ECON5020 – Macroeconomics

Week 28 - Borrowing, lending and inter-temporal budget constraints

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Address the following questions:

- **What does "rational expectations" mean?**
  - Agents have full information on the economy (about future and other agents).
  - On average, agents are right in terms of their expectations.
  - Agents are utility/profit maximizing agents.
  - Past mistakes are incorporate for future forecasts
- **Can a consumer spend more than its disposable income at any point in time? If so, by exactly how much?**
  - Yes, by borrowing and later repaying their debt.
  - If we are in period t, the maximum a consumer can spend is the present value of future income. Or

$$c_t = \sum_{i=0}^{N} \frac{y_{t+i}}{(1+r)^i}$$

where y_i is the income in period i and r is the interest rate.

Address the following questions:

- **How would the consumer's IBC look like if instead of two periods we had 3? And if we had N periods?**
  - Say the consumer spends c_1, c_2, c_3 and is awarded y_1, y_2, y_3 in each period. The budget constrain must be expressed in present value, or

$$c_1 + \frac{c_2}{1+r} + \frac{c_3}{(1+r)^2} = y_1 + \frac{y_2}{1+r} + \frac{y_3}{(1+r)^2}$$

  We can do the same thing for N:

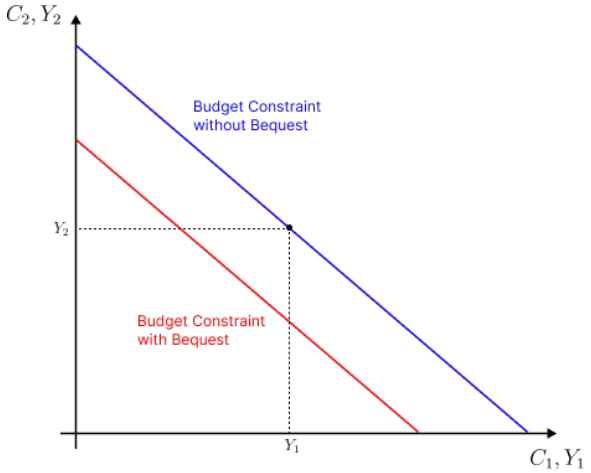
$$c_1 + \frac{c_2}{1+r} + \frac{c_3}{(1+r)^2} ... = y_1 + \frac{y_2}{1+r} + \frac{y_3}{(1+r)^2} ... \implies \sum_{t=0}^{N} \frac{c_t}{(1+r)^i} = \sum_{t=0}^{N} \frac{y_t}{(1+r)^i}$$

- **What's "Ricardian equivalence"?**
  - Phenomenon by which any fiscal policy does not affect household consumption behaviour.
  - Why?
    - Household internalises government budget constraint.
    - Agents are forward looking and know that any $\downarrow T$ today needs to be accompanied by an $\uparrow T$ tomorrow if government plans to keep balance budget: $G_1 + \frac{G_2}{1+r} = T_1 + \frac{T_2}{1+r}$

2-period agent and Bequest

- The decision of the household now becomes choosing consumption in the 2 periods and leaving an amount of money for the next generation:
  C_1, C_2, H (that happens in the 3 period).
- Agent has endowment Y_1 and Y_2.
- **Budget Constraint:**

$$C_1 + \frac{C_2}{1+r} + \frac{H}{(1+r)^2} = Y_1 + \frac{Y_2}{1+r}$$



2-period economy

- **If the Government wants to obey its IBC, what will be its expenditure in period 2?**
  - From Government IBC we have

$$G_1+\frac{G_2}{1+r} = T_1+\frac{T_2}{1+r} \iff 300+\frac{G_2}{1+5\%} = 200+\frac{300}{1+5\%} \text{ Solving for} G_2 \text{ renders } G_2 = 195$$

- **What will be the consumers' budget constraint?**
  - Using disposable income:

$$C_1 + \frac{C_2}{1+r} = Y_1 - T_1 + \frac{Y_2 - T_2}{1+r}$$

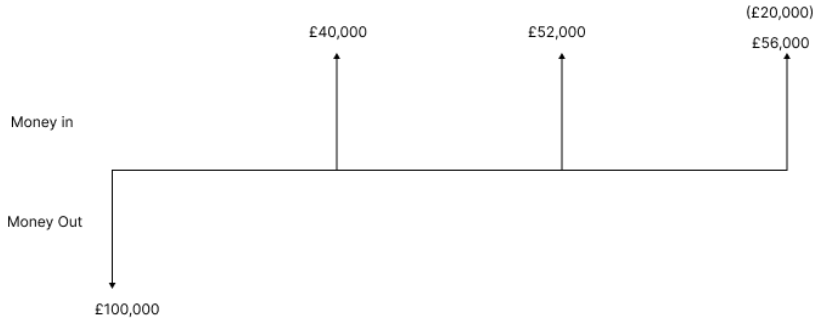
  - We can also sub in the government IBC and get

$$C_1 + \frac{C_2}{1+r} = Y_1 - G_1 + \frac{Y_2 - G_2}{1+r}$$

Assume now that taxes in period 1 are reduced to 100 but expenditure remains the same. Will the budget constraint of consumers change?

- No. Consumers internalise government IBC and understand that a reduction in taxes today will be accompanied by increase in taxes tomorrow, if the government plans to keep the balanced budget and not reduce expenditure.

Value of Firm



- Firm Value (zero equipment value):

$$100,000 + \frac{40,000}{1+5\%} + \frac{52,000}{(1+5\%)^2} + \frac{56,000}{(1+5\%)^3} = £33,635$$

- Firm Value (sale of equipment): $£33,635 + \frac{20,000}{(1+5\%)^3} = £50,912$