

MS15-135, Should the Federal Reserve Pay Competitive Interest on Reserves? Data and Programs

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1 Reserve Demand Regressions

1.1 Regressors:

1. Velocity is the ratio of demand deposits and other checkable deposits to excess reserves
 - (a) Demand deposits (NSA) are from Federal Reserve Board Statistical Release H.6, Table 5.
 - (b) Other checkable deposits (NSA) are from Federal Reserve Board Statistical Release H.6, Table 5.
 - (c) Excess reserves is calculated as Reserves of depository institutions, total (NSA) less Reserves of depository institutions, required (NSA). Both series are from Federal Reserve Board Statistical Release H.3, Table 2.
2. As the interest rate on reserves is zero in our sample, the interest rate spread is the effective federal funds rate, which is taken from Federal Reserve Board Statistical Release H.15.
3. The two dummy variables are set to 1 in September 2001 and September 2008, respectively and are zero otherwise.

1.2 Instrumental Variables:

1. The unemployment rate is the civilian unemployment rate from the Bureau of Labor Statistics, Employment Situation..
2. The inflation rate is rate of change of the consumer price index for all urban consumers from the Bureau of Labor Statistics.

1.3 Sample:

The regression is run on montly data from 1981 through September 2008.

1.4 Files:

1. Eviews: reserve demand.wf1.
2. Data: Reserve Demand Data.xlsx and Reserve Demand Data.prn
 - (a) Column 1: Date
 - (b) Column 2: Demand Deposits
 - (c) Column 3: Other Checkable Deposits
 - (d) Column 4: Total Reserves
 - (e) Column 5: Required Reserves
 - (f) Column 6: Effective Federal Funds Rate
 - (g) Column 7: Interest Rate on Required Reserves
 - (h) Column 8: Interest Rate on Excess Reserves
 - (i) Column 9: CPI-U
 - (j) Column 10: Unemployment Rate

2 Satiation Velocity (ν^*)

2.1 Data:

1. The interest rate on excess reserves is from the Federal Reserve Board, Policy Rates Release H.15.
2. The effective federal funds rate is from Federal Reserve Board Statistical Release H.15.
3. Velocity is defined as above.

2.2 Calculation:

The Federal Reserve began paying interest on reserves, both required reserves and excess reserves, on October 9, 2008. Initially the interest rate on excess reserves was set below the effective federal funds rate. On October 17, 2008, the effective federal funds rate fell below the interest rate on excess reserves and remained below until October 22, 2008. On October 23, 2008, the interest rate on excess reserves was raised and the interest rate on excess reserves has remained above the effective federal funds rate. Using data for the two-week reserve maintenance period ending on October 29, 2008, the ratio of deposits (demand deposits plus checkable deposits) to excess reserves was 1.96.

The estimated coefficient on the dummy variable for September 2008 in the reserve demand regression is 3.45. This provides an estimate of how much greater reserve demand was in the crisis. More precisely, the log of velocity was greater in the crisis by 3.45. To obtain an estimate of satiation velocity in normal times, we add $\exp(3.45)$ to the mid-October value of satiation velocity. This yields a value of $\nu^* = 61.74$ or $\log(\nu^*) = 4.12$.

2.3 Files:

1. Daily data on interest rates: Daily FRB Policy Rates.xlsx and Daily FRB Policy Rates.prn
 - (a) Column 1: Date
 - (b) Column 2: Interest Rate on Excess Reserves
 - (c) Column 3: Interest Rate on Required Reserves
 - (d) Column 4: Effective Federal Funds Rate
2. Weekly data on deposits and reserve balances: Weekly FRB Data.xlsx and Weekly FRB Data.prn.
 - (a) Column 1: Date
 - (b) Column 2: Interest Rate on Excess Reserves (one-week maintenance periods)
 - (c) Column 3: Interest Rate on Excess Reserves (two-week maintenance periods)
 - (d) Column 4: Interest Rate on Required Reserves (one-week maintenance periods)
 - (e) Column 5: Interest Rate on Required Reserves (two-week maintenance periods)
 - (f) Column 6: Excess Reserves
 - (g) Column 7: Required Reserves
 - (h) Column 8: Total Reserves
 - (i) Column 9: Demand Deposits
 - (j) Column 10: Other Checkable Deposits
 - (k) Column 11: Sum of Columns 9 and 10
 - (l) Column 12: Effective Federal Funds Rate
 - (m) Column 13: Velocity (Deposits from column 11 / excess reserves from column 6)

3 Financial and Resource Costs of Reserve Management

3.1 Data:

1. Deposits is the sum of demand deposits and other checkable deposits (see above for sources).
2. Velocity is as defined above.
3. The interest rate on bank prime loans is from, Federal Reserve Board, Release H.15.
4. The interest rate on 3-month Treasury bill is from, Federal Reserve Board, Release H.15.
5. Treasury securities held by private depository institutions is from Federal Reserve Board, Financial Accounts of the United States, table L.110.

3.2 Sample:

The sample is from 1981Q1 - 2008Q3. We use a quarterly frequency for these calculations was dictated by the frequency of the data in the Financial Accounts of the United States.

3.3 Calculations:

Our specification of banks' costs of managing liquidity is $\psi_t d_t$ with ψ_t given by equation (15) in the paper and reproduced below.

$$\psi_t = \begin{cases} \frac{\kappa}{\nu_t} \left[\frac{\nu_t - \nu^*}{\nu^*} - \log\left(\frac{\nu_t}{\nu^*}\right) \right] & \text{if } \nu_t > \nu^* \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

Since the reserved demand was not satiated during our sample, we need consider only the first part of specification for our calculations.

The value for satiation velocity is computed as above for every quarter in the sample except 2001Q3 and 2008Q3. For those two periods, we adjust the value of satiation velocity using the estimated coefficients on the dummy variables in the regression for reserve demand. We then compute a value of $\psi_t d_t$ for each quarter in the sample.

Then, we estimate financial costs for each quarter in our sample by multiplying depository institutions' holdings of Treasury securities by the spread between the prime rate and the rate on three-month Treasury bills. And finally, our estimate of Ψ is one minus the average of the ratio of financial costs to total transactions costs.

3.4 Files:

1. The data used are in rcpdata.xlsx.
 - (a) Column 1: Demand Deposits
 - (b) Column 2: Other Checkable Deposits
 - (c) Column 3: Reserves of Depository Institutions
 - (d) Column 4: Prime Rate
 - (e) Column 5: Treasury Bill Rate
 - (f) Column 6: Treasury Securities Held by Depository Institutions
2. The calculations are in the Matlab m-file, rcp.m.

4 Stochastic Simulations

The stochastic simulations yielding both the steady state values and the impulse respons functions are performed using Dynare. The main model file is `reserve_int_ramsey.mod`. This file uses two other files as inputs. The first, `res_int_ramsey_ss.m`, contains the steady state equations. The second, `res_int_gamma.m`, computes the constant in the autoregressive process for the default shock so that the steady state default rate is always 0.01.