The mystique surrounding the central bank's balance sheet

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or

Can the ECB by itself solve the crisis?

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All agents face resource constraints

$$h_{t+1} + v_{t+1} = h_t + (1 + i_t)v_t$$ } Old liabilities

New liabilities (bracket under $h_{t+1} + v_{t+1}$)

$$+ a_{t+1} - \sum_{j=1}^{J}(1 + i_{t+1}^j)a_t^j$$ } Expand balance sheet

$$+ d_{t+1}$$ } Pay dividends

What is special about a central bank:

- One of its liabilities, h_t, provides a service
- It commits to exchange h_t for v_t on par at all times.

Generating resources by seignorage

If $m_{t,t+1}$ is the real stochastic discount factor:

$$\mathbb{E}_t \left(m_{t,t+1} \hat{d}_{t+1} \right) = \mathbb{E}_t (m_{t,t+1} \hat{h}_{t+1}) - \frac{\hat{h}_t}{(1+i_t)(1+g_{t+1})}$$

$$- \mathbb{E}_t \left[m_{t,t+1} \left(\hat{a}_{t+1} - \hat{v}_{t+1} \right) - \frac{\hat{a}_t - \hat{v}_t}{1+g_{t+1}} \right]$$

But constrained by demand in generating seignorage:

$$\hat{s}_{t+1} = L(i_{t+1}) - \frac{L(i_t)}{1+g_{t+1}}.$$

Non-negative but has a maximum, around 1-1.2%.

Generating resources by borrowing

Iterating forward, in present value:

$$D_t = S_t + \hat{a}_t - \hat{v}_t - \lim_{T \to \infty} \mathbb{E}_t \left[m_{t,T}(1 + g_{t,T}) \left(\hat{a}_T - \hat{v}_T \right) \right]$$

If v_t are market liabilities, you can't run a Ponzi scheme:

$$D_t \leq S_t + \hat{a}_t - \hat{v}_t$$

Upper bound of 10-15% in present value.

Moreover, statutes require paying net income: $D_t = S_t$

Redistributing resources

Keeping totals fixed, the central bank can shift composition across regions i. But:

- $D_t(i)$, statutes disallow it.

- $a_t(i)$, but usually hold federal treasuries, and ECB's refinancing operations accept *any $a_t(i)$* as collateral, so no control over composition.

- $v_t(i)$ - Target2 implies that also lose control over it, because deposits open to all banks and shifts across $v_t(i)$ are undone by cross-central bank liabilities.

Pegging sovereign spreads

Yes it can: standing facility.

But if periphery bond pays 1 with risk-neutral probability *1-π*, but only *c≤1* with risk-neutral probability *π*, its yield is:

$$y_t \leq \frac{1 + i_t}{1 - \pi + \pi c}$$

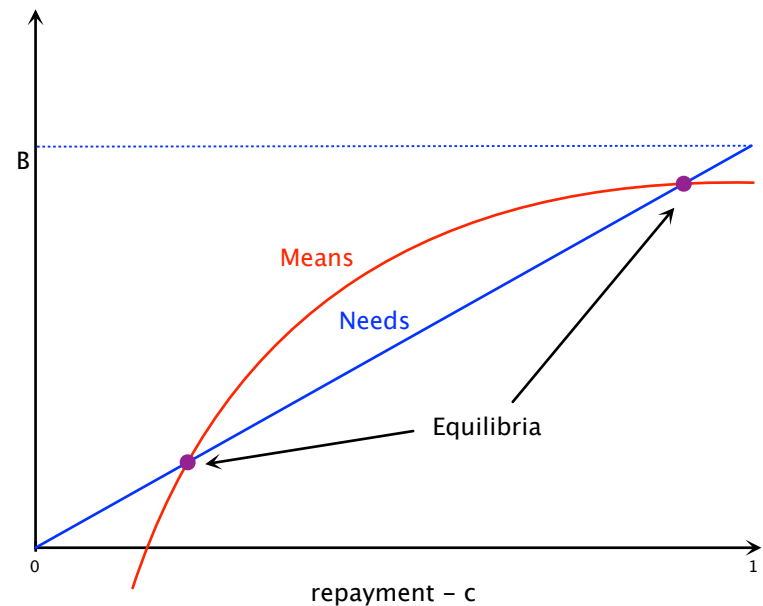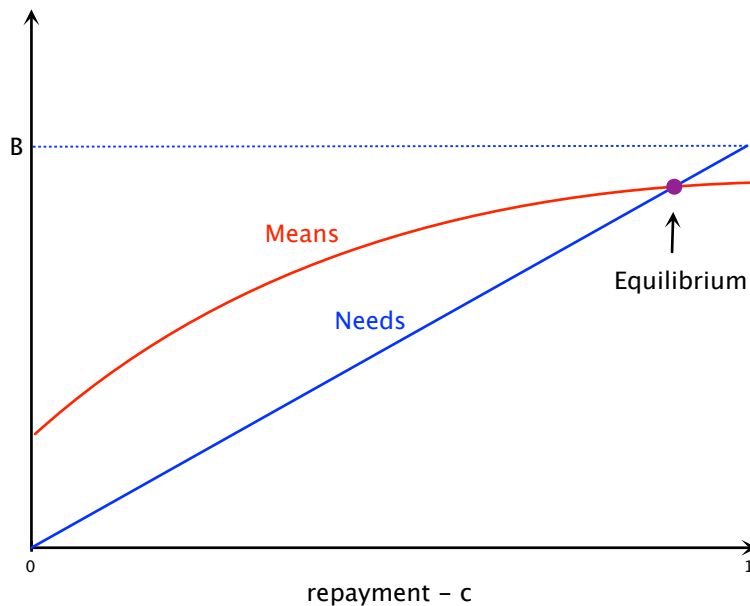If inequality, then hold whole stock. Otherwise must raise c, payment in bad state of the world.

A simple model of sovereign default

Government budget constraint:
$$c\hat{b}_t^p = F_t$$

Diabolic loop:
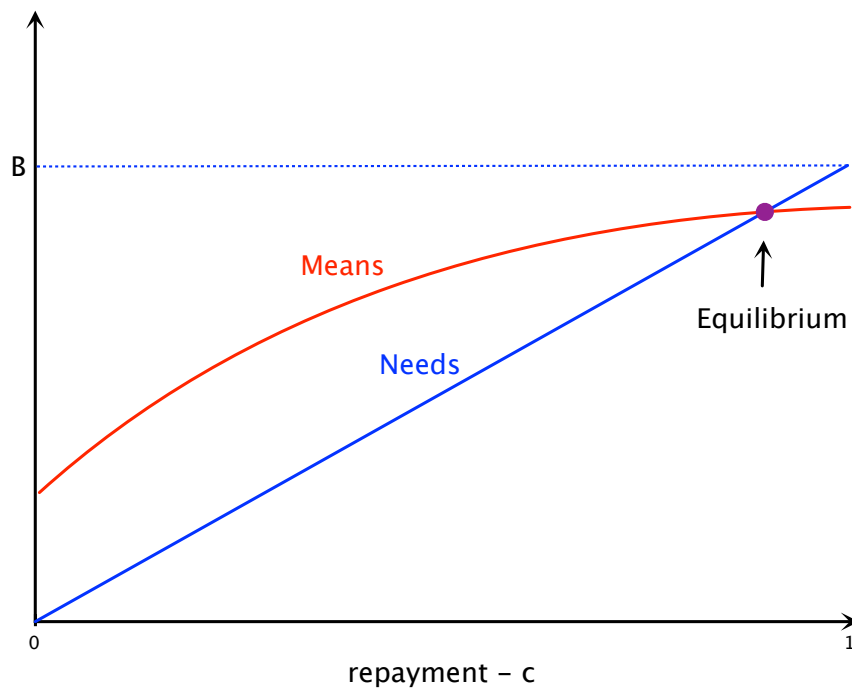$$F_t = \Phi(c) \quad \text{with } \Phi'(.) \geq 0, \Phi''(.) \geq 0$$

The central bank and fundamentals

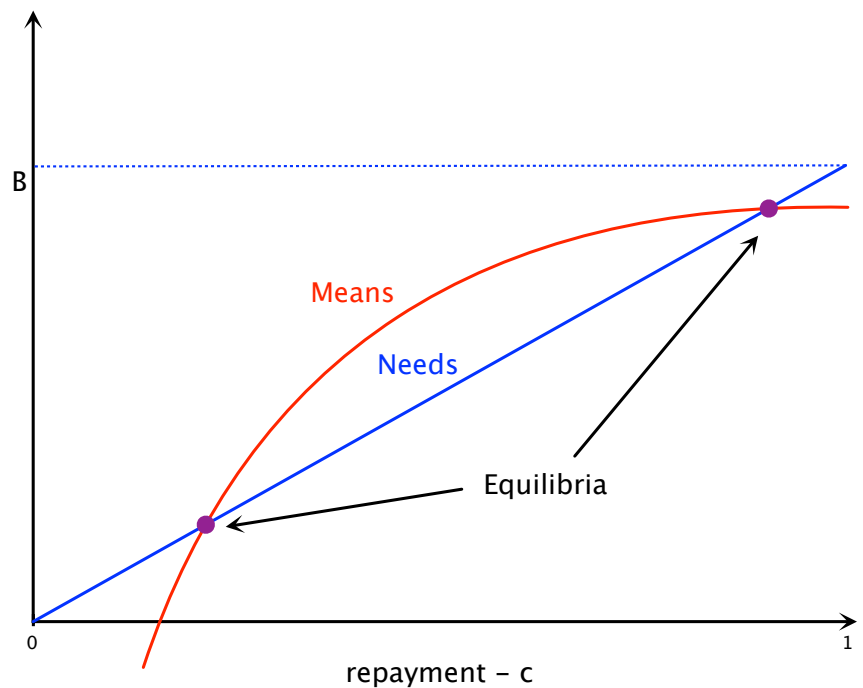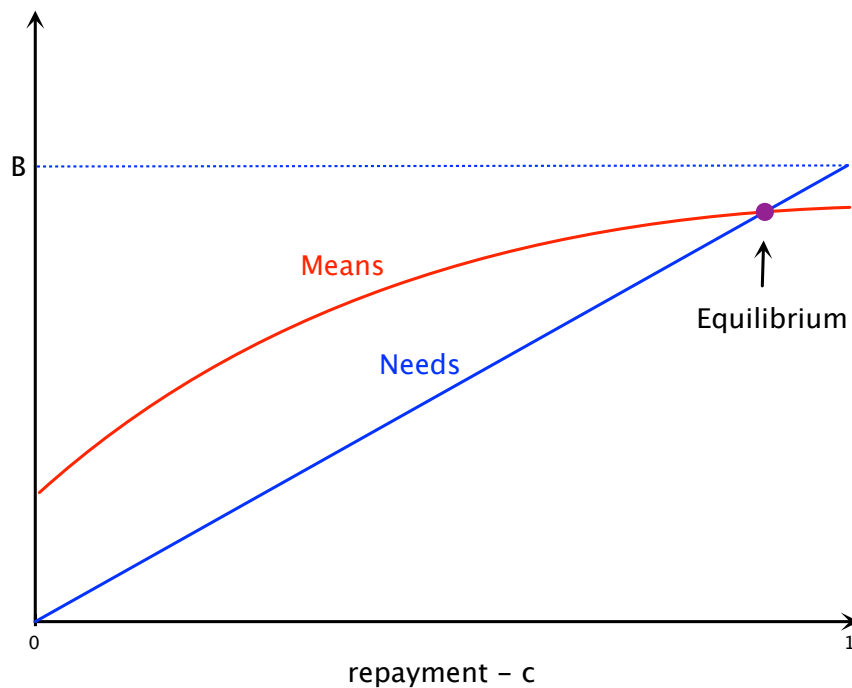1. Inflating and reducing real government liabilities.

$$c\hat{b}_t^p = p_t \Phi(c)$$
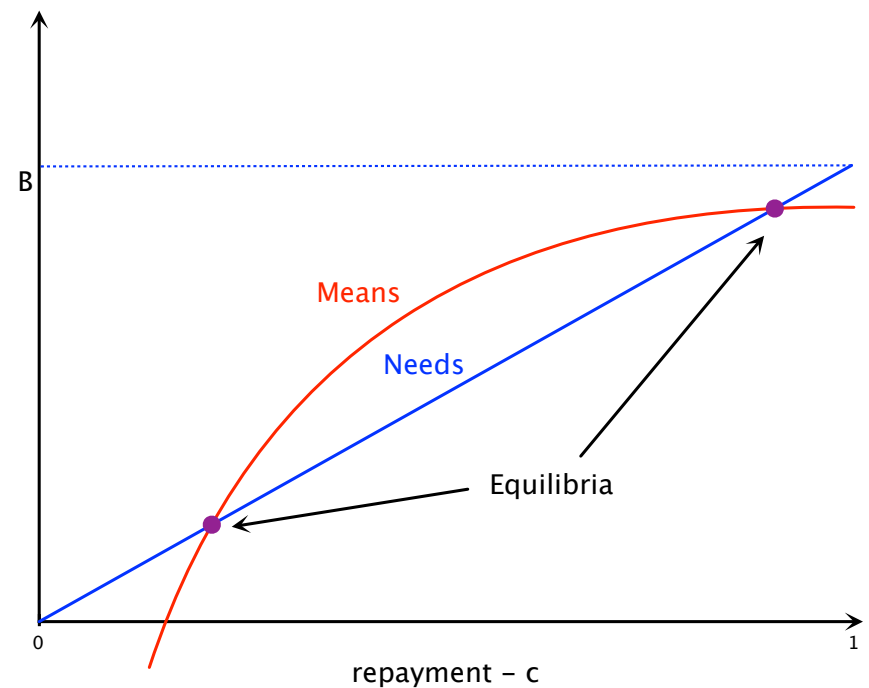
The central bank and fundamentals

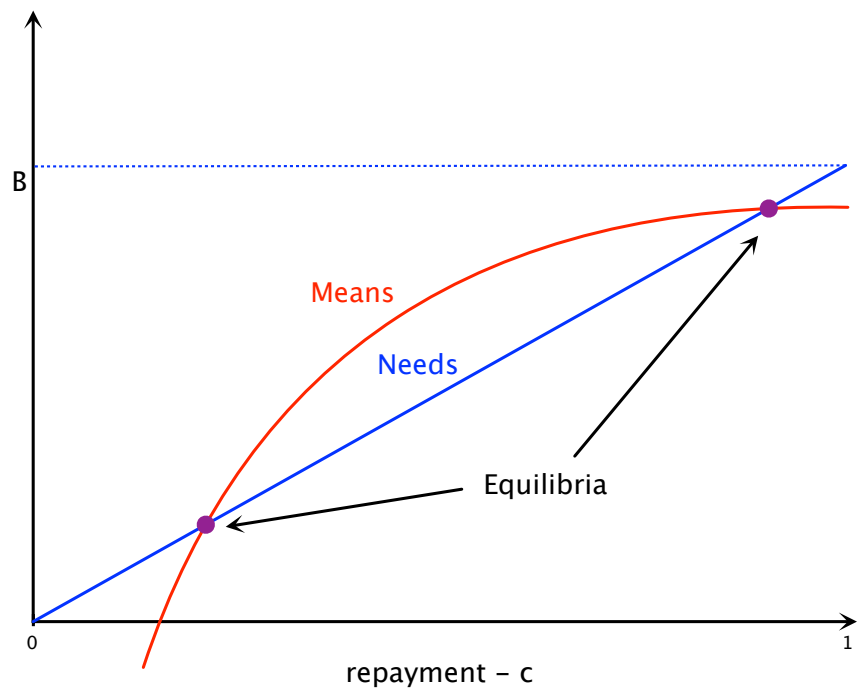2. Distribute more dividends via seignorage, more inflation.

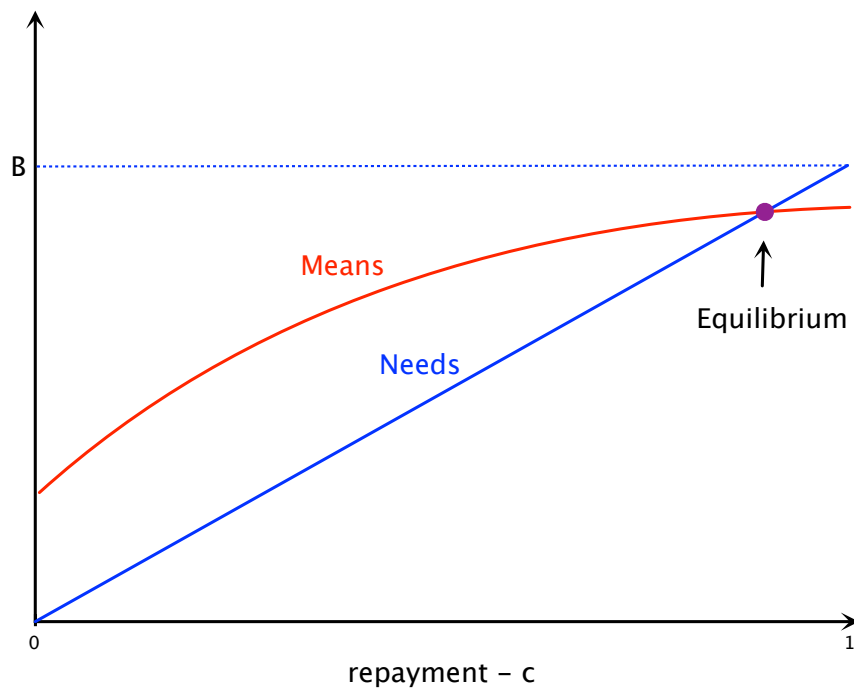$$c\hat{b}_t^p = p_t\Phi(c) + \delta D_t$$

The central bank and fundamentals

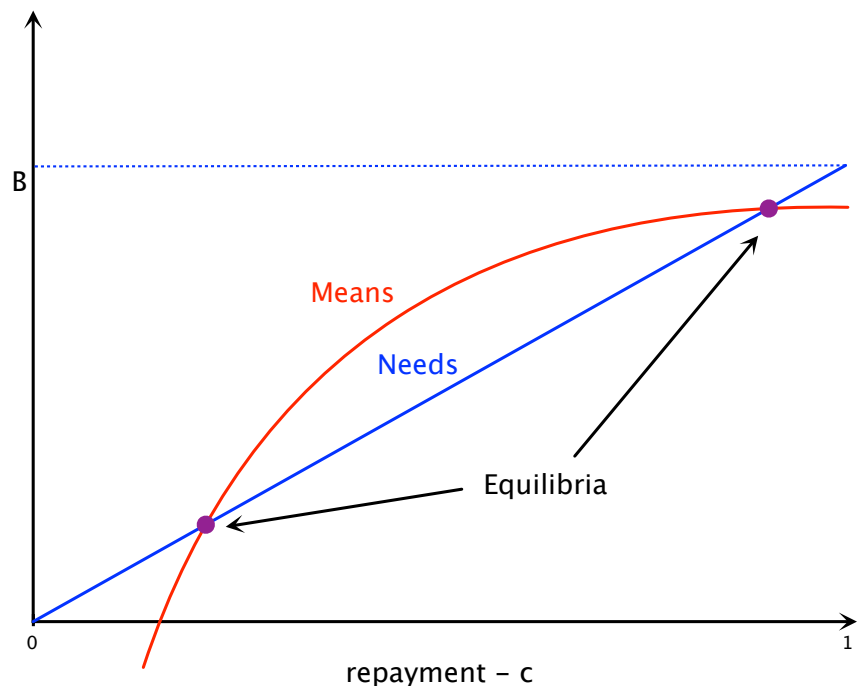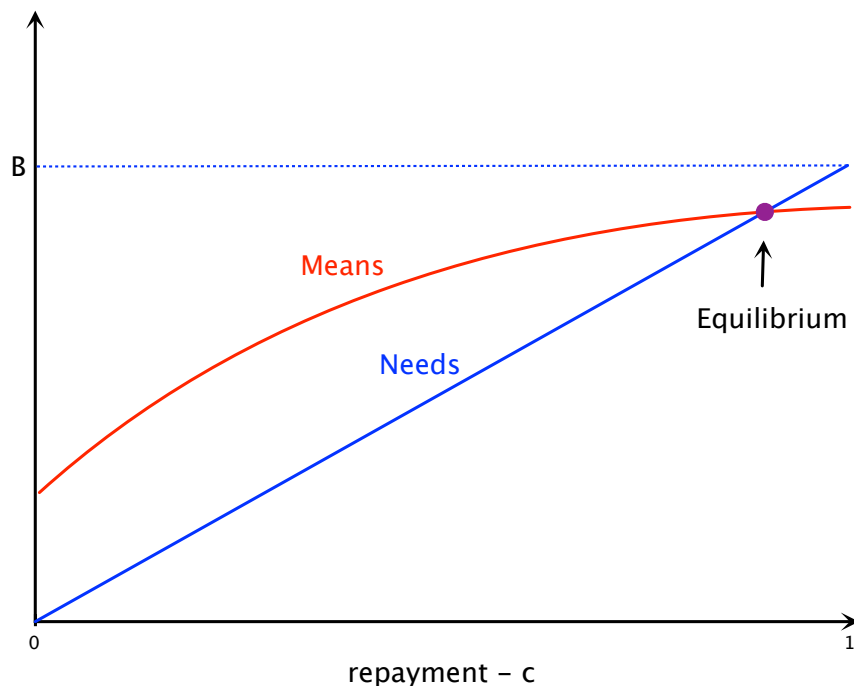3. Hold sovereign debt and restructure it.

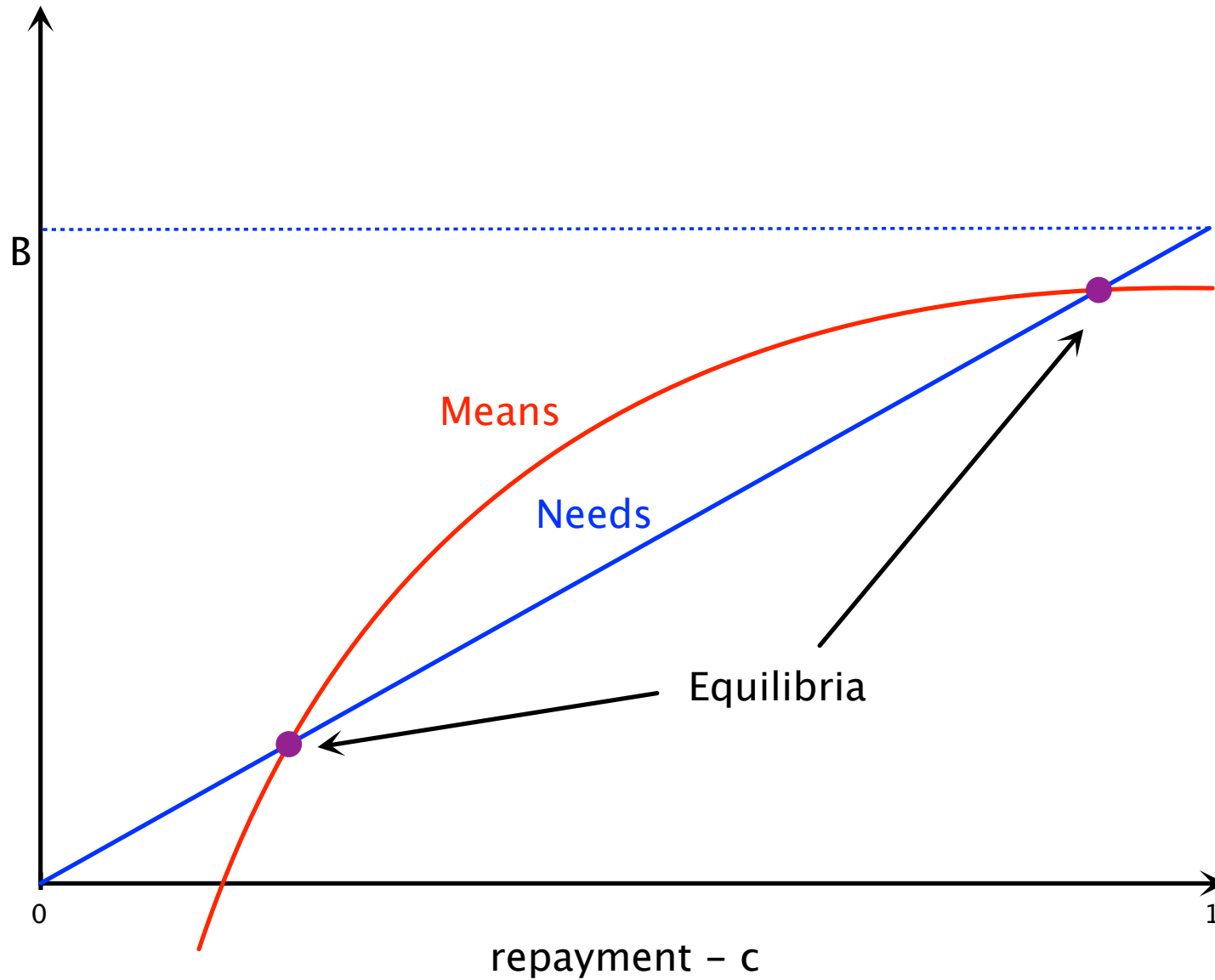$$c\hat{b}_t^p = p_t \Phi(c) + \delta D_t - c^e \hat{b}_t^e$$

The central bank and fundamentals

4. Allow sovereign to run Ponzi scheme on the central bank, requires redistribution.

$$c\hat{b}_t^p = p_t\Phi(c) + \delta D_t - c^e\hat{b}_t^e + \lim_{T\to\infty} \mathbb{E}_t\left(m_{t,T}(1 + g_{t,T})\textcolor{red}{\hat{b}_T^e}\right)$$

Equilibrium selection device

The central bank's power

The central bank can:

1. Inflate to raise seignorage revenues to distribute.

2. Inflate to lower real value of debt.

3. Inflate to raise tax revenues via economic activity

4. Inflate to raise consumption and lower marginal utility in the default state.

Perennial choice facing a central bank:

To inflate or not