MODULE 11

Small Open Economy Equilibrium IV:

Fiscal Policy

This module draws on the basic concepts developed in the previous modules in the sequence. It begins with an exposition of standard Keynesian fiscal policy and then turns to modern criticisms of it and the rebuttals to those criticisms. First, the concept of permanent income is introduced and its implications for the effects of tax cuts on consumption and aggregate demand examined. After setting out the government's budget constraint the effects of a tax cut financed by printing money are analyzed. This then leads to an analysis of bond finance and Ricardian equivalence. The effects of liquidity constraints are then considered followed by the intergenerational effects of bond-financed tax cuts. The module closes with a discussion of the crowding-out effects of government expenditure policy.

1. Simple Keynesian Fiscal Policy

Fiscal policy is the attempt to smooth fluctuations in output and employment by changing taxes and government expenditures. The idea behind traditional Keynesian fiscal policy is simple: By changing its contribution to aggregate consumption and investment expenditure, and adjusting taxes to change the net-of-tax incomes of private individuals, the government can affect the aggregate demand for goods.

In previous modules we developed the aggregate income-expenditure equation

$$Y = C + I + B_T + DSB \qquad (1)$$

where Y is income, C is aggregate public plus private consumption, I is aggregate public plus private investment, B_T is the balance of trade and DSB is the debt service balance.

Private plus public consumption and investment expenditures were determined by

$$C = \alpha + \beta Y \qquad (2)$$

$$I = \delta - \mu r^*. \qquad (3)$$

When the government provides more consumption and investment goods to the community at each level of aggregate income, α and δ increase in equation (2) and (3). Simple standard Keynesian analysis postulates that private expenditures on consumption depend on individuals' disposable incomes. A reduction in taxes thus puts additional funds in private hands for expenditure on consumption. Consumption will increase at each level of aggregate (tax inclusive) income, increasing α in equation (3).

Equations (1), (2), (3), together with the previously developed equation determining the balance of trade, combine to yield the real goods market equilibrium equation

$$Y = \frac{1}{s+m}[Z_{BT} + \alpha + \delta] + \frac{m^*}{s+m}Y^* - \frac{m^*}{s+m}r^*$$
$$- \frac{\sigma}{s+m}q + \frac{1}{s+m}DSB \qquad (4)$$

which appears as the *IS* curve in Figure 1.1. This curve shifts to the right when the government increases its expenditure on consumption and investment goods or cuts taxes.

Figure 1.1:
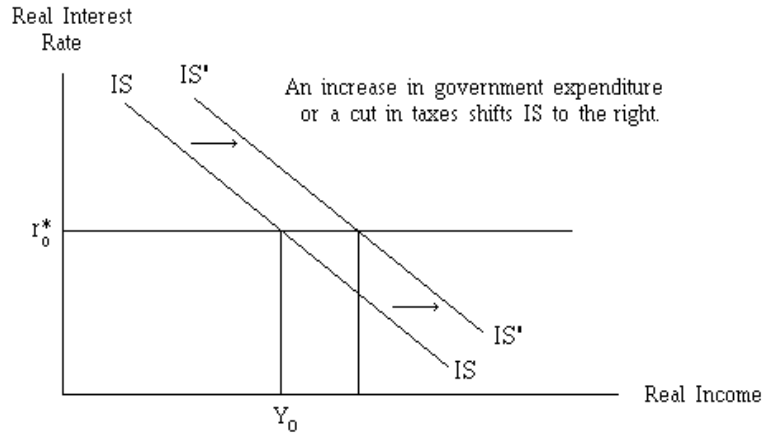
Figure 1.2:
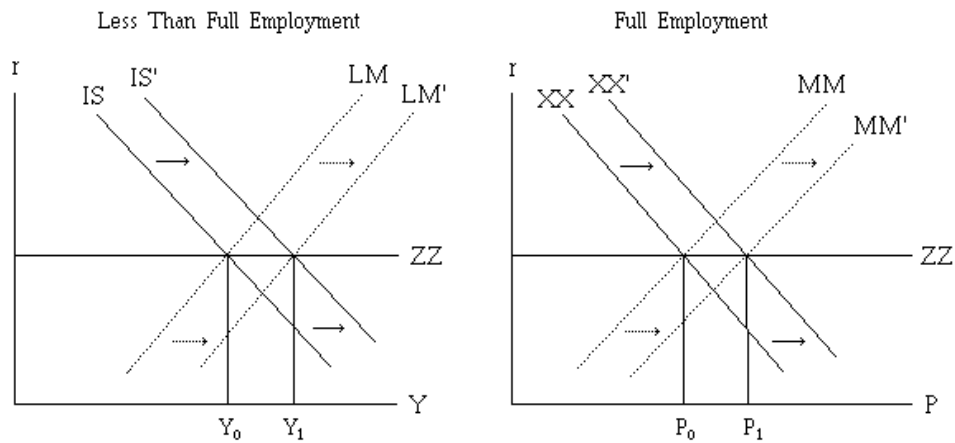
It was shown earlier that when the nominal exchange rate is fixed equilibrium is determined by the intersection of the *IS* curve and the *ZZ* line and that the money supply adjusts endogenously to drive the *LM* curve through this *IS-ZZ* intersection. When the price level is fixed there will be an increase in output and employment and an accommodating expansion of the nominal money supply, as is shown in the left panel of Figure 1.2.

When there is price flexibility and full employment, the equilibrium level of prices will adjust so that the *IS* curve passes through the *ZZ* line at the

full-employment level of output. The *LM* curve will again accommodate
through endogenous money supply changes. On the right panel of Figure
1.2, the equilibrium price level is determined by the intersection of *XX* and
ZZ and the money supply adjusts automatically to ensure that *MM* passes
through that *XX-ZZ* intersection.

Suppose now that the nominal exchange rate is allowed to fluctuate in
response to market forces. Equilibrium is then determined by the inter-
section of *LM* and *ZZ* in the left panel of Figure 1.3 (which analyzes the
less-than-full-employment case) or *MM* and *ZZ* in the right panel of that
figure (which gives the full-employment analysis). The nominal exchange
rate adjusts endogenously to ensure that the *IS* and *XX* curves will pass
through the respective *LM-ZZ* and *MM-ZZ* intersections. Fiscal policy
therefore has no effect on either output and employment or prices when the
exchange rate is flexible.

Figure 1.3:
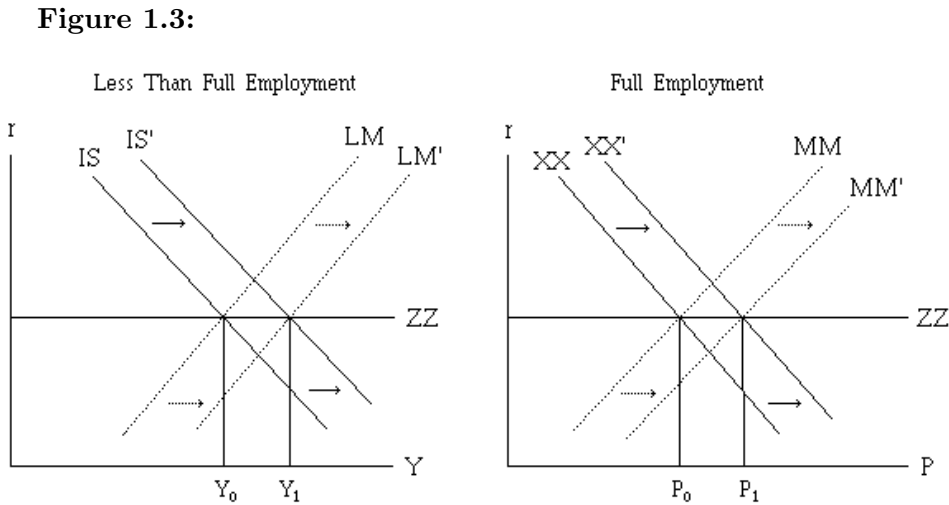
An expansionary fiscal policy that shifts *IS* (and *XX*) to the right will
put upward pressure on aggregate demand. Any increase in output or prices
will lead to an excess demand for money which will result in an attempted
sale of assets by domestic residents to foreigners to replenish money holdings.
This will cause the domestic currency to appreciate and the real exchange
rate to rise, eliminating the pressure on aggregate demand and returning *IS*
(or *XX*) to its initial level. A decline in the current account balance will ex-
actly offset the government induced increase in expenditure on consumption
and investment goods.

Thus fiscal policy can smooth output and employment (and price level) fluctuations under fixed exchange rates but is impotent under flexible exchange rates. By contrast, as noted in the previous two modules, monetary policy is effective under flexible exchange rates but not under fixed exchange rates.

2. Permanent and Transitory Income Effects of Tax Policy

The above analysis vastly oversimplifies the role of government expenditure and tax policy in affecting aggregate demand. As a first step in extending the analysis of tax policy we introduce the distinction between permanent tax changes (those expected to be in effect forever) and temporary changes (those expected to be reversed after a year or two).

The modern view is that consumption depends on people's wealth or *permanent income*. Permanent income can be thought of as the average flow of income one expects to receive—in good years income will be above its permanent level and in bad years it will be below its permanent level. This difference between permanent and current income is referred to as *transitory income*. So we must consider the effects of tax cuts on people's permanent income flow, not just on their current receipts.

Since the purpose of fiscal policy is to smooth out a temporary shortfall of aggregate demand, a tax cut should be expected to remain in force only for a year or two until the economy returns to full employment. An individual receiving a $100 tax cut for only one year receives, at an interest rate of, say, 8 percent, an increase in permanent income of $8, since the maximum additional amount that could be spent every year in the future as a result of the tax cut would be the interest earnings. A temporary tax cut for one or even two years would thus have a minimal effect on consumption and, hence, on the *IS* curve.

There is also the question as to why consumption would depend on net-of-tax or disposable income rather than on total income. Taxes paid by the public are used by the government to produce goods that are then given back to the public free, so that permanent income should include these goods as well as those produced entirely in the private sector. An increase in taxes to finance additional government services of equivalent value should not be viewed as a reduction in wealth and permanent income and therefore should not reduce consumption.

To obtain the goods and services to give to the public free, the govern-

ment must either buy them from the private sector or purchase labour and capital services to produce them itself. In either case, the government must take the same quantity of resources away from private production. The *government's budget constraint* can be written[1]

$$G = T + \Delta B + \Delta M \tag{1}$$

where G is government expenditure, T is tax revenues, B is the stock of government bonds or public debt in private hands, M is the stock of money in circulation and the symbol Δ denotes the per period change in the variable that follows it. (Actually, we should really use the stock of high-powered-money instead of M in the above equation, but we simplify things here by ignoring deposit expansion and treating the money multiplier as equal to unity.) So when the government cuts taxes while maintaining its expenditure constant it must either print money or borrow from the public to finance the revenue short-fall.

3. Money Financed Tax Cuts

Suppose that the government cuts taxes and finances the short-fall of taxes relative to expenditure by printing money. To keep things simple, assume that the money multiplier is unity and the money supply and stock of high-powered money are therefore the same.

Under less-than-full-employment conditions where the price level does not increase, the growth of nominal money holdings will increase real money holdings, putting an increased flow of resources at private individuals' disposal. Permanent income will rise but the increase will be small since the tax cut is temporary.

Alternatively, the government can expand the money supply through open market operations by buying bonds from the public with freshly printed money. If people feel that this has increased their permanent income they will spend more on consumption in the same way as if the increase in money holdings had financed a cut in taxes. In both cases the *LM* curve will initially shift to the right.

If the exchange rate is fixed there will be some expansion of output and employment due to the effect of the increase in consumption on the *IS* curve.

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[1]This equation could be equivalently written as

$$G = T + \frac{\Delta B}{\Delta t} + \frac{\Delta M}{\Delta t}$$

where $\Delta t = 1$.

The stock of foreign exchange reserves will have to adjust to ensure that the *LM* curve will ultimately pass through the new *IS-ZZ* intersection. Under flexible exchange rates the shift of the *LM* curve will lead to an expansion of output and employment with *IS* ultimately adjusting through changes in the exchange rate to ensure that it passes through the *LM-ZZ* intersection.

Once full employment is reached the price level must rise in proportion to the monetary expansion so the real money supply will not increase. The public gives goods to the government in return for money whose value is immediately eliminated by a rise in the price level. The public thus gives up the goods for nothing in return. This is exactly what was happening when the government was levying taxes to finance its expenditure rather than printing money. The government is simply substituting a tax on existing money holdings for conventional forms of taxation. Since the public is paying the same real taxes whether the government is printing money or using conventional taxation, the switch from tax to monetary finance of government expenditure has no effect on permanent income or consumption. The policy will be ineffective once full-employment is reached.

The effect of the money financed tax cut on output and employment when there is less than full employment will be limited not only by the temporary nature of the tax cut but by the knowledge that once full-employment is reached the wealth effect of the policy will disappear. There is thus no possibility that the public could view the tax cut as an equal corresponding increase in permanent income as would be implied by the conventional Keynesian analysis.

4. Tax Cuts Financed by Issuing Public Debt: Ricardian Equivalence

Now suppose that the government cuts taxes and finances the short-fall of revenue from expenditure by selling bonds to the public. As can be seen again from the government's budget constraint

$$G = T + \Delta B + \Delta M \tag{1}$$

T declines and ΔB increases by the same amount. The public seemingly gains from this policy since it now receives bonds for the goods it gives to the government and these bonds bear interest. In order to pay the interest on these bonds, however, the government has to levy appropriate additional future taxes.

Suppose that the government cuts taxes by \$100 per person and sells everyone \$100 worth of government bonds bearing interest at 8 percent. In every future year the government must raise \$8 additional taxes per person to pay these same people their \$8 interest. The public receives a \$100 reduction of this year's taxes in return for an \$8 increase in taxes in all future years. The present value of future taxes is

$$PV = \frac{\$8}{i} = \frac{\$8}{.08} = \$100 \tag{2}$$

which is identical to the tax cut. This assumes that the securities are perpetuities or consols. Suppose, alternatively, that the government cuts this year's taxes by \$100 and finances the revenue short-fall with an issue of government debt maturing in one year. It will cost \$108 next year to pay the interest on and retire this debt. The present value of these tax changes is

$$PV = -100 + \frac{108}{(1 + 0.08)} = 0. \tag{3}$$

The tax cut is really nothing more than a tax postponement on which interest must be paid at market rates. If people are forward looking they will realize that they can't get something for nothing, so their wealth and consumption will remain unaffected. This idea that the community's wealth and consumption will be the same whether the government finances its expenditure by levying taxes or borrowing from the public is called *Ricardian Equivalence.*

Another way of visualizing this idea is to recall that when the government makes an amount of expenditure G it must take G-dollars worth of resources away from the private sector whether it borrows them or obtains them through taxation. Private sector output will be reduced by the same amount in both cases.

It should be noted that the Ricardian Equivalence Principle does not apply unequivocally to situations where the government finances a tax cut by printing money. The same resources are taken from the private sector whether the tax cut is financed by selling bonds or printing money. But in the less-than-full-employment case private wealth will increase from monetary finance because real money holdings rise. In the full-employment case the equivalence principle goes through because the government is simply substituting a tax on money holdings for a tax on something else.

5. Liquidity Constraints and the Market for Human Capital

Consider now a tax cut financed by a new issue of government bonds and suppose that the population is equally divided into two types of people— *A*-people and *B*-people. *A*-people purchase all government debt in equal shares and *B*-people never purchase government bonds. Taxes are paid in equal shares by everyone. The situation is shown in Figure 5.1.

Figure 5.1:

	A-PEOPLE	B-PEOPLE
CURRENT YEAR		
Tax Cut	$100	$100
Bonds Purchased	200	0
ALL FUTURE YEARS		
Interest Received (at 8%)	$ 16	$ 0
Tax Increase	8	8

A-people's bonds are worth $200 and their future tax liabilities are worth $\frac{\$8}{.08}$ = $100. B-people's future tax liabilities are also worth $\frac{\$8}{.08}$ = $100 and they have no bonds. A-people have, in effect, lent $100 to B-people.

Everyone's taxes are cut by $100 and each *A*-person buys $200 worth of new government debt. The interest rate is 8 percent so everyone pays $8 of additional taxes in all future years and the *A*-people receive $16 in interest payments per year. The government is, in effect, arranging a loan from those who buy the bonds to those who choose not to buy bonds. Any individual not wanting to borrow or lend could purchase a quantity of bonds ($100 worth in this case) that will earn interest equal to his share of the future taxes that will be levied to service the newly issued debt.

Since human capital cannot be used as collateral (foreclosure being impossible due to a ban on slavery) the interest rate on an equivalent loan raised in the private market will have to be substantially above 8 percent to cover the additional risk. When the loan is arranged through a government tax cut the government, through its right to levy future taxes, can guarantee repayment.

The inability to devise a way to guarantee private loans on human capital can be viewed as a form of market failure which the government can compensate for by financing part of its expenditure by debt rather than taxes. Thus, when the stock of debt outstanding is not already too large the government can make the community wealthier by cutting taxes and financing the revenue short-fall by borrowing.[2] This would be expected to have some positive effect on consumption.

But the arrangement of loans from bond buyers to the general taxpayer in bad years has additional more important effects. When current income is above permanent income consumers will buy assets or pay off loans with the excess and when current income is below permanent income they will sell assets or borrow to maintain their consumption. Often, however, individuals cannot liquidate assets to maintain consumption in bad times because it is frequently in their interest to hold the bulk of their non-human wealth in assets like clothes, houses, automobiles, etc. that can not be converted easily into cash at prices known in advance. And they cannot borrow at reasonable interest rates because human capital cannot be used as collateral.

When individuals are in this way *liquidity constrained*, the best method of smoothing consumption is often to vary their investment in durable assets rather than make and liquidate private loans. This means that the tax savings when the government cuts taxes in recessions will indirectly flow to investment in consumer durables. People can borrow from government bond holders to maintain their consumption without having to let the real capital goods they own deteriorate. These effects of tax changes on the path of capital accumulation lead to shifts of the *IS* curve of the sort postulated by standard Keynesian analysis. And it turns out that, even though the changes in disposable income lead to changes in investment rather than consumption, these expenditures are nearly always part of the consumption aggregate as we usually measure it.

Ideally, consumption should be measured to include the absorption of non-durable goods such as food and personal services and the absorption of the services of durable goods such as clothes and automobiles. Unfortunately, it is very difficult to measure the annual services received from

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[2]The problem that arises when the debt is "too large" is considered in one of the test questions on the previous topic and again in a test question in this topic. If the stock of debt gets large enough it will pay taxpayers who don't own bonds to pressure the government into defaulting on it. The easiest way for the government to do this is to create inflation and thereby reduce the debt's real value. Because the probability of default increases as the stock of debt gets larger and larger, the interest rate the government will have to pay to borrow will get higher and higher.

durable consumer goods so in making estimates of aggregate consumption it is customary to simply add up all expenditures in each year, whether they be on bananas or TV sets. So a tax cut will increase C as conventionally measured even though the additional expenditure is really investment in consumer durables. And the effect on aggregate expenditure could well be a large fraction of the tax cut, as standard Keynesian analysis postulates, even though permanent income is not much affected.

6. Intergenerational Transfers

We now investigate the intergenerational effects of bond vs. tax finance of government expenditure. Continue to assume that the government cuts everyone's taxes by $100 and floats bonds, of which A-people each purchase $200 worth and B-people nothing. This is shown in Figure 6.1 (which is the same as Figure 5.1 above).

Figure 6.1:

	A-PEOPLE	B-PEOPLE
CURRENT YEAR		
Tax Cut	$100	$100
Bonds Purchased	200	0
ALL FUTURE YEARS		
Interest Received (at 8%)	$16	$0
Tax Increase	8	8

A-people's bonds are worth $200 and their future tax liabilities are worth $\frac{\$8}{.08} = \$100$. B-people's future tax liabilities are also worth $\frac{\$8}{.08} = \$100$ and they have no bonds. A-people have, in effect, lent $100 to B-people.

Ricardian Equivalence rests on the fact that all public debt must be serviced in perpetuity or paid back, so the future tax revenues raised to pay the interest on the debt must be equal in present value to the current tax cut. But this assumes that people live forever. Suppose that a particular B-person, who buys no bonds, knows he is going to die within a few years. At an interest rate of 8 percent, the present value of future tax increases that he will pay is much less than his $100 tax cut. His wealth has increased and

he will consume more. The remaining future taxes to service and amortize the debt will paid by the people living after he has died. Since all individuals have finite lifespans, everyone will have an incentive to consume more. They have more resources available for consumption now regardless of whether future generations' tax liabilities are matched by interest earned on bonds. Consumption will be higher than otherwise, and investment and the future capital stock smaller, so the next generation will be clearly worse off. And the *IS* curve will shift to the right and under fixed exchange rates and the tax cut will be expansionary, Ricardian equivalence arguments notwithstanding.

But there is a problem with this. A large fraction of people deliberately leave inheritances to their children. During their lifetimes they will make utility-maximizing decisions as to how much of their incomes to consume and how much to plough into assets that will eventually be left to their children. When the government cuts taxes now and raises future taxes it shifts wealth to the current generation from its heirs, disturbing that equilibrium—those who spend the proceeds of the tax cut leave future tax liabilities but not bonds to their heirs. The reaction of private individuals currently living will thus be to restore the integrity of their bequest to their children by simply saving the additional disposable income resulting from the tax cut to leave to their children. By buying bonds with the receipts from the tax cut each person now alive can guarantee that her heirs will receive an asset that will yield interest equal to the future taxes that will have to be paid to service the additional public debt resulting from the tax cut. Inheritances will remain at their equilibrium levels and there will be no effect on consumption.

The argument that a tax cut will shift wealth from future generations to the present generation assumes that the current generation does not care about its children. The Ricardian-equivalence approach essentially regards the family tree as the unit of decision, not the current generation in that family tree. The individual will eventually die, but the family will continue forever. The utility of the family will be maximized by an optimal path of intergenerational consumption which the government cannot affect by adjusting the intergenerational timing of its taxation.

For those that do not have heirs that they care about, a cut in taxes received late in life is an invitation to spend more and let other people's heirs pay interest to service and amortize the associated public debt in years to come. As a result, a cut in current taxes will have some intergenerational effect on current consumption, though not as much as might at first be supposed.

The Ricardian-equivalence argument also assumes that people know that a current tax cut must be financed by higher future taxes. But a tax cut of

a couple of hundred dollars in any given year may be hardly noticed. Disposable income will increase and the increase may be automatically spent. Tax cuts may therefore have some effect on consumption due to an *illusory wealth effect* even if there is no actual effect on wealth.

7. Government Expenditure Policy: Crowding Out

The standard Keynesian analysis postulates that an an expenditure of the government on consumption or investment goods will result in an equal increase in exogenous aggregate public plus private spending on consumption and investment goods. The increase in taxes to finance this expenditure is accompanied by a dollar-for-dollar reduction in (disposable) income that leads to the same reduction in consumption that would have occurred had there been an equivalent decline in income from any other source. People get no benefits from the government expenditure to compensate for the taxes they pay. Since the decline in consumption is less than the decline in disposable income and the government expenditure adds to aggregate demand dollar-for-dollar there will be a net expansion.

A more modern view would suggest that if the socially optimal amount of government expenditure is being undertaken a one-dollar increase in that expenditure should produce value exactly equal to the dollar of taxes required to finance it. Wealth, permanent income and consumption should not change. This would give the policy greater impact because the offsetting reduction in consumption would be smaller. An exception would be the situation where the country is engaged in a war. In this case wealth and consumption would be reduced by the government expenditure in comparison with the pre-war state, though not in comparison with the scenario where the war is avoided by surrender to the enemy. But standard Keynesian fiscal policy deals with government expenditure changes designed not to fight wars but to smooth cyclical fluctuations in output and employment. What is at issue is the timing of the path of government expenditure to offset fluctuations in private expenditure that cause variations in employment.

More importantly, substitutions of public for private consumption will tend to occur. Suppose, for example, that the government decides to hand out free soap and toothpaste to the community to increase employment in the factories producing these products. Since it must raise taxes to cover the expense of purchasing these household items the public has to reduce either its consumption or its savings by the additional amount the government is spending. It would seem reasonable to suppose that people would maintain

their original consumption of soap and toothpaste by simply substituting the products provided by government for those that were previously purchased in the private market. Total private plus public consumption would be unchanged and the fiscal policy would have no effect on the *IS* curve. More generally, for government expenditure policy to be effective in this type of situation it has to induce an increase in the fraction of permanent income consumed.

A more common form of government expenditure policy is the provision of welfare benefits to individuals whose need has been created by a decline in employment in a recession. Here, aggregate consumption will increase to the extent that those who pay the taxes reduce their consumption by less than the additional spending by those who receive the benefits. An overall increase in spending might be expected to the extent that the recipients of the funds are more liquidity constrained than those paying the additional taxes.

Another avenue for expanding government expenditure in recessions is increased expenditures on capital goods. To the extent that the government undertakes investment expenditures that do not substitute for private investment expenditures—for example, building and fixing roads—total private plus public investment will increase. The ordering of new jet airplanes by the government airline to provide expanded service, on the other hand, might well reduce the future returns to investment in aeroplanes by competing private airlines so that the public-sector investment will be offset by an equal contraction of private-sector investment.

Also, if an increase in public investment is to increase aggregate demand and shift *IS* to the right, it must not be offset by a reduction in private consumption in response to the increase in taxes necessary to finance the expanded public expenditure. This will be assured if the level of wealth and permanent income is not substantially reduced—that is, if the government produces capital goods of value close to what would otherwise have been produced with the additional taxes raised.

A reduction in private sector expenditure in response to an increase in government expenditure is called *crowding-out*. Some crowding out can nearly always be expected. It is important when analyzing the effects of a particular expenditure to try to determine the amount.

Study Questions

1. Under what circumstances will a standard open market operation in domestic bonds by the central bank lead to wealth-induced shifts of the *IS* curve? Can monetary policy, because of potential wealth effects on consumption, be used effectively as a countercyclical stabilizing device under fixed exchange rates?

2. There is a traditional argument that fiscal policy has built-in stabilization effects. In bad times the demands on government to subsidize the unfortunate are high and, since incomes are low and taxes are geared to income, the government's tax revenues are low. And in good times government expenditures to alleviate suffering tend to be low and tax revenues high. The government budget deficit thus varies countercyclically and tends to stabilize the economy in an automatic fashion. Evaluate this argument using what you have learned from this module.

3. You should now understand the operation of standard Keynesian fiscal policy, the modern criticisms of it, and the criticisms of the modern criticisms. Based on all this, can we say that fiscal policy is a good countercyclical stabilization device?

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