When does a central bank's balance sheet require fiscal support?

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ABSTRACT

Using a simple, general equilibrium model, we argue that it would be appropriate for a central bank with a large balance sheet composed of long-duration nominal assets to have access to, and be willing to ask for, support for its balance sheet by the fiscal authority. Otherwise its ability to control inflation may be at risk. This need for balance sheet support — a within-government transaction — is distinct from the need for fiscal backing of inflation policy that arises even in models where the central bank's balance sheet is merged with that of the rest of the government.

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1. Introduction

Hall and Reis (2013) and Carpenter et al. (2013) have explored the likely path of the Federal Reserve System's balance sheet during a possible return to historically normal levels of interest rates. Both conclude that though a period when the system's net worth at market value is negative might occur, this is unlikely, would be temporary and would not create serious problems.[1] Those conclusions rely on extrapolating into the future not only a notion of historically normal interest rates, but also of historically normal relationships between interest rates, inflation rates, and components of the System's balance sheet.

In this paper we look at complete, though simplified, economic models in order to study why a central bank's balance sheet matters at all and the consequences of a lack of fiscal support for the central bank. Unlike some of the previous literature, we are not just concerned about periods of zero remittances to the fiscal authority. Rather, we ask whether the lack of fiscal support (that is, a commitment by the fiscal authority never to recapitalize the central bank) implies that the central bank is no longer able to maintain control of inflation, because doing so would lead to its insolvency. These issues are important because they lead us to think about unlikely, but nonetheless possible, sequences of events that could undermine economic stability. As recent events should have taught us, historically *ab*normal events do occur in financial markets, and understanding in advance how they can arise and how to avert or mitigate them is worthwhile.[2]

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[1] Christensen et al. (2013) study the interest rate risk faced by the Federal Reserve using probabilities for alternative interest rate scenarios obtained from a dynamic term structure model. They reach the similar conclusions as Hall and Reis (2013) and Carpenter et al. (2013). Greenlaw et al. (2013) conduct a similar exercise as Carpenter et al. (2013), but also consider scenarios where concern about the solvency of the U.S. government lead to capital losses for the central bank.

[2] Work by Stella (2005a,b) was among the earliest to bring out the potential importance of central bank balance sheets. A number of recent papers, including (Buiter and Rahbari, 2012; Corsetti and Dedola, 2012; Bassetto and Messer, 2013a; Benigno and Nisticó, 2014; Reis, 2013), also study the central bank's and the fiscal authorities' balance sheets separately. Bhattarai et al. (2013) discuss how the acquisition of long-term government debt by the central

Constructing a model that allows us to address these issues requires us to specify monetary and fiscal policy behavior and to consider how demand for non-interest-bearing liabilities of the central bank (like currency, or required reserves paying zero interest) responds to interest rates. As we show below, seigniorage plays a central role in determining the possible need for fiscal support for the central bank. But with a given policy in place, seigniorage can vary widely, depending on how sharply demand for cash shrinks as inflation and interest rates rise. An equilibrium model with endogenous demand for cash is therefore required if we are to understand the sources and magnitudes of possible central bank balance sheet problems.

In the first section below we consider a stripped down model to show how the need for fiscal support arises. In subsequent sections we make the model more realistic and try to determine how likely it is that the US Federal Reserve System will need fiscal support. In both the simple model and the more realistic one, we make some of the same generic points.

For the price level to be uniquely determined, fiscal policy must be seen to "back" the price level. Our first point consists in distinguishing this "backing" from what we call fiscal "support". The central bank cannot on its own provide fiscal backing. Cochrane (2011) has made this point carefully. Fiscal backing requires that explosive inflationary or deflationary behavior of the price level is seen as impossible because the fiscal authority will respond to very high inflation with higher primary surpluses and to near-zero interest rates with lower, or negative, primary surpluses. But even when fiscal policy is in place that guarantees the price level is uniquely determined and the behavior of inflation is driven by monetary policy, it is nonetheless possible that the central bank, if its balance sheet is sufficiently impaired, may need recapitalization in order to maintain its commitment to a policy rule or an inflation target. Such a recapitalization is a within-government transaction, unrelated to whether fiscal backing is present. Fiscal "support" is what we call a commitment by the treasury to recapitalize the central bank if necessary. Without fiscal support, a central bank that could otherwise implement its policy rule or hit its inflation target, may find that it must allow more inflation than it would like.

Second, a central bank's ability to earn seigniorage can make it possible for it to recover from a situation of negative net worth at market value without recapitalization from the treasury, while still maintaining its policy rule. Whether it can do so depends on the policy rule, the demand for its non-interest-bearing liabilities, and the size of the initial net worth gap.[3]

Last, in the presence of a large long-duration balance sheet, a central bank that is committed to avoiding any request for fiscal support (or a fiscal authority committed to providing none) can open the door to indeterminacy via self-fulfilling equilibria. Expectations of high inflation in the future can lead to capital losses that need to be filled by generating seigniorage, thereby validating the expectations.

2. The simple model

We first consider a stripped-down model to illustrate the principles at work. A representative agent solves

$$\max_{C,B,M,F} \int_0^\infty e^{-\beta t} \log(C_t)\, dt \quad \text{subject to} \tag{1}$$

$$C_t \cdot (1 + \psi(v_t)) + \frac{\dot{B} + \dot{M}}{P_t} + \tau_t + F_t = \rho F_t + \frac{r_t B_t}{P_t} + Y_t, \tag{2}$$

where C is the consumption, B is the instantaneous nominal bonds paying interest at the rate r, M is the non-interest-bearing money, ρ is a real rate of return on a real asset F, Y is the endowment income, and τ is the primary surplus (or simply lump-sum taxes, since we have no explicit government spending in this model). Velocity v_t is given by

$$v_t = \frac{P_t C_t}{M_t}, \quad v_t \geq 0, \tag{3}$$

and the function $\psi(\cdot)$, $\psi'(\cdot) > 0$ captures transaction costs.

The government budget constraint is

$$\frac{\dot{B} + \dot{M}}{P_t} + \tau_t = \frac{r_t B_t}{P_t}. \tag{4}$$

Monetary policy is an interest-smoothing Taylor rule:

$$\dot{r} = \theta_r \cdot \left(\bar{r} + \theta_\pi \left(\frac{\dot{P}}{P} - \bar{\pi} \right) - r \right). \tag{5}$$