

## 3. Macroeconomic Equilibrium within Model AS – AD

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In this chapter we introduce first model. AS – AD model is widely mentioned model in a model Macroeconomics. Before we start examining the economy through this model, let's repeat briefly the essence of macroeconomics.

**Macroeconomics** focuses on the behaviour of the entire economy. It is concerned with the economy's total output of goods and services, the growth of output, the inflation rates, unemployment, exchange rates, balance of payment and exchange. In Macroeconomics we examine the rises (booms) and recessions of the economic performance of a country.

**Macroeconomics** is concerned with both long-run economic growth and the fluctuations in the short run that constitute business cycle.

**Macroeconomics** also examines policies that affect consumption and investment, currency, trade balance or performance of the economy in general. It deals with the determinants of changes in wages and prices, monetary and fiscal policies, interest rates, the money stock, the budget of a country, and the national debt.

Briefly spoken, macroeconomics is concerned with the main economic issues and problems affecting the living standards of the people. Sometimes we have to reduce or omit the complicated details of the economy to manageable fundamentals in order we could understand the essential interactions among goods, assets and labour markets in the economy and the linkages among national economies as well.

### *Macroeconomic Models in Different Time Frames*

In Macroeconomics, we examine the real world through the models that have its greatest applicability in a different time frame. The growth theory, which focuses on the growth of productive capacity, dominates the models examining the **long-run** behaviour of the economy. Productive capacity is considered given in the **medium-run**. The level of productive capacity determines output and fluctuations in demand relative to this level of supply determine prices and inflation. Fluctuations in demand determine how much of the available capacity is used and thus the level of output and unemployment in the **short-run**.

## **3.1. Aggregate Demand**

The level of **aggregate demand** represents the total demand for goods (and services) to consume, for new investment, for goods purchased by the government, and for net goods to be exported.

**Aggregate demand** could be depicted as a schedule or curve, which shows the various amounts of goods and services (the amounts of real output) that domestic consumers, firms, government, and foreign purchasers collectively wish to purchase at each possible price level. *Ceteris paribus* (other things equal) the lower the price level, the larger the real GDP these purchasers will demand. Conversely, the higher the price level, the smaller the real GDP they will buy. It follows that the relationship between the price level and the amount of real GDP (output) demanded is inverse or negative.

The **aggregate demand (AD) curve presents**, for each given price level, the level of output at which the goods market and money markets are simultaneously in equilibrium. The position of the aggregate demand curve depends on monetary and fiscal policy and the level of consumer confidence.

### 3.1.1. The Structure of Aggregate Demand

Aggregate demand presents the total demand for domestic output at given price level. It consists of four components: consumption spending by households (**C**), investment spending by businesses and households (**I**), government (federal, state and local) purchases of goods and services (**G**), and foreign demand (**NX**). These four categories cover, definitely, all spending. Let's bear in mind that aggregate demand comprises the planned (intended) expenditures corresponding each given price level.

$$AD = C + I + G + NX$$

**Consumption** include the goods and services purchased by households. It is usually divided into three subcategories: non-durable goods, durable goods and services. Non-durable goods are goods that last only a short period of time, such as food and clothing. Durable goods involve goods that last a long period of time, such as automobiles and refrigerators. In these cases the time to expiry is relatively longer. Services are the purchase of the personal services of individuals, for instance taxi drives, hair cuts or use of post.

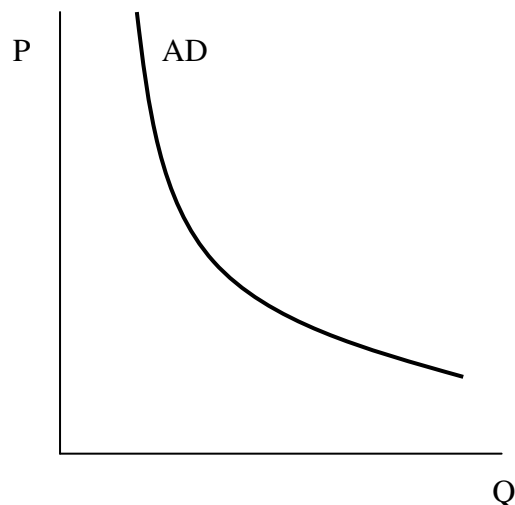
**Investment** consists of the goods purchased for its use in the future. Investment is usually divided into three subcategories: residential fixed investment, non-residential fixed investment, and inventory investment. Residential investment is the purchase of new housing by households and landlords. Non-residential investment is the purchase of new plants, machines and other equipment by firms. Inventory investment is the increase in firm's inventory of goods (if inventory is falling, inventory investment is falling).

**Government purchases** involve the expenditures of federal, state, or local for purchases of goods and services. This category involves, motorways, teachers' salaries, military equipment, and all the services that government workers provide. It does not include payments with no feedback in a form of goods or services. These payments involve transfers of finances to individuals such as social security and welfare. Such payments are not part of aggregate demand or GDP.

**Net exports** take into account trade with other countries. Net exports are the value of goods and services exported abroad minus the value of goods and services that foreigners sell us. If the value of exports equal the value of imports, net export would always be zero. In that case trade is in balance.

### 3.1.2. The Slope of AD Curve

**The aggregate demand is negatively sloped.** The inverse (negative) relationship between the price level and real output is shown in Figure 3.1 where the aggregate demand curve AD is sloped downward as is the demand curve for an individual product. **However, the rationale**



**of the downward slope is not the same as for the single product!**

**Figure 3.1** *The aggregate demand curve*

The aggregate demand curve assumes fixed supply of money in the economy. **The AD curve is downward sloping as higher prices reduce the value of money supply, which reduces the demand for output (aggregate demand).**

Let's explain the downward sloping AD curve in more details:

Assuming fixed supply of money we can distinguish among three main effects explaining (affecting) the downward sloping AD curve.

**Wealth effect.** The real value of purchasing power of the public's accumulated financial assets (saving accounts, bonds) is reduced as price level rises. The public is poorer in real terms and will reduce its spending due to erosion of purchasing power of these assets. Conversely, the real value or purchasing power of a household's wealth rises if the price level decline. Accordingly, consumption spending rises.

**Interest rate effect.** The aggregate demand curve is downward sloping due to impact of price-level changes on interest rates and, in turn, on consumption and investment spending. Rise in price level increases the demand for money. Assuming fixed money supply, this rise in demand for money pushes up interest rates (which is simply the price for its use). Thus, we

can say that interest rates rise as the price level rises. Increase in interest rates reduce investment spending and some parts of consumption sensitive to interest rates.

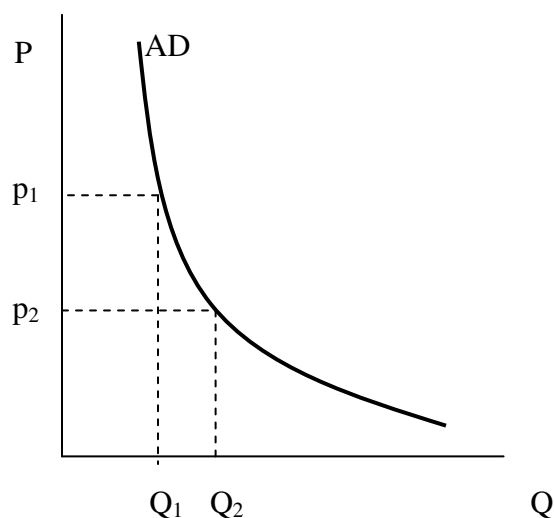
**Foreign purchase effect.** Decline in the aggregate amount of domestic output demanded could result from decreasing net exports. Net exports decline is a consequence of a relative increase in a nation's price level. Conversely, the amount of domestic output demanded rises as a relative decline in a nation's price level increases its net exports.

### 3.1.3. Determinants of Aggregate Demand

To define the determinants affecting aggregate demand we must distinguish between **changes in the quantity** of real output demanded (caused by changes in the price level) and **changes in aggregate demand** (caused by changes in one or more of the determinants of aggregate demand).

#### *Changes in the Quantity of Real Output Demanded*

A rise in the price level, other things equal (*ceteris paribus*), will decrease the quantity of real output (GDP) demanded. Conversely, a decline in the price level will increase the amount of real output demanded. We can show these changes graphically as movements along a fixed aggregate demand curve (Figure 3.2). In general we can say that changes in price level change the level of aggregate spending, and thus, change the amount of real output (GDP) demanded in the economy.

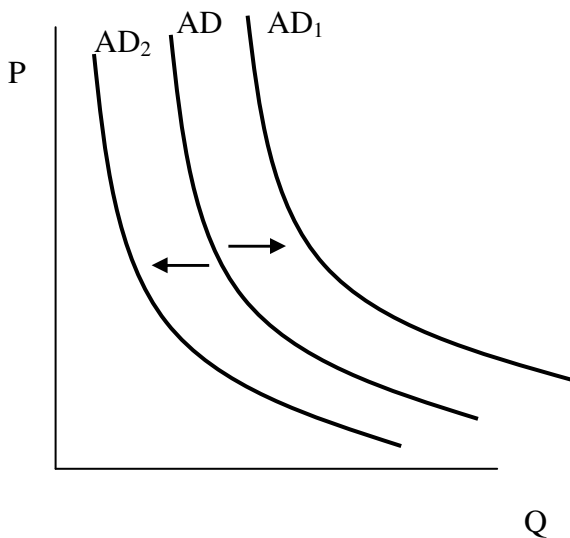


**Figure 3.2** *Changes in the quantity of real output demanded*

### Changes in Aggregate Demand

Figure 3.3. represents graphically the changes in aggregate demand. These changes are caused by the factors we have assumed to be held constant under the phrase “ceteris paribus – other things equal”. Change in aggregate demand is shown as a shift of the whole curve. The following list includes the aggregate demand shifters - determinants of aggregate demand.

1. Change in consumer spending (consumer wealth, consumer expectations, taxes, household indebtedness).
2. Change in investment spending (profit expectations (expected returns on investment projects, interest rates, business taxes, technology, degree of excess capacity (unused existing capital).
3. Change in government spending (government purchases of goods and services).
4. Change in net export spending (foreign national income, exchange rates)
5. Macroeconomic policy



**Figure 3.3** Changes in aggregate demand

**Consumer spending.** Domestic consumers collectively may change the amounts of their purchases of domestic produced goods and services even if the price level is constant at the same level. In this case, the entire aggregate demand curve shifts. If consumers purchase less output than before, at each possible price level, the aggregate demand schedule shifts leftward (from AD to AD<sub>2</sub> in Figure 3.3). Conversely, it moves rightward (AD to AD<sub>1</sub>) when they purchase more output at each possible price level.

**Investment spending.** Investment spending involve the purchases of capital goods by firms and businesses. AD curve shifts leftward if the amount of new capital goods demanded by

firms at each given price level decrease. A rise in the demanded amount of investment goods will increase aggregate demand and thus shifts AD curve rightward.

**Government spending.** The third major determinants are purchases of goods and services by local, state (and federal) government. Aggregate demand rises if government purchases more real output at each price level. Increased government expenditures for real output at each price level will increase aggregate demand as long as interest rates and tax collections do not change as a result eventually.

**Net export spending.** Aggregate demand is also influenced by net foreign demand for domestic goods. The nation's aggregate demand curve (in country B) shifts when foreign consumers (from country A) change their purchases of domestic (B's) goods independently of changes in the domestic (B's) price level.

## 3.2. Aggregate Supply

The **aggregate supply (AS) curve** depicts, for each given price level, the quantity of output firms are willing to supply. The position of the aggregate supply curve depends on the productive capacity of the economy.

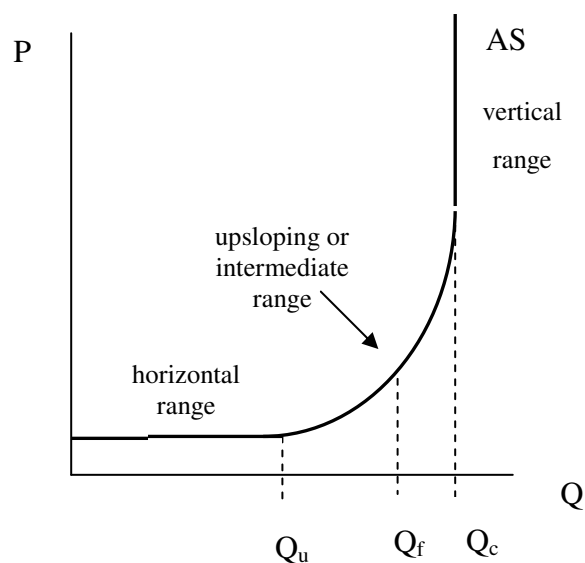
Aggregate supply is a schedule showing the level of real domestic output which will be produced at each price level.

The level of aggregate supply is the amount of output the economy can produce given the resources and technology available. The aggregate supply trade-off between price and output represents firms' decisions to raise or lower prices when demanded for output rises or falls.

### 3.2.1. The Slope of AS Curve

Relationship between the price level and the amount of real output firms and businesses produce and offer for sale at markets is positive or direct. Aggregate supply curve is positively sloped. The reason is that the enterprises are motivated by higher prices to produce and sell more output. Conversely, lower prices reduce output.

Let's assume, for now, that AS curve consists of three distinct segments or ranges: the horizontal, intermediate (upsloping), and vertical ranges.



**Figure 3.4** The aggregate supply curve. It consists of three ranges: the horizontal, intermediate (upsloping) and vertical.

**Horizontal range.** Let's first notice the potential output  $Q_f$  (full employment output) in Figure 3.4. This level of output corresponds with the *natural rate of unemployment*. Horizontal part of aggregate supply curve involves only real levels of output, which are substantially less than the potential output ( $Q_f$ ). Accordingly this range of AS indicates that economy experiences recession or depression and that large amount of unused inputs (machinery, workers) are available for production. Because producers can acquire labour and other inputs at stable prices, per-unit production costs do not rise as output is expanded up to  $Q_u$  (The Keynesian view).

**Vertical range.** The vertical shape of AS curve represents the other extreme, when economy reaches its potential capacity of production. This corresponds with the level of potential output (full-employment output) in Figure 3.4. In the vertical range any rise in prices will not produce additional (extra) real output, because the economy is already working at its full capacity level.

**Intermediate (Upsloping) Range.** The economy consists of numerous product resources markets and in the various sectors (or industries) full employment is not reached simultaneously. In the upsloping range of AS curve, per-unit production costs increases and businesses must obtain higher prices for their products to make profits. Thus, in this range, between between  $Q_u$  and  $Q_c$ , rising real output is accompanied by increasing price-level.

The AS schedule described above (except vertical range) corresponds with the short run AS curve. **In the long run the shape of AS curve is vertical reaching the level of potential output (full-employment level of output)** – the Classical view. The *natural rate of unemployment* occurs at this output.

**Full employment output also called potential output** is output economy could produce at full employment level given the existing resources. Full employed output (natural level of output, potential output) is the level of output at which economy's resources are fully<sup>1</sup> used (employed), or more realistically, at which unemployment is at its natural rate. Full employment corresponds with natural rate of unemployment which means that the rate of unemployment is not zero!

**Natural rate of unemployment** could be defined as the rate of unemployment relating to normal frictions at labour market that exist when labour market is in equilibrium.

### 3.2.2. Determinants of Aggregate Supply

Aggregate supply curve shows that real output rises as the economy moves from left to right through horizontal and intermediate ranges. Such changes in output originates from movements along the aggregate supply curve. It follows that we must keep in distinguishing between movements **along the aggregate supply curve** and **shifts of the curve itself**, similarly as in the case of aggregate demand.

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<sup>1</sup> Bear in mind that fully in this case does not mean maximally. Fully employed labour refers to natural rate of unemployment as is mentioned above.

Lets examine **the determinants of aggregate supply**, which shift the entire aggregate supply curve.

1. Change in input prices (availability of domestic resources as land, labour, capital, entrepreneurial ability; prices of imported resources; market power).
1. Change in productivity.
2. Change in legal-institutional environment (business taxes and subsidies, government regulations).
3. Macroeconomic policy.

**Input prices.** First we must distinguished the input prices from the output prices, which constitute the price level. A number of factors influence input prices. Ceteris paribus (other things equal) an increase in input prices rises per-unit production costs and reduce amount of aggregate supply. Conversely, decline input prices work in opposite way.

**Productivity.** Productivity relates level of real output in the country to the quantity of input used for production of that output. It means that productivity is a measure of real output per unit of input (or average real output):

Productivity = total output / total inputs

A rise in productivity means the economy can received more real output from its scarce resources – its inputs (factors of production). Accordingly the per-unit production cost decreases, an increase in productivity shifts the aggregate supply curve rightwards. The aggregate supply curve moves leftward when a decline in productivity increases the per-unit production costs.

**Change in legal-institutional environment.** The per-unit costs of output could be influenced by a change in the legal-institutional setting such as changes in taxes and subsidies, and changes in the extent of regulation. Such changes may eventually change aggregate supply.

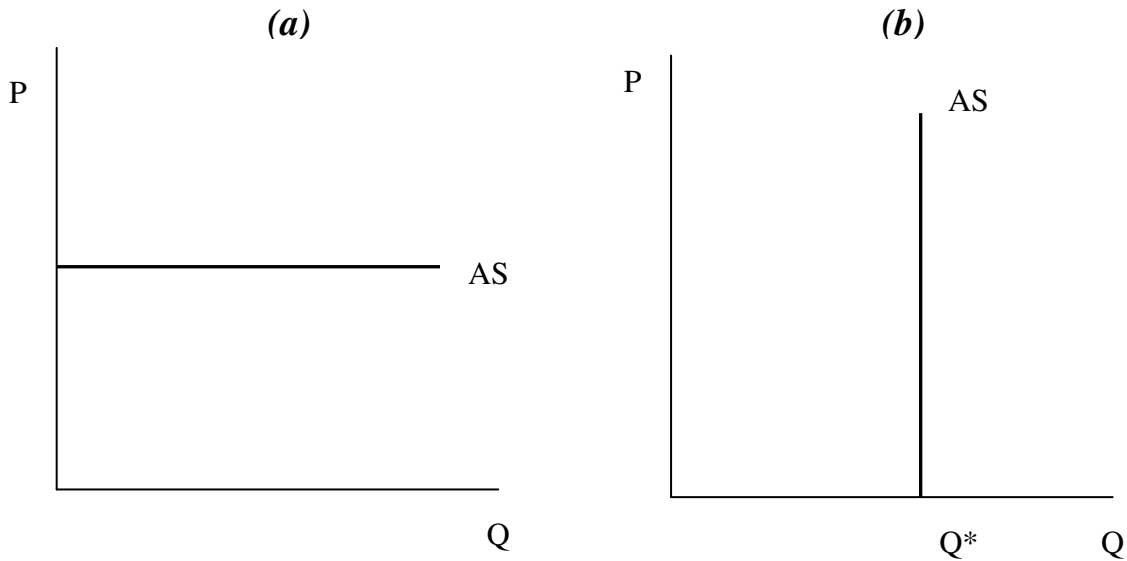
### 3.2.3. Keynesians vs. Classics

There are two extreme views on the shape of the AS schedule within economic theory.

**Vertical classical aggregate supply curve** suggests that no matter what the price level is, the same amount of goods will be supplied. The basic assumption of this approach is that the labour market is in equilibrium with full employment of the labour force. The full employment output is also called potential output,  $Y^*$ . The position of classical aggregate supply curve moves to the right over time, because potential output grows over time as the economy accumulates resources and technology improves. *Potential output moves each year independently on the price level.*

**The Keynesian aggregate supply curve is horizontal**, which indicates that firms will supply whatever amount of goods is demanded at the existing price level. The fundamental idea of the Keynesian approach is that firms can receive as much labour as they want at the current wage due to persisting unemployment. The changes in output are not accompanied by the changes in average costs of production. Thus firms are willing to produce and offer as much

as is demanded at given price level. *Under Keynesian aggregate supply curve assumptions, the price level does not depend on GDP.*



**Figure 3.5** Keynesian (a) and Classical (b) Aggregate Supply functions.

#### **Box 1: Keynesian and Classical – Short Run and Long**

*We repeatedly use the terms “Keynesian” and “Classical” to describe assumptions of a horizontal or vertical aggregate supply curve. Note that these are not alternative models providing alternative descriptions of the world. Both models are true: the Keynesian models holds in a short run, and the Classical model holds in the long run. Economists do have contentious disagreements over the time horizons in which either model applies. Almost economists (almost all) agree that Keynesian model holds over period of a few months or less and the classical model holds when the time frame is a decade or more.*

*Source: Dornbush-Fisher-Starz [7]*

### **3.3. Equilibrium within AS – AD Model: Real Output and the Price Level**

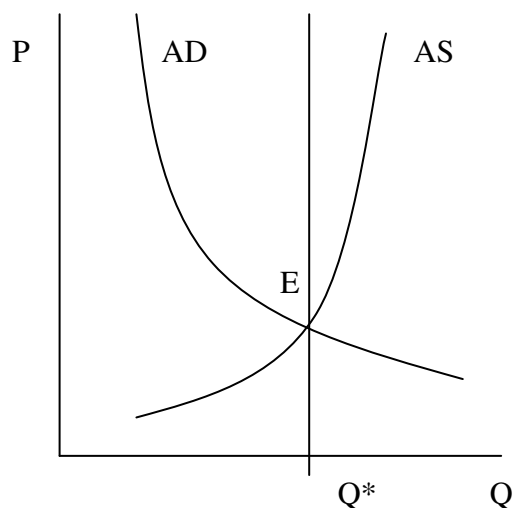
The aggregate supply – aggregate demand model (AS – AD model) belongs to the basic macroeconomic tools used for studying output fluctuations and the determination of the price

level and inflation rate. This model helps us understand why the economy deviates from a trend path of smooth growth over time and to examine the impacts of government policies intended to decrease unemployment, keep prices stable, and reduce output fluctuations.

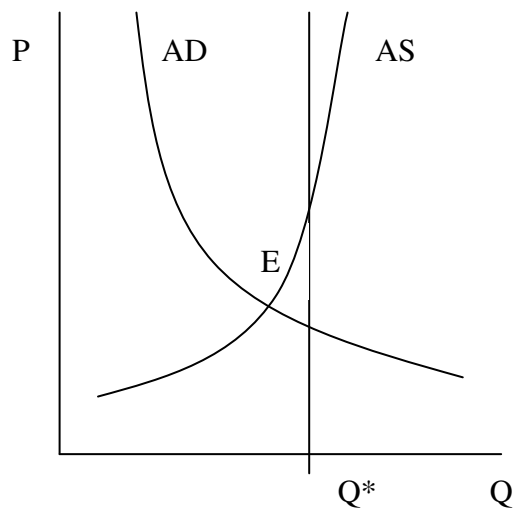
**AS – AD model** is a macroeconomic model, which uses aggregate demand and aggregate supply to determine and explain price level and the real domestic output.

The intersection of the aggregate demand and aggregate supply curves determines the economy's equilibrium price level and equilibrium real domestic output.

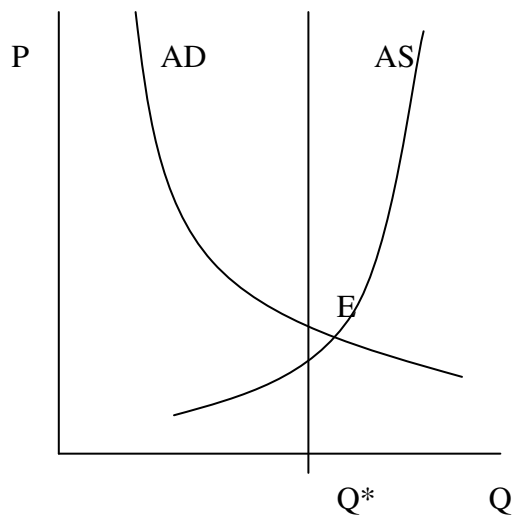
Generally we can distinguish between three situations in economy – three types of equilibrium.



1. **Equilibrium output equals potential level of output.** There is full employment in the economy - the natural rate of unemployment occurs at this output. All the possible (accessible) inputs (factors of production) are effectively used.



2. **Equilibrium output does not reach the level of potential output.** All the possible (accessible) inputs (factors of production) are not effectively used. The rate of unemployment is higher than the natural rate of unemployment. There is involuntary unemployment in the economy. Output gap = potential output – actual output.



3. **Equilibrium output reaches the higher level than the potential level.** The actual rate of unemployment is temporarily lower than the natural rate of unemployment. The economy is “overheated”. This situation is always temporary. It is impossible for the economy to be kept under such conditions in a long term.

