

Review Questions - Chapter 13

1.

- (a) The *primary deficit* is defined as government expenditures (i.e., government purchases plus transfer payments) minus tax revenue. The *total deficit* is the sum of the primary deficit and net interest payments on the stock of government debt.
- (b) Deficits present a number of economic difficulties. First, a government deficit can create incentives for the government to print money to pay off his debts, thereby raising the likelihood of inflation and the “inflation tax”. Also, the issue of generational account arises. Deficits and debt today have to be repaid out of tomorrow’s tax revenue, which implies that those funds cannot be used for other useful purposes like education, health care, and national defense. This imposes a burden in the near term, as well as into the future. Finally, deficits today conceivably lead to higher taxes tomorrow, which are never popular and can cause further economic deterioration.
- (c) We can rewrite $Y = C + I + G$ as $(Y - T - C) + (T - G) = I$, where $T =$ tax revenue. All else equal, it is therefore conceivable that when $(T - G)$ falls (i.e., when the deficit rises), investment could fall as well, leading to the conclusion that large budget deficits lead to a decrease in I . However, if private savings increases because of higher expected future taxes, the government deficit can be offset (this is known as *Ricardian equivalence*).
- (d) Economists have theorized that rising costs related to advances in medical technologies or fraud and corruption in the health care industry do not account for all of the growth in health spending observed in the richest countries. Instead, it is likely that as people become more affluent, their preferences for more health care services increases as well, because health benefits do not typically exhibit diminishing returns. Therefore, richer economies are probably more likely to face fiscal problems related to the financing of government or government-subsidized health care, because public demand for these services will typically be higher, the richer the country becomes.

2.

- (a) The expression for the total deficit is $\Delta B_t = B_t - B_{t-1} = iB_{t-1} + GE_t - T_t$. Divide through by Y_t to get $B_t/Y_t - B_{t-1}/Y_t = iB_{t-1}/Y_t + (GE_t - T_t)/Y_t$. Observe that if the economy is growing at g_Y , then we must have $Y_t = (1 + g_Y)Y_{t-1}$. Then our expression becomes $B_t/Y_t - B_{t-1}/[(1 + g_Y)Y_{t-1}] = iB_{t-1}/[(1 + g_Y)Y_{t-1}] + (GE_t - T_t)/Y_t$. Approximate $1/(1 + g_Y)$ as $1 - g_Y$ (by the binomial theorem or a simple Taylor expansion). This allows to write that $B_t/Y_t - (1 - g_Y)B_{t-1}/Y_{t-1} = i(1 - g_Y)B_{t-1}/Y_{t-1} + (GE_t - T_t)/Y_t$. Subtracting $g_Y B_{t-1}/Y_{t-1}$ from both sides gives us $B_t/Y_t - B_{t-1}/Y_{t-1} = \Delta(B_t/Y_t) = (i - g_Y) B_{t-1}/Y_{t-1} - ig_Y B_{t-1}/Y_{t-1} + (GE_t - T_t)/Y_t$. Ignoring the middle term, as ig_Y is negligibly small, we obtain $\Delta(B_t/Y_t) = (i - g_Y) B_{t-1}/Y_{t-1} + (GE_t - T_t)/Y_t$.

- (b) $i = 4.5\%$, $g_Y = 3.5\%$, and $B_0/Y_0 = 15\% \Rightarrow \mathbf{B}_1/Y_1 = .15 + (.045-.035).15 = .1515$.
 $\mathbf{B}_2/Y_2 = .1515 + (.045-.035).1515 = .1530$. $\mathbf{B}_3/Y_3 = .1530 + (.045-.035).1530 =$
 $.1545$. $\mathbf{B}_4/Y_4 = .1545 + (.045-.035).1545 = .1561$. $\mathbf{B}_5/Y_5 = .1561 + (.045-.035).1561$
 $= .1577$.
- (c) $i = 4.5\%$, $g_Y = 3.5\%$, and $B_0/Y_0 = 10\% \Rightarrow \mathbf{B}_1/Y_1 = .10 + (.045-.035).10 = .101$.
 $\mathbf{B}_2/Y_2 = .101 + (.045-.035).101 = .102$. $\mathbf{B}_3/Y_3 = .102 + (.045-.035).102 = .103$. \mathbf{B}_4/Y_4
 $= .103 + (.045-.035).103 = .1041$. $\mathbf{B}_5/Y_5 = .1041 + (.045-.035).1041 = .1051$.
- (d) $i = 4.5\%$, $g_Y = 3.5\%$ and increases every year by .5%, $B_0/Y_0 = 10\%$, and the primary
deficit is 2% every year $\Rightarrow \mathbf{B}_1/Y_1 = .10 + (.045-.035).10 + .02 = .121$. $\mathbf{B}_2/Y_2 = .121$
 $+ (.045-.04).121 + .02 = .142$. $\mathbf{B}_3/Y_3 = .142 + (.045-.045).142 + .02 = .162$. $\mathbf{B}_4/Y_4 =$
 $.162 + (.045-.05).162 + .02 = .181$. $\mathbf{B}_5/Y_5 = .181 + (.045-.055).181 + .02 = .20$.
Clearly, the persistence of even a modest deficit of 2%, in the presence of
increasing growth, leads to a substantial increase in the debt burden after 5 years. In
part (c), $\mathbf{B}_5/Y_5 = 10.5\%$, whereas in part (d), \mathbf{B}_5/Y_5 is twice as high at 20%.