Is government budget constraint binding?

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A common question against macroeconomics of public debts is: why should one think government budget constraint is binding when government, at least technically, can print out money to pay for debts. Out of compatible answers, we explore an answer that is not usually invoked. While in OLG models, government bonds can successfully exist as rational bubbles, concerns of time consistency leave trade-offs in exploiting breakdown of the economy-wise public debt transversality condition. Government budget constraint is one of most certain means to fight time consistency issues and ensure that market stability is achieved.

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I. Introduction

It is well-known that in overlapping generation (OLG) models, breakdown of an economy-wise transversality condition for an asset is possible, while satisfying transversality conditions for individual agents. Applied to public debts, this can lead to a suggestion that government fully exploits breakdown of the transversality condition and carries out policies without feeling bound

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by government budget constraint. Thus OLG models seem to overcome the transversality condition problem outlined in Kim (2019). Furthermore, OLG models naturally allow for the quantity effect: interest rate affects demanded government bonds quantity.

We construct a simple overlapping generation (OLG) model and demonstrate that time consistency concerns raised in Kim (2019) are not avoided in an OLG model. Government debts honoring the economy-wise transversality condition helps to overcome time inconsistency problems, and thus the transversality condition problem is connected to the time consistency problem.

An economy initially can have no time consistency problem, only later to experience time inconsistency issues - for example, 'old generation' may no longer sell all bonds it holds to 'young generation' because of change in economic structure, which was not the case in former economic structure. Differently said, government (including central bank) wishing to roll over bonds or debts by issuing new bonds may not be able to find sufficient 'young generation' demands. The problem is avoided by a sound fiscal policy.

II.   Fiscal-monetary coordination

One of central questions in macroeconomics is how far fiscal-monetary coordination is required for conducts of monetary policy. Conventional analysis suggests that such coordination is unnecessary, as can be witnessed in McCallum and Nelson (2005) and Woodford (2003). One can see analysis concluding otherwise - see Negro and Sims (2015) as an example.

In one aspect, Kim (2019) can be read as asking whether fiscal-monetary

coordination is more required than we ever thought. The time consistency issue and the transversality condition problem suggest that $B_t = 0$ (net zero government or central bank bonds) is required for an equilibrium, but when $B_t = 0$, conducts of monetary policy are at risk. To avoid this, fiscal policy needs to be conducted such that government bonds or surplus can appropriately be generated, while maintaining the spirit of $B_t = 0$: that eventually, government (including central bank) must actually pay back debts, instead of continuously rolling over by new bonds.

As aforementioned, OLG models seem to provide a promising escape from the transversality condition problem - government bonds can be supported as rational bubbles and the economy-wise transversality condition is violated while individual transversality conditions are satisfied. But because OLG models are not safe from the time consistency issue, this escape does not always work, and the economy-wise transversality condition may have to be imposed ('fiscal discipline') to provide market stability.

III. A simple OLG model, time inconsistency and government budget constraint

Each consumer i lives for three periods - from time i to $i + 2$. Consumer i maximizes utility U_i:

$$(1) \qquad U_i = \sum_{t=i}^{i+2} \beta_i \left[\frac{C_{i,t}^{1-\sigma}}{1-\sigma} - \frac{N_{i,t}^{1+\varphi}}{1+\varphi} \right]$$

subject to budget constraint for period $t = i$ and $t = i + 1$:

$$(2) \qquad P_t C_{i,t} + \frac{B_{i,t}}{1+i_t} \leq W_t N_{i,t} + F_{i,t} + B_{i,t-1}$$

and budget constraint for period $t = i + 2$:

$$(3) \qquad P_t C_{i,t} \leq B_{i,t-1}$$

where $C_{i,t}$ represents consumption at time t by consumer i, $B_{i,t}$ represents government or central bank bond purchased at time t by consumer i to be redeemed at time $t + 1$ with value $B_{i,t}$. i_t represents nominal interest rate, $N_{i,t}$ represents labor of consumer i utilized for production.

We now consider consumer i in period $i + 1$ and $i + 2$ and consumer $i + 1$ in the same periods. From consumer optimizations, we get:

$$(4) \qquad \left(\frac{C_{i,i+2}}{C_{i+1,i+2}} \right)^{-\sigma} = \frac{(1 - \gamma)}{\gamma} \left(\frac{\beta_{i+1}}{\beta_i} \right)$$

where

$$(5) \qquad \frac{1 - \gamma}{\gamma} = \left(\frac{C_{i,i+1}}{C_{i+1,i+1}} \right)^{-\sigma}$$

That is, an OLG model repeats the time consistency issue outlined in Kim (2019).

We may avoid this time inconsistency conclusion if $B_t = 0$ and thus monetary policy is assumed to be non-existent. As stated in Kim (2019), whether the time consistency issue is really eliminated depends on supply-side details, but $B_t = 0$ is the necessary condition here, as long as the consumer side is not modified.

One can also note that if each consumer i only lives for two periods, then the time inconsistency issue is also avoided.

A.   Government budget constraint

Of course this is not the end of the story. The lesson of the above $B_t = 0$ conclusion is that government bonds cannot be left as bubbles, if one cares about market stability. Enter fiscal policy, which modifies the consumer side. Then the generalization of the $B_t = 0$ conclusion says that government bonds must actually be paid back, whether in future or today, represented by the economy-wise transversality condition, by taxation or other revenues generated. Thus, government budget constraint becomes binding.

IV.   Conclusion: stability versus efficiency?

Sargent (2011) explores trade-offs between stability and efficiency in choice of a monetary system. The theme was similar here: while OLG models allow for better welfare through rational bubbles of government bonds without proper fiscal backing, a monetary system relying on the rational bubble strategy is unstable, considering a possible switch from an economic structure allowing for time-consistent decisions to an economic structure that has the time inconsistency issue.

In the end, this is matter of a policy choice and empirical analysis. Even with inevitable appearance of a dynamic disequilibrium in reality, as long as it eventually settles down, people may be better welfare-wise with instability. But costs of disequilibrium must be factored in for welfare calculations. Conventional analysis values stability - thus government budget constraint becomes binding, despite initial appearance that it is not so.

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