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Econ 491
Lecture notes 2:
Determination of output and income
Classical closed economy equilibrium

1. Supply or output

Production function

$$Y^{FE} = F(K^{FE}, L^{FE}).$$

The supply side of the economy. Given technology. Constant returns to scale, diminishing marginal product.

If the factors in employment are fixed in a given period, at full employment, the level of output is also fixed, at the *full-employment level of output*.

[For this course you may skip the section on the labour market. Just bear in mind that in equilibrium real wage = MP_L. Focusing on wage adjustment does not yield useful policy implications. You don't see economists suggesting, e.g., that wage cuts might solve current weak employment in the US. They are more likely to suggest lower interest rates, or even a lower US\$. There is a reason for this, as follows.]

## 2. Aggregate demand or spending
$$Y = C + I + G.$$

We will consider G exogenous—set by policy (transfers, which include unemployment insurance, etc., are clearly endogenous—they vary with the business cycle (i.e. with Y itself)—but are not in G since these are not demand for final output).

Consumption function

$$C = C(Y - T).$$

T = taxes – government transfers

Chart 1

45° (unit slope)

C

slope MPC<1

Y-T

*FE*   *disposable income*
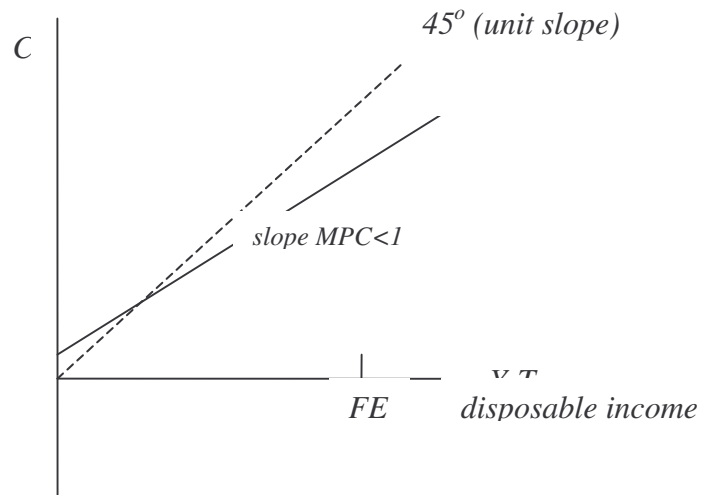
Saving function
We can write an identity for private saving, recognizing that it is residual income after consumption and taxes:

$$S = Y - T - C.$$

In this definition, saving includes any household outlay that counts as investment in the previous identity. That is, purchases of a new house, or renovations, are deemed to be both saving and investment, simultaneously. They represent additions to the real assets of households, just as regular saving represents additions to financial assets.

The consumption function implies a saving function—the difference between the 45° line and the consumption line in Chart 1.

Chart 2

S

S^{FE}

slope MPS=1-MPC<1   *S=S(Y-T)*

Y-T

FE

disposable income
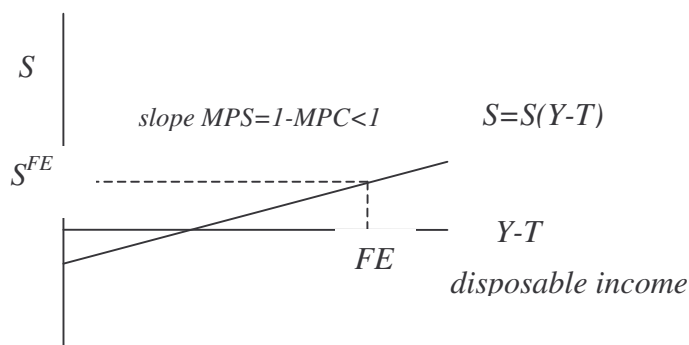
Investment function

$$I = I(r).$$

r = real interest rate

The relationship is negative—a downward-sloping demand curve.

In practice, the most interest-sensitive components of demand are residential construction and consumer durables. Household outlays for "big ticket" items are strongly influenced by cash-flow, which is in turn negatively affected by interest payments. The outstanding example is the lower mortgage interest rates of the past 10 years, which has had a strong positive impact on household spending, as existing mortgages are refinanced atlower rates.

We will get to the open economy, the Canadian situation. First though, we look at a closed economy—you can think of it as the world (which is certainly a closed economy), or at a stretch as the US situation.

3. Equilibrium—full-employment supply and demand

$$Y^{FE} = C(Y^{FE} - T) + I(r) + G$$

In a closed economy the interest rate adjusts to equate aggregate demand to full employment output—r is the one endogenous variable in this equation.

Any tendency for demand to be less than full employment supply would be corrected by a drop in the interest rate, and vice versa. This mechanism can be illuminated by looking at the market for saving.

Saving equals investment

The closed-economy identity for total spending implies

$$I + G = Y - C,$$

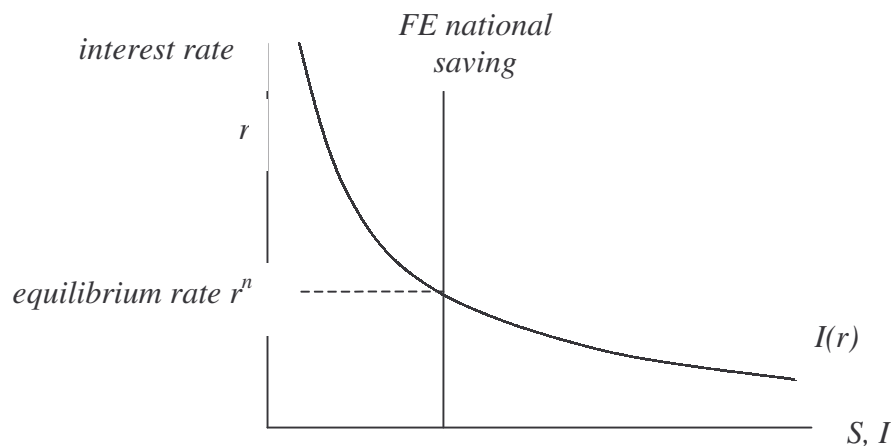and the identity for saving implies

$$S + T = Y - C,$$

so that

$$I + G = S + T.$$

This yields the equilibrium condition:

$$I(r) = S^{FE} + T - G = \textit{full-employment national saving}.$$

In equilibrium, demand for saving (investment) equals the full-employment supply (private saving plus government saving or *budget surplus*).

Chart 3

Any discrepancy between full-employment national saving and the demand for saving causes an equilibrating adjustment of the interest rate. Excess supply causes a drop in the rate which stimulates investment sufficiently to eliminate the excess. Vice versa for excess demand.

These are equivalent statements of the equilibrium position:
- the interest rate brings aggregate demand into equality with full-employment output (this is more straightforward)
- the interest rate brings investment into equality with full-employment national savings (this one is more revealing of the market adjustment)

Chart 4
Increased government spending
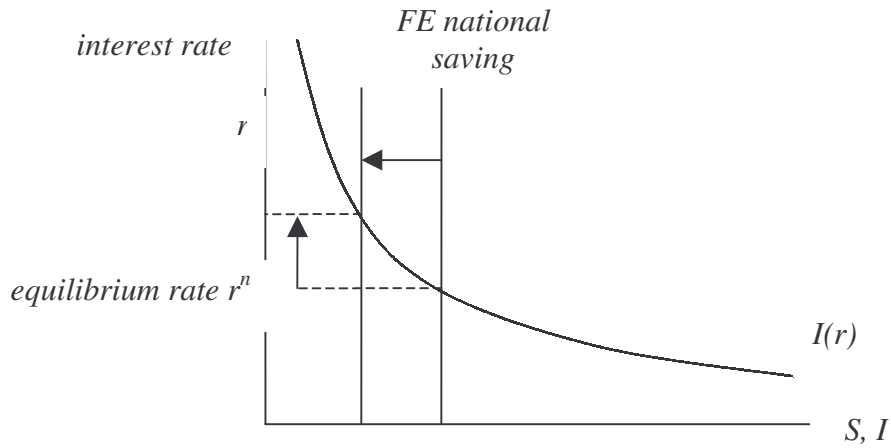
The increased budget deficit reduces national saving, drives up the interest rate, and "crowds out" investment spending. Comparing the second equilibrium position to the first, output is diverted from investment to government programs.