

Macroeconomics A: EI056

Quizz

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Class of November 21, 2023

1 Timing of taxes with infinite horizon

Question: Do tax cuts financed through public debt matter in an infinite horizon environment? Why?

Answer: No. If the government cut taxes today, borrow the money, and repays it tomorrow by raising taxes, this is offset by agents. Agents understand that their higher income today is offset by lower income tomorrow. The tax cut thus has no impact on lifetime income, hence wealth.

As consumption today reflects wealth, it is unchanged. The tax cut is entirely saved into government bonds. The repayment on these bonds tomorrow is just what is needed to pay for the higher taxes (as these taxes are raised to pay the bonds). As both agents and the government have the same interest rate, the interest income exactly offset the higher taxes. This feature is called Ricardian Equivalence.

2 Interest rates and consumption

Question: What are the three channels through which the interest rate affects consumption?

Answer: The first channel is the substitution effect. A higher interest rate makes savings more attractive and reduces current consumption. The strength of this channel depends on the sensitivity of the marginal utility of consumption with respect to the level of consumption, as reflected in the parameter θ . The less concave the utility (the lower θ), the stronger is the substitution effect.

The second channel is the income effect. When the interest rate is high, the agent does not need to save as much to reach a given target of assets in the second period. A higher interest rate then raises current consumption. In the case of the log utility of consumption ($\theta = 1$) the substitution and income effects cancel out and the agent consumes a constant fraction of wealth (the value of his assets plus the present value of his current and future incomes, from wages for instance).

The last channel is the wealth effect. A higher interest rate reduces the value of future income from the point of view of today. This reduction in wealth leads to a reduction in current consumption.

3 Core of OLG models

Question: What is the fundamental ingredient of Overlapping Generation (OLG) models?

Answer: The fundamental ingredient is that private agents have a different time horizon than the government. In the OLG model with two periods of life, agents have a two period horizon while the government has an infinite one.

A debt funded tax cut then matters. It does not change the net present value of government assets, but changes the wealth of current agents. This is because some of the higher future taxes are paid by agents that are not yet borne, and thus cannot influence today's planning of consumption and savings. The tax cut then affects consumption as current agents are wealthier.

The different horizons is key in breaking Ricardian Equivalence. All that's needed is for the private sector to have a shorter horizon than the government.

4 Steady state: Ramsey and OLG

Question: Do the Ramsey model with intertemporal horizon and the OLG model give the same level of steady-state capital?

Answer: No. The reason is that the driving equations are different. In the Ramsey model the key equation is the Euler condition. In the steady state the consumption of the representative agent is constant, which pins down the real interest rate, hence the capital. The capital dynamics equation then only serves to give the level of consumption.

In the OLG model, the steady state requires that the consumption of agents of a given age (young and old) is the same across successive cohorts. The consumption of a given agent can however differ between the period when he is young and the period when he is old, so consumption need not be constant within cohorts. As the Euler condition only applies to dynamics within cohorts, but not across cohorts, it is not sufficient to pin down the capital stock. This instead requires the capital accumulation equation. Therefore, the resulting steady state capital can differ from the Ramsey model.

5 Pareto efficiency in OLG

Question: Weil (2012) points that the market allocation in OLG models is not Pareto efficient. Why is that? What can be done about it?

Answer: The inefficiency arises in model where agents are patient and thus do not put a high value on consumption when young, and goods cannot be easily stored (formally the rate of return from storage is below the population growth rate). Under the market allocation agents are forced to

eat their endowment period by period. They cannot trade intertemporally because there is nobody that they will meet twice to trade.

A transfer of resources from young to old is Pareto improving. Young agents do not mind parting with part of their endowment when young as they do not enjoy consuming it much. They are however very happy to see their consumption when old increase from the transfer they'll receive from future young agents. All generations starting with the current young agents are thus happier. The current old generation is also as it received the first installment of the transfer. As all agents are better off, this is a Pareto improvement.

Concretely, such an improvement can be implemented in a transfer retirement system (pay as you go) where the contributions by young agents are immediately paid to current old agents. Public debt can also help as it provides a savings device linked to an infinitively lived agent that the private market cannot create.

6 Bequests and OLG

Question: How do bequest affect the OLG model?

Answer: Bequests are savings that dying agents leave to the next generation. If current agents care about future generations in the utility, their planning horizon is in effect infinite even though lives are not.

This partially brings Ricardian equivalence back. Partially because agents may care about future generations less than if it was they who remain alive. The effective discount rate is then lower (the future matters, but not that much). The government and agents then both have the same horizon, but with different weights on the future (so the agents' horizon is effectively shorter).h