
Government and Central Bank Balance Sheets, Inflation and Monetary Policy

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1 What determines the level of prices?

Two ways to think about the price level

- The rate at which “money” trades for “goods”.
- The rate at which mature government nominal bonds trade for “goods”.
- Both of these definitions are true simultaneously — that’s the definition of a “nominal bond”.

The price level in a world without interest-bearing government debt

Transactions theory:

$$\frac{M}{P} = kY$$

therefore

$$P = \frac{M}{kY}.$$

The price level in a world without money

$$\frac{B}{P} = \frac{\tau}{\rho}$$

τ : primary surplus (taxes - expenses + interest on the debt) ρ : real interest rate
Therefore

$$P = \frac{B\rho}{\tau}$$

Where does the debt equation come from?

$$\begin{aligned} B_t &= R_{t-1}B_{t-1} - \tau_t P_t \\ \frac{B_t}{P_t} &= \frac{R_{t-1}P_{t-1}}{P_t} \frac{B_{t-1}}{P_{t-1}} - \tau_t \\ \frac{B_t}{P_t} &= \frac{R_{t-1}P_{t-1}}{P_t} \frac{B_{t-1}}{P_{t-1}} - \tau_t \\ \frac{B_t}{P_t} &= E \left[\sum_{s=1}^{\infty} \frac{\tau_{t+s}}{(1+\rho)^s} \right] \end{aligned}$$

2 Separating monetary and fiscal policy?

Monetary and fiscal variables

- Fiscal policy: Taxes, expenditures, budgets, government debt
- Monetary policy: Interest rate, money supply, inflation

Monetary-fiscal interactions

- Interest rate changes (M) produce changes in the “interest expense” item in the budget (F), thereby (depending on whether and how much taxes and expenditures react) producing changes in the growth rate of government debt (F).
- Central banks (M) hold earning assets (usually bonds) to back the currency they issue, which does not earn interest. This gives the banks a stream of revenue, called “seigniorage”, which they generally turn over to the treasury (F).

- Increased inflation (M) reduces the real burden of the stream of future payments specified in long term government bonds (F).

Monetary or fiscal dominance

- A fiscal authority that controlled *every* component of the budget would control seigniorage and interest expense, and in doing so would effectively determine monetary policy.
- A monetary authority that controls seigniorage and interest rates does not control taxes and expenditures, but as we shall see, it imposes a long term relation between the two.

3 Rules of the road for monetary and fiscal policy

Central bank independence

- The central bank's job is to control inflation and the business cycle — not the level of interest expense in the government budget.
- The legislature and treasury are not to complain about fluctuations in the amount of seigniorage revenue turned over to them.
- In effect, certain types of fiscal effects of monetary policy are accepted passively by the fiscal authorities.
- This convention is always subject to re-examination if the fiscal impacts become too noticeable — if seigniorage shows a sudden, large drop from a previously stable level (or even becomes negative), e.g., or if interest expense becomes a large fraction of the total budget.

Implications for fiscal policy of central bank independence

- CB independence means the legislature must eventually cover debt issues with future taxes — otherwise, since the central bank is not controlling the interest expense, the debt will grow in real value without bound at the real rate of interest.

- This is impossible, because someone has to be willing to hold debt that is issued. Eventually, without inflation, the debt holders will feel so rich they will try to spend their wealth, creating excess demand until the CB devalues the debt by allowing inflation.

The old US model: No central bank balance sheet risk.

- Liabilities: mainly currency outstanding, reserve balances.
- Assets: Mainly US government debt, and mainly fairly short maturities.
- Exchange rate movements or inflation can change the value of the dollar, but since assets and liabilities are all in dollars, no effect on net worth.
- Changes in long interest rates can change the market value of long bonds, but since the assets are mainly short term, this effect is minor.
- The US government is extremely unlikely to default outright on its nominal bonds, in part because when this might be an attractive possibility, inflation to reduce the value of the debt is easier and more efficient.

The old(?) European Central Bank model: Foreign reserves, no fiscal counterpart

- Their assets and liabilities are in different denominations, because they have large non-Euro reserves.
- There is no single fiscal counterpart to pressure them over seigniorage or interest expense, and the defining documents for the ECB forbid such pressures in any case — indeed seem to discourage any kind of communication with fiscal authorities.
- So in principle they do face some balance sheet risk.

How central banks get into balance sheet trouble

- Surprise upward movements in the value of domestic currency, when foreign reserves are a big component of assets.

- Issuing bonds, or taking interest-bearing deposits, in domestic currency, which require higher interest rates than foreign currency reserves are paying. (Korea, Israel at one point, e.g.)
- Taking on private sector assets in exchange for bonds as part of a “bailout”, with the private sector assets turning out to be worth much less than the bonds. (Mexico, many others.)

Should the central bank care about its balance sheet?

- Naive answer: Of course not, since they can always “print money” to pay for anything they owe.
- Correct answer: Yes, if the central bank is responsible for controlling inflation.
- Open market operations to restrain inflation: Sell assets to put upward pressure on interest rates and reduce high-powered money.
- If the CB’s stock of assets is well below the total value of its liabilities, there will be limits to how sharply it can tighten without running out of assets to sell.
- Some CB’s in this situation (running out of assets) have issued interest bearing debt on their own account (e.g. Korea) or taken in deposits bearing market interest rates (Israel). These have non-traditional fiscal impacts — in effect an unelected body is generating potential future fiscal burdens and competing with the Treasury in the bond markets.

The CB balance sheet and CB independence

- If the CB’s net worth is negative and it cares about inflation, it needs fiscal backing.
- It might simply receive a donation of government bonds from the Treasury, which restores its net worth.
- Or it might receive enough from the Treasury to cover negative seignorage, so that its net worth slowly increases.
- The need to make a request for such support, though, provides an opening for the Treasury to press its concerns about interest rate and open market policy.

4 What has happened recently? Historic change.

- In a matter of weeks, the Fed has wiped away the traditional Fed balance sheet model.
- Its assets are no longer mainly government bonds: They are mainly loans to the private sector.
- More than 25% of its liabilities are in the form of a special deposit from the Treasury. This has in itself major implications for Fed independence.
- It has begun to pay interest on deposits, at rates that are comparable to the Fed Funds rate.

The Fed balance sheet: Assets

	week ending 10/22/2008	Change from 10/24/2007
Reserve Bank credit	1,803,300	944,345
Securities held outright	490,633	-288,947
U.S. Treasury	476,528	-303,052
Federal agency	14,105	14,105
Repurchase agreements	80,000	42,286
Term auction credit	263,092	263,092
Other loans	418,580	418,286
Primary credit	105,754	105,612
Primary dealer and other broker-dealer credit	111,255	111,255
Asset-backed commercial paper money market mutual fund liquidity facility	114,219	114,219
Other credit extensions	87,332	87,332
Net portfolio holdings of Maiden Lane LLC	29,137	29,137
Float	-1,048	-558
Other Federal Reserve assets	522,906	481,050
Gold stock	11,041	0
Special drawing rights certificate account	2,200	0
Treasury currency outstanding	38,773	92

The Fed Balance sheet: liabilities

Currency in circulation	854,517	41,706
Reverse repurchase agreements	98,110	61,384
Foreign official and international accounts	73,110	36,384
Dealers	25,000	25,000
Treasury cash holdings	276	-46
Deposits with F.R. Banks, other than reserve balances	554,927	542,895
U.S. Treasury, general account	23,166	18,120
U.S. Treasury, supplementary financing account	524,771	524,771
Foreign official	254	155
Service-related	6,138	-441
Required clearing balances	6,138	-441
Adjustments to compensate for float	0	0
Other	598	289
Other liabilities and capital	46,213	4,273
Total factors, other than reserve balances, absorbing reserve funds	1,554,044	650,212
Reserve balances with Federal Reserve Banks	301,270	294,225

Implications of the shift

- It should be clear that there are risks to central bank independence from every one of these changes.
- The Fed is in a position where it could suffer substantial capital losses not offset by reductions in its liabilities.
- The large Treasury deposit gives the Treasury potential leverage over monetary policy.
- This is why Bernanke insisted that the most recent drastic measures — purchasing even riskier assets, taking capital positions in banks — be taken outside the Fed’s balance sheet and be approved explicitly by Congress.
- But even the measures the Fed has taken without explicit Congressional approval have potential fiscal impacts far beyond that of traditional open market operations in Treasury debt.

Are we seeing a big monetary expansion?

- The balance sheet of the Fed has approximately doubled in the last year.

- If told this a year ago, most economists would have said this represented a huge monetary expansion.
- But it does not, because it did not take place by the traditional route of expanding liabilities and assets by printing money and using it to buy bonds.
- The monetary base has expanded dramatically — over 20% in the last month, 15% in the last week, but *excess* reserves — reserves in excess of reserve requirements — which used to be a tiny fraction of the total, are now the same order of magnitude as required reserves.
- These “reserves” are interest-bearing assets, and banks are holding them as safe assets.

The flight to liquidity

- The Fed has been trying to make banks confident enough in each other to lend to each other, and confident enough in themselves to lend to businesses.
- It has been doing this by systematically taking illiquid private assets onto its balance sheet in exchange for Treasury securities and interest-bearing deposits with the Fed.
- The tremendous appetite for safety is reflected in the demand for these low-interest (less than 1%) Fed deposits, and also in the rise in the dollar despite the highly uncertain US fiscal prospect.

5 Where do we go from here?

Risk has an upside and a downside

- That the Fed is taking on risk does not imply that it will necessarily get into balance sheet trouble.
- The same holds for the broader fiscal risks being taken on by the Treasury through its own program of buying troubled assets and taking capital positions in banks and insurance companies.

Rosy scenario

- The panic subsides.
- The private assets the Fed and the Treasury have acquired prove saleable at prices better than their purchase prices.
- The tax burden of future generations is slightly reduced.
- The Fed goes back to its old balance sheet model; independence of monetary policy is preserved.

Bad luck: Deflationary spiral

- Even the tremendous interventions of the Fed and the Treasury prove too slow and too small to stem panic.
- Asset prices continue to drop.
- Bankruptcies snowball.
- Commodity price drops feed in to the general price level and deflation accelerates.
- Deflation only makes bonds still more attractive.
- Deflation makes Fed dollar-denominated assets rise in real value, while making more of the private loans it has acquired default — the Fed's balance sheet deteriorates.

Bad luck: Inflationary spiral

- The Fed's asset purchases turn out to be worth little.
- Possibly even without deflation, its balance sheet goes negative.
- Popular revulsion against Wall Street and the Fed makes it politically impossible for the Treasury to provide backing to the Fed.
- "No new taxes" political rhetoric becomes even more popular, so that investors come to see the US as unlikely to back its suddenly larger fiscal burden with future primary surpluses.
- So inflation spirals out of control.

Bad luck: Good policy

- That either or both of inflation and deflation could emerge if the assets acquired turn out to be worth little is both a frightening aspect of the situation and a key to its possible resolution.
- Several recent studies analyzing the great depression (e.g. Eggertsson, *AER*) have suggested that the only successful monetary/fiscal policy combination would have been one that convinced the public that policy would deliver *future* inflation at some target level.
- This would make government paper less attractive now, and thereby induce people to start spending.

Is Bad luck, good policy plausible?

- The fact that substantial fiscal effort may be required to avoid future inflation may help make it believable that some future inflation will emerge.
- Then, to avoid an inflationary spiral, it will have to be clear that when inflation is back into a low-single-digit target range, the fiscal backing to the Fed required to keep inflation from accelerating will be forthcoming.
- But this would require nimble, thoughtful policy-makers who are good communicators.

6 Conclusion

One sure thing

- Economists will have plenty to think and argue about.