

## Macroeconomics in Context, Fourth Edition

# Chapter 12 Aggregate Supply, Aggregate Demand, and Inflation Putting It All Together

If you read the financial pages in any newspaper (or sometimes the front pages if economic issues are pressing), you will see discussion about government budgets and deficits, interest rate changes, and how these affect unemployment and inflation. You may also see news about changes in the availability of certain crucial resources—particularly energy resources—and about how the impact of such changes in resource supplies spread throughout the country's economy. How does economic theory help to make sense of it all?

In Chapter 8, we started to build a model of business cycles, focusing at first on the downturn side of the cycle and the problem of unemployment. In Chapters 9, 10, and 11 we explained economic theories concerning fiscal and monetary policy. So far, our models have focused on the “demand side,” illustrated by shifts of the aggregate expenditure (*AE*) curve. In this chapter, we complete the demand-side story, using the broader term “aggregate demand”, so that it includes explicit attention to the potential problem of inflation. Then we move on to the issue of the actual productive capacity of the economy, or “supply side” issues. Finally, we will arrive at a model that we can use to “put it all together.” We then use this model to analyze several real-world economic cases including recent trends in unemployment and inflation.

## 1 Aggregate Demand and Inflation

The *AE* curve in the Keynesian model used in the previous three chapters was graphed with income on the horizontal axis and output on the vertical axis. We mentioned that if output is above its full-employment level, there may be a threat of rising inflation, but nothing in the figures incorporated this idea. The graphs that we used all measured income, output, and aggregate expenditures without considering changes in price levels. It is time now to remedy that omission by introducing an explicit measure showing changes in prices.

### 1.1 The Aggregate Demand (*AD*) Curve

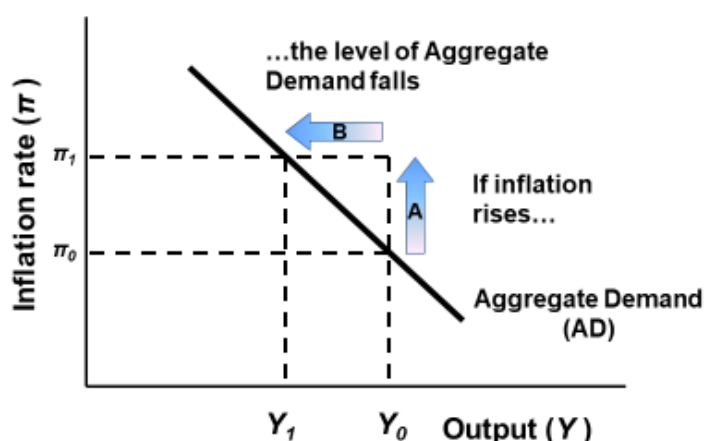
Recall from Chapter 8 that aggregate demand is the total level of spending in the economy. Since the level of spending is influenced by the changes in price levels, we use the **aggregate demand (*AD*) curve** to represent the relationship between the equilibrium level of output and inflation. To show this graphically, we put output (*Y*) on the horizontal axis and inflation on the vertical axis, (denoted by the symbol  $\pi$ ).<sup>\*</sup> This is shown in Figure 12.1. The *AD* curve shown here differs from the *AE* curve used in the preceding chapters since it takes into account changes in inflation and the reaction of the central bank to different levels of inflation, but the points on the *AD* curve all correspond to macroeconomic equilibrium points where the

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<sup>\*</sup> Some versions of the *AD* curve use “price level” rather than inflation on the vertical axis. The authors of this text believe that using inflation better represents the reality of an economic system in which prices are rarely constant.

Keynesian *AE* curve crosses the 45° line. We are building on that previous equilibrium analysis by introducing an extra dimension—inflation—shown on the vertical axis.

**Figure 12.1** The Aggregate Demand Curve



**aggregate demand (AD) curve:** graph showing the relationship between the rate of inflation and the total quantity of goods and services demanded by households, businesses, government, and the international sector

This view of aggregate demand assumes that higher inflation rates will tend to reduce total demand, for several reasons:

- When inflation rises, it reduces the value of money assets. Even if this does not reach the level of hyperinflation discussed in Chapter 10, it hurts savers and people who have money balances. This **real wealth effect** tends to reduce their consumption, lowering total demand.

**real wealth effect:** the tendency of consumers to increase or decrease their consumption based on their perceived level of wealth

- Inflation also lowers the **real money supply**, defined as  $M/P$ , where  $M$  is the nominal money supply and  $P$  is the general price level. This has an effect similar to contractionary monetary policy, raising interest rates and discouraging investment.

**real money supply:** the nominal money supply divided by the general price level (as measured by a price index), expressed as  $M/P$

- Inflation hurts net exports by making domestically produced goods more expensive for foreigners and imports more attractive for domestic consumers. This decreases aggregate demand by decreasing net exports.<sup>†</sup>

<sup>†</sup> As defined in Chapter 4, and discussed further in Chapter 13, net exports are exports minus imports, and represent a net addition to aggregate demand and GDP levels.

- The Federal Reserve generally responds to higher inflation by raising interest rates, as discussed in Chapter 11. This also tends to lower investment and total demand. There is some disagreement among economists about which of these effects are most significant, but there is little doubt about the overall result: higher inflation will tend to result in lower aggregate demand levels.

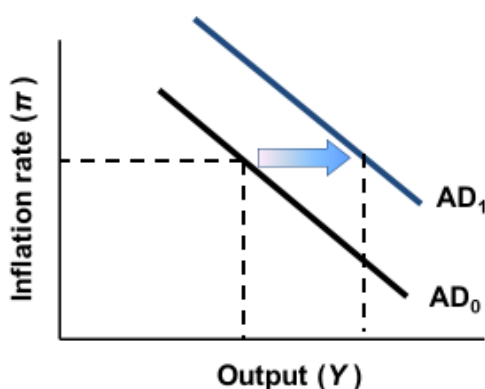
## 1.2 Shifts of the *AD* Curve: Spending and Taxation

The downward slope of the *AD* curve shown in Figure 12.1 is based on the indirect impacts of inflation on aggregate demand, as discussed above. What determines the position of the curve? The logic is essentially the same as discussed in our Keynesian *AE* analysis in Chapter 8. The position of the *AD* curve depends on specific levels of government spending, taxation, autonomous consumption, autonomous investment, and autonomous net exports.<sup>‡</sup> Changes in these variables will therefore cause the *AD* curve to shift.

For example, if the government were to undertake expansionary fiscal policy, this would shift the *AD* curve to the right, as illustrated in Figure 12.2. At any level of inflation, there would now be aggregate demand sufficient to support a higher level of output.

An increase in autonomous consumption or investment would have a similar effect, as would an autonomous increase in net exports. Recall that autonomous consumption is the part of household spending that does not depend on income, and autonomous investment is the part of business spending that does not depend on the interest rate. These are often used to represent consumer and business “confidence”. Thus, an increase in consumer or investor confidence could also cause the rightward shift seen in Figure 12.2. Conversely, of course, contractionary fiscal policy, reductions in consumer or investment confidence, or reduction in autonomous net exports would shift the *AD* curve to the left.

**Figure 12.2** The Effect of Expansionary Fiscal Policy or Increased Confidence on the *AD* curve



<sup>‡</sup> The specific role of net exports will be discussed further in Chapter 13.

### 1.3 Shifts of the AD Curve: Monetary Policy

As we have noted, the Federal Reserve usually responds to higher inflation by increasing interest rates, and this is reflected in the slope of the *AD* curve. This kind of policy response, which aims to keep inflation near a target level, is a rather passive sort of monetary policy. Including it in the *AD* curve is based on the assumption that this kind of Fed response will be more or less automatic. A more active form of Fed intervention occurs when the Fed's leaders decide to change policy more fundamentally—either by changing their inflation target or by shifting their focus to fighting unemployment. Such a change can shift the *AD* curve.

For example, in a severe recession the Fed might decide that the economy requires additional stimulus. If the Fed instituted significant expansionary monetary policies, driving interest rates down (as it did, for example, in 2007 and again in 2020 to respond to recessions), this would, in theory, have the effect of boosting investment and shifting the *AD* curve to the right. Alternatively, if the Fed decided that its policies on inflation have been too lax, it could tighten monetary policy (this happened, for example, in 1982 and also in 2022 in response to inflation). This would have the effect of shifting the *AD* curve to the left.

To summarize:

- The *AD* curve indicates levels of equilibrium GDP at different possible rates of inflation.
- The *AD* curve can be shifted by changes in levels of autonomous consumer spending, autonomous investment, fiscal policy, net exports, or by major changes in monetary policy.

#### Discussion Questions

- 1 “The negative slope of the *AD* curve means that higher levels of output will lead to lower levels of inflation.” Is this statement correct or not? Discuss.
- 2 Does the Fed always want the inflation rate to be as low as possible? Why or why not?

## 2 Capacity and the Aggregate Supply Curve

As we have noted in earlier chapters, increases in aggregate expenditure can push output up toward the full-employment level. In our current analysis, an increase in aggregate expenditure is shown by a rightward shift in the *AD* curve. But what happens when output reaches—or maybe even exceeds—the full-employment level? In a graph such as Figure 12.2, for example, there is nothing in the model that seems to prevent expansionary policies from just shifting the *AD* curve, and output, up and up and up.

Obviously, this cannot be true in the real world. At any given time, there are only certain quantities of labor, capital, energy, and other material resources available for use. The U.S. labor force, for example, comprises just over 160 million people. The United States simply cannot, then, produce an output level that would require the work of 200 million people. This is a *hard capacity constraint*: What happens as an economy approaches maximum capacity can be modeled using the **aggregate supply (AS) curve**. The *AS* curve shows combinations of output and inflation that can, in fact, occur within an economy, given the reality of capacity constraints.

**aggregate supply (AS) curve:** graph representing the relationship between the rate of inflation and the total goods and services producers are willing to supply, given the reality of capacity constraints

## 2.1 The Aggregate Supply (AS) Curve

Figure 12.3 shows how aggregate supply is related to the rate of inflation. It will be easiest to explain the shape of the curve starting from the right, at high output levels. Moving from right to left, we can identify five important, distinct regions of the diagram.

First (starting on the right in Figure 12.3), the vertical **maximum capacity output** line indicates the hard limit on a macroeconomy's output. Even if every last resource in the economy were put into use, with everybody working flat out to produce the most they could, the economy could not produce to the right of the maximum capacity line.

**maximum capacity output:** the level of output an economy would produce if every resource in the economy were fully utilized

Just below the maximum capacity level of output, the AS curve has a very steep, positive slope. This indicates that, as an economy closely approaches its maximum capacity, it is likely to experience a substantial increase in inflation. If many employers are all trying to hire many workers and buy a lot of machinery, energy, and materials all at once, workers' wages and resource prices will tend to be bid upward. But then, to cover their labor and other costs, producers will need to raise the prices that they charge for their own goods. Then, in turn, if workers find that the purchasing power of their wages is being eroded by rising inflation, they will demand higher wages, which leads to higher prices, and so on. The result is a phenomenon called a **wage-price spiral**, in which higher wages and higher prices lead to a steep rise in self-reinforcing inflation.

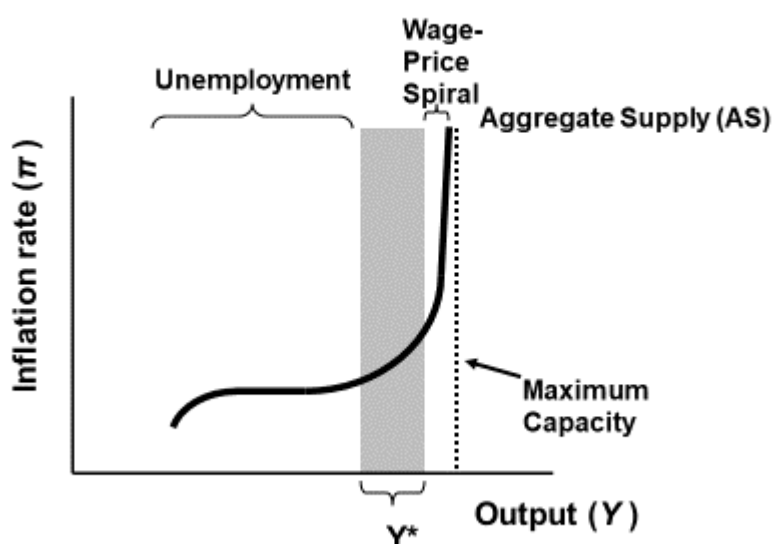
**wage-price spiral:** when upward pressure on wages creates upward pressure on prices and, as a result, further upward pressure on wages

In the real world, such steep increases in inflation are usually the result of dramatic pressures on producers, such as often occur during a national mobilization for war. During World War II, for example, the U.S. government pushed the economy very close to its maximum capacity—placing big orders for munitions and other supplies for the front, mobilizing the necessary resources by encouraging women to enter the paid labor force, encouraging the recycling of materials on an unprecedented scale, encouraging the planting of backyard gardens to increase food production, and in general pushing people's productive efforts far beyond their usual peacetime levels. As a result, unemployment plummeted. The government, knowing that such pressures could lead to sharply rising inflation (as shown in the wage-price spiral region of Figure 12.3), kept inflation from getting out of hand by instituting **wage and price controls**—direct regulations telling firms what they could and could not do in the way of price or wage increases.

**wage and price controls:** government regulations setting limits on wages and prices or on the rates at which they are permitted to increase

The shaded area to the left of the wage-price spiral region in Figure 12.3 indicates, as it did in the national income equilibrium graphs in Chapters 8 and 9, a range of full-employment levels of output. While it is controversial to say exactly where that level may be, it can be thought of as an output level high enough that unemployment is not considered a national problem. And because it must be low enough to allow for at least a small measurable level of transitory unemployment, the *full-employment* level of output is slightly lower than the *maximum capacity* level of output.

**Figure 12.3** The Aggregate Supply Curve



Within the full-employment range, Figure 12.3 shows a moderately rising AS curve. This is because, even well before an economy approaches the absolute maximum capacity given *all* its resources, producers may tend to run into “bottlenecks” in the supply of *some* resources. Agricultural workers may be plentiful, for example, but professional and technical workers may be in short supply. Or fuel oil may be plentiful, but there may be a shortage of natural gas. Shortages in the markets for particular kinds of labor and other inputs may lead to an acceleration of inflation in some sectors of the economy. Because the measured inflation rate represents an average for the economy as a whole, some aggregate increase in inflation may be observed. If many significant economic sectors experience shortages, as occurred in 2021 during the recovery from the pandemic recession of 2020, the increase in inflation may be significant, and cause a rethinking of fiscal and monetary policy.

Some increase in inflation is what economists expect to happen when the economy nears a business cycle “peak.” Note, however, that the AS curve has been drawn as flatter towards the left of the  $Y^*$  range, indicating that combinations of full employment and stable inflation may also be possible.

Moving further to the left, the AS curve shows a region in which the economy is below full employment, perhaps going into recession or recovering from a recession. The flat AS line shown in Figure 12.3 for this region indicates that, under these conditions, there is assumed to be no tendency for inflation to rise. Because a significant amount of labor and other resources are unemployed, there is no pressure for higher wages or prices. It is also likely that because wages and prices tend to be slow in adjusting downward, inflation will not fall either—at least not right away.

When the economy is hit not by a regular recession, but by a really deep recession, such as one experienced in most industrialized countries in 2007-2009 and again in 2020, output is so far below the full employment level that inflation starts to drop, and may even become negative (deflation). In this situation, demand is so weak that a large number of companies may fail. Struggling to stay in business, firms are forced to cut prices in order to maintain at least some sales. Also, in such a situation, workers and their unions might agree to wage cuts which lowers firms' costs and allows them to further reduce their prices. Here, the AS curve in Figure 12.3 slopes downwards again as a further fall in aggregate demand accelerates the process of **disinflation** (a decline in the rate of inflation) or even deflation (an absolute decrease in price levels).

**disinflation:** a decline in the rate of inflation

## 2.2 Shifts of the AS Curve: Inflationary Expectations

When people have experienced inflation, they come to expect it. They then tend to build the level of inflation that they expect into the various contracts into which they enter. If a business expects 4 percent inflation over the coming year, for example, it will add 4 percent to the selling price that it quotes for a product to be delivered a year into the future, just to stay even. If workers also expect 4 percent inflation, they will try to get at least a 4 percent cost of living allowance, just to stay even. A bondholder who expects 4 percent inflation and wants a 2 percent real rate of return will be satisfied only with an 6 percent nominal rate of return.<sup>§</sup>

In this way, an expected rate of inflation can start to become institutionally “built in” to an economy. As a first approximation, it is reasonable to assume that people expect something like the level of inflation that they have recently experienced (an assumption that economists call “adaptive expectations”). Thus, inflation can be, to some degree, self-fulfilling.

Because different contracts come up for renegotiation at different times of the year, the process of building in inflationary expectations will take place only over time. Because of the time that it takes for prices and wages to adjust, we need to make a distinction between short-run and medium-run aggregate supply responses.

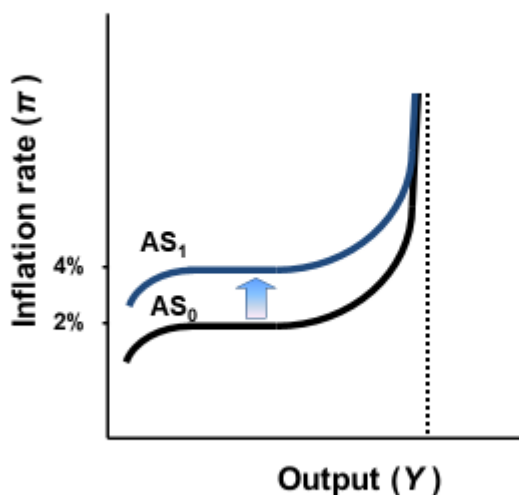
The AS curve in Figure 12.3 was drawn for a particular level of expected inflation in the *short run*. Before people have caught on to the fact that the inflation rate might be changing, their expectations of inflation will continue to reflect their recent experience. In this model, an economy in recession, or on the horizontal part of the AS curve, will tend in the short run to roll along at pretty much the same inflation rate as it has experienced in the past. Tight labor and resource markets caused by a boom could tend to increase inflation, but this will initially come as a surprise to people and

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<sup>§</sup> As noted in Chapter 11, Appendix A2, the real rate of return equals the nominal rate minus inflation,  $r = i - \pi$ .

will not immediately translate into a change in expectations. For the purposes of this model, you might think of the short run as a period of some weeks or months.

**Figure 12.4** The Effect of an Increase in Inflationary Expectations on the Aggregate Supply Curve



Over a longer period of time—the *medium run*—however, a rise in inflation due to tight markets tends to increase people’s expectation of inflation.<sup>¶</sup> If they expected 2 percent inflation but over a period of time they experience 4 percent inflation, the next time that firms set prices or workers renegotiate contracts they may build in a 4 percent rate. Figure 12.4 shows how the AS curve shifts upward as people’s expectation of inflation rises. Note that the maximum capacity of the economy has not changed—nothing has happened that would affect the physical capacity of the economy to produce. All that has happened is that now, at any output level, people’s expectation of inflation is higher.

Similarly, if people experience very loose markets for their labor or products (i.e. low demand), or lower inflation due to lack of aggregate demand and recessionary conditions, over the medium run the expected inflation rate may start to come down. Employers may find that they can still get workers if they offer lower wages. Unions might agree to lower wage increases as their members might be afraid of unemployment, but only need a small wage increase to guarantee stable purchasing power. Producers may raise their prices less this year than last year or cut prices, because they are having trouble selling in a slow market.

When people start to observe wage and price inflation tapering off in some sectors of the economy, they may change their expectations about inflation. As people react to the sluggish aggregate demand that occurs during a recession, they will tend, over time, to lessen their expectations about wage and price increases. The graph for this would be similar to Figure 12.4, but would show the AS curve shifting downward instead of upward.

<sup>¶</sup> As distinguished from the *long run*, discussed in the Appendix.



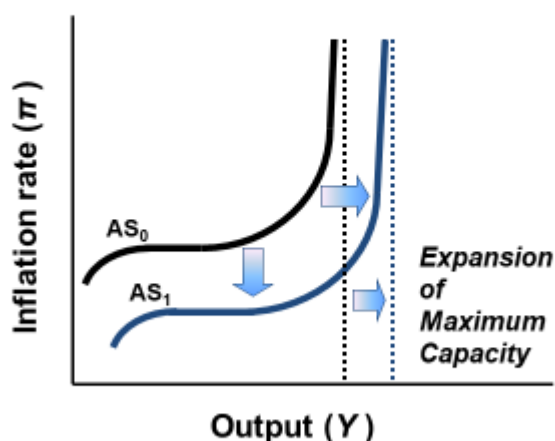
## 2.3 Shifts of the AS Curve: Supply Shocks

The AS curve also shifts when the capacity of the economy changes. A **supply shock** is something that changes the ability of an economy to produce goods and services. Supply shocks can be beneficial, as when there is a bumper crop in agriculture or a new invention allows more goods or services to be made using a smaller quantity of resources. Increases in labor productivity also allow an economy to produce more goods and services.

**supply shock:** a change in the productive capacity of an economy

In such cases, the real capacity of the economy expands, as shown in Figure 12.5. The line indicating maximum capacity also shifts to the right, showing that the economy can produce more than before. We model the beneficial supply shock as moving the AS curve both to the right and downward. It moves to the right because capacity has increased. It moves downward because beneficial supply shocks are often accompanied by decreases in prices. As computer technology has improved, for example, the price of any given amount of computing power has dropped rapidly. Since computers play a significant role in the economy, this tends to reduce inflation.

**Figure 12.5** A Beneficial Supply Shock: Expansion of Output Capacity



Supply shocks can also be adverse. Natural occurrences, such as hurricanes or droughts, and human-caused situations, such as wars, that destroy capital goods and lives are examples of adverse supply shocks. Restrictions on key supply chains during and after the pandemic recession of 2020 could also be classified as adverse supply shocks. With regard to energy resources, adverse supply shocks can arise from physical changes such as the exhaustion of an oil or gas reserve. They can also arise for economic reasons such as a successful limitation of energy supply by a cartel or major supplier (the OPEC oil cartel was a major factor in promoting inflation during the

1970s, and possible Russian limitations on natural gas supply have become a concern for many European economies.) Adverse supply shocks reduce the economy's capacity to produce and, by concentrating demand on the limited supplies of resources that remain, tend to lead to higher inflation. Adverse supply shocks would be illustrated in a graph such as Figure 12.5, but with the direction of all the movements reversed.

### Discussion Questions

- 1 Describe in words how the *AS* curve differs from the *AD* curve. What does each represent? What explains their slopes?
- 2 Do you get “cost of living” raises at your job or know people who do? Why does this practice have important macroeconomic consequences?

## 3 Putting the AS/AD Model to Work

Economists use the *AS/AD* model to illustrate three points about the macro-economy:

- 1 Fiscal and monetary policies affect output and inflation:
  - *Expansionary fiscal and monetary policies* tend to push the economy toward higher output. If the economy is approaching its maximum capacity, they will also cause inflation to rise.
  - *Contractionary fiscal and monetary policies* tend to push the economy toward lower output. Inflation may not fall quickly, but a persistently lower level of economic activity will tend to lower inflation over the long term.
- 2 *Supply shocks* may also have significant effects:
  - Adverse supply shocks lower output and raise inflation.
  - Beneficial supply shocks raise output and lower inflation.
- 3 *Investor and consumer confidence and expectations* also have important effects on output and inflation.

Bearing these principles in mind, we will see how this model helps to explain some major macroeconomic events.

### 3.1 An Economy in Recession

In Figure 12.6, we bring together the *AS* and *AD* curves for the first time. The (short run) equilibrium of the economy is shown as point  $E_0$ , at the intersection of the two curves. Depending on how we place the curves in the figure, we could illustrate an economy that is in a recession, at full employment, or in a wage-price spiral. (We temporarily omit the maximum capacity line, but we reintroduce it when we discuss inflation.)

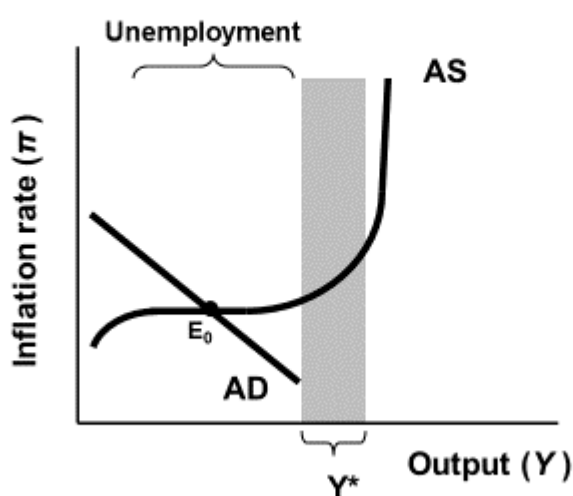
In this specific case, the fact that  $E_0$  is well to the left of the full-employment range of output indicates that the economy is in a recession. Private spending, as determined in part by investor and consumer confidence, along with government and foreign sector spending, are not enough to keep the economy at full employment. The fact

that the curves intersect on the flat part of the AS curve indicates that inflation (in the short run) is stable. So in this situation unemployment is the major problem. What can be done?

Figure 12.6 models the real-world situation of the U.S. economy in the 2007–9 and 2020 recessions. Unemployment rose to 10 percent in 2009, and briefly to 14 percent in 2020, but inflation was very low in both periods. In this situation, the Federal government implemented major fiscal stimulus programs. The goal of the stimulus programs was to promote employment both through direct impact and through multiplier effects expanding private spending and employment. This effect is shown in Figure 12.7 as a rightward shift of the AD curve.

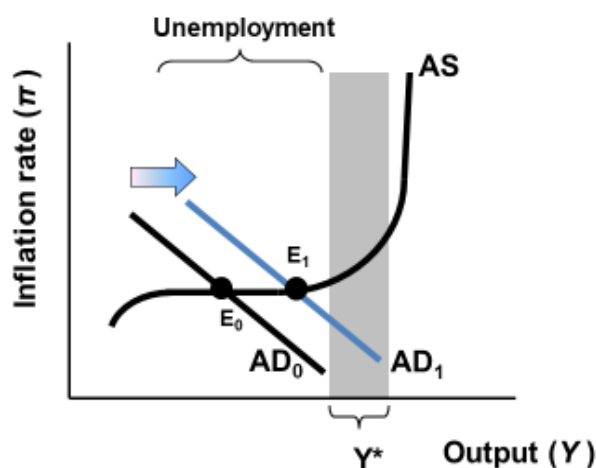
As noted in Chapter 9 (Box 9.2), the 2009 stimulus plan was responsible for adding millions of jobs to the economy. While economists are not in agreement about how large the multiplier effects of the program were, many argue that without the program, the economy would have continued to plunge deeper into recession.<sup>1</sup> The effects, however, were not large enough to bring the economy back to full employment. The unemployment rate remained above 7 percent until 2013, and only gradually declined to 5 percent in late 2015. This is reflected in Figure 12.7 as an AD shift that moves output toward, but not into, the full-employment zone.

**Figure 12.6** Aggregate Demand and Supply Equilibrium in Recession



<sup>1</sup> Blinder and Zandi, 2010; CBO, 2012; Montgomery, 2012.

**Figure 12.7**      Expansionary Fiscal Policy in Response to a Recession



How about the effect of this expansionary program on inflation? As the *AS/AD* model would lead us to expect, inflation did not rise in response to the 2009 stimulus because the economy did not move beyond the flat portion of the *AS* curve. Some economists and political commentators warned at the time that such a high level of government spending and deficits would certainly cause serious inflation—but inflation remained low through 2017, eight years after the initiation of the stimulus program.

Would more macroeconomic stimulus in 2009 have made sense, given that unemployment was still high and inflation relatively low? Some economists argued that it would, but proposals for further fiscal stimulus were not acted on by Congress, largely out of fear that deficits were already too high (for more on this debate, see Chapter 15). So the Federal Reserve stepped in with the expanded monetary stimulus known as “quantitative easing” (as discussed in Chapter 11). The hope was that a combination of this monetary expansion plus recovering confidence on the part of consumers and businesses could lead to a more complete recovery.

When the official unemployment rate hit 4.1 percent in late 2017, many economists believed that the U.S. economy had reached or was close to reaching the goal of full employment. This is illustrated in Figure 12.8, where we see that a larger *AD* shift brings the economy back into the full-employment zone. At this point, the model predicts that there could be at least a slight increase in inflation. Detection of such rising inflation would signal the Fed to cut back on its monetary expansion. In 2017–2018, amid some signs of increasing inflation, the Fed started to reverse its quantitative easing program, and cautiously started increasing interest rates (see Box 12.1).

The achievement of full employment with relatively low inflation could be judged a success (indicated by point  $E_1$  in Figure 12.8). The process of recovery from the 2007-9 recession was very slow, however, with about 1.39 million workers being long-term unemployed (over 27 weeks), and the unemployment rate including marginally attached workers and those working part-time for economic reasons remaining above 8 percent in February 2018. The uncertainty about whether full employment had really been reached is reflected by our “gray zone” or shaded area denoting a range for what can be considered full employment.

### Box 12.1 Unemployment and Inflation: A Tale of Two Recoveries

By 2018, the U.S. economy had entered its ninth year of expansion following the crisis of 2008–09. As of early 2018, the unemployment rate was at 4.1 percent—the lowest since 2000—and hourly wages had increased by about 2.6 percent since the previous year. The strengthening conditions in the labor market raised concerns about the possibility of inflation, as the rising demand for workers could drive up salaries and prices. Amid fears of inflation, the Federal Reserve planned to raise interest rates at least three times in 2018.

As of mid-2018, however, inflation rates remained below 2 percent. An Economic Policy Institute report argued that until wages are rising by at least 3.5 to 4 percent, there would be no threat that inflation would exceed the Fed’s 2 percent inflation target.<sup>1</sup> Some economists suggest that a moderate amount of inflation actually provides a good environment for economic activity:

Economic research suggests that inflation is best in moderation. Price increases lead to wage increases, which make it easier to repay existing debts, like mortgages, and more attractive to incur new debts, like borrowing to start a company. Inflation also functions as a kind of economic WD-40, easing shifts in the allocation of resources. Perhaps most importantly, moderate inflation keeps the economy at a safe distance from deflation, or general price declines, which can freeze activity as would-be buyers wait for lower prices.<sup>2</sup>

The trick for policymakers is to achieve just the right amount of inflation, without either allowing inflationary expectations to get out of hand, or pushing the economy back into recession.

The experience of 2021/2022 was different. After a rapid recovery from the recession of 2020, inflation gained a definite foothold in the economy. At the end of 2021, prices had risen 5.8 percent over the year according to the Personal Consumption Expenditures index used by the Federal Reserve to gauge inflation. “Core prices”, which exclude volatile food and energy categories, rose 4.9 percent, the biggest increase since 1983.<sup>3</sup> At the same time, job growth was very strong, averaging over half a million jobs per month throughout 2021. So a clear policy success—rapid employment recovery—was accompanied by a problem of significant inflation.

Economists differed in their interpretation of this combination. Former U.S. Treasury Secretary Lawrence Summers commented in early 2022, “We’ve got an overheated economy, and the Fed is going to have the very real challenge of cooling that economy off, and doing it in a controlled way.” Summers warned that there was “a surfeit of purchasing power and demand relative to the capacity of the economy to produce, and unless we bring those things into balance, we’re going to have not just higher inflation but possibly even accelerating inflation.”<sup>4</sup>

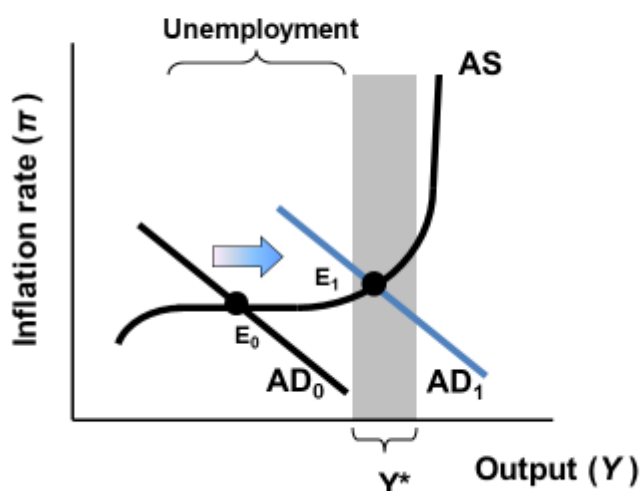
Economist Paul Krugman, who admitted that he had not seen the inflation coming, nonetheless believed that it was significantly different from the inflation of the 1970s, which had required very drastic Fed action to control. He argued that “overall demand in the United States actually doesn’t look all that high” and that inflation had arisen primarily from “supply-chain issues.” This could be a time-limited phenomenon since “expected inflation has not (yet?) become entrenched the way it had by the end of the 1970s.”<sup>5</sup> But, according to Krugman, engineering a “soft landing” would still be tricky: “The Fed will adjust its policies based on incoming

economic data, but monetary policy acts with a substantial lag, so it can be many months before we know whether interest rates are too low, too high or just right.”<sup>6</sup>

The recovery from the 2020 recession can be contrasted with the earlier experience of recovery from the 2007-2009 recession (see Box 12.1). In both cases, as the economy approached full employment there was concern about the possibility of rising inflation. But in the first case, inflation never became a serious problem, whereas in 2021-2022 it did.

As with the earlier recession, considerable Federal stimulus was applied through expansionary fiscal policy, including the \$2.2 trillion CARES Act of 2020 and the \$1.9 trillion American Rescue Plan of 2021. The combined size of these programs was several times that of the 2009 stimulus. At the same time, the Fed implemented expansionary monetary policy, both keeping interest rates very low and expanding “quantitative easing”. The result of this combination of expansionary fiscal and monetary policies was a rapid recovery during late 2020 and 2021. But by the end of 2021, inflation had become a definite problem. This was the first time since the 1980s that the U.S. economy had suffered from significant inflation. To analyze this in terms of our AS/AD model, it will be useful to recall some lessons from the experience of inflation in the 1960s, 1970s, and 1980s.

**Figure 12.8** A Greater Expansion of Aggregate Demand



### 3.2 An Overheated Economy

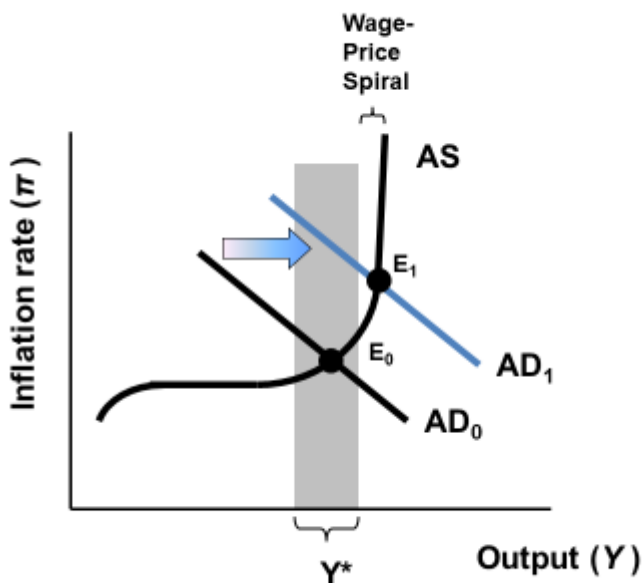
Problems with inflation were a major issue in the United States starting in the late 1960s. High government spending, in particular spending on the Vietnam war, meant that fiscal policy was excessively expansionary. Monetary policy during this period tended to accommodate the fiscal expansion. Although unemployment was very low as a result, by the late 1960s the economy started to “overheat,” causing inflation to rise.

This period of history is modeled in Figure 12.9. The *AD* curve moves further to the right due to the increases in government spending. It shifts from  $AD_0$ , which at  $E_0$  corresponds to a full-employment equilibrium, to  $AD_1$ , which crosses the *AS* curve in the wage-price spiral range. The economy became overheated, moving beyond full employment to  $E_1$ .

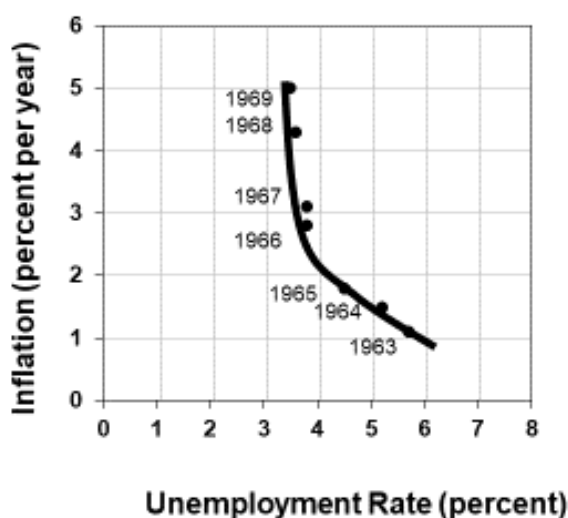
The tradeoff between unemployment and inflation in the 1960s established a pattern that became known as the Phillips curve, after the economist who first identified an empirical relationship between unemployment and inflation. Working on data from 1861 to 1957, A.W. Phillips found that for the U.K. periods of high inflation coincided with periods of low unemployment and vice versa. If one looks at data for the U.S. in the 1960s, this relationship also seems to be evident. The 1960s Phillips curve for the U.S. is shown in Figure 12.10.

As you can see, the shape of the upward-sloping portion of the *AS* curve is essentially a mirror image of the Phillips curve. This is no coincidence. The models that economists developed during the 1960s grew out of observing such a pattern of unemployment and inflation rates and trying to explain why it occurred. Although, as we will see, subsequent events challenged the simple view of the Phillips curve, the concept of an unemployment/inflation tradeoff is still relevant, as is evident in more recent concerns about rising inflation as the economy approaches full employment (Box 12.1).

**Figure 12.9** Excessively High Aggregate Demand Causes Inflation



**Figure 12.10**      The Phillips Curve in the 1960s



### 3.3 Responding to Inflation

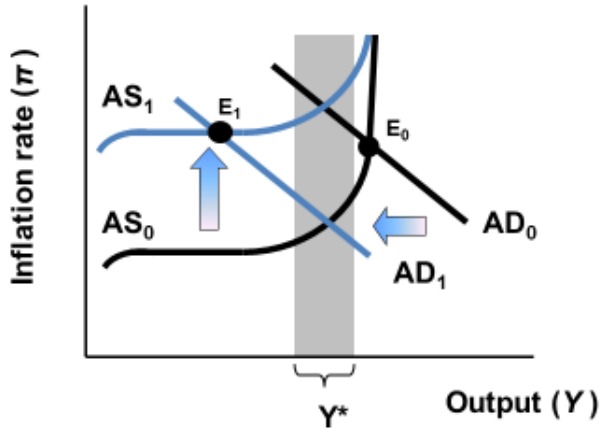
Economic history shows that the Phillips curve is not always a reliable guide to policy. The developments of the 1970s came as a shock to Phillips-curve-minded economists and policymakers. During the 1970s unemployment and inflation *both* rose, and both stayed fairly high. Oil price increases by the OPEC cartel added considerably to already significant inflationary pressures. This combination of economic stagnation (recession) and high inflation came to be known as **stagflation**. In 1979, the price of oil was *ten* times higher than it had been in 1973. The overall inflation rate in the United States was more than 9 percent in 1979—and exceeded 10 percent (measured at an annual rate) during some months.

**stagflation:** a combination of rising inflation and economic stagnation

The high rates of inflation experienced in the late 1970s were very damaging to the economy. Once people experienced high inflation over a period of time, expectations of further inflation rose. At the same time, the economic problems associated with stagflation forced cutbacks in consumption, investment, and government spending, lowering aggregate demand. Figure 12.11 shows the combination of these effects, moving the economy from  $E_0$  to  $E_1$ . The situation at equilibrium  $E_1$  shows stagflation—a combination of unemployment and high inflation. Even though the economy is no longer in the wage-price spiral range, inflation persists because inflation expectations have risen.



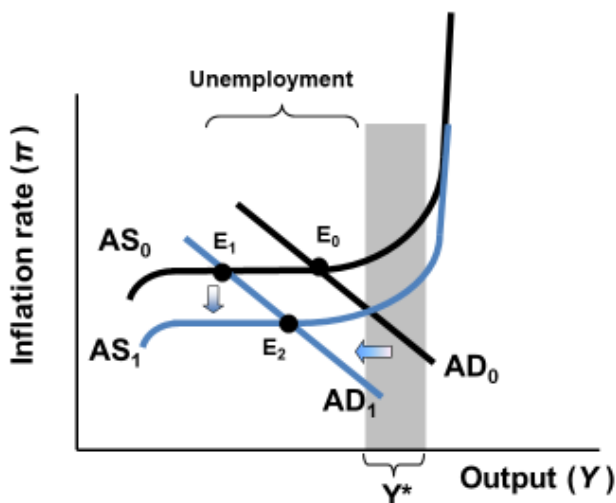
**Figure 12.11** “Stagflation”—A Combination of Unemployment and Inflation



As we noted in Chapter 10, high rates of inflation can wipe out the value of people’s savings and make it very difficult for households and business to plan, save, and invest. Because unemployment was also high, as shown in Figure 12.11, it was difficult to see how consumers and businesses could ever recover confidence while inflation seemed out of control.

Even though the economy was already in a recession, and the unemployment rate was above 7 percent, the Federal Reserve, under the chairmanship of Paul Volcker, took deliberate and drastic action to bring the long-term inflation rate down, by implementing very contractionary monetary policies. The effects of these “tight money” policies during the early 1980s can be seen in Figure 12.12.

**Figure 12.12** The Effect of the Fed’s “Tight Money” Policies in the 1980s.



As discussed earlier, contractionary monetary policy shifts the  $AD$  curve to the left. The  $AS/AD$  model predicts that the immediate effect of this policy will be to send the economy even deeper into a recession, with output falling even farther below its full-employment level, as shown by equilibrium point  $E_1$ . Recession tends to lower inflation, since in recession firms find it more difficult to raise prices, and workers are not able to get wage increases. But there is a further effect, on inflationary expectations. Once people see that inflation is declining, they tend to reduce their expectations of future inflation.

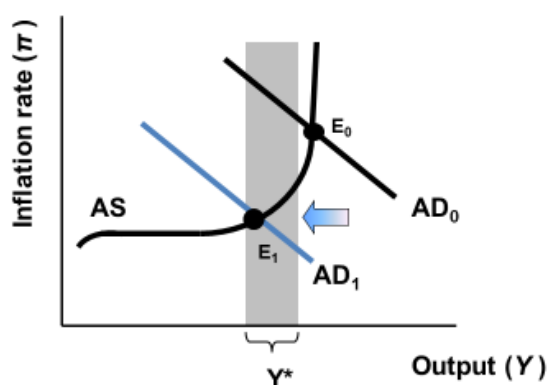
The effect of this decrease in inflationary expectations is shown as a downward shift in the  $AS$  curve to  $AS_1$ , showing a reduction in inflation. Such a recession with falling inflation is, in fact, what happened in the early 1980s. By 1983, the inflation rate had fallen to 4 percent, but at a significant human and economic cost. Unemployment during 1982 and 1983 rose to nearly 10 percent. But in the years that followed, the economy recovered and employment increased, as shown by equilibrium point  $E_2$ .

The experience of the 1980s showed that after inflationary expectations become established, they can be reduced only by policies that cause major economic pain. This has led future policymakers to be very wary of encouraging any new inflationary wage-price spiral.

When inflation once again made an appearance in 2021, after having been relatively low for almost thirty years, the memory of 1970s stagflation spurred policymakers into action (See Box 12.1). It seemed that, in the rapid recovery of 2020/2021, the economy might have “overshot” into the wage-price spiral range. This created an urgency to act *before* high inflationary expectations and “stagflation” set in.

The goal of policymakers in early 2022 is shown in Figure 12.13. Judging that the economy was at an equilibrium similar to  $E_0$ , the goal was seen as shifting it to  $E_1$ , which would be in an acceptable employment range while reducing the danger of an inflationary spiral. This called for a more contractionary policy on the part of the Fed. Accordingly, the Fed indicated its intention to stop bond purchases (“quantitative easing”) and start increasing interest rates during 2022. The risk in this type of policy is overshooting in the other direction, pushing the economy into recession. As of early 2022, it appeared that the Fed might be successful in engineering a “soft landing”, reducing inflationary pressures while not forcing the economy into another recession.

Figure 12.13A Policy Response to Inflation.



A complicating factor in 2021/2022 was that the inflation that began in 2021 had an unusual character. Economists differentiate between two major types of inflation: **demand-pull inflation** and **cost-push inflation**. Our discussion so far has focused on demand-pull inflation—the result of the Aggregate Demand curve moving too far to the right, exceeding supply capacity and thus forcing up wages and prices. Cost-push inflation, by contrast, results from supply-side restrictions and bottlenecks, and may occur even if overall demand is not high.

This was the case, for example with the oil price increases of the 1970s. It was also evident in the recovery from the 2020 pandemic recession. The impact of COVID-19 led to many supply-chain and transportation problems, as a shortage of workers in key areas made it difficult to meet consumer demands. The fact that many services, which required in-person contact, were impacted by COVID-19 also led consumers to shift their budgets in favor of goods purchases. The combination of greater demand and limited supply for many goods, for example in the automobile market, led to significant price increases.

**demand-pull inflation:** inflation primarily caused by excessive aggregate demand

**cost-push inflation:** inflation primarily caused by supply restrictions and bottlenecks

The appropriate policies for responding to the two types of inflation might differ. In the case of widespread supply-chain problems, it would be best to try to alleviate these problems directly rather than reducing aggregate demand. An overall reduction in demand could hurt the economy and employment without doing anything to remedy the supply problems.

So which was type of inflation was the major problem in 2021/2022? There were probably elements of both. There is no question that the pandemic led to widespread supply problems. At the same time, as mentioned earlier, the CARES Act and American Rescue Plan between them had injected about \$4 trillion of additional demand into the economy. Even in an approximately \$20 trillion economy, that is a large amount of additional aggregate demand! This may well have been an appropriate response to high unemployment, but it did contribute to inflationary pressures.

This logic was what drove the Fed in 2022 to implement a moderately contractionary monetary policy, to cool down excessive demand. But the situation was not as bad as the out-of-control inflation of the late 1970s, which led to much more drastic Fed policies to break the back of inflation even at the cost of plunging the economy into a deep recession. The hope was that inflation could be moderated this time without such drastic impacts on the economy.

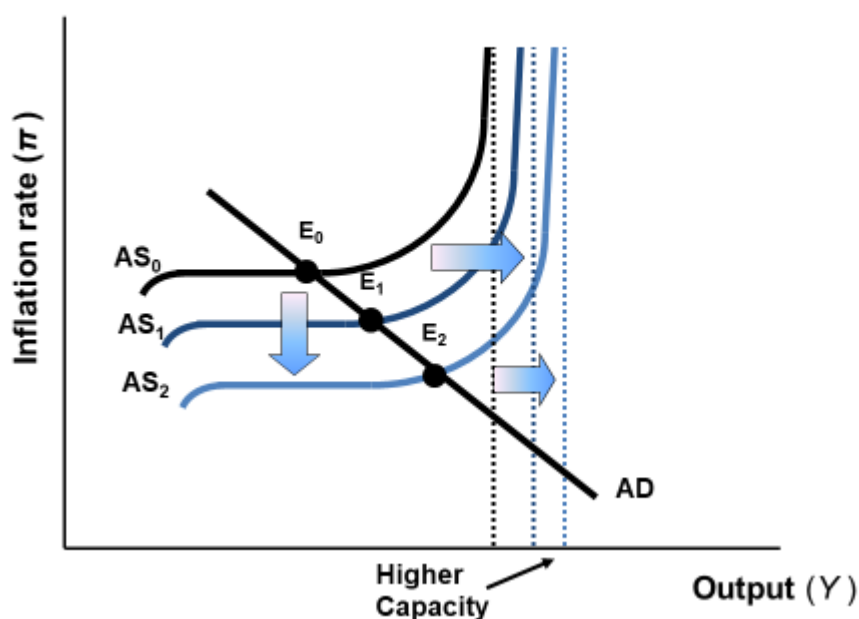
In addition to monetary policy, the perception of rising inflation had an impact on fiscal policy. The Biden administration had passed the \$1.9 trillion Infrastructure Investment and Jobs Act in 2020. As noted in Chapter 9, this spending was spread over a ten-year period, so it would have little immediate impact on inflation. Nonetheless, the next major Biden initiative, the Build Back Better Act, also planned to cover a ten-year period and accompanied by revenue-raising provisions, ran into significant problems in Congress due to the perception that more spending at a time of inflation was unwise.

### 3.4 Technology and Globalization

We can use our *AS/AD* analysis to focus on one more historical period: the expansion of the 1990s. As with our analysis of the earlier 1960s-1980s period, past economic history may have some lessons for the present. From 1992 to 1998, unemployment rates and inflation rates steadily fell. In 1998, unemployment was 4.4 percent, the lowest it had been since 1971. Inflation was 1.6 percent, lower than it had been in more than 10 years. This was clearly the best macroeconomic performance in decades. Unemployment continued to fall for another two years, reaching 3.9 percent in 2000.

What caused this sustained recovery? Significant advances in innovation—in particular enormous leaps in information technology, including the advent of widespread use of the Internet and information systems for business supplies, deliveries, and product design—provided a major impetus for this period of superior macroeconomic performance. This can be modeled as a period of beneficial supply shocks, as shown in Figure 12.14.

**Figure 12.14** The Effects of Technological Innovation and Increased Efficiency



Many economists also point to increasing global competitiveness as a factor in the rising productivity of this period. Competition from foreign firms, they argue, made U.S. firms work harder to become efficient. Meanwhile, competition from foreign workers and anti-union government policies weakened the power of domestic unions. This helped keep wage and price inflation low, although it also had negative consequences for the U.S. distribution of income, as described in Chapters 1 and 14.

The strong performance of the macroeconomy in the 1990s inspired economic optimism. A number of commentators wondered whether we were entering a “new economy” in which business cycles would become a thing of the past. Events after 2000 proved otherwise. In 2001–2 the stock market crashed, as the “dot-com” speculative bubble burst. About a year later, the economy slid into recession.

Expansionary fiscal and monetary policies, including tax rate cuts and low interest rates, helped to promote a recovery from that recession. But in 2007, another even more significant speculative bubble in housing collapsed, leading rapidly to the most severe recession since the 1930s—often referred to as the Great Recession because of its length and severity. And in 2020 the onset of the COVID-19 pandemic plunged the economy into another recession. Clearly, recessions and the effort to recover from them are not a thing of the past.

This brings us back to the broader issue of application of *AS/AD* analysis. It seems that we have not entered a new, business-cycle-free, “recession-proof” economic optimum. Instead, we have relived some of the recessionary and inflationary problems of previous decades. Although the real productivity gains made during the 1990s did not go away, and many of the effects of that supply capacity expansion persist to this day, the kinds of economic fluctuation and policy response that we have modeled with *AS/AD* analysis clearly remain of prime importance to macroeconomics. Significant declines in aggregate demand require expansionary policy measure to prevent worsening recession. As the economy moves out of recession and approaches full employment, concerns typically shift to possible excessive aggregate demand and the need for policies to moderate inflation—but if possible without tipping the economy back into recession.

### Discussion Questions

- 1 Under what circumstances can aggregate demand be increased without leading to problems with inflation? Under what circumstances is an increase in aggregate demand likely to cause inflation?
- 2 Stagflation—a combination of unemployment and inflation—seems to be the worst of both worlds. What policies can be used to respond to stagflation? Why is it important to differentiate between demand-pull and cost-push inflation in formulating policies?

## 4 Competing Theories

The *AS/AD* model has given us insight into some of the major macroeconomic fluctuations of the past several decades. But there remains much room for controversy. Was the expansionary fiscal policy enacted in response to the 2007–2008 recession too little or too much? Was it a good idea for the Federal Reserve to lower interest rates to near zero in 2008–2015 and again in 2020 to try to promote recovery? Was strong contractionary policy required in 2022 to respond to inflation? Economists often differ in their views on these issues, and their theoretical backgrounds tend to inform their answers to these and other more contemporary questions.

Here we review the ways in which classical and Keynesian economics address these questions. Additional theories—some of which take positions between these two poles, and some of which are more radical—are reviewed in the Appendix to this chapter.

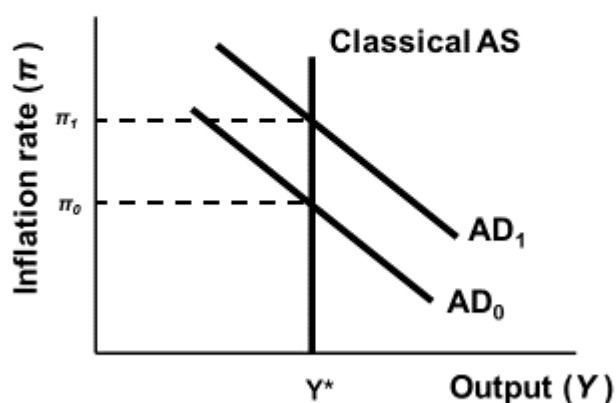
## 4.1 Classical Macroeconomics

As discussed in previous chapters, economists with ties to the classical school tend to believe in the self-adjusting properties of a free-market system. In the classical view, labor markets clear at an equilibrium wage (Chapter 7). Classical markets for loanable funds cause savings and investment to be equal at an equilibrium interest rate (Chapter 8). In theory, then, a smoothly functioning economy should never be at anything other than full employment.

In terms of the *AS/AD* model, the classical theory implies an *AS* curve that is quite different from the one that we have been working with, as shown in Figure 12.15. In such an economy, output would always be at or close to its full-employment level (now shown as a distinct value, rather than a range). The *AD* level would determine the inflation rate, but nothing else.

The rationale for this vertical *AS* curve is as follows. At the full-employment level, people are making their optimizing choices about how much to work, consume, and so on. If for some reason the economy were to produce at less than the full-employment level, the unemployed workers would bid down wages and full employment would be restored. If the economy were to produce at more than its full-employment level, wages would be bid up, and employment would drop back to its full-employment level. Similar adjustments would take place in product markets and financial markets. Such processes are assumed to work quickly and smoothly, so that the economy will return to full employment fairly quickly.

**Figure 12.15** The Classical View of *AS/AD*



What, according to the classical model, is the effect of aggregate demand management policies? As we can see in Figure 12.15, expansionary fiscal or monetary policy can have no effect on the output level. Classical economists believe that increased government spending just “crowds out” private spending (as discussed in Chapter 9), in particular spending on investment. Because the economy is already at

its full-employment level of  $Y^*$ , more spending by government just means less spending by consumers and businesses.

The extreme version of this view, as expressed in Figure 12.15, is probably not held by many economists. Even most classically oriented economists acknowledge that there can be short-term variations in employment, and temporary effects of fiscal and monetary policies. But they argue that in the longer run, the economy will achieve its natural equilibrium ( $Y^*$  in Figure 12.15), and government stimulatory policies such as a shift from  $AD_0$  to  $AD_1$  in Figure 12.15, will only lead to inflation, as shown by the move from  $\pi_0$  to  $\pi_1$  (The concept of a vertical long-run aggregate supply curve is discussed in more detail in the Appendix to this chapter.)

As we saw in our discussion of classical monetary theory in Chapter 11, the classical prescription is that the central bank should just choose a certain growth rate of the money supply or level of the interest rate to support and stick to it, without concerning itself about unemployment and output. Classical theory tends to support politically conservative policies that emphasize small government and strict rules on monetary policy. Classical economists would tend to say that the fiscal expansionary policies put into place in 2009 and 2020/2021 were unnecessary for the purposes of macroeconomic stabilization, but that the anti-inflationary monetary contraction of the early 1980s was a good idea.

## 4.2 Keynesian Macroeconomics

The original Keynesian belief was that market economies are inherently unstable. The Keynesian notion of the influence of “animal spirits” on investment refers to the tendency of private decision-makers to become overly optimistic and create booms in investing and production. And the higher the boom, the deeper the crash. Firms that have overextended and overproduced during an upswing need time to regroup, sell off inventory, and so on, before they will be ready to go on the upswing again. Households that have overextended and overspent during a boom also need to regroup and perhaps pay down debt, before they will be willing to restart an optimistic spending bandwagon.

This view of perpetual business cycles is a fundamentally different worldview from those that presume an automatic “settling down” of the economy at a full-employment equilibrium. Keynes did *not* believe that macroeconomic phenomena could be explained by assuming rational, optimizing behavior by individuals, and then extrapolating from models of individual markets to the macroeconomy. Modern Keynesians argue that this inherent tendency toward market instability requires active government intervention and that the alternative—simply waiting for the market to correct itself—risks major economic damage and long-term depression.

It is important to note that Keynesians do not only favor expansionary fiscal and monetary policies. They believe that such policies are needed in case of recession, but under different circumstances, such as the inflationary periods that we have discussed, contractionary policy may be called for. Keynesians thus find the kind of analysis that we have presented in this chapter very useful for determining what type of policy is needed in different circumstances.

The traditional model of Keynesian business cycles must be modified to deal with new events such as supply shocks (discussed above) and sustainability issues (discussed in Chapter 17). These require models that are flexible enough to address new issues as they arise. Such models are best built on the understanding that economies are subject to a variety of forces, many of which can swamp the market

equilibrium logic that would be expected to lead to a classical situation of full-employment equilibrium.

In the modern era, the debate between economists who favor classical approaches and those who argue for Keynesian analysis has continued. The Great Recession of 2007-2009 and the COVID recession of 2020 provided new fodder for these arguments about economic analysis and policy (see Box 12.2).

### Box 12.2 Classical and Keynesian Views of Recession and Recovery

The recessions of 2007-2009 and 2020 provided a new arena for the long-running debate between classical and Keynesian views in economics and their impacts on macroeconomic policies.

Two major responses to the recessions in the U.S.—the fiscal stimulus programs of 2009, 2020, and 2021 and Federal Reserve policies of ultralow interest rates and “quantitative easing”—are right out of the Keynesian playbook of expansionary fiscal and monetary policy.

On the other hand, contractionary fiscal policies of “austerity” (drastic spending cutbacks) implemented in many European countries following the 2007-2009 crisis reflected the classical perspective that excessive government spending is a problem, not a solution, and that budget deficits need to be eliminated. But by 2016 the European Central bank had adopted a different approach, moving to a more expansionary monetary policy. And in response to the 2020 recession Europe followed the lead of the United States in putting expansionary policies into place.

Keynesians argued that the stimulative fiscal and monetary policies implemented in the United States in 2009 prevented a much worse recession, saving or creating millions of jobs and putting the country on a (slow) road to recovery.<sup>7</sup> They believed that the results, in terms of employment creation, were limited mainly because the stimulus was not large enough, and that the stimulus approach was abandoned after 2010 Republican congressional victories. Meanwhile, Keynesians pointed to the deepening recession in Europe after 2009 as proof that the “classical medicine” of budget austerity was counterproductive.

Classical economists, by contrast, saw government efforts at economic stimulation in 2009 as a failure, one that would saddle the country with an increased burden of debt. According to conservative economist Allan Meltzer (2011):

U.S. fiscal and monetary policies are mainly directed at getting a near-term result. The estimated cost of new jobs in President Obama’s jobs bill is at least \$200,000 per job ... once the subsidies end, the jobs disappear—but the bonds that financed them remain and must be serviced. Perhaps that’s why estimates of the additional spending generated by Keynesian stimulus—the “multiplier effect” have failed to live up to expectations.<sup>8</sup>

Until 2016, the U.S. economy was performing much better than most European economies, which were still well below their production levels of 2007, with unemployment rates in some countries remaining at Great Depression levels of over 25 percent. Predictions by classical economists of the beneficial effects of budget austerity in Europe, and of accelerating inflation in the United States, did not come true

After 2016, European economies experienced robust growth and declining unemployment. GDP in the EU region rose by 2.6 percent in 2017—the fastest since



2007—and the unemployment rate dropped below 8 percent for the first time since 2008.<sup>9</sup> This progress in European economies was mainly attributed to the expansionary policies of the European Central Bank, including low lending rates and large-scale purchases of securities, which has increased liquidity and boosted growth.<sup>10</sup> This seemed to support the Keynesian argument that activist and expansionary government policy is essential to get out of a severe recession.

The experience of 2020-2022 provided some fodder for both perspectives. On the one hand, Keynesians could argue that once again expansionary government fiscal and monetary policy saved the day, bringing economies back from the deep Covid-induced recession in a relatively short time period. According to Keynesian economist Paul Krugman, “Economic policy in 2021 was actually pretty good. . . holding back the recovery would have been a serious mistake if — and it’s a big if — the inflation spike of 2021 doesn’t turn into a wage-price spiral, and we can eventually get inflation back down without having to go through a serious recession.”<sup>11</sup> Krugman pointed to record jobs growth in 2021 as evidence that the stimulus policies were on target. Federal Reserve Chair Jerome Powell seemed to agree: “The country’s early aid was ‘a lot,’ and it’s ‘too soon’ to say whether the early pandemic aid is at fault for the recent [inflationary] headwinds, Powell said in a press conference in January 2022. Still, the actions were taken while the economy faced a ‘shocking’ drop in activity, and the recovery since has been superlative.”<sup>12</sup>

On the other hand, classically oriented economists could claim that they were right this time about the dangers of inflation. At a minimum, they could find some support for the argument that the stimulus policies of 2020 and 2021 were too large. According to conservative economist Douglas Holtz-Eakin, commenting on the policies of President Biden’s first year, “The president’s fiscal policy was a disaster. The American Rescue Plan – the \$1.9 trillion stimulus passed in March 2021—was a major policy error. It was unnecessary, too large, incredibly poorly designed. It fueled the inflation that is bedeviling the middle class.”<sup>13</sup> Yet without any stimulus policies at all, it seems very likely that the recession of 2020 would have been much more protracted.

The real world is the testing ground for economic theories. As events unfold, the economic argument will continue, and new policies and new data will be grist to the mill of continued economic debate.

### Discussion Questions

- 1 What is the effect of expansionary fiscal and monetary policies in the classical model?
- 2 Which do you think gives a better description of economic realities: classical or Keynesian macroeconomic theory? Explain.

### Review Questions

- 1 What does the *AD* curve represent, and why does it slope downward?
- 2 What shifts the *AD* curve?
- 3 What does the *AS* curve represent, and why does it have the shape that it has?

- 4 What shifts the AS curve?
- 5 Describe, using the AS/AD model, a combination of events that might cause an economy to suffer from “stagflation.”
- 6 Describe, using the AS/AD model, the impact of an adverse supply shock.
- 7 Describe, using the AS/AD model, how Federal Reserve policy might bring down inflation over time.
- 8 Describe, using the AS/AD model, the effects of a series of positive supply shocks.
- 9 What does the AS curve look like in the classical model, and why?
- 10 What underlying dynamic did Keynes believe is behind the business cycle? Illustrate with an AS/AD graph.

## Exercises

- 1 For each of the following, indicate which curve in the AS/AD model shifts (initially), and in which direction(s):
  - a A beneficial supply shock
  - b An increase in government spending
  - c A monetary contraction designed to lower the long-run inflation rate
  - d An increase in taxes
  - e An adverse supply shock
  - f A fall in people’s expectations of inflation
  - g A decrease in consumer confidence
- 2 Suppose the inflation rate in an economy is observed to be falling. Sketching an AS/AD model for each case, determine which of the following phenomena could be the cause. (There may be more than one.)
  - a The federal government gives households a substantial tax cut
  - b Agricultural harvests are particularly good this year
  - c Businesses are confident about the future and are buying more equipment
  - d The Fed is trying to move the economy toward a lower long-run inflation rate
- 3 Suppose that an economy is currently experiencing full employment, and inflation is only slightly higher than had been expected.
  - a Draw and carefully label an AS/AD diagram that illustrates this case. Label the point representing the state of this economy  $E_{(a)}$ .
  - b Suppose that investors’ confidence is actually only in the middle of an upswing. As investor confidence continues to rise, what happens to inflation and output? Add a new curve to your graph to illustrate this, as well as explaining in words. Label the point illustrating the new situation of the economy  $E_{(b)}$ .
  - c What sort of tax policy might a government enact to try to counteract an excessive upswing in investor confidence? Assuming this policy is effective, illustrate on your graph the effect of this policy, labeling the result  $E_{(c)}$ .
- 4 Suppose that an economy is in a deep recession.

- a Draw and carefully label an AS/AD diagram that illustrates this case. Label the point representing the state of this economy  $E_0$ .
  - b If no policy action is taken, what will happen to the economy over time? Show on your graph, labeling some new possible equilibrium points  $E_1$ ,  $E_2$ , and  $E_3$ . (Think about which curve shifts over time, and why, when the economy stagnates. Assume that no changes occur in investor or consumer confidence or in the economy's maximum capacity output level.)
  - c Suppose that the changes you outlined in (b) occurred very rapidly and dramatically. Is government policy necessary to get the economy out of the recession?
  - d Write a few sentences relating the above analysis to the dispute between classical and Keynesian macroeconomists.
- 5 Check recent inflation rates at <https://www.rateinflation.com/inflation-rate/usa-historical-inflation-rate/> What do you think explains the recent pattern of inflation? How does this relate to *AS/AD* analysis, and to the debate among different schools of thought, as discussed in Box 12.2?
- 6 Empirical data on the macroeconomy can be found in the *Economic Report of the President*. Go to [www.gpo.gov/fdsys/](http://www.gpo.gov/fdsys/) and search for statistical tables for the “civilian unemployment rate” and “price indexes for gross domestic product.” Jot down data on the *seasonally adjusted* unemployment rate and the *percent change in the GDP implicit price deflator* for recent periods. Plot a few points on a graph to show how the economy has performed recently. (Sometimes data is presented for months or calendar quarters, rather than for years. For the purposes of this exercise, you may simply average the numbers within a year to get a number for the year.)
- 7 Match each concept in Column A with a definition or example in Column B.

Column A	Column B
a. Aggregate supply	1. A rightward shift in the <i>AD</i> curve
b. Real wealth effect	2. A suggested relationship between inflation and unemployment
c. Increase in autonomous consumption	3. People's feelings about prices, based on experience or observation
d. Maximum capacity output	4. The economy's total production in relation to inflation
e. Beneficial supply shock	5. A sudden shortage of a key resource
f. Reduction in autonomous investment	6. A self-reinforcing tendency of wages and prices to rise
g. Aggregate demand	7. Increased (or decreased) spending as a result of feeling wealthier (or poorer)

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Column A	Column B
h. Inflationary expectations	8. Government regulations to prevent wages and prices rising
i. Phillips curve	9. The economy's total production if all resources are fully utilized
j. Wage-price spiral	10. A burst of technological progress
k. Wage and price controls	11. Total spending on goods and services in an economy
l. Vertical AS curve	12. A leftward shift in the AD curve
m. Adverse supply shock	13. Represents the classical model of an economy at full employment

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## Appendix: More Schools of Macroeconomics

### A1 New Classical Economics

In the simple classical model presented above, the economy is nearly always at or close to full employment. Faced with the empirical evidence of widely fluctuating output and unemployment rates, some modern-day economists—often called “new classical” economists—have come up with a number of theories that seek to explain how classical theory can be consistent with the observed fluctuations.

At one extreme, some economists have sought to redefine full employment to mean pretty much whatever level of employment currently exists. Assuming that people make optimizing choices and markets work smoothly, one might observe employment levels rising and falling if, for example, technological capacities or people’s preferences for work versus leisure shift over time. For example, during and after the COVID-19 recession, large numbers of people left the labor force in what was called the “Great Resignation”.

Some new classical economists, who have worked on what is called **real business cycle theory**, have suggested that “intertemporal substitution of leisure” (i.e., essentially, people voluntarily taking more time off during recessions) could be at the root of the lower employment levels observed during some historical periods. Availability of unemployment compensation, in this view, could also make people more likely to choose not to work.

**real business cycle theory:** the theory that changes in employment levels are caused by change in technological capacities or people’s preferences concerning work

Economists of the **rational expectations** school (which originated during the 1970s and 1980s) proposed a theory according to which monetary policy only affects the inflation rate and not output. The basic idea is that people have perfect foresight (i.e., they are perfectly rational), so their decisions already factor in the effects of predictable Fed policy, rendering it ineffective. This model can be explained by using the *AS/AD* model with a classical-type vertical *AS* (as shown in Figure 12.15). This vertical *AS* is interpreted to be the real supply curve for the economy, with an output level unaffected by government policies. Possibly a very unexpected move by the Fed might have a temporary effect on output, but as soon as people understand what policies the Fed is carrying out, the policies will become ineffective due to changes in expectations.

**rational expectations theory:** the theory that people's expectations about Federal Reserve policy cause predictable monetary policies to be ineffective in changing output levels

Other new classical economists accept that unemployment is real and very painful to those whom it affects. But they see aggregate demand policies as useless for addressing it. Rather, they claim that unemployment is caused by imperfections in labor markets (the “classical unemployment” described in Chapter 7). To reduce unemployment, new classical economists prescribe getting rid of government regulations (such as rigorous safety standards or minimum wages), restricting union activity, or cutting back on government social welfare policies that make it more attractive (according to the new classical economists) to stay out of work. Market pressures, they believe, will be enough on their own to support full employment—if given free rein.

## A2 The Neoclassical Synthesis and New Keynesian Macroeconomics

Somewhere in the middle ground is what has been called the “classical-Keynesian synthesis” or **neoclassical synthesis**. (It is a bit confusing that the terms “neo-classical” and “new classical” sound so similar, but they represent two different approaches). In this way of looking at the world, Keynesian theory, which allows for output to vary from its full-employment level, is considered a reasonably good description of how things work in the short and medium run. However, this view holds that, for the reasons set out in the classical model, the economy will tend to return to full employment in the long run.

**neoclassical synthesis:** A combination of classical and Keynesian perspectives

You may have noticed that in the exposition of the *AS/AD* model above, we talked about the short run and the medium run, but did not mention the long run. This is because in more decidedly Keynesian thought (to be discussed below), the economy is really a succession of short and medium runs. Shocks to the economy are so frequent and so pronounced, and price and wage adjustments (especially downward ones) so slow, that the economy never has a chance to “settle down” at a long-run equilibrium.

In the neoclassical synthesis, however, it is assumed that the economy, if left to its own devices for long enough, would settle back at full employment, due to the (eventual) success of classical wage and price adjustments. Models built on this basis would use an analysis much like that presented in the *AS/AD* model used in the body of this chapter but add a vertical *AS* curve such as that shown in Figure 12.15, labeling it “long-run aggregate supply.”

To the extent that neoclassical economists and some Keynesians agree on this model, then, debates come down to a question of how long it takes to get to the long run. More classically oriented economists tend to emphasize that excessive unemployment is merely temporary and believe that (at least if government stays out of the way) the long run comes fairly soon. Some Keynesian economists, often called **New Keynesians**, have accepted the challenge from classical economists to present

all their analysis in terms of the workings of markets, individual optimizing behavior, and possible “imperfections” in markets. They have built up theories (such as efficiency wage theory, discussed in Chapter 7) to explain why wages do not just fall during a recession to create a full employment equilibrium. They tend to work within the neoclassical synthesis, but claim that due to institutional factors the long run may be a long, long way away. (As Keynes himself wryly said, “In the long run, we are all dead.”) New Keynesians, therefore, believe that activist government fiscal and monetary policy is often justified.

**New Keynesian macroeconomics:** a school of thought that bases its analysis on micro-level market behavior, but which justifies activist macroeconomic policies by assuming that markets have “imperfections” that can create or prolong recessions

### A3 Post-Keynesian Macroeconomics

**Post-Keynesian** economists base their analyses on some of the more radical implications of the original Keynesian theory. (Once again, the similarity between the terms “New Keynesian” and “post-Keynesian” can be confusing, but there is a significant difference in the theoretical perspectives, as we will discuss). Post-Keynesians believe that modern economies are basically unstable and do not accept the idea of a long-run equilibrium at full employment. They stress the view that history matters in determining where the economy is today (a perspective known as **path dependence**). They also believe that the future, although it will depend to some extent on the actions we take now, is fundamentally unpredictable, due to the often surprising nature of economic evolution and world events.

**post-Keynesian macroeconomics:** a school of thought that stresses the importance of history and uncertainty in determining macroeconomic outcomes

**path dependence:** the idea that the state of a system such as the economy is strongly dependent on its past history

For example, one post-Keynesian argument is that high unemployment, like high inflation, may also be “toothpaste” that is very difficult to get back into the tube. When people are unemployed for a long time, they tend to lose work skills, lose work habits, and get demoralized. If this is true, then government action to counter unemployment is even more needed, since high unemployment now may tend to lead to high unemployment in the future, even if the demand situation recovers. (Economists sometimes use the term “hysteresis” to refer to an event such as unemployment that persists into the future, even after the factors that cause that event have changed.)

In addition, long periods of high unemployment mean a permanent loss of output and investment—making the economy weaker in the long term. For these reasons, it is essential for the government to act to maintain full, or close-to-full, employment. Post-Keynesian economists would say that the fiscal expansionary policies put into place in 2009 and 2020 were a good idea, because they do not believe that an

economy left to its own devices will naturally return to full employment, even “in the long run.”

Environmental problems, in the post-Keynesian view, add to the unpredictability of the future. Many environmental problems, like climate change and species loss, have long term implications that are rarely if ever taken into account in market decision making. This strengthens the argument that activist government policy is necessary to ensure a stable macroeconomic future—essentially the opposite of the classical view that the economy is best left to itself for the long run.

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<sup>1</sup> Economic Policy Institute, 2018.

<sup>2</sup> Appelbaum, 2013.

<sup>3</sup> Christopher Rugaber, “A Key Inflation Gauge Rose 5.8% in 2021, the most in 39 years.” Associated Press, January 28, 2022.

<sup>4</sup> Summers, 2022.

<sup>5</sup> Krugman, 2021.

<sup>6</sup> Krugman, 2022a.

<sup>7</sup> Blinder and Zandi, 2010; Krugman, 2011.

<sup>8</sup> Meltzer, 2011.

<sup>9</sup> Based on data from Eurostat, European Commission.

<sup>10</sup> El-Erian, 2017.

<sup>11</sup> Krugman, 2022b.

<sup>12</sup> Winck, 2022.

<sup>13</sup> Holtz-Eakin, 2022.