Sovereign Default, Exit and Contagion in a Monetary Union

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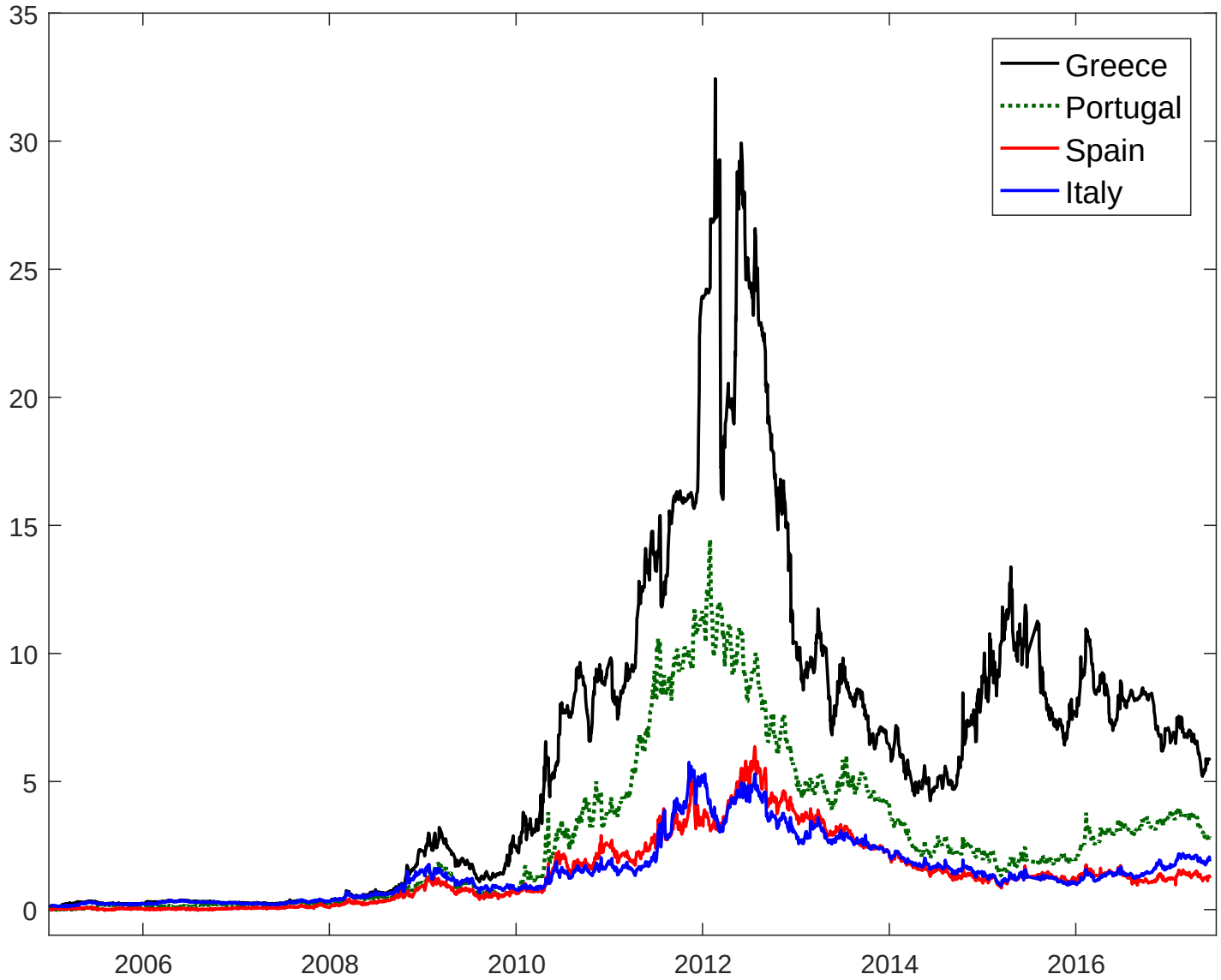
Crisis and Contagion in the Eurozone



This paper

1. A theoretical framework for analyzing two sovereign decisions:
   - default on external debt,
   - exit from a monetary union.
2. Explain contagion within a monetary union:
   - risk of one country exiting triggers sovereign debt problems in other countries.

This paper - setup

- Small Open Economy dynamic macro model,
- SOE issues debt on international financial markets,
- SOE is a member of a monetary union.

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    - is banned from international financial markets,
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- Government makes the optimal long-run decision, which depends on past debt and current conditions.

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- Optimal decision: exit iff

$$Benefits > Cost$$

Exit cost & benefits

Exit benefits:

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Exit cost in reality - examples:

- losses in trade and production,
- liquidity issues during transition, potential (domestic and international) bank runs,
- EMU vs EU membership.

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Conclusion: exit cost is unknown!

Main mechanism - Contagion

- Cost of exiting are unknown, $C \in \{C^L, C^H\}$,
- First country exiting reveals the true exit cost,
- Exit decisions depend on information available:
  - With uncertainty $\Rightarrow$ exit decision against expected cost C^e,
  - After cost revealed $\Rightarrow$ exit decision with true cost, C^L or C^H,

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- Assumption:

$$C^H > C^e > Benefits > C^L$$

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- re-denomination + devaluation = partial default,
- investors price it in (today) $\Rightarrow$ increase in interest rates.

Model overview

SOE model a la Schmitt-Grohé & Uribe (JPE, 2016), Na et al. (2017):

- SOE issues bonds on international financial markets,
- may default on the debt,
- downward nominal wage rigidity,
- the rigidity may cause involuntary unemployment.

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We extend the model with:

- SOE is member of a monetary union - fixed exchange rate,
- possibility of (costly) exit from the union,
- exit allows devaluation and debt reduction.

Quantitative analysis

Benchmark analysis:

- Standard calibration - Argentina, calibration
- Simulation: 1000 series x 5000 periods,
- 1 period = 1 quarter

Simulation results more switches

Expected exit cost	**Fraction of simulation series with regime switch**	
	EXIT	DEFAULT
0.7	99.7%	100%
0.8	93.9%	100%
1.1	33.0%	100%
1.5	3.9%	100%
1.9	0.1%	100%
2.2	0.0%	100%
2.3	0.0%	100%

Quantitative analysis

Benchmark analysis:

- Standard calibration - Argentina, calibration
- Simulation: 1000 series x 5000 periods,

Contagion experiment:

- Take benchmark simulation periods without default/exit,
- Introduce a rumors shock - probability that Greece exits before next period (information revelation),
- Compare with benchmark simulation.

Simulation results - Contagion more

Experiment setup			**Exit Prob.** (%)	**Additional defaults as % of no-default periods**		
C^e	C^L	C^H		all periods	periods with positive debt	recessions
2.3	**0.8**	**3.8**	**0**	**0.78**	**1.44**	**4.43**

Simulation results - Contagion

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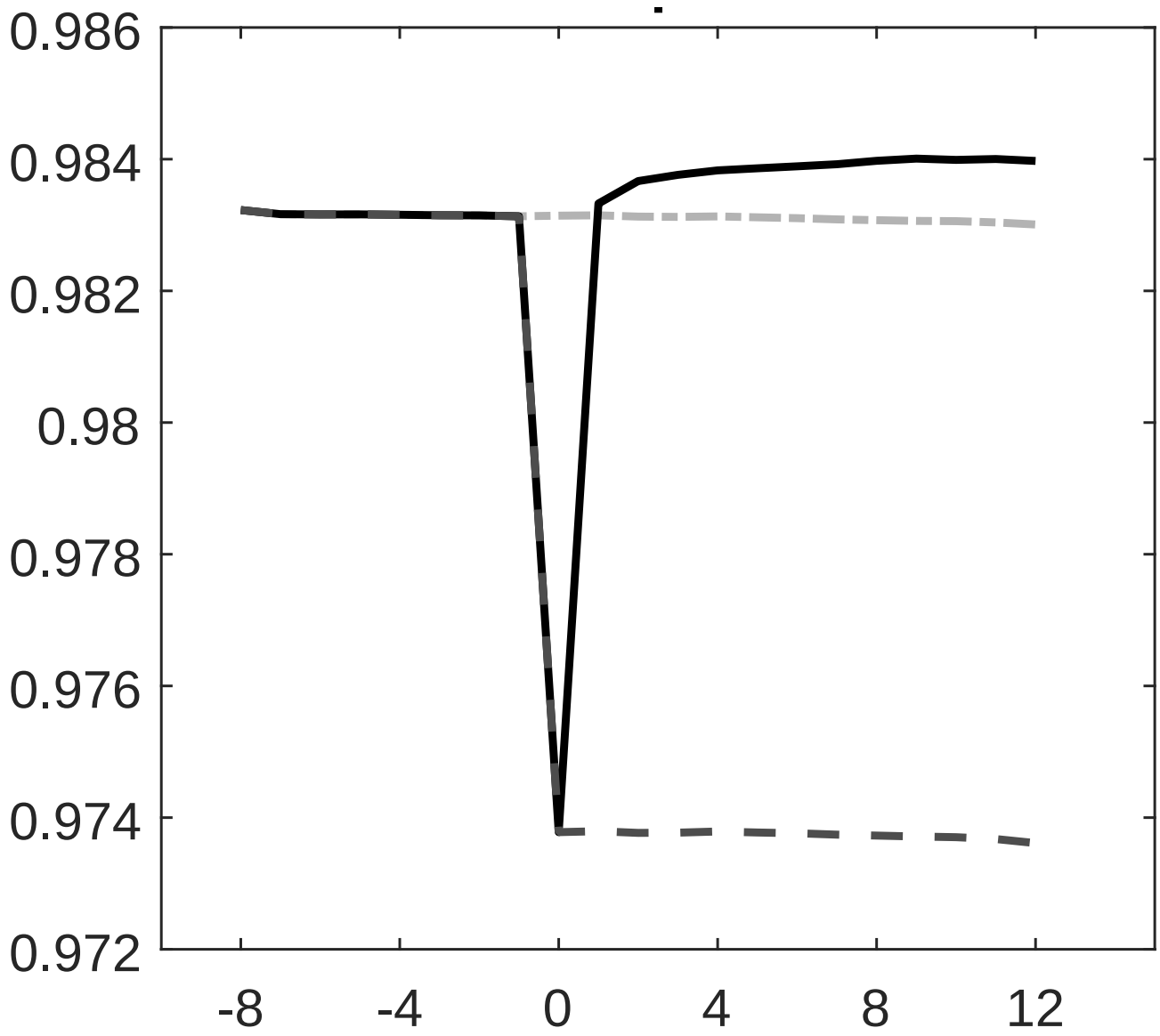
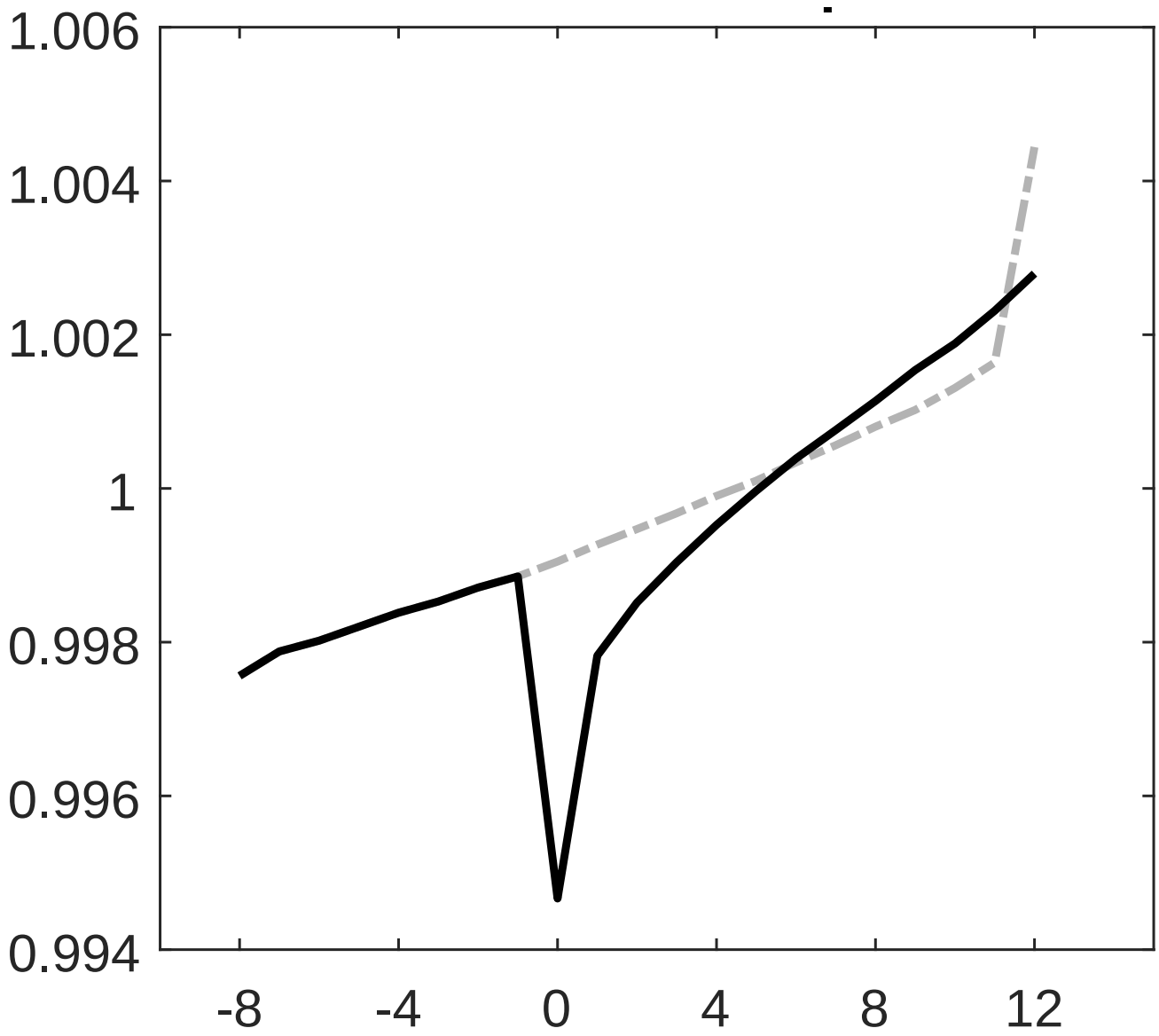
Default multipliers:				$\frac{0.78+0.38}{0.38} =$ **3.05**	$\frac{1.44+0.70}{0.70} =$ **3.05**	$\frac{4.43+1.00}{1.00} =$ **5.43**

Simulations - bond prices



Simulations - consumption more



Conclusions

- Model explaining contagion in a monetary union,
- Rumors of a first exit cause debt problems in other countries,
- Information friction (uncertainty) generates fragility,
- Limiting uncertainty limits space for contagion,
- but (potentially) at the cost of more exits.

Appendix

Calibration back

Parameter	Value	Description
β	0.87	Quarterly discount factor
r^*	0.01	Quarterly net world interest rate
γ	0.99	Degree of downward nominal wage rigidity
δ_1	-0.25	Parameters of the output loss function
δ_2	0.27	
C^L	0.8	Low exit cost
C^H	3.8	High exit cost
C^e	2.3	Expected cost of exit

Calibration back

Parameter	Value	Description
σ	2	Inverse of intertemporal elasticity of consumption
a	0.28	Share of tradables
ε	0.44	Elasticity of substitution between T and NT
α	0.59	Labor share in the non-traded sector
ρ	0.932	Serial correlation of ln y_t^T
σ_y	0.037	Standard deviation of innovation to y_t^T

Benchmark simulation results

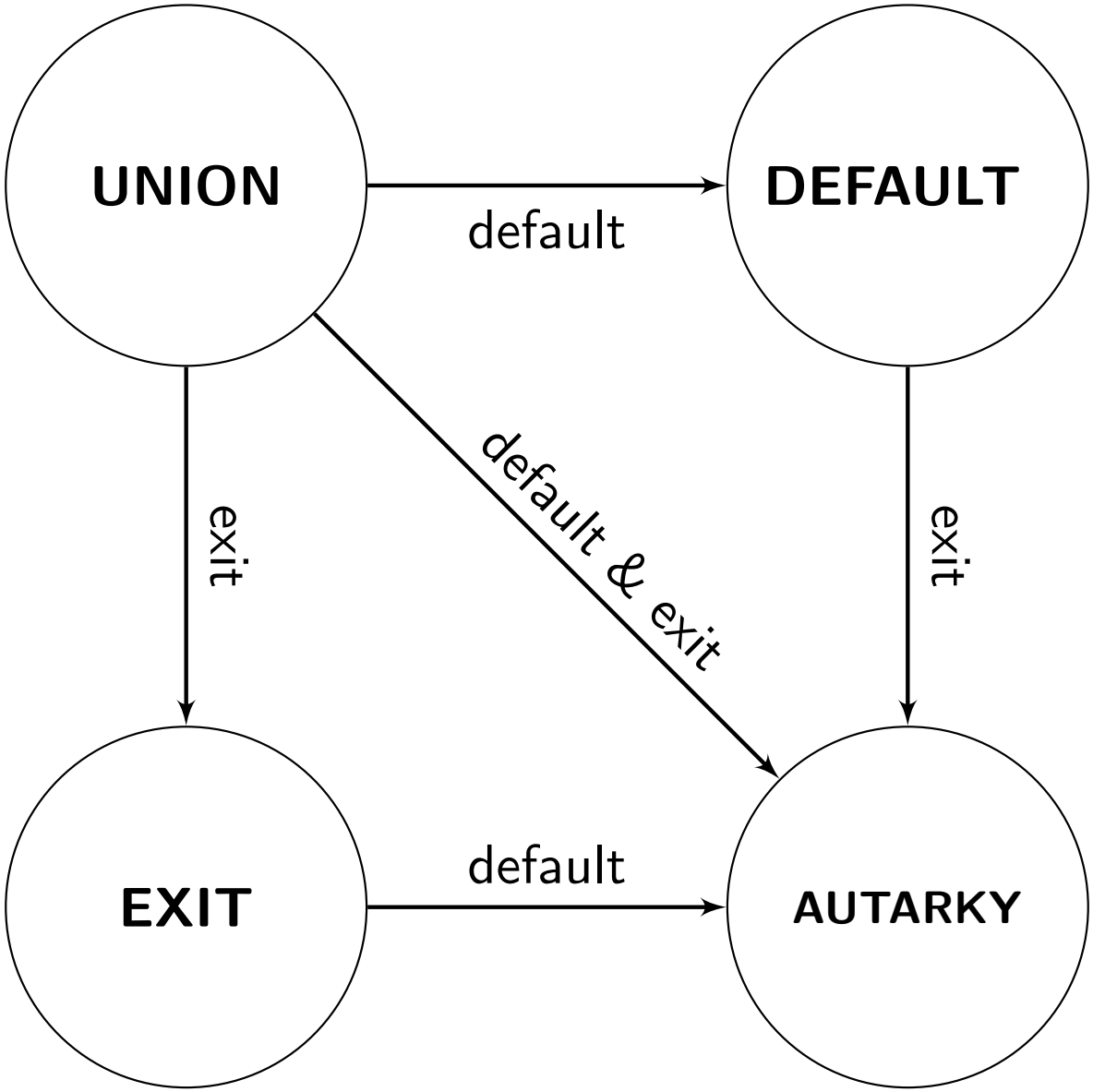
back

Expected exit cost	**Consumption equivalent**	**Fraction of simulations with regime switch**	
		EXIT	DEFAULT
0.7	8.3%	99.7%	100%
0.8	9.4%	93.9%	100%
1.1	12.5%	33.0%	100%
1.5	16.3%	3.9%	100%
1.9	19.8%	0.1%	100%
2.2	22.2%	0.0%	100%
2.3	23.0%	0.0%	100%

Benchmark simulation results back

Expected exit cost	**First regime switch**		
	EXIT	DEFAULT	BOTH
0.7	66.2	33.2	0.6
0.8	53.5	46.1	0.4
1.1	22.8	77.1	0.1
1.5	3.5	96.5	0
1.9	0	100	0
2.2	0	100	0
2.3	0	100	0

Regime switches in the model



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C^e	C^L	C^H		all periods	periods with positive debt	recessions
2.3	**0.8**	**3.8**	**0**	**0.78**	**1.44**	**4.43**
2.3	0.7	3.9	0	1.20	2.21	6.20
2.3	1.1	3.5	0	0.42	0.78	1.92
2.3	1.9	2.7	0	0.25	0.46	0.38
1.5	0.7	2.3	0.00	0.75	1.38	5.06
1.5	0.8	2.2	0.00	0.43	0.79	4.08
1.5	1.1	1.9	0.00	0.16	0.30	1.52

Simulations - unemployment

back