QE in the Future: The Central Bank's Balance Sheet in a Fiscal Crisis

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QE in the future: the central bank's balance sheet in a fiscal crisis
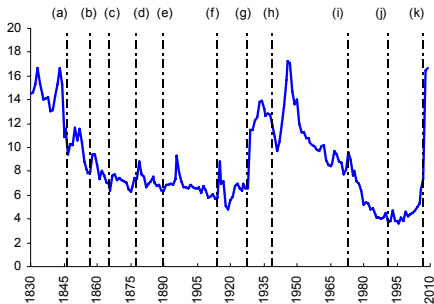
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Introduction: large balance sheets

**Chart 2: Bank of England balance sheet
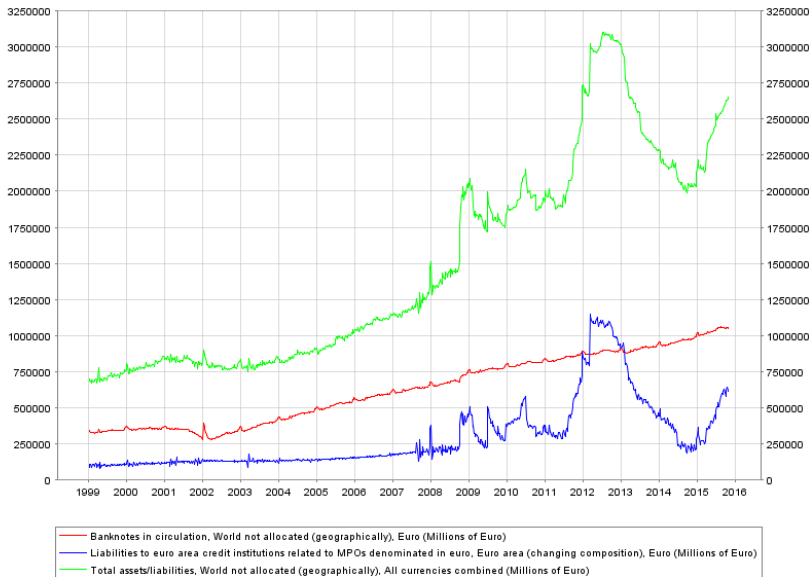as a percentage of annual nominal GDP**

(a) Famine / End of railroad boom (1847)
(b) Overextension of credit from 1855-1866 (1857)
(c) Failure of Overend Gurney (1866)
(d) Failure of City of Glasgow Bank (1878)
(e) Support for Barings (1890)
(f) WWI (1914)
(g) Currency and Bank Note Act (1928)
(h) World War II (1941)
(i) Secondary Banking Crisis (1973)
(j) Small Banks Crisis (1991)
(k) Current Crisis (2007)

Notes: The balance sheet observations are end-February for 1830-1966, end-year for 1967-2008, and November for 2009.
Sourced: Consensus forecast, ONS, Bank of England calculations . A variant of this chart was originally published in a speech by Andy Haldane (Chart 5, of 'Banking on the State')

Introduction: funded by reserves

Banknotes in circulation, World not allocated (geographically), Euro (Millions of Euro)
Liabilities to euro area credit institutions related to MPOs denominated in euro, Euro area (changing composition), Euro (Millions of Euro)
Total assets/liabilities, World not allocated (geographically), All currencies combined (Millions of Euro)

Source (all series) : European Central Bank

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Figure 2. The maturity of assets of the Fed: old versus new-style central banking
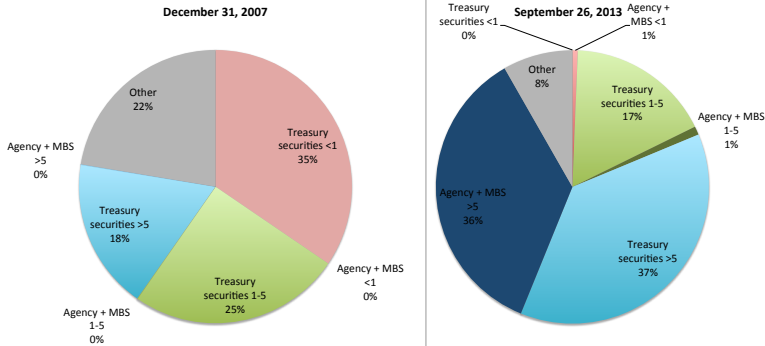
Source: Reis (2013a)

QE in the future

- If motivation was financial crisis and zero interest rates, no.

- In the future: fiscal crisis looming. QE in a fiscal crisis?

- Some might say absolutely not:
  - Interest rates are high, not low, in a fiscal crisis.
  - No problem in transmission mechanism.
  - Treasury debt management is a perfect substitute for QE.
  - QE is stealth monetary financing of the deficit.
  - QE delays fiscal reforms.

- Two arguments for QE, counter to these objections.

1. A MODEL OF MONETARY POLICY

▶ Fiscal policy picks $\{f_t, \delta_t, b_t, B_t\}$ subject to $\{g_t\}$, $f_t < \bar{f}_t$, and budget constraint:

$$\delta_t(b_{t-1} + q_t B_{t-1}) = p_t(d_t + f_t - g_t) + q_t b_t + Q_t B_t.$$

▶ Monetary policy picks $\{i_t, v_t, h_t, b_t^c, B_t^c\}$ subject to $\{s_t\}$ and:

$$v_t - v_{t-1} = i_{t-1} v_{t-1} + q_t b_t^c + Q_t B_t^c - \delta_t(b_{t-1}^c + q_t B_{t-1}^c) + p_t(d_t - s_t)$$

Financial sector

- Capital is a perishable fixed input into production owned by households $(1 - \kappa)$, unproductive banks $\kappa(1 - \omega)$ and banks matched with firms $\kappa\omega$.

- Interbank market, x_t but must hold collateral:

$$(1 - \xi)x_t \leq q_{t-1}b_{t-1}^p + v_{t-1}$$

- Deposit market, z_t subject to having enough net worth (skin in the game):

$$(1 - \gamma)(1 + r_t)(n_t + z_t) \leq (1 + r_t)(n_t + z_t) - z_t$$

Households and firms

▶ Standard 3-equation New Keynesian setup with a few simplifications
  ▶ money in the utility function,
  ▶ risk-neutrality,
  ▶ extensive margin, love of variety, no scale effects $k^* = 1$,
  ▶ some prices set one period ahead, price dispersion Δ_t.

▶ Welfare is

$$\mathbb{E}_t \sum_{\tau=0}^{\infty} \beta^\tau y_{t+\tau}^* \left[\frac{y_{t+\tau} - k_{t+\tau} + k^*}{y_{t+\tau}^*} - \left(\frac{y_{t+\tau}}{y_{t+\tau}^*} \right)^{1+\alpha} \frac{\Delta_{t+\tau}^{1+\alpha}}{1+\alpha} \right]$$

Price dispersion and capital underutilization lower welfare.

THE FISCAL CRISIS AND QE

▶ The only source of uncertainty: at date 0 everyone learns that at date 1, with probability $1 - \pi$, $\bar{f}_t = \bar{f} - \phi$, while otherwise $\bar{f}_t = \bar{f}$.

▶ Assumptions (i) initial debt not too high, (ii) extent of fiscal crisis ϕ is large enough.

▶ *Quantitative easing*, consists of changes in the balance sheet such that: $\hat{v}_t = q_t \hat{b}_t^c + Q_r \hat{B}_t^c$

▶ Monetary policy target $p_t^* = 1$, accommodate currency demand h_t.

2. QE in normal times

Proposition

If $\phi = 0$ and the fiscal authority chooses f_t so that
$f_t = (1 - \beta)(v_{-1}/\beta + b_{-1} - b^c_{-1} + \beta B_{-1} - \beta B^c_{-1}) - s + g$ at all
dates, and issues enough bonds $\beta b_t \geq (1 - \xi)(1 - \omega)\kappa$ at all
dates, then the economy reaches the efficient outcome.

- ► The equilibrium is independent of $\{v_t, b^c_t, B^c_t\}$.
- ► QE is neutral in normal times.
- ► Consolidated liabilities of the government:
  $(1 + i_{t-1})v_{t-1} + b_{t-1} - b^c_{t-1} + q_t(B_t - B^c_t)$
- ► Wallace neutrality: even in a crisis, if $\delta_t = 1$, QE is neutral because reserves and short-term bonds are perfect substitutes.

3. Effect of QE on inflation

If committed to $\delta_t = 1$, but fiscal dominance over the price level, p_t must adjust, central bank sets i_t accordingly.

In this case, $k_t = k_t^*$ but $\Delta_t > 1$ and:

1. The price level is on target after the crisis, $p_t = 1$ for $t \geq 2$.
2. The price level is higher during a crisis: p_1 is higher in the crisis state of the world.
3. QE at date 0 using long-term bonds ($\hat{v}_0 = Q_0 \hat{B}_0^c$), leads to a smaller dispersion of inflation.
4. QE at date 0 has no effect on $\mathbb{E}_0(1/p_1)$ or on p_0.
5. QE at any other date has no effect.

QE and aggregate demand and welfare

- Intuition: QE changes the maturity of privately-held debt, thus the needed inflation for a same-sized change in the real value of the debt.

- Effect is through surprise inflation.

- Surprise inflation affects aggregate demand: QE leads to smaller output gaps via the Phillips curve.

- Welfare: QE can raise welfare by reducing price dispersion and price surprises.

4. Effect of QE on default

▶ Prices on target, so $p_t = 1$. Default is inevitable.

▶ First result: fiscal authority chooses $f_t = \bar{f}$.

▶ Second result: QE lowers recovery rate.

$$\delta_1 = 1 - \frac{\phi}{\frac{\bar{f}+s}{(1-\beta)} - \frac{v_0}{\beta}}$$

▶ Third result: QE has no effect on the size of the transfer from private to public sector.

QE and ex post ank losses

- Deposits when IC binds:

$$z_t = \left(\frac{\gamma(1+r)}{1 - \gamma(1+r)} \right) [\omega\kappa - b_0^p(1 - \delta_1)$$

- Result: fiscal crisis lowers net worth, deposits and credit.

- Result: QE lowers b_0^p, lowers bank losses, raises credit.

- Intuition: QE gives banks a shield against default. Losses now in central bank dividends, and as a result less resources for government per δ, so in equilibrium lower recovery rate. QE transfers resources from households to banks in a fiscal crisis.

QE AND EX ANTE MARKET FREEZES

- Interbank loans when IC binds:

$$x_1 \leq \left(\frac{\beta}{1-\xi}\right)[(\pi + (1-\pi)\delta_1)b_0^p + v_0].$$

- First result: The larger is the fiscal crisis (higher ϕ so lower δ_1) or the more likely (lower π), lower right-hand side.

- Second result: Since $b_0^p \leq b_0$, can have $x_1 < \kappa(1-\omega)$ market freeze, not enough safe collateral. Lower credit.

- Third result: QE that buys risky (long-term) bonds relaxes constraint, increases credit, output and welfare.

- QE increases supply of safe assets via reserves.

5. What is special about reserves?

1. Held exclusively by banks.

2. Supplied exclusively by central bank, set interest rate.

3. Default free.

4. Unit of account.

QE versus Treasury debt management

Can a choice of $\{b, t, B_t\}$ reach the same outcome as QE, independently of the central bank's actions?

No

Because of four properties of reserves

- ▶ Effect on inflation: only if the central bank chooses an $\{i_t\}$ policy that is consistent with it.
- ▶ Effect on default recovery rate: reserves are default free, bonds are not.
- ▶ Effect on bank losses: marginal holder of bonds is household, not banks.
- ▶ Effect on safe assets: bonds not unit of account, their value falls in crisis.

QE versus monetary financing

Is QE monetary financing of the debt?
<div align="center">No</div>

1. QE generates no revenues for government.
2. QE lowers the recovery rate.
3. QE causes no inflation.

Alternative: $\hat{m}_t = q_t \hat{b}_t^c + Q_t \hat{B}_t^c$ using currency:

1. not be as effective since marginal holder are households,
2. comes with inflation,
3. raise seignorage.

Limitations of QE

1. Central bank solvency

2. It involves redistribution

3. Needs to be targeted in maturity and/or risk.

6. Conclusions

▶ Standard model of monetary policy to study QE but without limits to arbitrage or a binding ZLB.

▶ QE is neutral in normal times. With fiscal crisis, QE can play two roles, consistent with the traditional targets of the central bank:

  1. Stabilize inflation by managing the sensitivity of inflation to fiscal shocks.
  2. Prevent a credit crunch by lowering bank losses and providing safe assets.

▶ QE is not the same as debt management and it is not monetary financing of the deficit.