Problem Set 8: Sovereign Debt Default

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** We have used the Matlab code provided by the professor Luis Rojas.*

1 Bond price schedule

The bond-price schedule is telling us the set of quantity-price combinations for the public debt given the GDP endowments. The graph 1 shows the bond-price menu for $\tau = 0.2$ and $\lambda = 0.5$, where τ is the fraction of the GDP lost if the government defaults and λ is the probability of returning to the financial markets once you've been excluded.

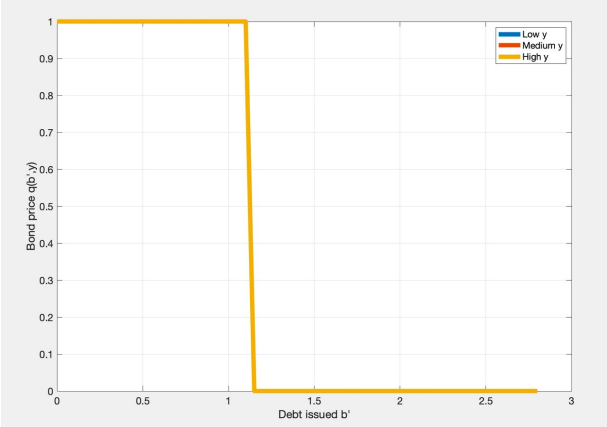

Figure 1: Bond-price menu for tau=0.2

Now, we change the value of τ, assigning different τ to different levels of GDP endowments. In other words, we assume that the output cost of default depends on the level of output. Thus, introducing state-contingent losses makes default more responsive to GDP shocks and then, less responsive to outstanding debt.

2 Equilibrium default

Adjusting the parameters to have that each country is 3% in default, we get a graph with the probability of default at t+1 given the debt-to-gdp ratio.

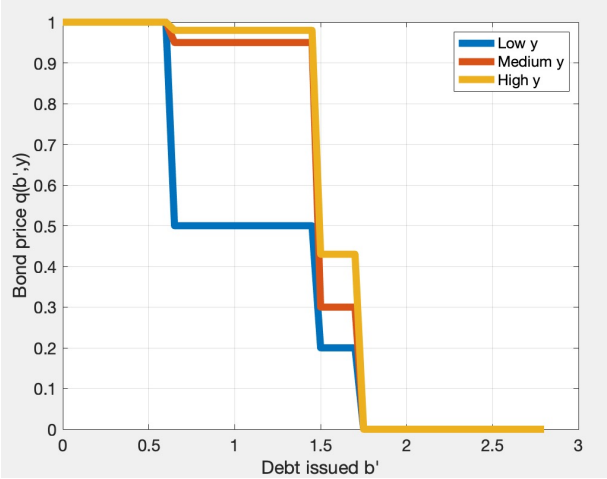

Figure 2: Bond-price menu for different tau's and GDP endowments.

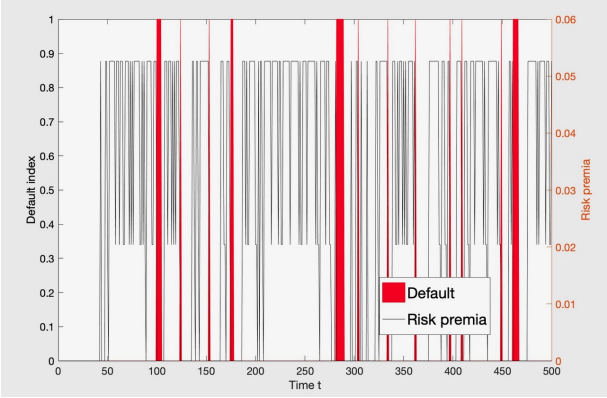

Figure 3: Probability of default.

3 Indirect inference

First, we have estimated a logit on the probability of default using the debt-to-gdp as the only regressor and controlling for country fixed effects. By doing so, we got that the coefficient of the *debt_to_gdp* is equal to 1.15. This is the code we've run in Stata:

```
xtset Year Ind
xtlogit default debt_to_gdp, fe nolog
```

Second, we simulate the model and run the same logit regression over the simulated time series. In that case, the coefficient is 1.96. To make them closer, we change β to 0.91; as a result, the coefficient became 1.12. Graph 4 shows the probability of default out of the simulation.

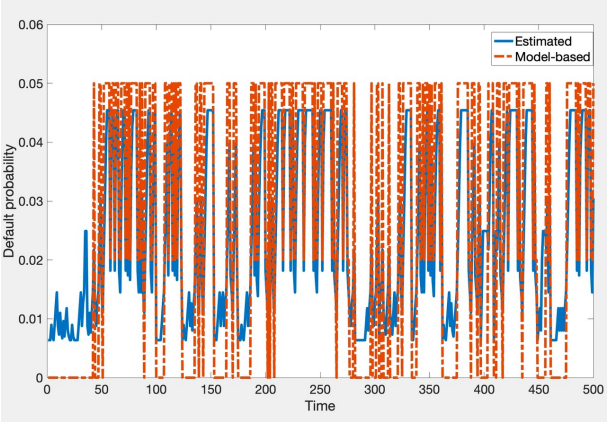

Figure 4: Probability of default of the simulation.