Monetary Macroeconomics

Chapter 17:
The National Debt and Crowding out of Capital

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Effect of National Debt

- During the last decade, the economic impact of the issuance of government debt is a topic that has received a great deal of attention.

- We will apply what we learned about wealth, consumption, and saving in the previous chapter to study the effects of the national debt.

- What is the effect of national debt on capital and savings?
- If the government increases the stock of government bonds, does this mean that people will invest in less capital?
- We will examine two cases which differ in one single assumption.

OLG model with constant population and 2-period lived identical agents.

When young they have y_1 units of endowment, and when old y_2 units.

Capital pays a rate of return x.

There is no fiat money in this economy. The government spending per young person is g_t.

The government collects lump-sum taxes: $\tau_{1,t}$ from each young and $\tau_{2,t}$ from each old.

Government issues bonds paying the same rate of return as capital.

Lifetime budget constraint of an agent born at t is

$$c_t^t + \frac{c_{t+1}^t}{r} \leq \underbrace{(y_1 - \tau_{1,t}) + \frac{\left(y_2 - \tau_{2,t+1}\right)}{r}}_{\text{after-tax wealth}}$$

Government budget constraint in period t is

$$g_t + rb_{t-1} = \tau_{1,t} + \tau_{2,t} + b_t$$

What is the Effect of a Decrease in $\tau_{1,t}$?

Assume that there is no decrease in government spending and no increase in $\tau_{2,t}$.

$$g_t + rb_{t-1} = \tau_{1,t} + \tau_{2,t} + b_t$$

Thus b_t has to increase at the same amount $\tau_{1,t}$ has decreased to balance the government's budget. Hence the government debt increases.

Case 1: The government debt will be paid off at some future date by some other generation.

For example, young of the next generation in next period.

Thus $\tau_{2,t+1}$ will remain the same. And the wealth of the agents born in period t increases:

$$\text{wealth } = \underbrace{(y_1 - \underbrace{\tau_{1,t}}_{\downarrow}) + \left(\frac{y_2 - \tau_{2,t+1}}{r}\right)}_{\uparrow}$$

We assumed that consumption when young and consumption when old are both *normal goods*. Thus with the increase in wealth they both have to increase.

To be able to increase consumption when old, the agent must increase his savings.

To be able to increase consumption when young, the agent cannot save the entire tax cut.

Thus the savings of the agent rises by a number less than the tax cut — i.e. less than the increase in bonds.

Recall the agent can save in capital and government bonds:

$$s_t = k_t + b_t$$

Hence

$$\underbrace{\Delta s_t}_{\uparrow} = \underbrace{\Delta k_t}_{\downarrow} + \underbrace{\Delta b_t}_{\Big\uparrow}$$

Since the agents have only a given amount to save, capital must have fallen.

The reduction of capital because of the increase in government debt is called the **crowding out of capital**, because bonds are substituting for capital in personal savings.

Interest Rates

Since we assumed constant marginal product x, the interest rates remain unchanged.

But if we assume that capital has diminishing return, then the interest rates must go up. The government would offer a higher interest rate to attract agents to hold government bonds, people would decrease their capital holdings until the point where the interest rate on bonds equals to the interest rate on capital.

Case 2: The government debt will be paid off by the <u>same</u> generation next period.

Assume that the government will increase taxes for the old next period to finance the debt.

For simplicity, assume the following situation: Originally the government spending is financed only by taxes from young.

$$g_t + rb_{t-1} = \tau_{1,t} + \tau_{2,t} + b_t$$

Thus $\tau_{1,t} = g_t$, $\tau_{2,t} = 0$, and $b_t = 0$.

The consumer's lifetime budget constraint *before* the tax-cut is

$$c_t^t + \frac{c_{t+1}^t}{r} \leq (y_1 - g_t) + \frac{y_2}{r}$$

New government policy, $\tau_{1,t} = 0$. Then to balance the government budget, $b_t = g_t$ must be the case.

Next period, government taxes the same generation to payoff the deficit.

$$g_{t+1} + rb_t = \tau_{1,t+1} + \tau_{2,t+1} + b_{t+1}$$

Thus $\tau_{2,t+1} = rb_t = rg_t$.

In this case the consumer's lifetime budget constraint *after* the tax-cut is

$$\begin{aligned} c_t^t + \frac{c_{t+1}^t}{r} &\leq (y_1 - 0) + \frac{y_2 - rg_t}{r} \\ &\leq y_1 + \frac{y_2}{r} - g_t \end{aligned}$$

We see that the wealth of the consumer is the same as before. Hence the tax-cut is wealth-neutral.

Thus the consumer's consumption decision does not change, only his savings adjust. The consumer saves the whole tax-cut to be able to pay off next period's taxes. Thus $\Delta s_t = \Delta b_t$.

There is no crowding out of capital. There is no effect on marginal product of capital and on the interest rates.

This result is often referred to as the
Ricardian Equivalence Theorem after David Ricardo (1792-1823).

Summary:

The effects of bond-financed tax cuts depend on whether the people who receive the tax cut will pay the increase in taxes that will retire the resulting debt.