Maintaining Central-Bank Solvency under New-Style Central Banking

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But when interest rates rise, capital losses on bonds plus higher rate paid on reserves could cause trouble

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Our approach

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Previous work focused mainly on projections, not on CB in RE equilibrium

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$$V' = (1 + r_s)V + q_{s'}[B_{s'} - (1 - \delta)B_s] - c_s B_s - n_{s,s'} + d_{s'}$$

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$$n_{s,s'} = \frac{p' N_{s'} - p N_s}{p'}$$

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$$V_s = q_s B_s - N_s$$

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No re-capitalization, dividends keep nominal net worth constant

$$W' = \frac{W}{1+\pi_s} - z'$$

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$$Z' = \frac{1}{1+\pi_s} Z + d' - y'$$

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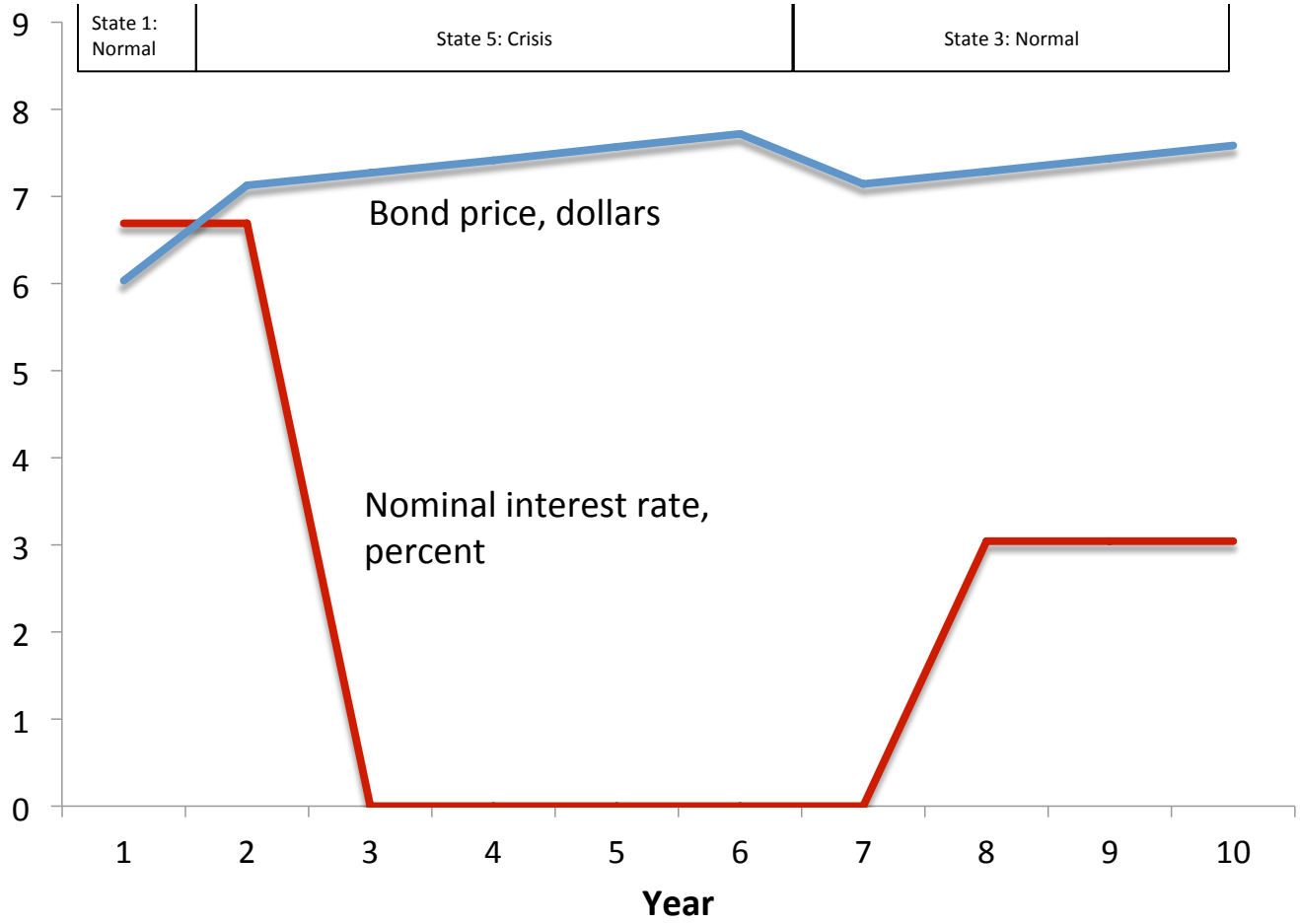
Inputs from Data

	Model inputs			*Other data*	
State number	*Safe rate, r*	*Bond holdings, B*	*Currency, N*	*Inflation, p'/p-1*	*Reported income, y*
1	0.039	0.0079	0.0504	0.028	0.0038
2	0.021	0.0089	0.0574	0.023	0.0026
3	0.010	0.0089	0.0547	0.034	0.0028
4	-0.009	0.0091	0.0548	0.057	0.0031
5	-0.021	0.0243	0.0661	0.017	0.0050

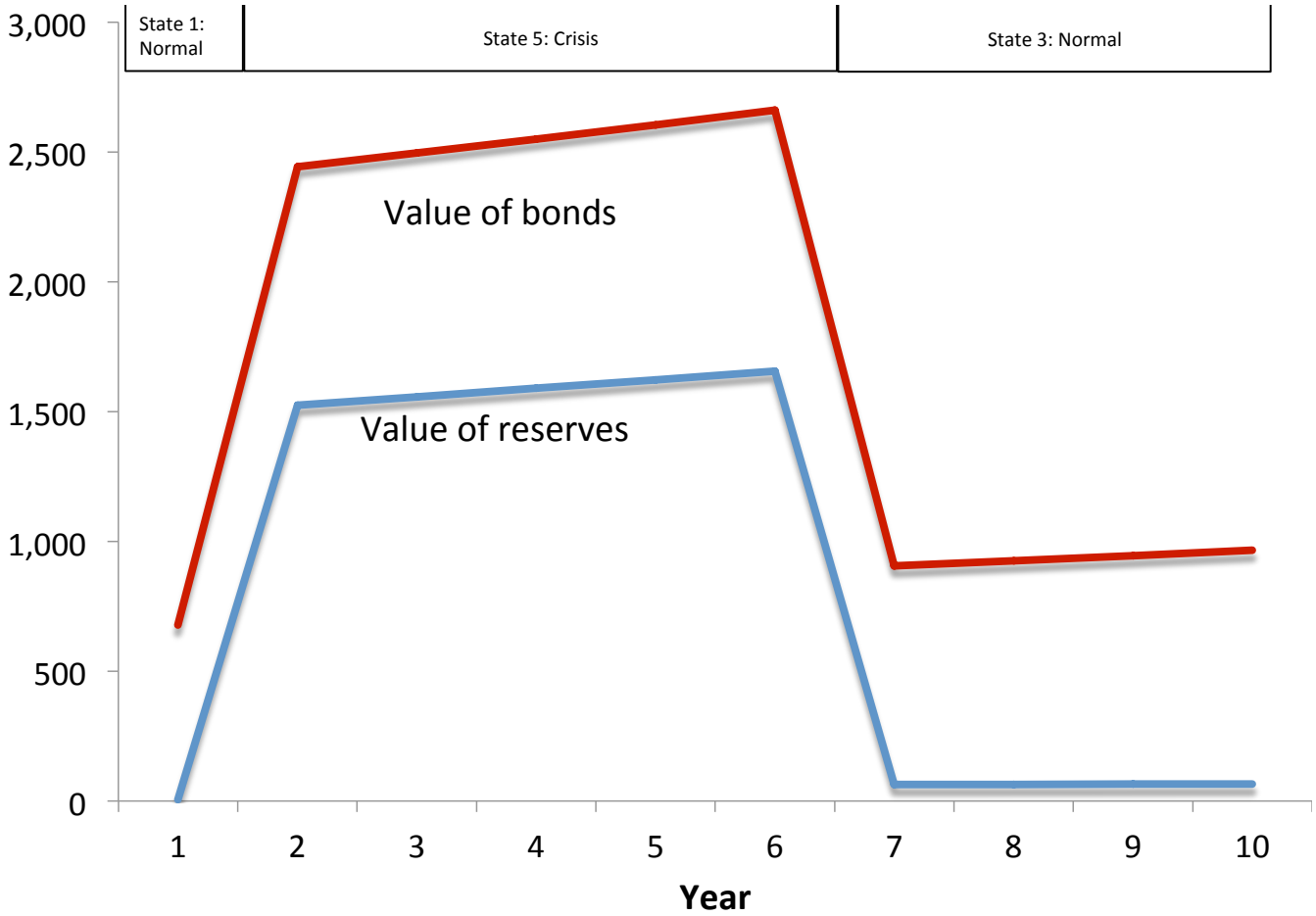
Real Interest Rate, Marginal Utility, and Delta-Bond Price

State	*Safe rate, r*	*Marginal utility, μ*	*Coupon, c*	*Bond price, q*
1	3.92	1.000	1.00	5.99
2	2.09	0.995	1.00	6.05
3	1.02	0.963	1.00	6.22
4	-0.88	0.928	1.00	6.43
5	-2.10	0.821	1.00	6.88

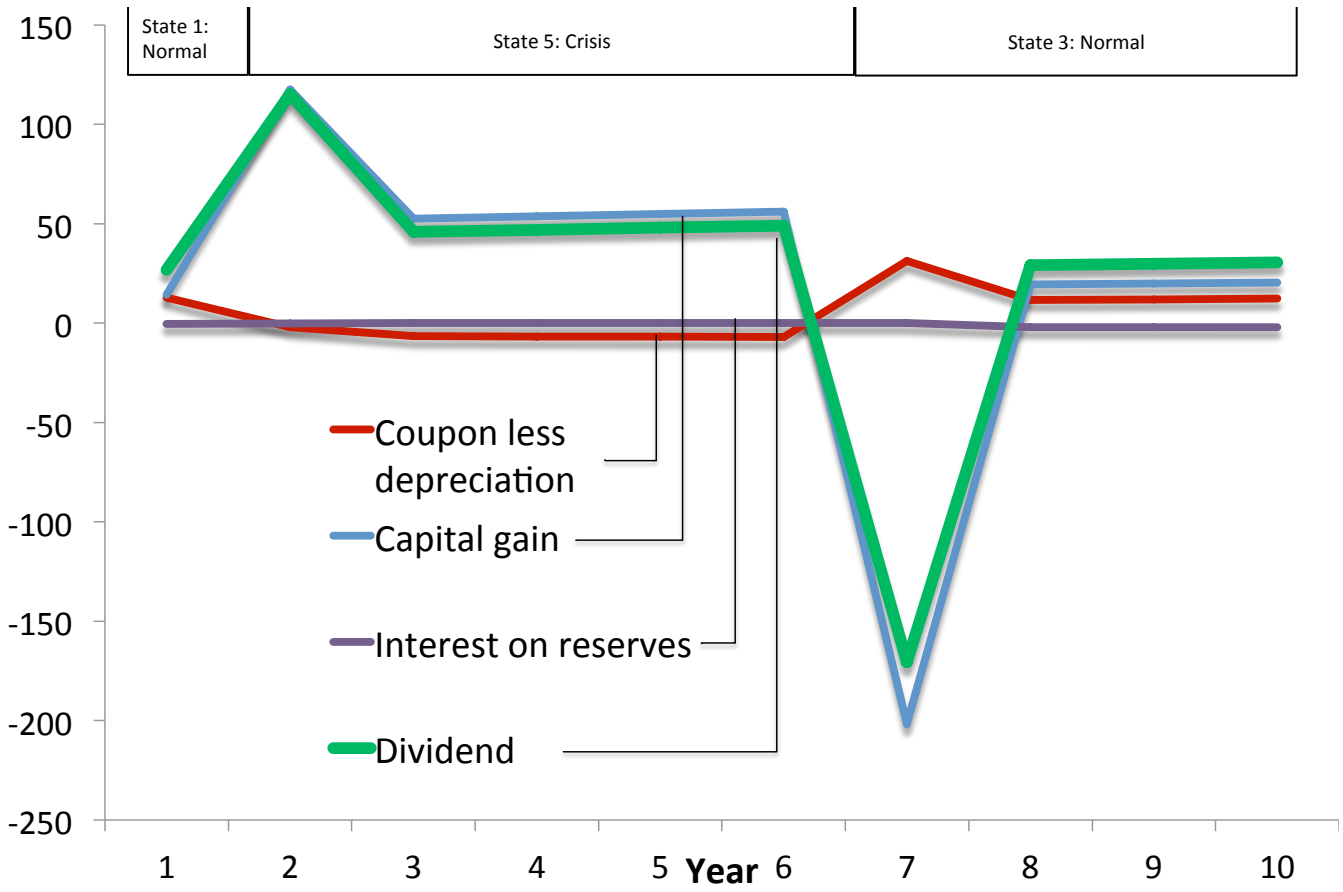
Interest Rate and Bond Price



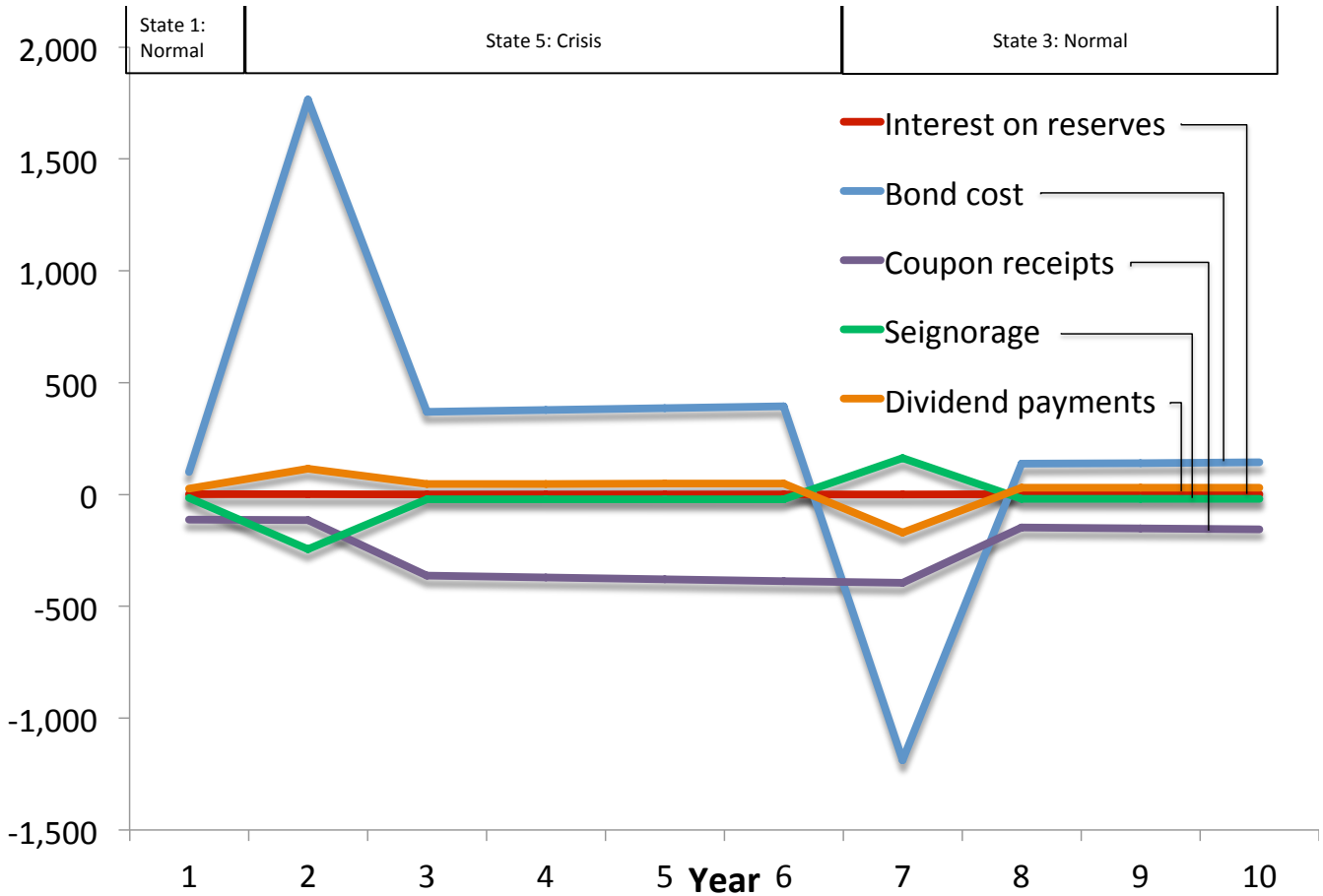
The Values of the Fed's Bond Holdings and Reserves Outstanding, Billions of Dollars



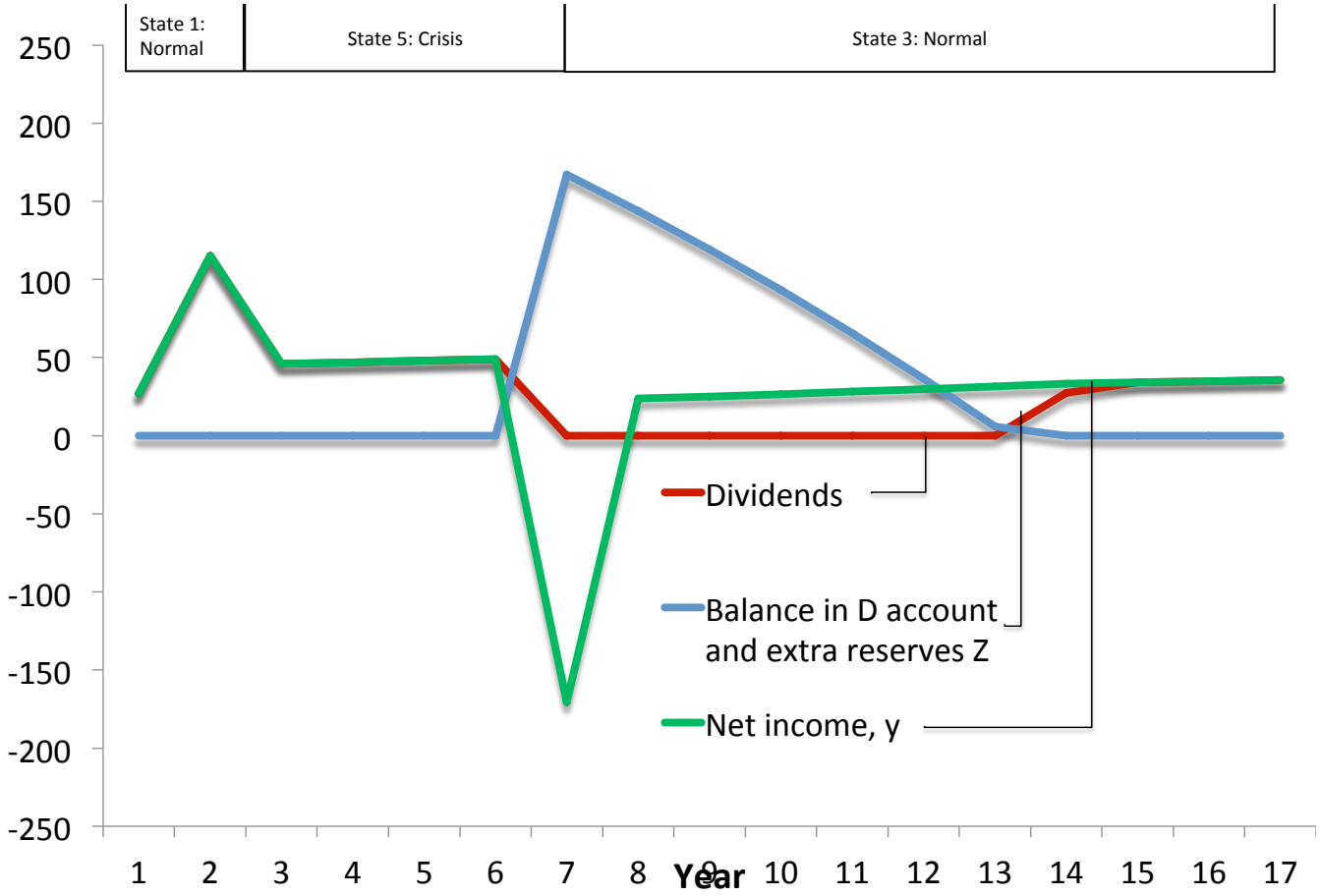
Components of the Fed's Dividend to the Treasury



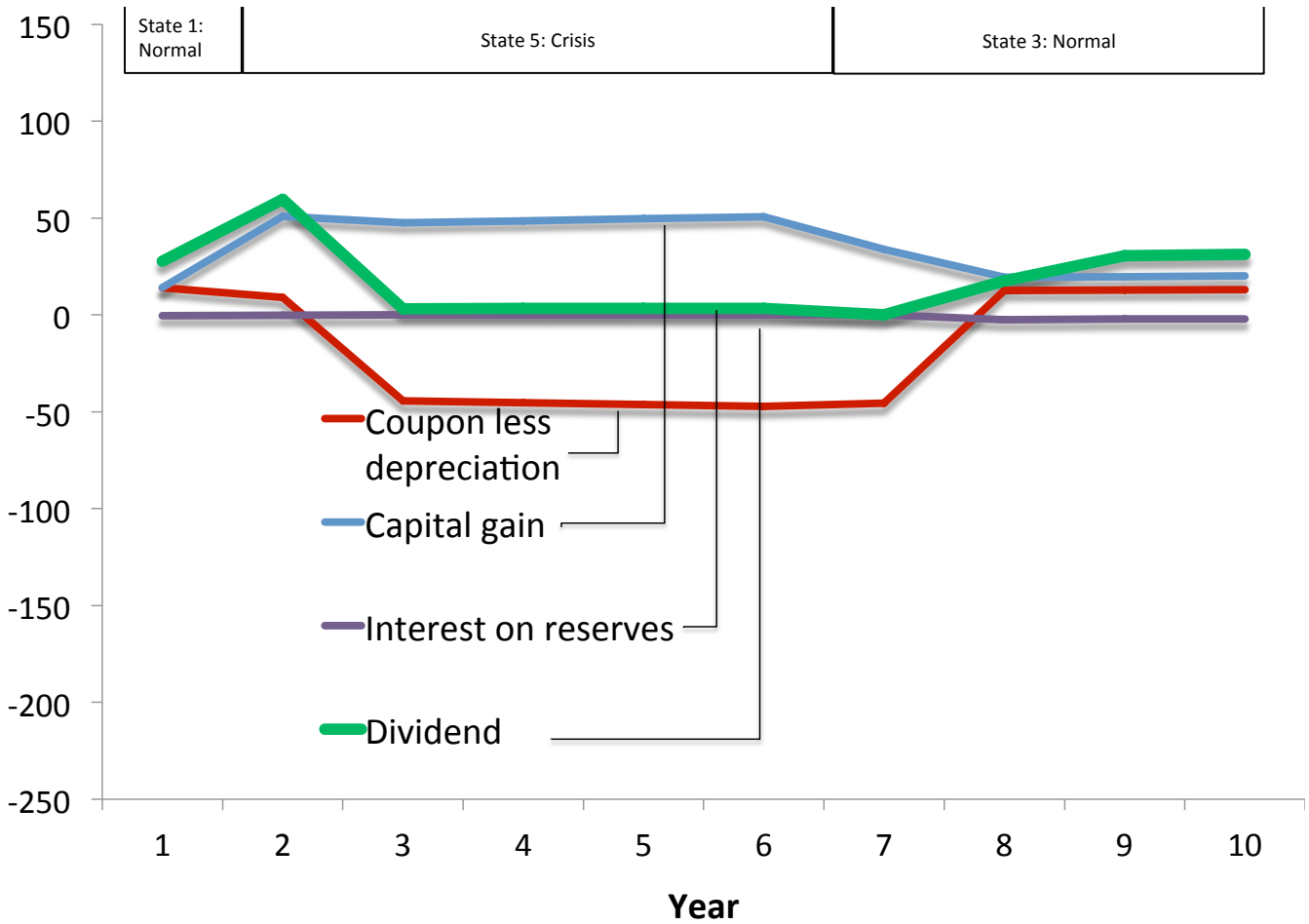
Flows Into and Out of Reserves



How the D Account Generates a Speedy Elimination of Extra Reserves from a Capital Loss



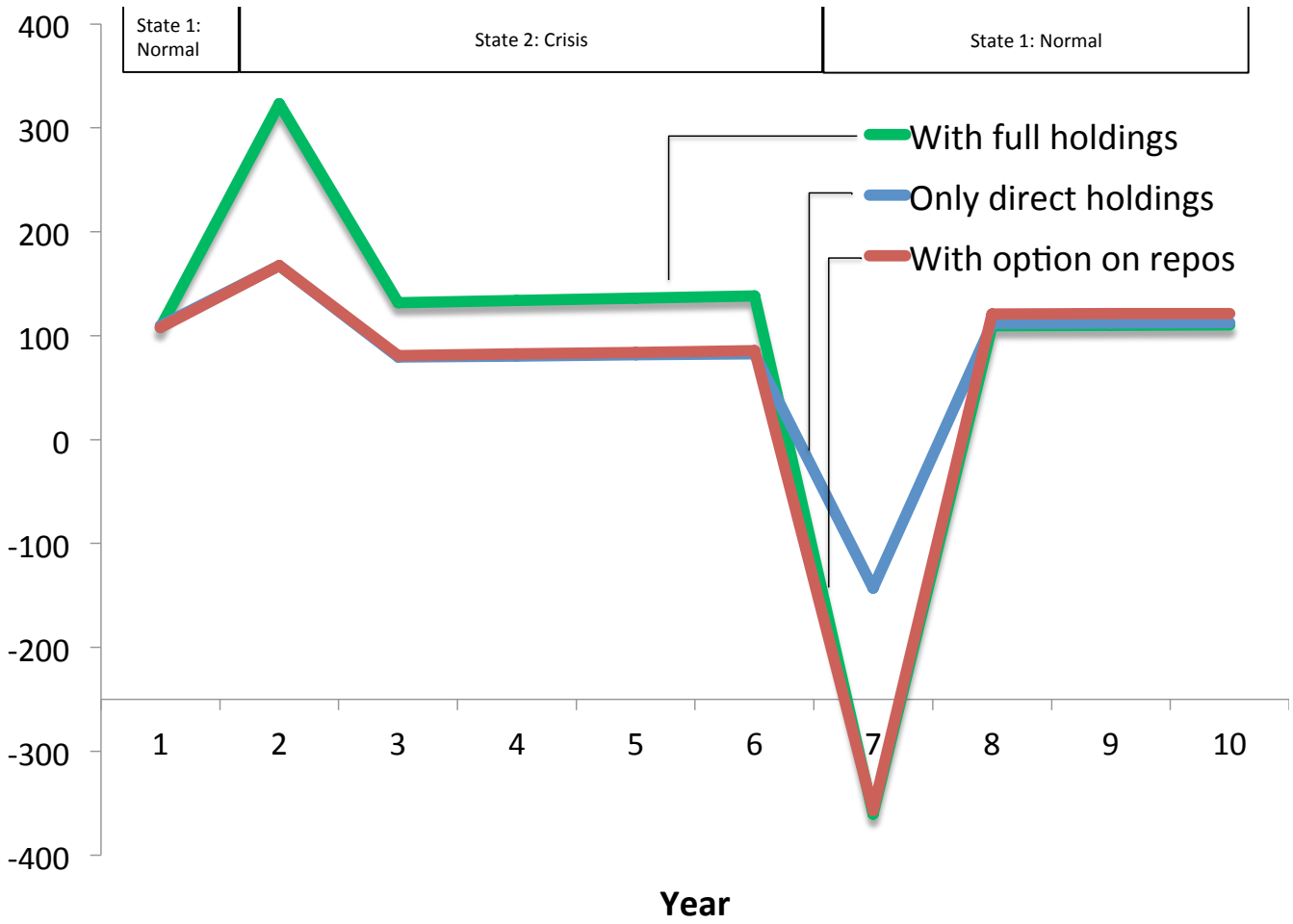
Components of Dividends with Bond Default



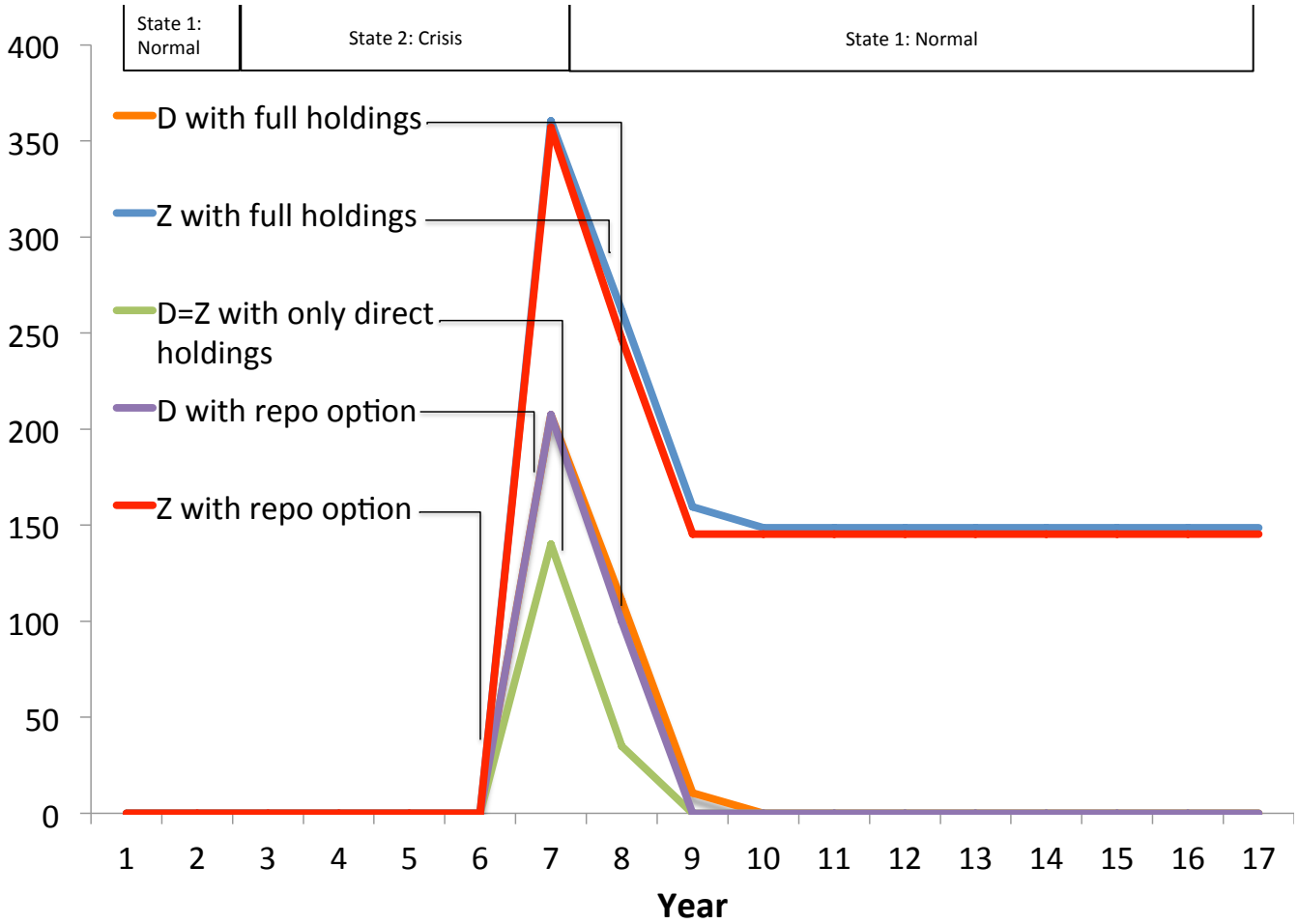
Inputs for ECB version

	Model inputs				*Other data*	
State number	*Safe rate, r*	*Repos, Br*	*Direct bond holdings, Bd*	*Currency, N*	*Coupon, c*	*Bond price, q*
1	0.978	0.049	0.018	0.058	1.000	6.364
2	-1.067	0.077	0.064	0.088	1.000	6.767

Net income under alternative scenarios



Balance in D account and extra reserves Z



Conclusions

1. If the central bank has a draw on the treasury when its income is negative, reserves are stationary and the central bank is always solvent.

2. Under old-style central banking, with no interest on reserves and short-term assets, net income is always positive and solvency issues never arise.

3. Focus on $d < 0$. If the treasury does not pay in, the prospect of insolvency cannot be eliminated, even if a deferred account lowers its probability.

4. Absent complete meltdown with defaults on bonds, the problem is not entering or staying in crisis, it is the recovery period, when losses on bond portfolio occur.

5. Fed and ECB seem in good shape right now. ECB is not nearly as exposed to interest-rate increases.