Monetary Macroeconomics

Lecture 12:
National Debt, Capital, and Savings
Temptation of Inflation

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Chapter 17: The Effect of the National Debt on Capital and Savings

What is the effect of national debt on capital and savings?

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

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

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.

Capital pays one-period gross rate of return x.

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

Lifetime budget constraint of an agent born at t is

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

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.

Chapter 18: Temptation of Inflation

- Why would a government want to default on its debt?
- What is time inconsistency problem of government policy?
- Is there a temptation of inflation?

Consequences of a Default on National Debt

Suppose the government unexpectedly enacted a one-time default on the debt owed in period t.

What are the consequences?

- The government can decrease its taxes, seigniorage revenue or increase its expenditures

- It redistributes resources from the generation that owned the initial debt to generations that follow ($\Rightarrow$ default $=$ tax on bondholders)

This story works only if the default is really a *surprise* to people. Otherwise they would not be willing to hold bonds in the first place.

Recall the Fisher equation.

What if the government defaults once and promises never to do so again?

Will you believe the government?

Would you buy bonds again?

Time (In)Consistency?

If the government's policy is to default today, but not in the future, the government will always default, because it is always today!

The incentive of the government to behave in one way today (e.g. to default) and to promise not to behave that way in the future is referred to as the **time inconsistency problem of government policy** (by Kydland and Prescott).

Commitment

The most effective way of convincing people about one's future actions is to bind oneself in advance to these actions (e.g. by offering collateral to the creditor).

However, commitment is not easy for the government because the government is *both* the debtor and the enforcer of the contracts.

Reputation

Reputation plays an important role for the government as well. If the government is aware that people are watching its current behavior as a signal of its future behavior, it may rationally decide not to default.

This still requires the public's trust that the government will not change its mind in the future.

Benefits from Unexpected Inflation

The government's budget constraint in period t is

$$p_t N_t g_t + R_{t-1} D_{t-1} = p_t N_t \tau_t + [M_t - M_{t-1}] + D_t$$

where g_t denotes real government expenditures per young, D_t denotes national debt, and τ_t denotes lump-sum tax from each young.

In real terms,

$$N_t g_t + \frac{R_{t-1} D_{t-1}}{p_t} = N_t \tau_t + \frac{M_t - M_{t-1}}{p_t} + \frac{D_t}{p_t}$$

where the second term on the left hand side is the current value of last period's debt.

If the government prints fiat money unexpectedly and prices go up, then the real value of the last period's debt, $\frac{R_{t-1}D_{t-1}}{p_t}$, will decrease.

So unexpected inflation acts like a default!

But the government cannot inflate unexpectedly all the time. Rational consumers will learn and start anticipating the high inflation.

They will demand a nominal interest rate R that will take into account the expected inflation.

This strategy of government will not lower the real value of the debt anymore!

A binding commitment to avoid inflation is the surest way to convince the public that it will not try to inflate away the national debt.

- Index the national debt to inflation (i.e. issue bonds whose value is tied to price changes)

- Keep the central bank independent of the government and away from political pressure

If we can measure the *ex ante* expected rate of inflation and compare it with the *ex post* rate, we can estimate the amount of unexpected inflation.

- One way to do this is simply to conduct surveys of expectations.

- According to the Livingston Survey, for example, in 1974, the expected inflation rate in the US was 5.4%, but the actual rate was 11%.

- In 1986, on the other hand, the expected inflation was 4.1%, but the actual rate was 1.9%.

In years, when inflation is under-predicted the government raises real revenues by diluting its debt.

- In 1980, e.g., unexpected inflation cut real US government debt by USD 61.3 billion.

- This was significantly higher than the USD 17.5 billion raised in real seigniorage!

Further reading:

“On the determinants of Original Sin: an empirical investigation” by Ricardo Hausmann and Ugo Panizza, Journal of International Money and Finance, 2003, Vol 22.