Lecture notes 11

Budget deficit and debt sustainability

Basic debt ratio equation
A budget deficit is not indefinitely sustainable if it involves growth without limit in the debt/GDP ratio—i.e. eventual explosive debt growth. Beware, then, of compound interest!

Let

\[ b = \frac{\text{government debt}}{\text{GDP}} \]
\[ r = \text{interest rate (assume zero inflation)} \]
\[ d = \frac{\text{budget deficit}}{\text{GDP}} \]
\[ g = \frac{G}{\text{GDP}} \]
\[ t = \frac{T}{\text{GDP}}, \text{i.e. tax rate} \]
\[ n = \text{steady-state growth of GDP (labour force plus technology)} \]

then

\[ b = (1 - n) b_{-1} + d, \]

and

\[ d = g - t + r b_{-1}. \]

These equations yield the basic equation for the government debt ratio:

\[ b = (1 - n) b_{-1} + g - t + r b_{-1} \]

or

\[ b = (1 - n + r) b_{-1} + g - t. \]

Constant primary deficit ratio
The primary, or operational, deficit is \( G - T \), i.e. the overall deficit less interest payments. What is the sustainable primary deficit? In steady state, with a constant debt ratio at any given level, we would have

\[ b = (1 - n + r) b + g - t \]

so that
This is the primary budget deficit required to keep the debt ratio constant. Recall the Golden Rule: in the optimal steady-state the interest rate is equal to the GDP growth rate, \( n = r \). In this case, the sustainable steady-state primary deficit is zero.

In theory, in an efficient economy, the rate of return on capital (in the simplest possible model this is the interest rate) would not be less than the GDP growth rate (otherwise consumption could be permanently increased by reducing the savings ratio). Suppose, then, that \( r > n \). In this case, the sustainable steady-state primary deficit is negative—starting from a position with positive debt, the government must run a primary surplus just to hold the debt ratio constant.

In practice, the rate of interest on government debt—the cost of borrowing to the government—is substantially less than the overall rate of return on capital. This is because government is secure and highly liquid, so the risk and liquidity premiums in government debt yields are negligible compared to those on real capital. In Canada, historically, the average rate of interest on long-term government bonds has been about equal to the growth of GDP (roughly 3%, both), so \( r \approx n \). Typically then, a balanced budget might stabilize the debt ratio on average, but in some periods it might not.

Example. The Mulroney government 1984-93 achieved a primary surplus, but did not succeed in curbing debt growth. Compound interest did in budgets that the Finance Minister, Michael Wilson, looking at a primary surplus, thought were prudent.

Message: the primary budget position may be a treacherous guide to the sustainability of the budget. Balance or a small surplus may imply explosive debt growth.

In the early 1990s real interest rates were around 9%, the growth rate was about 3%, the federal debt/GDP ratio was about 70%. A sustainable primary surplus/GDP ratio would have been at least (9-3) \( 0.70 = 4.2\% \).

**Constant overall deficit ratio**

Under PM Chrétien, Paul Martin took a different tack, and focused on the overall position, i.e. \( g - t + rb \). From above, in steady state, where \( b = b_{-1} \),

\[
(n - r) b = g - t.
\]

The steady-state overall deficit ratio is equal to the rate of GDP growth times the stock of debt. This is intuitive: debt growth = GDP growth in steady state.

Martin did not have the bad surprises that Wilson had. In part this was good luck (falling versus rising interest rates), but in part it was he put the focus on the overall deficit, including interest payments. In fact, Martin achieved surpluses in the overall budget, and very large surpluses in the primary budget (which no longer gets much attention in Canada—discredited).