Discussion of “When Does a Central Bank’s Balance Sheet Require Fiscal Support?” by Del Negro and Sims

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1. Fundamental points

1. *Central banks can run out of resources*

– It issues liabilities for others to hold.

– Default, (hyper)inflation, currency reform.

– Uniqueness? Seignorage.

$$s = \frac{\Delta M}{P}$$

Fundamental points

2. Central bank solvency = backing = independence

– Difference from Department of Transportation

– Insolvent *iff* Treasury does not provide backing *iff* cannot be financially independent.

– Approach: take P as given.

– Three forms of insolvency: period, rule-based, intertemporal.

Period-solvency

Every period ensure that $d > 0$

Case 1: textbook central bank

$$d = s = \frac{\Delta M}{P}$$

Case 2: open-market-operations central bank

$$d = iB$$

Case 3: New-style central bank

$$d_{s'} = n_{s,s'} - r_s(V_0 - q_0 B_0) + (c_s - \delta q_{s'} - r_s q_s)B_s + (q_{s'} - q_s)B_s.$$

Period-solvency for Fed?

Hall Reis (2013)

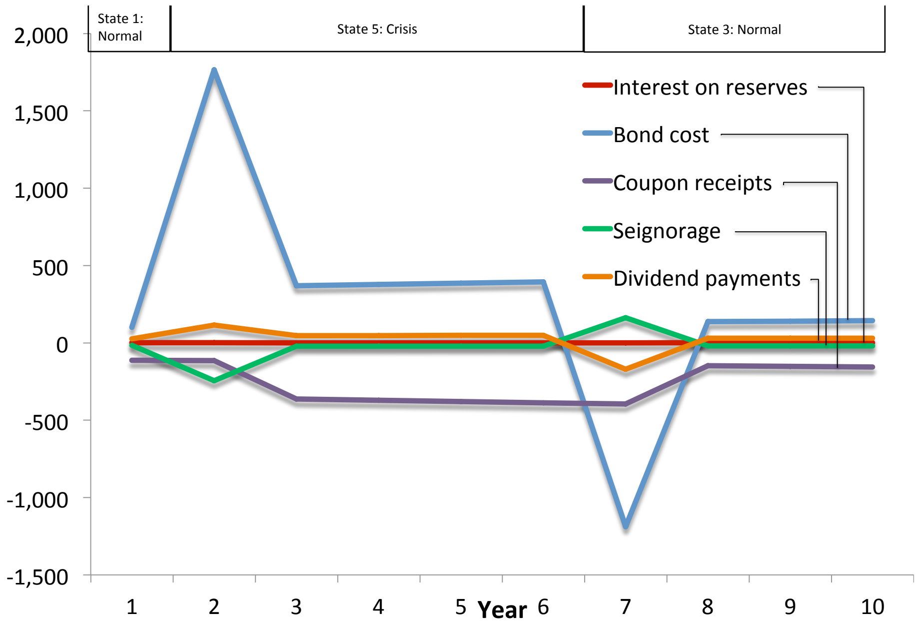
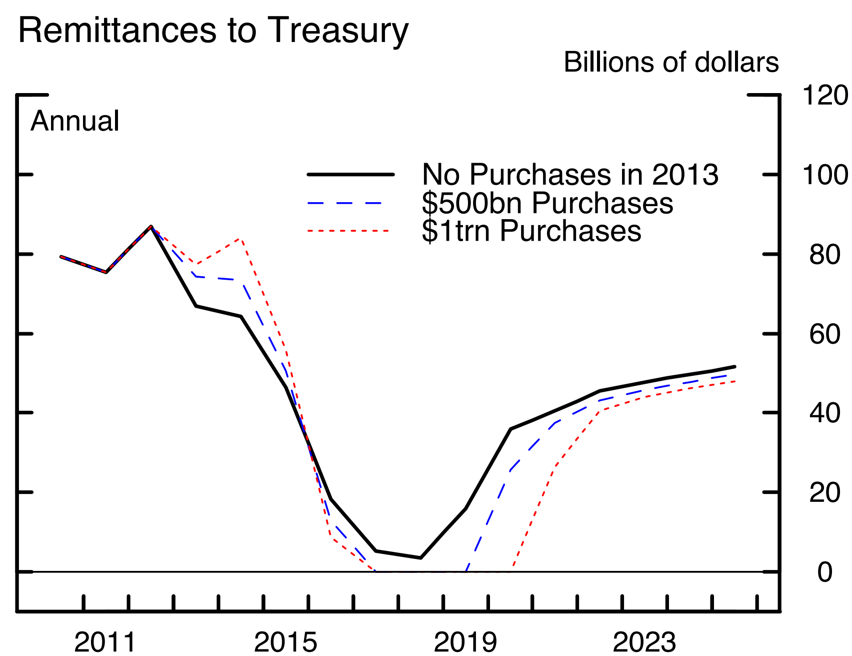


Figure 4: Flows Into and Out of Reserves

Carpenter et al (2013)



Rule-solvency

Every period, stick to rule in agreement with Treasury.

Hall-Reis result 1: if *d=y=net income*, always solvent.

Hall-Reis result 2: if *d=max{y,0}*, insolvent with prob. 1

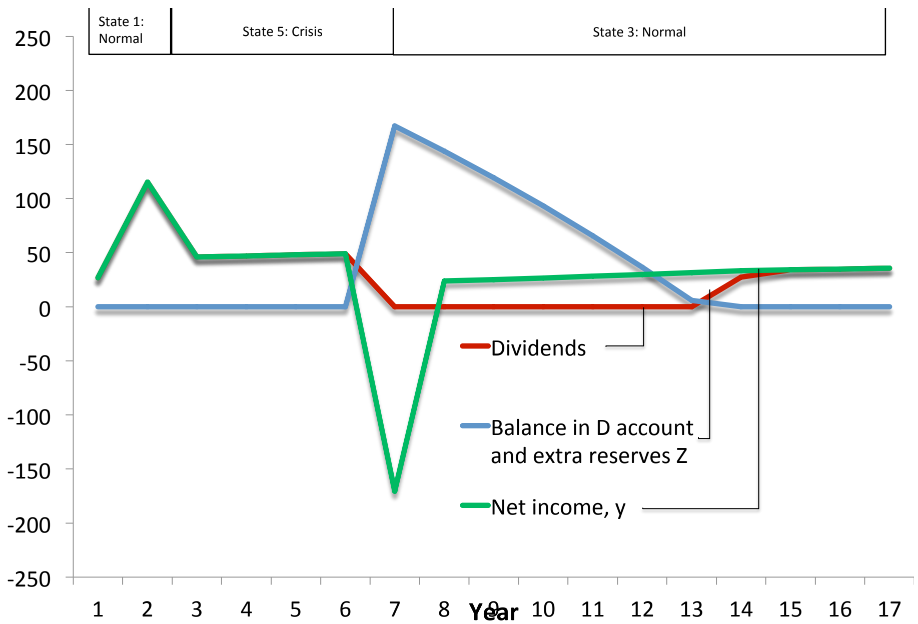
Hall-Reis result 3: if deferred asset, very likely solvent.

$$d' = \max(y' - D, 0).$$

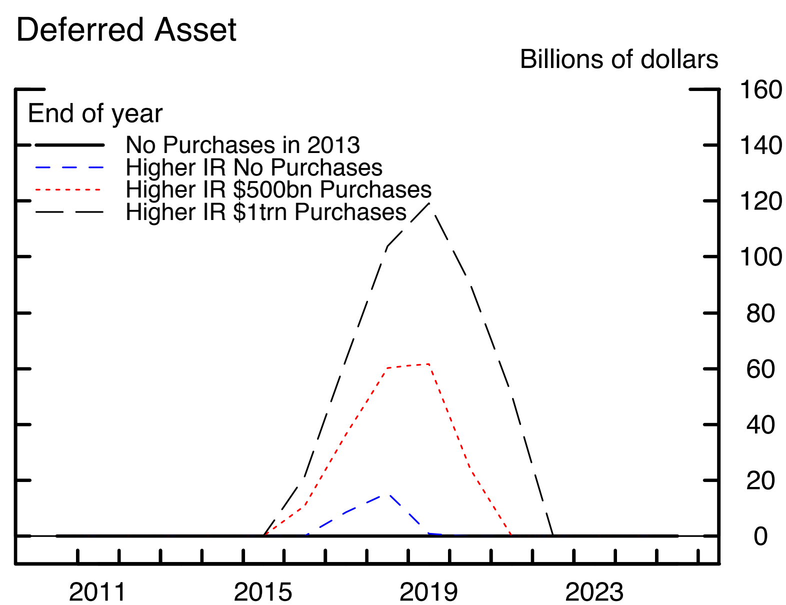
$$D' = \min\left(\bar{D}, \frac{1}{1+\pi_s}(D - \max(y' - d', 0) + \max(-y', 0))\right)$$

Rule-solvency for Fed?

Hall Reis (2013)



Carpenter et al (2013)



Intertemporal-solvency

If no bubble on excess reserves (and no arbitrage):

PROPOSITION

The intertemporal fiscal capacity of a central bank is bounded above by the present value of seignorage, plus the value of bond holdings and assets, minus the value of excess reserves:

$$\underbrace{\mathbb{E}_t \sum_{\tau=1}^{\infty} m_{t,t+\tau} d_{t+\tau}}_{Solvency} \leq \underbrace{a_t + \sum_{j=0}^{J} \frac{q_t^j b_t^j}{p_t} - v_t}_{Balance\text{-}sheet\ capital} + \underbrace{\mathbb{E}_t \sum_{\tau=1}^{\infty} m_{t,t+\tau} s_{t+\tau}}_{PV\ of\ seignorage}$$

Reis (13), Bassetto Messer (13), Corsetti Dedola (14)

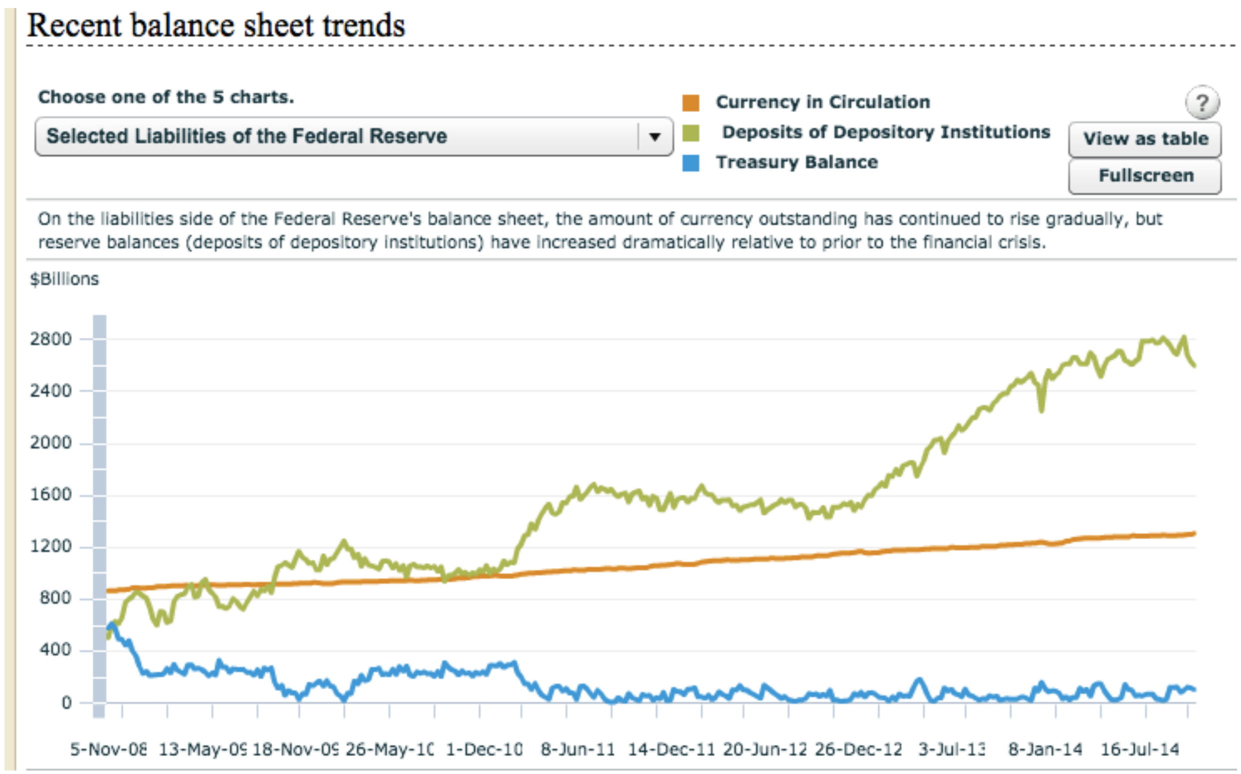
Del Negro and Sims (2014)

How large are terms for Fed?

Balance-sheet capital at end of 2013:

-- size of reserves: 14.7% of GDP.

-- balance: 0.4% of GDP.



Present value of seignorage

- Basic rule of thumb: $\bar{s}/r = 0.04/0.02 = 20\%$
- Simple rule of thumb:

$$\int e^{-rt}\left(\frac{\Delta M}{PY}\right)\frac{M}{M}dt \approx \frac{vg}{r} = \frac{0.07 \times 0.06}{0.02} = 21\%$$

- Hilscher, Raviv, Reis (2014): *16-18%* of GDP.

$$\mathbb{E}\left[\int_t m_{0,t}\frac{s_t}{y_0}\right] = \int_t e^{-r_{0,t}} \times \mathbb{E}e^{g_{0,t}} \times$$

$$\int_\pi f(\pi_t)\hat{s}\left(\pi_t, \mathbb{E}_t\pi_{t+1}\right)d\pi_t \approx 16 - 18\%$$

- Del Negro Sims: *92%* of GDP.

And changes a lot

TABLE 3. Central bank's resources under different simulations

		(1)	(2)	(3)	(4)	(5)
		qB/P $-V/P$	PDV seigniorage	(1)+(2)	q	$\bar{B}/B$
	Baseline calibration					
(1)	Baseline scenario	0.146	1.139	1.285	1.08	
(2)	Higher rates (β)	0.130	0.181	0.311	1.06	12.62
(3)	Higher rates (γ)	0.141	1.443	1.584	1.06	60.23
(4)	Inflation scare	0.028	0.692	0.720	0.85	4.15
(5)	Explosive path	0.069	0.466	0.535	0.85	3.28
	Higher θ_π					
(6)	Inflation scare	0.048	0.599	0.647	0.90	4.54
(7)	Explosive path	-0.010	0.175	0.165	0.61	1.34
	Lower θ_π					
(8)	Inflation scare	-0.070	0.861	0.791	0.47	2.69
(9)	Explosive path	0.135	6.806	6.942	1.05	199.41

2. Endogenous inflation target

Simple case: geometric bonds, steady state inflation

$$\frac{B}{r+\pi+\delta} - v + PV(s(\pi)) = PV(d)$$

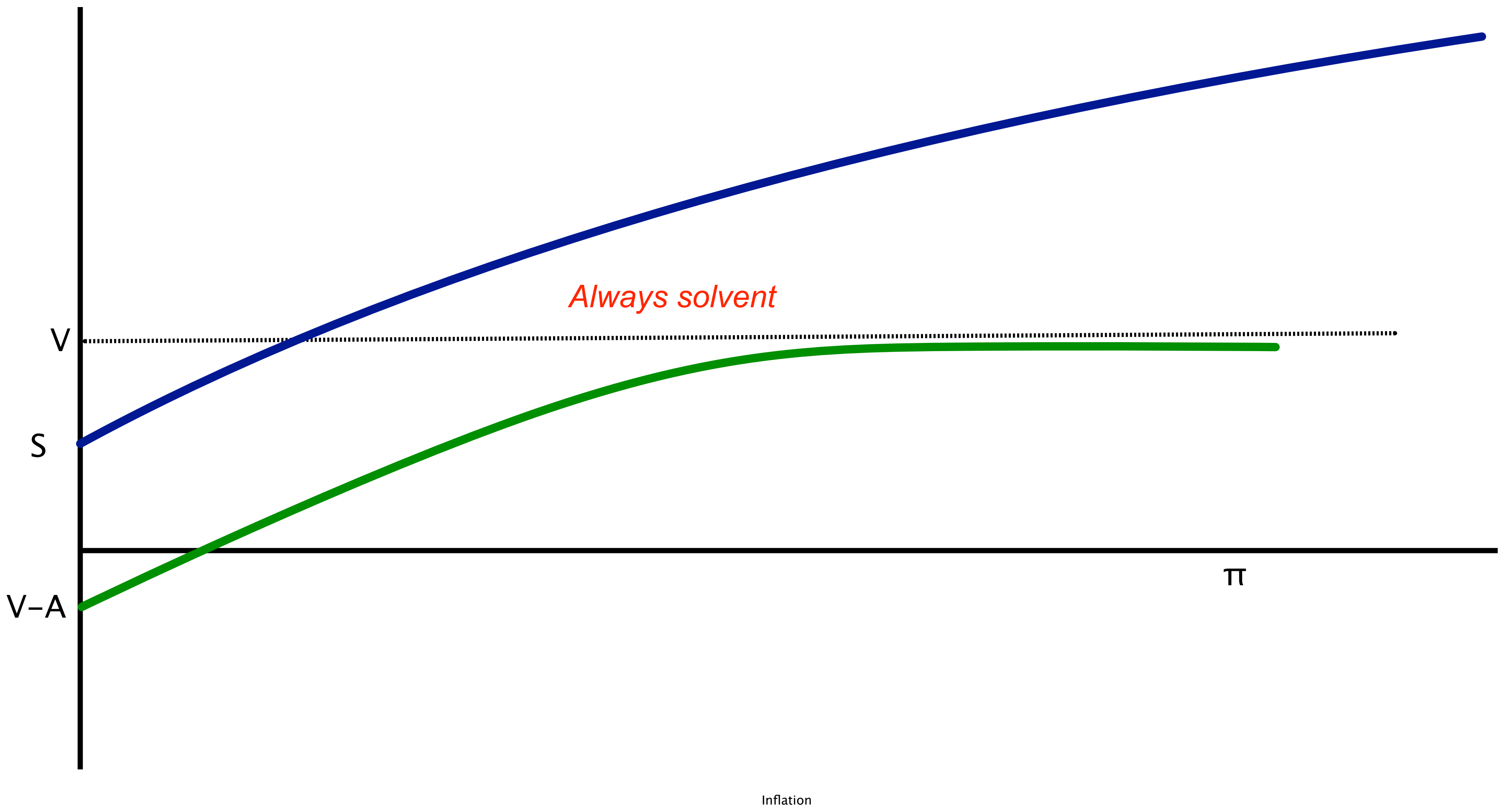
High inflation:

-- increases seignorage;

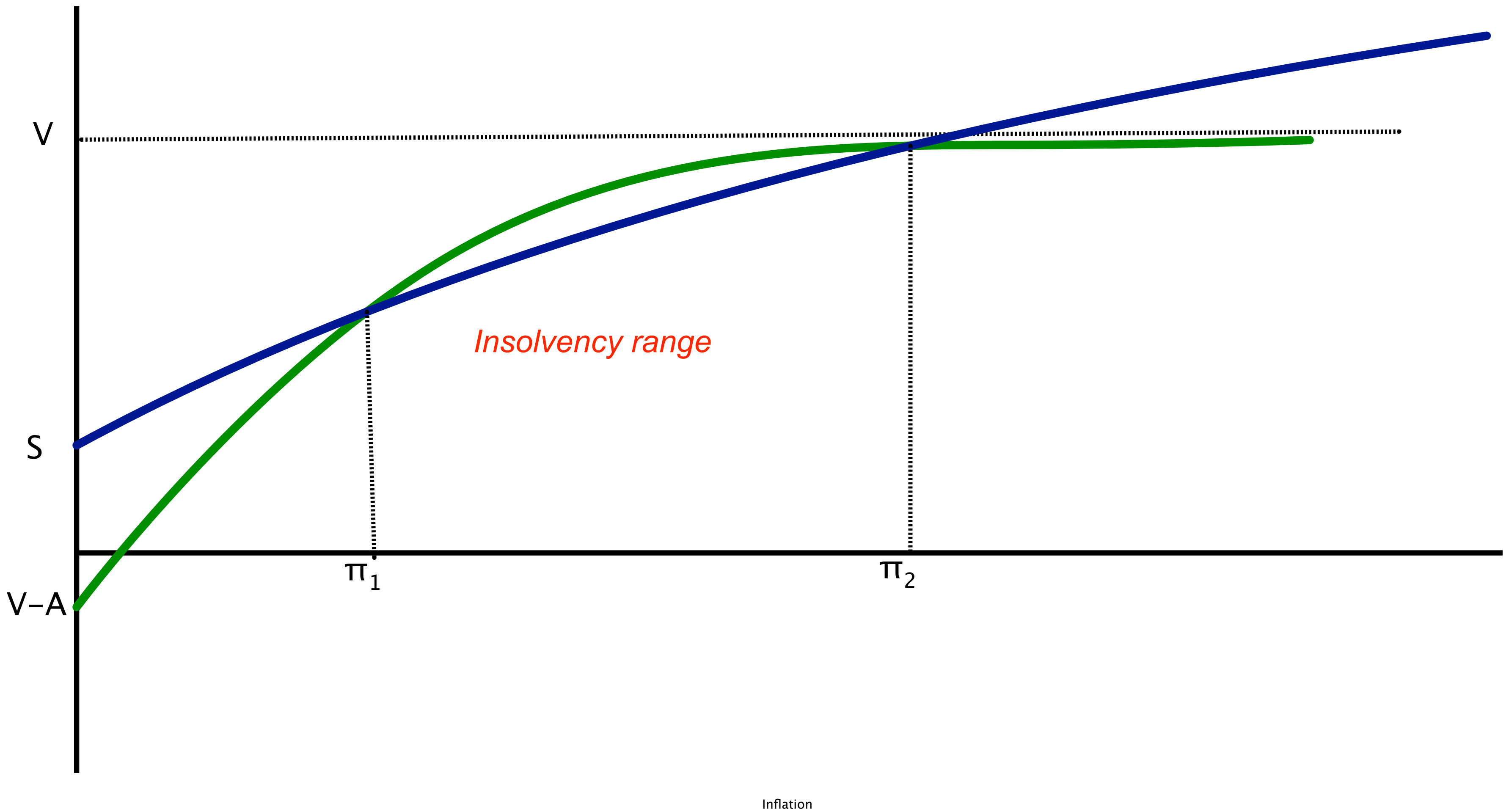
-- lowers real value of nominal bonds held.

(Irony of government.)

Solvency and inflation



Solvency and inflation



3. Crucial input: seignorage

If *v* is velocity (*PY/M*), in steady state:

$$\frac{S}{Y} = (\pi + g)v^{-1}(\pi)$$

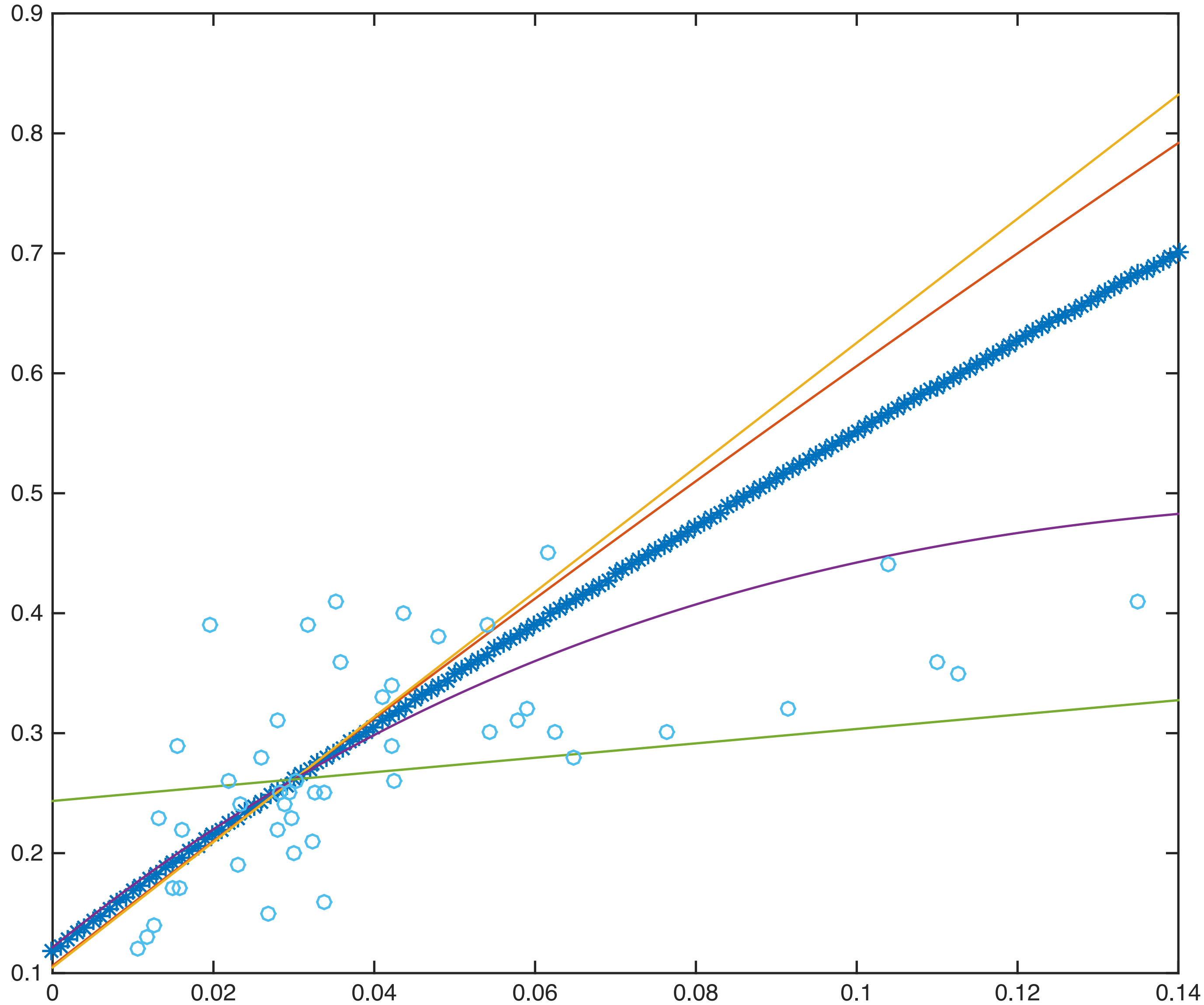
Del Negro and Sims: $v^{-1} \propto -\frac{1}{\psi_1}\ln(r+\pi)$

Log-log function: $\ln v^{-1} \propto \psi_1 \ln(r+\pi)$

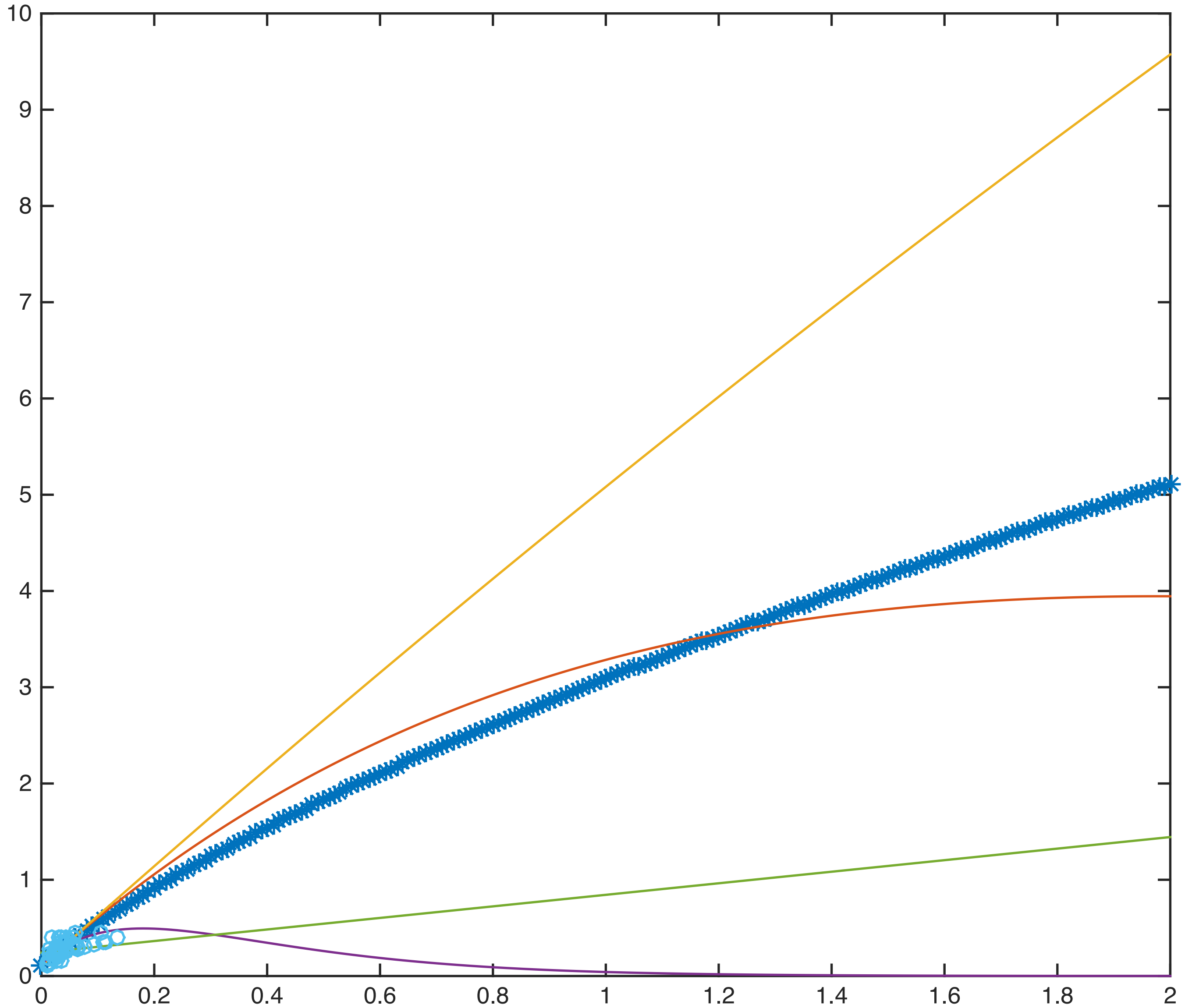
Semi-log function: $\ln v^{-1} \propto \psi_1 (r+\pi)$

Hilscher-Reis Raviv: $s/y = \gamma_0 + \gamma_1(L)\pi + \epsilon_t$

Which one fits best?



For larger values, really guessing



Conclusion

Many contributions: (i) discussion of insolvency, (ii) inflation scares as source of losses, (iii) extend intertemporal-solvency approach, (iv) large changes in dividends still always solvent, (v) self-fulfilling crises if endogenize inflation target.

My comments:

1) Meaning of insolvency and link to literature.
2) Steady-state presentation of multiple equilibrium.
3) Difficulty with pinning down seignorage.