

3 Ex 3. Government deficit

From the exercise, we have

- $b = 0.6$
- $\gamma = 0.02$
- $r = i - f = 0.055 - 0.025 = 0.03$
- $\tau = 0.2$
- $g = 0.25$
- $i = 0.055$

1. To prevent the debt/GDP ratio to grow further, we need to have $b_{t+1} = 0.6$ as well, since

$$b_{t+1} = (b_t(1+r) - \tau + g)/(1+\gamma)$$

we have

$$0.6 = (b_t(1+r) - \tau + g)/(1+\gamma)$$

so

$$g^* = 0.6(0.02 - 0.03) + 0.2 = 0.194$$

which means that the government spending can be no more than 19.4 percent of GDP.

2.¹ Real/nominal primary surplus is $20\% - 19.4\% = 0.6\%$ of real/nominal Gdp. the total nominal deficits will be nominal interest payment on debt plus the nominal primary deficit (where GDP_N denotes nominal GDP)

$$0.006 * GDP_N - 0.6 * GDP_N * i$$

and the nominal deficits relative to GDP equals to

$$0.006 - 0.6 * 0.055 = -0.027 = 2.7\%$$

3. Although the GDP growth is greater than the real interest rate, the primary deficit is too big to be compensated, so the debt/GDP ratio will continue to increase.

$$\begin{aligned} b_{t+1} &= (b_t(1+r) - \tau + g)/(1+\gamma) \\ &= (0.6(1+0.03) - 0.2 + 0.25)/(1+0.04) \\ &= 0.642 \end{aligned}$$

4. The constant interest rate assumption is not realistic. Running deficits means higher government spending and raises aggregate demand, which in turn may lead to increased interest rate.

¹For those who attended Monday's seminar: By mistake, I calculated the nominal debt instead of nominal deficits. Here you will find the corrected solution for question 2. I would also like to thank the student who pointed this out after the Monday Seminar.