CHAPTER 8
AGGREGATE DEMAND AND AGGREGATE SUPPLY

CHAPTER OBJECTIVES

Complete this chapter and you will be able to understand and manipulate the aggregate supply and aggregate demand model of macroeconomics. You will understand why the aggregate demand curve is downward sloping and why there is controversy over the shape of the aggregate supply curve. You will also understand what variables shift these curves and how the shifting translates into price and output impacts. Finally, you will understand the difference between demand-pull and cost-push inflation, and you will understand what is meant by supply-side economics.

INTRODUCTION

Now that we have laid out the language of macroeconomics and some of the measurement issues, it is time that we turn our attention to modeling the macroeconomy. Just as we used the supply and demand model in Chapter 2 to help us understand what would happen in a particular industry if certain variables change, we use the Aggregate Supply and Aggregate Demand model to help us understand how other variables affect the economy as a whole.
Remember that models are not perfect. They rest on simplifying assumptions that allow us to boil down the essentials of what we are looking at in a way that helps us understand the big picture. In microeconomics, supply and demand is a well understood and pretty well accepted framework to look at particular industries. Regrettably, in macroeconomics no such comparable model exists.

The closest we come to finding a workable model that is relatively easy to use and that is flexible enough to encompass a variety of differing viewpoints is the Aggregate Supply and Aggregate Demand model. It also has the virtue of mirroring the Supply and Demand model that we studied in Chapter 2, so the concepts are less foreign than they would be with a completely new model.

The reason for caution with regard to macro models is that, unlike micro-economic models where there is only one market, many interrelated goods and services are combined. Where we can write down a list of five important things that influence the price of apples, it would take more than five pages to write down the important things that affect the economy as a whole. The macroeconomy is just a much bigger and much more complex thing to model than any particular market. With that caution in mind we will proceed in this chapter with the Aggregate Supply - Aggregate Demand model knowing that, while not perfect, it is reasonably suited to the purpose at hand.

Following the method of presentation in Chapter 2, we will explain this model by first examining Aggregate Demand and Aggregate Supply individually. Then we will look at them together as part of one model. Just as in Chapter 2 where we then look at why supply and demand might change, we will examine why aggregate supply and aggregate demand might change and what happens when they do. Lastly, we will use the Aggregate Supply-Aggregate Demand Model to explain, albeit very briefly, supply-side economics.
**AGGREGATE DEMAND**

**Definition**

**Aggregate Demand** shows various amounts of goods and services: It shows the quantities of real domestic output which domestic consumers, businesses, governments and foreign buyers collectively will desire to purchase at each possible price level. As a practical matter we map this on a graph (Figure 1) with our measure of real goods and services sold, Real Gross Domestic Product (RGDP) on the horizontal axis and our measure of all prices, the price index (PI), on the vertical axis.

Just as in Chapter 2, when we asserted that the demand curve was downward sloping and then discussed why this makes sense, we do the same now. As shown in Figure 1, the aggregate demand curve does, in fact, relate all prices to real output in a negative or inverse manner. This makes sense for three reasons: the real balances effect, the foreign purchases effect, and the interest rate effect.
**Figure 1 Aggregate Demand**
The Aggregate Demand Curve is downward sloping, with our measure of overall prices, PI, on the vertical axis and our measure of overall output, RGDP, on the horizontal axis.

**Why Aggregate Demand is Downward Sloping**

The **real balances effect** is the idea that any wealth that you may have in the form of cash or securities becomes less valuable as prices rise. Also, if you have less ability to buy real goods and services when prices are higher, then the two are negatively related.

The second reason why the aggregate demand curve is downward sloping is the **foreign purchases effect**. The argument here is that as prices rise in the U.S., Americans will be more willing to buy imports and less willing to buy American-made goods. Foreigners will also be less willing to buy US goods, thus reducing our exports to them. If you remember Chapter 7 and its expenditures...

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**Real Balances Effect**: Because higher prices reduce real spending power, prices and output are negatively related.

**Foreign Purchases Effect**: When domestic prices are high, we will export less to foreign buyers and we will import more from foreign producers. Therefore higher prices leads to less domestic output.
approach, you will recall that any increase in imports reduces U.S. GDP.

The **interest rate effect** is that higher prices lead to inflation. This in turn leads to less borrowing and a lowering of RGDP. The definition of aggregate demand will help explain the significance of interest rates as they relate to the downward sloping nature of aggregate demand curve. Recall from Chapter 7 that, using the expenditure approach, aggregate demand is made up by figuring the sum of total consumption, business investment, government spending on goods and services, and exports and subtracting imports. Two of those items, consumption and business investment are interest-sensitive. When people buy homes, cars, home furnishings, or any good expected to last longer than 3 years (what economists call durable goods) they often do it by borrowing the money. When interest rates are high, the payments people can expect to make on the consumption of these goods will be higher than they are when interest rates are lower. When businesses borrow money to build a new plant or buy new equipment, the payments they must make to their creditors are also determined by the interest rate. Any time the interest rate rises, the volume of both large-dollar-item consumption and business investment will fall because the interest rates have caused costs to be greater. Recall from Chapter 4 that inflation increases interest rates, so if prices rise, inflation rises; if inflation rises, interest rates rise; if interest rates rise, consumption and investment fall; if consumption and investment fall then RGDP falls.

**AGGREGATE SUPPLY**

**Definition**

**Aggregate Supply** shows the level of output available at each possible price level.
real domestic output available at each possible price level. It is in the aggregate supply curve where the accommodations for differing viewpoints take place. The differing viewpoints hinge on what is called full employment. Since most economists say that full employment exists when cyclical unemployment is zero, that means there are still unemployed people at “full employment.” Specifically, the so-called structurally unemployed, the people for whom the industry in which they worked has moved or no longer exists, are without work. In addition, the frictionally unemployed, those who quit because they are looking for better jobs or quit because their spouse found a better job in a new location, are out of work during what is referred to as “full employment.” These differences of opinion are displayed in the various ranges of the Aggregate Supply Curve shown in Figure 2.

![Aggregate Supply Curve Diagram]

**Figure 2** The Aggregate Supply Curve
Aggregate Supply has three ranges: the Keynesian Range is horizontal and assumes there are many unemployed; the classical range is vertical and assumes full employment; and the intermediate range is upward sloping and assumes that some industries are at full employment and others are not.
Competing Views of the Shape of Aggregate Supply

We have a serious divergence of opinion among macroeconomists on several important definitions. What constitutes full employment and what unemployment is voluntary and what unemployment is involuntary are questions which separate the two main camps of economists. There are some, called classical economists, who believe in the ability of all markets to generate good outcomes without government involvement. They believe that if there are minimum wage jobs available and unemployed steel workers choose not to take them, they are not involuntarily unemployed, just deluded about their prospects. As a result, they believe that cyclical unemployment is zero and therefore we will, by definition, always be at full employment because changes in the labor market will ensure that all people who want a job have them as long as they are willing to work for the market equilibrium wage. If they are not, then they do not count anyway; at least within the definition of full employment held by classical economists.

If according to classical economists we are always at full employment, we are never there for Keynesian economists. These economists, followers of the early 20th century economist John Maynard Keynes, argue that there are always more people willing to work than there are jobs available and that, as a practical matter, we have never actually reached full employment. To Keynesians the concept is irrelevant. Thus, however many people there are employed, Keynesians argue there could always be more and increases in aggregate demand are needed to employ them.

To depict these differing views on a graph, classical economists believe that the aggregate supply curve is vertical all the time. They believe that prices and wages will constantly equilibrate all markets, so increases in aggregate demand will only bid up prices, and the underlying real gross domestic product
will remain unchanged. As an example, recall the memory chip making firm we studied in Chapters 5 and 6. Suppose it has many competitors that are identical to it. If aggregate demand increases leading to an increase in demand for computers and therefore memory chips, our firm will want to expand output. Classical economists argue that since all markets are at full employment to begin with, our firm will have to raise the wage they pay to attract more employees to produce those extra chips. Whether or not they succeed in luring away the workers from the competition, total industry output will remain the same, since the total number of workers will not have changed. The only thing that will change if the classical economists are right is that prices will rise.

On the other hand, Keynesian economists believe that prices and wages are rigid and that unemployment results from that fact. The only way to employ these people, so the Keynesian’s argument goes, is to increase aggregate demand. Moreover, since prices do not change, the aggregate supply curve should be thought of as horizontal. Again, using our chip maker as an example, if there are many unemployed workers available for hire into the chip making business, then increasing output to meet increased demand does not require that wages rise.

A reasonable middle ground between these two models is that some industries are at full employment while other industries are not. If that is the case, an increase in aggregate demand may simply bid up prices in some industries and simply increase output in others. Thus, in the aggregate, real GDP rises a little and prices rise a little. If some industries, like computer chip makers, are at full employment and others, like steel, are not, then an increase in aggregate demand that increases demand for these two products will cause only inflation in the chip industry and only an increase in output in the steel industry.
The aggregate supply curve and the differences among economists are shown in Figure 2. As you can see the vertical portion corresponds to what classical economists believe and is so indicated because any increase in aggregate demand will simply increase prices and not output. Similarly, the horizontal region corresponds to what Keynesian economists believe and is labeled as such because any increase in aggregate demand will simply increase output and not prices. The middle ground, what we refer to as the intermediate range, connects the two ideological extremes and does so on the assumption that the classical economists may be right for some industries and the Keynesians for others.

You should understand that the representation of aggregate supply in Figure 2 is not one that most economists would embrace as perfect. For our purposes, though, it allows us to deal with the differences of opinion among the major schools of thought within macroeconomics in a way that as uncomplicated as it can be (This is not to say that you will necessarily find it to be uncomplicated.)

**SHIFTS IN AGGREGATE DEMAND AND AGGREGATE SUPPLY**

**Variables that Shift Aggregate Demand**

Just as we saw in Chapter 2, where there were factors that shifted demand, there are factors that will shift aggregate demand. If you look at the elements of aggregate demand you get clues as to what these might be. Anything that affects people’s willingness to consume, government’s desire or need to spend money on goods and services, business’s desire to invest in new plant and equipment, or net exports, i.e., exports minus imports, will affect aggregate demand.

For instance, taxes on personal or business income will affect consumption and investment respectively. With higher tax rates, consumers have less take-home income to spend on things. With higher business or corporate tax rates, prospective business ventures are not as attractive as they might
otherwise be. Thus, any increase in personal or business taxes will lower aggregate demand, shifting it to the left on the graph and any increase will raise it or shift it to the right on the graph.

Any increase in interest rates will have a similar effect. As we saw in Figure 1 in Chapter 4 and as we described in the previous discussion on the interest rate effect, increases in interest costs diminish individuals’ and businesses’ willingness to borrow money. The result is that aggregate demand decreases and moves to the left on the graph.

Any increase in business and consumer confidence will be followed by an increase in, and a movement to the right in, aggregate demand. This result occurs because as consumers become more confident in their own financial situation, they are more willing to take on debt to buy durable goods. As businesses have more confidence in their ability to sell their products, they will invest more in their productive capacity. Any reduction in that confidence will, of course, have the opposite effect. It will lessen aggregate demand and move the curve to the left on the graph.

The effect of foreign exchange rates on aggregate demand is complicated by the fact that exchange rates are not published consistently. The Yen typically is expressed in terms of the amount of Yen it takes to buy a U.S. dollar, while the British pound typically is expressed in terms of how many dollars it takes to buy the pound. This aside, we can say that if the dollar becomes stronger, exports will fall and imports will rise. Thus, a strong dollar reduces aggregate demand, moving it to the left on the graph. Of course, a weaker dollar has the opposite impact. Aggregate demand increases and moves the curve to the right on the graph.

The only variable that impacts aggregate demand directly, one that needs little explanation, is government spending. Because government spending on goods and services is a direct part of the
addition that makes up aggregate demand, the impact is direct. An increase in government spending causes an increase in aggregate demand, and a decrease in government spending causes a decrease in aggregate demand. Therefore, an increase in government spending will move the aggregate demand curve to the right and a decrease in government spending will move the curve to the left.

These impacts are summarized in Table 1, while the effect of an increase in aggregate demand is shown in Figure 3, and the effect of a decrease in aggregate demand is shown in Figure 4.

Table 1
Determinants of Aggregate Demand

<table>
<thead>
<tr>
<th>Variable</th>
<th>Part of Aggregate Demand Affected</th>
<th>Effect of an Increase in Variable on the movement of aggregate demand</th>
<th>Effect of a Decrease in Variable on the movement of aggregate demand</th>
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</thead>
<tbody>
<tr>
<td>Taxes</td>
<td>Consumption</td>
<td>decreases AD so curve moves left</td>
<td>increases AD so curve moves right</td>
</tr>
<tr>
<td></td>
<td>Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest rates</td>
<td>Consumption</td>
<td>decreases AD so curve moves left</td>
<td>increases AD so curve moves right</td>
</tr>
<tr>
<td></td>
<td>Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence</td>
<td>Consumption</td>
<td>increases AD so curve moves right</td>
<td>decreases AD so curve moves left</td>
</tr>
<tr>
<td></td>
<td>Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength of the Dollar</td>
<td>Exports and Imports</td>
<td>decreases AD so curve moves left</td>
<td>increases AD so curve moves right</td>
</tr>
<tr>
<td>Government Spending</td>
<td>Government Spending</td>
<td>increases AD so curve moves right</td>
<td>decreases AD so curve moves left</td>
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</tbody>
</table>
Figure 3 Aggregate Demand Increases, Causing it to move to the Right on the Graph
An increase in aggregate demand causes prices to rise and output to rise.

Figure 4 Aggregate Demand Decreases, Causing it to Move to the Left on the Graph
A decrease in aggregate demand causes a decrease in prices and a decrease in output.

Variables that Shift Aggregate Supply

Just as there are factors that will change aggregate demand, there are important factors that will change aggregate supply. These are factors that are important to business. Any change that increases business costs will be important in terms of aggregate supply. Other factors that matter are government regulations and factors affecting productivity.

Any factor that will increase costs of production will hurt aggregate supply. That is, an increase in labor costs or other input costs will decrease aggregate supply and shift the curve to the left, whereas a decrease in those costs will increase aggregate supply and move the curve to the right. Along with any or all other costs of doing business, interest rates also impact the aggregate supply curve in that they affect borrowing costs on lines of credit used to keep cash-flow problems at a minimum.
Similarly, if government regulations increase costs of production in some way, then aggregate supply will decrease and the curve will shift to the left. Deregulation will have the opposite impact because firms can eliminate costs of complying with regulations. Lastly, if firms become more productive, then aggregate supply will increase and the curve will shift to the right.

Table 2 summarizes these impacts while Figures 5 and 6 summarize the impacts of those shifts on an Aggregate Supply-Aggregate Demand diagram. Figure 5 shows the impact of an increase in aggregate supply, while Figure 6 shows a decrease in aggregate supply.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Effect of an increase in the variable on the movement of aggregate supply</th>
<th>Effect of a decrease in the variable on the movement of aggregate supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Prices</td>
<td>decreases AS so curve moves left</td>
<td>increases AS so curve moves right</td>
</tr>
<tr>
<td>Productivity</td>
<td>increases AS so curve moves right</td>
<td>decreases AS so curve moves left</td>
</tr>
<tr>
<td>Government Regulation</td>
<td>decreases AS so curve moves left</td>
<td>increases AS so curve moves right</td>
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</table>

Table 2
Determinants of Aggregate Supply
Figure 5 Aggregate Supply Increases, Causing it to Move to the Right on the Graph
An increase in aggregate supply causes a decrease in prices and an increase in output.

Figure 6 Aggregate Supply Decreases, Causing it to Move to the Left on the Graph
A decrease in aggregate supply causes an increase in prices and a decrease in output.

CAUSES OF INFLATION

As can be seen in Figures 3 and 6, increases in prices can result from demand side impacts or supply side impacts. Anything that causes the aggregate demand curve to move to the right increases prices. Economists refer to the inflation caused for this reason as **demand pull inflation**. Anything that causes the aggregate supply curve to move to the left also increases prices. Economists refer to the inflation caused for this reason as **cost push inflation**.

Many of the things that move the aggregate demand curve to the right are things that government manipulates. If government spending is increased or taxes are decreased, aggregate demand is increased and demand pull inflation occurs. In addition, monetary policy purposefully influences interest rates. If the...
impact of that policy is the lowering of the rates, then the aggregate demand increases as a result of the increase in interest-sensitive consumption and investment.

During the 1960s when President Lyndon Johnson was simultaneously attempting to fight the Vietnam war as well as a war on poverty there was a substantial concern of demand pull inflation. Government spending was increasing rapidly, and though taxes during this period also increased, inflation increased from 1% in 1965 to 6% in 1970.

Input costs are important influences on the aggregate supply curve. For example, an increase in wages that comes about either because of market actions or legislation will move the aggregate supply curve to the left, thereby increasing prices. Increases in such things as oil prices will have a similar effect on the aggregate supply curve.

The inflation of the late 1970s was largely attributable to increases in oil prices. Oil, a significant input to production throughout the economy, increased from $5.21 per barrel in 1973 to 35.15 per barrel in 1981. This is turn contributed to inflation rising from 3% in 1972 to 18% in the first quarter of in 1980.

SUPPLY-SIDE ECONOMICS

During the late 1970s a new way of thinking about government’s ability to influence the economy began to arise. At its heart, the new way of thinking involved policy actions that would influence the aggregate supply curve. If you recall, we have already seen that fiscal and monetary policy influence the aggregate demand curve. If you look at Figures 3 and 4, any movement in the aggregate demand curve will either increase RGDP but also increase inflation, or it will decrease RGDP but also decrease inflation. Movements in the aggregate supply curve to the right have only good consequences:
Supply-side economics involves influencing the aggregate supply curve by lowering input costs and reducing regulation. It does not involve any changes in either government spending or taxes. Only some of the actions the Reagan administration (1981-1989) took are properly understood as supply-side actions: tax cuts aimed at businesses (the investment tax credit and accelerated depreciation schedules), their attempts at deregulation and their lax enforcement of existing regulations, and its vetoing of increases in the minimum wage are clearly supply-side policies. On the other hand, the large tax cut to individuals and the larger defense buildup are properly thought of as typical aggregate demand side policy.

The biggest supply-side impact in the 1980's was that the price of a barrel of oil fell from $40 to less than $10.

CHAPTER SUMMARY

This chapter has laid out the aggregate demand and aggregate supply model that we will use when discussing the macroeconomy as we approach the macroeconomic issues to follow. In laying out the model, we first examined aggregate demand and aggregate supply in isolation where we explained why aggregate demand is downward-sloping. We also explained the shape of the aggregate supply curve in the context of the differences between classical and Keynesian views of both aggregate supply and full employment. In putting them together as one, we were able to show what happens when certain macroeconomic variables change. In that way we used them to explain the concepts of cost-push and
demand-pull inflation, and supply-side economics.

<table>
<thead>
<tr>
<th>KEY TERMS</th>
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<tbody>
<tr>
<td>Aggregate Demand</td>
<td>Aggregate Supply</td>
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<tr>
<td>Real Balances Effect</td>
<td>Demand Pull Inflation</td>
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<tr>
<td>Foreign Purchases Effect</td>
<td>Cost Push Inflation</td>
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<tr>
<td>Interest Rate Effect</td>
<td>Supply-Side Economics</td>
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<table>
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<tr>
<th>ISSUES YOU ARE READY FOR NOW</th>
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<tbody>
<tr>
<td>Federal Deficits, Surpluses and the National Debt</td>
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<tr>
<td>Fiscal Policy</td>
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<tr>
<td>Monetary Policy</td>
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<tr>
<td>NAIRU</td>
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Quiz Yourself

The rationale for interest rates determining AD is
   a) with lower interest rates firms will borrow more to invest.
   b) with lower interest rate consumers will borrow less to buy durables.
   c) with lower interest rate consumers will borrow more to buy durables.
   d) the cost of current capital will be less to companies.
   e) a) and c).
   f) b) and d).

The rationale for exchange rates determining AD is
   a) with stronger dollar exports will fall AD will rise
   b) with stronger dollar imports will fall AD will rise.
   c) with weaker dollar exports will fall AD will rise.
   d) with weaker dollar imports will fall AD will rise.

The difference between nominal and real interest rates is
   a) you pay the real rate and the lender gets the nominal rate.
   b) the real rate is after taxes whereas the nominal rate is before taxes.
   c) nominal rates are what you get for waiting.
   d) real rates are what you get after inflation has been accounted for.

A decrease in taxes will cause
   a) AD to increase (move to the right).
   b) AD to decrease (move to the left).
   c) AS to increase (move to down and to the right).
   b) AS to decrease (move to up and to the left).

An increase in confidence will cause
   a) AD to increase (move to the right).
   b) AD to decrease (move to the left).
   c) AS to increase (move to down and to the right).
   b) AS to decrease (move to up and to the left).

An increase in regulation will cause
   a) AD to increase (move to the right).
   b) AD to decrease (move to the left).
   c) AS to increase (move to down and to the right).
   d) AS to decrease (move to up and to the left).
The notion of the “interest rate effect” was one of the basic reasons behind the downward sloping nature of the

a) supply curve.
b) aggregate demand curve.
c) present value curve.
d) aggregate supply curve.
e) demand curve.

Define Aggregate Demand. Then, list and explain the intuitive reasons why Aggregate Demand is downward sloping.

Discuss the shape of the Aggregate Supply curve, listing and explaining the reasons behind the various ranges.

Draw and label an aggregate demand-aggregate supply diagram to show what would happen if there were an increase in each of the determinants of aggregate demand. Do the same for a decrease in each of the determinants of aggregate demand. Repeat for aggregate supply.

Think about This
Why would vetoing a minimum wage increase be an act of supply-side policy? What are the demand side implications?

Talk about This
Suppose the government is running a surplus (rather than a deficit) and aggregate demand is so high that any further increases in it will cause only inflation, what should the government do with the extra money?