

Tax smoothing and the optimal level of debt

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Abstract

Barro's case for deficits in wars and recessions, the Lucas-Stokey view of debt as insurance, and Aiyagari and McGrattan's estimate of how much debt a precautionary economy wants.

The identity in The government budget constraint and debt dynamics tells you what a debt path costs, not which path to choose. The normative literature starts from a different question: given that taxes distort, how should a government spread them over time, and what level of debt follows from the answer?

Barro: keep tax rates flat

Barro's argument is a direct analogue of consumption smoothing. Distortionary taxes create deadweight losses that rise more than proportionally with the tax rate, so for a given present value of revenue the loss is minimised by keeping the rate constant over time. A war or a recession that temporarily raises spending or lowers the tax base should therefore be financed by borrowing, and the debt repaid slowly through a permanently slightly higher rate. The prediction is that tax rates follow a random walk and that deficits are counter-cyclical, and Barro found both in US data from 1917 to 1976 (Barro, 1979).

Theorem 1 (Tax smoothing). *If the deadweight loss of taxation is convex in the tax rate and the government can borrow at the market rate, the optimal policy equalises expected marginal deadweight loss across periods, which under quadratic loss means a constant expected tax rate. Debt absorbs temporary shocks to spending and the tax base.*

The implication for debt is modest: its *level* is whatever history left, and only its *changes* are pinned down. Barro's government is indifferent between debt at 30 or 90 percent of GDP as long as it smooths from there. That indifference is the first thing the later literature removes.

Lucas and Stokey: debt as state-contingent insurance

Lucas and Stokey reformulated the problem with complete markets. If the government could issue securities whose payoff depends on the state, it would insure itself against spending shocks: debt would pay less when war breaks out and more in peace, and tax rates would move with the state rather than with the history of shocks (Lucas & Stokey, 1983). Real governments cannot write such contracts explicitly, but nominal debt is a partial substitute: unexpected inflation lowers the real value of outstanding nominal bonds, a state-contingent capital levy on bondholders. The war and post-war inflations that Hall and Sargent found in their decomposition are this mechanism at work (Hall & Sargent, 2011), and it reappears as a conflict rather than a policy in Monetary and fiscal interaction.

Aiyagari and McGrattan: how much debt does an economy want?

With incomplete markets on the household side the level of debt matters. Households facing uninsurable income risk hold precautionary savings; government bonds give them a safe asset to hold, which is a benefit, and the taxes that service the debt distort labour supply and crowd out capital, which is a cost. Aiyagari and McGrattan computed the trade-off in a calibrated model and found an optimal US debt ratio of about two thirds of GDP, close to the actual post-war average, with a welfare surface so flat that moving debt

anywhere between zero and one hundred percent of GDP changed welfare by hundredths of a percent of consumption (Aiyagari & McGrattan, 1998). The flatness is the message: within a wide range, the level of debt is a second-order question compared with how taxes are set and how shocks are absorbed.

What the low-rate decade added

The safe-asset view sharpened after 2010. If private agents value the liquidity and safety of government bonds, the government earns a **convenience yield**: it borrows below the marginal product of capital, and part of the interest cost is offset by a service the bond provides. This is one reading of $r < g$ in Is public debt sustainable?, and it makes public debt closer to money than to a loan: the state supplies a scarce asset and collects seigniorage on it. The reading also carries the same warning as money: the yield exists only as long as the asset stays safe.

Putting the pieces together

Three principles survive across models. Finance temporary shocks by borrowing, not by tax spikes. Do not expect a large welfare gain from moving the debt level within the ordinary range. And remember that the level does matter at the edges, where the safe-asset premium can vanish and the self-fulfilling equilibria of Sovereign debt and the euro area become possible. Fiscal rules, the subject of a later lesson, are an attempt to write the first two principles into law without triggering the third.

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