The Federal Reserve's Balance Sheet and Overnight Interest Rates

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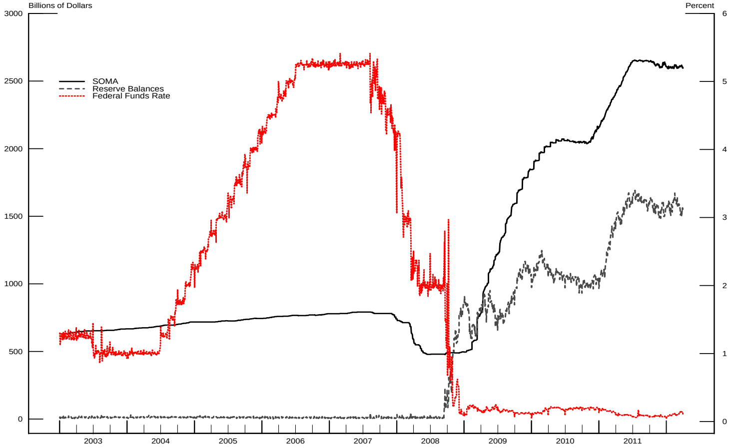
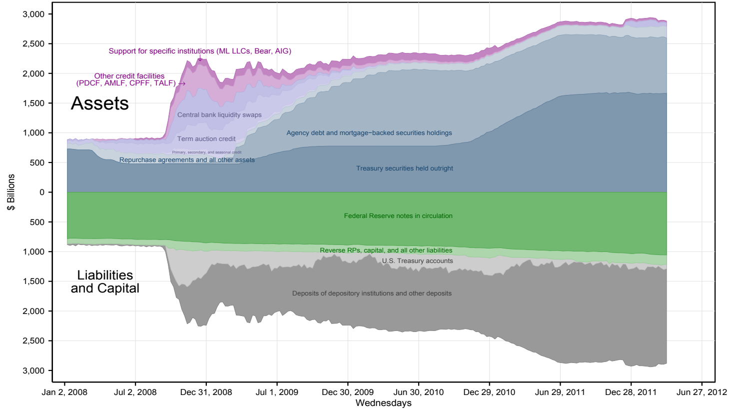
Purpose of the Study

- Model the interplay between the Federal Reserve's balance sheet and overnight interest rates
- Assess the effect of both conventional and unconventional monetary policy changes on overnight interest rates
  - Further policy accommodation
  - Removal of policy accommodation
- In particular, translate an exit strategy that is consistent with the June 2011 FOMC exit strategy principles into a path for the federal funds rate

Federal Funds Rate, Reserve Balances, and SOMA



Composition of the Federal Reserve's Balance Sheet from 2008 to 2012



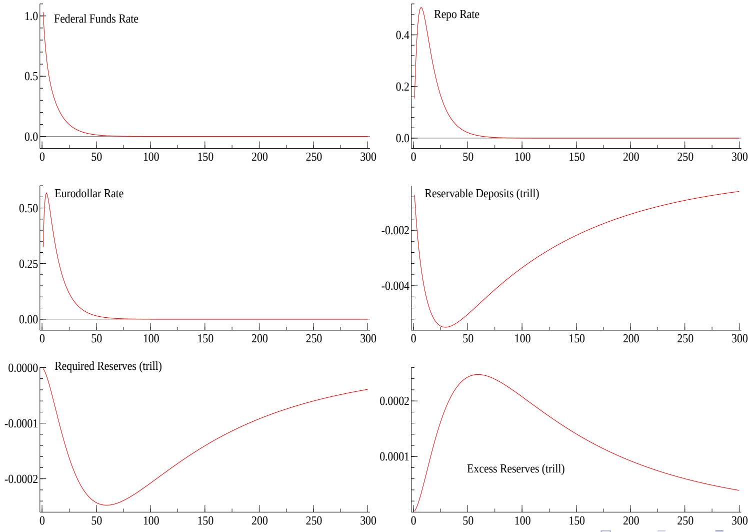
Econometric Considerations

- Interdependencies between short-term funding rates
- Non-linear relationship between interest rates and reserve balances
- Simultaneity (among interest rates as well as between the federal funds rate and reserve balances)
- Sample period:
  - Estimated parameters should reflect the full range of values for the variables, especially for studying the exit from the current situation
  - Interest rates in post-2008 sample exhibit little variation
- Estimation method: Full-information maximum likelihood
- Daily frequency (business days) from January 10, 2003 to April 16, 2012

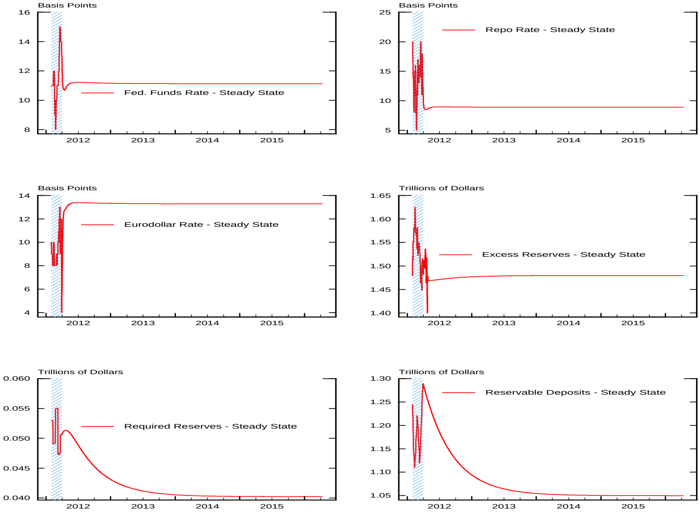
Model Specification

$$
\begin{aligned}
\ln i_t^{fed} &= \underset{(\pm)}{\alpha_0} + \underset{(+)}{\alpha_1} \ln i_t^{repo} + \underset{(+)}{\alpha_2} \ln i_t^{eurdol} + \underset{(+)}{\alpha_3} \ln i_t^{disc} + \underset{(-)}{\alpha_4} R_t^e \\
&\quad + \underset{(+)}{\alpha_5} i_t^{er} + \underset{(+)}{\alpha_6} \ln i_{t-1}^{fed} + u_t^{fed}, \\
\ln i_t^{repo} &= \underset{(\pm)}{\beta_0} + \underset{(+)}{\beta_1} \ln i_t^{fed} + \underset{(+)}{\beta_2} \ln i_t^{eurdol} + \underset{(+)}{\beta_3} \ln i_{t-1}^{repo} + u_t^{repo}, \\
\ln i_t^{eurdol} &= \underset{(\pm)}{\delta_0} + \underset{(+)}{\delta_1} \ln i_t^{fed} + \underset{(+)}{\delta_2} \ln i_t^{repo} + \underset{(+)}{\delta_3} \ln i_{t-1}^{eurdol} + u_t^{eurdol}, \\
R_t^e &= S_t + RP_t - (R_t^r + C_t - OA_t + OL_t), \\
R_t^r &= \underset{(\pm)}{\lambda_0} + \underset{(+)}{\lambda_1} D_t + \underset{(+)}{\lambda_2} R_{t-1}^r + u_t^r, \\
D_t &= \underset{(\pm)}{\phi_0} + \underset{(+)}{\phi_1} Y_t + \underset{(-)}{\phi_2} \ln i^{fed} + \underset{(+)}{\phi_3} D_{t-1} + u_t^D, \\
\mathbf{u}_t &= (u_t^{fed}, u_t^{repo}, u_t^{eurdol}, u_t^r, u_t^D)' \sim N(0, \mathbf{\Omega}).
\end{aligned}
$$

Dynamic Stability



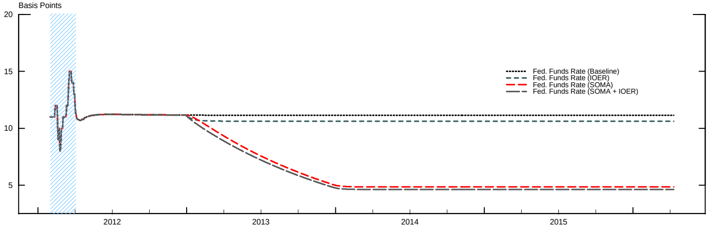
Steady States

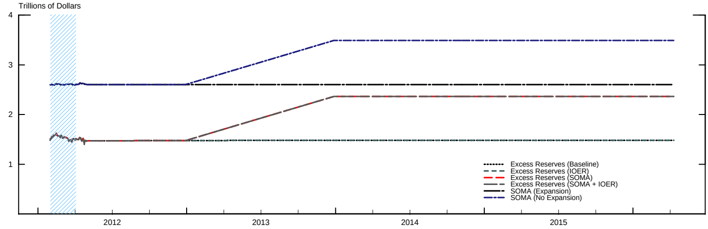


Long-Run, Reduced-Form Parameter Estimates

	SOMA	Disc.	IOER	Repos	Other	CIRC	Inc.
FFR	-0.933 [0.058]	1.204 [0.033]	0.482 [0.241]	-0.993 [0.058]	0.993 [0.058]	0.993 [0.058]	0.035 [0.016]
Repo	-0.981 [0.064]	1.265 [0.044]	0.507 [0.254]	-0.981 [0.064]	0.981 [0.064]	0.981 [0.064]	0.037 [0.017]
Eur.	-0.881 [0.056]	1.136 [0.034]	0.455 [0.228]	-0.881 [0.056]	0.881 [0.056]	0.881 [0.056]	0.033 [0.015]
Dep.	0.078 [0.021]	-0.100 [0.027]	-0.040 [0.023]	0.078 [0.021]	-0.078 [0.021]	-0.078 [0.021]	0.711 [0.319]
RBR	0.004 [0.001]	-0.005 [0.001]	-0.002 [0.001]	0.004 [0.001]	-0.004 [0.001]	-0.004 [0.001]	0.038 [0.017]
ER	0.996 [0.001]	0.005 [0.001]	0.002 [0.001]	0.996 [0.001]	-0.996 [0.001]	-0.996 [0.001]	-0.038 [0.017]

Effects of Additional Unconventional Monetary Policy



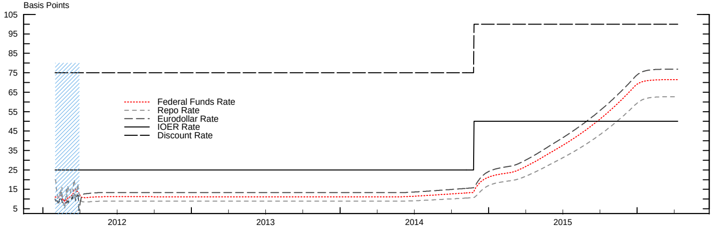


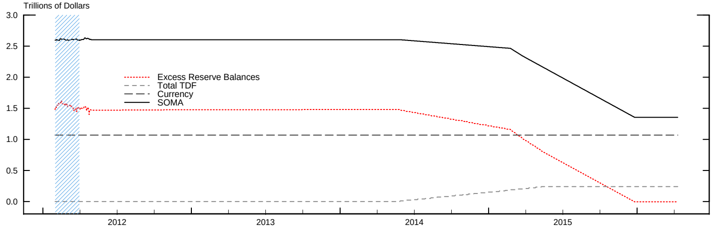
Exit Strategy Principles

As stated in the June 2011 FOMC minutes, the exit strategy will be implemented in four phases:

1. Stop reinvestments of securities
2. Implement temporary reserve-drainage operations (e.g., expand the Term Deposit Facility (TDF) or conduct reverse repurchase agreements (RRP))
3. Increase policy rates
4. Sell SOMA securities

Effects of the Removal of Unconventional Monetary Policy





Conclusion

- In the current environment with quite elevated levels of excess reserves by historical standards, the effect of further monetary policy accommodation on short-term interest rates is limited.

- Assuming a path for the removal of monetary policy accommodation that is consistent with the June 2011 FOMC exit principles, we project that the accommodative stance of monetary policy is effectively removed.