Aggregate Demand

The demand for goods and services is an important influence on the performance of the economy. Aggregate demand depends on the willingness and ability of consumers, business firms, and governments to purchase the goods and services produced nationally and made available for sale in domestic and foreign markets.

The amount of the final products that will be demanded in any given year depends on a variety of factors, including the price level, consumer confidence, wealth, and the availability of credit. In analyzing the overall demand for final products in the economy, we first isolate the relationship between the amount that will be demanded and the general level of prices for products, holding all other influences on demand fixed. The amount of final products (measured as real GDP) buyers will purchase at a given price level is called the aggregate quantity demanded

Aggregate demand is a relationship between aggregate quantity demanded and the economy's price level. In macroeconomics, we depict this relationship using an **aggregate demand curve**, a graph that shows how aggregate quantity demanded varies with the price level for the economy. A downward-sloping aggregate demand curve implies that the lower the price level, the greater the aggregate quantity demanded, other things being equal.

Although the aggregate demand curve may look like a market demand curve, it's really quite different. It describes a relationship between an *index* of prices and an *aggregate* of the final products demanded in a nation instead of a relationship between the price and quantity of a single good. For example, when you move down an aggregate demand curve, there's an increase in an *aggregate* of the goods and services demanded in the nation. When the price level falls, it means that the cost of purchasing an *aggregate* (or "market basket") of many products falls. Some individual prices may actually rise when the price level falls, and vice versa.

Because changes in real GDP mean changes in input use in the nation, income earned in the nation also changes when you move along an aggregate

demand curve. Therefore, income isn't held constant as you move along an aggregate demand curve as it's held constant when you move along the market demand curve for a single product.

The downward-sloping aggregate demand curve means that an increase in the price level will decrease the willingness and ability of at least some buyers to purchase the products included in real GDP. The reasons for the downward slope of an aggregate demand curve are much more complex than those that explain downward-sloping market demand curves for a single product. Here are three basic reasons for the inverse relationship between the aggregate quantity demanded and the price level:

1. *The real wealth effect: A higher price level can decrease real wealth in a nation and reduce consumer spending on final products*. The purchasing power of accumulated savings denominated in fixed dollar amounts declines when the price level goes up. For example, suppose you have $100 in cash in a cookie jar in your apartment. If the price level rises, the real value of this currency falls. The reduction in purchasing power associated with the rise in the price level will make you less wealthy and can decrease your willingness and ability to purchase final goods and services. The aggregate reduction in wealth caused by an increase in the price level is likely to decrease the willingness and ability of all consumers to purchase currently produced final products during the year.

2. *The real interest rate effect: A higher price level can increase interest rates, making credit more expensive and reducing the quantity of investment goods demanded*. The ability of business firms and households to purchase goods and services produced depends on the cost of credit, which is measured by the real interest rate. Naturally, at a higher price level, the dollar amount of credit necessary to purchase any given quantity of goods and services also increases. However, at a higher price level, households and businesses want to hold more cash in their bank accounts to finance their larger dollar volume of transactions. The increased desire to hold cash decreases the supply of loanable funds, thereby putting upward pressure on real interest rates when people need more credit to

finance their daily business. As real interest rates rise, business firms cut back their purchase of investment goods and households cut back their spending. These actions decrease the aggregate quantity of goods and services demanded.

3. *The foreign trade effect: A higher price level reduces foreign demand for exports and increases domestic demand for imports*. Because the higher domestic price level implies that goods become more expensive relative to foreign goods, consumers tend to substitute imported goods for domestic goods.

Changes in Aggregate Demand

The amount of final products demanded doesn't depend on the price level alone. Aggregate demand is also influenced by such economic variables as wealth, interest rates, foreign exchange rates, and expectations about the future. A **change in aggregate demand** is a change in the amount of a nation's final products that will be purchased caused by something other than a change in the price level.

A change in aggregate demand is represented by an inward or outward shift of the economy's aggregate demand curve. The distinction between a *change in aggregate demand* and a *change in aggregate quantity demanded* is similar to the distinction between change in demand and change in quantity demanded for market demand curves. A change in aggregate quantity demanded is a movement along a given aggregate demand curve that occurs in response to a change in the price level. *A change in aggregate demand, however, implies a movement of the entire aggregate demand curve*. When aggregate demand increases or decreases, the relationship between the price level and aggregate quantity demanded is altered.

Influences on Aggregate Demand

Changes in the economy cause changes in aggregate demand by affecting the willingness of consumers to spend their income on the final products of domestic producers. Business demand for investment goods fluctuates, as do government purchases. Similarly, changes in the demand for our exports can influence aggregate demand for the products of domestic producers.

Much of the macroeconomic analysis in the text examines, in depth, the various influences on aggregate demand. At this point, we'll briefly list them.

1. *The quantity of money in circulation*. Suppose the government were to suddenly declare that each dollar people held in their pockets as currency or on deposit in banks was now worth two dollars. As a result, aggregate demand would increase, because people would have more money to spend. On the other hand, a decrease in the quantity of money would decrease aggregate demand. Unrestrained increases in the quantity of money in circulation are a major cause of inflation and hyperinflation.

2. *Wealth*. Wealth consists of assets that can be sold, if necessary, to provide money for spending, such as stocks, bonds, and real estate. When stock prices are high, consumers who hold stocks are likely to be more willing to spend their current income rather than save it. Conversely, when the prices of stocks and other assets (such as land and homes) fall, aggregate demand can decrease.

3. *Government purchases, taxes, and transfers*. An increase in government purchases of goods and services increases aggregate demand, while a decrease in such purchases decreases aggregate demand. Taxes take a portion of income earned by households and businesses out of the spending stream. An increase in tax rates, other things being equal, decreases disposable income to households and is likely to decrease aggregate demand. Conversely, a decrease in tax rates is likely to increase aggregate demand because it increases disposable income. Transfer payments are a source of income pensions and to those who depend on welfare or unemployment benefits. Transfers influence consumption expenditures, and, when they increase, aggregate demand also increases. For example, when the unemployment rate goes up, aggregate demand tends to decrease because labor earnings decline. However, unemployment insurance compensation (which is a transfer) goes up when the unemployment rate increases. The increase in transfer payments from unemployment insurance acts to increase aggregate demand, thereby cushioning the impact of increased cyclical unemployment on the economy

4. *Expectations about the future*. If the outlook for future increases in disposable income is bleak, consumers are likely to cut back on spending. The decrease in aggregate demand resulting from a decline in the demand for consumption goods can reduce the demand of business firms for investment goods. If business firms don't think they can sell all their current production, they're unlikely to purchase more inventory, machines, or equipment or to plan new plants. When expectations turn up, aggregate demand is also likely to increase.

Aggregate Supply Sellers, like buyers, respond to incentives. How much they're willing to produce in a given year depends on their assessments of the profitability of selling their products. The amount sellers are willing and able to supply to product markets is influenced by the price of their products and by such considerations as wages, other input prices, and technology. In macroeconomic analysis, we begin by isolating the influence of product prices on production decisions. The aggregate quantity supplied is the quantity of final products (measured by real GDP) that will be supplied by producers at a given price level. Aggregate supply is a relationship between the price level and aggregate quantity supplied.

An **aggregate supply curve** shows the aggregate quantity supplied for each possible price level over a given period. When drawing an aggregate supply curve, we assume that all input prices and the general availability and quality of productive resources in the economy are fixed. We also assume that technology doesn't advance over the given period.

An upward-sloping aggregate supply curve implies that an increase in the price level will increase the aggregate of the final products, measured by real GDP, that domestic business firms will produce. As was the case for aggregate demand, the shape of the aggregate supply curve can't be as easily explained as that of a market supply curve for a particular item. A market supply curve slopes upward, because higher prices imply greater opportunities for profit, thereby attracting new sellers to enter the market over the long run. When we discuss aggregate supply,

the number of sellers and the resources available during the year are more or less fixed, so it's not possible to explain the increase in output in terms of the attraction of additional sellers or resources into production.

However, there's reason to believe that profit opportunities from supplying more output do increase in the aggregate, at least over a period of a year, when the price level rises. Over a short period, a higher price level increases the amount businesses receive from selling additional output, *while input prices stay the same*. Naturally, if product prices rise but *input* prices remain constant, opportunities arise for additional profit from producing more. This leads producers to produce more until the costs of additional output rise to match the higher prices. (This is the marginal cost of output.) The costs of additional output eventually rise because firms must work their existing facilities more intensely and must hire less experienced workers to produce more. As this occurs, unit costs of production tend to rise because of overuse of facilities and because of the lower skill and productivity of less experienced workers.

The level of real GDP corresponding to potential real GDP is indicated on the horizontal axis. Potential real GDP is the level of real GDP that would be produced if the economy were at full employment. As potential real GDP for the economy is approached, factories, offices, and other productive facilities are pushed beyond the levels at which the unit cost of production is at a minimum. This impairs the overall efficiency of operation. These factors contribute to the higher unit production costs that occur, even though input prices are constant.

In addition, as an economy's potential real GDP is approached, businesses often have difficulty in obtaining all of the input they require. To operate facilities around the clock, firms must use overtime labor, which is often difficult to obtain without paying bonuses. The aggregate supply curve becomes steeper as output increases, because the costs of producing the additional units increase as potential real GDP is approached. (Just as the marginal cost of output for an individual producer increases when output goes up, the marginal cost of real GDP increases as the economy approaches full employment.)

Notice that the aggregate supply curve goes through the line corresponding to potential real GDP. The economy can produce more than the amount of final products corresponding to potential real GDP when the actual unemployment rate falls below the natural rate of unemployment. However, there's a physical limit to the amount of output that can be produced in a given year. When the economy surpasses potential real GDP, firms hire less experienced workers and work their plants around the clock. As this occurs, unit costs of production tend to soar. These higher costs are reflected in the steeply rising aggregate supply curve beyond the level of real GDP corresponding to the natural rate of unemployment.

The aggregate supply curve eventually becomes vertical. The level of real GDP corresponding to that point is the physical limit of production for the economy for the year. At that point, it's virtually impossible to obtain the labor and other inputs necessary to increase output anymore.

Segments of the Aggregate Supply Curve

The slope of the aggregate supply curve differs depending on how much slack there is in the economy at the beginning of a year (or any other production period). The aggregate supply curvehas been divided into three distinct segments for corresponding levels of real GDP:

Segment 1: *The economy is operating well below its potential, with considerable cyclical unemployment*. When actual real GDP is considerably below the level that corresponds to potential real GDP, there will be cyclical unemployment and idle capacity. Under these circumstances, aggregate production can increase without much upward pressure on unit costs. If the economy is operating in this segment, business firms can easily produce more by bringing idle plant capacity and equipment back into service. It's also easy for business firms to obtain materials and labor under these circumstances, so they can increase output without increasing the costs of additional units of output. In this segment, there is considerable slack in the economy and, other things being equal, little or no increase in the price level will suffice to increase aggregate quantity supplied.

Segment 2: *The economy is close to full employment*. As idle capacity is eliminated and the economy is approaching the level of aggregate production corresponding to potential real GDP, costs of additional units of output begin to rise more quickly. Under these circumstances, more substantial increases in the price level are necessary to induce firms to increase aggregate quantity supplied. It follows that, as the economy approaches full employment, inflation will heat up if aggregate quantity supplied increases further.Segment 3: *The economy is overheated*. The aggregate quantity supplied will exceed potential real GDP. Unit costs of production will rise very rapidly, and much higher prices will be necessary to cover those higher unit costs if the economy is to produce more. An economy operating at the beginning of the year in the nearly vertical portion of its aggregate supply curve will be bursting at the seams through overproduction.**Changes in Aggregate Supply**The amount sellers will produce doesn't depend on the price level alone. Changes in wages and other input prices, changes in the quality and quantity of resources available, and advances in technology will change the aggregate quantity supplied at each possible price level. A **change in aggregate supply** is a change in the amount of national production resulting from something other than a change in the price level. A change in aggregate supply implies a shift of the economy's aggregate supply curve. Remember that the aggregate supply curve is drawn under the assumption that the level of all input prices, including the price of labor (nominal wages), the availability and quality of inputs, and technology, are fixed. A decrease in aggregate supply is represented by an *inward* shift of the aggregate supply curve, and an increase in aggregate supply is represented by an *outward* shift of the aggregate supply curve.

How Changes in Input Prices Affect Aggregate Supply Some changes in the economy that change aggregate supply have little impact on the level of real GDP that corresponds to potential real GDP and the nation's physical limit to output for the year. Consider the impact of a change in nominal wages on aggregate supply. As nominal wages go up, the unit and marginal costs of production also go up, decreasing the profitability of selling output at any given

price level. Because firms now require higher prices to make any given level of output available, the aggregate supply curve shifts inward, just as a market supply curve shifts inward in response to an increase in wages. However, the wage increase itself affects neither the economy's potential real GDP nor the level of output corresponding to the economy's physical limit to production.

A decrease in nominal wages or a decrease in fuel prices would increase aggregate supply without affecting potential real GDP or the level of real GDP corresponding to the economy's capacity output. Lower input prices increase profit opportunities and induce businesses to increase the aggregate quantity supplied at each possible price level.

How Changes in the Quantity or Productivity of Inputs Affect Aggregate Supply Changes in the availability or productivity of resources and advances in technology increase or decrease aggregate supply and also change the levels of output corresponding to potential real GDP and the nation's capacity output. The graph in Box 9 shows an increase in aggregate supply that results when changes in the economy affect the nation's potential real GDP and the level of real GDP corresponding to capacity output. For example, an increase in the size of the labor force means that more labor hours are available for production. Because of the increased labor, potential real GDP is greater, and so too is the capacity of the economy to produce goods and services. Similarly, an increase in the nation's capital stock will increase aggregate supply because more capital means that a given labor force has more tools with which to work. Naturally, with more tools, labor will be more productive.

An increase in the availability of raw materials can also increase aggregate supply. Improvement in the *quality* of inputs is another important cause of increases in aggregate supply that also increase potential real GDP. For example, improvement of the educational level of the labor force is a major cause of such increases in aggregate supply. Advances in technology, such as new and faster computers and automated production techniques, also contribute to such outward shifts in aggregate supply.

Macroeconomic EquilibriumA **macroeconomic equilibrium** is attained when the aggregate quantity demanded equals the aggregate quantity supplied. When aggregate supply and demand balance at the equilibrium price level, there is neither widespread unplanned buildup of product inventories nor an unexpected rapid reduction in inventories because businesses can't fill orders quickly enough. When a macroeconomic equilibrium is achieved, the aggregate production made available for sale over a given period is, on average, willingly purchased in markets at the prevailing price level.The phrase *on average* is important when discussing macroeconomic equilibrium because both the price level and real GDP are aggregates. Some *individual* markets can be out of equilibrium, even when a macroeconomic equilibrium is attained. For example, the demand for digital cameras may fall, resulting in a surplus of cameras and an unanticipated buildup of inventories. At the same time, an increase in the demand for DVRs may result in an unanticipated depletion of producer inventories. There would, therefore, be downward pressure on the price of digital cameras and upward pressure on the price of DVRs as these markets move to a new equilibrium.When a macroeconomic equilibrium exists, there may be shortages in some product markets and surpluses in other product markets. *In the aggregate*, however, there's neither upward nor downward pressure on the price level or the level of real GDP once macroeconomic equilibrium is attained.