

Resurrecting the New-Keynesian Model: (Un)conventional Policy and the Taylor rule

Web Appendix

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C. Figures

C.1. Impulse responses

Figure C.1: Responses to monetary policy shocks (temporary and permanent)
In this figure we show (from left to right, top to bottom) the simulated responses to unexpected monetary policy shocks to both the (initial) interest rate (-0.025) and the inflation target rate (-0.005), with effects for the output gap, the inflation rate, and the level and slope of the interest rate in the minimal model (blue solid), in the linearized version (dashed), and in the simple model (around $\pi_{ss} = 0$, dotted).

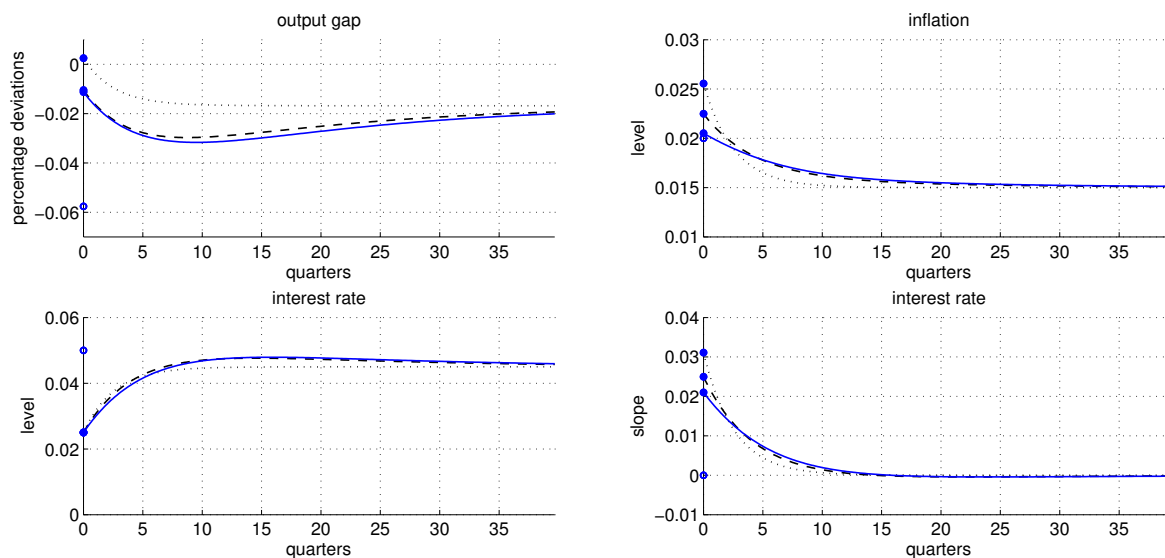


Figure C.2: Responses to monetary policy shocks at near zero interest rates
In this figure we show (from left to right, top to bottom) the simulated responses to unexpected monetary policy shocks to both the (initial) interest rate (-0.025) and the inflation target rate (-0.005), with effects for the output gap, the inflation rate, and the level and slope of the interest rate in the minimal model (blue solid), in the linearized version (dashed), and in the simple model (around $\pi_{ss} = 0$, dotted).

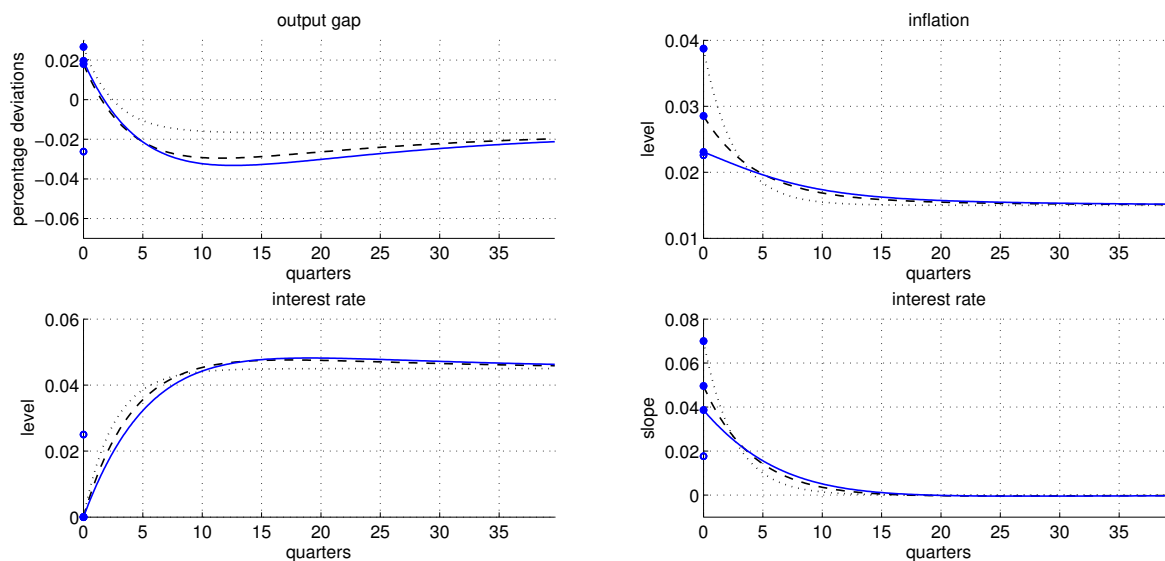


Figure C.3: Responses to monetary policy shocks (temporary and permanent)
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected monetary policy shocks (0.01) either permanent (or target shock, left) or temporary (or initial interest rate, right), with effects for the interest rate (red dashed) and inflation (blue solid), and output in the minimal model (cf. Uribe, 2017, Figure 3). Effects for the simple model are very similar (not shown)

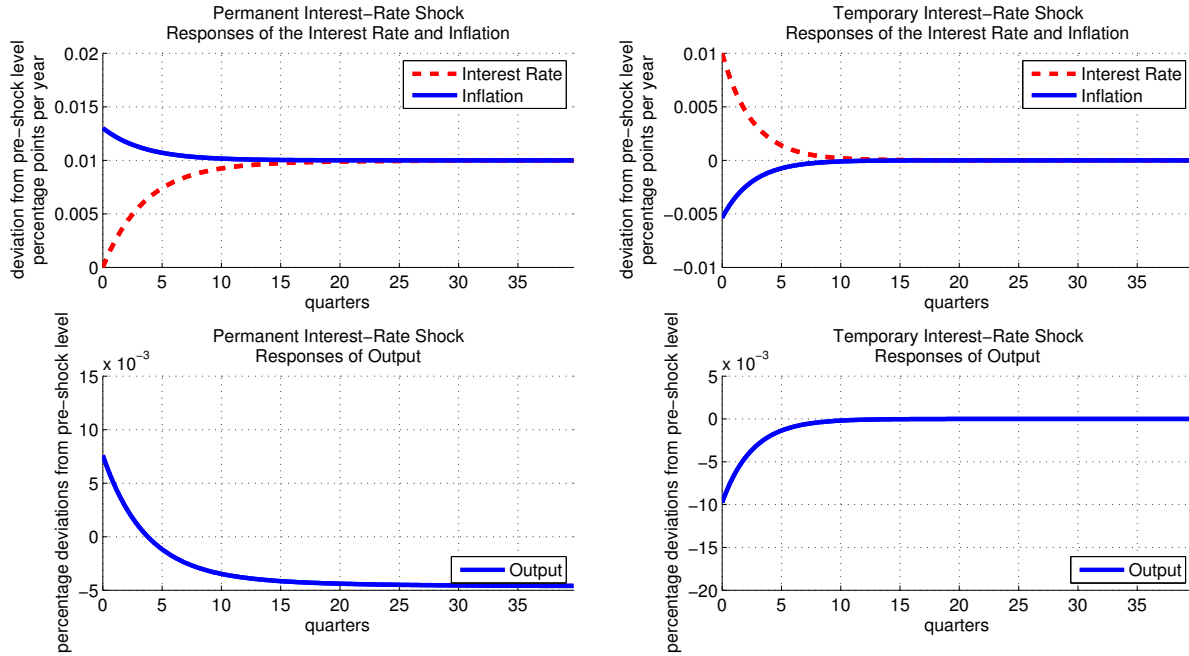
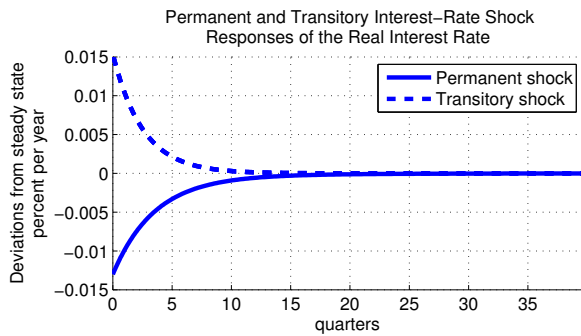


Figure C.4: Responses to monetary policy shocks (temporary and permanent)
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected monetary policy shocks (0.01) either permanent (or target shock, left) or temporary (or initial interest rate, right), with effects for the real interest rate in the minimal model (cf. Uribe, 2017, Figure 4).



C.2. Simulated shocks

Figure C.5: Simulated shocks to interest rate and target rate (2001-2003), macro dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.05) and the inflation target rate (-0.02), with effects for the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

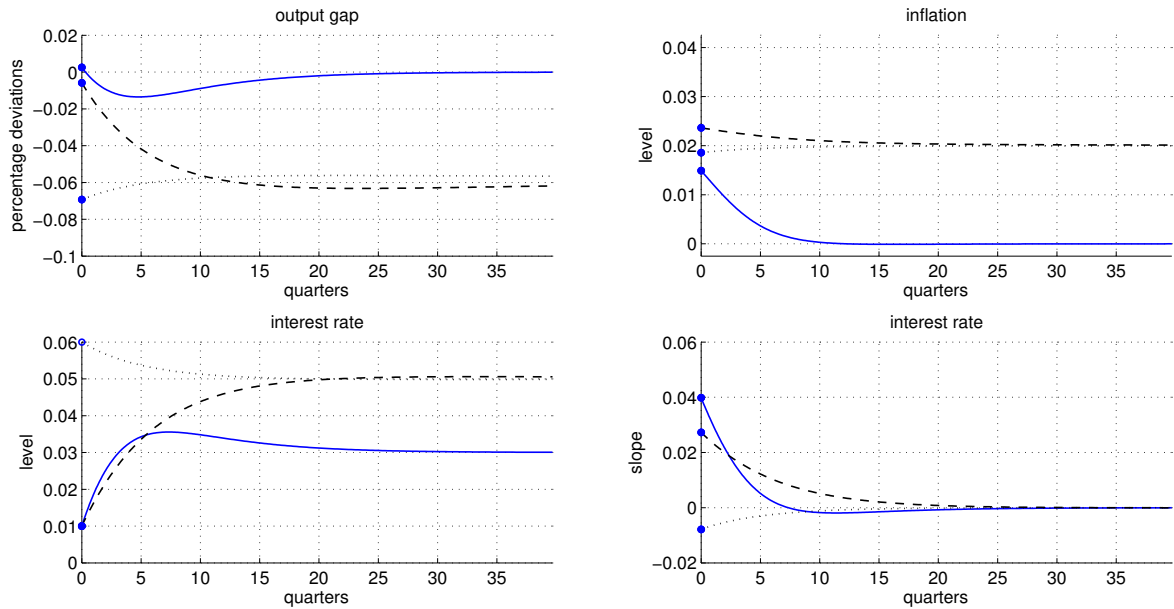


Figure C.6: Simulated shocks to interest rate and target rate (2001-2003), yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.05) and the inflation target rate (-0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

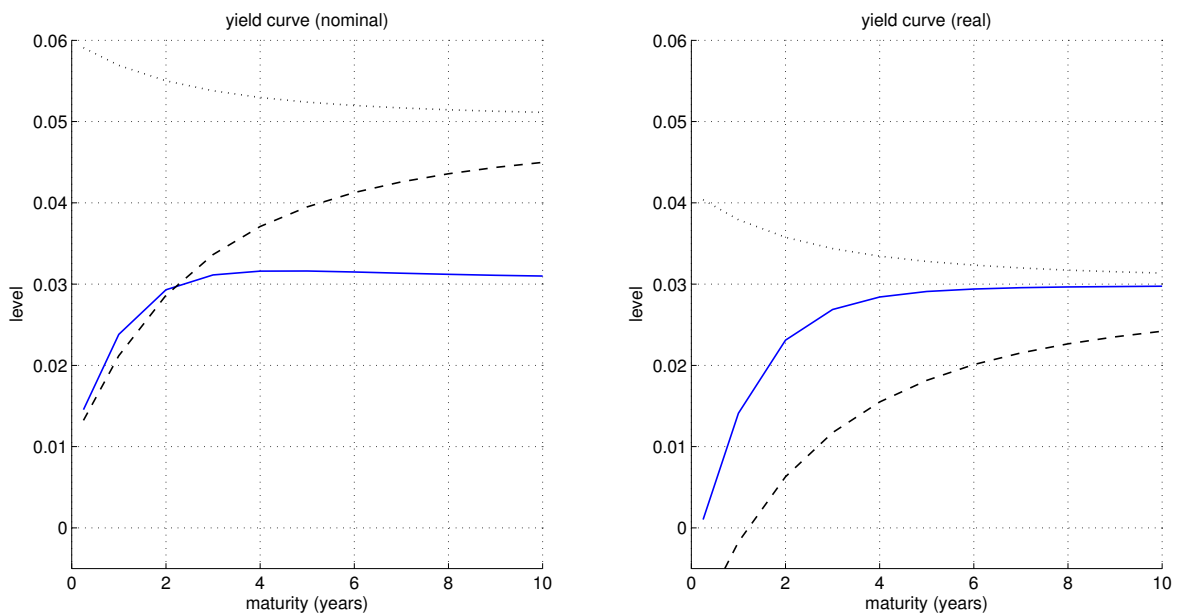


Figure C.7: Simulated shocks (2001-2003) with simple model around $\pi_{ss} \geq 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.05) and the inflation target rate (-0.02), with effects for the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

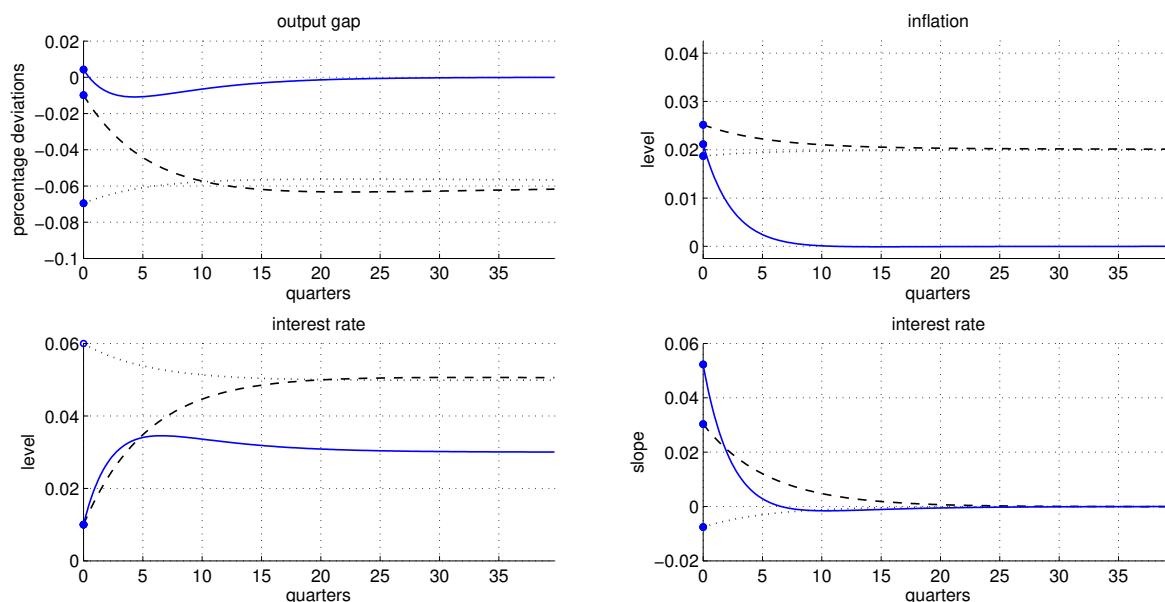


Figure C.8: Simulated shock (2001-2003) with simple model around $\pi_{ss} \geq 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.05) and the inflation target rate (-0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

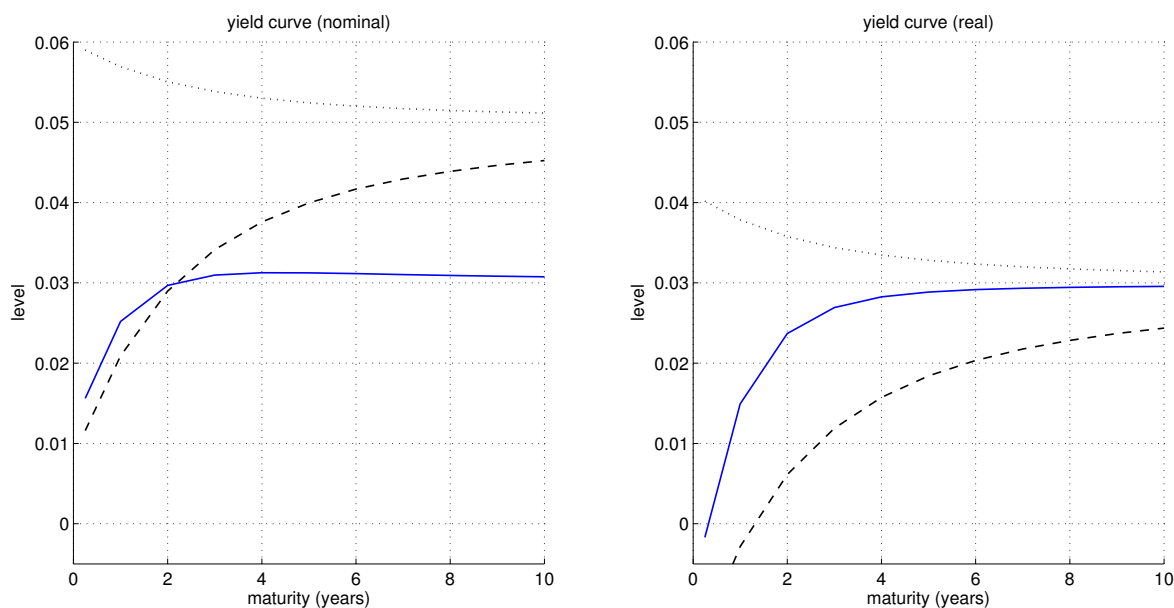


Figure C.9: Simulated shock (2001-2003) with simple model around $\pi_{ss} = 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.05) and the inflation target rate (-0.02), with effects for the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

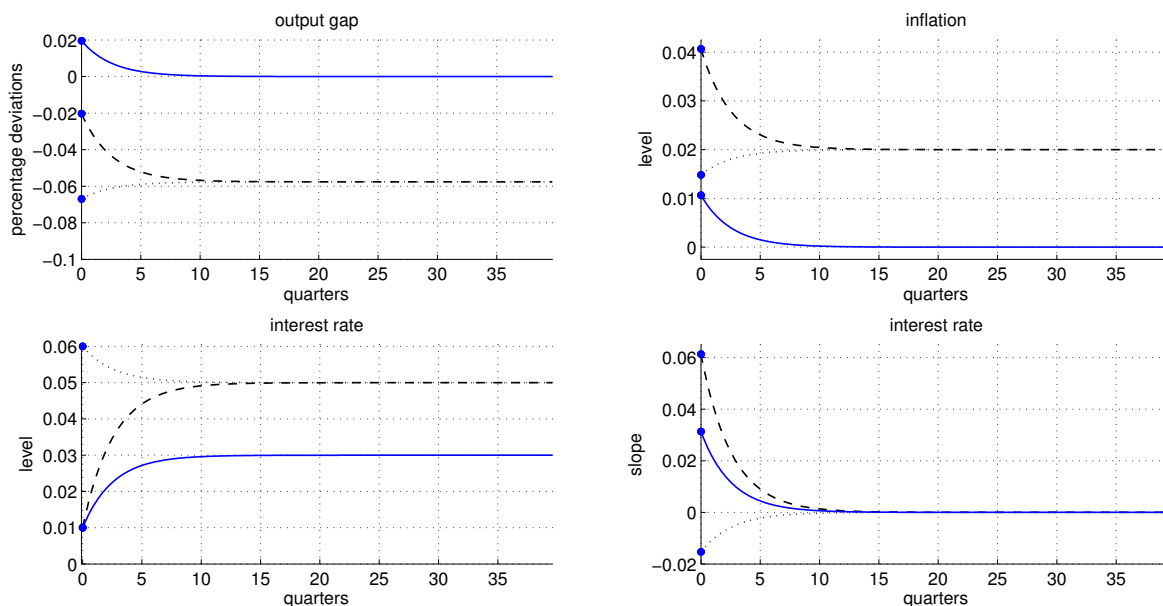


Figure C.10: Simulated shock (2001-2003) with simple model around $\pi_{ss} = 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.05) and the inflation target rate (-0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

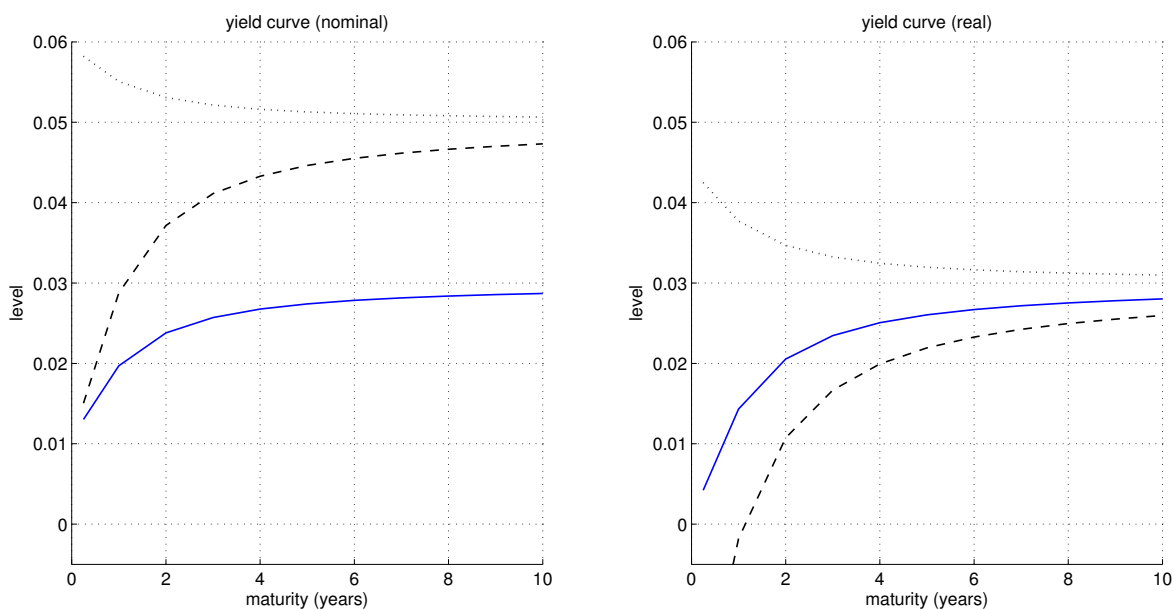


Figure C.11: Simulated shock to interest rate and target rate (2003-2007), macro dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (0.04) and the inflation target rate (0.02) and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

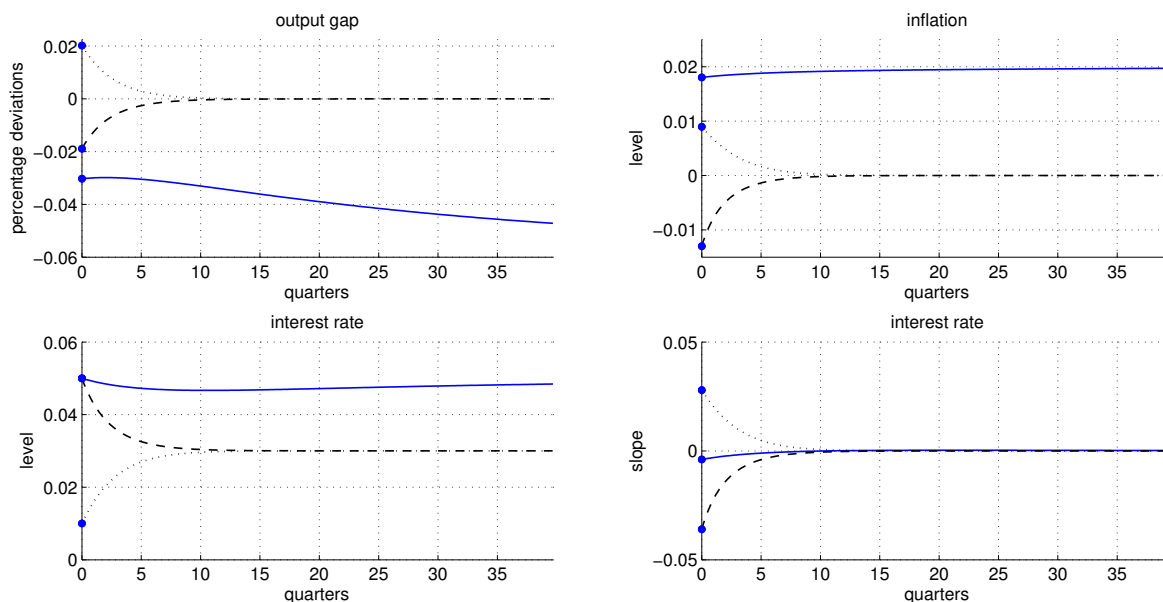


Figure C.12: Simulated shock to interest rate and target rate (2003-2007), yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (0.04) and the inflation target rate (0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

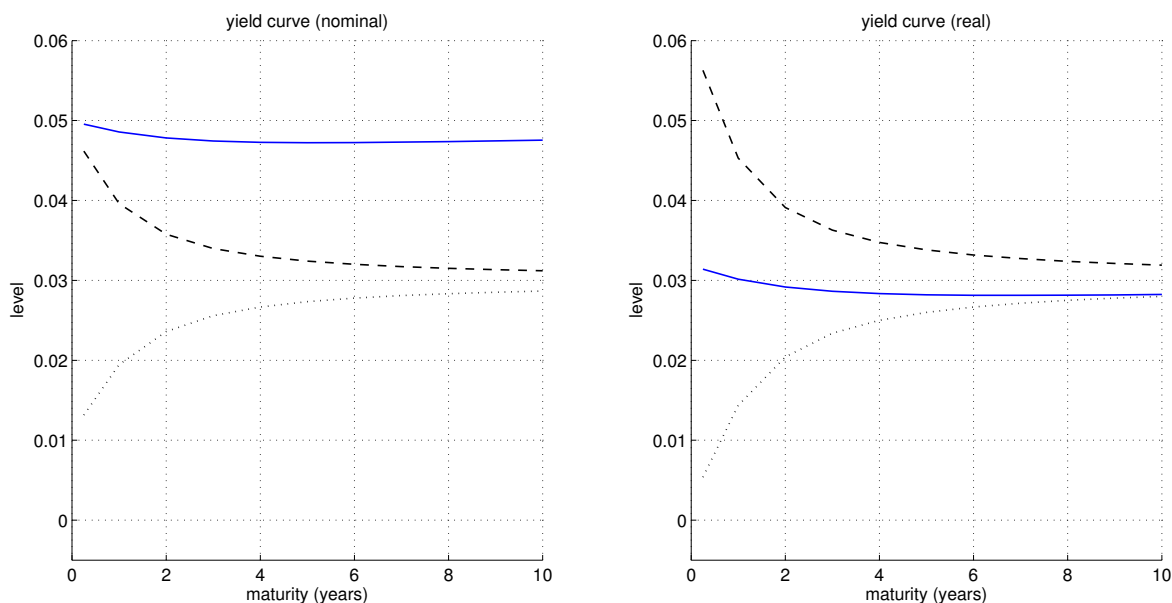


Figure C.13: Simulated shock (2003-2007) with simple model around $\pi_{ss} \geq 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (0.04) and the inflation target rate (0.02) and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

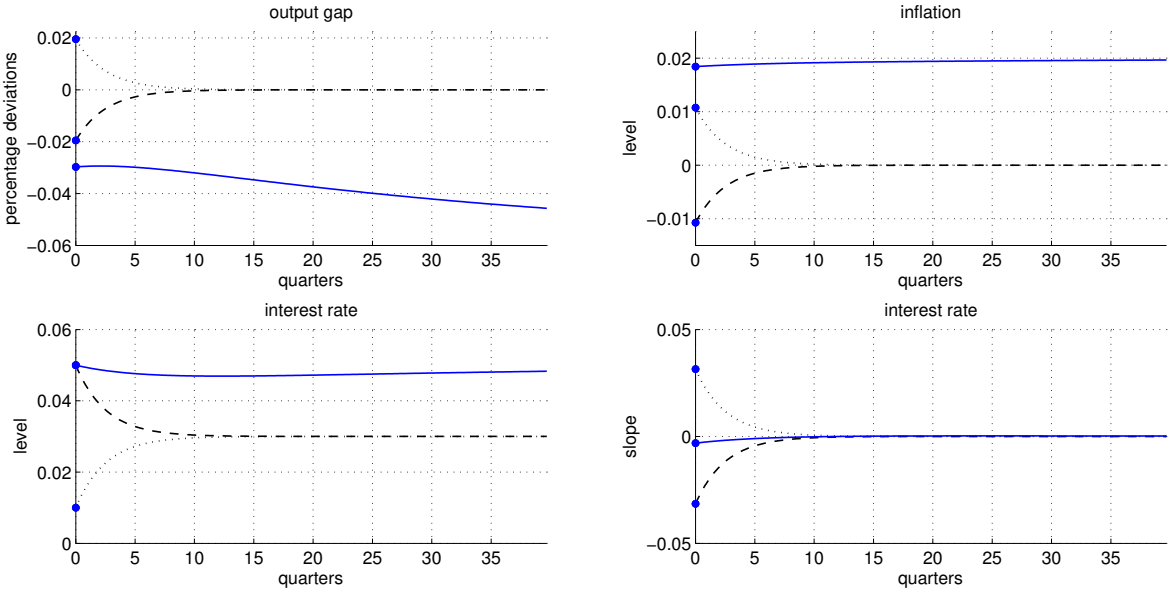


Figure C.14: Simulated shock (2003-2007) with simple model around $\pi_{ss} \geq 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (0.04) and the inflation target rate (0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

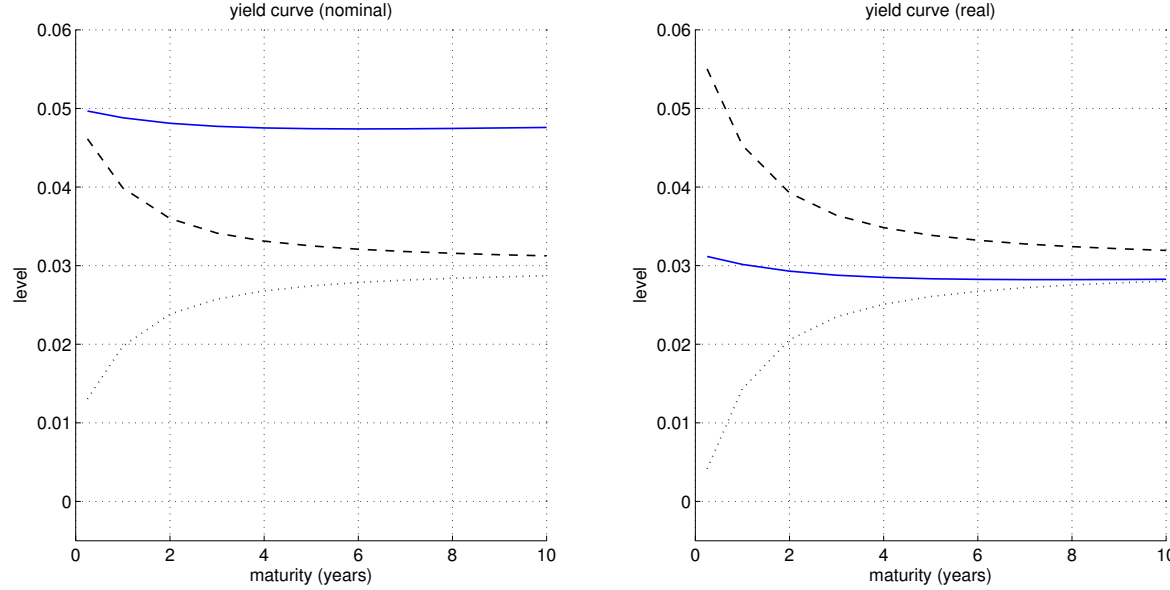


Figure C.15: Simulated shock (2003-2007) with simple model around $\pi_{ss} = 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (0.04) and the inflation target rate (0.02) and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

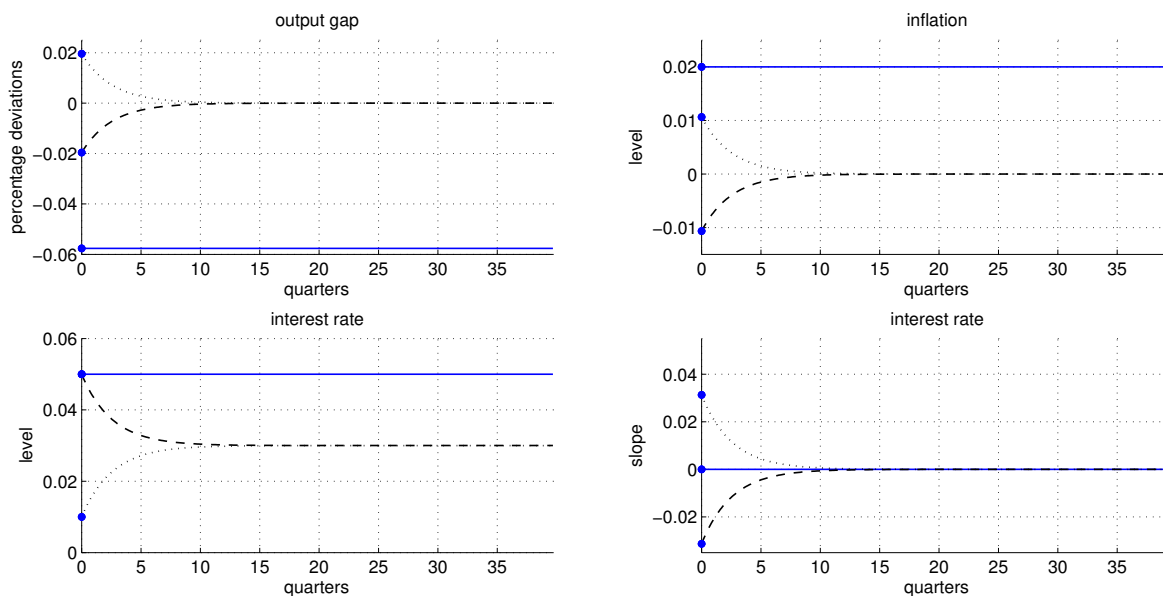


Figure C.16: Simulated shock (2003-2007) with simple model around $\pi_{ss} = 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (0.04) and the inflation target rate (0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

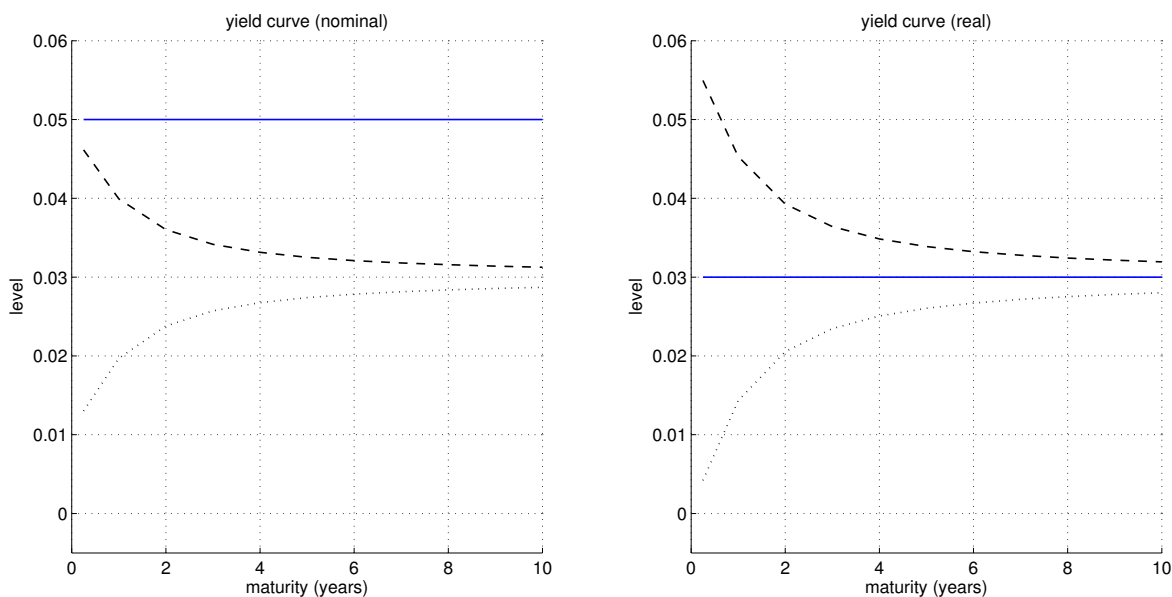


Figure C.17: Simulated shock to interest rate and target rate (2007-2011), macro dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.0475) and the inflation target rate (-0.02) and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

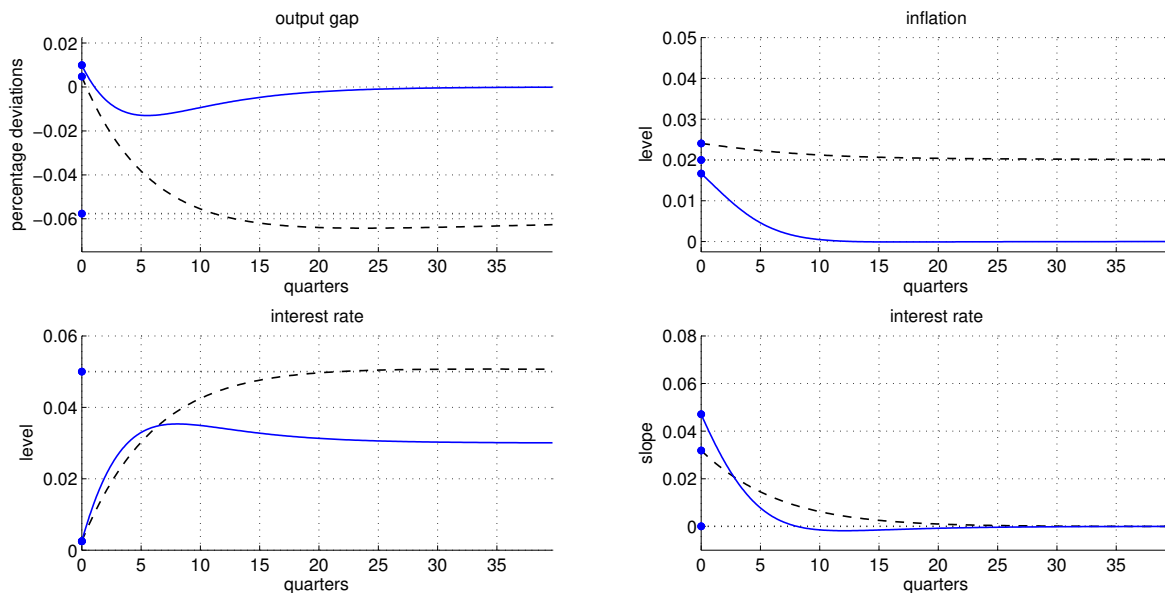


Figure C.18: Simulated shock to interest rate and target rate (2007-2011), yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.0475) and the inflation target rate (-0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

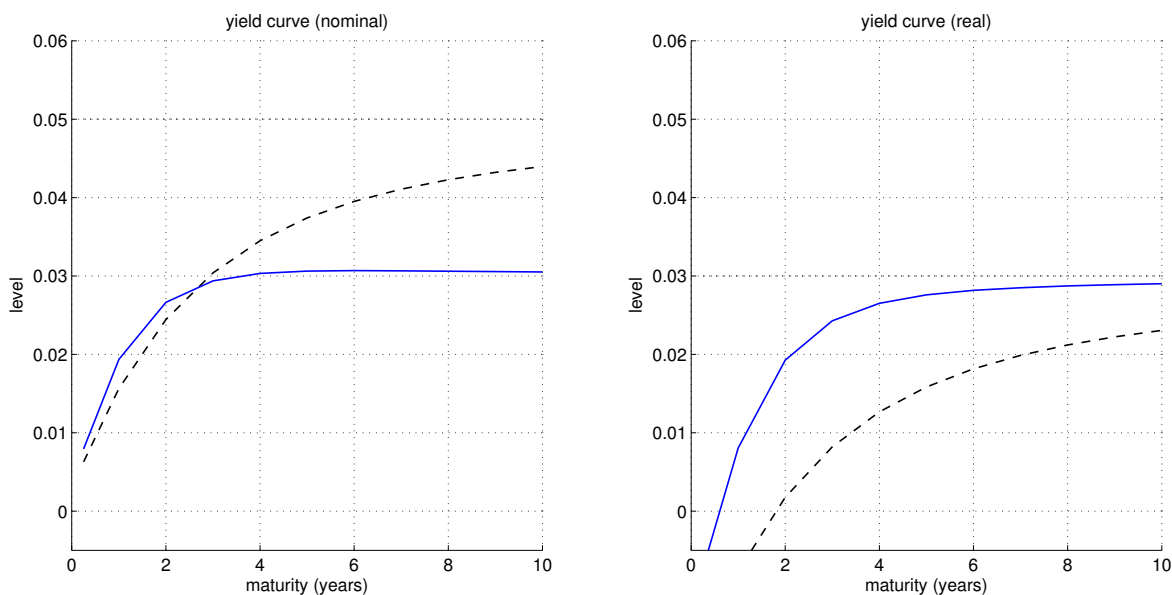


Figure C.19: Simulated shock (2007-2011) with simple model around $\pi_{ss} \geq 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.0475) and the inflation target rate (-0.02) and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

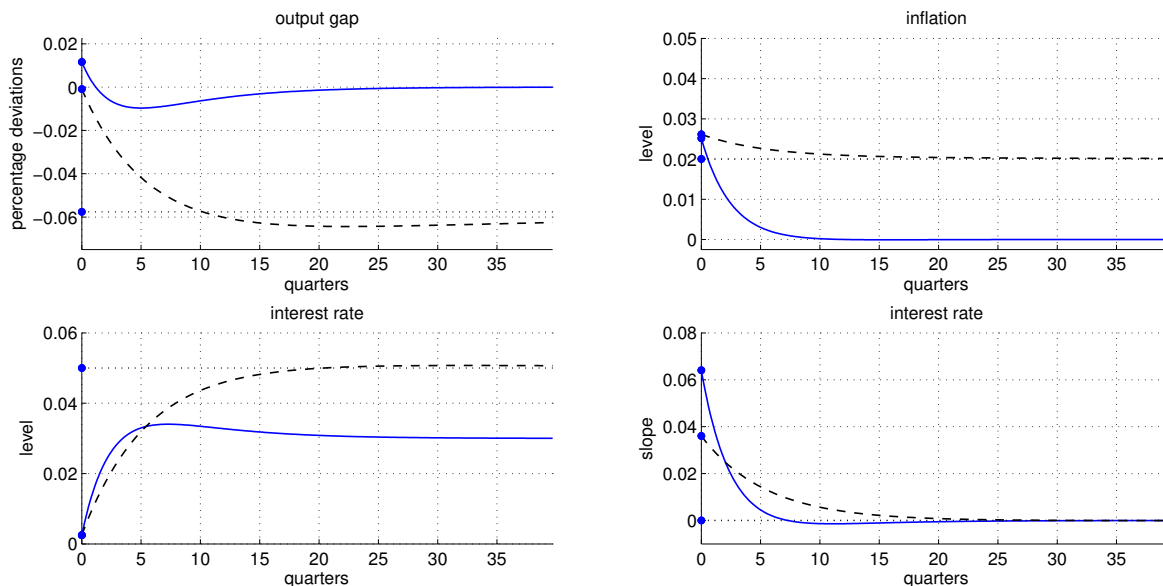


Figure C.20: Simulated shock (2007-2011) with simple model around $\pi_{ss} \geq 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.0475) and the inflation target rate (-0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

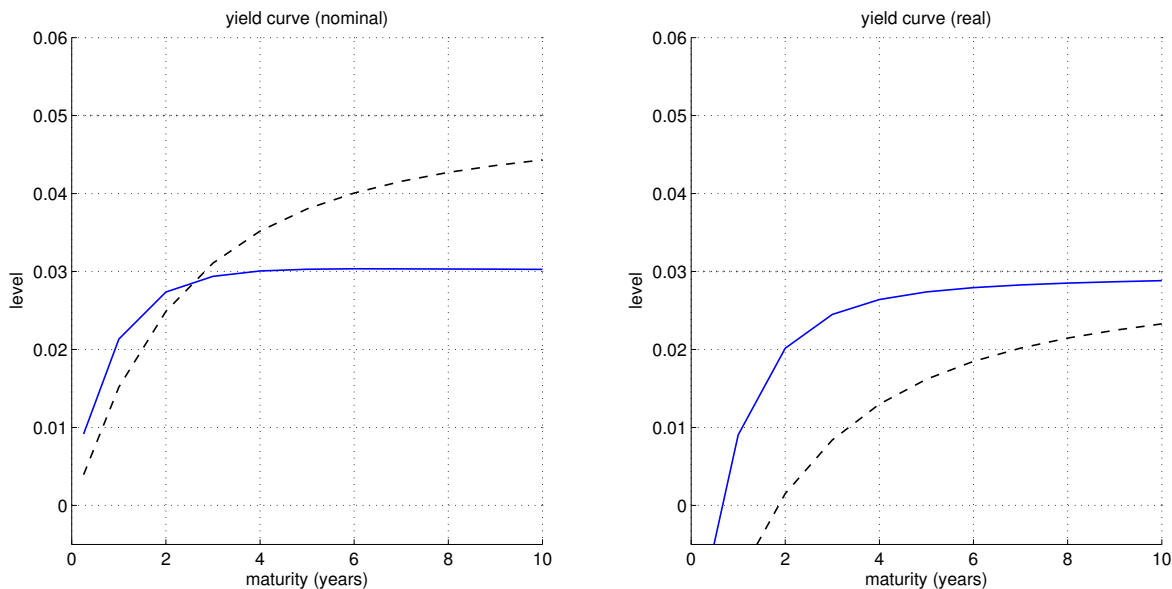


Figure C.21: Simulated shock (2007-2011) with simple model around $\pi_{ss} = 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.0475) and the inflation target rate (-0.02) and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

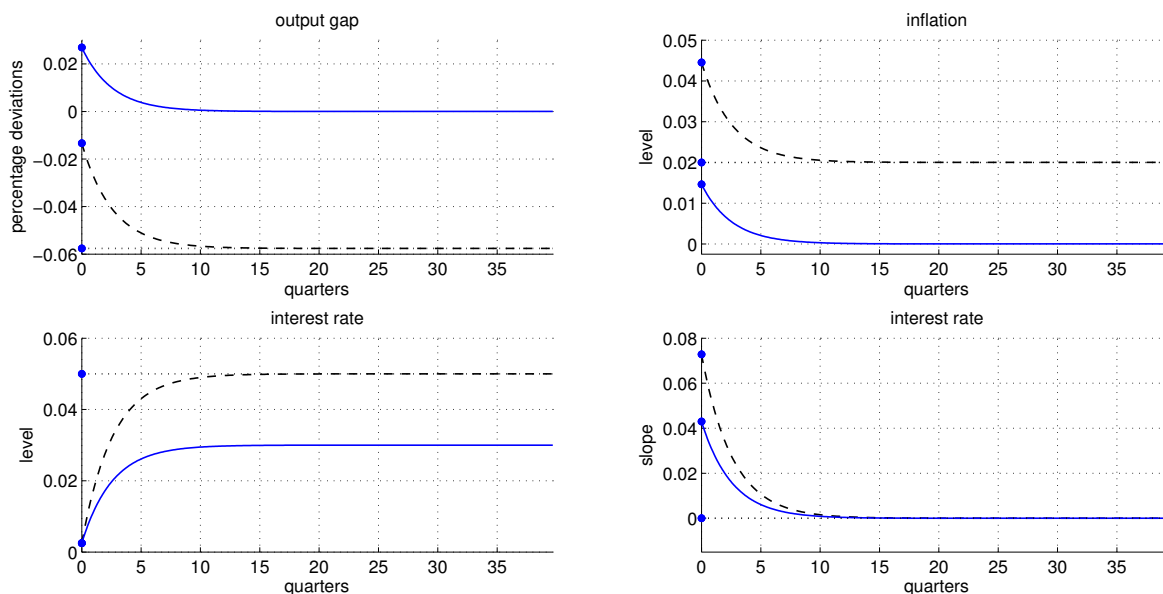


Figure C.22: Simulated shock (2007-2011) with simple model around $\pi_{ss} = 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.0475) and the inflation target rate (-0.02), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

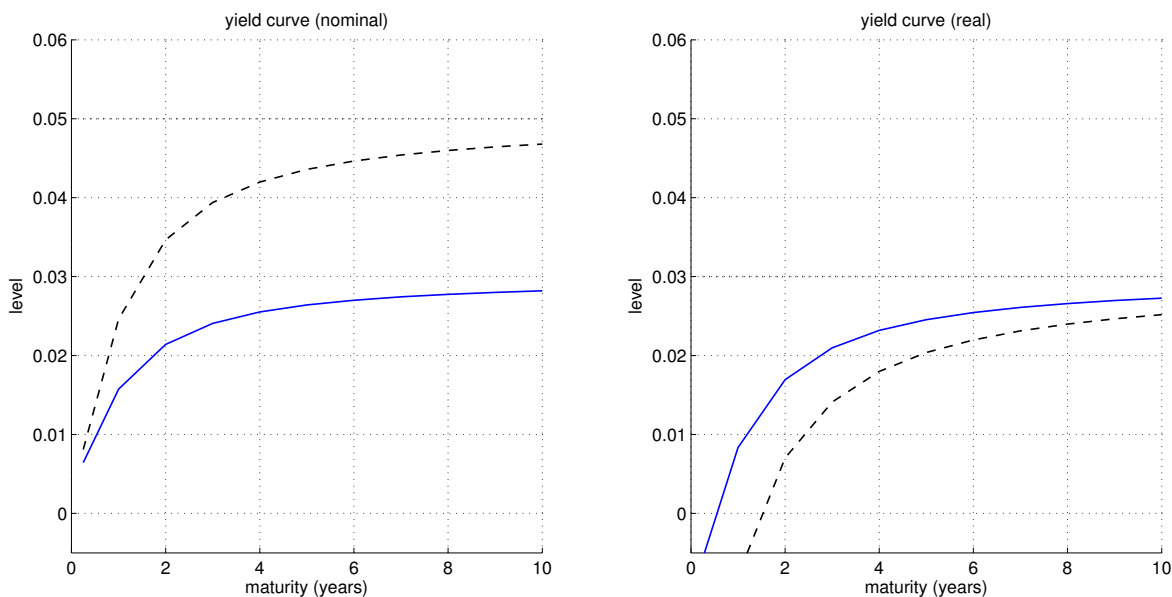


Figure C.23: Simulated shock to interest rate and target rate (2007-2011), macro dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.0475), the inflation target rate (-0.02), and preferences (-0.1), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

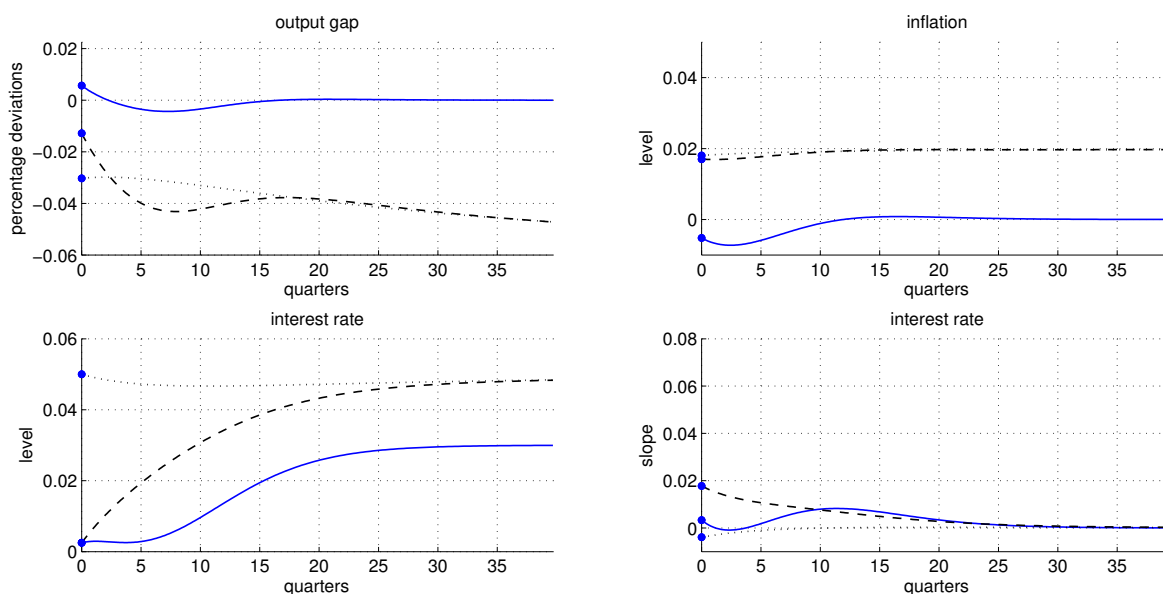


Figure C.24: Simulated shock to interest rate and target rate (2007-2011), yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.0475), the inflation target rate (-0.02), and preferences (-0.1), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

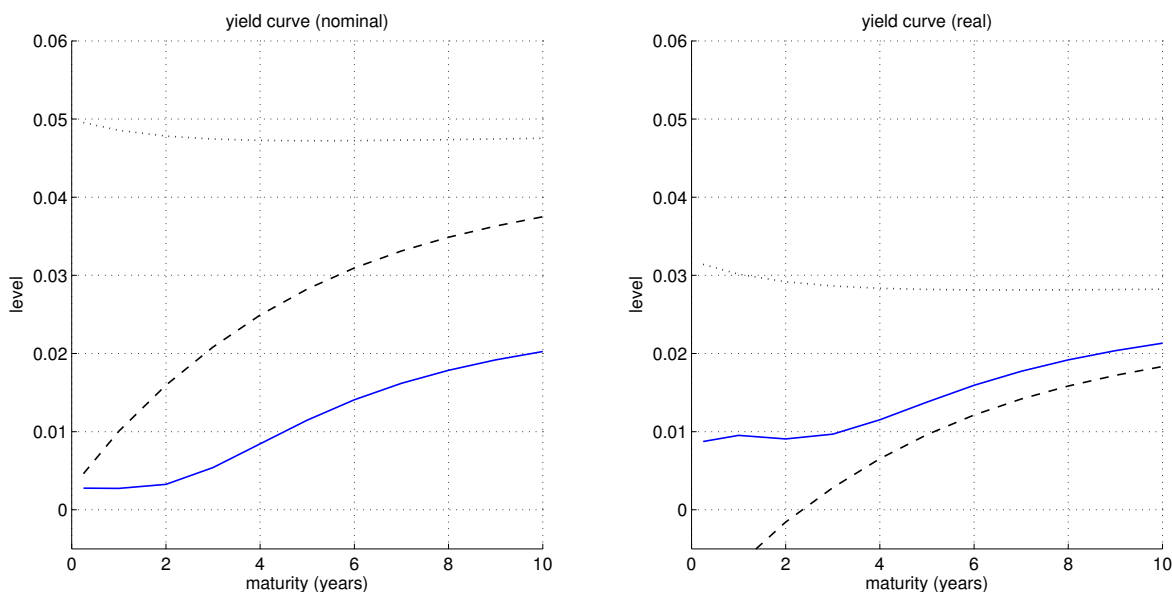


Figure C.25: Simulated shock (2007-2011) with simple model around $\pi_{ss} \geq 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.0475), the inflation target rate (-0.02), and preferences (-0.1), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

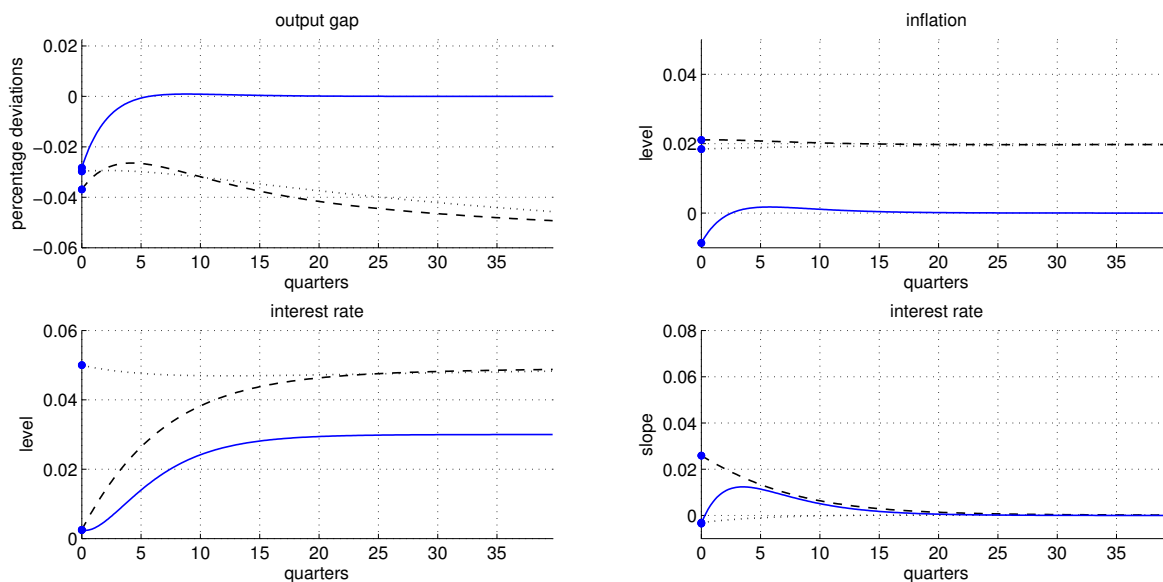


Figure C.26: Simulated shock (2007-2011) with simple model around $\pi_{ss} \geq 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.0475), the inflation target rate (-0.02), and preferences (-0.1), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

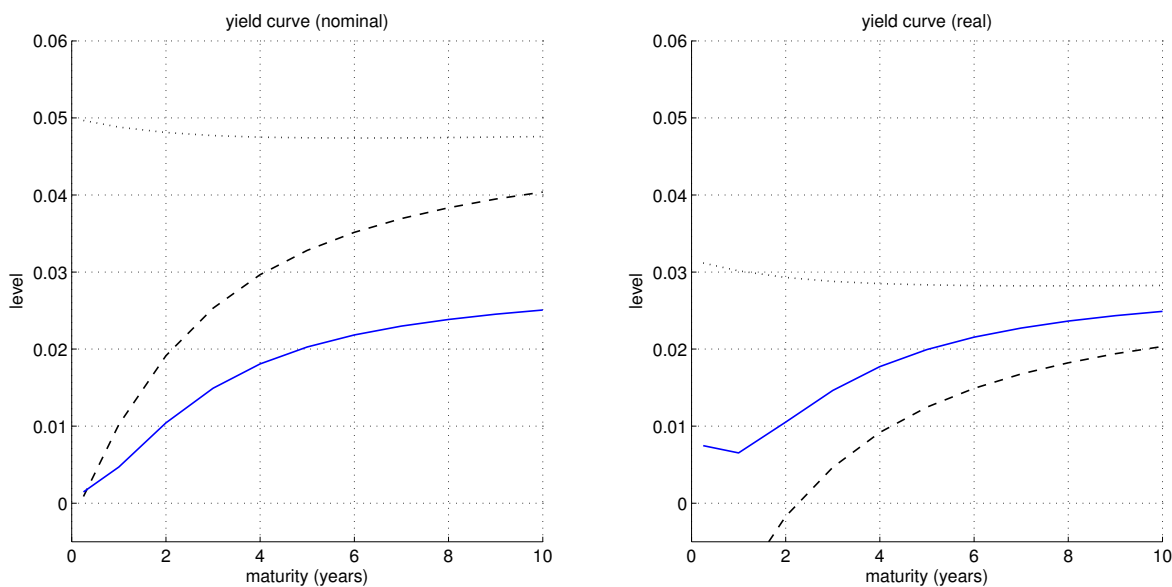


Figure C.27: Simulated shock (2007-2011) with simple model around $\pi_{ss} = 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (-0.0475), the inflation target rate (-0.02), and preferences (-0.1), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

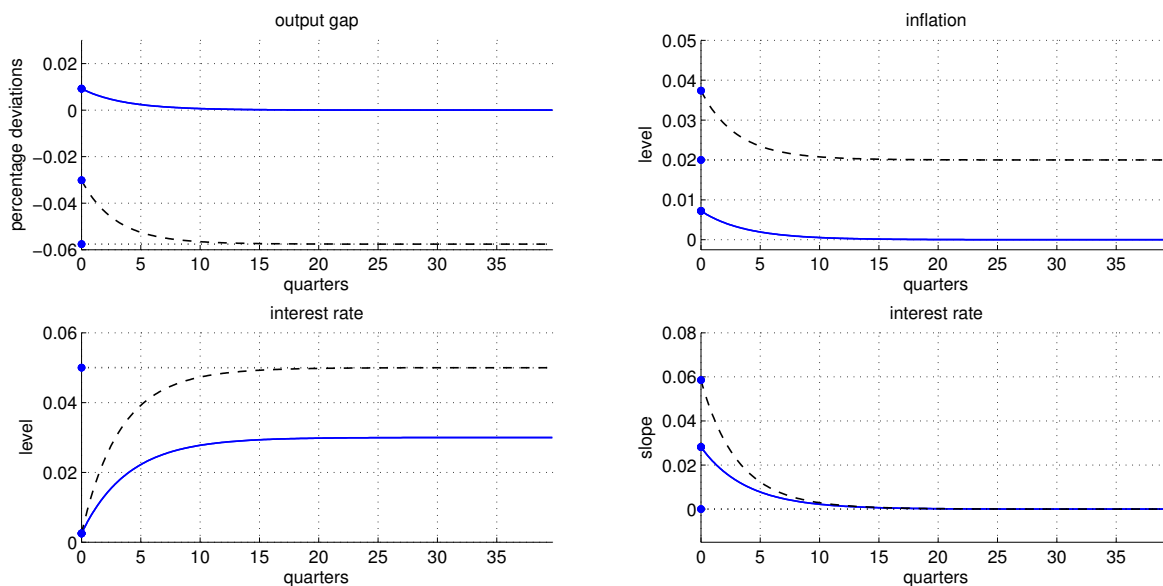


Figure C.28: Simulated shock (2007-2011) with simple model around $\pi_{ss} = 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (-0.0475), the inflation target rate (-0.02), and preferences (-0.1), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0.02$), and the pre-shock scenario (dotted).

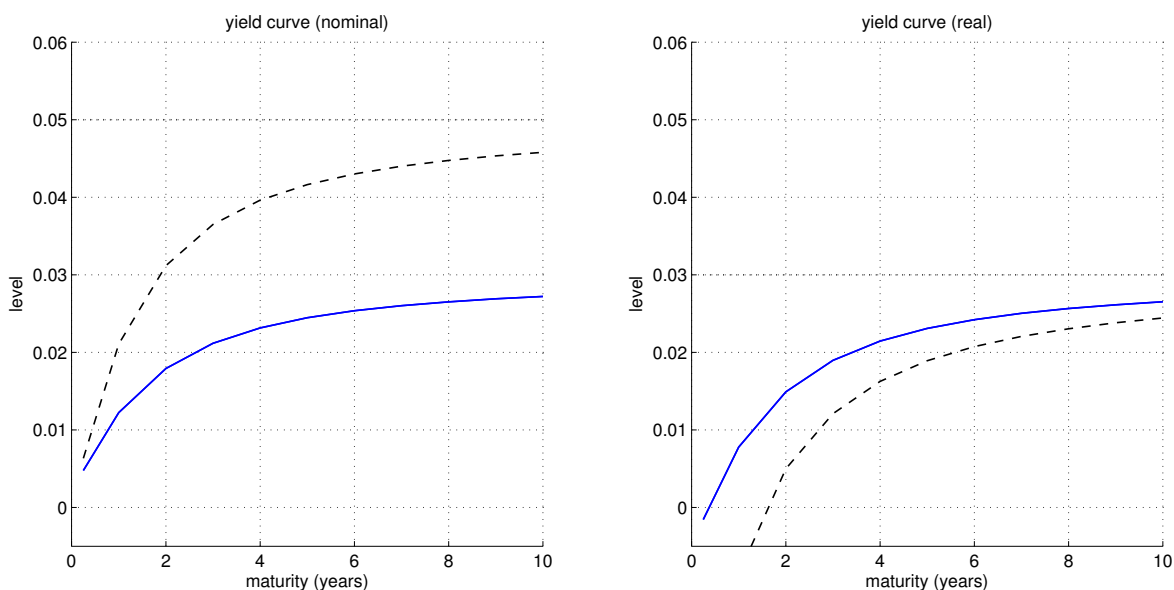


Figure C.29: Simulated shock to target rate (2011-2015), macro dynamics

In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the inflation target rate (0.02), and preferences (-0.15), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

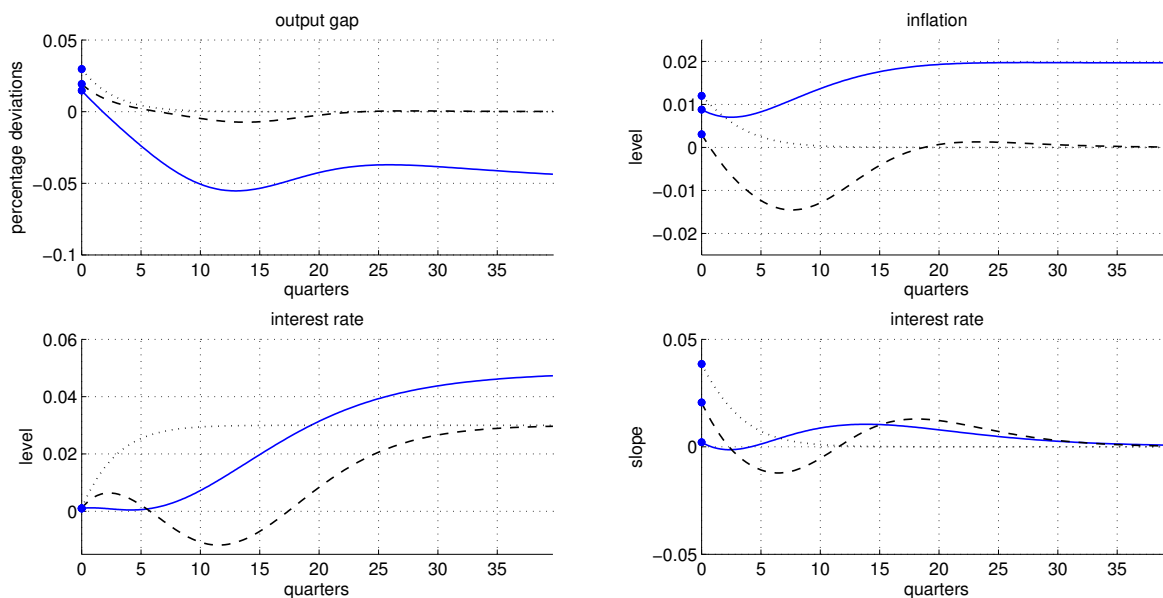


Figure C.30: Simulated shock to target rate (2011-2015), yield curve

In this figure we show the yield curve response to unexpected shocks to the inflation target rate (0.02), and preferences (-0.15), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

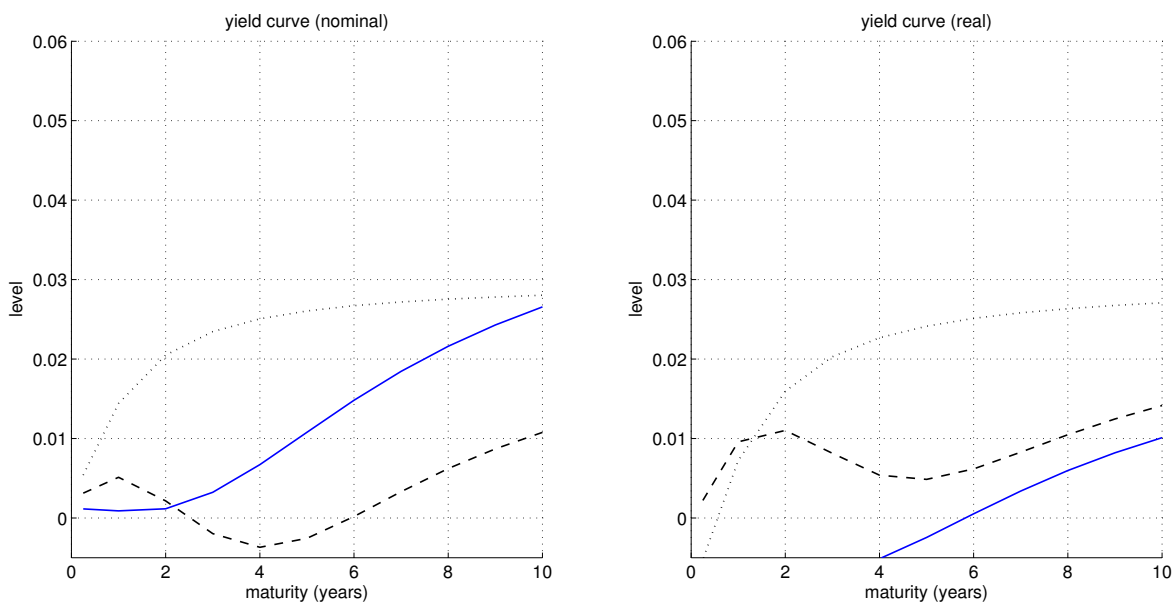


Figure C.31: Simulated shock (2011-2015) with simple model around $\pi_{ss} \geq 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the inflation target rate (0.02), and preferences (-0.15), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

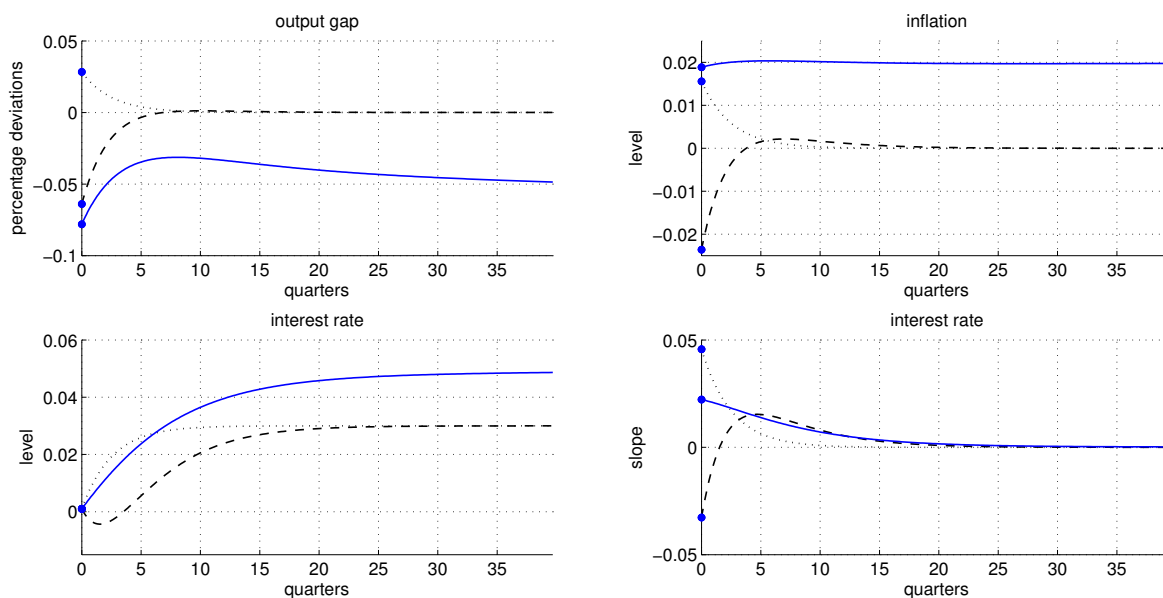


Figure C.32: Simulated shock (2011-2015) with simple model around $\pi_{ss} \geq 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the inflation target rate (0.02), and preferences (-0.15), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

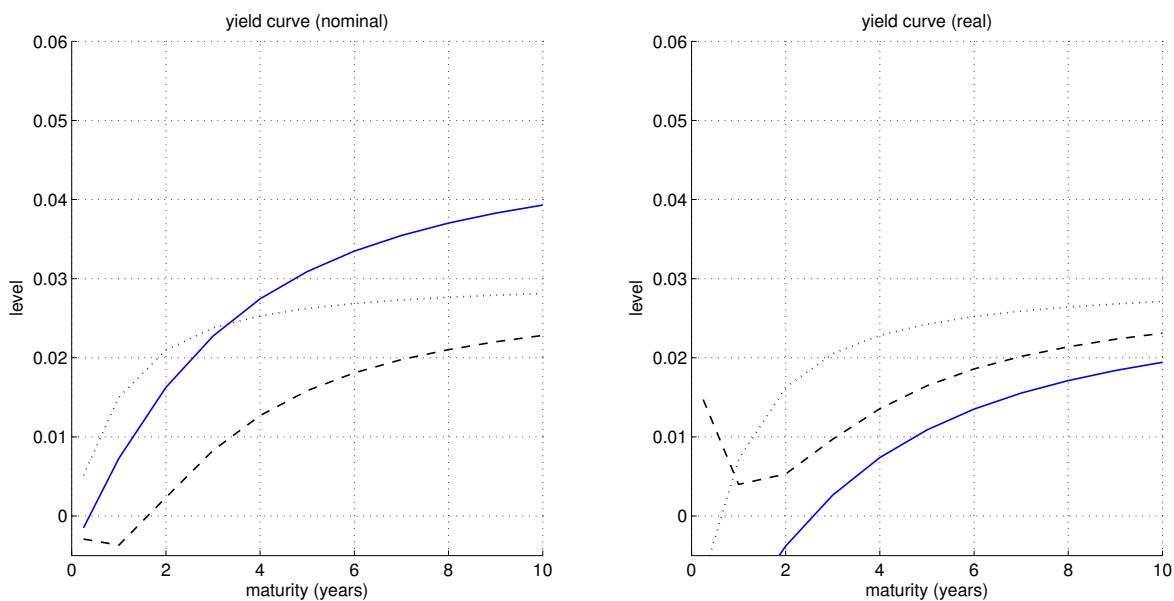


Figure C.33: Simulated shock (2011-2015) with simple model around $\pi_{ss} = 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the inflation target rate (0.02), and preferences (-0.15), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

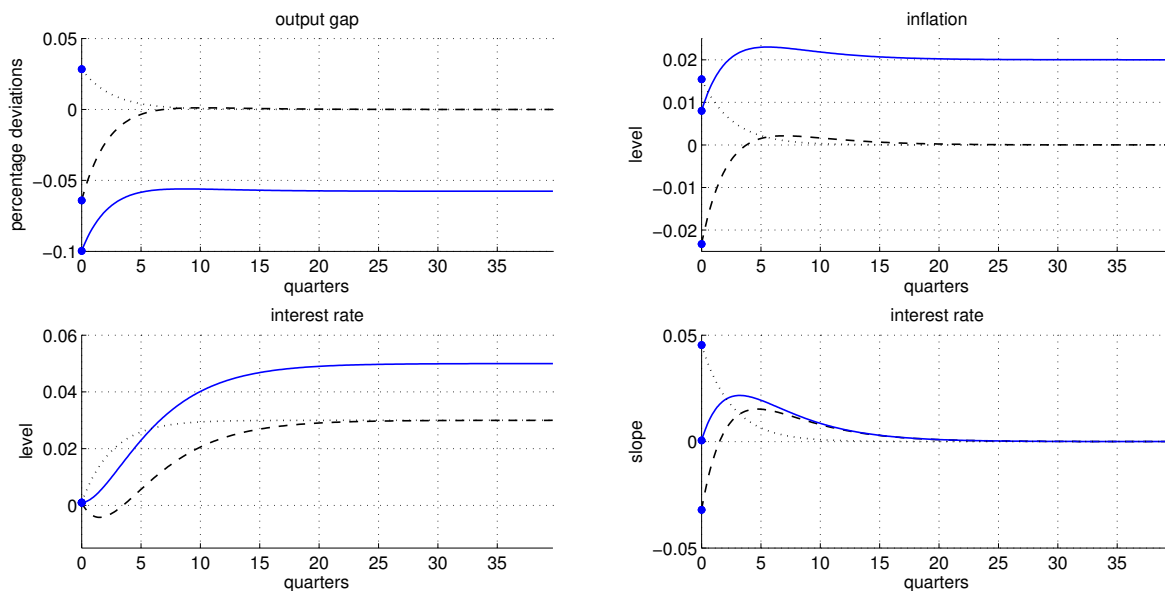


Figure C.34: Simulated shock (2011-2015) with simple model around $\pi_{ss} = 0$, yield curve
 In this figure we show the yield curve response to unexpected shocks to the inflation target rate (0.02), and preferences (-0.15), with effects for the nominal and real yields (blue solid), the no-target rate shock scenario (black dashed, $\pi_{ss} = 0$), and the pre-shock scenario (dotted).

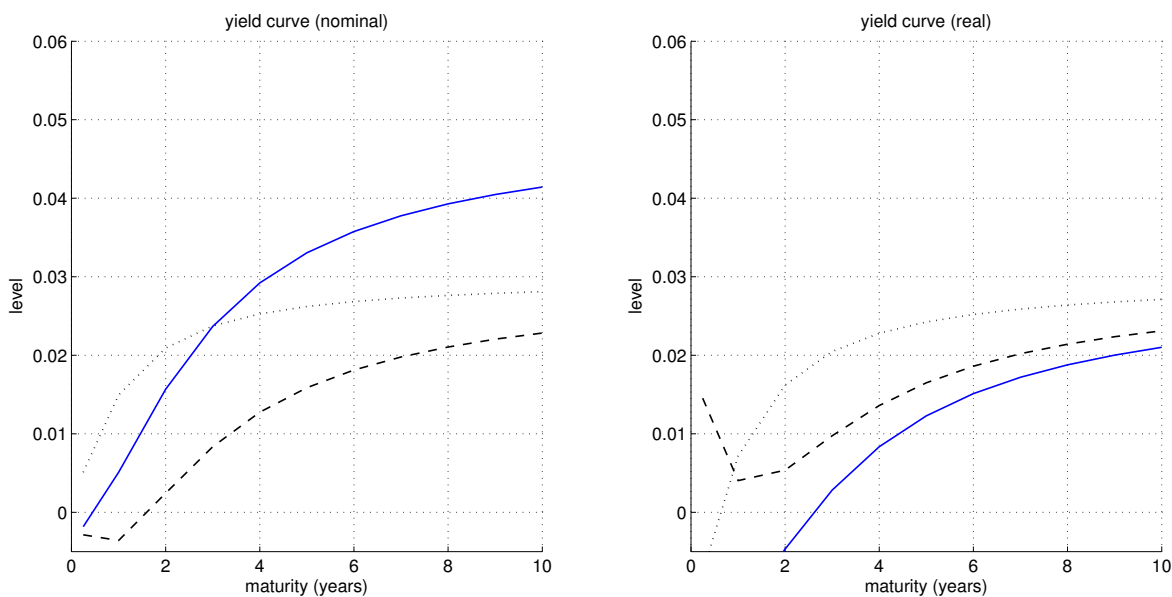


Figure C.35: Simulated shock to interest rate (2004-2005), macro dynamics

In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (0.015), and preferences (-0.1), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), and the pre-shock scenario (dotted).

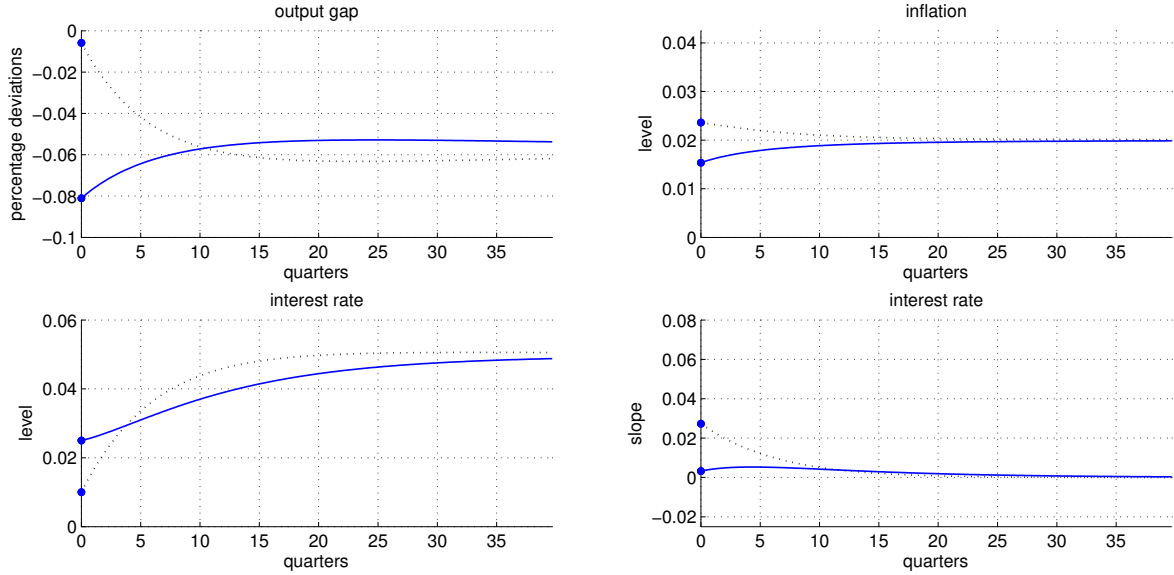


Figure C.36: Simulated shock to interest rate (2004-2005), yield curve

In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (0.02), and preferences (-0.15), with effects for the nominal and real yields (blue solid), and the pre-shock scenario (dotted).

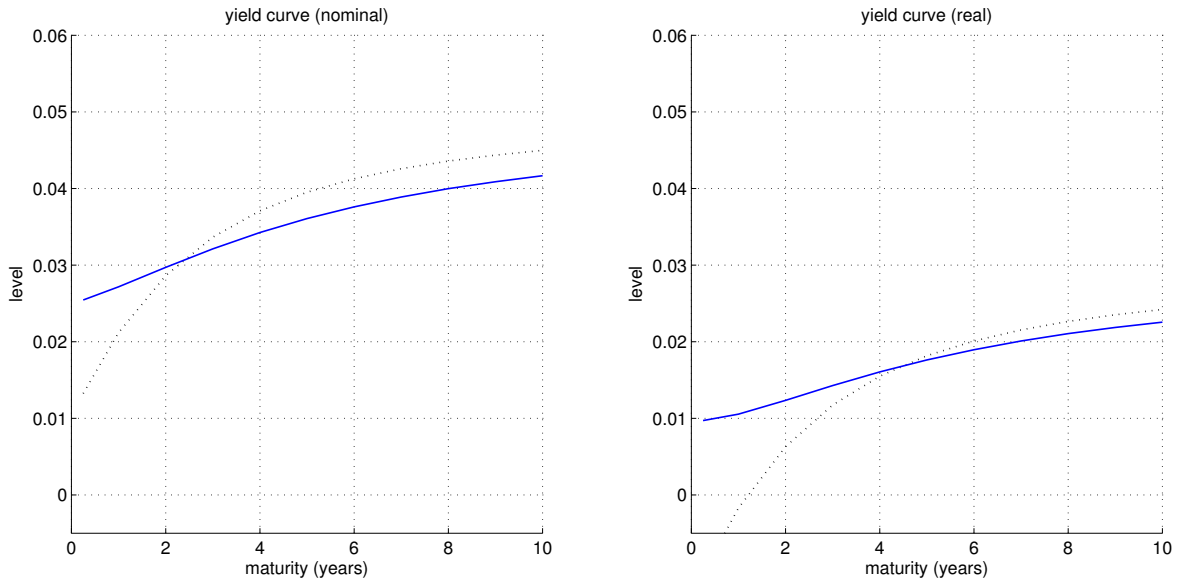


Figure C.37: Simulated shock (2004-2005) with simple model around $\pi_{ss} \geq 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (0.015), and preferences (-0.1), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), and the pre-shock scenario (dotted).

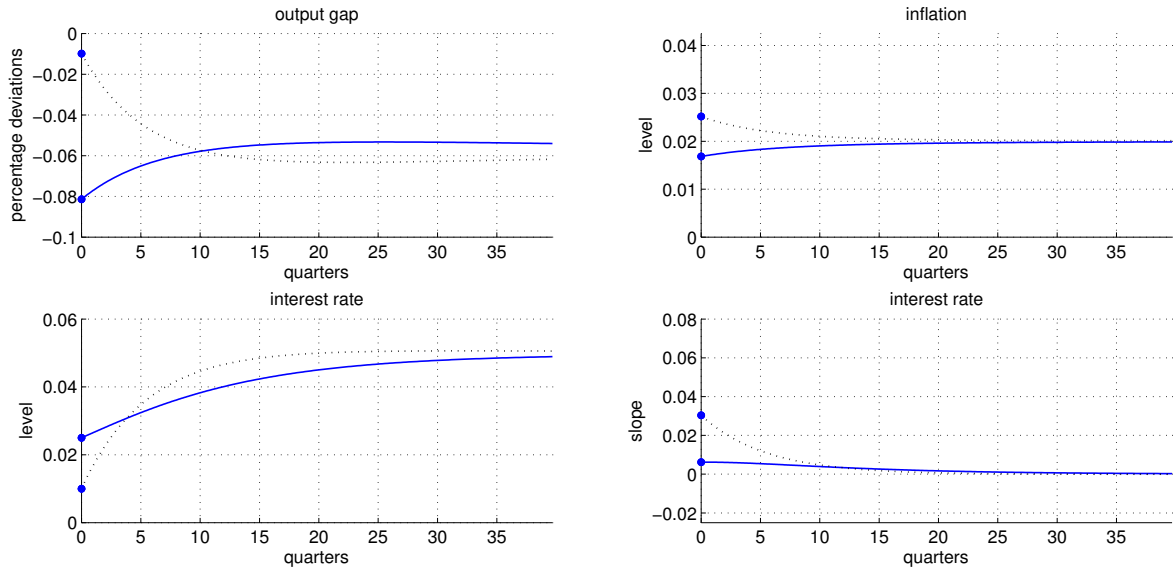


Figure C.38: Simulated shock (2004-2005) with simple model around $\pi_{ss} \geq 0$, yields
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (0.02), and preferences (-0.15), with effects for the nominal and real yields (blue solid), and the pre-shock scenario (dotted).

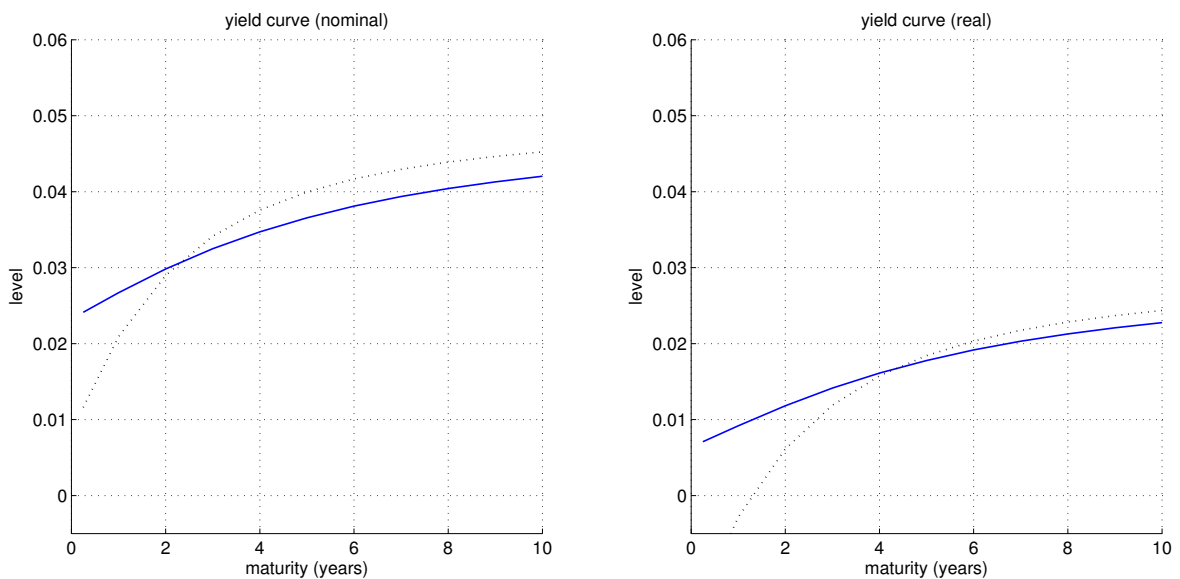


Figure C.39: Simulated shock (2004-2005) with simple model around $\pi_{ss} = 0$, dynamics
 In this figure we show (from left to right, top to bottom) the simulated responses to unexpected shocks to the (initial) interest rate (0.015), and preferences (-0.1), and its effect on the output gap, the inflation rate, and the level and slope of the interest rate (blue solid), and the pre-shock scenario (dotted).

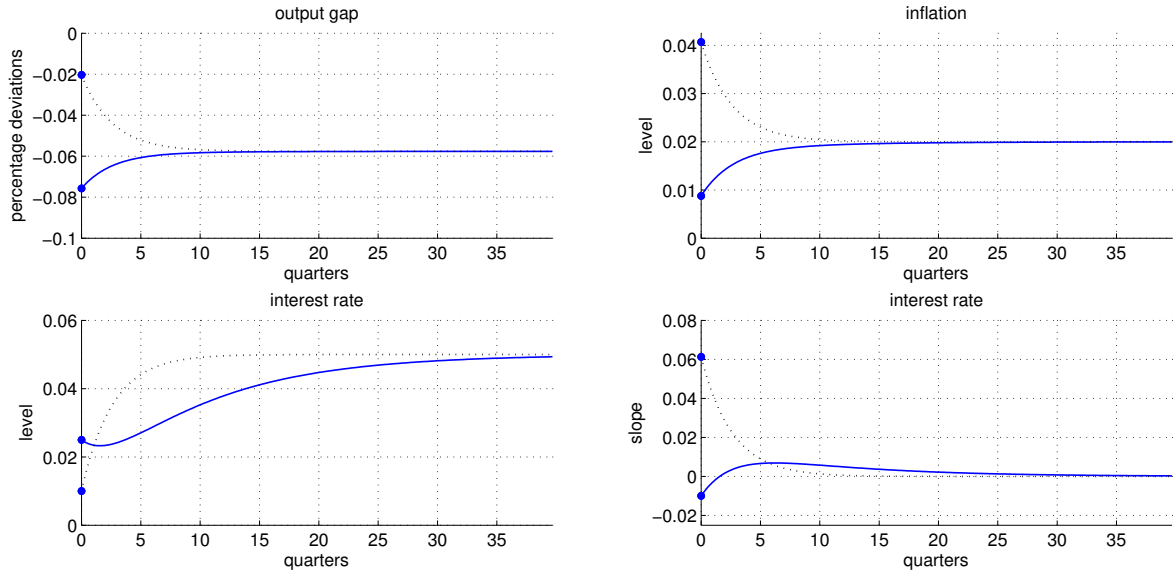
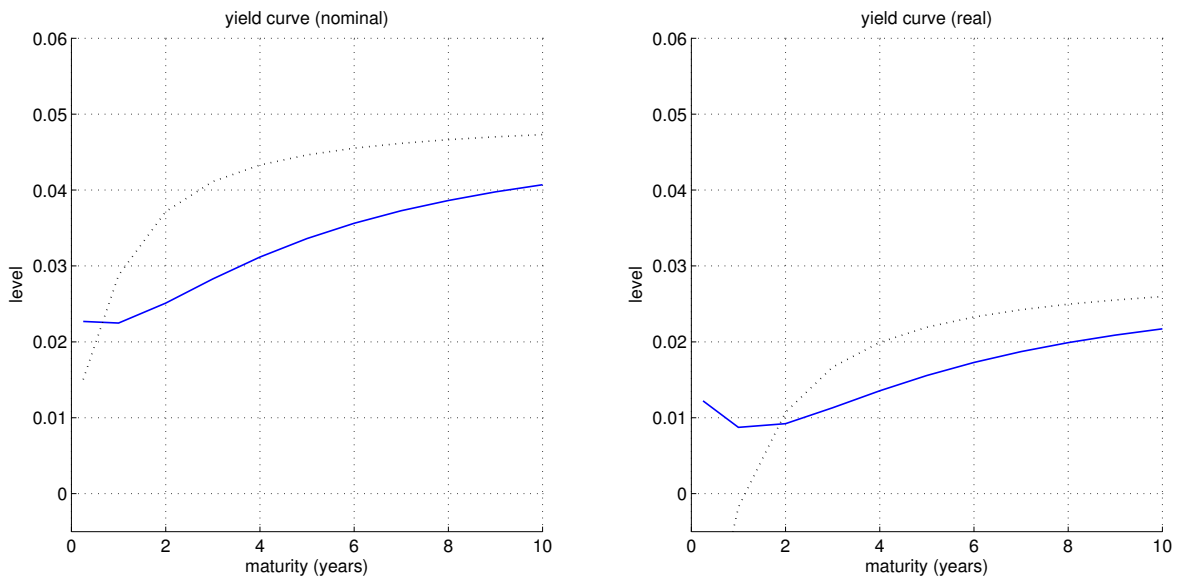


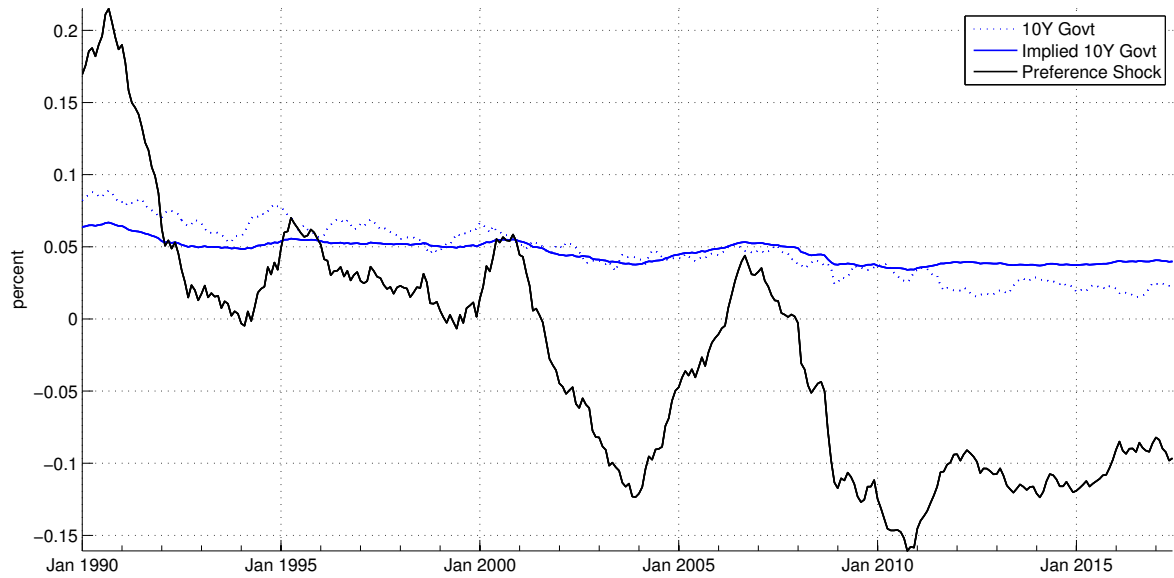
Figure C.40: Simulated shock (2004-2005) with simple model around $\pi_{ss} = 0$, yields
 In this figure we show the yield curve response to unexpected shocks to the (initial) interest rate (0.02), and preferences (-0.15), with effects for the nominal and real yields (blue solid), and the pre-shock scenario (dotted).



C.3. Model-implied shock processes

Figure C.41: Implied 10-year treasury rate and natural rate

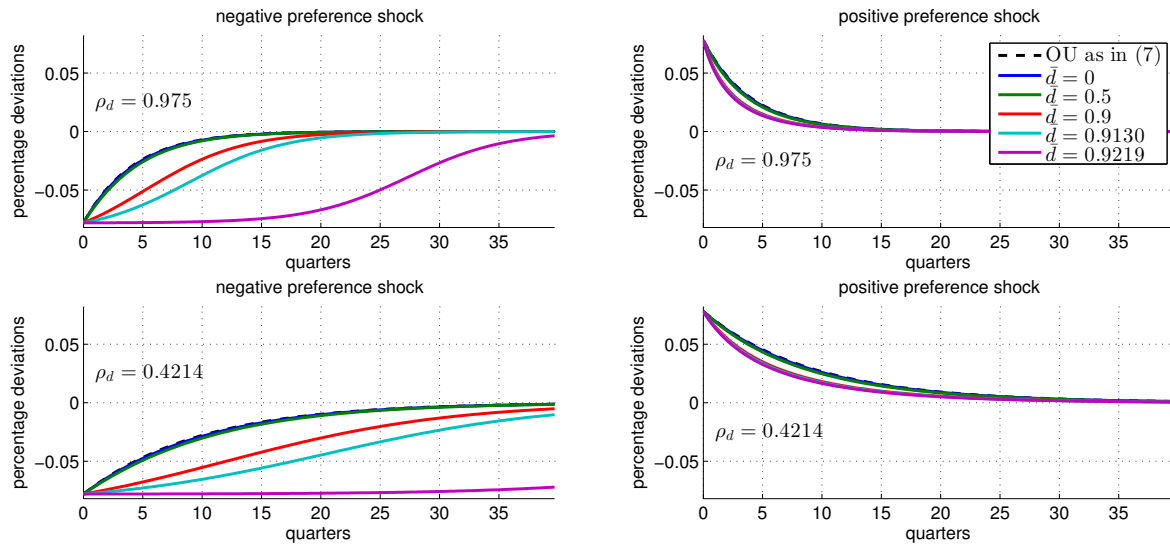
In this figure we show time series plots of the model-implied 10-Year Treasury Rate (Implied 10Y Govt) and the model-implied preference shock using the simple NK model around $\pi_{ss} = 0$, when matching the observed US Effective Federal Funds Rate (Fed Funds) and the Consumer Price Index, seasonally adjusted, all at the monthly frequency. The sample runs from January, 1990, through June, 2017.



C.4. Alternative shock processes

Figure C.42: Generalized logistic preference shock

In this figure we plot the dynamics of the logistic process, $dd_t = \rho_d(d_t - \bar{d})(1 - d_t)/(1 - \bar{d}) dt$, and the Ornstein-Uhlenbeck (OU) process, $d \log d_t = -\rho_d \log d_t dt$, for different parameterizations of ρ_d and \bar{d} . It shows that the dynamics are similar if the lower bound \bar{d} is sufficiently far away from $d_0 > \bar{d}$. For $\bar{d} = 0$ we obtain the (standard) logistic growth model $dd_t = \rho_d d_t(1 - d_t) dt$ (cf. Section A.9).



C.5. Policy functions

Figure C.43: Solution in the state space (policy functions)

In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of the interest rate. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

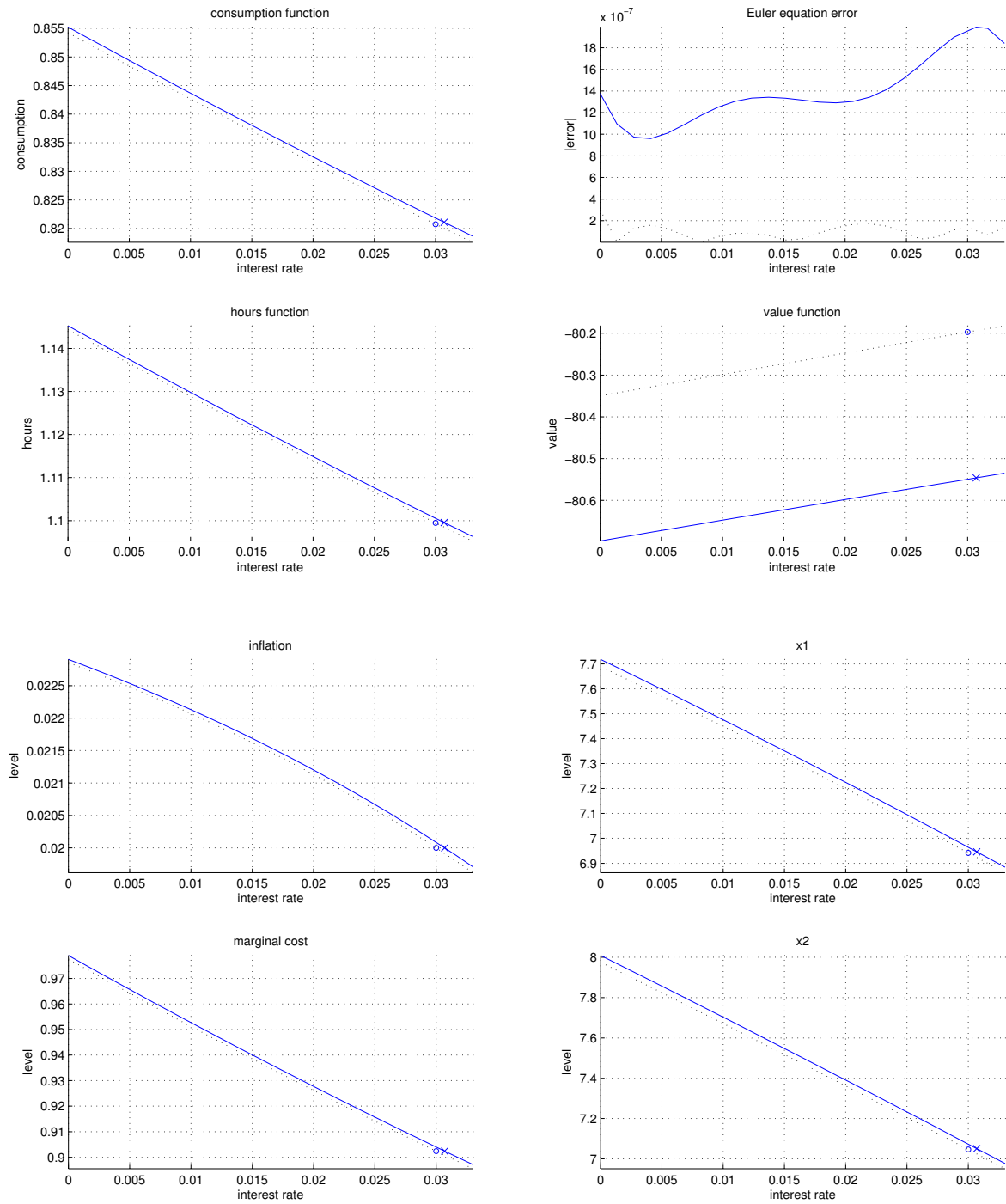


Figure C.44: Solution in the state space (policy functions)

In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of price dispersion. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

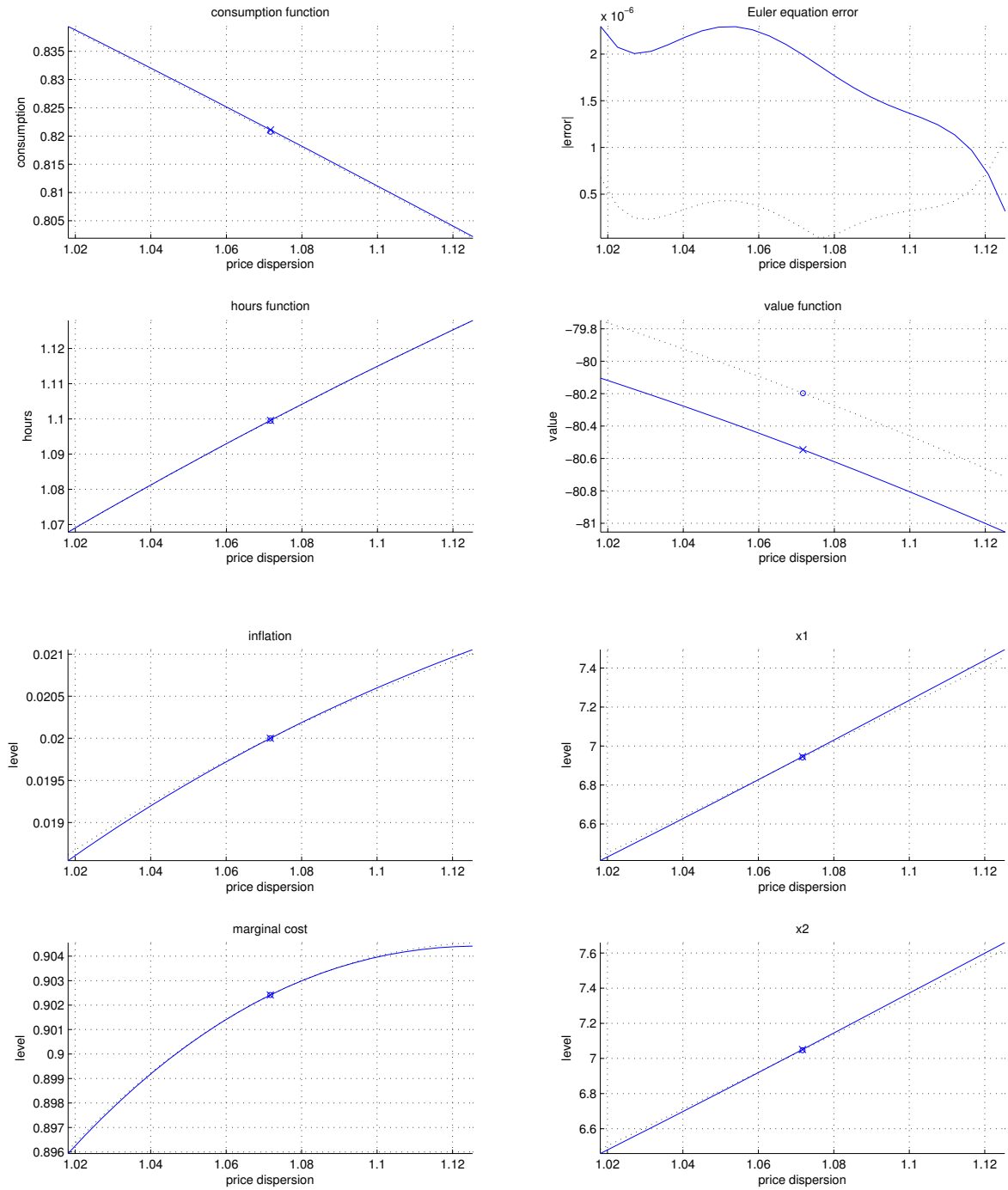


Figure C.45: Solution in the state space (policy functions at zero nominal interest rates)
 In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of price dispersion. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic model.

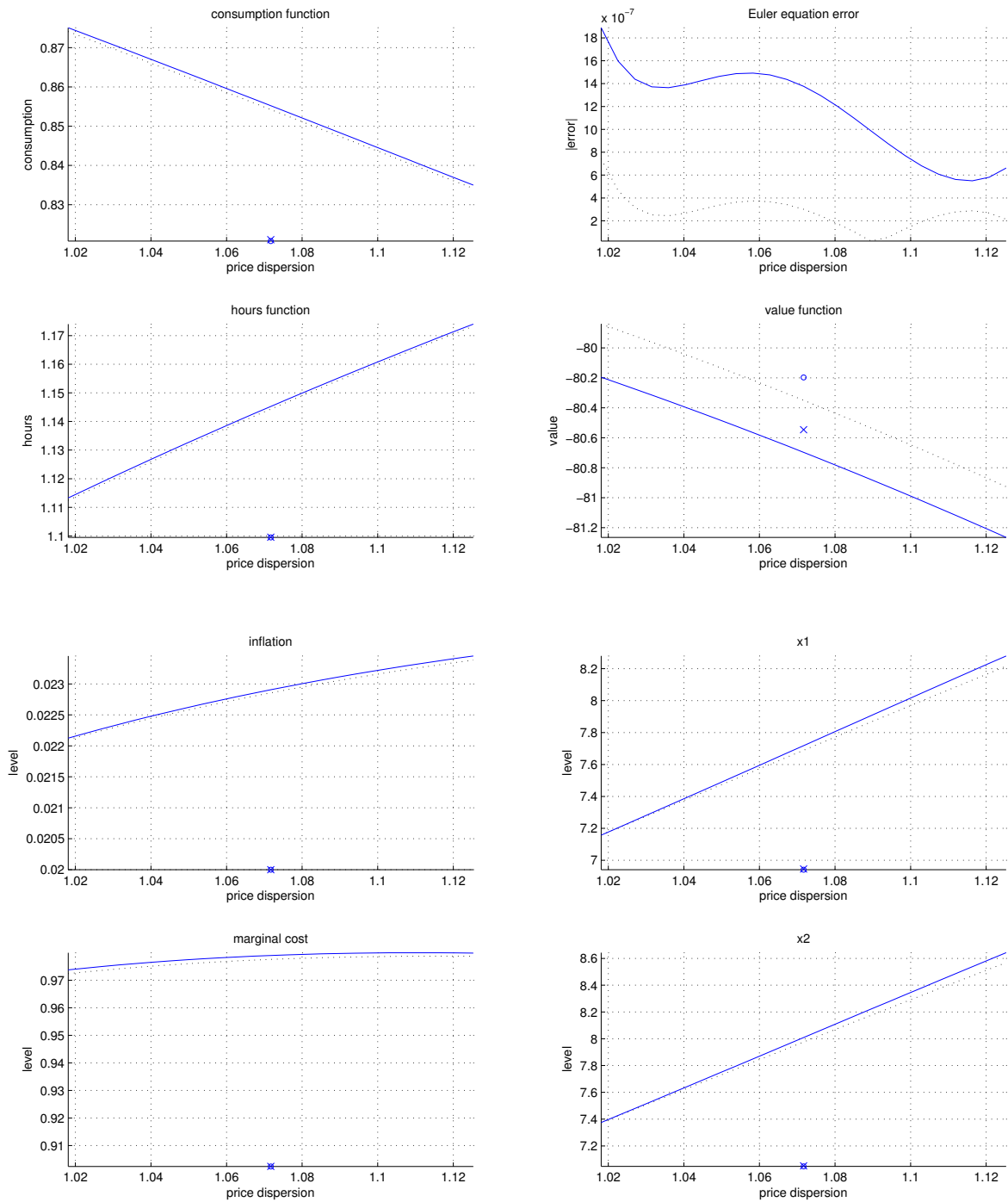


Figure C.46: Solution in the state space (policy functions)

In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of the preference shock. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

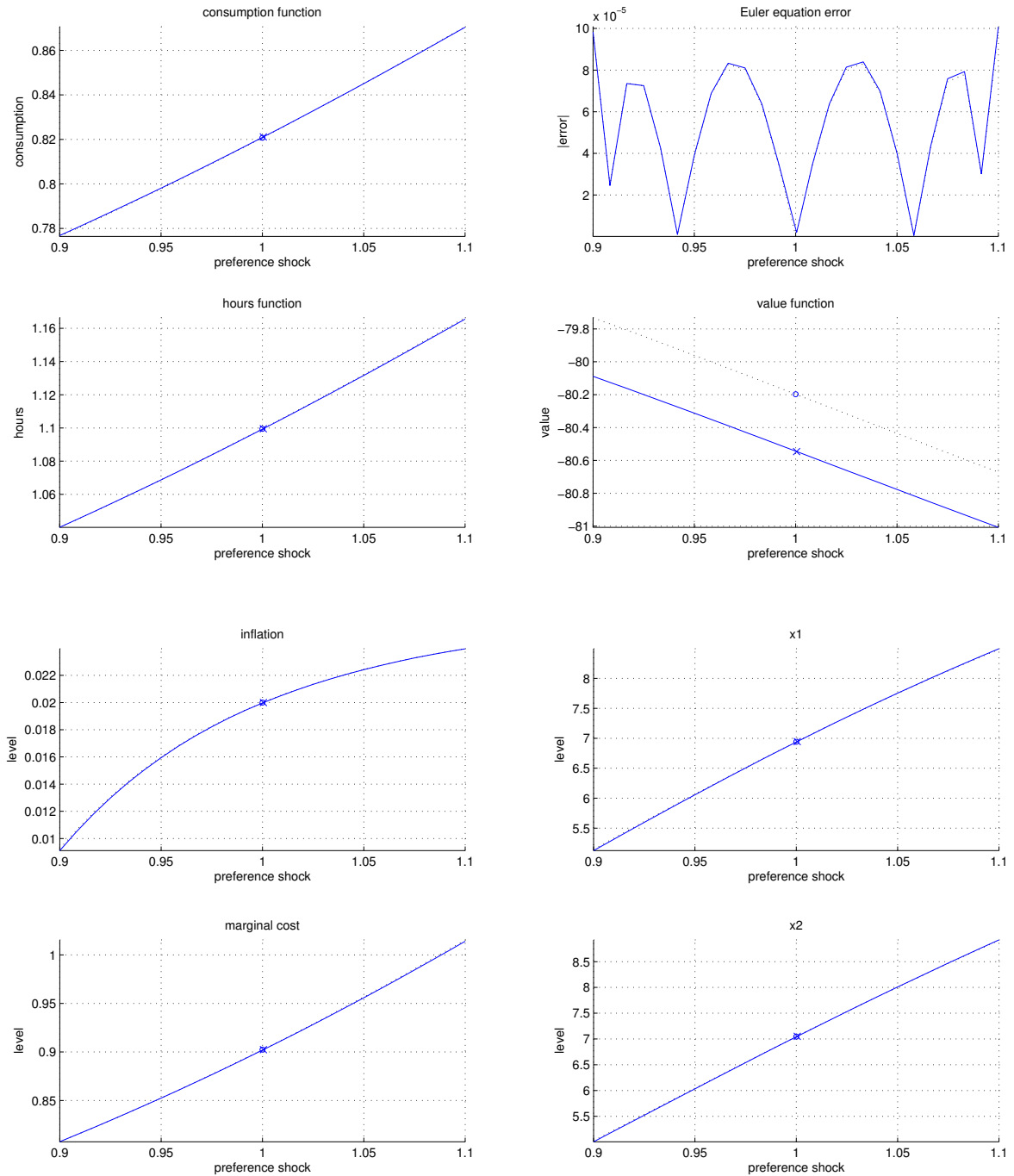


Figure C.47: Solution in the state space (policy functions at zero nominal interest rates)
 In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of the preference shock. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

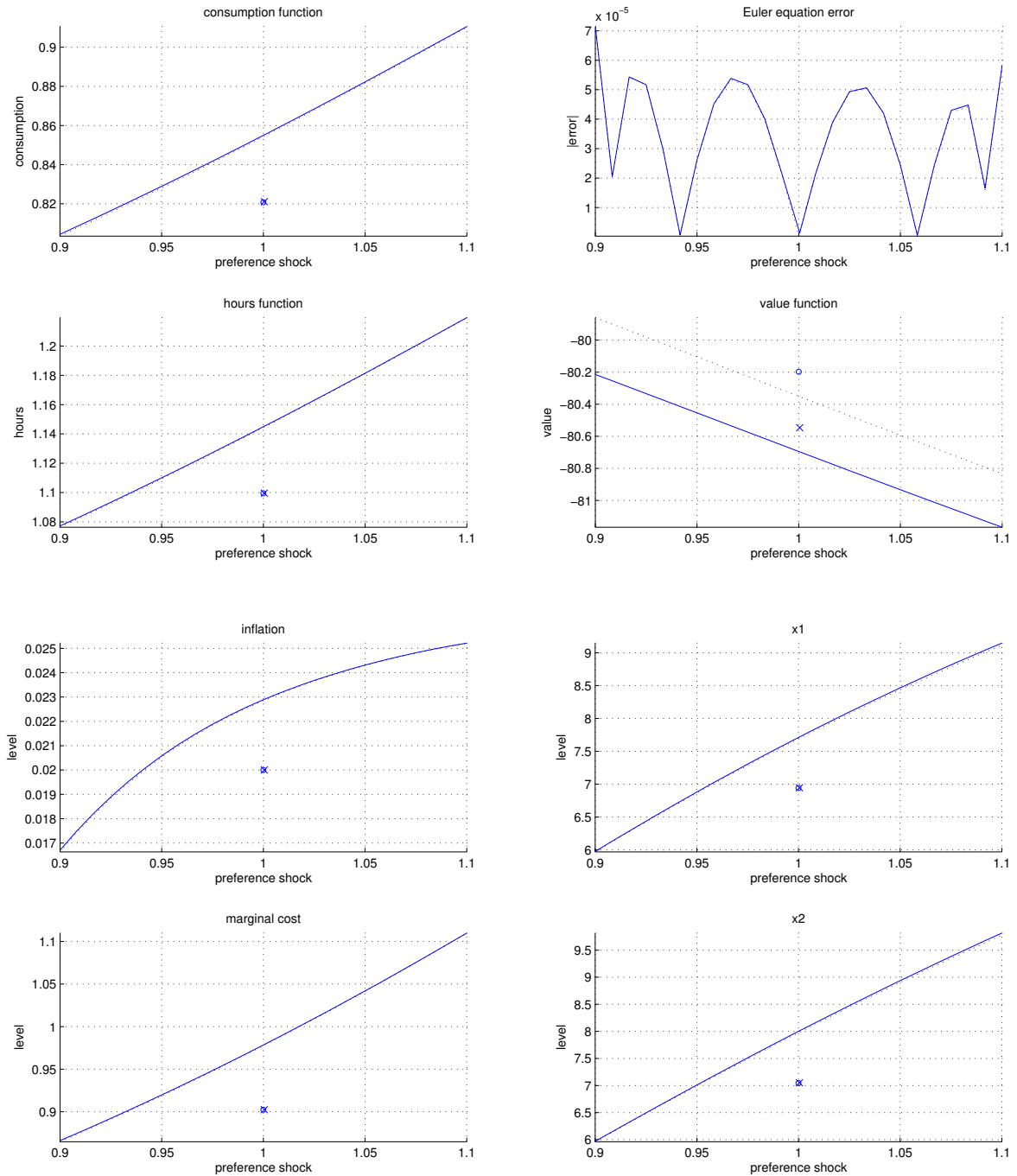


Figure C.48: Solution in the state space (policy functions)

In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of the technology shock. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

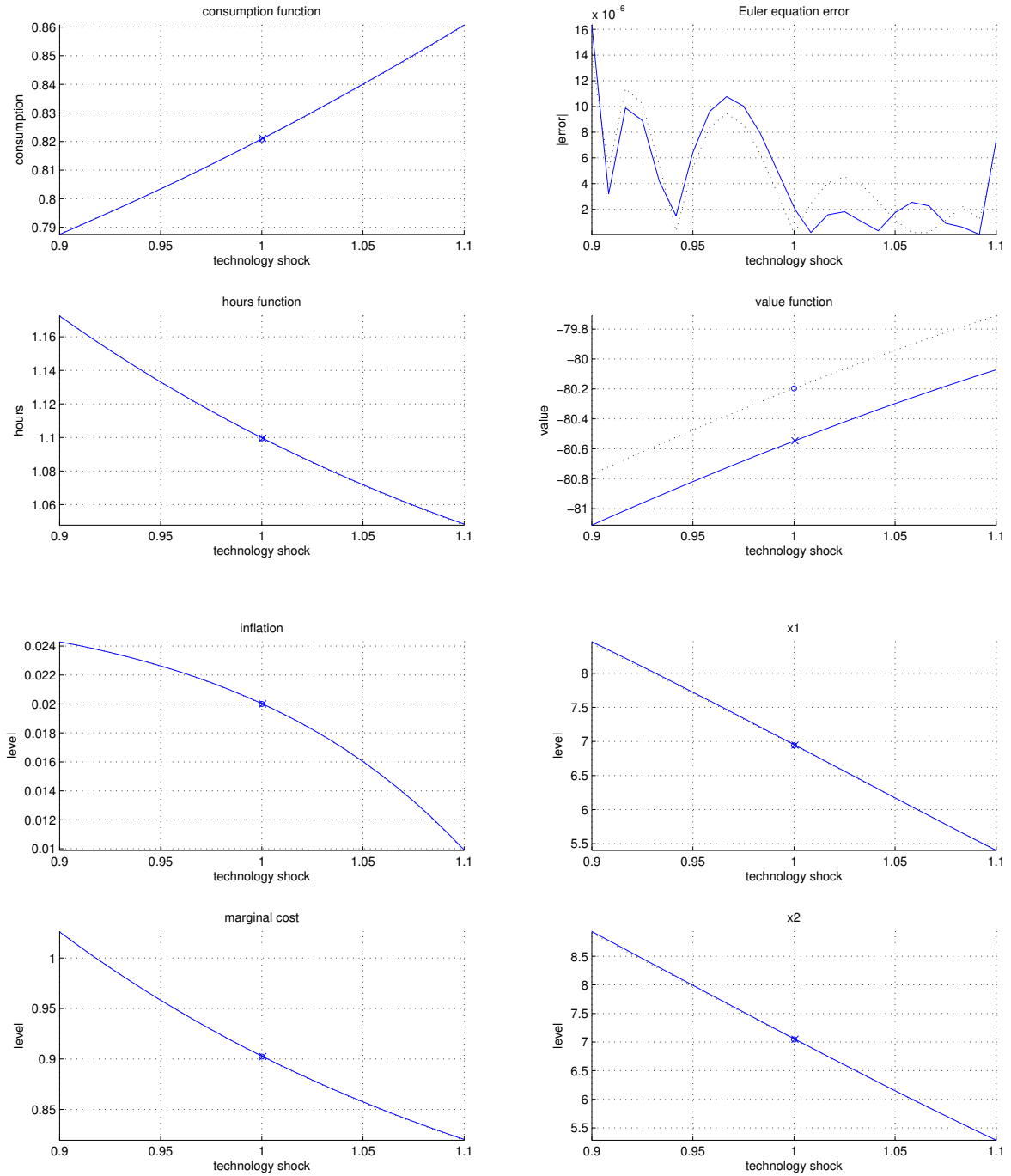


Figure C.49: Solution in the state space (policy functions at zero nominal interest rates)
 In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of the technology shock. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

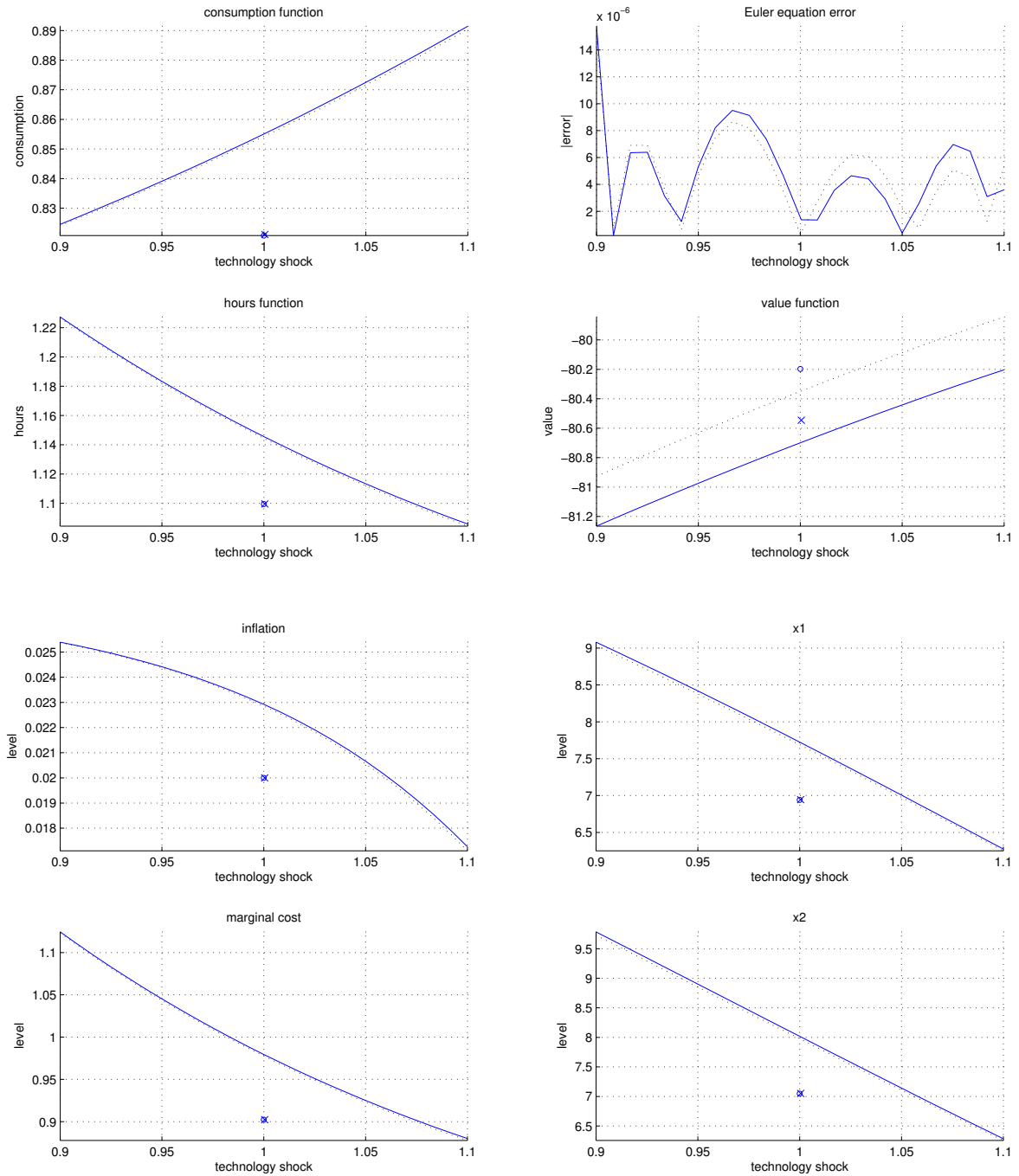


Figure C.50: Solution in the state space (policy functions)

In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of the government expenditure shock. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

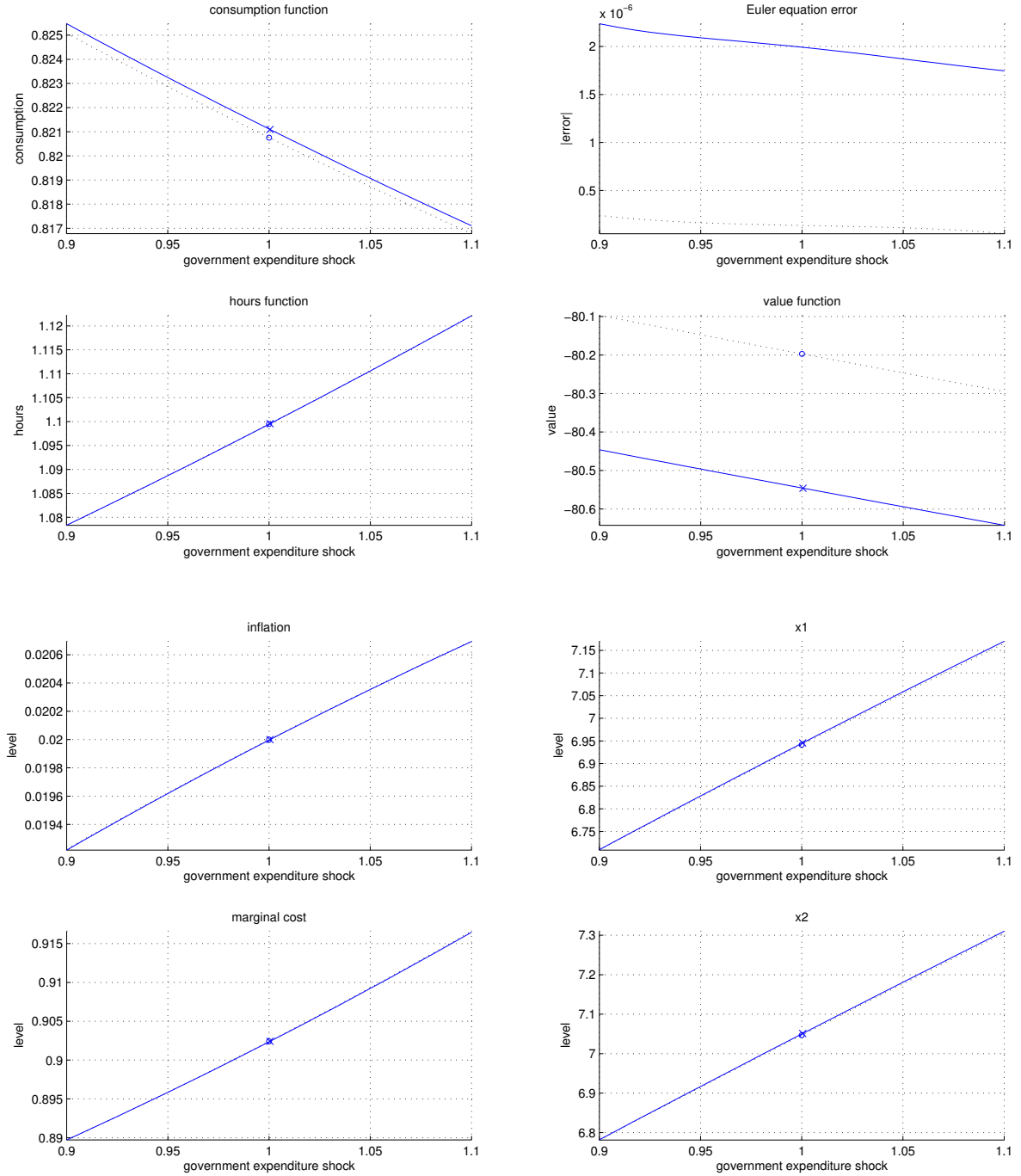


Figure C.51: Solution in the state space (policy functions at zero nominal interest rates)
 In this figure we show (from left to right, top to bottom) optimal consumption, the Euler equation errors, optimal hours, the value function, the inflation rate, the auxiliary variable x_1 , marginal cost, and the auxiliary variable x_2 as a function of the government expenditure shock. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.

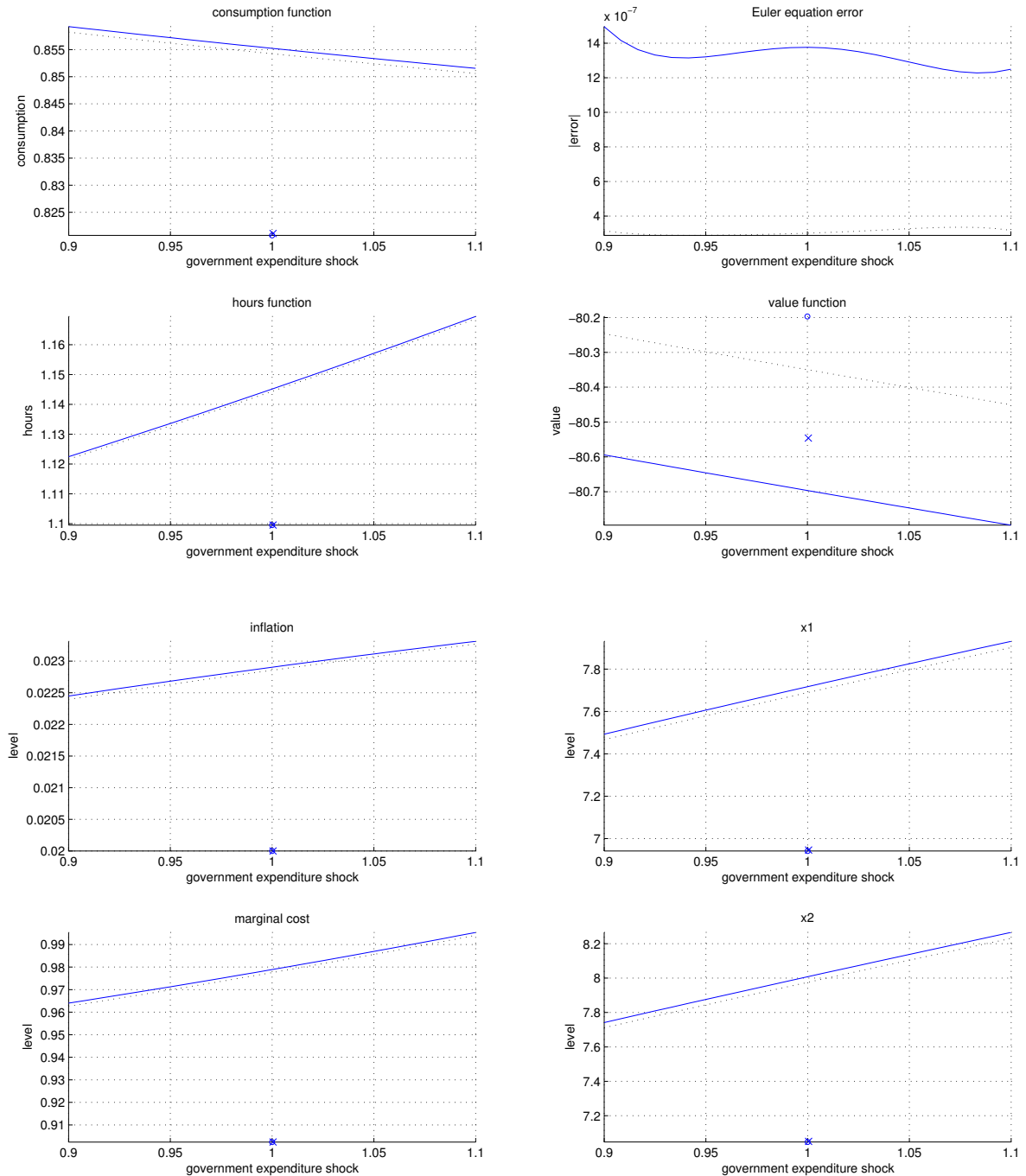
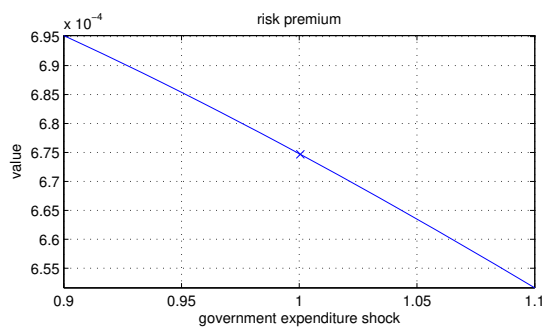
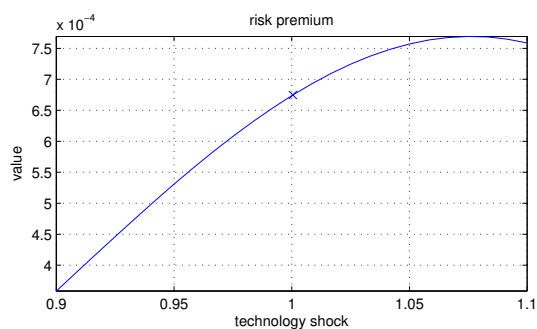
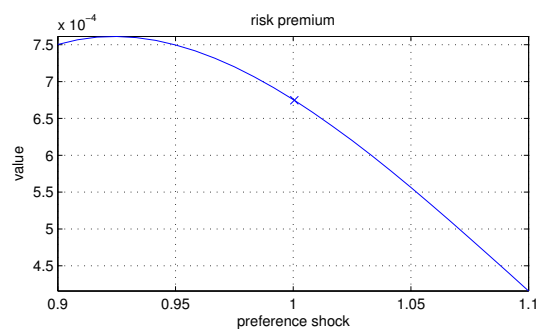
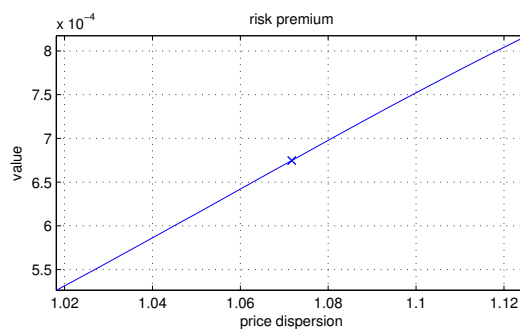
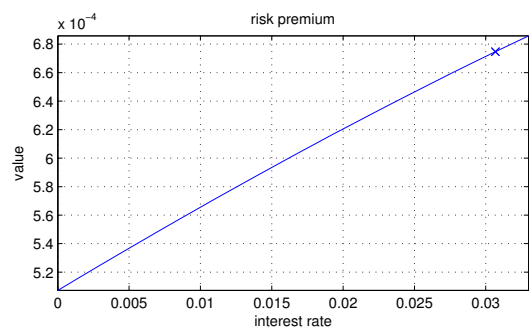


Figure C.52: Implied risk premium in the state space (policy functions)

In this figure we show (from left to right, top to bottom) the risk premium as a function of the interest rate, price dispersion, the preference shock, the technology shock and the government expenditure shock. A blue solid line shows the solution of the stochastic model, the black dotted line indicates the solution of the deterministic version.



References

URIBE, M. (2017): “The Neo-Fisher Effect in the United States and Japan,” *NBER*, w23977.