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ECON 8702 Prof. Javier Bianchi
Problem Set 4 May 2, 2023
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Rollover Crises

We start by computing the threshold between the safe zone and the crisis zone, that is, the level of debt b^- such that:

$$V_R^-(b^-) = u(y - b^-) + \frac{\beta}{1-\beta} u(y) = \frac{1}{1-\beta} u(y - \phi) \tag{1}$$

Parameter	Value
β	0.8
γ	2
y	1
ϕ	0.2
π	0.5

We set the above parameters and got $b^- = 0.5$. [1] Next, we solve the sovereign's problem when it is still possible to borrow for two different risk aversion parameters:

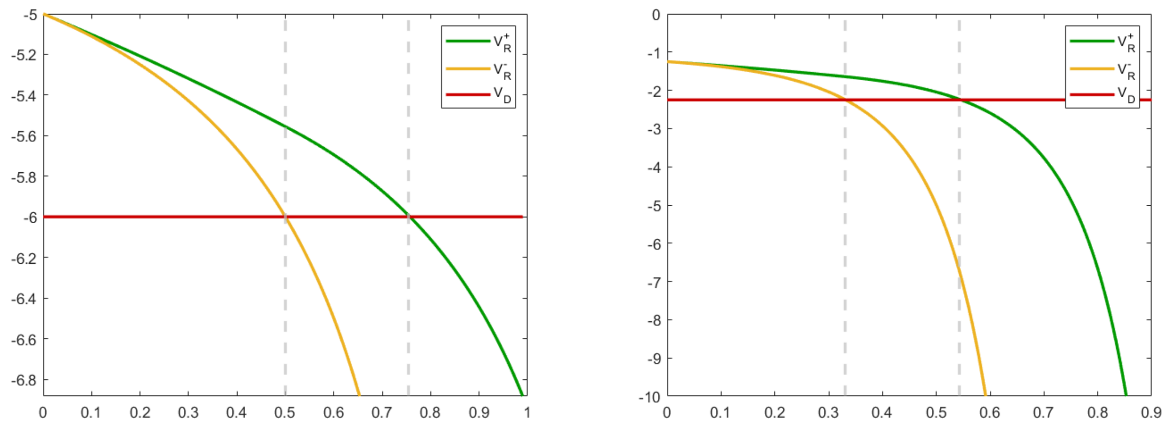
$$V_R^+(b) = \max_{b',c} \{u(c) + \beta \mathbb{E}[V(b')]\}$$
$$\text{s.t } c \leq y - b + \tilde{q}(b') b'$$

Parameter	Crisis region
$\gamma = 2$	[0.50, 0.75]
$\gamma = 5$	[0.33, 0.54]

For higher values of risk aversion, the sovereign save more to avoid entering the crisis zone and facing the only source of uncertainty in this model. This seems to yield a shorter crisis region when compared to $\gamma = 2$. Moreover, despite shrinking the crisis region we also perceived it has shifted to the left. The graphic intuition is clear: an increase in risk aversion shifts V_D upwards, which is the dominant effect.

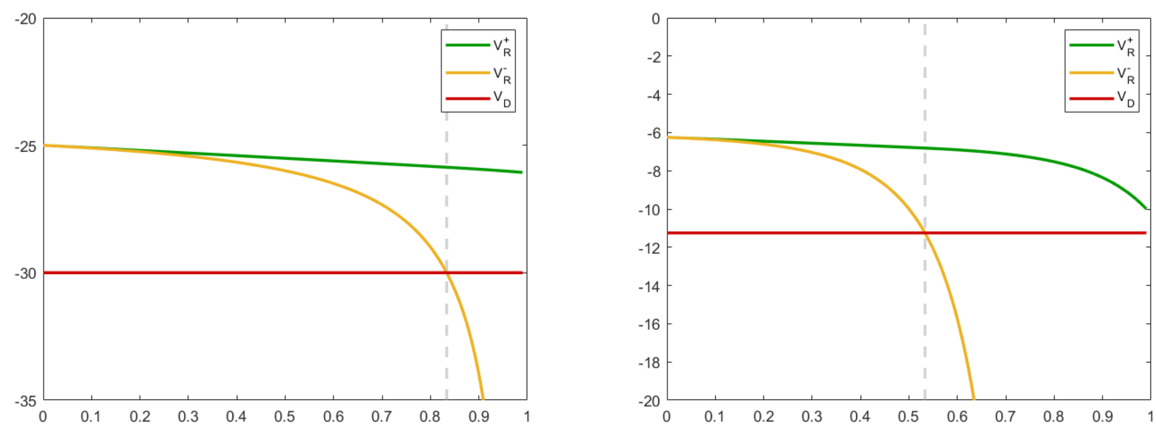
[1] Using the suggested value for $\beta = 0.96$ we found that $b^- = 0.83$. We kept using a smaller value to get more reasonable plots. The MATLAB code used can be found here, and a Python version can also be found here.

Figure 1: $\gamma = 2$ (left) and $\gamma = 5$ (right)



Using the suggested parametrization with $\beta = 0.96$ we get that the government does not default if investors decide to roll over the current debt:

Figure 2: $\gamma = 2$ (left) and $\gamma = 5$ (right)



Note that for higher risk aversion b^- is shifting to the left. In the left panel, at b^- the value of repayment with rollover V_R^+ is still flat, so it is hard to infer where the b^+ will be. On the right panel, we can have a better idea of the extent of the crisis zone. Moreover, we cannot extend the upper bound of the grid of debt to numbers higher than one since the utility has a CRRA functional form.