

15 AGGREGATE SUPPLY

REAL-WORLD ISSUE:

Why does economic activity vary over time and why does this matter? How do governments manage the economy and how effective are their policies?

By the end of this chapter, you should be able to:

- Define aggregate supply (AS)
- Define and illustrate short-run aggregate supply
- Explain the causes of shifts in short-run aggregate supply (SRAS)
- Distinguish between short-run aggregate supply and long-run aggregate supply (LRAS)
- Distinguish between a “Keynesian” AS and a new classical LRAS
- Explain the sources of increases in the AS/LRAS.

What is aggregate supply?

In this chapter we continue our macroeconomic analysis by introducing the concept of aggregate supply. The concept of the “supply side” of the economy is extremely important in the study of the overall productive capacity of the economy. By definition, aggregate supply is the total amount of goods and services that all industries in the economy will produce at every given price level. It is essentially the sum of the supply curves of all the industries in the economy. In contrast to the theory of aggregate demand, however, we distinguish between the short run and the long run in looking at aggregate supply.



What does the short-run aggregate supply curve look like?

Graphically, the short-run aggregate supply (SRAS) curve looks very much like a microeconomic supply curve in that it is upward sloping. There is a positive relationship between the price level and the amount of output that a country's industries will supply.

Remember from microeconomics and the Law of Supply (Chapter 5) that supply curves are usually curved and get steeper as price rises. Thus, the SRAS curve would be the same since it is a horizontal summation of all the microeconomic supply curves. It would look like the SRAS curve in Figure 15.1.

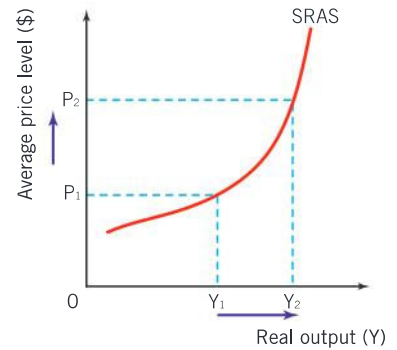
However, for ease of analysis, economists usually draw SRAS curves as straight lines, as in Figure 15.2, and so shall we from now on.

At any given price level, industries will supply a certain level of output. Let us look at what happens in the short run if the country's industries want to increase the level of output. It is necessary to understand what is meant by the short run. In our macroeconomic analysis, the short run is defined as the period of time when the prices of the factors of production do not change. Most importantly, the price of labour – the wage rate – is fixed.

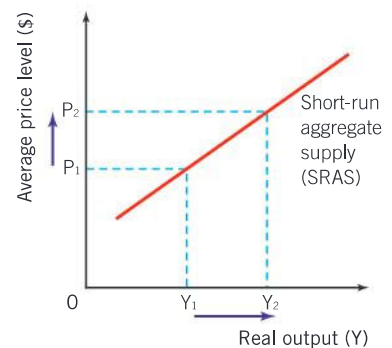
If a larger level of output is to be produced, firms are likely to face higher average costs of production. For example, in order to produce more, firms will have to provide incentives to workers to produce a larger amount. Most commonly this is done by paying "overtime" wages. These might be one and a half times the normal wage and so costs rise. Higher level students should recall that the law of diminishing returns means that marginal and average costs will rise as output increases in the short run. In the short run then, an increase in output will be accompanied by an increase in average costs. Industries will pass on an increase in costs in the form of a higher price level. This explains why the SRAS curve is upward sloping. In Figure 15.2, an increase in the level of output from Y_1 to Y_2 will be accompanied by an increase in the price level from P_1 to P_2 .

What will shift the SRAS curve?

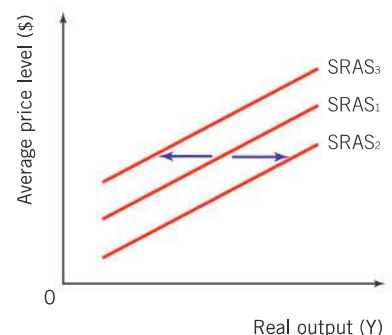
We have shown that the SRAS curve shows the relationship between the average price level and the level of national output under the *ceteris paribus* assumption. That is, we assume that factor costs remain constant. A change in the price level results in a change in the level of output and is shown as a movement along the SRAS curve as shown in Figure 15.3. This is similar to the microeconomic supply curve, where an increase in the price leads to an increase in the quantity supplied, and is shown as a movement along the supply curve. But, just as with the microeconomic supply curve, a change in anything other than the price will lead to a shift in the whole curve. Thus a change in any of the factors other than



▲ Figure 15.1 The curved SRAS curve



▲ Figure 15.2 The straight-line SRAS curve



▲ Figure 15.3 Shifts in the SRAS curve

the price level will result in a shift in the SRAS curve. These may be referred to as “supply-side shocks”.

Figure 15.3 shows an increase in the short-run aggregate supply ($SRAS_1 \rightarrow SRAS_2$) and a decrease in the SRAS ($SRAS_1 \rightarrow SRAS_3$).

The most straightforward explanation of supply-side shocks is that they are factors that cause changes in the costs of production. Similar to our microeconomic analysis, a decrease in costs results in an increase in aggregate supply; while an increase in costs results in a decrease in aggregate supply.

Typical examples of changes in the costs of production include the following:

- *A change in wage rates:* An increase in wages will result in an increase in the costs of production to firms and therefore a fall in aggregate supply. If, for example, the government raised the legal minimum wage it would increase labour costs. If labour unions in manufacturing industries, whose priority is usually to ensure good wages and conditions for workers, were to negotiate higher wages for manufacturing workers, then this would also result in a fall in the SRAS.
- *A change in the costs of raw materials:* For a change to have an effect on aggregate supply we are assuming an increase in the price of significant, widely used, raw materials. An increase in the price of rubber would affect industries that use rubber as a factor, but this might not be significant enough to affect aggregate supply noticeably. However, a change in the price of oil would have an impact on all industries, as oil is widely used in most production processes.
- *A change in the price of imports:* This point is linked to the previous point. If the capital or raw materials used by a country’s industries are imported, then a rise in import prices will increase the costs of production. This can occur due to changes in the exchange rate of a country’s currency. For example, if the value of the euro falls then this makes the import price of the raw materials and capital used by European producers relatively more expensive, raising their costs of production.
- *A change in government indirect taxes or subsidies:* An increase in indirect taxes effectively increases the costs of production to firms and therefore results in a fall in the SRAS curve. Conversely, a fall in indirect taxes will result in an increase in the SRAS curve. Since subsidies are a payment from governments to firms, then an increase in government subsidies reduces firms’ costs of production, resulting in a decrease in the SRAS while a decrease in subsidies will increase firms’ costs of production and shift the SRAS curve to the left.

Since indirect taxes are imposed on the majority of goods and services in an economy, any change in the rate of indirect taxation will have a clear



effect on SRAS. In the case of subsidies, the granting of a subsidy for a single product will have minimal impact upon SRAS, unless the product is essential and widely used, such as fuel.

What happens when AD meets SRAS in the short run?

The economy will operate where aggregate demand is equal to aggregate supply. This is shown in Figure 15.4.

At the average price level (PL), all the output produced by the country's producers is consumed. There is no incentive for producers either to increase output or raise prices. The concept of macroeconomic equilibrium will be discussed in more detail in the next chapter.

What is long-run aggregate supply?

There is considerable debate regarding the long-run aggregate supply (LRAS) curve. There are two different "schools of thought" concerning the shape of the LRAS. The first one discussed is often referred to as the new classical (or monetarist) LRAS and this may be viewed as the more broadly used model. However, there is a model which challenges some of the assumptions of this model, known as the "Keynesian" AS. This model was developed by followers of the famous economist John Maynard Keynes, who we have already come across in Chapter 2. The different-shaped LRAS curves lie at the basis of controversies about different policies to be used by governments.

What does new classical LRAS look like?

New classical economists include a number of different branches of economists including monetarists, "supply-side economists" and economists from "the Austrian school". In very simple terms, what these economists have in common is their belief in the efficiency of market forces and their view that there should be the very minimum of government intervention in the allocation of resources in the economy.

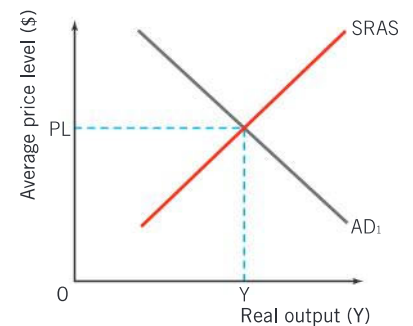
In this view, the LRAS curve is perfectly inelastic, or vertical, at what is known as the "full employment level of output". This full-employment level of output represents the potential output that could be produced if the economy were operating at full capacity and is annotated as Y_f on a macroeconomic diagram. It is important to realize that full employment does not mean that there is zero unemployment, but this is something that we will cover in more detail later.

This view asserts that the potential output is based entirely on the quantity and quality (productivity) of the factors of production and not on the price level. Thus, the LRAS is independent of the price level. This model is illustrated in Figure 15.5. The price level might rise from P_1 to P_2 but the level of output does not change.

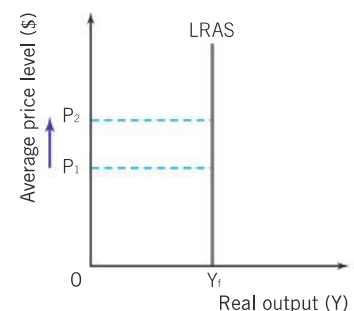
Exercise 15.1

ATL Thinking and Communication

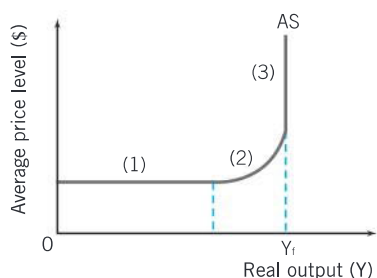
1. Draw a SRAS curve and label it $SRAS_1$. [Be sure to label the axes correctly.]
2. Add a new SRAS curve demonstrating an increase in SRAS. Label this $SRAS_2$.
3. Explain two possible reasons for this increase in SRAS.



▲ Figure 15.4 Short-run macroeconomic equilibrium



▲ Figure 15.5 New classical LRAS curve



▲ Figure 15.6 Keynesian LRAS curve

What does Keynesian AS look like?

The shape of the curve that is known as the Keynesian AS shows three possible phases and does not really distinguish between the short run and the long run. These are shown in Figure 15.6 as regions (1), (2) and (3).

Phase (1) – In this phase, the aggregate supply curve will be perfectly elastic at low levels of economic activity. Producers in the economy can raise their levels of output without incurring higher average costs because of the existence of “spare capacity” in the economy. That is, there are high levels of unused factors such as unemployed labour and underutilized capital. Should there be a need for greater output, these can be used to their fullest capacity at constant average costs. This corresponds to the region (1) in Figure 15.6.

Phase (2) – As the economy approaches its potential output (Y_f) and the spare capacity is “used up”, the economy’s available factors of production become increasingly scarce. As producers continue to try to increase output, they will have to bid for the increasingly scarce factors. Higher prices for the factors of production mean higher costs for the producers, and the price level will rise to compensate for the higher costs. This corresponds to region (2) with an upward-sloping AS.

Phase (3) – When the economy reaches its full capacity (Y_f), it is impossible to increase output any further because all factors of production are fully employed. This suggests that AS is perfectly inelastic and is shown as region (3). This third range corresponds exactly to the LRAS of the new classical economists. At this stage output cannot be increased without an increase in the quantity or improvement in the quality (productivity) of the factors of production.

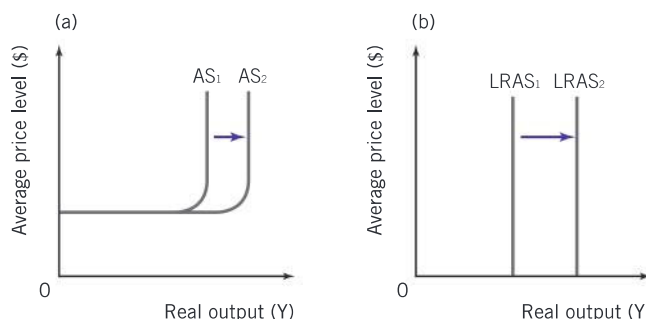
Exercise 15.2

ATL Thinking and Communication

Draw the Keynesian aggregate supply curve and add notes to your diagram to describe each of the phases.

What will shift the AS and LRAS curves?

As a country’s factors of production are constantly changing we would expect to see steady increases in its AS/LRAS. This is effectively an illustration of potential economic growth. An outward shift of a country’s AS/LRAS curve means that its productive potential has increased. In fact, a shift in the AS/LRAS can be likened to an outward shift of the production possibilities curve (PPC).

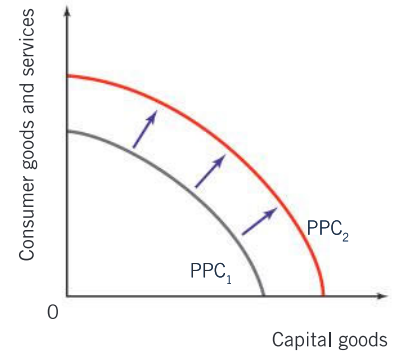


▲ Figure 15.7 A shift in the LRAS curve (a) from the Keynesian perspective and (b) from the new classical perspective



A shift in the AS/LRAS can be shown from either a Keynesian perspective, as in Figure 15.7 (a), or a new classical perspective, as in Figure 15.7 (b). The increase in the full employment level of output is equivalent to the outward shift of the PPC in Figure 15.8.

In very simple terms, the AS/LRAS curve will shift to the right if there is an improvement in the quality of the factors of production – that is, an increase in the productivity (output per unit of input) of the resources used in production – or an increase in the quantity of the factors of production. Either of these may be affected by advances in technology, so improvements in technology are of vital importance to the supply side of any economy. To see how this might come about it is worth considering each factor of production to understand how the quantity or productivity might increase. This is shown in Table 15.1.



▲ **Figure 15.8** An increase in productive potential equivalent to an increase in the LRAS

Factors of production	Increase in quantity	Improvement in quality (increase in productivity)
Land (all natural resources)	<ul style="list-style-type: none"> • Land reclamation • Increased access to supply of resources • Discovery of new resources 	<ul style="list-style-type: none"> • Technological advancements that allow for increased access to resources or the discovery of new resources • Fertilizers • Irrigation
Labour + entrepreneurship	<ul style="list-style-type: none"> • Increase in birth rate • Immigration • Decrease in the natural rate of unemployment (this aspect of unemployment will be covered later) 	<ul style="list-style-type: none"> • Education • Training • Re-training • Apprenticeship programmes
Capital	<ul style="list-style-type: none"> • Investment 	<ul style="list-style-type: none"> • Technological advancements that contribute to more efficient capital • Research and development

▲ **Table 15.1** Factors affecting the quality or quantity of factors of production

Many of the sources of these supply-side changes come naturally through market forces. For example, students in school are attracted to study engineering, scientific research or entrepreneurship because they have an incentive to earn higher wages. Immigrants are attracted to a country because they are similarly motivated by the incentive to achieve a higher standard of living than they would at home. Businesses are motivated by the desire to earn higher profits and will therefore engage in research and development to improve productivity of their resources.

Exercise 15.3

ATL Thinking and Communication

How might each of the following expenditures by government contribute to an increase in the LRAS curve?

1. An apprentice sheet-metal worker.
2. Construction of the Zakim Bunker Hill Bridge, Boston, Massachusetts.



Raw-material producers are similarly incentivized by the profit motive to develop improved resource extraction technologies.

Key concept



INTERVENTION

Regardless of the extent to which market forces contribute to more and better factors of production, governments also have a very important role to play. The policies that a government uses to increase the quantity or improve the quality of the factors of production are known as supply-side policies and these can be divided into two types of policies: interventionist policies and market-based policies. We will look at these policies when we consider supply-side policies in Chapter 18.

EXAMINATION QUESTIONS

Paper 1, part (a) questions

1. Explain three possible causes of a decrease in the SRAS curve. [10 marks]
2. Explain the difference between the Keynesian AS and the new classical LRAS. [10 marks]
3. Explain the concept of potential economic growth. [10 marks]