

When does a Central Bank's Balance Sheet Require Fiscal Support? By Marco Del Negro and Christopher Sims

Comments by Luca Dedola

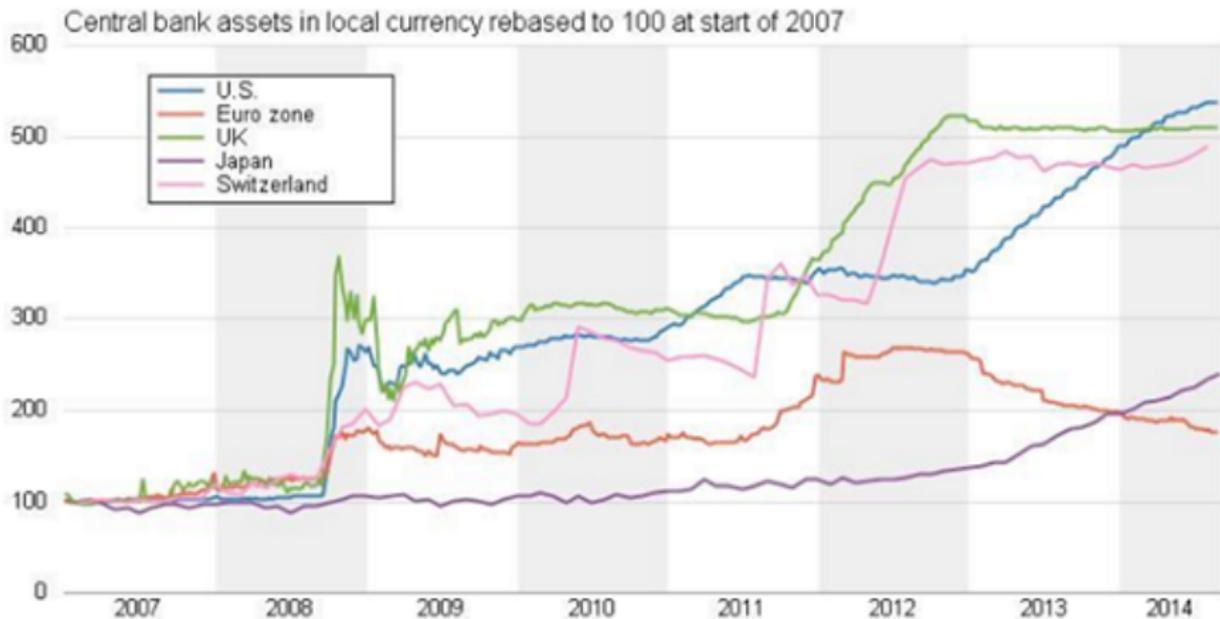
DG-Research, ECB and CEPR

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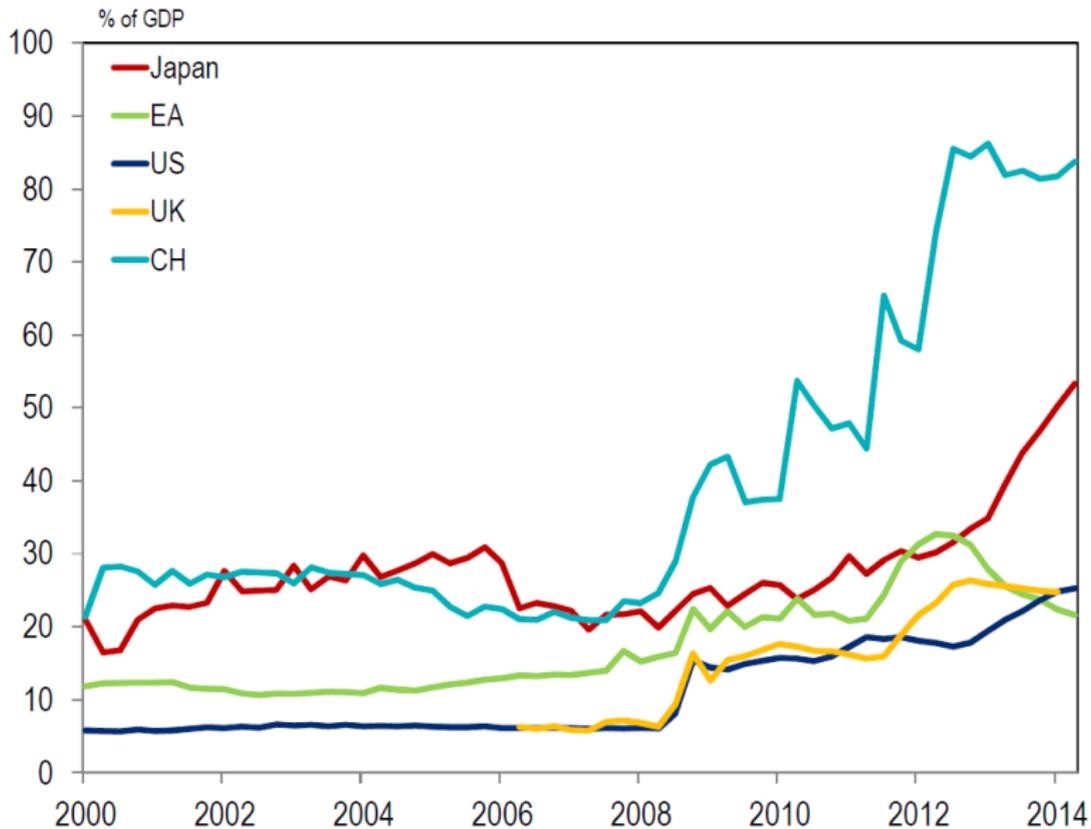
Central bank balance sheets since 2007



Source: Thomson Reuters Datastream, data to 8/27/2014

V. Flasseur @ReutersGraphic

Figure 1. Total assets of the leading central banks as a share of GDP



▶ **Motivation**

- ▶ Can large central banks' balance sheets pose problems in case of losses on risky assets holdings?
 - ▶ SNB suffered 30 billion CHF loss in 2015-Q1
- ▶ What is insolvency for a central bank? Is negative equity a problem?
- ▶ Does insolvency necessarily result in high inflation?

▶ **Why a new research question?**

"Of the ultimate solvency of the Bank of England, or of the eventual safety of its vast capital, even at the worst periods of its history, there has not been the least doubt"

Walter Bagehot, "Lombard Street", 14th ed., 1873, page 208.

- ▶ Recent answers not uncontroversial: Buiter (2008): "Can Central Banks Go Broke?"; Whelan (2012): "Can you really make losses printing money?"; De Grauwe and Ji (2013): "The value of the CB assets has no bearing for its solvency"; BIS (2013): "Keep equity positive in the face of losses"

Main results and policy messages

- ▶ **Paper touches on many key aspects**
 - ▶ Realistic computation of CB balance sheet risks
 - ▶ Risk of CB failing to pay remittances for some time (accounting insolvency)
 - ▶ Risk of CB losing control of inflation
- ▶ **CB insolvency not clear and present danger**
 - ▶ Expected PVD of seigniorage large, making CB insolvency unlikely despite current large expansion in balance sheets, unless currency disappears
 - ▶ The problem of not being able to pay remittances may be real, but it is not a major one for leading CBs
 - ▶ The major problem of central bank insolvency may be self-fulfilling inflation
- ▶ **Outstanding paper, frustrating to discuss, all bases covered, even says I'm right!**
 - ▶ CB insolvency risks not related to FTPL, even Buiter and Sims agree!
 - ▶ Shamelessly draw from Reis (2015) comments.

What I really like: Showing what is wrong with following statements

- ▶ "It makes no sense to state that the limit to the losses a CB can make at any point in time is given by the present value of future seigniorage (see Corsetti and Delada 2013). There is no such limit."

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- ▶ "What happens if the government defaults on its outstanding bonds? Default leads to losses for private holders of these bonds. But it is immaterial for CB-held bonds."
- ▶ "It is sometimes argued that if the CB has no assets (because of a default by the government), then it no longer has instruments to reduce the money stock. This may sometimes be necessary to reduce inflationary pressures. This argument does not hold water. The CB can issue interest-bearing bonds and sell them in the market. This has the effect of reducing liquidity (money base)."

- ▶ "Suppose that for reasons of reputation the member states decide to recapitalize the ECB. This will just be a bookkeeping operation without involving taxpayers. When national governments decide to recapitalize the ECB to make up for the loss of €1 billion, they transfer bonds to the ECB worth 1 billion, allowing the ECB to increase its equity by €1 billion. As a result, each government pays interest to the ECB in the same proportion to its capital share. But at the end of the year the ECB transfers these interest revenues back to the same governments using the same capital shares."

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- ▶ "The CB (that cannot default) needs no fiscal backing from the government (that can default)."

Comments and questions

- ▶ The (E)CB balance sheet
 - ▶ ECB has different assets and liabilities than e.g. Fed
- ▶ CB insolvency and the role of interest bearing reserves
 - ▶ Less emphasis on accounting insolvency due to remittances rules, not really relevant for ECB — see Hall-Reis (2015)
 - ▶ Intertemporal insolvency — interest-bearing reserves cannot be rolled over indefinitely as debt service requires a transfer of real resources
- ▶ The key role of seigniorage
 - ▶ Estimates of its PDV and relation with inflation
 - ▶ Abolishing currency does not sound such a good idea...
- ▶ Consequences of CB insolvency
 - ▶ Self-fulfilling inflationary equilibria
 - ▶ Alternative solution could be financial repression, reserves requirements
 - ▶ A further problem is that insolvency risk can make CB reluctant to act in crisis situations

Central banks' balance sheets: Size and composition

ECB has small amount of outright purchases (so far)

	Dates	Total Assets (% GDP)	Monetary Base (% GDP)	Outright Purchases (% GDP)	Outright Purchases (% total assets)
ECB	Latest	17.6	11.9	2.2	12.1
	Peak (June 2012)	26.2	18.0		
	2007	9.9	8.8		
FED	Latest	24.5	23.4	24.4	99.5
	2007	5.8	5.5		
Japan	Latest	59.1	54.7	53.1	89.9
	2007	16.3	17.1		
UK	Latest	22.6	20.8	20.9	92.4
	2007	5.4	4.4		

Sources: ECB, Federal Reserve, Bank of England, Bank of Japan.

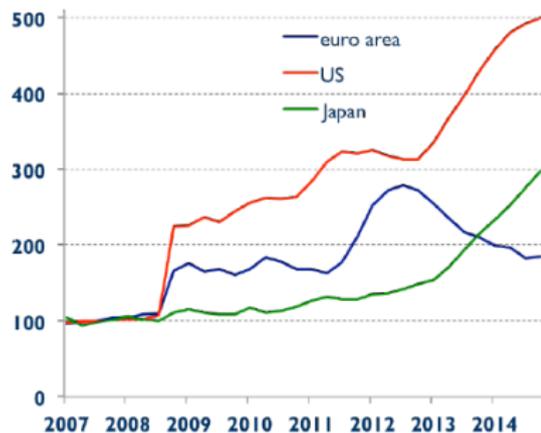
Note: 2014 GDP based on *OECD November 2014 Economic Outlook forecast*. Figure for Federal Reserve *monetary base* refers to October 2014.

Central banks' balance sheets and monetary base

Eurosystem less leveraged (0.5 trillion euros capital)

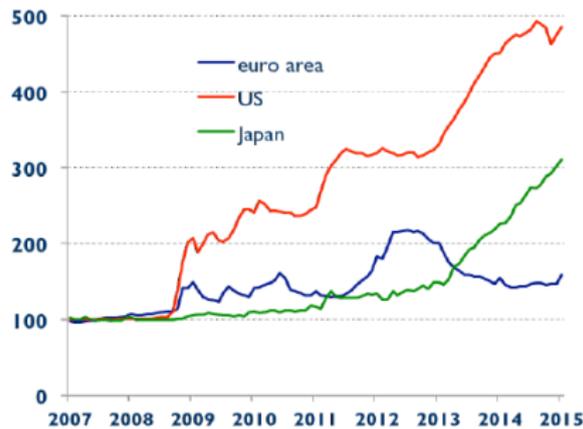
Central banks' balance sheets

(index 2007=100; quarterly data)



Monetary base

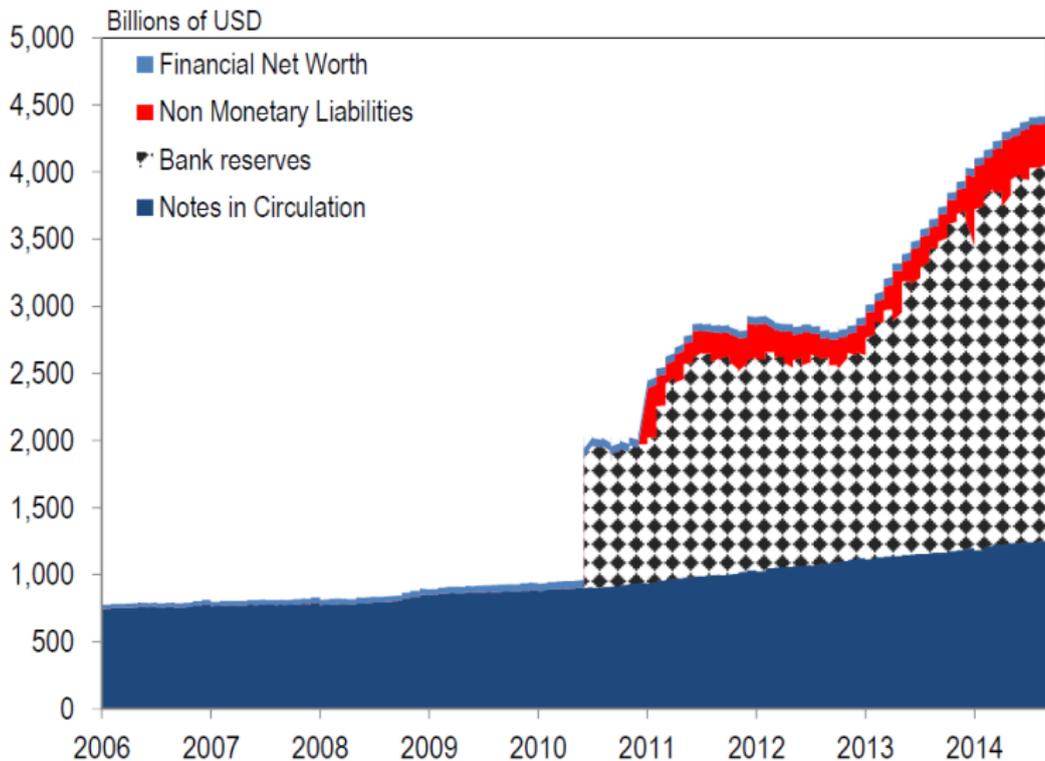
(index 2007=100; monthly data)



Sources: ECB, Federal Reserve Board, Bank of Japan and ECB staff calculations.

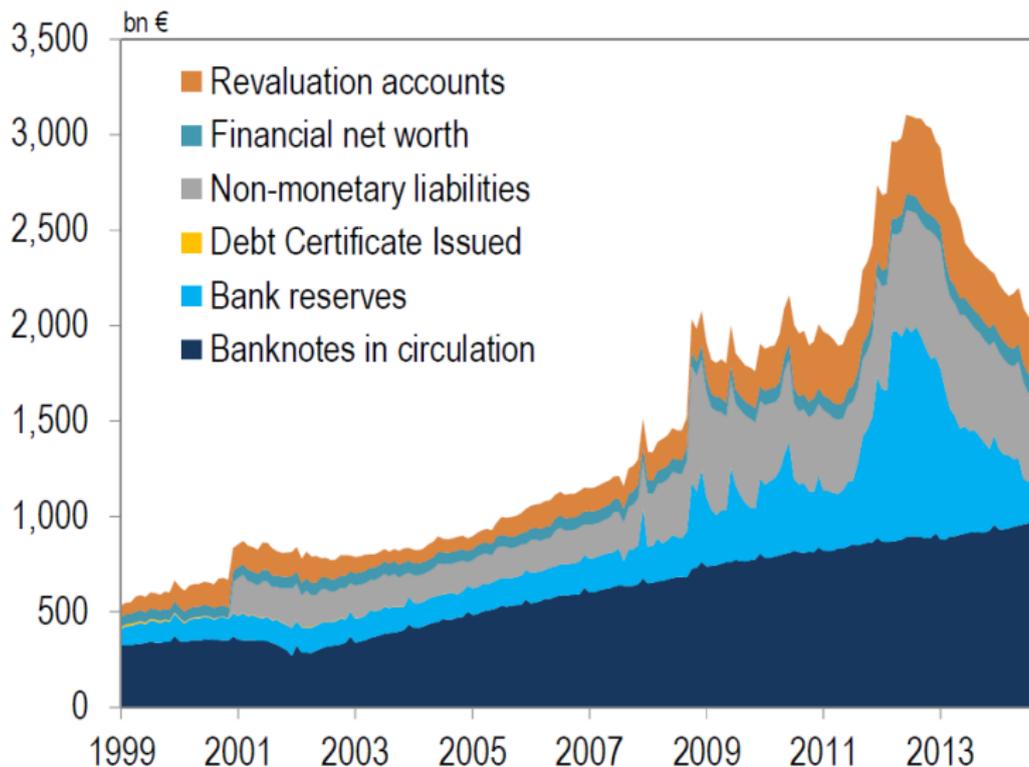
Note: Indices are based on quarterly averages of assets in national currencies. Data refer to the simplified balance sheet (methodology focusing on the monetary policy elements of the balance sheet). Last observation refers to December 2014.

Liabilities:



Source: Federal Reserve Board

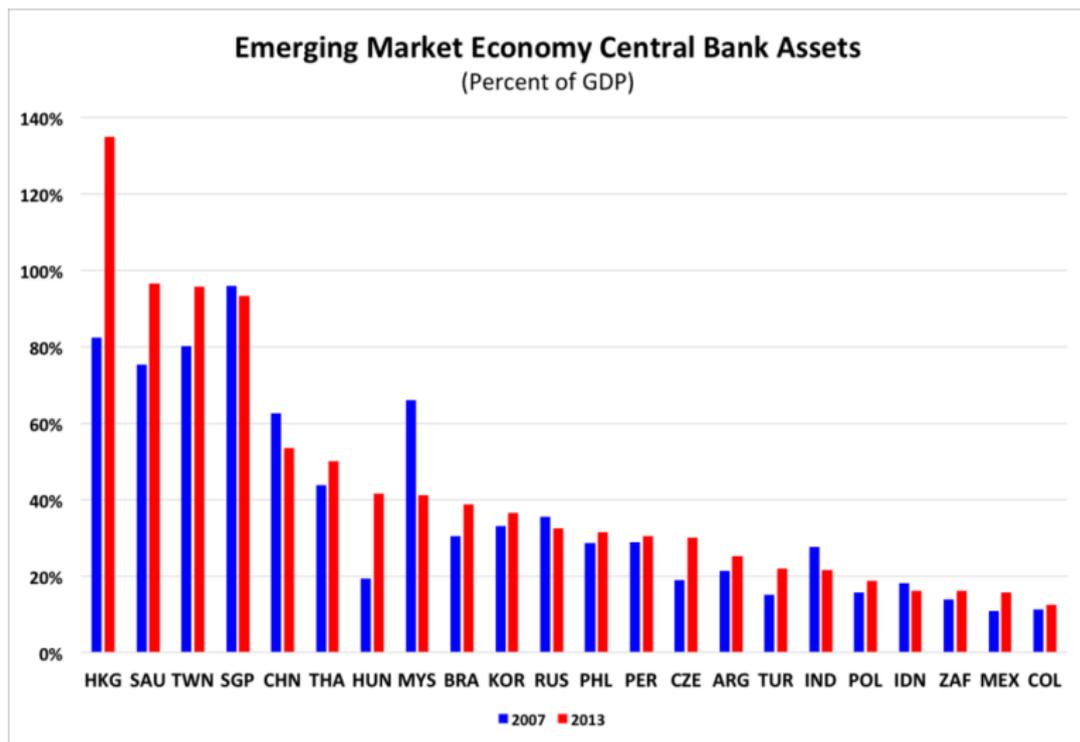
Liabilities



Source: European Central Bank

EMEs CBs have much larger balance sheets than AEs

Required reserves, financial repression



The evolution of the CB balance sheet and insolvency risks

- ▶ CB liabilities are non-interest bearing (M) and interest bearing (L), to finance assets A_t and generate net income n_t

$$p_t n_t + A_t = M_t - M_{t-1} + L_t - (1 + i_{t-1}) L_{t-1} + R_t A_{t-1}$$

- ▶ H includes remunerated (mandatory) reserves, M non-remunerated
 - ▶ A include gold, bonds, loans to banks
- ▶ Balance sheet insolvency (liabilities $>$ assets) is not relevant for CB, because of future revenues from seigniorage
 - ▶ But self-recapitalisation through seigniorage may generate undesirably high rates of inflation

Traditional CB balance sheet

- ▶ Textbook balance sheet $L = A = 0$

$$n_t = \frac{M_t - M_{t-1}}{p_t} = s_t, \text{ net seignorage}$$

$$s_t = v(i_t) - v(i_{t-1}) / (1 + \pi_t),$$

trend growth in currency ensures positive *nominal* seignorage

- ▶ Hall and Reis (2015) show that traditional balance sheet management meant that $A - M - L$ roughly constant (open market operations), meaning net income always positive

$$n_t = \frac{i_t (A_t - L_t)}{p_t} = i_t \frac{M_t}{p_t}$$

CB balance sheet risks after the crisis

- ▶ Del Negro-Sims: Maturity mismatch, but also default risk or exchange rate risk imply we should worry about intertemporal solvency; iterating budget constraint forward yields PDV of net income

$$\begin{aligned} PDV(n_t) &= PDV(s_t) + q_t a_{t-1} - l_{t-1} + \lim_{T \rightarrow \infty} E_t [m_{t,T} (a_T - l_T)] \\ &\leq PDV(s_t) + q_t a_{t-1} - l_{t-1} \end{aligned}$$

The last term on the right-hand side shows that an increase in dividends funded by extra liabilities must be sustained by higher liabilities forever. For this to work, the private sector must be willing to lend these resources to CB.

- ▶ Whether there is a bubble on currency, or not, L are, by definition, liabilities which private agents do not value beyond their return.
- ▶ CB should not be able to run a Ponzi scheme on these liabilities because no private agent would accept to be on the other side.

Realistic computation of balance sheet risks: How large is PDV(seigniorage)?

- ▶ PDV of seigniorage plays a key role, but how large is it at inflation target?

$$s_t/y_t = v(i_t) - v(i_{t-1}) / [(1 + \pi_t)(1 + g_t)]$$

- ▶ DNS assume $s_t/y_t = 0.23\%$, discounted at rate $\frac{1+\rho}{1+g} - 1 \simeq 2\% - 1.75\% \Rightarrow PDV(s) = 95\%$ of US GDP.
- ▶ How reliable are these estimates? Reis (2015) argues that uncertainty is quite large, DNS estimates in upward range.

Realistic computation of balance sheet risks: How large is PDV(seigniorage)?

- ▶ Could not easily compute average seigniorage for euro area, different approach
- ▶ Buiter (2014) assumes semi-log money demand with constant growth rate $1 + \mu = (1 + \pi)(1 + g)^\alpha$:

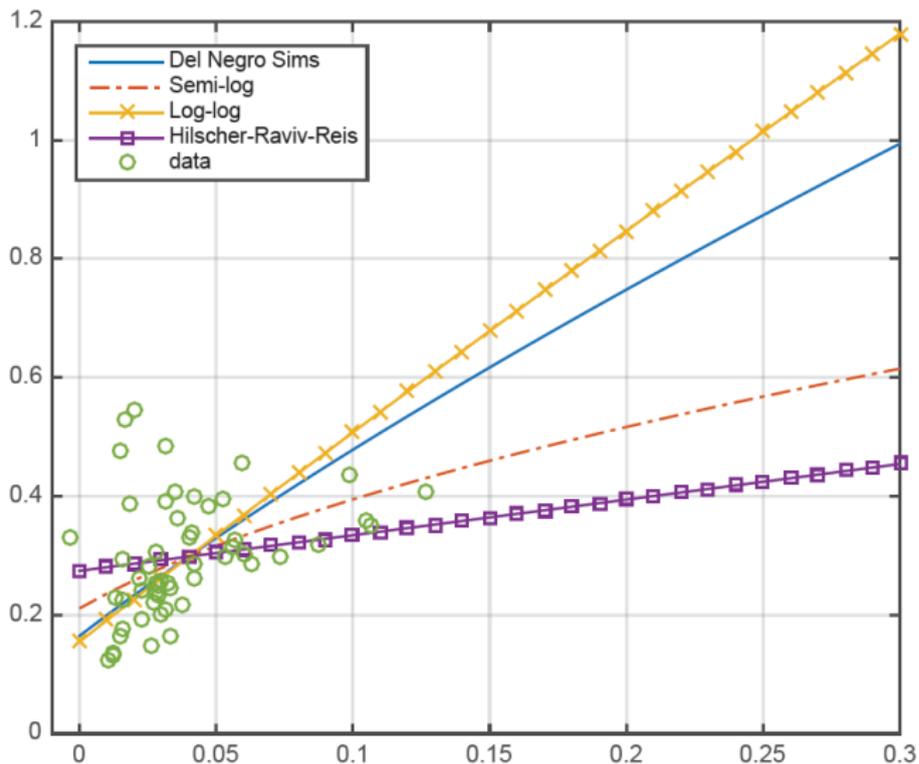
$$PDV(s) / Y = \frac{1 + i}{i - \mu} \mu \frac{M}{PY}$$

- ▶ Assuming $i = \rho + \pi = 4\%$, $g = 2\% \Rightarrow PDV(s) = 50\%$ of US GDP ($\alpha^{US} = .8$), 90% of EA GDP ($\alpha^{EA} = .9$).

Realistic computation of balance sheet risks: How does seigniorage depend on inflation?

- ▶ The key result is that as policy rates normalized, bond prices, money demand and inflation will react
 - ▶ Offsetting each other?
- ▶ Quantitative results sensitive to vI , match data on velocity
 - ▶ Also sensitive to size of capital losses, policy rule
- ▶ Reis (2015): Pinning down how seigniorage varies with inflation even harder than computing its PDV

Figure 2: Different models of seignorage (% of GDP) against inflation



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- ▶ US inflation mainly single digit, what would really happen with run-away inflation?
 - ▶ US currency held abroad, switching to foreign currencies?

Inflationary risks of lack of fiscal backing and support

- ▶ Fiscal backing: Necessary out of equilibrium to rule out pathologies due to Taylor rule — explosive paths, liquidity traps.
- ▶ Fiscal support: Necessary to rule out self-fulfilling inflationary equilibria.

Inflation indeterminacy due to solvency

- ▶ Approximate CB intertemporal budget constraint — Reis (2015):

$$\frac{a_t}{\rho + \pi + \delta} - l_t + y_t \frac{\pi}{\rho} v(\rho + \pi) \geq PDV(n_t) = 0,$$

assume constant $r, g = 1, \pi$, average maturity δ and inverse velocity $v'(i) \leq 0$.

- ▶ Permanently higher π lowers the real value of the long-dated nominal bonds a_t , and though it can increase the present value of seignorage, LHS can be decreasing for some range of inflation.
- ▶ In this case, there is a "Laffer curve" in (expected) inflation and multiple equilibria can arise — e.g. see Bassetto (2002).
 - ▶ "Laffer curve" could arise even with constant velocity, $v' = 0$.

- ▶ Depending on the size of the balance sheet l_t , LHS can be always positive for positive inflation, or potentially it can be negative in a range between two levels of positive inflation (π_l ; π_h).
 - ▶ If the central bank is committed to stay intertemporally solvent, then all inflation rates outside of the interval (π_l ; π_h) are consistent with an equilibrium.
 - ▶ If the central bank is commanded by the fiscal authorities to deliver a particular level of dividends, say zero for simplicity, then there are two possible equilibria, (π_l ; π_h).
- ▶ What is exactly the role of CB policy, lack of commitment? More or less than fiscal authority?
- ▶ Trade-off self-fulfilling inflation or e.g. impose reserve requirements?

Bottom line

- ▶ Timely comprehensive analysis, with reassuring message on CB balance sheet risks
- ▶ Central banks subject to no Ponzi scheme conditions, intertemporal solvency constraint
- ▶ Fiscal support may be needed to rule out inflation indeterminacy, CB as solvent as fiscal authority
- ▶ Seigniorage as a reliable CB income source is crucial, but also strong legislative provisions on CB financial independence