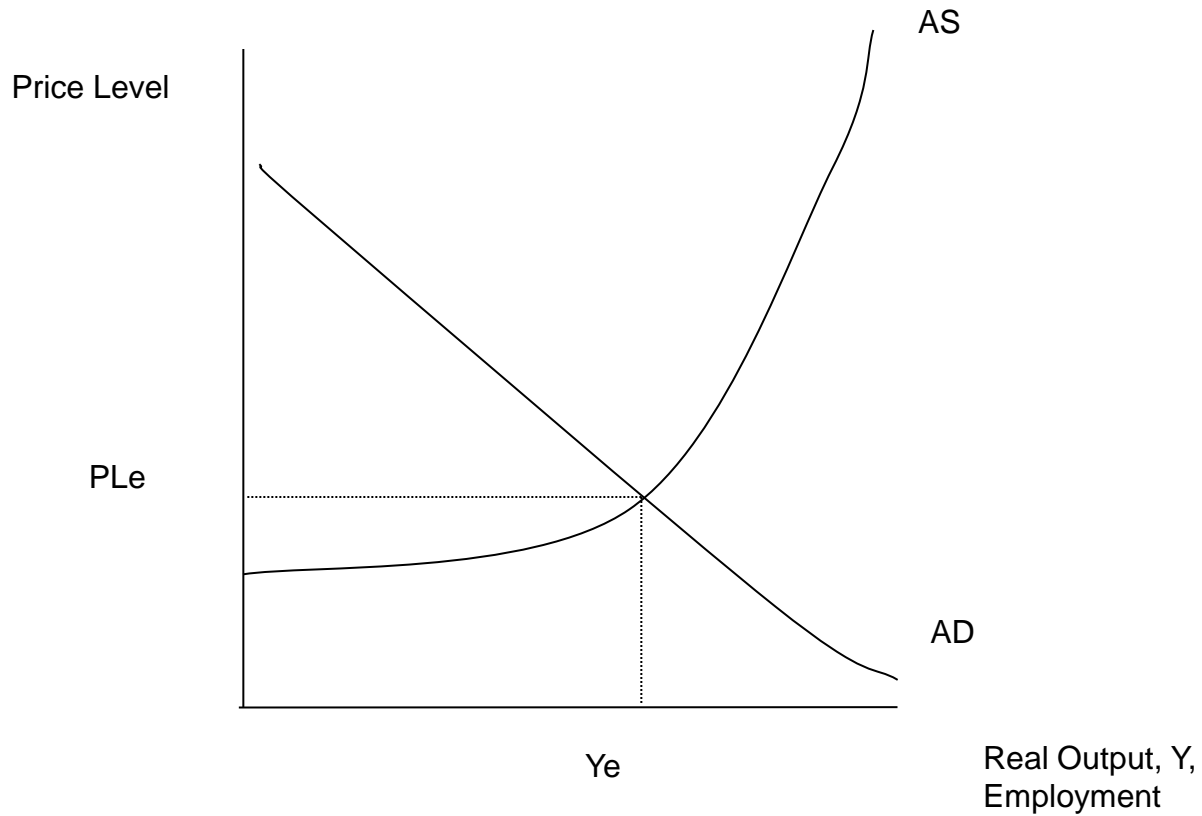
- AS is the total quantity of all goods and services (national output)
- that all producers are willing and able to supply
- at a range of prices in a given time period

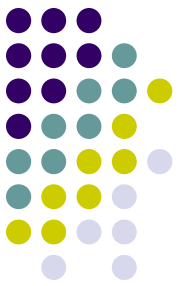
# Supply, Market Supply, Aggregate Supply



- Individual Supply
  - Supply by **one** producer of **one** product
- Market Supply
  - Supply by **all** producers of **one** product
- Aggregate Supply
  - Supply by all producers of all products

# AD/AS Diagram





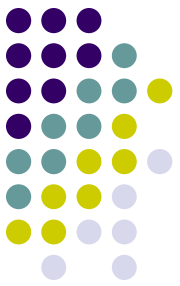
# Shifts of the AD Curve

- The AD curve will shift if there is a change in one of the factors that make up AD
  - Interest rate changes – impact on C and I
  - Income changes – impacts on C
  - Business confidence – impacts on I
  - Exchange rate changes – impacts on X – M
  - Inflationary expectations – impacts C
- The shift in the AD curve will result in a movement along the AS.

# Shape of the AD Curve



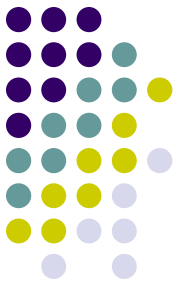
- The AD curve is negatively sloped because:
  - At higher price levels consumers lose purchasing power, this reduces consumer spending and aggregate demand ( $\downarrow C$ )
  - Higher price levels will raise interest rates meaning households and firms face increased borrowing costs ( $\downarrow C, \downarrow I$ )
  - An increase in the domestic price level will mean that locally produced goods are less price competitive ( $\downarrow X, \uparrow M$ )



# Shifts of the AS Curve

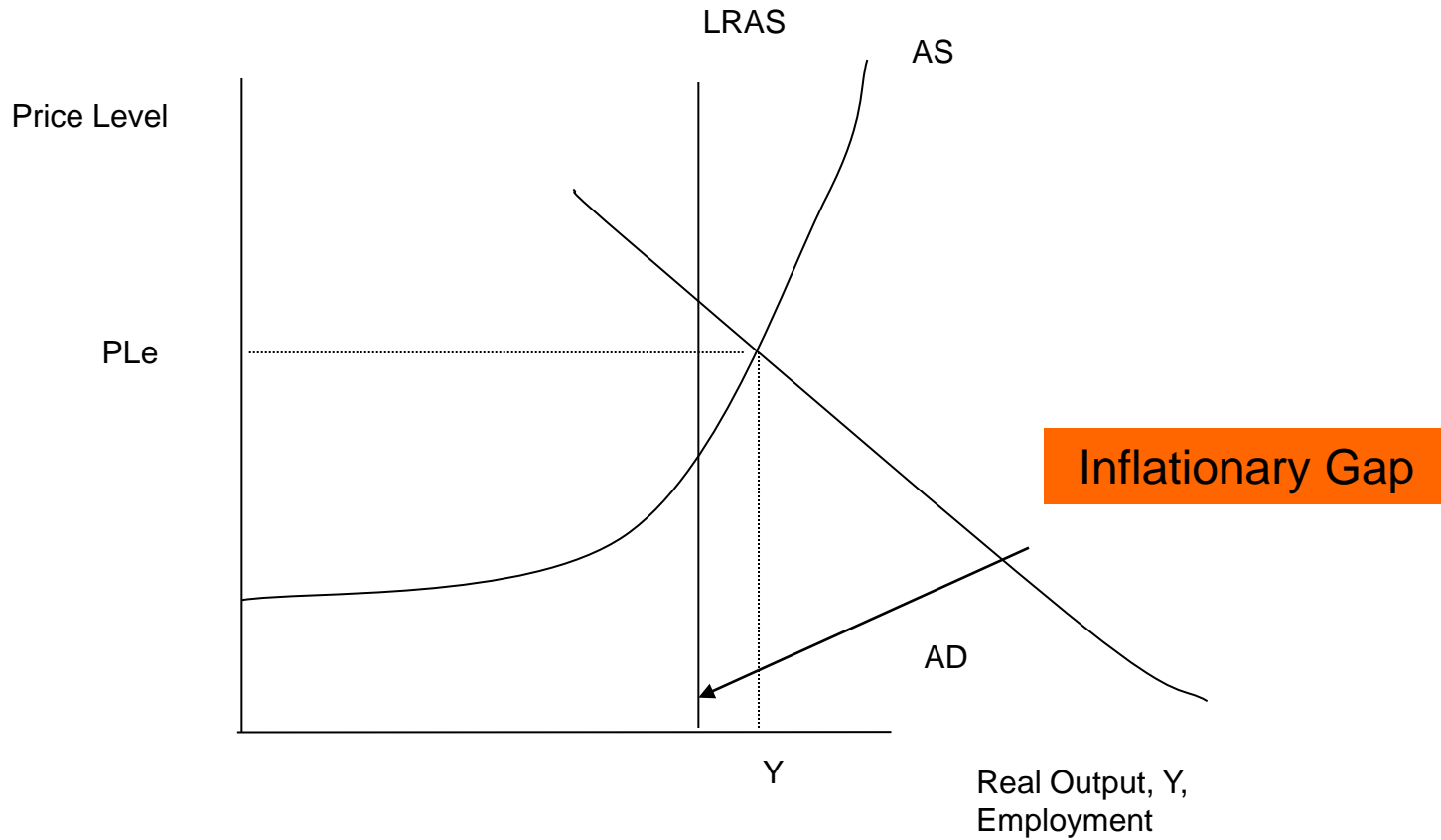
- The AS curve is drawn with the following things held constant:
  - Nominal wages
  - Cost of imported raw materials/components
  - The state of technology
  - Productivity
- Therefore if any of these change the AS curve will shift.
- Shifts of the AS curve will cause a movement along the AD curve.

# Shape of the AS Curve



- The AS curve is positively sloped and gets steeper as output increases:
  - At low levels of output it is flat as there is a lot of excess capacity. Output can be increased by bringing this excess into production
  - As output increases the AS gets steeper as diminishing returns sets in (it costs more for proportionately less output)
  - At higher levels of output there is no spare capacity, production increases require overtime, there is increased competition for resources increasing production costs

# Inflationary Gap





# Price Index



- A price index is a tool used to measure changes in price level
- It takes into account the changes in a number of prices
- Common indices used to measure inflation are CPI (official measure), Producer Price Index, Capital Goods Price Index and Labour Cost Index
- In each case the price of a common ‘basket’ of goods is measured in different time periods to measure price changes
- With a weighted price index the importance of each good in overall spending is accounted for.



# A Simple Price Index

- A simple price index measures changes in price only.
- E.g. Jill buys only apples and oranges. In 2008 apples cost \$1 each, oranges cost \$2. In 2009 apples cost \$1.10 and oranges cost \$2.10. Jill's inflation rate is:

$$\text{Apple inflation} = \frac{.10}{1} \times 100 = 10\%$$

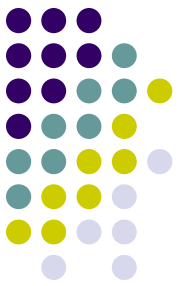
$$\text{Orange inflation} = \frac{.10}{1} \times 100 = 5\%$$

$$\text{Overall inflation} = (10+5) / 2 = 7.5 \%$$



# A Weighted Price Index

- A weighted price index also takes into account the amount spent on each good.
- E.g. Jill buys only apples and oranges. In 2008 apples cost \$1 each, oranges cost \$2. In 2009 apples cost \$1.10 and oranges cost \$2.10. In 2008 Jill bought 10 apples and 4 oranges. Jill's inflation rate is:



# A Weighted Price Index

Good	Qty consumed	Price 2008	Price 2009
Apple	10	\$1	\$1.10
Orange	4	\$2	\$2.10

	2008	2009
Apples	10.00	11.00
Oranges	8.00	8.40
Total	18.00	19.40

$$\text{Index} = \frac{\text{Expenditure this year}}{\text{Base Year Expenditure}} \times 1000$$

$$\text{Inflation rate} = \% \Delta \text{ in Index Number}$$

Year	Index No.	Inflation rate
2008	1000	-
2009	1078	7.8%

# The Official Measure of Inflation



- In New Zealand the CPI is the official measure of inflation
- The CPI measures the change in the price level of a basket of goods purchased by the ‘average’ New Zealand household
- The items in the CPI are reviewed regularly to keep up to date with changing expenditure patterns
- Items in the CPI are weighted according to its level of importance to household expenditure



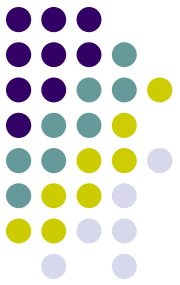
# Groups in the CPI

- Food Group
  - Includes subgroups such as fruit and vegetables, restaurant and ready to eat meals, meat and poultry etc.
- Alcoholic beverages and tobacco
- Clothing and footwear
- Housing and household utilities
  - Rental, property maintenance etc
- Household contents and services
  - Furniture, appliances etc
- Health



# Groups in the CPI

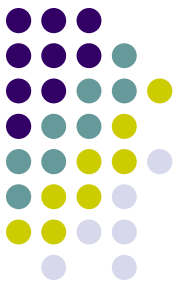
- Transport
  - Purchase of vehicles, private vehicle services, passenger services
- Communication
  - Postal, telecommunications
- Recreation and culture
  - Computer equipment, recreation equipment, recreation services etc
- Education
- Miscellaneous goods and services



# Limitations of CPI

- Spending rates differ between countries so CPI can not be used to compare inflation between countries
- Not all goods and services have their price measured in the CPI
- Not all areas of the country are surveyed for CPI information
- The quality of goods may improve over time but this is not reflected in the CPI
- Reviews may not keep pace with changing expenditure patterns
- What is a typical or average household?





# Uses of CPI

- The CPI is used as a ‘deflator’ to convert nominal values into real values
  - E.g. If nominal income is \$20 000 and the CPI is 1250, then real income is \$16 000
- The CPI is used to support pay negotiations, rent negotiations.
- The government uses the CPI to make cost of living adjustments to benefits

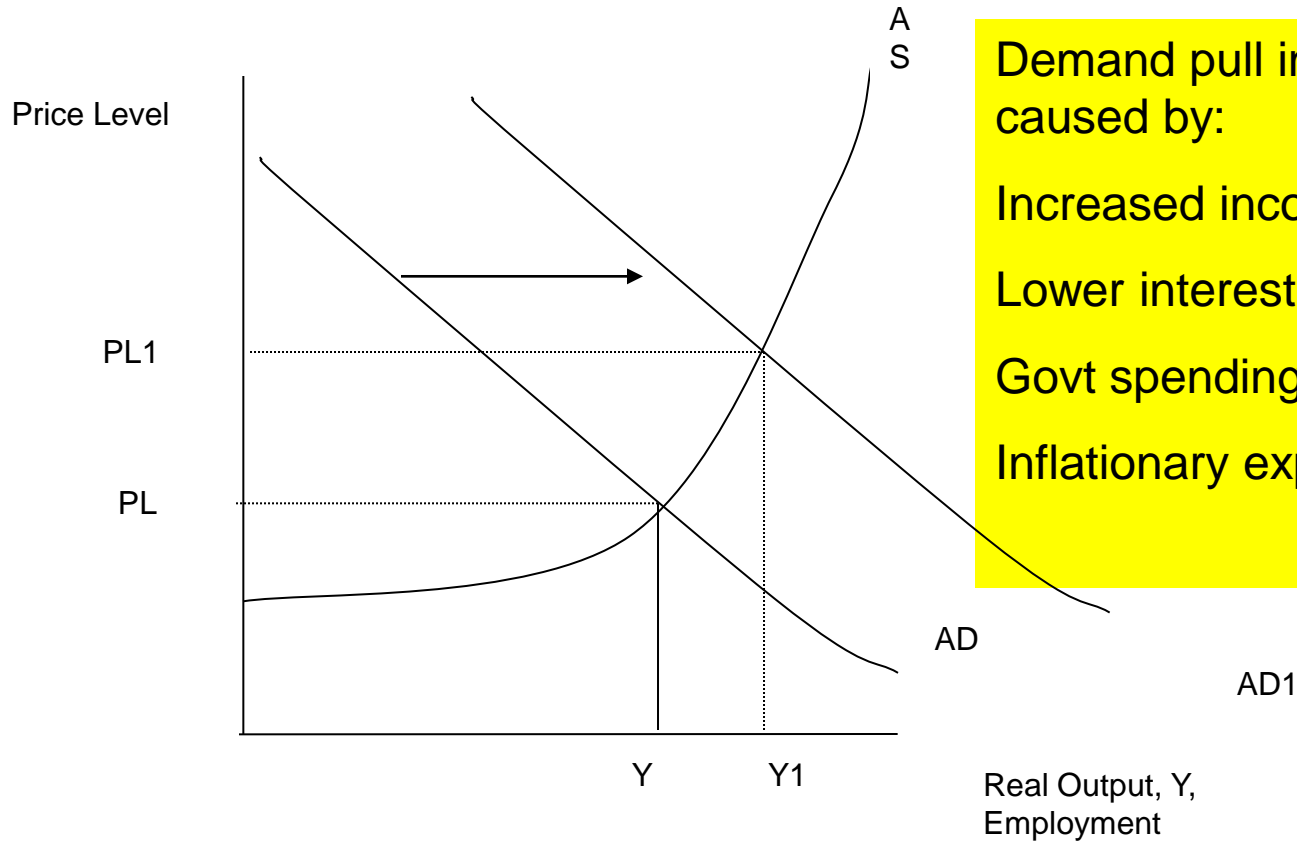


# Causes of Inflation

- Demand-Pull
  - This occurs when demand exceeds supply at current prices
  - AD shifts to the right and the price level rises
- Cost-Push
  - This occurs when the costs of production are increasing
  - The AS shifts to the left and the price level rises



# Demand Pull Inflation



Demand pull inflation is caused by:

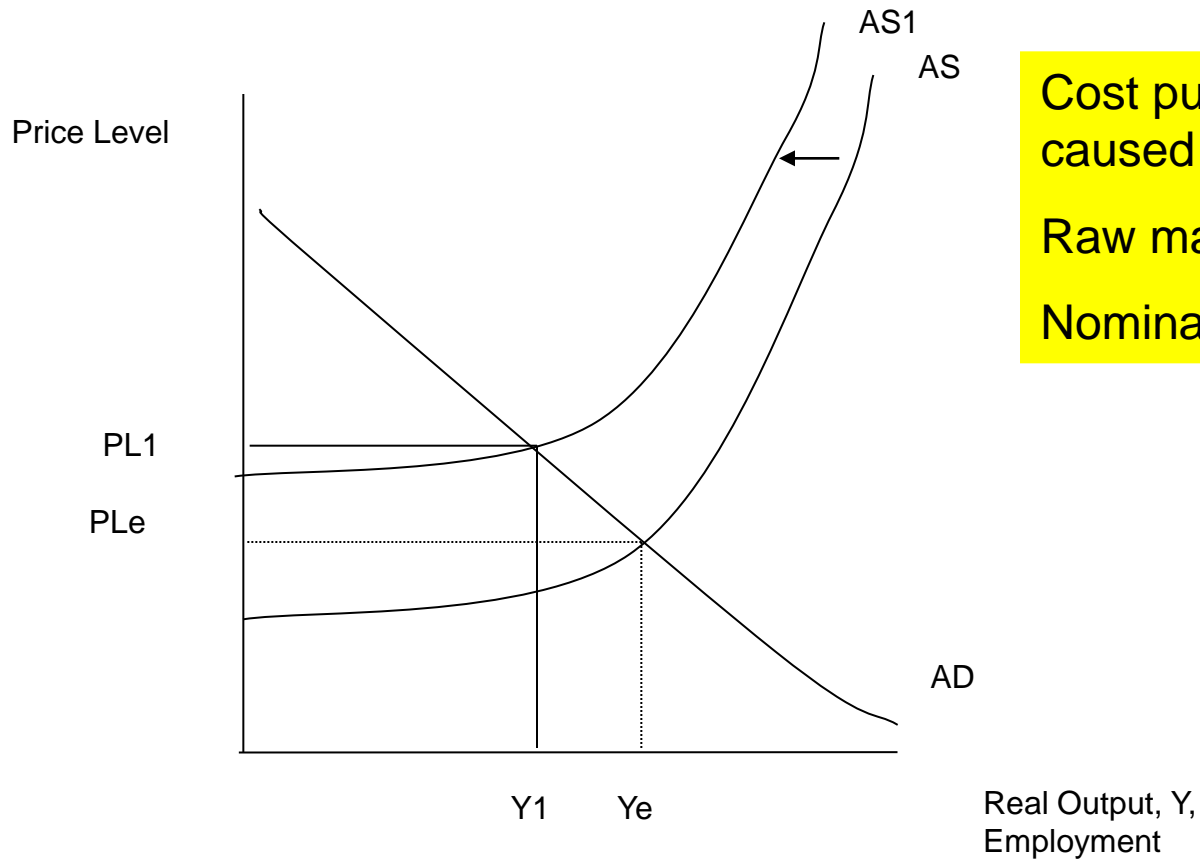
Increased incomes (C)

Lower interest rates (C, I)

Govt spending

Inflationary expectations

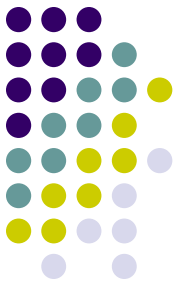
# Cost Push Inflation



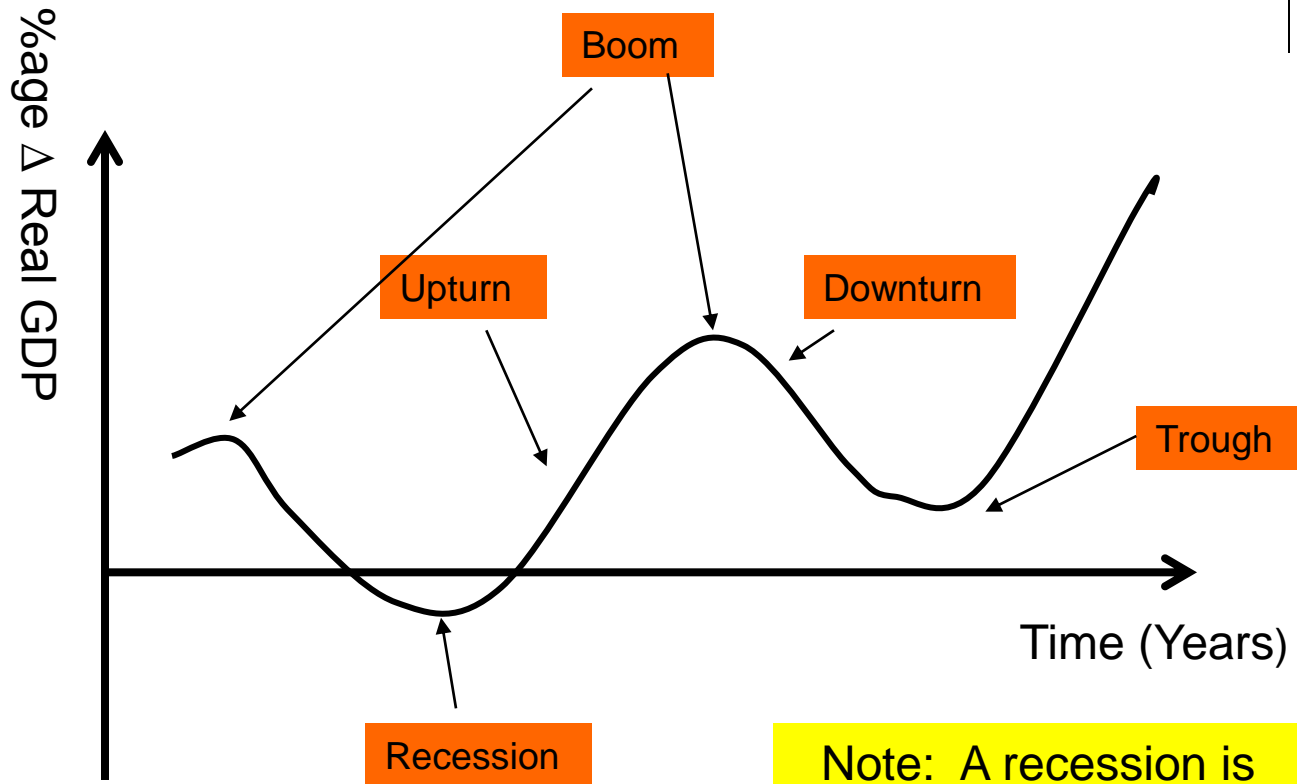
Cost push inflation is caused by:

Raw materials increase

Nominal wage increase



# The Business Cycle



Note: A recession is usually defined as 2 or more consecutive quarters of negative economic growth



# The Business Cycle

- Most economies follow a business cycle something like what is shown above
- It should be noted however that the cycle is not quite as predictable or smooth as is shown in many textbooks.
- In general over time the real output of an economy would be expected to increase (the business cycle overall trend is upwards)

# The Business Cycle and Inflation

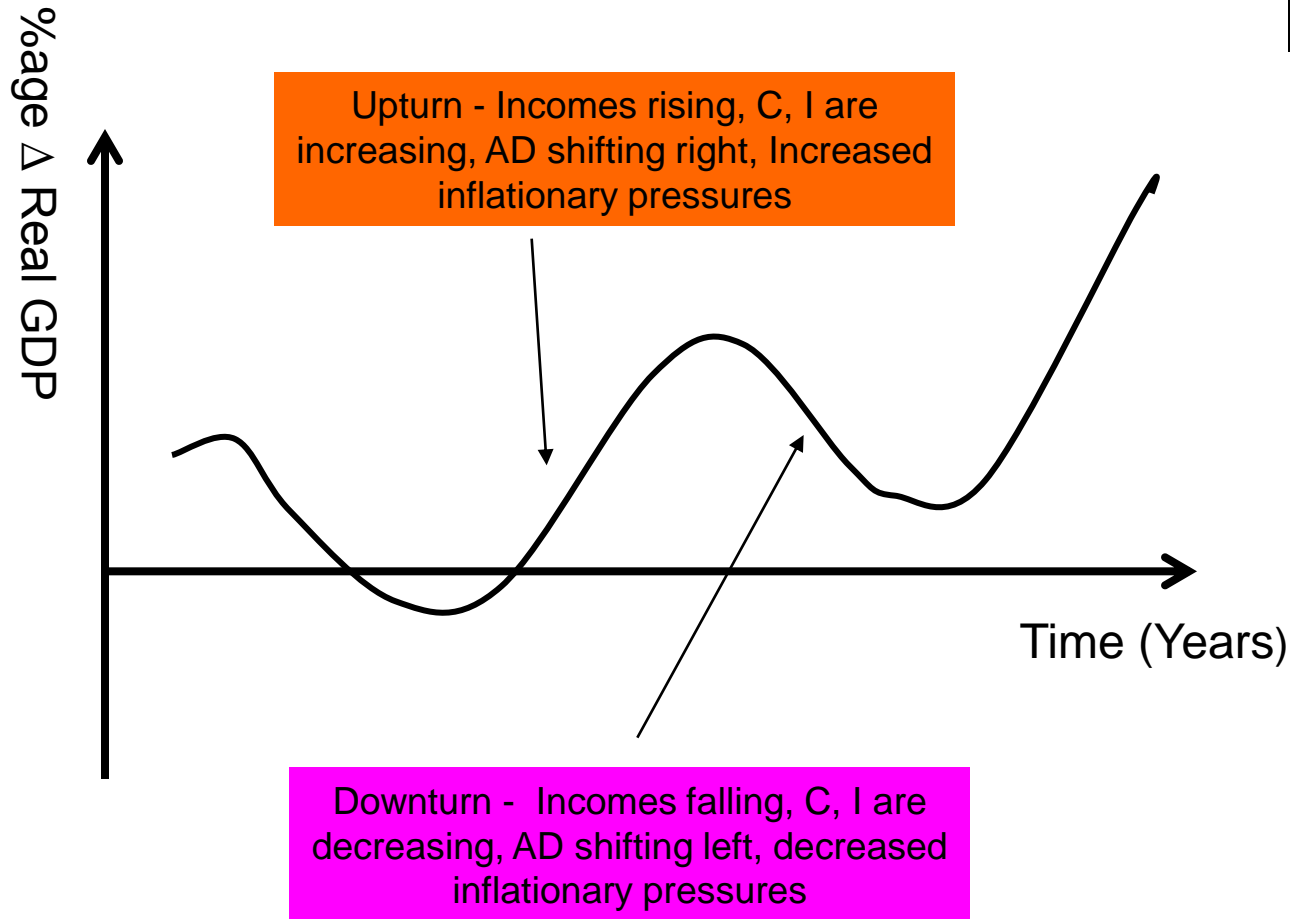


The stage of the business cycle can have an impact on inflation

# The Business Cycle and Inflation



The stage of the business cycle can have an impact on inflation





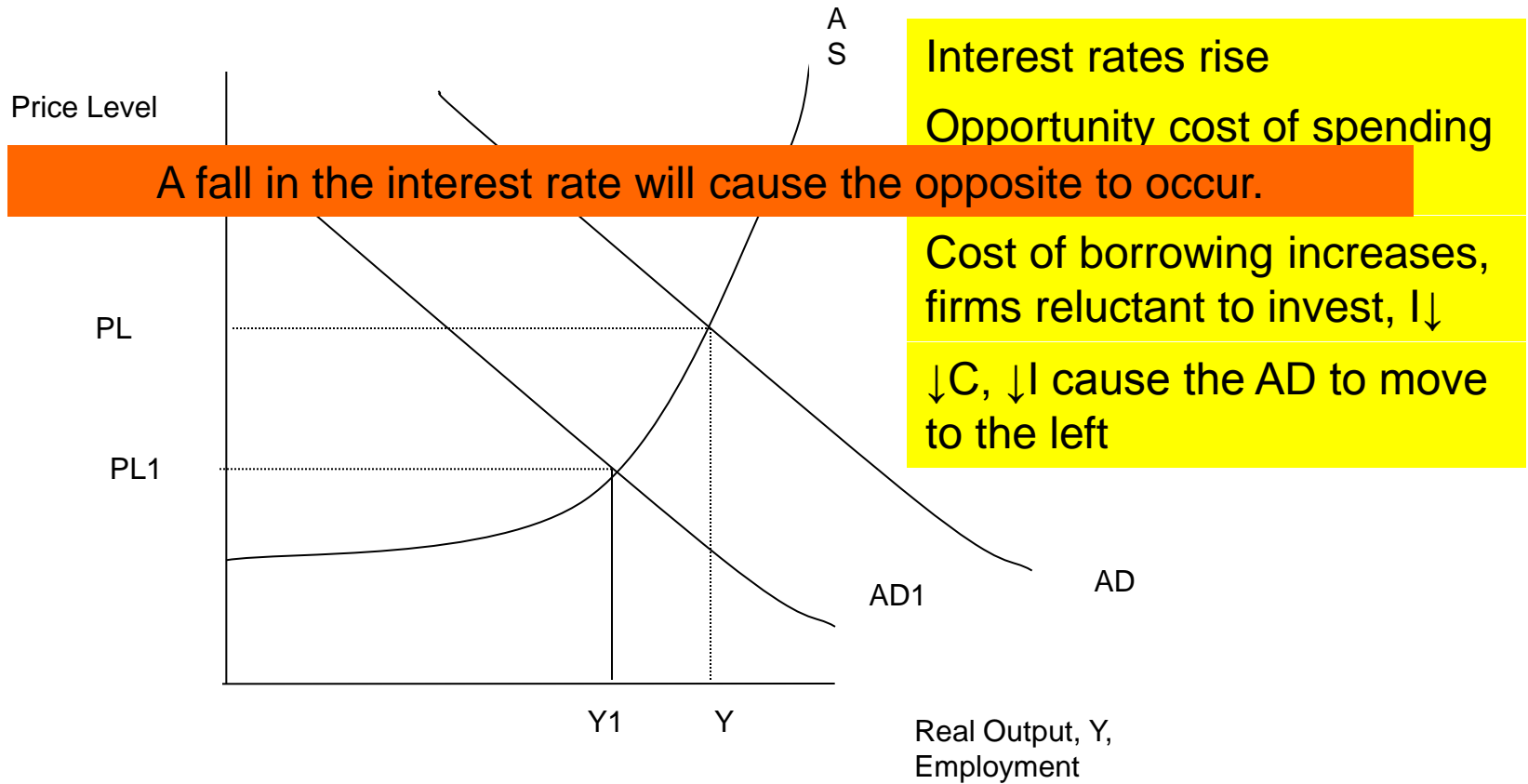
# Impact of Interest Rates on Inflation



- The interest rate impacts on the level of savings/consumption and investment
- A rise in the interest rate increases the opportunity cost of present consumption so increasing savings, reducing consumption
- The higher interest rate also discourages firms from borrowing to invest
- Added together this causes the AD curve to shift to the left. This causes the price level (inflation) to fall



# Impact of interest rate on inflation



# Impacts of Inflation on Consumers

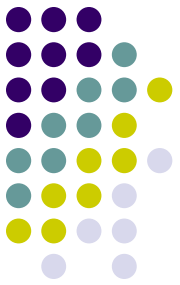


- Consumers face rising prices that increase the cost of living
- Those on fixed incomes (such as pensioners) or those on low wages will not be able to negotiate pay rises and therefore their real wage will fall
- Those who can will negotiate higher wages which contributes to cost push inflation

# Impacts of Inflation on Consumers



- Households buy now to avoid higher prices in the future – this creates false market signals and contributes to demand pull inflation
- Incentive to save is reduced, therefore households save less
- Fiscal drag pushes people into higher tax brackets as nominal wages increase to keep pace with inflation (see next slide)



# Fiscal Drag

The real wage is income adjusted for inflation

For example if a basket of normal household goods increases in price by 10% then nominal wages must rise by 10% to be able to afford the same level of consumption

The 10% increase in nominal wages will move some people into a higher tax bracket.

## Current New Zealand Tax Brackets

Incomes	Tax Rate
Up to \$14 000	12.5 cents
\$14 001 - \$48 000 inclusive	22.7 cents
\$48 001 - \$70 000 inclusive	34.7 cents
\$70 001 and over	38 cents

# Impacts of Inflation on Producers

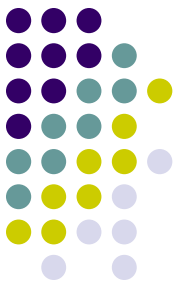


- Price changes normally signal where producers should allocate resources, during times of inflation these price signals become blurred making it difficult to plan for the future
- Business confidence is reduced as it is difficult to predict costs and revenues in the future. Increased interest rates to combat inflation mean there will be a decrease in investment.
- Business growth decreases



# Impacts of Inflation on Producers

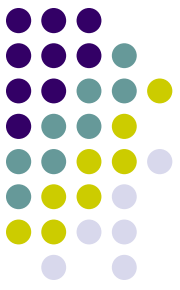
- Labour costs increase as staff negotiate higher nominal wages to maintain their real wage
- Exports decrease as NZ products become more expensive than foreign goods
- Imports increase for the same reason



# Impacts of Inflation on Trade

- The reserve bank will raise interest rates to combat inflation, this will cause an appreciation of the NZD (see later slide)
- The increased exchange rate will cause export receipts to fall (foreign currencies earned from export are exchanged for fewer NZD)
- For the same reason imports will become cheaper
- The combined effect is a worsening of the current account deficit





# Impacts of Inflation on Growth

- High interest rates and low business confidence combine to reduce investment
- This reduces the stock of capital goods available - even to the extent of running down the capital stock – reducing productivity and slowing growth
- The value of savings is eroded, reducing household savings meaning less is available for investment

# Government Policies to control inflation

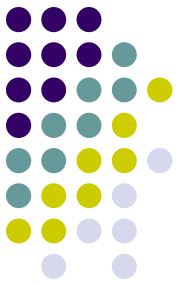


- Government policies fall into two main categories
  - Fiscal policy (taxes and government spending)
  - Monetary policy (interest rates and the money supply)
- In NZ monetary policy is controlled by the reserve bank independent of the government to maintain price stability.



# Monetary Policy

- Monetary policy is the responsibility of the Reserve Bank who operate it to maintain price stability
- Price stability is currently defined as 1 – 3% rise in the CPI
- The other roles of the reserve bank are
  - The issue of notes/coins to the public
  - Supervising the banking system



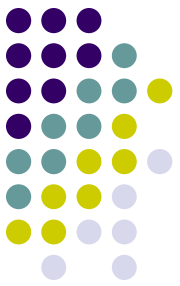
# Price Stability

- The most visible role of the Reserve Bank is to maintain price stability
- The *Policy Targets Agreement* signed between the reserve bank governor and the minister of finance requires inflation to be kept to 1 – 3% in the medium term.
- The main monetary policy tool the reserve bank uses is the Official Cash Rate



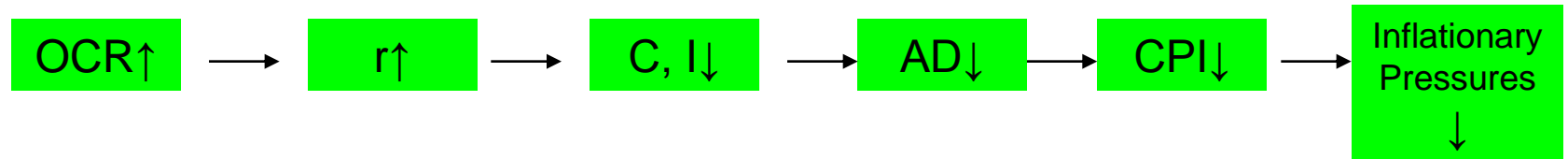
# Maintaining Price Stability

- When inflation pressures exist the reserve bank will raise the OCR
- The raised OCR will flow on to short term interest rates.
- This will shift AD to the left because:
  - $C \downarrow$  because opportunity cost of spending has increased/cost of borrowing has increased
  - $I \downarrow$  for the same reasons outlined above
  - $X-M \downarrow$  because the exchange rate will rise with the OCR

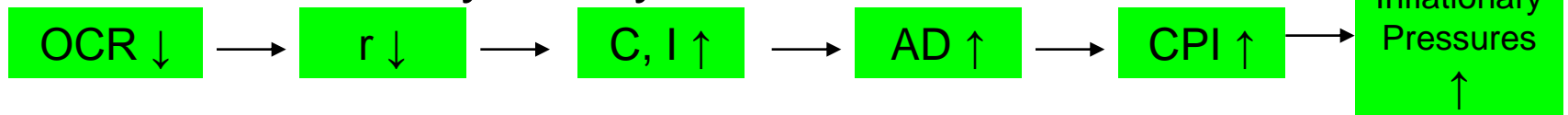


# Maintaining Price Stability

## Tight Monetary Policy



## Loose Monetary Policy

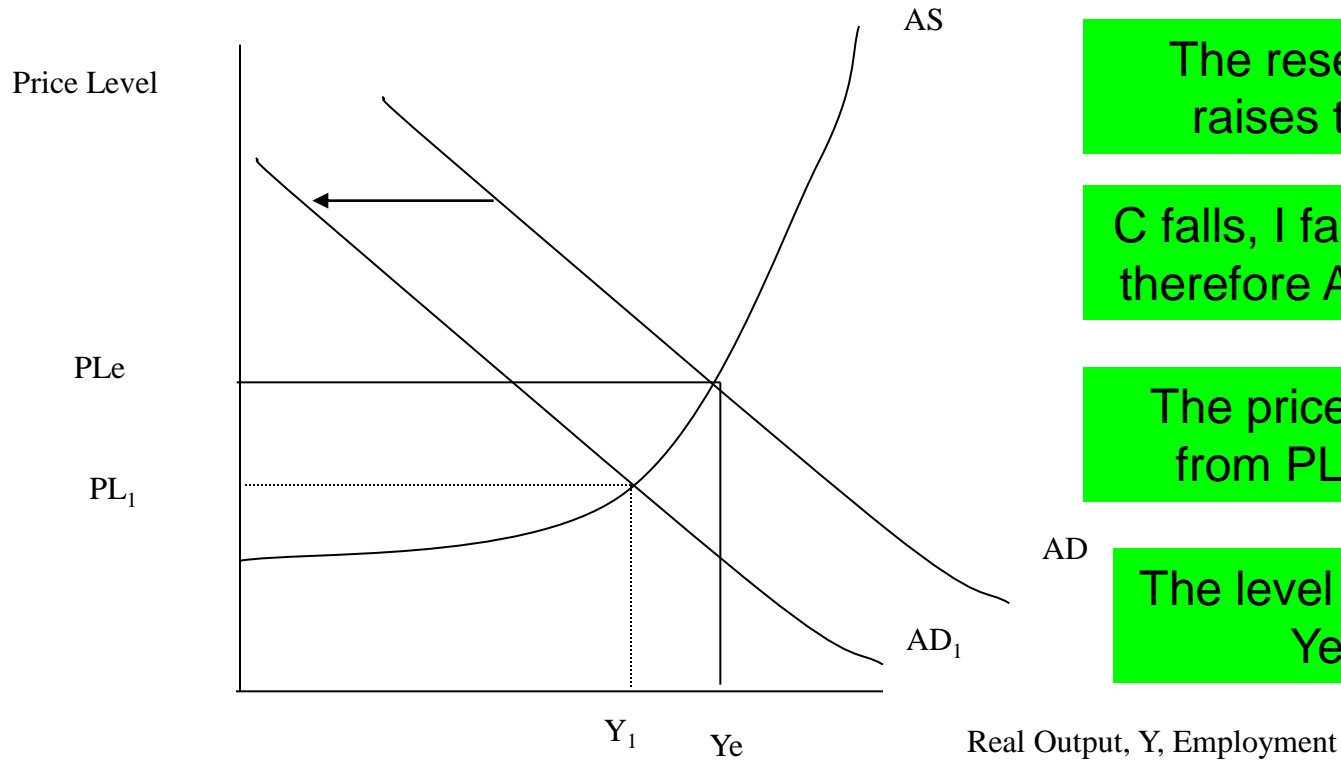


# Maintaining Price Stability



- Unfortunately the operation of monetary policy is not as simple as we have shown it here
- In reality there is a significant time lag between the change in the OCR and the change in consumer/investor behaviour
- In 2007 the reserve bank governor made repeated increases to the OCR to cool the housing market in particular but consumers ignored this as capital gains in housing were out weighing the interest hikes.
- The interest rate has a significant impact on the exchange rate. Moves to curb inflation can reduce import earnings

# Tight Monetary Policy



The reserve bank raises the OCR

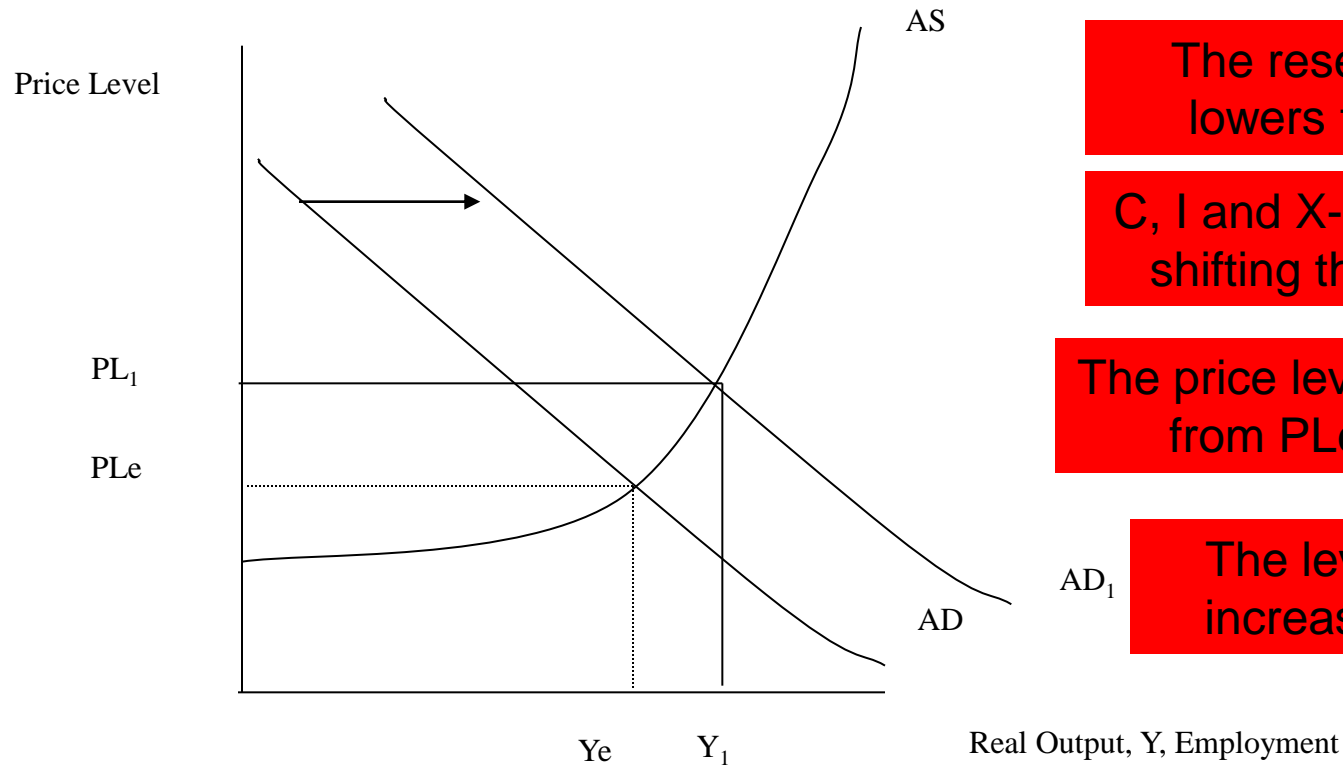
C falls, I falls, X-m falls therefore AD shifts left

The price level falls from  $PL_e$  to  $PL_1$ .

The level of output falls  $Y_e$  to  $Y_1$ .



# Loose Monetary Policy



The reserve bank lowers the OCR

C, I and X-M increases shifting the AD right

The price level increases from  $P_{Le}$  to  $P_{L1}$

The level of output increases  $Y_e$  to  $Y_1$

# Effects of Fiscal Policy on Inflation



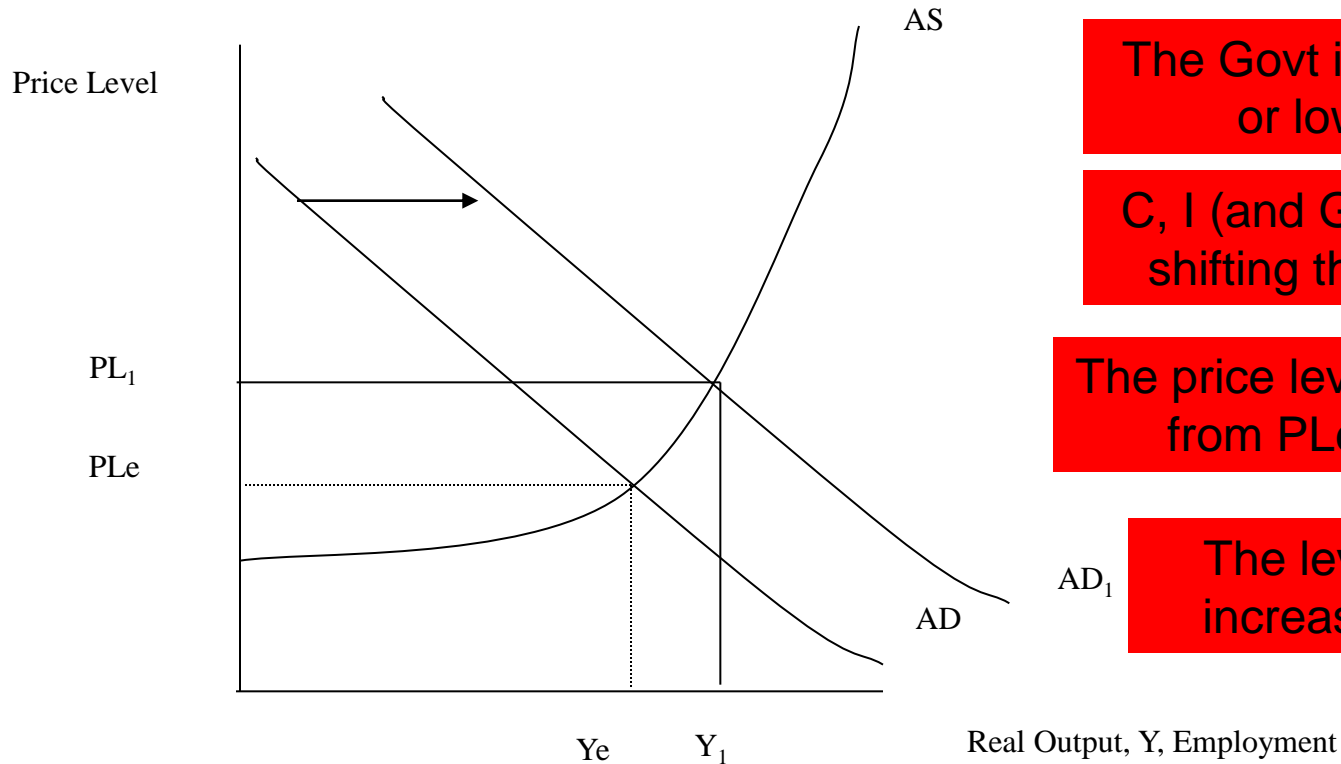
- Fiscal policy is the government's planned budget for spending and income to achieve its economic goals.
- The government plays a significant role in the economy as one of the major sectors of the circular flow
- Therefore decisions made about the level of taxes and spending will impact on the level of economic activity

# Expansionary Fiscal Policy



- Expansionary fiscal policy is a decrease in the level of taxation and/or an increase in government spending (may result in fiscal deficit)
- A reduction in taxes will increase household disposable income and therefore consumption.
- Investment will also increase as firm's expect demand to increase in future
- Together this increase in C, I will cause AD to shift right
- An increase in government spending will also contribute to a rightward shift in AD

# Loose Monetary Policy



The Govt increases  $G$  or lowers  $T$

$C$ ,  $I$  (and  $G$ ) increases shifting the  $AD$  right

The price level increases from  $PL_e$  to  $PL_1$

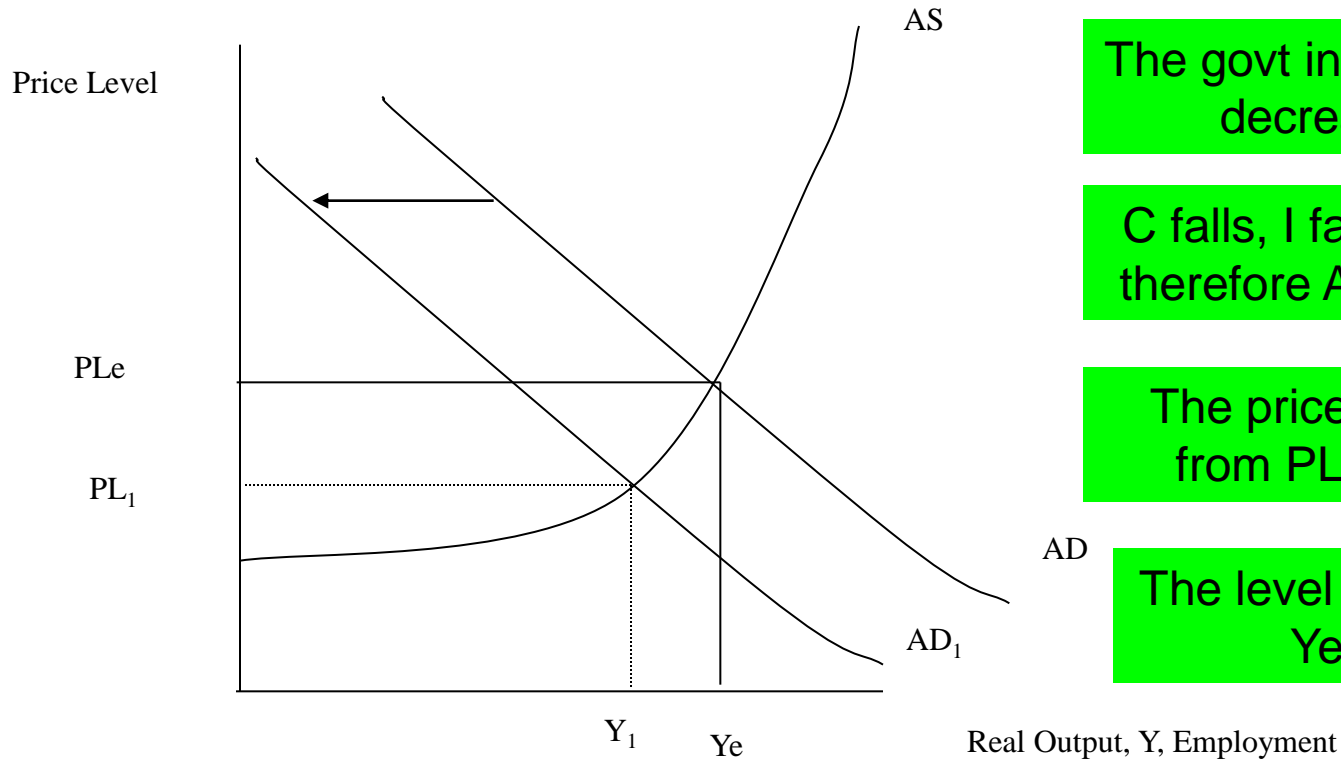
The level of output increases  $Y_e$  to  $Y_1$

# Contractionary Fiscal Policy



- Contractionary fiscal policy is an increase in the level of taxation and/or a decrease in government spending (may result in fiscal surplus)
- An increase in taxes will decrease household disposable income and therefore consumption.
- Investment will also decrease as firm's expect demand to fall in future
- Together this decrease in C, I will cause AD to shift left
- A decrease in government spending will also contribute to a leftward shift in AD

# Contractionary Fiscal Policy



The gov't increases  $T$  or decreases  $G$

$C$  falls,  $I$  falls, ( $G$  falls) therefore  $AD$  shifts left

The price level falls from  $PL_e$  to  $PL_1$ .

The level of output falls  $Y_e$  to  $Y_1$ .