Appendix

How do the Fed's operations affect the balance sheets of the Fed, banks, and nonbanks?

A fundamental feature of U.S. monetary policy implementation is the way in which the Federal Reserve's operations—such as securities purchases, overnight reverse repurchase agreement transactions, and term deposits—affect the balance sheets of not only the Fed, but also its key financial counterparties: banks and nonbanks. The Fed's balance sheet is reported to the public weekly on the H.4.1 statistical release at http://www.federalreserve.gov/releases/h41. The balance sheets of banks and nonbanks tend to be reported less frequently, typically at quarter ends. This appendix uses an accounting framework to walk through how the Fed's interactions with the private sector affect the balance sheets of the entities involved.

A.1 Federal Reserve securities purchases

The effects of Federal Reserve securities purchases are illustrated in Figures A1 and A2, which display simplified balance sheets for a financial nonbank entity, a bank, and the Federal Reserve. In the initial time period (Figure A1), a nonbank entity holds securities (S_N) and deposits (D_N) on the asset side of its balance sheet, with liabilities (L_N) and equity (E_N) counterbalancing. The bank holds securities (S_B), loans (LN_B), and reserves balances at the Fed (R) as assets, counterbalanced with deposits (D_B) and equity (E_B). The Federal Reserve's key asset is securities (S_F), main liabilities are reserves (R) and currency (C), and it holds capital (K).

Figure A1: Initial balance sheets

Nonbank entity

A	L + E
S_N	L_N
D_N	E_N

Bank

A	L + E
S_B	D_B
LN_B	E_B
R	

Federal Reserve

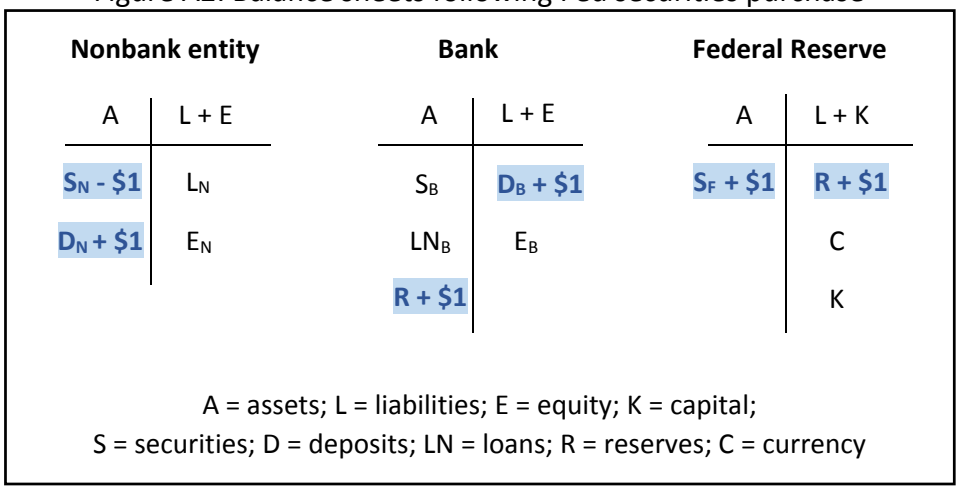
A	L + K
S_F	R
	C
	K

A = assets; L = liabilities; E = equity; K = capital;
S = securities; D = deposits; LN = loans; R = reserves; C = currency

The shaded items in Figure A2 highlight the balance sheet effects of $1 worth of securities purchases by the Federal Reserve from a nonbank entity. The nonbank entity sells a security (S_N → S_N – $1) and, in the course of clearing and settling that transaction through the banking

sector, receives deposits in return ($D_N \rightarrow D_N + \$1$). As the bank is the intermediary for the transaction, it receives payment in its reserve account ($R \rightarrow R + \$1$) from the Fed, and then credits this payment to the nonbank's deposit account ($D_B \rightarrow D_B + \$1$). That increase in deposits in the account that the nonbank holds at the bank is realized on the liability side of the bank's balance sheet. Meanwhile, the Federal Reserve ends up with the desired additional securities on its balance sheet ($S_F \rightarrow S_F + \$1$) and a larger reserves liability ($R \rightarrow R + \$1$).

Figure A2: Balance sheets following Fed securities purchase



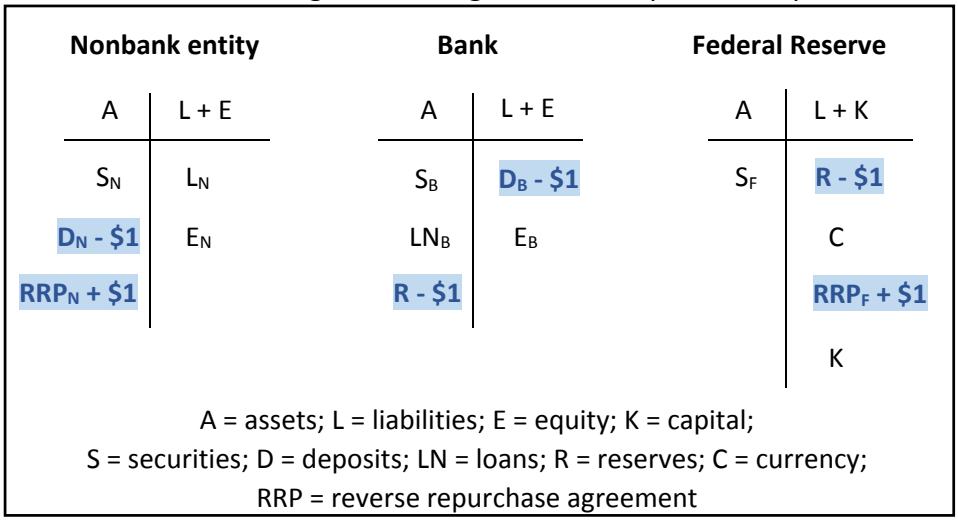
Note that while an individual bank may take steps to reduce its reserve balances—for example, a given bank could reduce its reserve balances by paying down loans from the Federal Reserve—the *aggregate* quantity of reserves in the banking system generally cannot be reduced without further actions by the Federal Reserve. For example, a bank can sell reserves to another bank in the federal funds market and reduce its own holdings of such balances, but this activity leaves reserve balances unchanged in total. Or a bank could reduce the rate of interest that it pays on deposits with the aim of causing depositors to withdraw some of their deposits, a step that would, all else equal, cause the bank's reserve balances to decline to the same extent. However, these depositors would most likely shift their funds to another bank (instead of holding cash) and that bank's reserve balances would then increase. Again, total reserve balances in the banking system would be unchanged.

A.2 Federal Reserve overnight reverse repurchase operations

The shaded items in Figure A3 highlight the effects of an overnight reverse repurchase agreement operation conducted by the Fed on the same three balance sheets. Most of the Fed's overnight reverse repurchase agreements are conducted with nonbank counterparties, such as money market funds, and we illustrate this case. Figure A1 again represents the initial time period, before the operation is conducted. The shaded items in Figure A3 illustrate the balance sheet effects of $1 worth of overnight reverse repurchase agreements ("RRP" below)

conducted by the Fed with a nonbank entity. The nonbank counterparty increases its reverse repurchase agreement holdings ($RRP_N \rightarrow RRP_N + \$1$), and in exchange lends funds to the Fed. In the course of settling the transaction through the banking sector, the nonbank's deposits are reduced ($D_N \rightarrow D_N - \$1$). That reduction in deposits is realized on the liability side of the bank's balance sheet ($D_B \rightarrow D_B - \$1$). Meanwhile, the bank passes the funds of the nonbank on to the Fed, booking a reduction in reserve balances in return ($R \rightarrow R - \$1$). The Fed ends up with the desired additional reverse repurchase agreements on its balance sheet ($RRP_F \rightarrow RRP_F + \$1$), in effect a liability to repay the loan to the nonbank, and a smaller stock of reserve balances outstanding ($R \rightarrow R - \$1$). Note that in repo transactions (unlike a sale or purchase), the security does not actually change hands—that is, it is not rebooked—and so the amount of securities on the Fed's (and other institutions') balance sheets is unchanged.[1]

Figure A3: Balance sheets following Fed overnight reverse repurchase operation with nonbank



A.3 Federal Reserve term deposits

Figure A4 shows the accounting effects of awarding $1 of term deposits at the Fed's Term Deposit Facility, operations that are only available to banks. As before, Figure A1 represents the initial time period, before the term deposit operation is conducted. The shaded items in Figure A4 illustrate the balance sheet effects of $1 worth of term deposits conducted by the Fed with a

[1] When the Fed buys a security in a repo transaction or sells a security in a reverse repo transaction the size of its securities holdings is unchanged, in accordance with generally accepted accounting principles. However, these transactions do temporarily change the composition of the Fed's balance sheet while the trades are outstanding. For example, as discussed here, a reverse repo transaction shifts funds out of reserve balances and into reverse repos, resulting in a compositional change in the Fed's liabilities and no change to its assets. For more information, see the FAQ on the Federal Reserve Bank of New York's website at http://www.newyorkfed.org/markets/rrp_faq.html.

bank. The bank's term deposits ("TDF" below) rise by $1 (TDF ➜ TDF + $1). The $1 in funds placed by the bank at the Fed's Term Deposit Facility come out of its reserve balances. As a result, the outstanding stock of reserves in the banking system is smaller over the term of the deposit. The Fed reduces the bank's reserve balances and credits its term deposit account (R ➜ R – $1; TDF ➜ TDF + $1). Nonbank entities are not involved in the transaction.

Figure A4: Balance sheets following Fed term deposit operation

Nonbank entity

A	L + E
S_N	L_N
D_N	E_N

Bank

A	L + E
S_B	D_B
LN_B	E_B
R - $1	
TDF + $1	

Federal Reserve

A	L + K
S_F	**R - $1**
	C
	TDF + $1
	K

A = assets; L = liabilities; E = equity; K = capital;
S = securities; D = deposits; LN = loans; R = reserves; C = currency;
TDF = Term Deposit Facility