Long-run Aggregate Supply (LRAS)

RIDLEY COLLEGE
SINCE 1889

Assessment Objectives

Specific Expectations	
2.E	Define (using graphs as appropriate) the short run and the long run.
2.F	Define (using graphs as appropriate) the long-run aggregate supply (LRAS) curve.

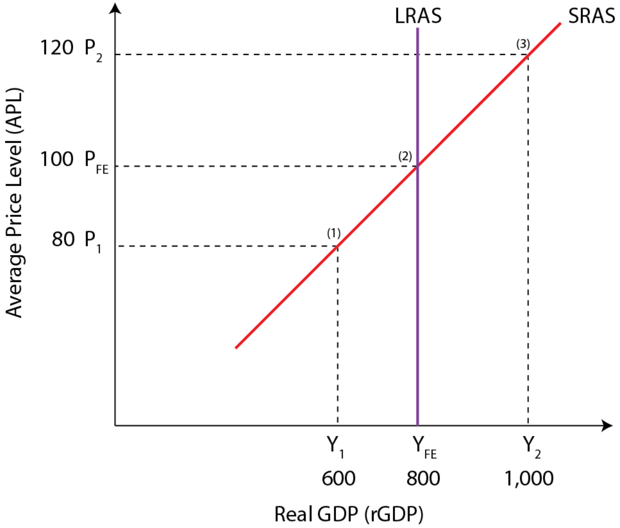
Long-run Aggregate Supply (LRAS): Monetarist View

- **Long-run aggregate supply (LRAS):** The total quantity of goods and services (real output or real GDP) produced in an economy in the long run (when wages and other resource prices change to reflect changes in the price level), ceteris paribus.
- **Long-run aggregate supply (LRAS) curve:** A curve showing the relationship between real GDP produced and the price level when wages (and other resource prices) change to reflect changes in the price level, ceteris paribus.
  - The LRAS curve is vertical at the full employment level of GDP, indicating that in the long-run output is independent of the price level.
  - There is no long-run trade-off between inflation and unemployment

Long-run Aggregate Supply (LRAS): Monetarist View

- The LRAS curve is vertical at a country's full employment level of output, or the real GDP that would be produced when all resources are fully utilized and wages have fully adjusted to the price level in the economy.
  - According to the **monetarist/new classical perspective**, the long-run aggregate supply (LRAS) curve is vertical at the full employment level of output, indicating that in the long-run the economy produces potential GDP, which is independent of the price level.
  - Wages (and other resource prices) change to match output price changes and firms' costs of production remain constant even as the price level changes.
  - With constant real costs, firms' profits are also constant, and firms no longer have any incentive to increase or decrease their output levels.

Long-run Aggregate Supply (LRAS): Monetarist View

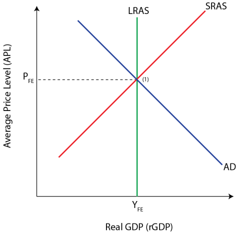


Short-run Equilibrium in the AS-AD Model

- The macroeconomic equilibrium real output and price level are what an economy achieves at a particular time given the level of AD and AS in the economy.
  - The **short-run equilibrium** is given by the point of intersection of the AD and SRAS curves, and determines the price level, the level of real GDP and the level of employment.
    - Short-run equilibrium occurs when the aggregate quantity of output demanded and the aggregate quantity of output supplied are equal.
    - When an economy's short-run equilibrium output is above or below the full-employment level, positive or negative output gaps are created.
    - Recessionary (deflationary) and expansionary (inflationary) gaps represent short-run equilibrium positions of the economy.
  - The **long-run equilibrium** occurs when the SRAS and AD curves intersect on the LRAS curve at the full employment or potential output.

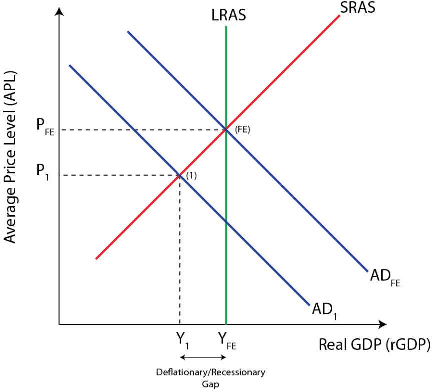
Long-run Equilibrium: AS-AD Model

- When an economy is at its full employment equilibrium level of GDP, the AD curve intersects the SRAS curve at the level of potential GDP.
  - There is no deflationary or inflationary gap.
  - This is the economy's **full employment level of output**, also known as the **potential output**.
  - A country's full employment level of output is its maximum sustainable output assuming all resources are efficiently employed, and unemployment is at its natural rate.

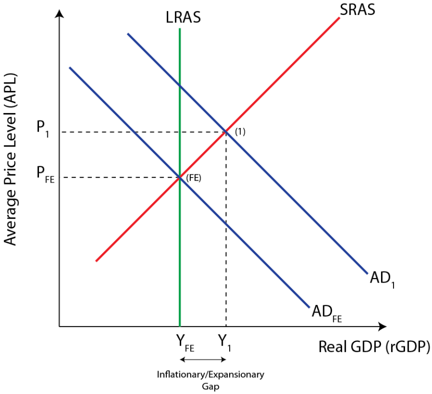


Short-run Equilibrium: Deflationary/Recessionary Gap

- A **deflationary (recessionary) gap** is a situation where real GDP is less than potential GDP (and unemployment is greater than the natural rate of unemployment) due to insufficient aggregate demand.



- A **inflationary (expansionary) gap** is a situation where real GDP is greater than potential GDP (and unemployment is smaller than the natural rate of unemployment) due to excess aggregate demand.

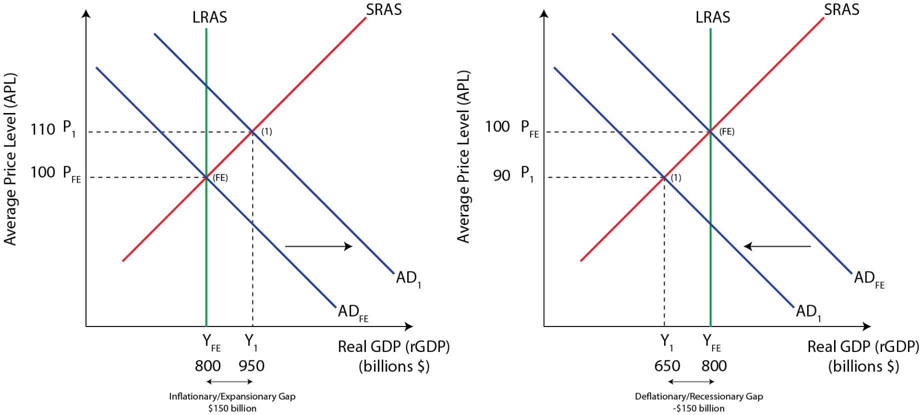


Aggregate Demand (AD) Shocks

- Output gaps are the result of shocks to either aggregate demand (AD) or aggregate supply (AS).
  - A shock occurs when one of the components of AD or the determinants of SRAS change.
  - This causes the level of total spending or production to increase or decrease and short-run equilibrium price level and real GDP to change.

1. **Positive aggregate demand (AD) shock:** causes output, employment, and the price level to rise in the short-run.
   - The economy will move from an equilibrium at full employment to one where both the price level and output increase in the short-run.
   - The gap between the equilibrium output and full employment level of output is called the inflationary gap.
   - The economy is essentially overheating; the unemployment rate is below the natural rate of unemployment and inflation is higher than desired.

Aggregate Demand (AD) Shocks



Aggregate Demand (AD) Shocks

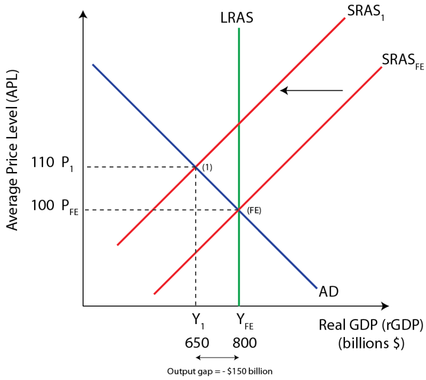
2. **Negative aggregate demand (AD) shock:** causes output, employment, and the price level to fall in the short-run.
   - The economy will move from an equilibrium at full employment to one where both the price level and output decrease in the short-run.
   - Costs must be cut in the face of falling prices, and the only way to reduce costs is to reduce output and employment since wages cannot be lowered in the short-run.
   - The gap between the equilibrium output and full employment level of output is called the deflationary (recessionary) gap.

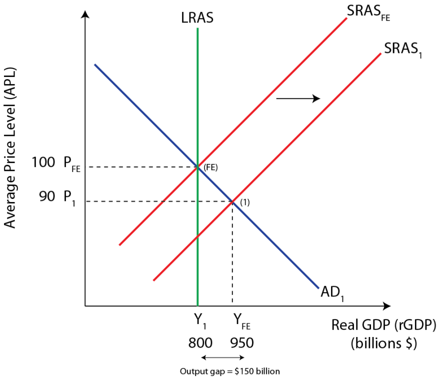
Aggregate Supply (AS) Shocks

- A supply shock occurs when there is a change in a determinant of SRAS, causing output, employment, and the price level to change.

  1. **Negative supply shock:** a negative supply shock may lead to higher production costs, which are passed to consumers through higher prices
     - Because wages are sticky, firms must fire workers to compensate for the higher energy prices, so unemployment increases as inflation increases.
     - A negative output gap results along with a higher price level.
  2. **Positive supply shock:** occurs when the costs to businesses are reduced, shifting the SRAS curve to the right.
     - SRAS will shift outward, employment and output will increase and the price level will decrease.
     - There is a positive output gap and a lower price level due to the lower cost of doing business in the economy
     - Unemployment falls below its natural rate, as firms increase output.

Aggregate Supply (AS) Shocks





Long-run Self-Adjustment

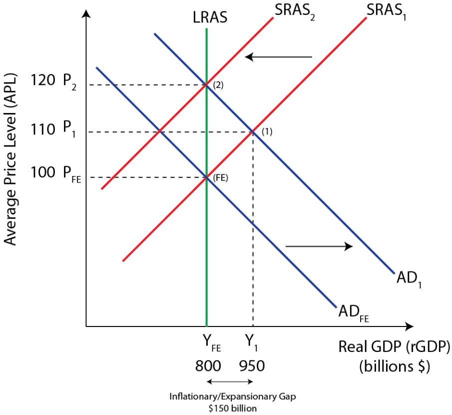
- A country's equilibrium level of output can be above or below its full employment output in the short-run, creating inflationary or recessionary gaps.
  - In the long-run, when wages and other input costs have been fully adjusted to the price level, national output will return to its full employment level.
  - In the monetarist/new classical perspective recessionary (deflationary) and expansionary (inflationary) gaps are eliminated in the long-run.
  - This ensures that in the long-run the LRAS curve is vertical at the level of potential GDP and there is no trade-off between unemployment and inflation.
  - The economy has a built-in tendency towards full employment equilibrium and the unemployment rate will always settle at the natural rate of unemployment.

Long-run Self-Adjustment: Inflationary Gap

- From a positive output gap, the inflationary gap is a short-run phenomenon.
  - The gap exists because wages are sticky and therefore, firms compete for the few available workers in order to increase output in response to rising prices.
  - While wages remain fixed, firms demand more labor and increase their output in the short-run.
  - In the long-run, nominal wages will begin to rise in response to the increased labour demand and limited labour supply.
    - Workers will have more bargaining power as the labour market tightens; they will begin to demand pay hikes to keep up with the rising cost of living.
  - As the nominal wage rate rises, firms will find it less attractive to continue employing more workers and some firms will be forced to cut back on output and employment.

Long-run Self-Adjustment: Inflationary Gap

- As the nominal wage rate is a determinant of short-run aggregate supply, the SRAS will decrease in the long-run, pushing prices up further and causing output to fall back to its full employment level.

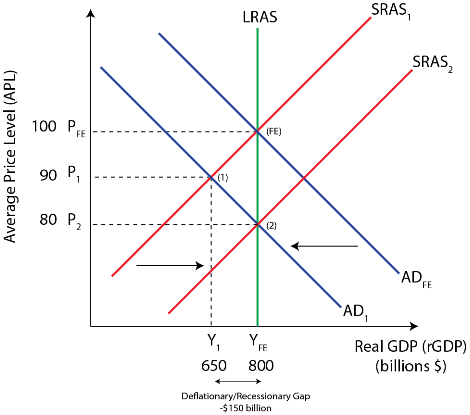


Long-run Self-Adjustment: Deflationary Gap

- From a negative output gap, the recessionary gap is a short-run condition that will be resolved in the long-run once wages have adjusted to the lower price level.
  - Assuming AD remains low and the unemployment rate remains higher than the natural rate, the excess supply of labour in the market will eventually lead to a fall in the nominal wage rate.
  - A government benefits for unemployed workers expire and labor unions lose their bargaining power, new contracts offering lower wages will eventually be accepted and firms will once again begin hiring workers and increasing output due to falling costs of production.
  - Wages become downwardly flexible during a recession, causing SRAS to increase in the long-run, and increasing output back to the full employment level

Long-run Self-Adjustment: Deflationary Gap

- While nominal wage rate falls, real income and output are restored to the full employment level as lower wages are offset by lower prices across the economy.



Economic Growth: Shifts in AD and SRAS

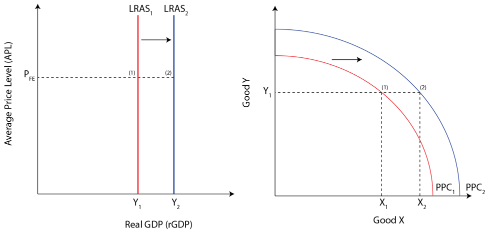
- In the monetarist/new classical perspective changes in aggregate demand can have an influence on real GDP only in the short-run.
  - In the long-run, the only impact of a change in aggregate demand is to change the price level, having no impact on real GDP, as this remains constant at the level of potential or full employment output.
  - Increases in aggregate demand in the long-run are therefore inflationary
    - A decrease in AD causes a recession in the short-run
    - An increase in AD causes demand-pull inflation in the short-run
    - In both cases, output returns to full-employment once wages and other input prices have fully adjusted.
  - Changes in SRAS can cause a short-run decrease in output (if resource costs increase) or increase in output (if resource costs decrease).
  - Shifts in AD and SRAS along will not cause an increase in an economy's potential output, only in its actual output (its short-run equilibrium real GDP).

Economic Growth: Shifts in LRAS

- Economic growth occurs when there is an increase in a country's actual and potential output of goods and services over time.
  - In order for potential output to increase, there must be an outward shift in the long-run aggregate supply (LRAS) curve.
  - LRAS will increase if there is an increase in the quantity of factors of production or if there is an increase in the quality of the factors of production.
  - Typically, such changes also result in increased AD and SRAS as well (due to new investment and consumption or increased government spending on human or physical capital.)

LRAS and the PPC

- The LRAS curve corresponds to the production possibilities curve (PPC) because they both represent maximum sustainable capacity or full employment output.
  - An increase in a country's maximum sustainable output will shift both the PPC and the LRAS curves outward.
  - An outward shift of LRAS and the PPC illustrates economic growth or an increase in the actual and potential output of goods and services in a country over time.



Long-run Aggregate Supply (LRAS): Shifts

- Full employment output increases when there is an increase in either the quality or the quantity of a country's factors of production, including:

  1. **Increase in the quantities of the factors of production:** if the quantity of the factors of production increases, the LRAS curve and the Keynesian AS curve shift to the right.
  2. **Improvements in the quality of the factors of production:** improvements in resource quality shift the LRAS and SRAS curves to the right.
     - **Labour:** an improvement in the productivity of labor or in the size of a country's workforce will increase a country's maximum sustainable capacity, shifting the PPC and LRAS curves outward.
     - **Land:** An improvement in the efficiency with which land resources are used through improved technology or an increase in the amount of land available to a country will increase the maximum sustainable capacity.

Long-run Aggregate Supply (LRAS): Shifts

- **Capital:** Technological improvements increase productivity in the manufacturing, service, and primary sectors of the economy and increase the maximum sustainable capacity, shifting the PPC and LRAS curves outward.
- **Entrepreneurship:** is the willingness of individuals to pursue creative and risky ventures aimed at introducing unique products to the marketplace. An increase in entrepreneurship in a country will increase the economy's maximum potential capacity.

3. **Improvements in technology:** an improved technology of production means that the factors of production using it can produce more output and the AS curves shift to the right.
4. **Increases in efficiency:** when an economy increases its efficiency in production, it makes better use of its scarce resources, and can as a result produce a greater quantity of output.

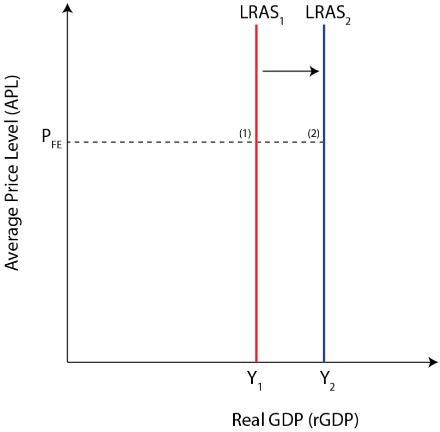
Long-run Aggregate Supply (LRAS): Shifts

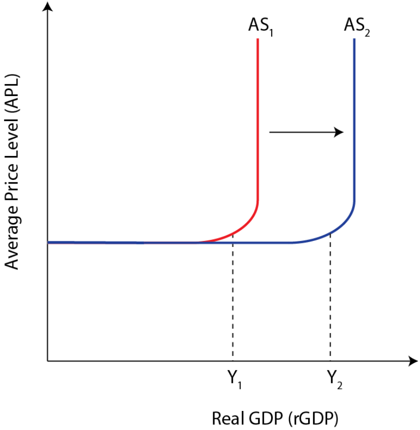
5. **Institutional changes:** changes in institutions can sometimes have important effects of how efficiently scarce resources are used, and therefore on the quantity of output produced.
6. **Reduction in the natural rate of unemployment:** if the NRU decreases, the economy is making better use of its resources, and can therefore produce a larger quantity of output.

Note: Any factor that shifts the LRAS curve must, over the long-term, also shift the SRAS curve.

- There are certain events with only a temporary effect on aggregate supply, and these can shift the SRAS curve for a short while, leaving the LRAS curve unchanged.

Long-run Aggregate Supply (LRAS): Shifts





Test your understanding

Question: Illustrate diagrammatically the impacts on the economy's LRAS and the Keynesian AS curve of the following:

1. There is a widespread introduction of a new technology that increases labour productivity.
2. The government provides training programmes for workers to retrain and improve their skills.
3. A developing country receives large amounts of foreign aid, which allows it to purchase large quantities of capital goods.
4. An extensive nationwide public health campaign undertaken by the government improves levels of health of the population.
5. The government introduces anti-monopoly legislation, reducing market power of firms and increasing the economy's efficiency.

Summary

- **Enduring Understanding**
  - Economists use the aggregate demand–aggregate supply model to represent the relationship between the price level and aggregate output in an economy and to illustrate how output, employment, and the price level respond to macroeconomic shocks.

- **Essential Knowledge**
  - In the long run all prices and wages are fully flexible, while in the short run some input prices are fixed. A consequence of flexible long-run prices and wages is the lack of a long-run trade-off between inflation and unemployment.
  - The LRAS curve corresponds to the production possibilities curve (PPC) because they both represent maximum sustainable capacity. Maximum sustainable capacity is the total output an economic system will produce over a set period of time if all resources are fully employed.

Summary

- The LRAS curve is vertical at the full-employment level of output because in the long run wages and prices fully adjust.
- Short-run equilibrium occurs when the aggregate quantity of output demanded and the aggregate quantity of output supplied are equal this occurs at the intersection of the AD and SRAS curves.
- Long-run equilibrium occurs when the AD and SRAS curves intersect on the LRAS,at the full-employment level of real output.
- A positive (negative) shock in AD causes output, employment, and the price level to rise (fall) in the short run.
- A positive (negative) shock in SRAS causes output and employment to rise (fall) and the price level to fall (rise) in the short run.
- In the long run, in the absence of government policy actions, flexible wages and prices will adjust to restore full employment and unemployment will revert to its natural rate after a shock to aggregate demand or short-run aggregate supply.

Summary

- Shifts in the long-run aggregate supply curve indicate changes in the full-employment level of output and economic growth.