FISCAL POLICY

Chapter 16

Monika Islam Khan

Chapter Outline

- **16.1** What Is Fiscal Policy?
- **16.2** The Effects of Fiscal Policy on Real GDP and the Price Level
- **16.3** Fiscal Policy in the Dynamic Aggregate Demand and Aggregate Supply Model
- **16.4** The Government Purchases and Tax Multipliers
- **16.5** The Limits to Using Fiscal Policy to Stabilize the Economy
- **16.6** Deficits, Surpluses, and Federal Government Debt
- **16.7** The Effects of Fiscal Policy in the Long Run
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16.1 What is Fiscal Policy?

Fiscal policy refers to changes in *federal* taxes and government purchases that are intended to achieve macroeconomic policy objectives.

- State taxes and spending are not generally aimed at affecting *national level* objectives.
- Some forms of government spending and taxes automatically increase or decrease along with the business cycle; these are **automatic stabilizers**.

  Example: Unemployment insurance payments are larger during a recession.

- *Discretionary fiscal policy*, on the other hand, refers to intentional actions the government takes to change spending or taxes.

Does Fiscal Policy Create Jobs?

Recall that, government spending is a component of real GDP:

$$Y = C + I + G + NX$$

- The equation above makes it appear as though increases in government spending increases output—and hence other relevant economic variables like employment.

However some economists argue that government spending simply shifts employment from one group to another—it does not increase *total employment*.

- This debate was particularly important after the 2007-2009 recession: can the government use *discretionary fiscal policy* to increase employment?

Figure 16.1 The Federal Government's Share of Total Government Expenditures, 1929-2014

Before the Great Depression of the 1930s, most government spending was at the state or local level; now the federal government's share is two-thirds to three-quarters.

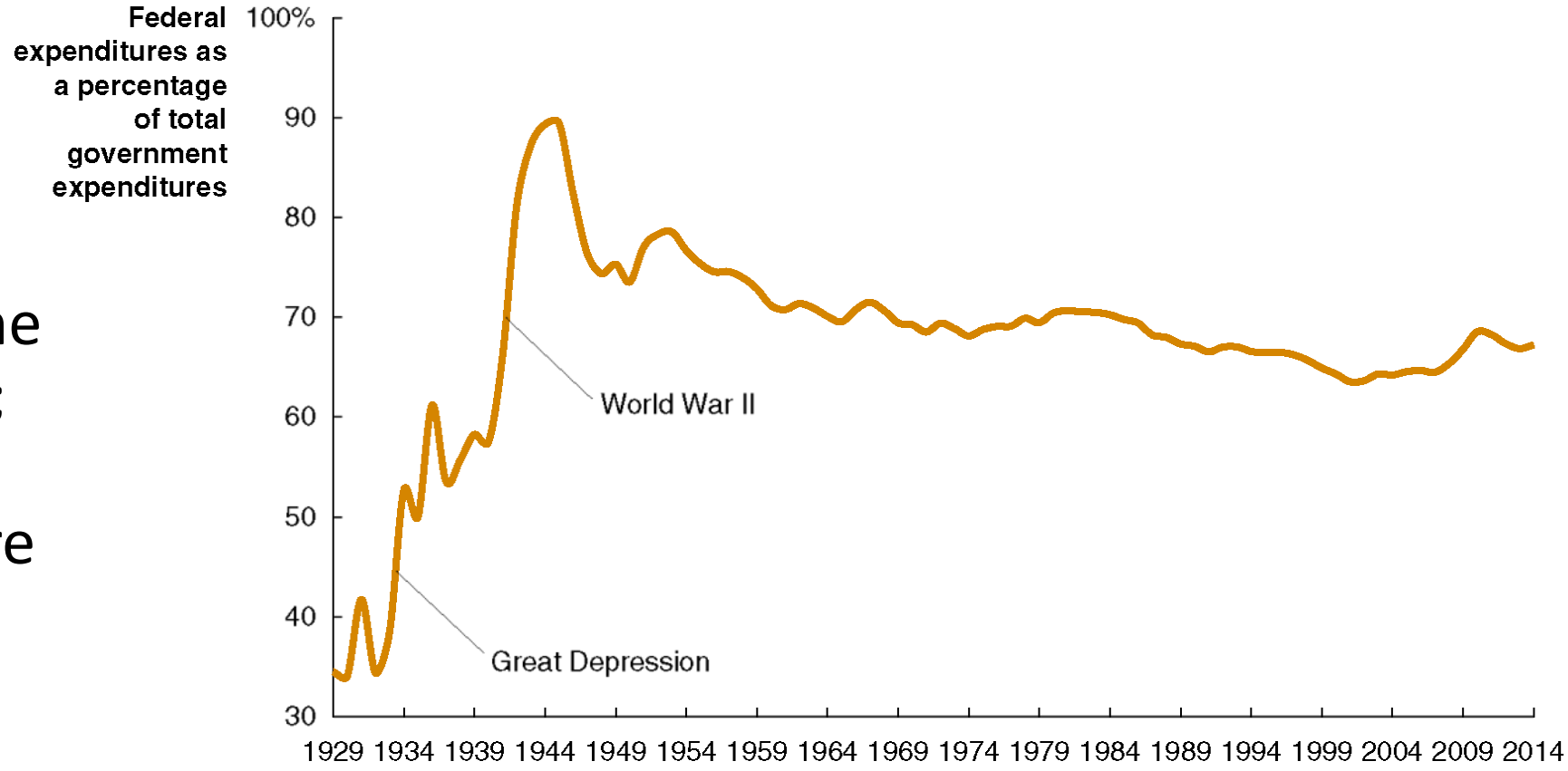


Figure 16.2 Federal Purchases and Federal Expenditures as a Percentage of GDP, 1950-2014

As a percentage of GDP, federal expenditures are now higher than ever—almost 25 percent of GDP.

However a smaller proportion is now spent on government purchases of goods and services (mostly military spending).

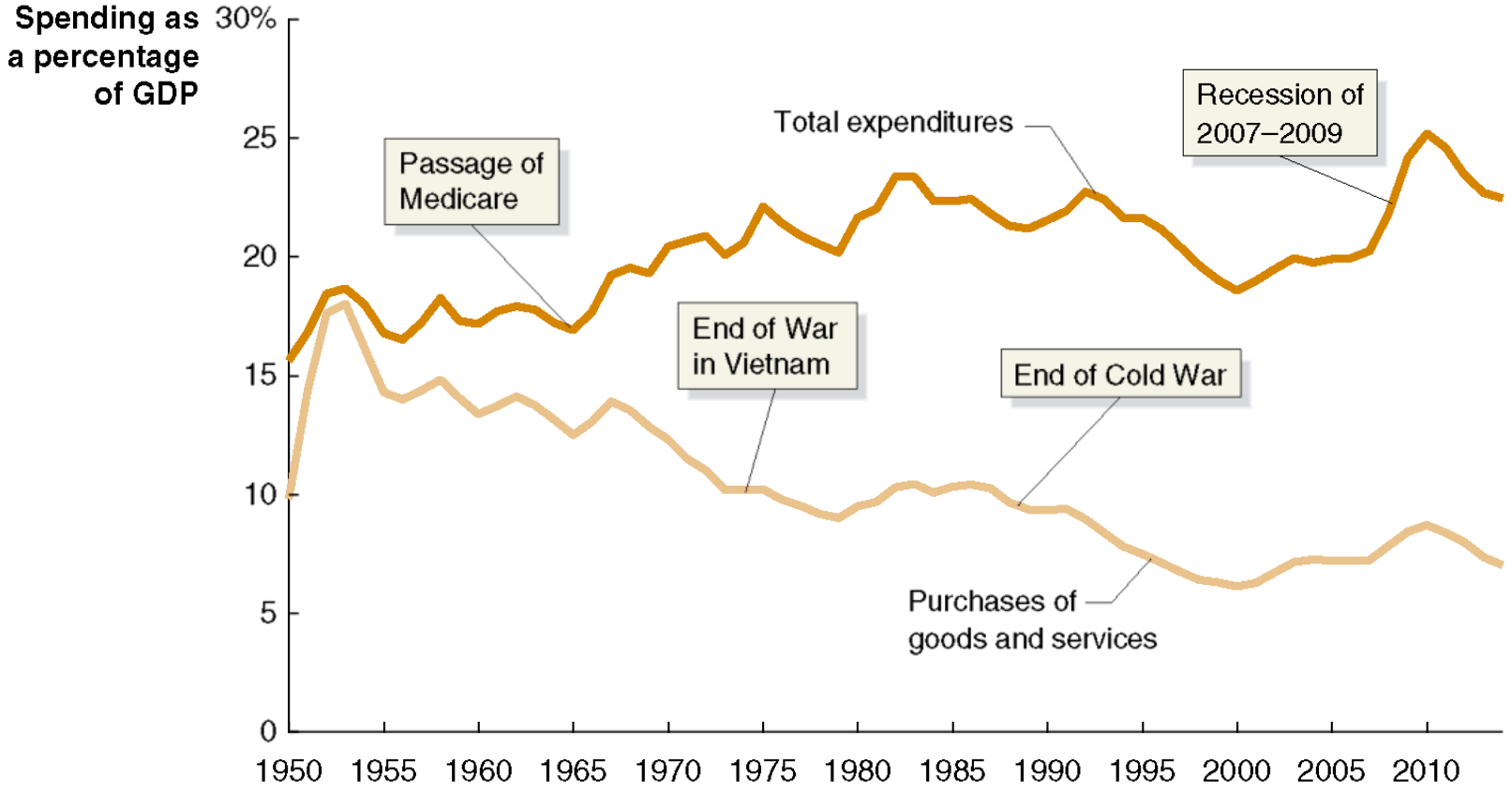
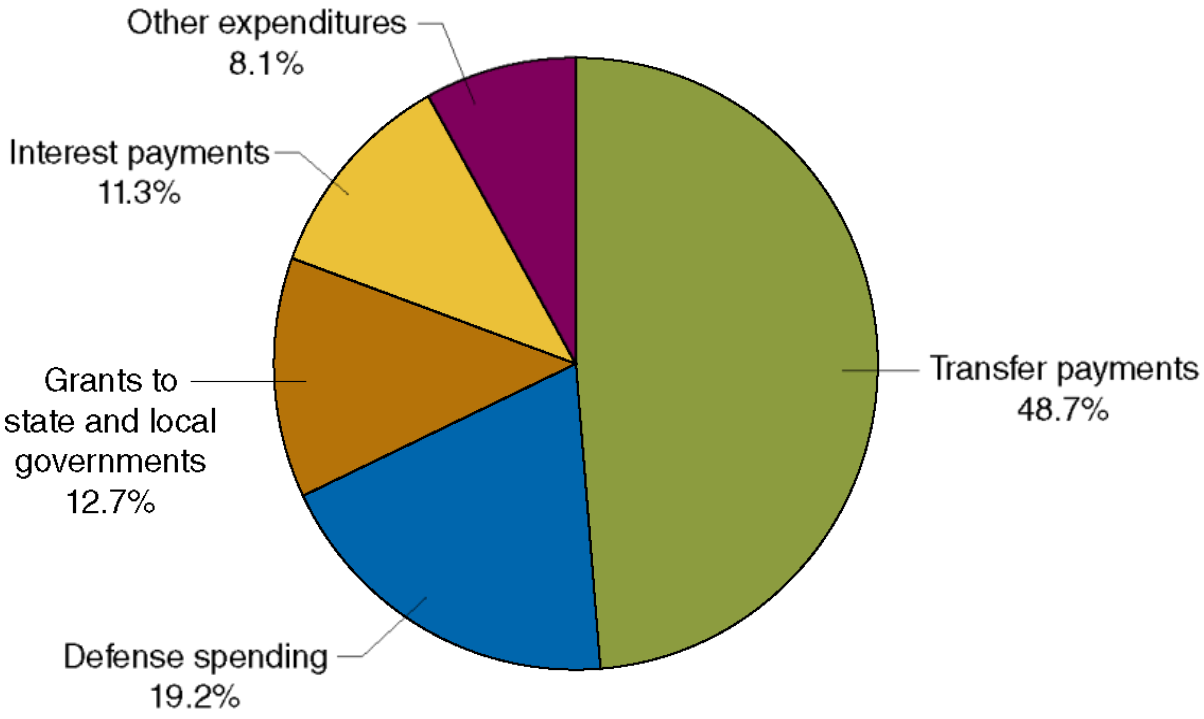


Figure 16.3 Federal Government Expenditures, 2014



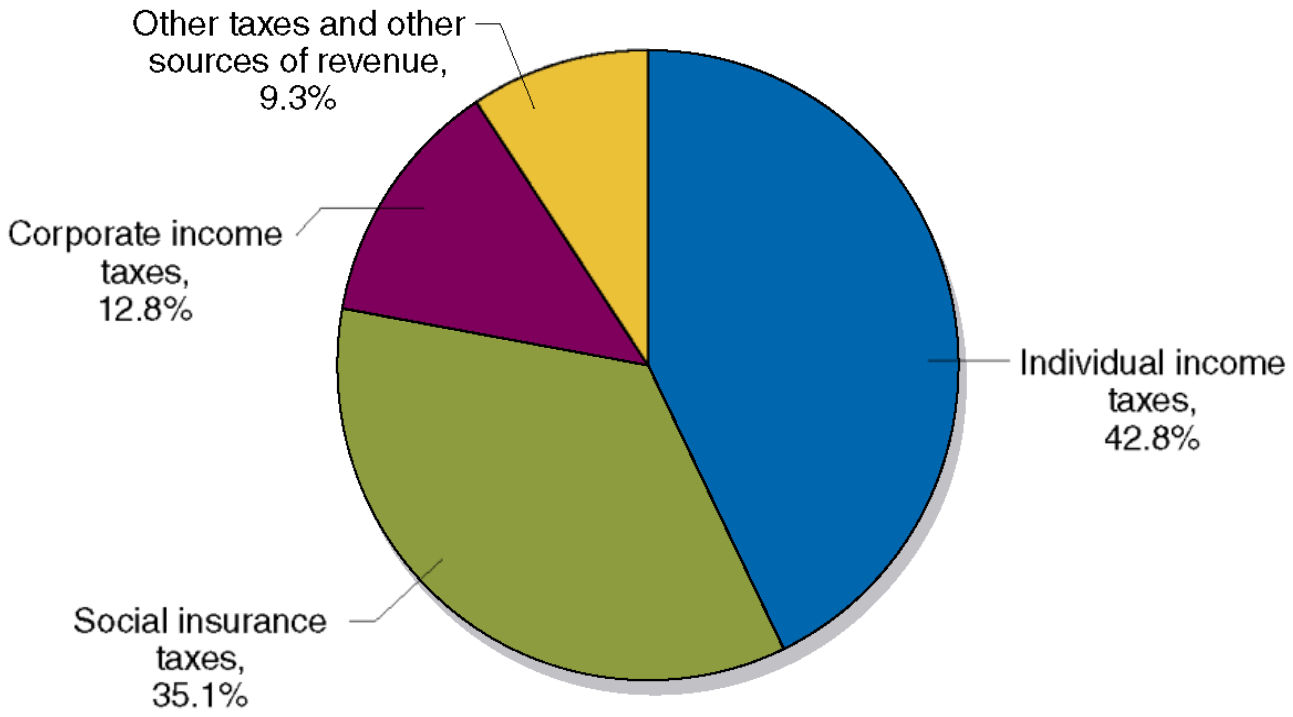
Federal Government Expenditures =
Federal Purchases + Federal Expenditures

Federal ***purchases*** consist of defense spending and "everything else," like salaries of FBI agents, operating national parks, and funding scientific research.

Around half of federal ***expenditures*** are spent on transfer payments, like Social Security, Medicare, and unemployment insurance.

The rest is spent on grants to state and local governments to support their activities, like crime prevention and education, and on paying interest on the federal debt.

Figure 16.4 Federal Government Revenue, 2014



- The majority of federal revenues come from taxes on individual employment: individual income taxes and payroll taxes earmarked to fund Social Security and Medicare.
- Taxes on corporate profits constitute about one-seventh of federal receipts.
- The remainder of federal revenue comes from excise taxes (on cigarettes, gasoline, etc.), tariffs on imports, and other fees from firms and individuals.

16.2 The Effects of Fiscal Policy on Real GDP and the Price Level

The Congress and the President carry out fiscal policy through:

- Changes in government purchases
- Changes in taxes

So, how does fiscal policy affect aggregate demand and how can the government use it to stabilize the economy?

- A change in government purchases *directly* affects aggregate demand.
- A change in taxes changes income, which in turn affects consumption, and so a change in taxes has an *indirect* effect on aggregate demand.

Figure 16.5 Fiscal Policy: Expansionary

Expansionary fiscal policy involves increasing government purchases or decreasing taxes so that the aggregate demand (AD) curve shifts to the right.

If the government believes real GDP will be *below potential GDP*, it can enact *expansionary fiscal policy* in an attempt to restore long-run equilibrium—decreasing unemployment or increasing employment.

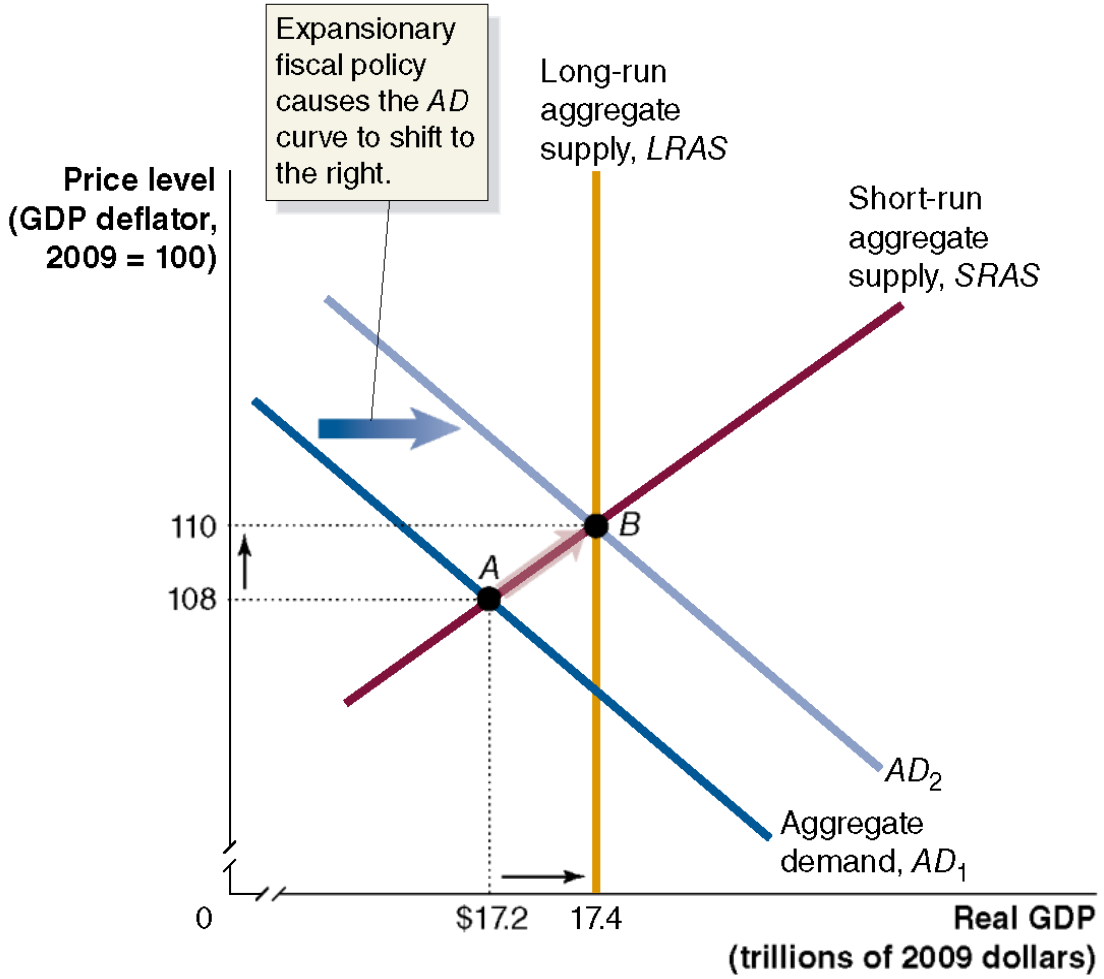


Figure 16.5 Fiscal Policy: Contractionary

Contractionary fiscal policy involves *decreasing* government purchases or *increasing* taxes so that the aggregate demand (AD) curve shifts to the left.

- This works just like expansionary fiscal policy, only in reverse.
- If the government believes real GDP will be *above potential GDP* (which may lead to increased inflation), it can enact *contractionary fiscal policy* in an attempt to restore long-run equilibrium—decreasing inflation.

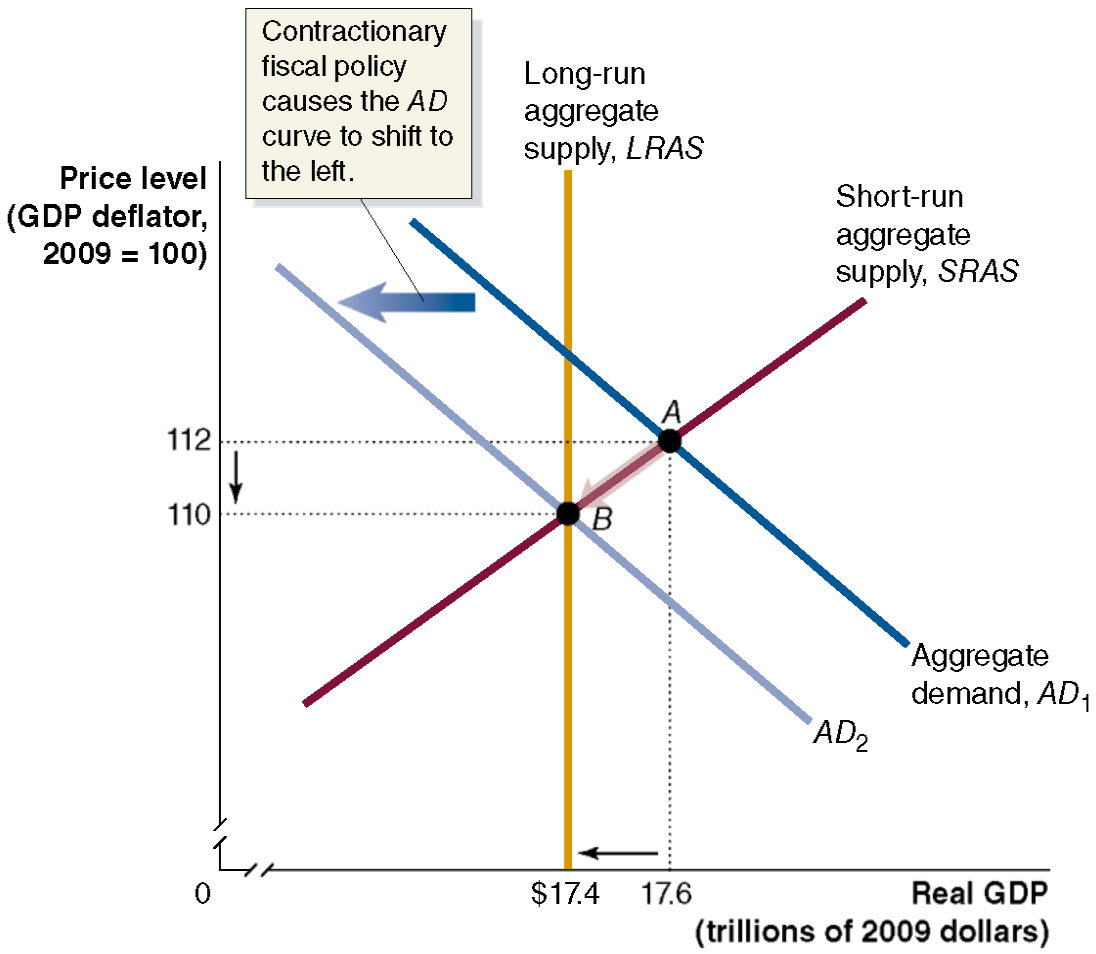


Table 16.1 Countercyclical Fiscal Policy

Problem	Type of Policy Required	Actions by Congress and the President	Result
Recession	Expansionary	Increase government purchases or cut taxes	Real GDP and the price level rise.
Rising inflation	Contractionary	Decrease government purchases or raise taxes	Real GDP and the price level fall.

The federal government's actions described on the table above and the previous slides constitute a *countercyclical fiscal policy*.

Bear in mind that:

- The effects described assume *ceteris paribus*: everything else is staying the same, including *monetary policy.*
- Contractionary fiscal policy is not really causing prices to fall; it's causing inflation to be lower *than it otherwise would have been*.

16.3 Fiscal Policy in the Dynamic Aggregate Demand and Aggregate Supply Model

Our model of fiscal policy so far has been *static*: assuming long-run potential GDP does not change, and that the price level is constant.

While the *lessons* from this model are still appropriate—Congress and the President can use fiscal policy to affect real GDP and the price level—our understanding of fiscal policy can be improved by seeing it in the *dynamic aggregate demand and aggregate supply model*.

Recall that, dynamic aggregate demand and aggregate supply model constitutes that the long-run potential GDP changes i.e. the long-run aggregate supply curve (LRAC) may shift to the right.

Figure 16.6 An Expansionary Fiscal Policy in the Dynamic Model

Initially, the economy is in long-run equilibrium at A.

- **Problem:** The federal government projects that aggregate demand will not rise by enough to maintain full employment.
- **Solution:** It enacts an expansionary fiscal policy to increase aggregate demand, hopefully to the full employment level at C.

The price level is higher (at C) than it would have been without (at B)the expansionary fiscal policy.

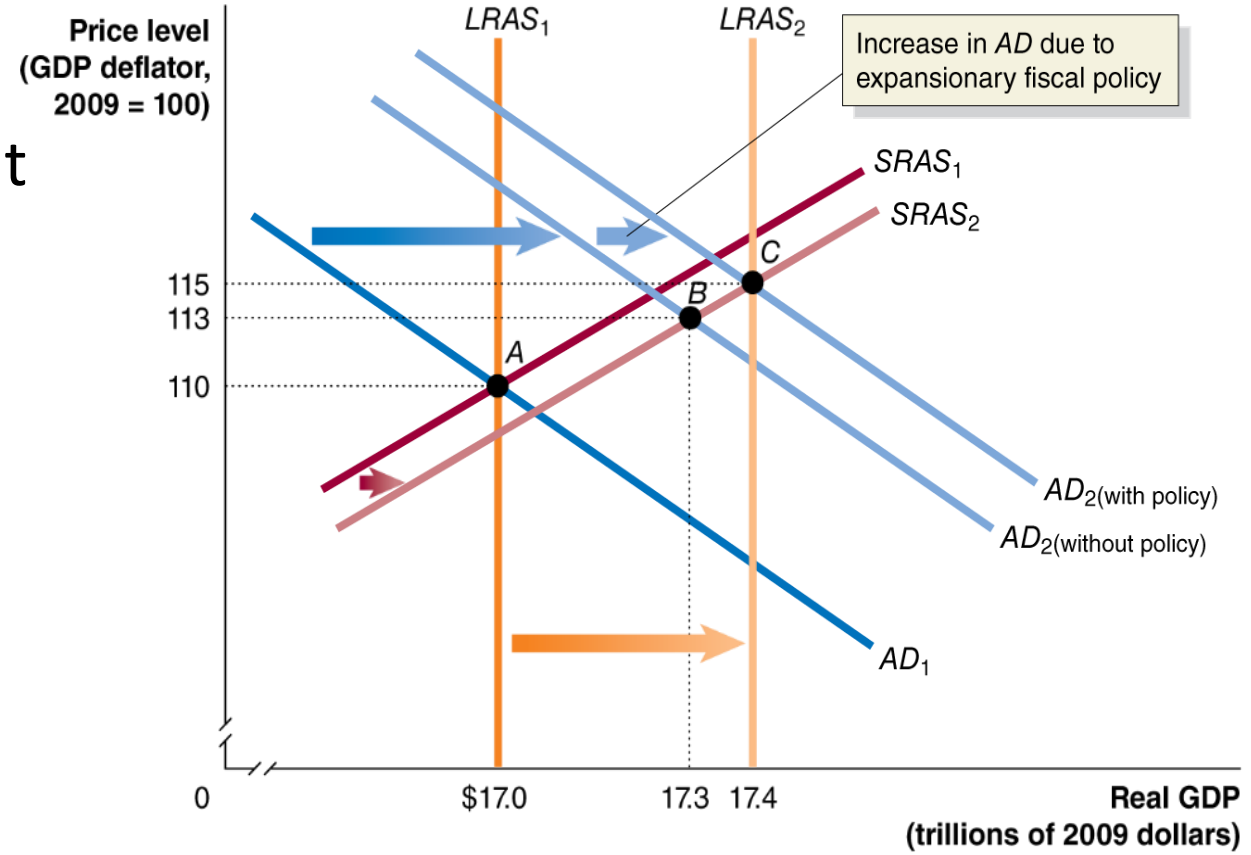
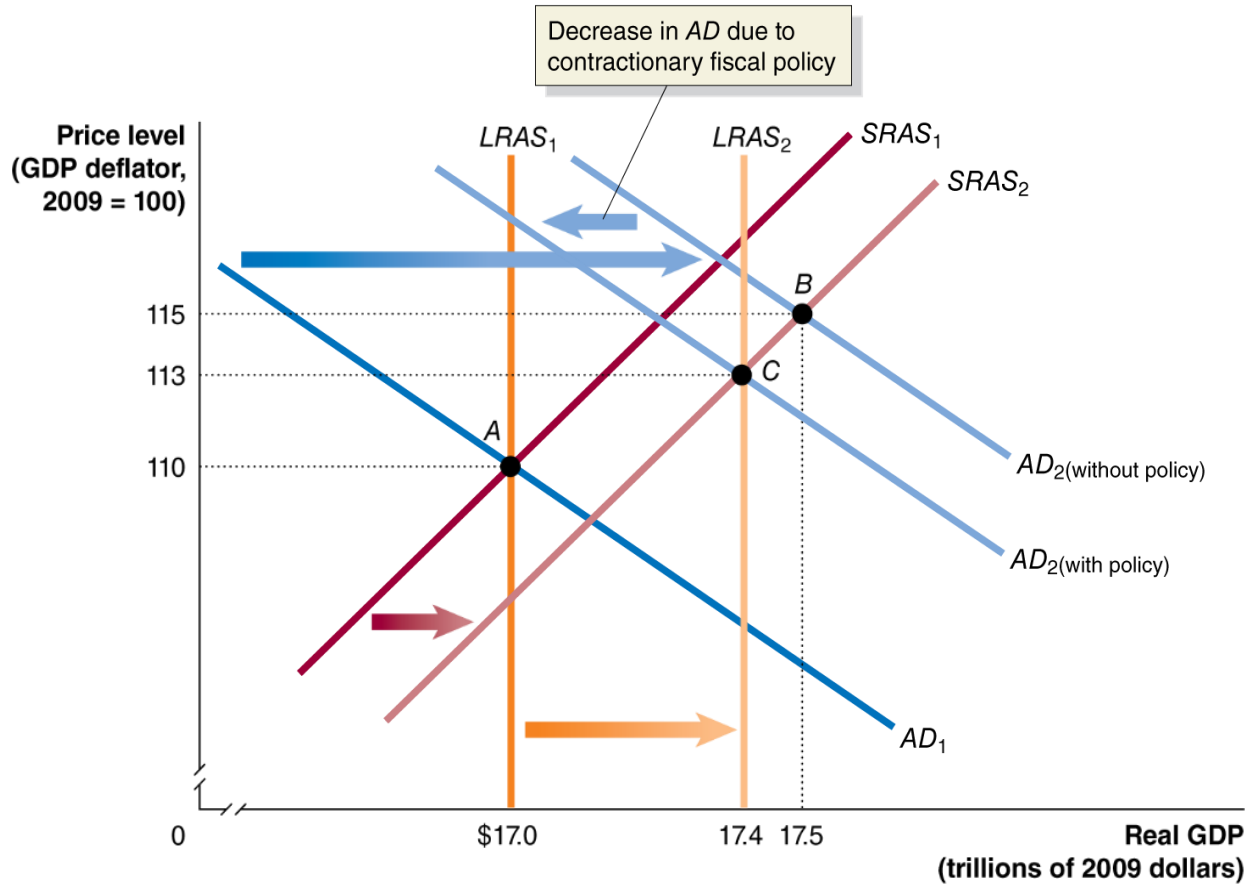


Figure 16.7 A Contractionary Fiscal Policy in the Dynamic Model

The economy starts once more in long-run equilibrium at A.

- **Problem:** The federal government projects that aggregate demand will rise so much that employment is beyond the full employment level, causing high inflation.
- **Solution:** It enacts a contractionary fiscal policy to decrease aggregate demand, again ideally to the full employment level at C.



16.4 The Government Purchases and Tax Multipliers

If the government increases its spending on goods and services, then aggregate demand increases immediately. This is the *autonomous* increase in aggregate demand.

But then people receive this increased spending as increased income, and increase their consumption spending accordingly.
This is the *induced* increase in aggregate demand.

- The series of **induced** increases in consumption spending that results from the initial increase in **autonomous** expenditures is known as the **multiplier effect**.

Figure 16.8 The Multiplier Effect and Aggregate Demand

- AD_1 represents the initial aggregate demand curve.
- A $100 billion increase in government purchases results in an **autonomous** increase in aggregate demand to AD.
- Due to the **multiplier effect**, there is a series of further increases in income and consumption spending leading to an **induced** increase in aggregate demand to AD_2.

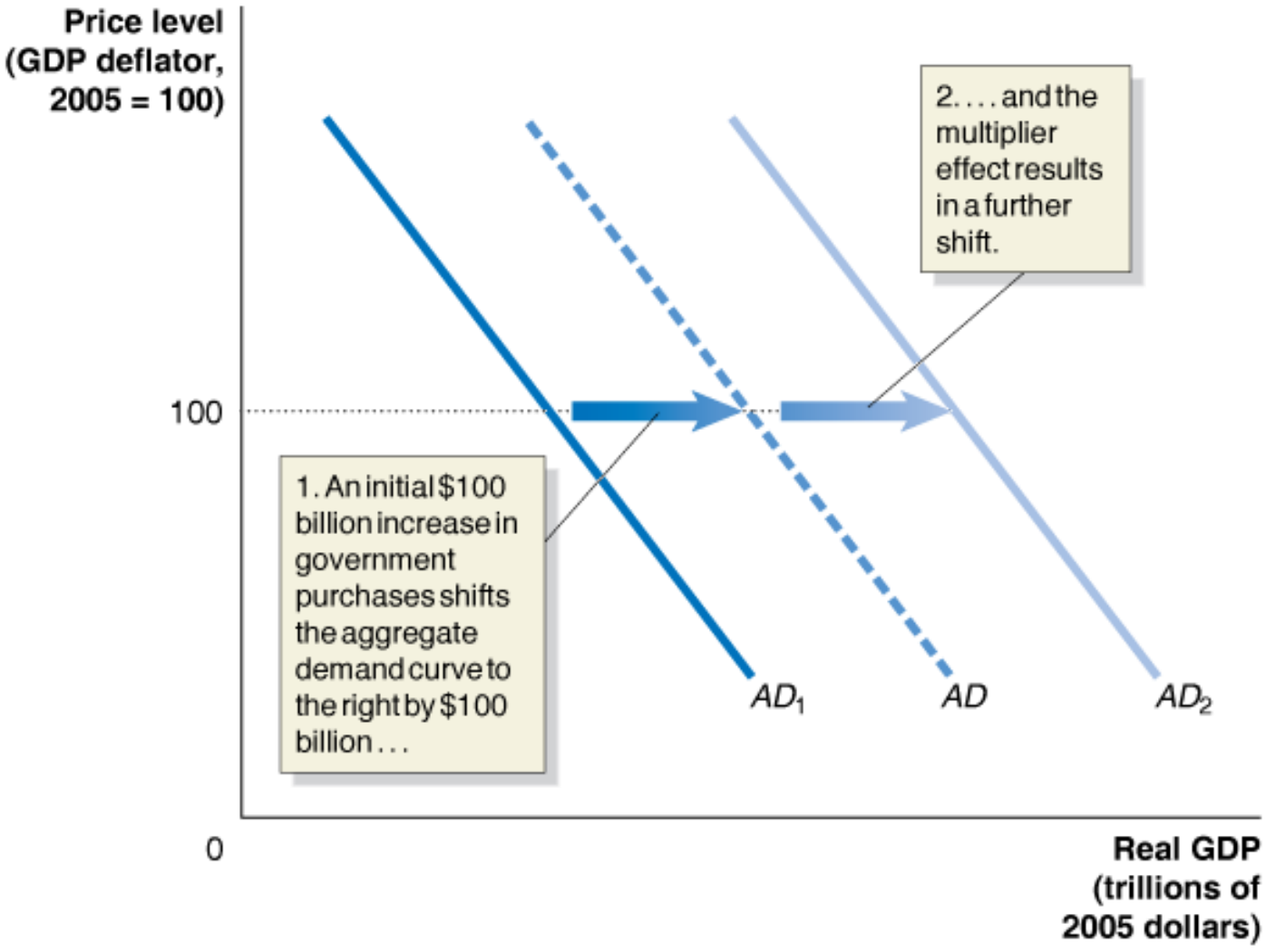
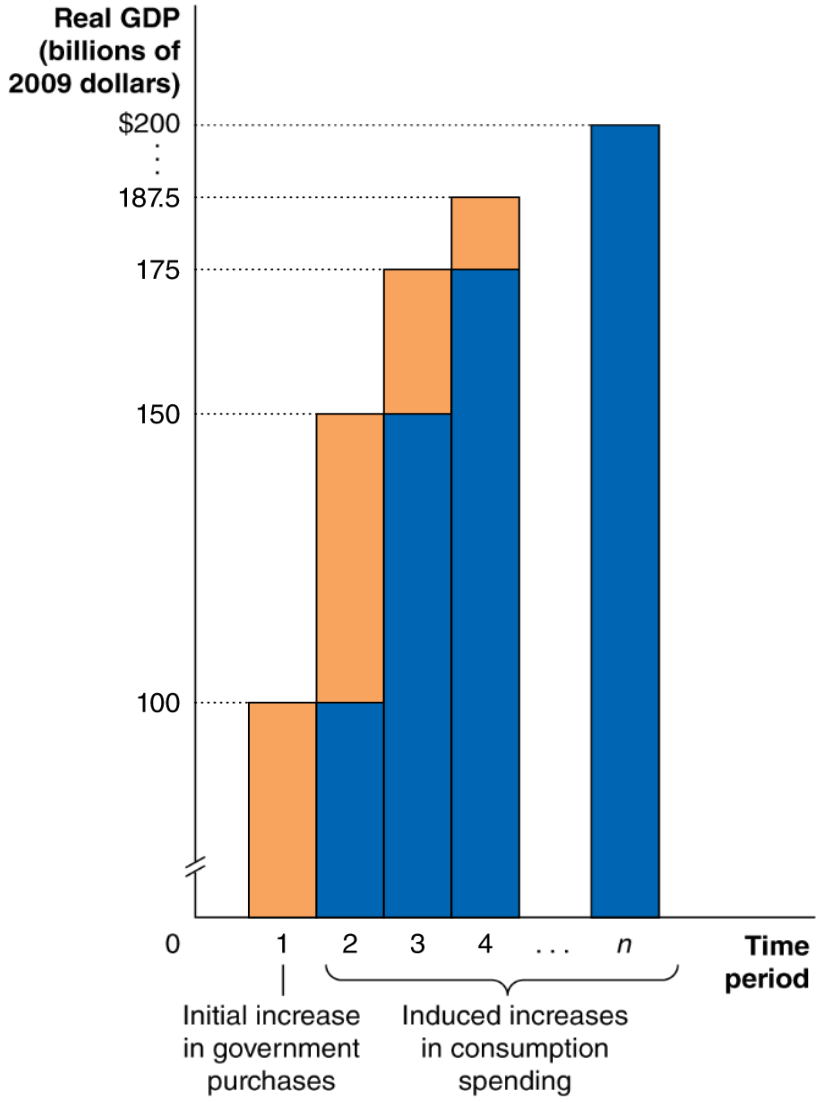


Figure 16.9 The Multiplier Effect of an Increase in Government Purchases

Period	Additional Spending This Period	Cumulative Increase in Spending and Real GDP
1	$100 billion in government purchases	$100 billion
2	$50 billion in consumption spending	$150 billion
3	$25 billion in consumption spending	$175 billion
4	$12 5 billion in consumption spending	$1875 billion
⋮	⋮	⋮
n	0	$200 billion



Suppose each increase in spending induces half (50% or 0.50) as much consumption spending as in the previous period.

- Over time, a $100 billion increase in government purchases will result in an additional $100 billion in induced consumption spending ($200 billion overall).

Figure 16.9 The Multiplier Effect of an Increase in Government Purchases

Again, a $100 billion increase in government purchases will result in an additional $100 billion in induced consumption spending ($200 billion overall). How?

$$\frac{Overall\ Cumulative\ Increase\ in\ Spending\ and\ Real\ GDP}{Initial\ Increase\ in\ Government\ Purchases} = \frac{}{Percentage\ Increase\ in\ Induced\ Spending\ every\ Period}$$

$$Overall\ Cumulative\ Increase\ in\ Spending\ and\ Real\ GDP = \frac{\$100\ billion}{0.50} = \$200\ billion$$

Multipliers for Government Purchases and Taxes

We can describe the total effect of a change (increase *or* decrease) in government purchases or taxes by measuring the change in equilibrium real GDP.

$$\text{Government purchases multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in government purchases}}$$

$$\text{Tax multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in taxes}}$$

The tax multiplier will be a negative number: an increase in taxes will *decrease* equilibrium real GDP and vice versa.

We expect the tax multiplier to be *smaller* (in absolute value) than the government purchases multiplier.

- Why? A $100 billion increase in purchases initially increases spending by $100 billion; but a $100 billion tax cut is partially spent and partially saved.

The Effect of Changes in Tax Rates

The tax multiplier applies to changes in the *amount* of taxes, without changes in *tax rates*.

- *Example: In 2009 and 2010, the federal government enacted the* Making Work Pay Tax Credit*: a $400 reduction in taxes for working individuals ($800 for households).*

Decreases in tax *rates* have a slightly different effect:

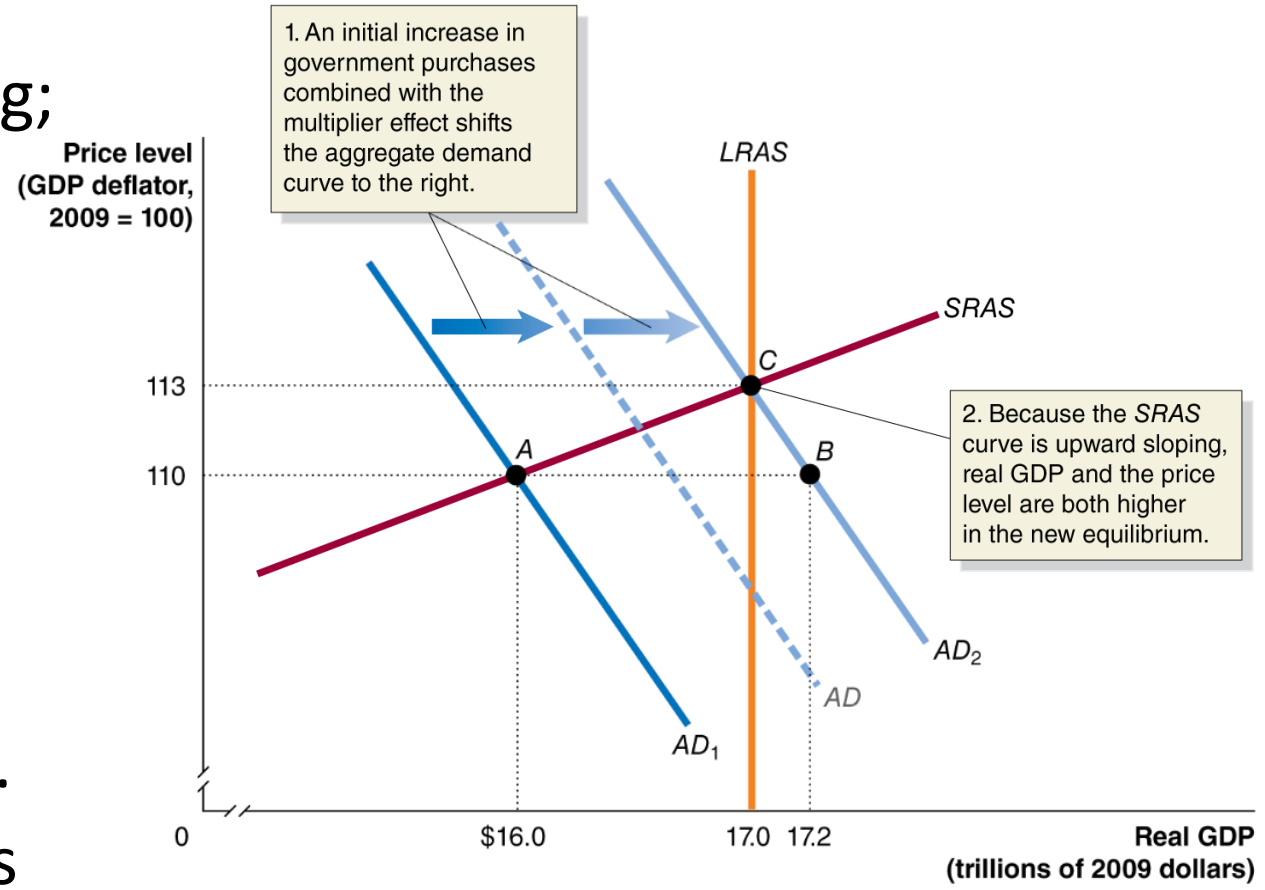
1. Increases the disposable income of households, leading to people increasing their consumption spending
2. Increases the size of the multiplier effect, since more of any increase in income becomes disposable income.

Figure 16.10 The Multiplier Effect and Aggregate Supply

An increase in aggregate demand will not only result in real GDP rising; it will also result in a price level increase, because the short-run aggregate supply curve is upward-sloping.

Suppose that between the autonomous and induced effects, fiscal policy causes aggregate demand to increase by $1.2 trillion.

- The resulting real GDP increase is smaller—only $1.0 trillion. The price level also rises.



Multipliers Work in Both Directions

An increase in government purchases and a cut in taxes have a **positive** multiplier effect.

A decrease in government purchases and an increase in taxes have a **negative** multiplier effect.

- *Example: a reduction in government spending on defense initially affects defense contractors, but then it would spread to suppliers to and employees of those contractors and then to other firms and workers.*

16.5 The Limits of Using Fiscal Policy to Stabilize the Economy

For several reasons, fiscal policy may be even less effective than monetary policy at countercyclical stabilization:

- Timing fiscal policy is harder, due to:
  - Legislative delay: Congress needs to agree on the actions
  - Implementation delay: Large spending projects may take months or even years to begin, even once approved.

  Why does timing matter? Suppose government decides to cut spending and purchases and raise taxes to ease the rising inflation rate that was decreasing by the time the policy was implemented. This could as well drive the economy into a recession.
- Government spending might *crowd out* private spending

Crowding out: A decline in private expenditures as a result of an increase in government purchases

Figure 16.11 An Expansionary Fiscal Policy Raises Interest Rates

A temporary increase in government purchases will cause the demand for money, and hence the interest rate, to rise.

But with the higher interest rate, consumption, investment, and net exports all fall.

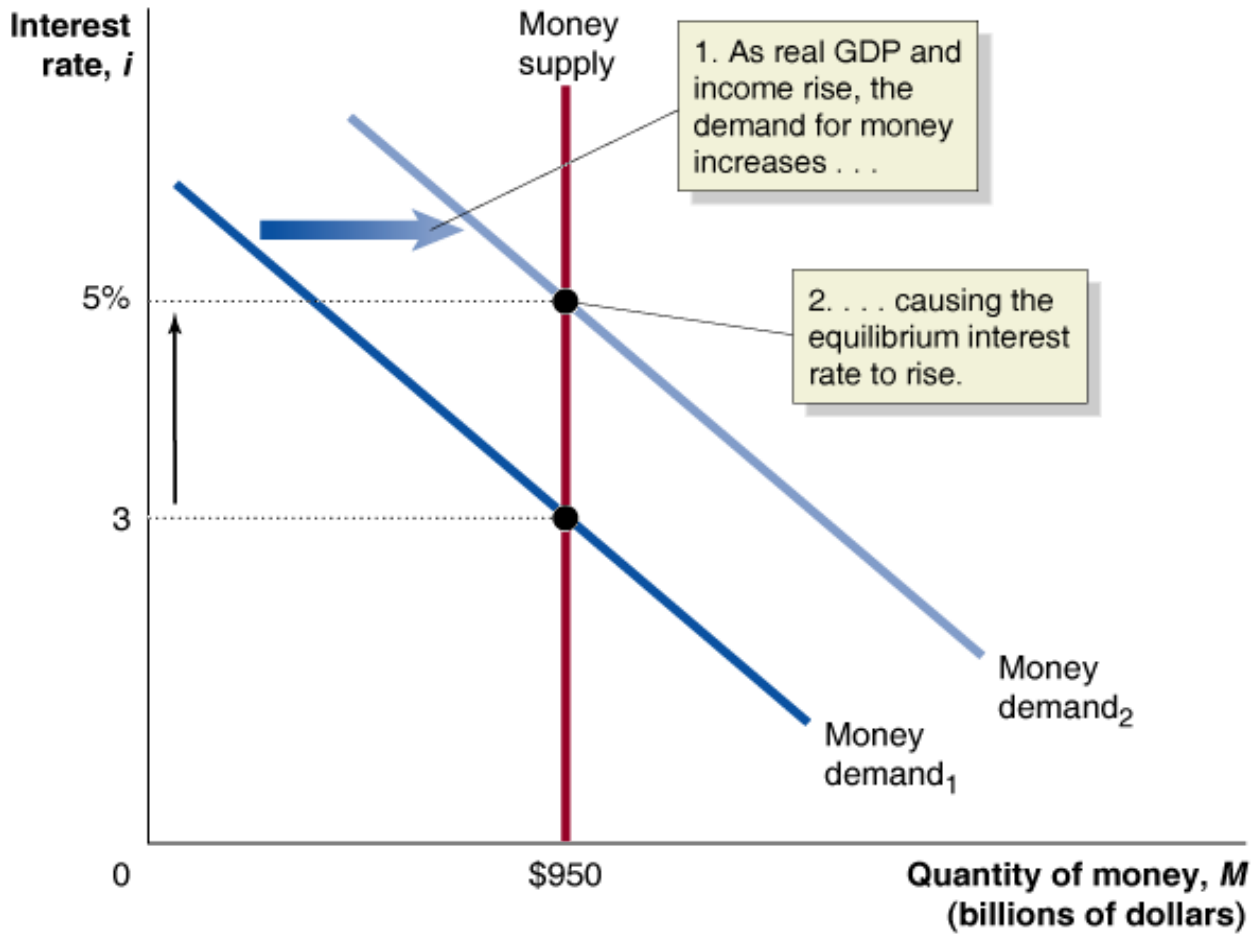
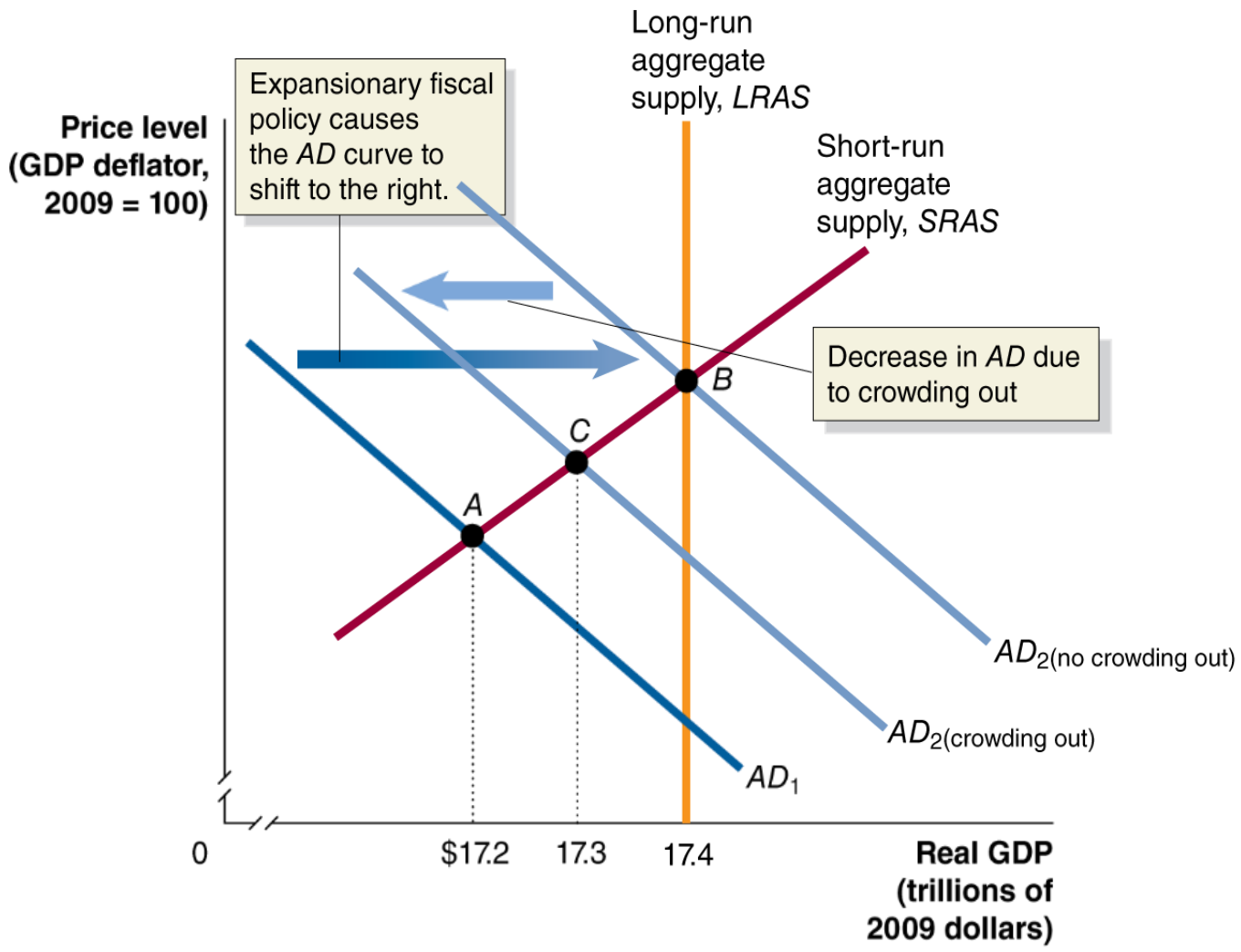


Figure 16.12 The Effect of Crowding Out in the Short Run

Expansionary fiscal policy increases AD and shifts the equilibrium from A to B.

However, due to crowding of private spending, AD decreases and shifts the equilibrium only to C.

Therefore, the initial increase in spending is partially offset by the crowding out.



Crowding Out in the Long Run

In the long run, the increase in government purchases will have no effect on real GDP: the reduction in consumption, investment, and net exports will exactly offset the increase in government purchases.

- Why? Because *in the long run, the economy returns to potential GDP*, even without the government's intervention.
- The long run effect is simply to increase the size of the government sector within the economy.

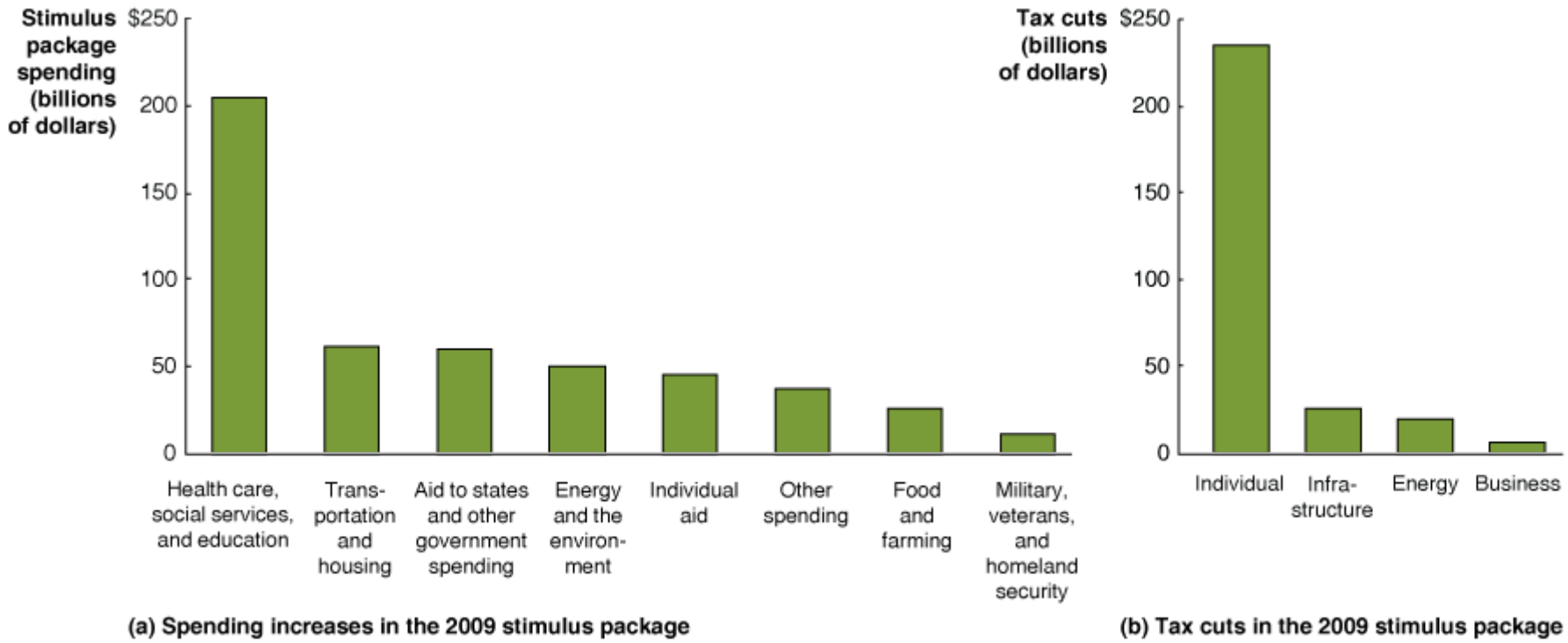
Bear in mind that the long run may be many years away, however, so the intermediate increase in real GDP may be worth the cost.

Fiscal Policy in Action: The 2007-2009 Recession

In early 2008, believing a recession was imminent, Congress authorized a tax cut: a one-time *rebate* of taxes already paid, totaling $95 billion.

- This resulted in a boost to consumers' *current incomes*. Changes to current incomes result in smaller increases in spending than changes to *permanent incomes*, because people seek to "smooth" their consumption over time.
- Economists estimate that consumers spent about 33-40 percent of the rebates they received, so the tax cut resulted in about $35 billion in increased spending.

Figure 16.13 The 2009 Stimulus Package



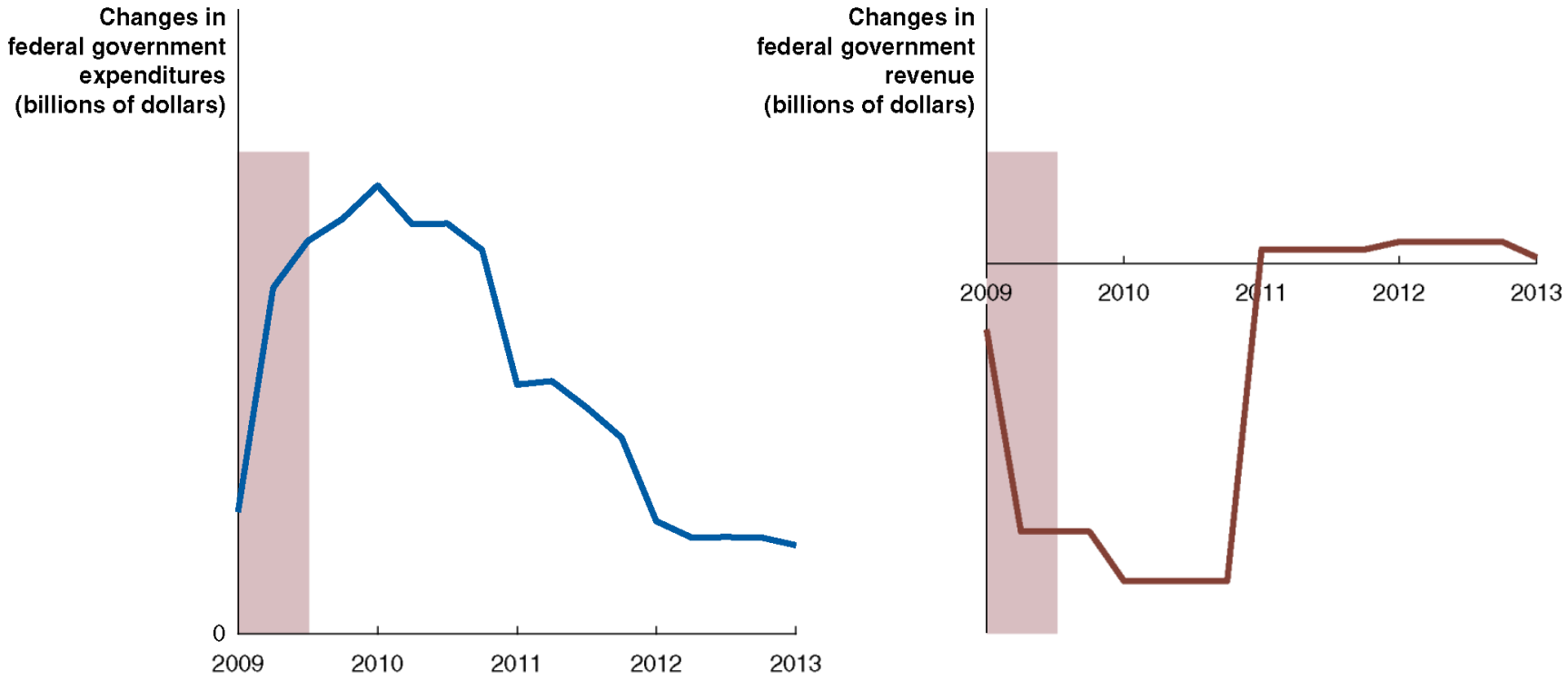
(a) Spending increases in the 2009 stimulus package

(b) Tax cuts in the 2009 stimulus package

In 2009, Congress passed the "stimulus package," a combination of increased government spending (about two-thirds) and decreased taxes (about one-third).

- At $840 billion, the stimulus package was by far the largest fiscal policy action in U.S. history.

Figure 16.14 The Effect of the Stimulus Package on Federal Expenditures and Revenue



The effect of the stimulus package on federal expenditures and revenue was not immediate, but it mostly occurred over the following two years.

How Effective Was the Stimulus Package?

When the stimulus was passed, Obama administration economists believed that by the end of 2010, it would:

- Increase real GDP by 3.5 percent
- Increase employment by 3.5 million

By the end of 2010, real GDP actually rose by 4.4 percent but employment *fell* by 3.3 million.

Did the stimulus fail?

- To judge the effect of the stimulus package, we have to measure its effects *holding constant all other factors affecting real GDP and employment*.
- Isolating the effects of the stimulus package is very difficult; economists *still* differ in their views about how effective the stimulus package was.

Table 16.2 CBO Estimates of the Effects of the Stimulus Package

Year	Change in Real GDP	Change in the Unemployment Rate	Change in Employment (millions of people)
2009	0.4% to 1.8%	−0.1% to −0.5%	0.3 to 1.3
2010	0.7% to 4.1%	−0.4% to −1.8%	0.9 to 4.7
2011	0.4% to 2.3%	−0.2% to −1.4%	0.6 to 3.6
2012	0.1% to 0.8%	−0.1% to −0.6%	0.2 to 1.3
2013	0.1% to 0.4%	0% to −0.3%	0.1 to 0.5
2014	0% to 0.2%	0% to −0.2%	0.1 to 0.3

The Congressional Budget Office (CBO) is a non-partisan organization that estimates the effects of government policies.

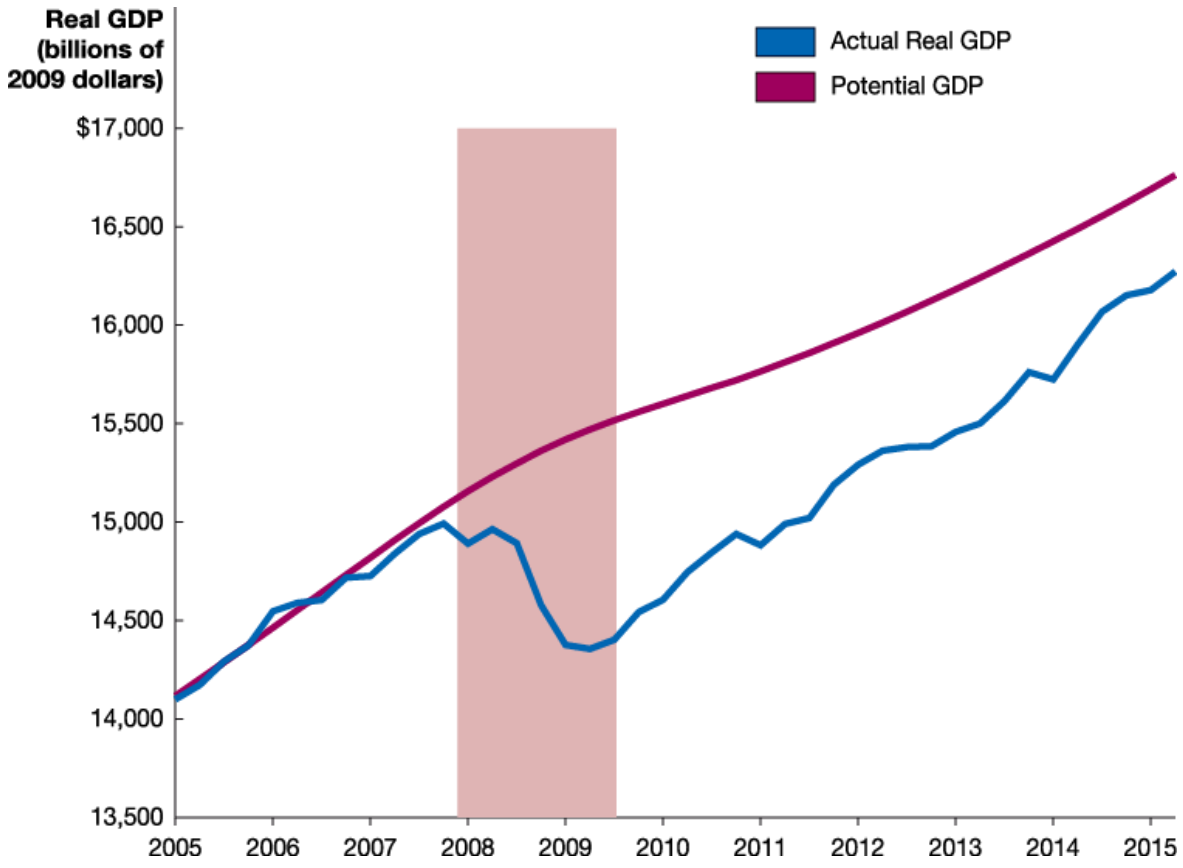
- The table shows CBO estimates of the effect of the stimulus package on economic variables, *relative to what would have happened without the stimulus package*.
- The CBO's conclusion: the stimulus package reduced the severity of the recession but did not come close to bringing the economy back to full employment.

Making the Connection: Do We Depend Too Much on the Fed?

Even after the stimulus package, the economy had not returned to potential GDP.

Recently, monetary policy has been expansionary, but fiscal policy has been much less so.

Do you think more expansionary fiscal policy is needed?



16.6 Deficits, Surpluses, and Federal Government Debt

A **budget deficit** occurs when the government's expenditures are greater than its tax revenue.

A **budget surplus** occurs when the government's expenditures are less than its tax revenue.

- *Do you know whether the federal government is running a budget deficit or a budget surplus currently?*

Figure 16.15 The Federal Budget Deficit, 1901-2015 (1 of 2)

The U.S. federal government does not generally balance its budget. Sometimes its revenues are higher than its expenditure, but **usually** the reverse is true—especially so during wartime.

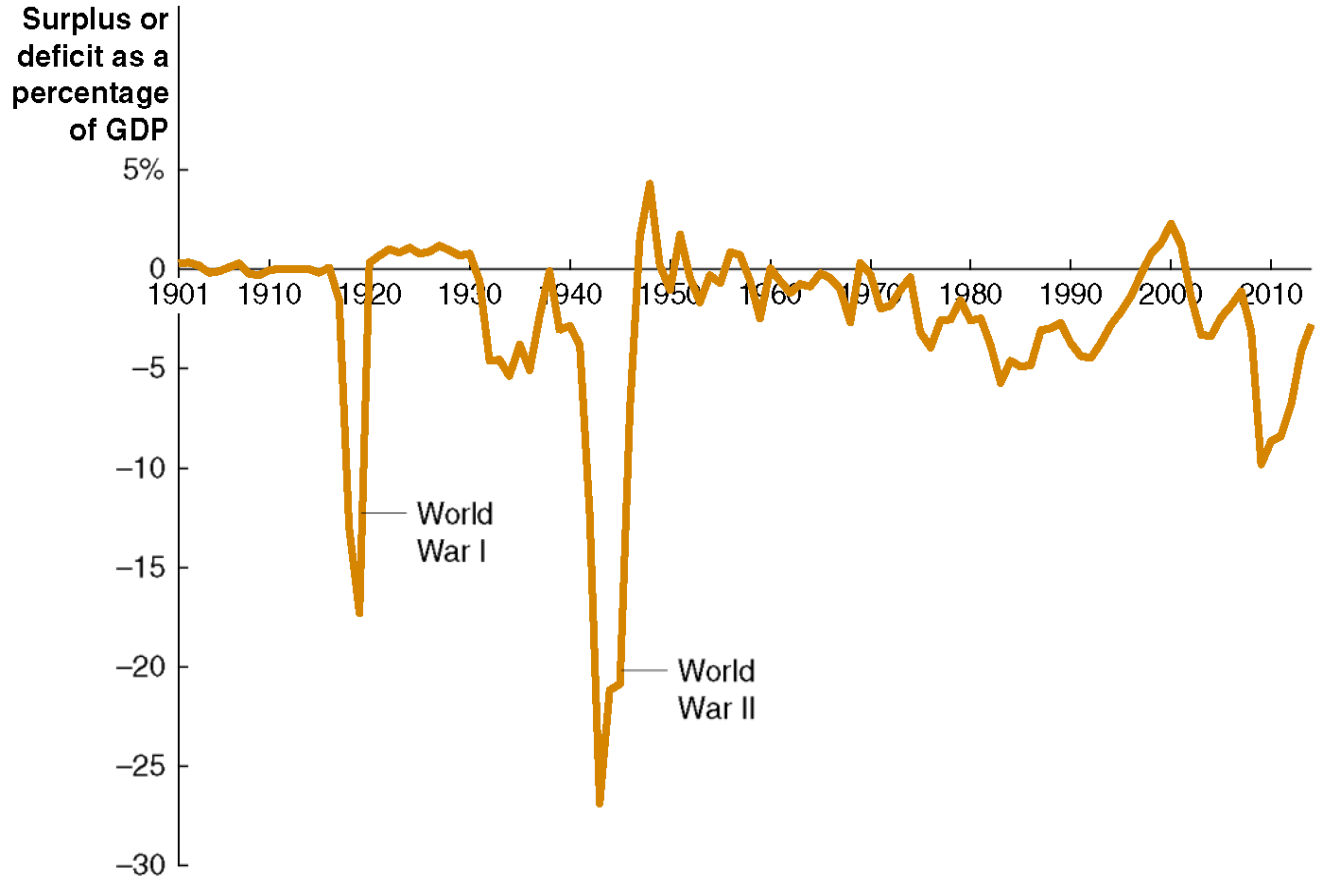
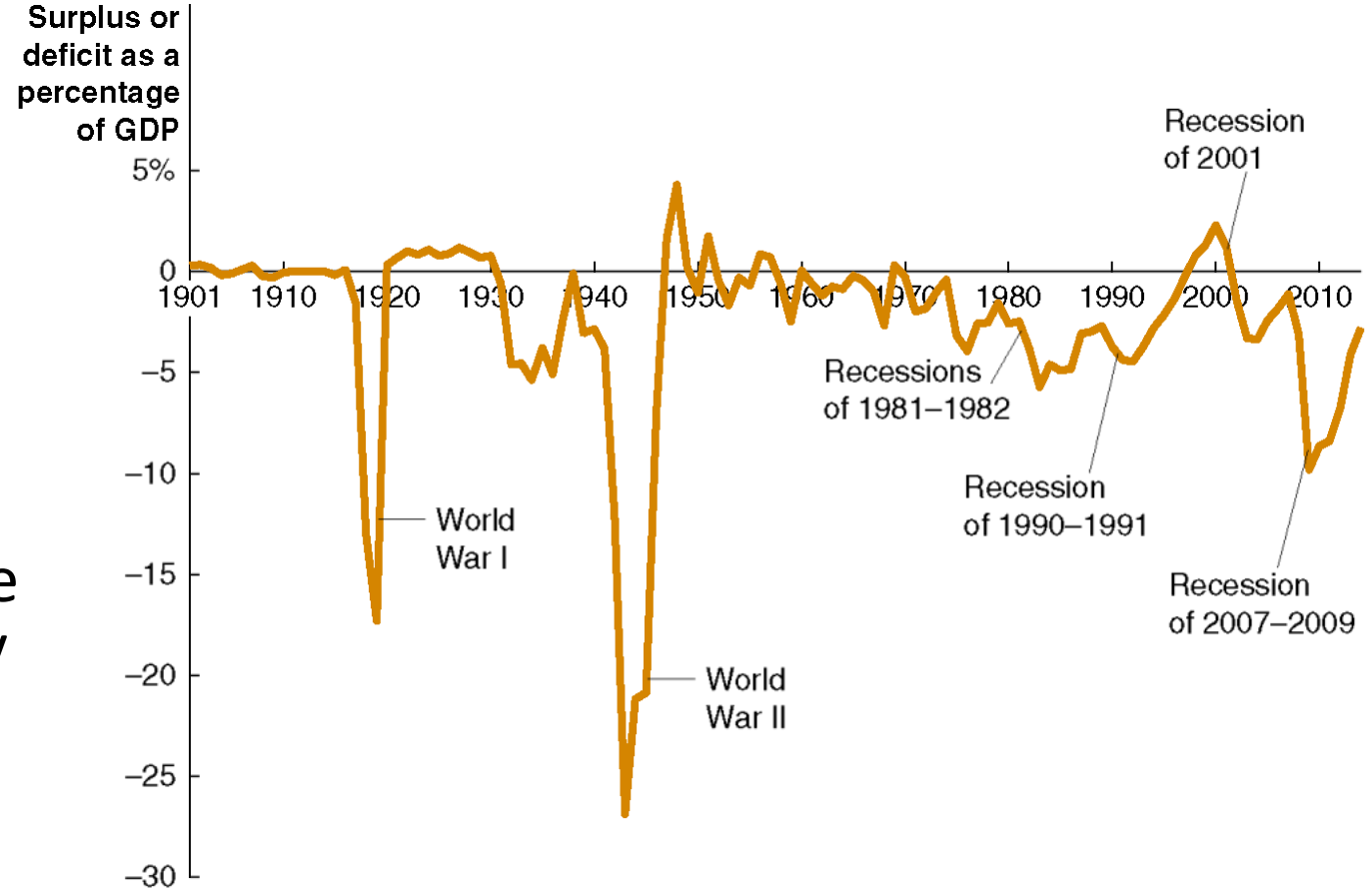


Figure 16.15 The Federal Budget Deficit, 1901-2015 (2 of 2)

Budget deficits also occur during recessions, as tax receipts fall, and *automatic stabilizers* like increases in transfer payments (unemployment insurance, food stamps, etc.) take effect.

- These automatic stabilizers are important for limiting the severity of a recession; many economists believe that the Great Depression of the 1930s was more severe because most of these automatic stabilizers did not exist then.



How Large Is the Deficit in the U.S.?

Currently, the federal government runs a budget deficit, around 2.7 percent of GDP in 2015.

- How much of this deficit is due to GDP being below potential, and how much is due to government spending and tax policies?

We can identify this by looking at the **cyclically adjusted budget deficit or surplus**: the deficit or surplus in the federal government's budget if the economy were at potential GDP.

- The CBO estimated that the budget deficit would be 1.6 percent of real GDP in 2014 if real GDP were at its potential.
- So this is the amount that spending needs to be cut, or taxes raised, in order to bring the federal budget into balance *in the long run*. The rest (1.1 percent) is due to automatic stabilizers.

Making the Connection: Did Fiscal Policy Fail during the Great Depression? (1 of 2)

Government expenditures increased after the Great Depression of the 1930s as part of the New Deal, enacted by Franklin D. Roosevelt.

- Similarly, there was a budget deficit each year in the 1930s (except 1937).

However recovery from the Great Depression was painfully slow.

- Does show that expansionary fiscal policy didn't work during the 1930s?

Should the Federal Budget Be Balanced?

Although many economists believe the federal budget should be balanced when the economy is at potential GDP, few believe it should be balanced during a recession.

- During a recession, tax revenues fall; to balance the budget, spending would have to fall also—which would make the recession worse.

In fact, some economists argue that the federal budget should *normally* be in deficit. Just as households and firms borrow money to implement long-term investments, they argue that the federal government should do the same.

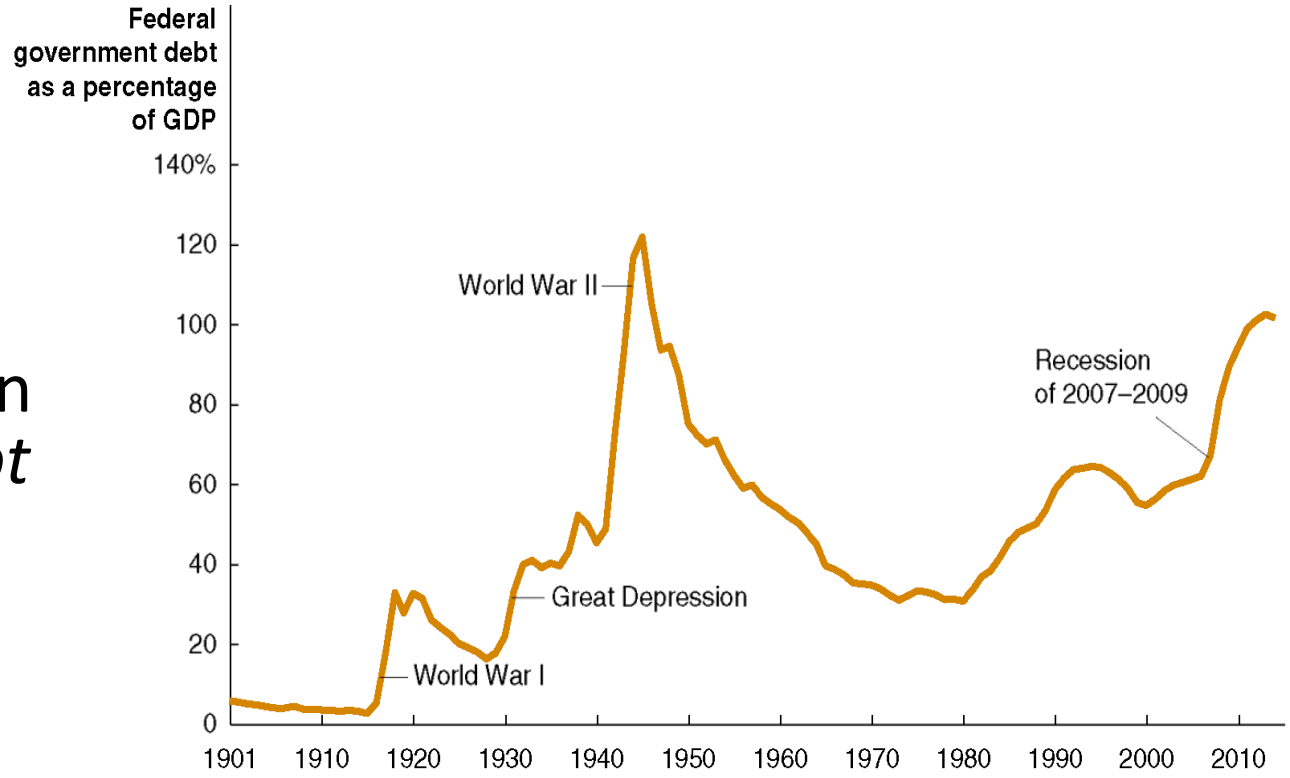
- Especially since the government can borrow so cheaply.

Figure 16.16 The Federal Government Debt, 1901-2015

When the federal government runs a budget deficit, it finances its activities by selling Treasury securities.

- The total value of those securities outstanding is known as the *federal government debt* or the *national debt*.

The national debt increased dramatically as a percentage of GDP during the two world wars and the two worst recessions. It is now at its highest level since 1947.



Is Government Debt a Problem?

For now, the federal government is at no serious risk of *defaulting* on its obligations, because:

- The interest rate it can borrow money at is *very* low
- The size of the interest payments on the debt is low relative to the size of the federal budget—around 11 percent

In the long run, a debt that increases in size relative to GDP can pose a problem—potentially **crowding out** investment, which is a key component of long term growth.

- This problem is reduced if the government debt was incurred to finance *infrastructure*, education, or research and development; these serve as a long-term investment for the economy.

16.7 The Effects of Fiscal Policy in the Long Run

The fiscal policy we have concentrated on so far was intended to address short-run goals of stabilizing the economy.

- But other fiscal policy actions are intended to have long-run impacts on potential GDP—i.e. on *aggregate supply*, rather than *aggregate demand*.
- Hence these actions are often referred to as *supply-side economics*.

Most such policies are based on changing taxes in order to increase incentives to work, save, invest, and start a business.

The Long-Run Effects of Tax Policy

Most taxes are assessed as a percentage of some economic activity, like individual income, corporate income, or capital gains.

- When an individual decides how much to work, he bases the decision on how much an hour of work will increase his ability to consume goods and services—the *posttax wage*.
- When a firm decides how many people to employ, it considers how much it has to pay in total for each worker: the *pretax wage*.

The difference between these is an example of a **tax wedge**: the difference between the pretax and posttax return to an economic activity.

- A large tax wedge *distorts the incentives* of individuals and firms to take part in economic activities, generally resulting in lower levels of economic activity—lower real GDP.

Tax Rates Matter

Marginal tax rates matter because the larger they are, the larger will be the *behavioral response* to the tax:

Individual income tax

- Affects labor supply decisions and the returns to entrepreneurship

Corporate income tax

- Affects the incentives of firms to engage in investment

Tax on dividends and capital gains

- Affects the supply of loanable funds from households to firms and hence the real interest rate
- Also affects the way firms disburse profits—2003 reduction in dividend tax led some firms like Microsoft to pay dividends for the first time

Tax Simplification

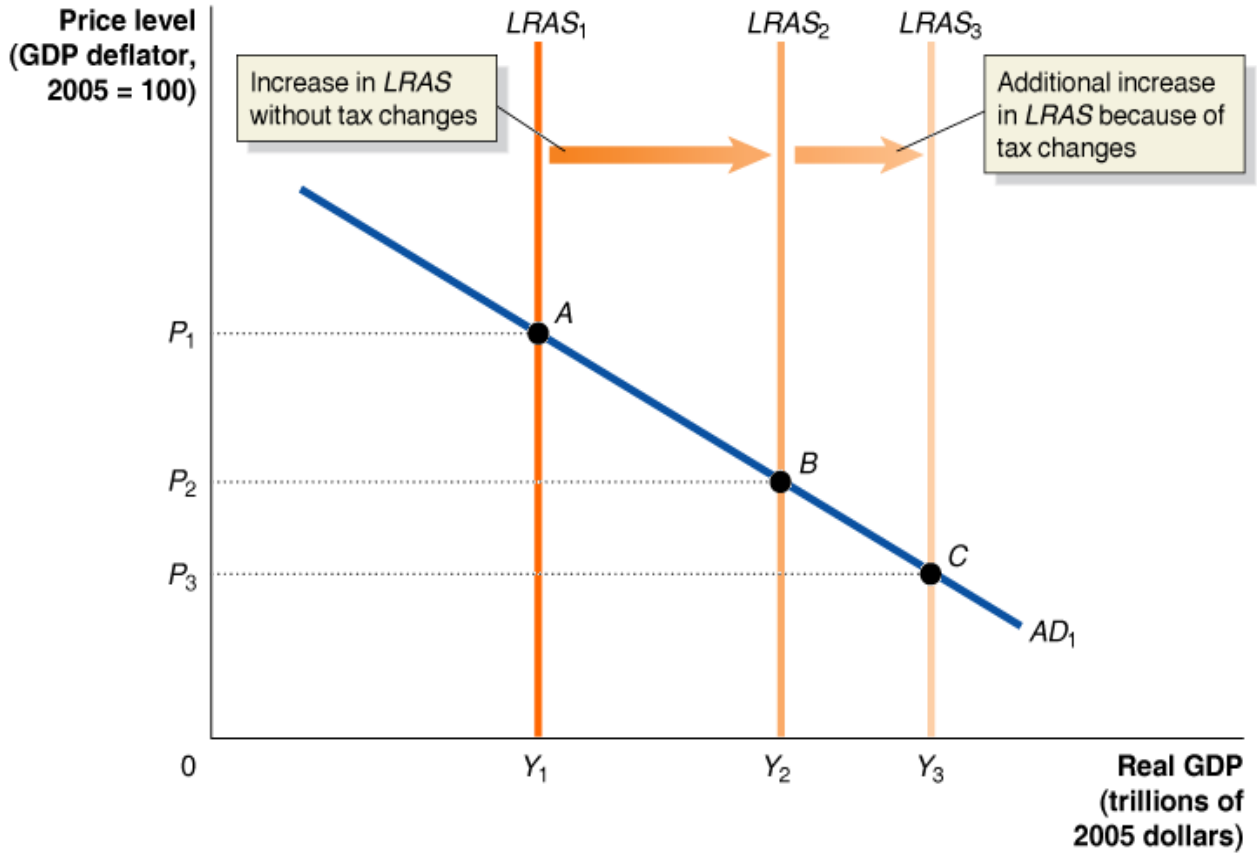
Simpler taxes would also lead to economic gains for society.

- The current tax code is extremely complicated—over 3,000 pages long.
- The IRS estimates that taxpayers spend more than 6.4 billion hours each year filling out their tax returns—45 hours per tax return.
- A simplified tax code would increase economic efficiency by reducing the number of decisions households and firms make solely to reduce their tax payments.

Figure 16.17 The Supply-Side Effects of a Tax Change

Tax reform has the potential to significantly increase real GDP in the long run beyond the increases that would otherwise occur.

- The magnitude of the effect is uncertain, however.
- For example, while people might like to work more if tax rates are lowered, they might be constrained by employers expecting a particular work week (like 40 hours).



Appendix: A Closer Look at the Multiplier

Our objective in this appendix is to develop an *econometric* model for how real GDP is determined.

Then we will use that model to identify:

1. The government purchases and tax multipliers
2. How those multipliers are altered by tax rates
3. How those multipliers change in an *open economy*, i.e. when net exports change in response to income changes.

Throughout, we will assume that price levels do not change.

Finding Equilibrium GDP

For simplicity, we will initially assume that taxes do not depend on income (i.e. they are a fixed amount), there are no government transfers to households, and there are no imports or exports.

1. Consumption function: $C = 1{,}000 + 0.75(Y - T)$
2. Planned investment function: $I = 1{,}500$
3. Government purchases function: $G = 1{,}500$
4. Tax function: $T = 1{,}000$
5. Equilibrium condition: $Y = C + I + G$

- These numbers are in billions of dollars, except the marginal propensity to consume (MPC) of 0.75.
- (Y-T) is *disposable income.*

Finding Equilibrium GDP

Substituting into the equilibrium condition, we obtain:

$$Y = 1{,}000 + 0.75(Y - 1{,}000) + 1{,}500 + 1{,}500$$

$$Y = 3{,}250 + 0.75Y$$

$$Y - 0.75Y = 3{,}250$$

$$0.25Y = 3{,}250$$

$$Y = \frac{3{,}250}{0.25} = 13{,}000$$

So in our model, real GDP = $13,000.

A More General Approach

More generally, we could allow the parameters of the model to be represented by letters:

1. Consumption function: $C = \bar{C} + MPC(Y - T)$
2. Planned investment function: $I = \bar{I}$
3. Government purchases function: $G = \bar{G}$
4. Tax function: $T = \bar{T}$
5. Equilibrium condition: $Y = C + I + G$

- *The letters with bars over them are parameters—fixed (autonomous) values.*
- For example, $\bar{I} = 1{,}500$ in our example.

A More General Approach

Solving now for equilibrium, we get:

$$Y = \bar{C} + MPC(Y - \bar{T}) + \bar{I} + \bar{G}$$
$$Y - MPC(Y) = \bar{C} - (MPC \times \bar{T}) + \bar{I} + \bar{G}$$
$$Y(1 - MPC) = \bar{C} - (MPC \times \bar{T}) + \bar{I} + \bar{G}$$
$$Y = \frac{\bar{C} - (MPC \times \bar{T}) + \bar{I} + \bar{G}}{1 - MPC}$$

This is more useful for us in "change form":

$$\Delta Y = \frac{\Delta\bar{C} - (MPC \times \Delta\bar{T}) + \Delta\bar{I} + \Delta\bar{G}}{1 - MPC}$$

A Formula for the Government Purchases Multiplier

$$\Delta Y = \frac{\Delta \bar{C} - (MPC \times \Delta \bar{T}) + \Delta \bar{I} + \Delta \bar{G}}{1 - MPC}$$

If consumption, taxes, and investment remain constant, their changes are zero; so we get:

$$\Delta Y = \frac{\Delta G}{1 - MPC}$$

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1 - MPC}$$

For $MPC = 0.75$, this gives a government purchases multiplier of 4:

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1 - 0.75} = \frac{1}{0.25} = 4$$

A $10 billion increase in government purchases increases GDP by $40 billion.

A Formula for the Tax Multiplier

$$\Delta Y = \frac{\Delta \bar{C} - (MPC \times \Delta \bar{T}) + \Delta \bar{I} + \Delta \bar{G}}{1 - MPC}$$

If consumption, investment, and government purchases remain constant, their changes are zero; so we get:

$$\Delta Y = \frac{-(MPC \times \Delta \bar{T})}{1 - MPC}$$

$$\frac{\Delta Y}{\Delta T} = \frac{-MPC}{1 - MPC}$$

For $MPC = 0.75$, this gives a tax multiplier of -3:

$$\frac{\Delta Y}{\Delta T} = \frac{-0.75}{1 - 0.75} = \frac{-0.75}{0.25} = -3$$

A $10 billion increase in tax decreases GDP by $30 billion.

The "Balanced Budget" Multiplier

Suppose we increase government spending and taxes both by $10 billion; what would happen to real GDP?

$$\Delta Y \text{ from government purchases increase} = \Delta G \times \frac{1}{1 - MPC}$$

$$\Delta Y \text{ from tax increase} = \Delta T \times \frac{-MPC}{1 - MPC}$$

So the overall ΔY is the sum of these:

$$\Delta Y = \$10 \text{ billion} \times \frac{1}{1 - MPC} + \$10 \text{ billion} \times \frac{-MPC}{1 - MPC}$$

$$\Delta Y = \$10 \text{ billion} \times \left[\frac{1}{1 - MPC} + \frac{-MPC}{1 - MPC}\right]$$

$$\Delta Y = \$10 \text{ billion} \times \left[\frac{1 - MPC}{1 - MPC}\right]$$

$$\Delta Y = \$10 \text{ billion}$$

Interpreting the Balanced Budget Multiplier

$\Delta Y = \$10$ billion tells us that if we raise government purchases and taxes both by $10 billion, GDP goes up by $10 billion in the short run.

This is the same for any identical increase to government purchases and taxes.

The long run effect is still zero; in the long run, GDP is determined by potential GDP instead.

- The increased government purchases will instead crowd out private consumption and/or investment.

Incorporating Tax Rates (1 of 2)

In our model, taxes were autonomous. Now, we will make them depend on income. Assuming a tax rate of t, consumers will now have disposable incomes of (1-*t*)*Y*.

So the consumption function changes to:

$$C = \bar{C} + MPC(1 - t)Y$$

Going through the same steps as before, we can obtain:

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - MPC(1 - t)}$$

Incorporating Tax Rates (2 of 2)

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - MPC(1 - t)}$$

If $MPC = 0.75$ and $t = 0.2$, we obtain:

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - 0.75(1 - 0.2)} = 2.5$$

If $MPC = 0.75$ and $t = 0.1$, we obtain:

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - 0.75(1 - 0.1)} = 3.1$$

So lower tax rates lead to larger multipliers.

The Multiplier in an Open Economy (1 of 2)

Now suppose we have imports and exports. Assume exports are autonomous, but the level of imports depends on income:

$$\text{Exports} = \overline{\text{Exports}} \qquad \text{Imports} = MPI \times Y$$

MPI is the *marginal propensity to import*: the fraction of an increase in income spent on imports.

Our equilibrium condition becomes:

$$Y = \bar{C} + MPC(Y - \bar{T}) + \bar{I} + \bar{G} + [\overline{\text{Exports}} - MPI \times Y]$$

A little algebra gives:

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - [MPC(1 - t) - MPI]}$$

The Multiplier in an Open Economy (2 of 2)

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - [MPC(1-t) - MPI]}$$

Let $MPC = 0.75, t = 0.2, MPI = 0.1$; then

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - [0.75(1-0.2) - 0.1]} = 2$$

This is smaller than before; a portion of spending goes on imports, which do not *feed back in* to higher domestic income.

If MPI increases to 0.2, we have

$$\text{Government purchases multiplier} = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - [0.75(1-0.2) - 0.2]}$$
$$= 1.7$$

So as we spend more imports, the government purchases multiplier falls.

THE END

“And that reality has implications for the nation as a whole. For Texas is where the modern conservative theory of budgeting—the belief that you should never raise taxes under any circumstances, that you can always balance the budget by cutting wasteful spending—has been implemented most completely. If the theory can't make it there, it can't make it anywhere.”

— Paul Krugman