Interest Premium, Sudden Stop, and Adjustment in a Small Open Economy

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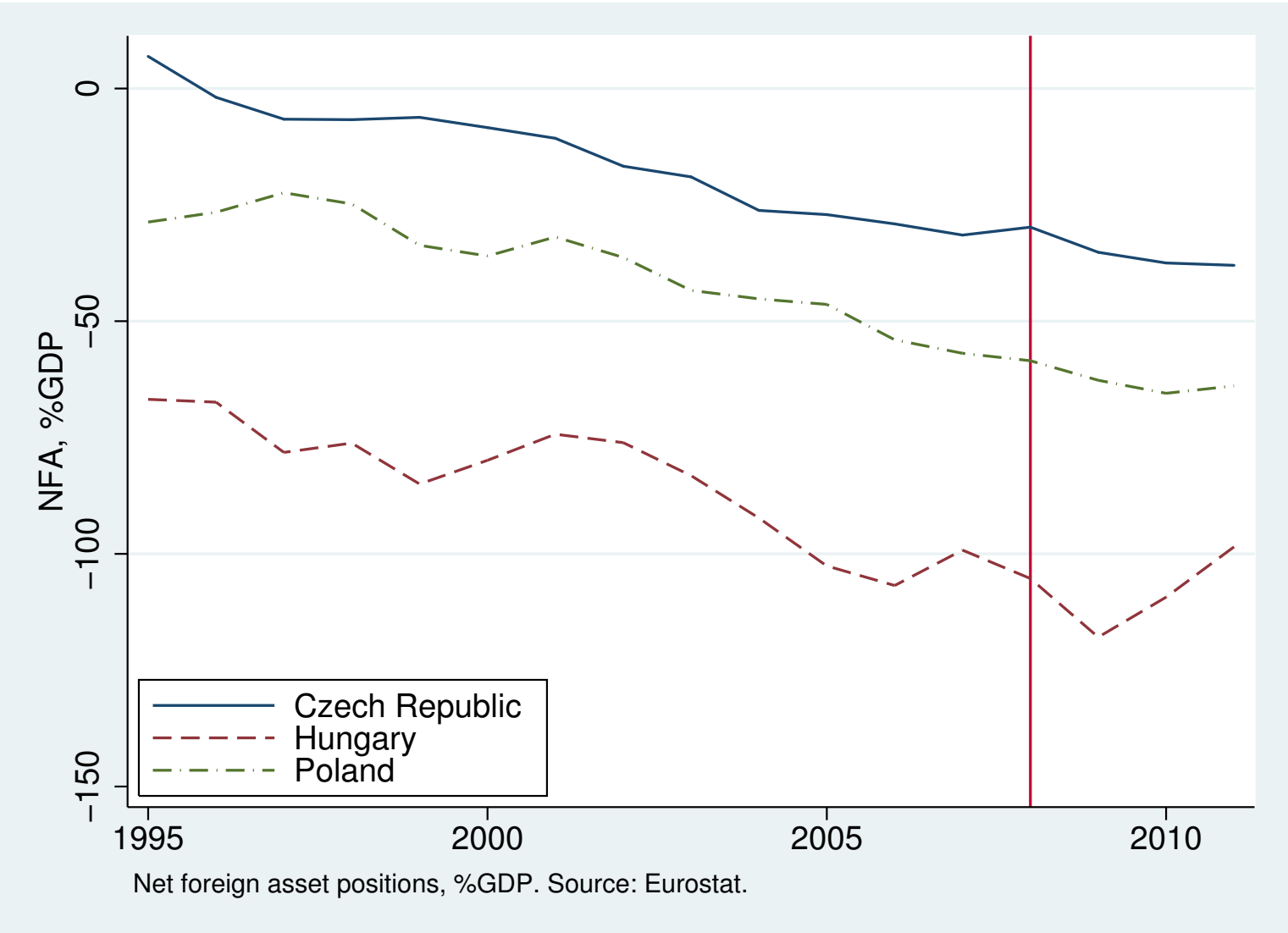
Disclaimer

The views expressed are those of the authors and do not necessarily reflect the official view of the Magyar Nemzeti Bank (the central bank of Hungary).

Motivation

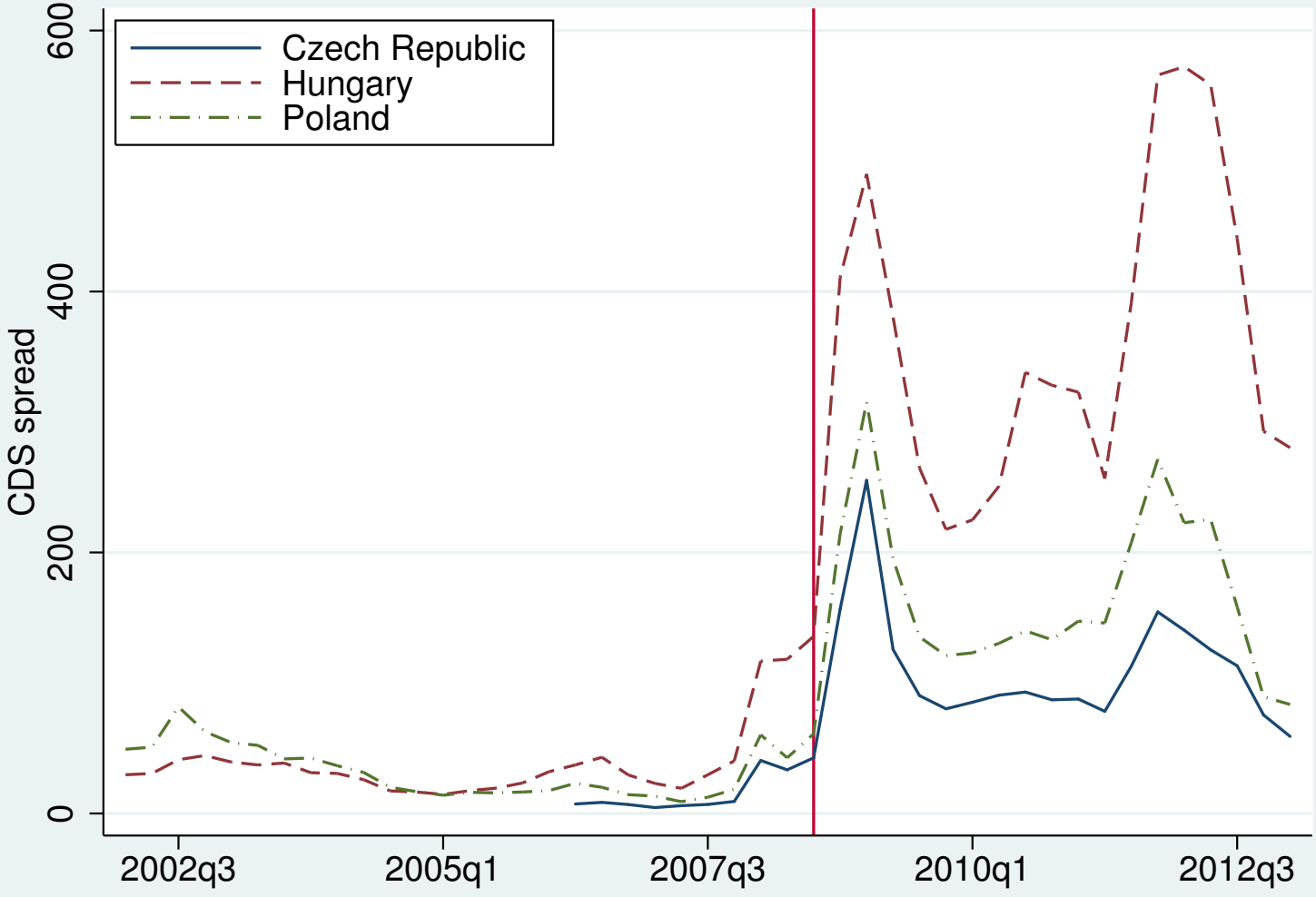
- The crisis of 2008-2009 hit many small open economies by tightening their external conditions
- The CEE economies provide a good laboratory
- Important differences in initial conditions and responses
  - NFA per GDP
  - Exchange rate regime
  - Currency mismatch
  - Balance sheet adjustment
  - Current account
  - Traded-nontraded reallocation

Net Foreign Assets



Net foreign asset positions, %GDP. Source: Eurostat.

CDS Spreads



5–year sovereign CDS spreads. Source: Bloomberg.

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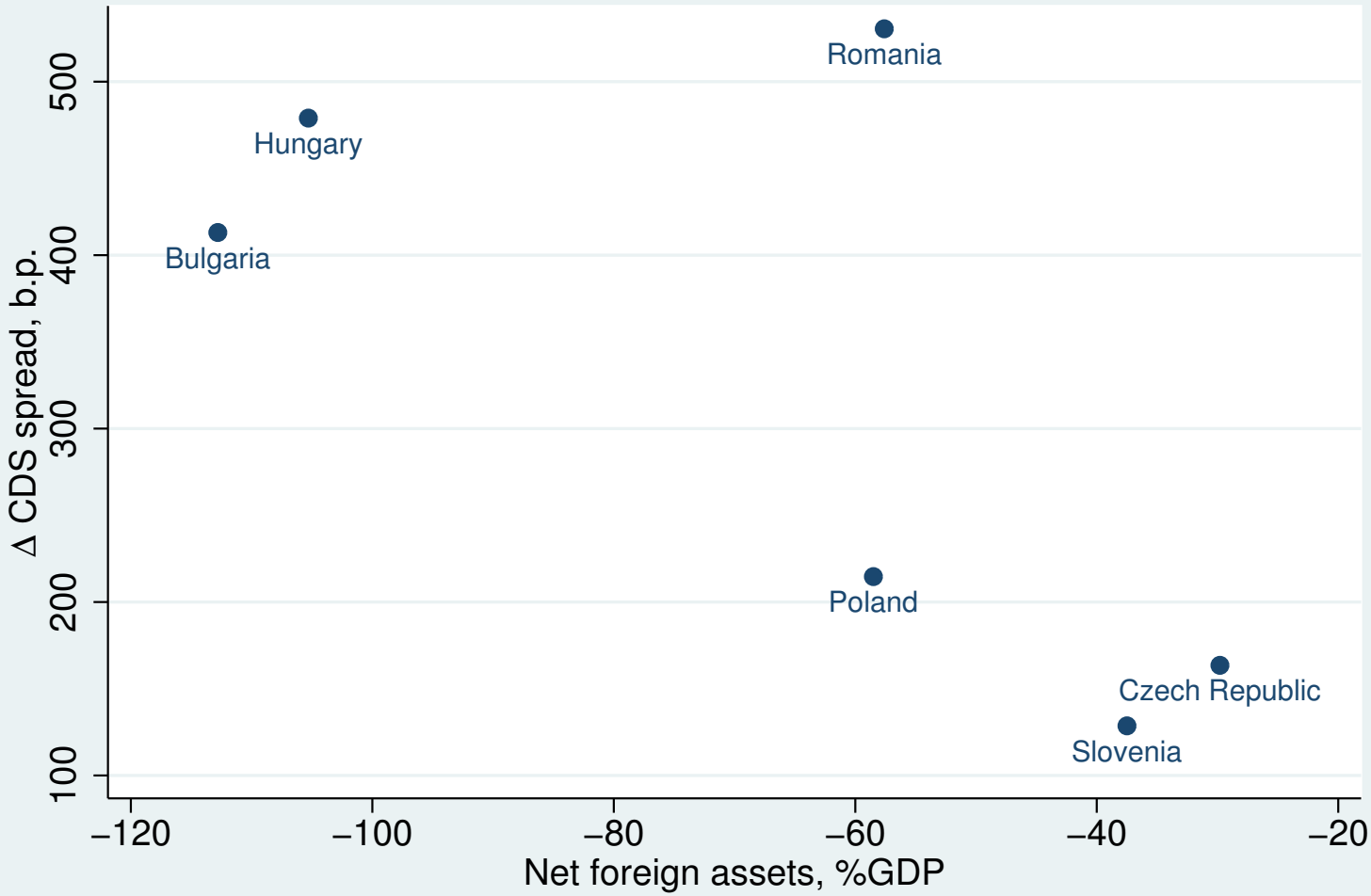
Debt and CDS Spreads



Maximum increase in CDS spreads after 2008Q3. Source: Eurostat, Bloomberg
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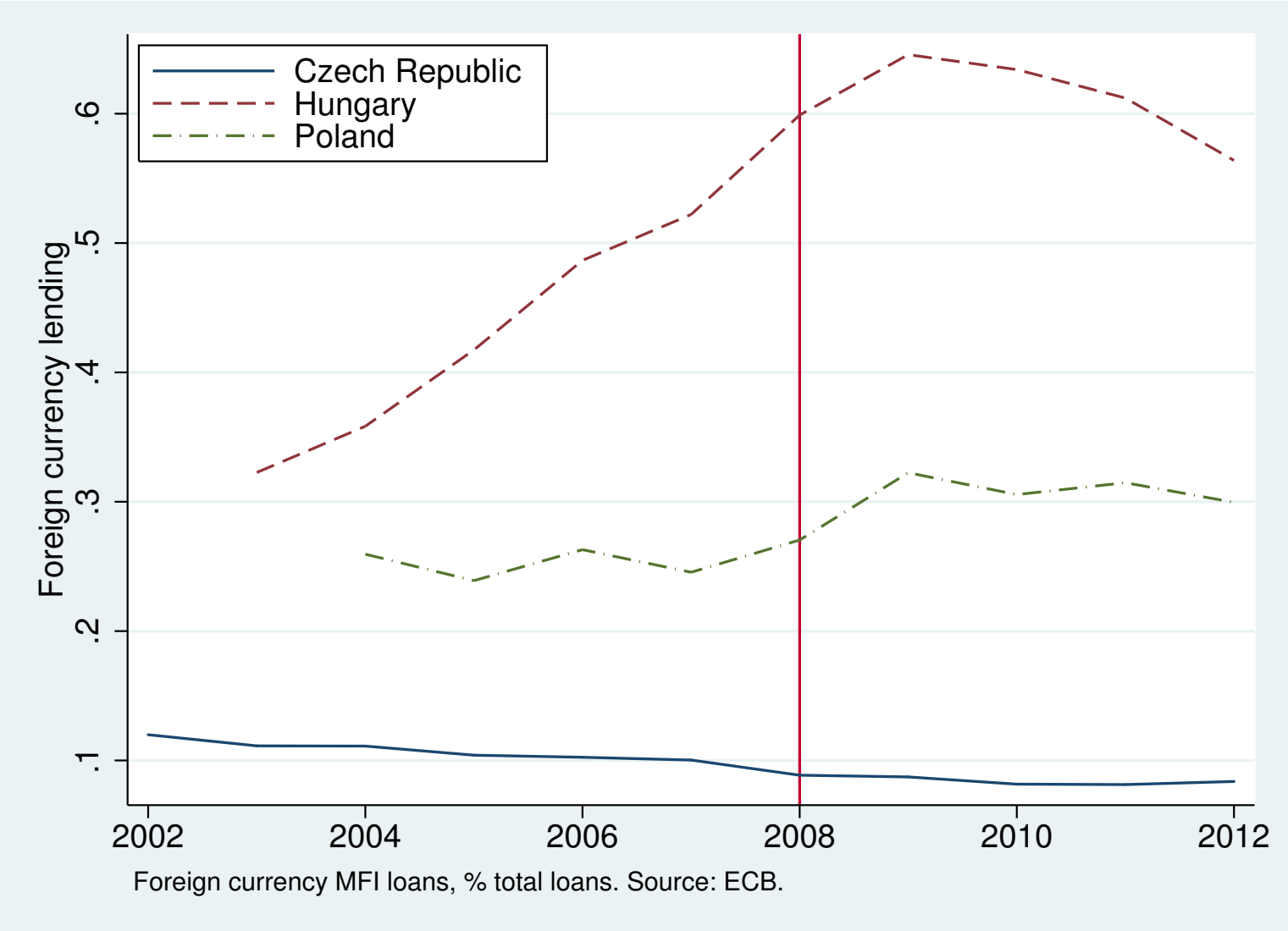
Foreign Currency Lending



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This Paper

- The crisis: a permanent tightening in the cost of foreign borrowing (and a one-period drop in export demand)
  - Calibrate the model to Hungarian data, evaluate quantitative fit conditional on only two shocks
  - Counterfactuals: exchange rate regime, initial indebtedness
  - Is "optimal" policy conditional on initial conditions?
- Two-sector, flexible price model with money-in-the-utility and debt-dependent interest rate
  - Interest premium highly nonlinear, similar to credit constraint Go
  - Downward nominal wage rigidity (internal devaluation) Go
  - Currency mismatch

LITERATURE

- Nominal growth, model ingredients: Benczúr-Kónya (JIMF 2013)
- Real models of the current account and real exchange rates: Kehoe and Fernandez de Cordoba (2000), Bems and Hartelius (2006)
- Small open economy models with money: Rebelo and Vegh (1995) and Burstein, Eichenbaum and Rebelo (2007)
- Exchange rate regimes and financing frictions: Cook and Devereux (2006), Gertler, Gilchrist and Natalucci (2007), Brzoza-Brzezina and Makarsky (2011), Heer and Schubert (2012)
- Sudden stops: Curdia (2008), Christiano et al. (JME 2009)
- Valuation effects: Tille (2005)
- Downward nominal wage rigidity: Fahr and Smets (2010)

Model

- Production: exports and nontradables, consumption: imports and nontradables
- Sector-specific investment with adjustment costs
- Money-in-the-utility and non-linear, debt-dependent foreign interest premium
- Endogenous labor supply, downward nominal wage rigidity
- Monetary policy: degree of exchange rate flexibility
- Small open economy with downward-sloping export demand

Mechanism

- MIU implies households hold assets (money) in domestic currency; foreign borrowing assumed to be in foreign currency $\Rightarrow$ currency mismatch
- Higher premium makes HHs poorer, debt more expensive
  - External rebalancing $\Rightarrow$ exchange rate depreciates $\Rightarrow$ mismatch exacerbated
- Fixed exchange rate protects HH balance sheets, but hinders CA adjustment through exports
- In standard models, valuation effects for CB reserves exactly offset this
  - Here, premium depends only on unconsolidated HH position
  - CB reserves earn lower interest rate

The Central Bank

- Per period budget constraint

$$\underbrace{S_t \left(B_t^c - R_{t-1}^c B_{t-1}^c\right)}_{\text{CB foreign reserves}} + D_t - R_{t-1}^d D_{t-1} + T_t = H_t - H_{t-1}$$

- Policy rule in terms of exchange rate flexibility

$$\left(\frac{H_t}{H_{t-1}}\right)^{\rho_s} \left(\frac{S_t}{S_{t-1}}\right)^{1-\rho_s} = 1$$

- Reserve policy

$$B_t^c = \rho_h \frac{H_t}{S_t}$$

Current Account

- Private debt

$$B_t^h - R_{t-1} B_{t-1}^h = TB_t - \rho_h \left(\frac{H_t}{S_t} - \frac{R_{t-1}^c H_{t-1}}{S_{t-1}} \right)$$

- Total debt

$$\underbrace{B_t^h + B_t^c}_{B_t} - R_{t-1} B_{t-1} = TB_t - \rho_h \left(R_{t-1} - R_{t-1}^c \right) \frac{H_{t-1}}{S_{t-1}}$$

- Money is not neutral!
  - Debt vs. reserves
  - Interest rate on reserves

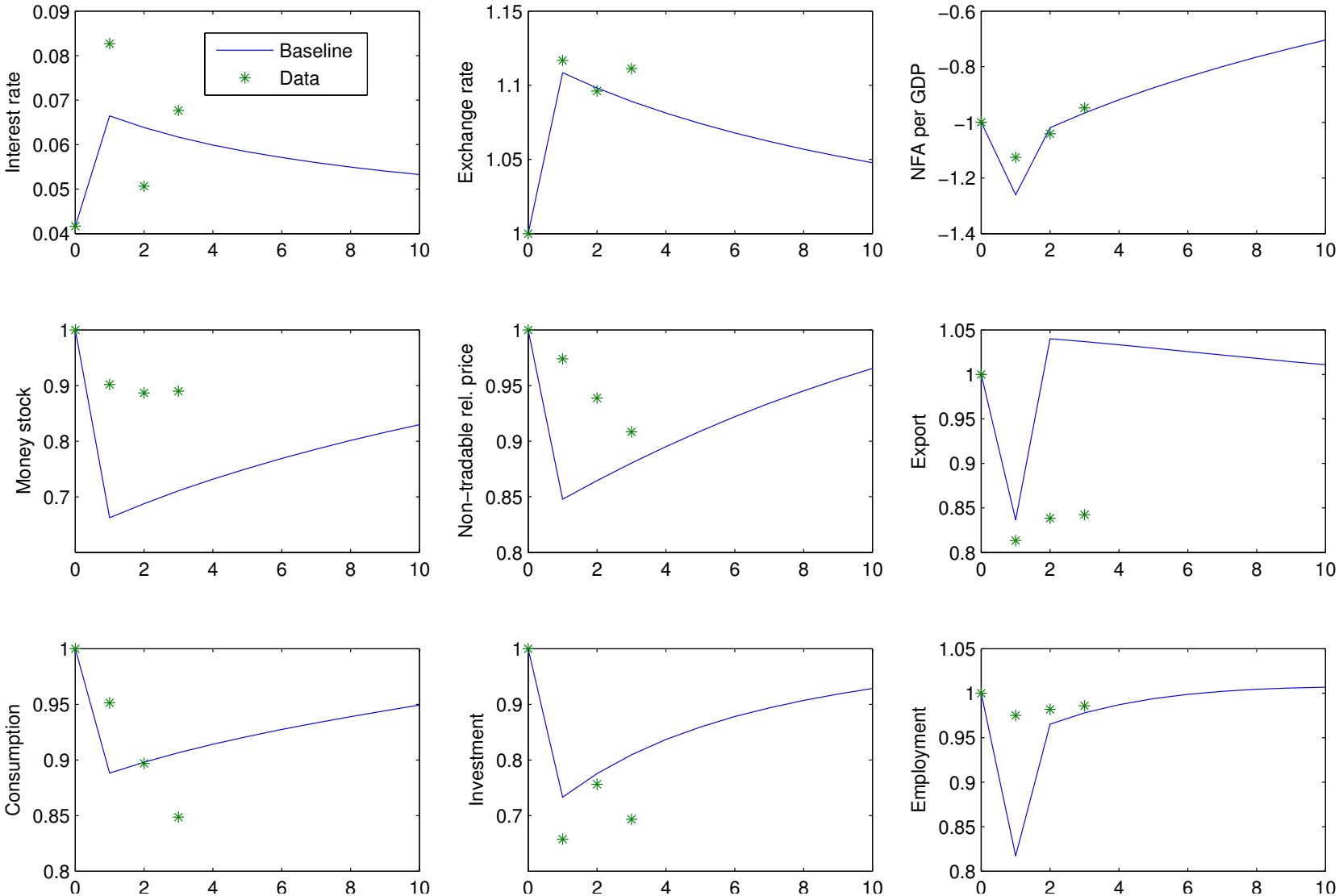
EXPERIMENTS

- We simulate the deterministic, nonlinear model
- Transition from an initial to a new steady state
  - Long-run NFA per GDP ($b_y = \bar{B}^h/\bar{Y}$): $-1 \Rightarrow 0$
  - Unexpected, permanent shock
  - (First period only: large decline in export demand)
- Counterfactuals
  - Different exchange rate regimes
  - Lower initial indebtedness

Calibration

Parameters	Notation	Value	Calibration target
Discount rate	β	0.96	Real interest rate
Depreciation	δ	0.06	Literature
Imports share in C	λ	0.36	National accounts
Import share in I	λ_I	0.44	National accounts
Capital share in X	α_T	0.42	National accounts
Capital share in NT	α_N	0.37	National accounts
Labor supply elast.	$1/\omega$	1/3	Literature
Wage markup	σ_w	3.5	Literature
Wage adjustment function	ν_w; ξ_w	1; 100	Literature
Cap. adj. cost	ϕ	5	Literature
Exp. demand elast.	η	0.5	HU DSGE model
Importance of money	γ	0.35	Euro Area M1/GDP
Initial/new NFA/GDP	$b_0, \bar{b}$	$-1, 0$	HU data, int. av.
Linex parameters Go	ν, ξ	0.01, 2	CDS $\Uparrow$ in HU, CZ
Central bank reserves	ρ_h	1	HU M1/Reserves
Monetary policy	ρ_s	0.2	Exchange rate resp.

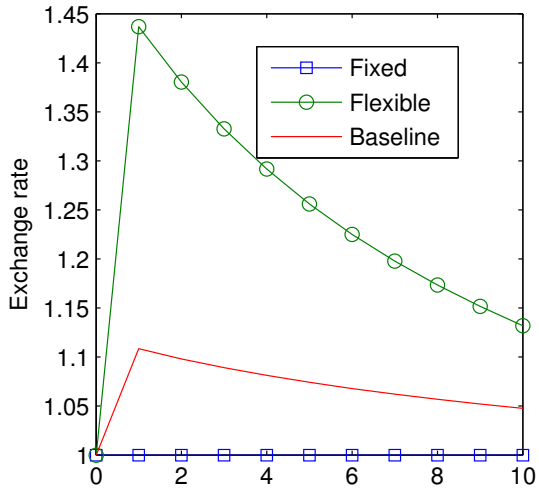
Baseline simulations

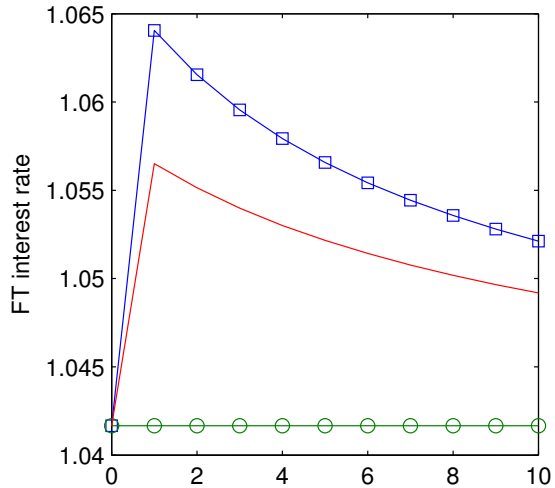


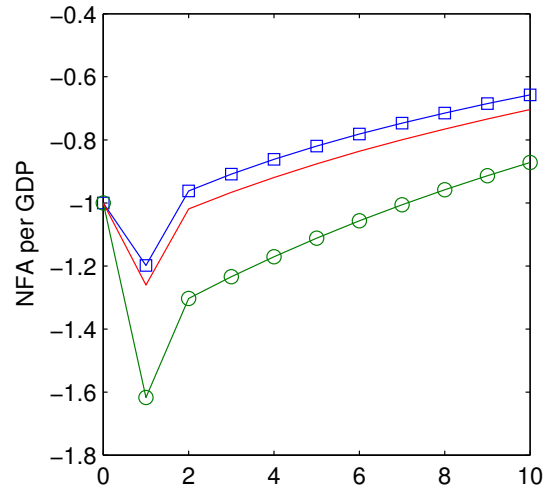
Baseline Results

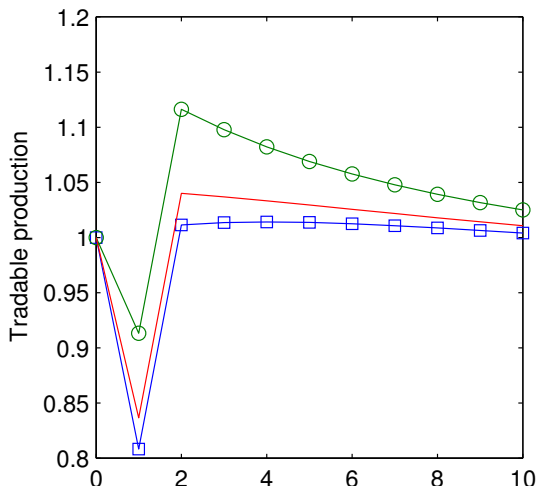
- *Data points: pre-crisis trends removed*
- Model captures relevant movements qualitatively, often quantitatively as well
- Money drops too little, consumption too much, and NT relative price too little
  - *Cumulative three period changes closer to data*
  - Portfolio adjustment costs, illiquid assets?
  - Price rigidities?
- Employment, exports

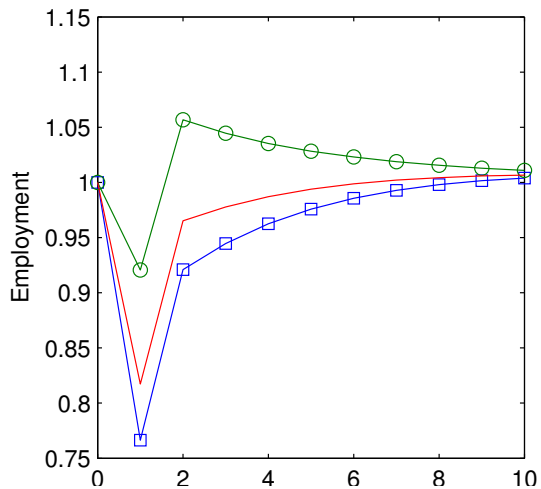
Alternative exchange rate regimes

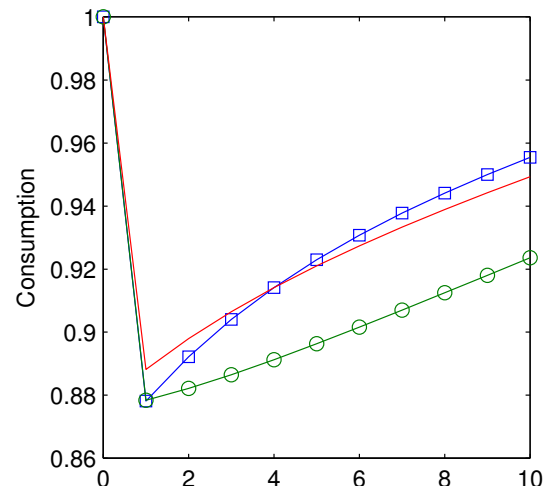




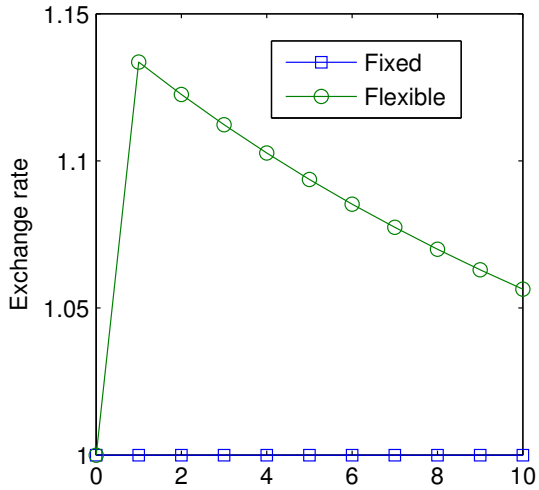


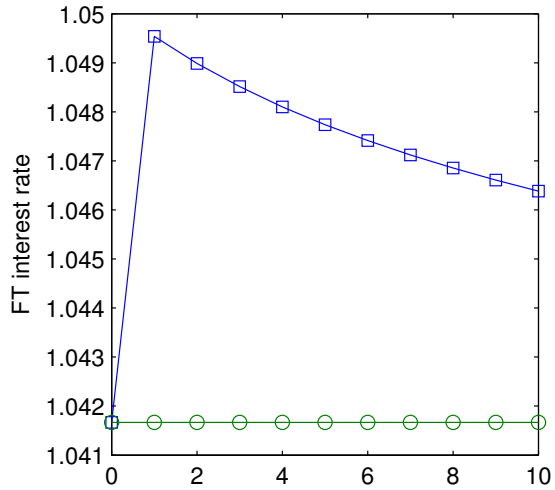


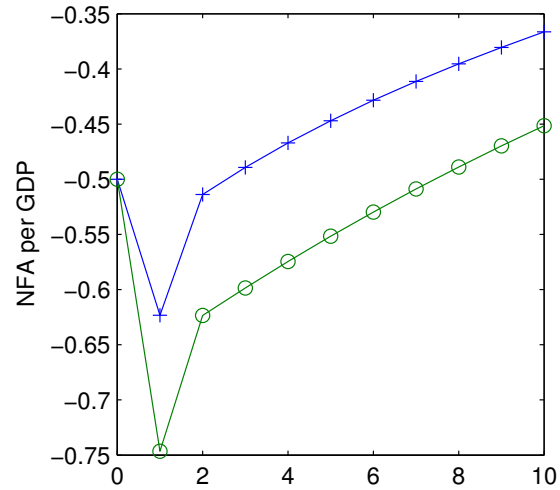


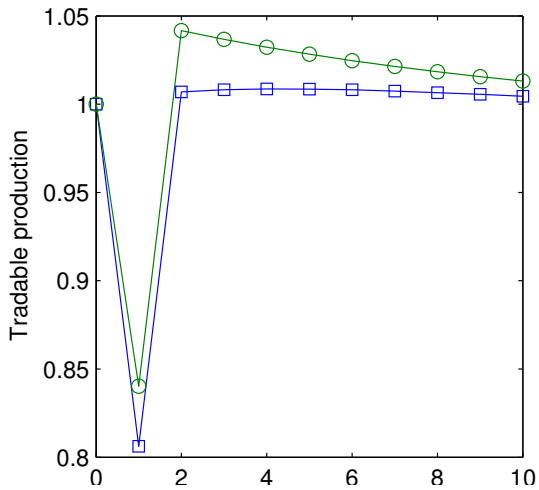


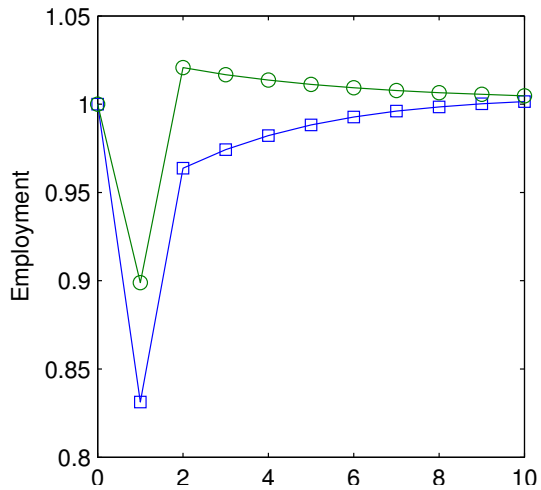
Policy comparison with lower initial indebtedness

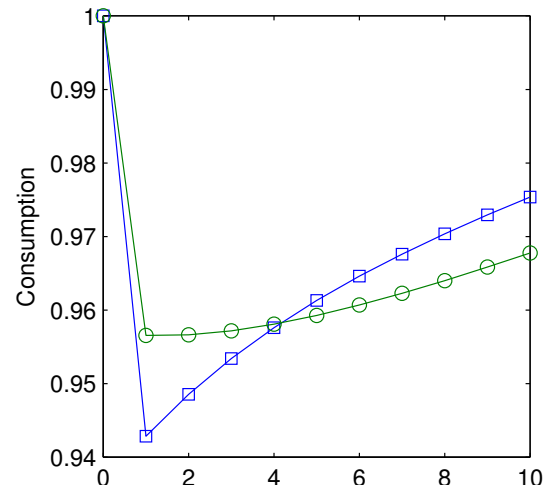












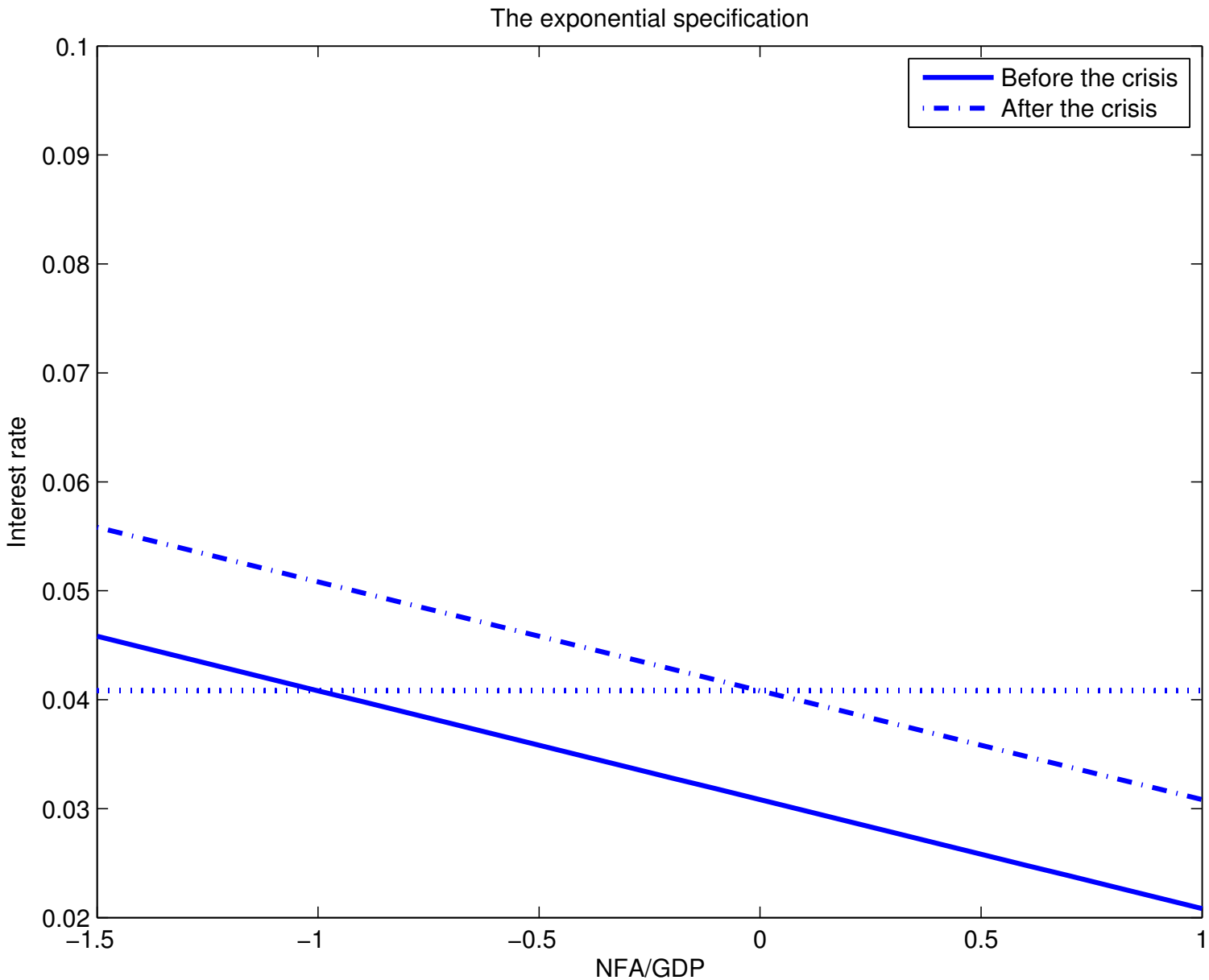
Counterfactual Results

- Flexible exchange rate
  - Employment falls less (DNWR), export sector declines less
  - Consumption drops more, because of valuation effects
- Fixed exchange rate
  - Employment falls more (DNWR), export sector declines more
  - Consumption falls less, because HH balance sheets are protected
- *Lower indebtedness*: flexible regime better for consumption

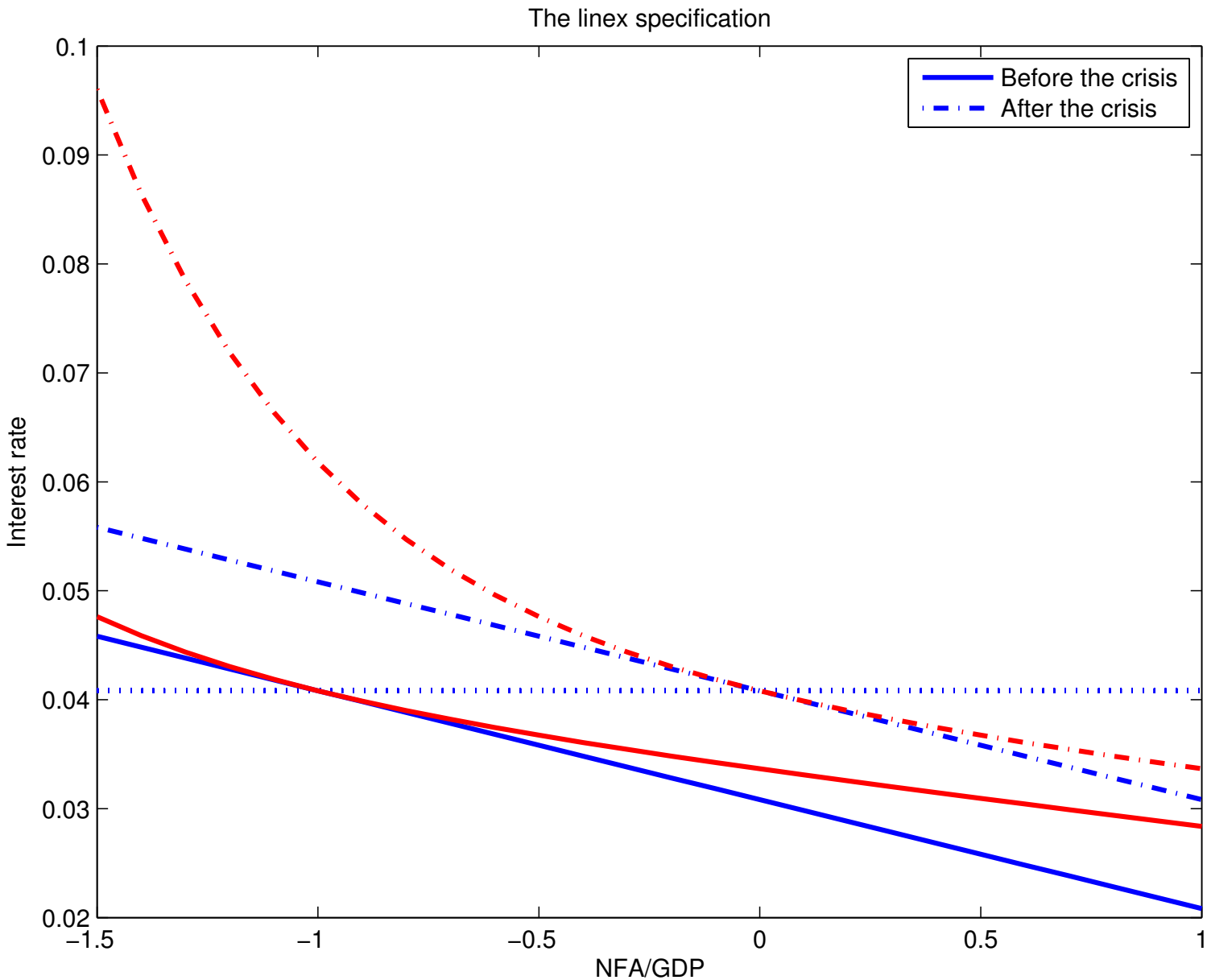
Conclusion

- We built a simple two-sector model to quantitatively evaluate the impact of the crisis of 2008-2009 in a small open economy
- Key features are external interest premium, currency mismatch, DNWR
- Model captures stylized facts well (even quantitatively)
- We highlight the interactions between the exchange rate regime and initial indebtedness
  - Export sector and employment vs. balance sheets and consumption
  - Exchange rate policy of central bank important for tradeoff
- Many things still to be explored! Regional comparisons

Interest Premium: exponential



Interest Premium: Linex



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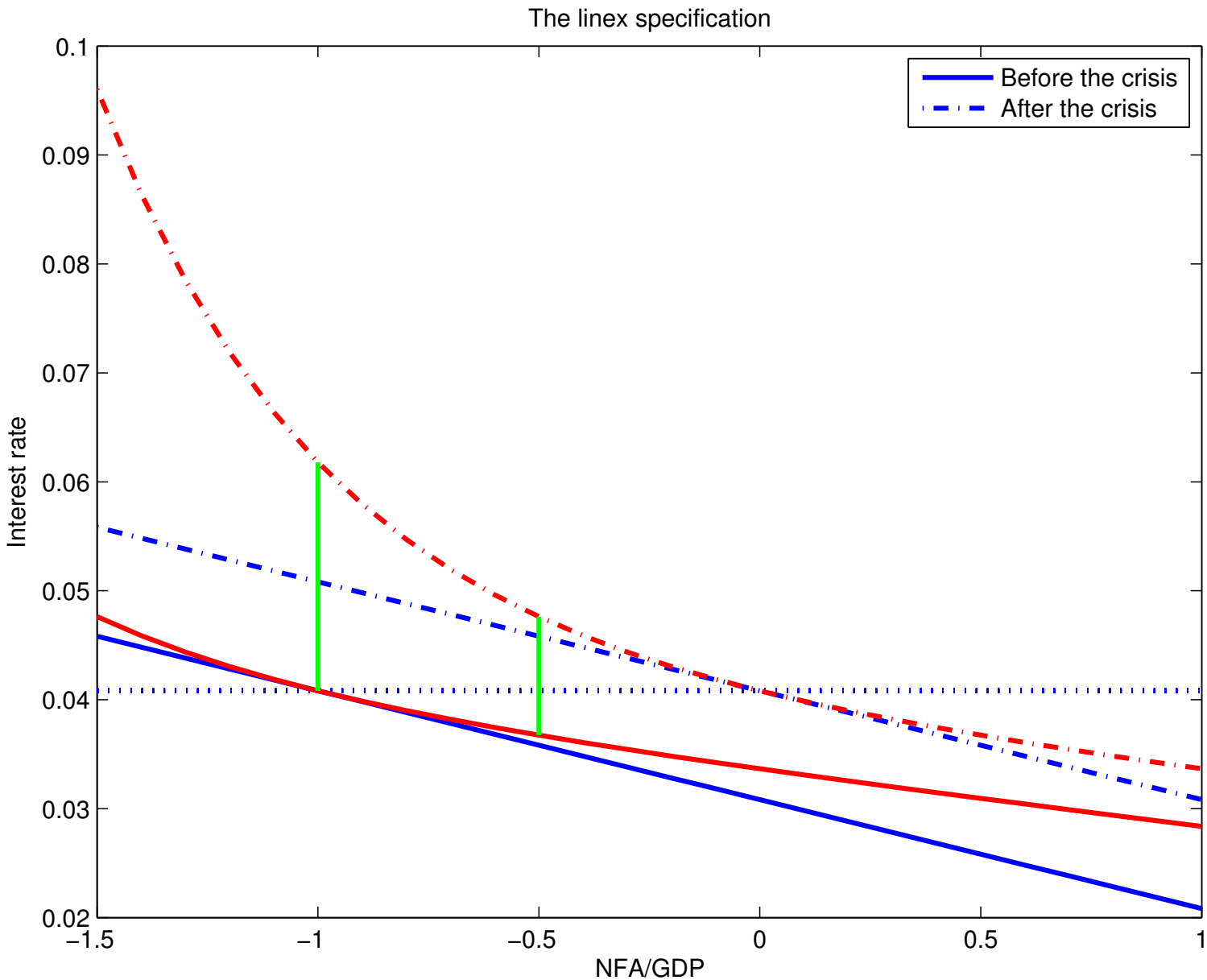
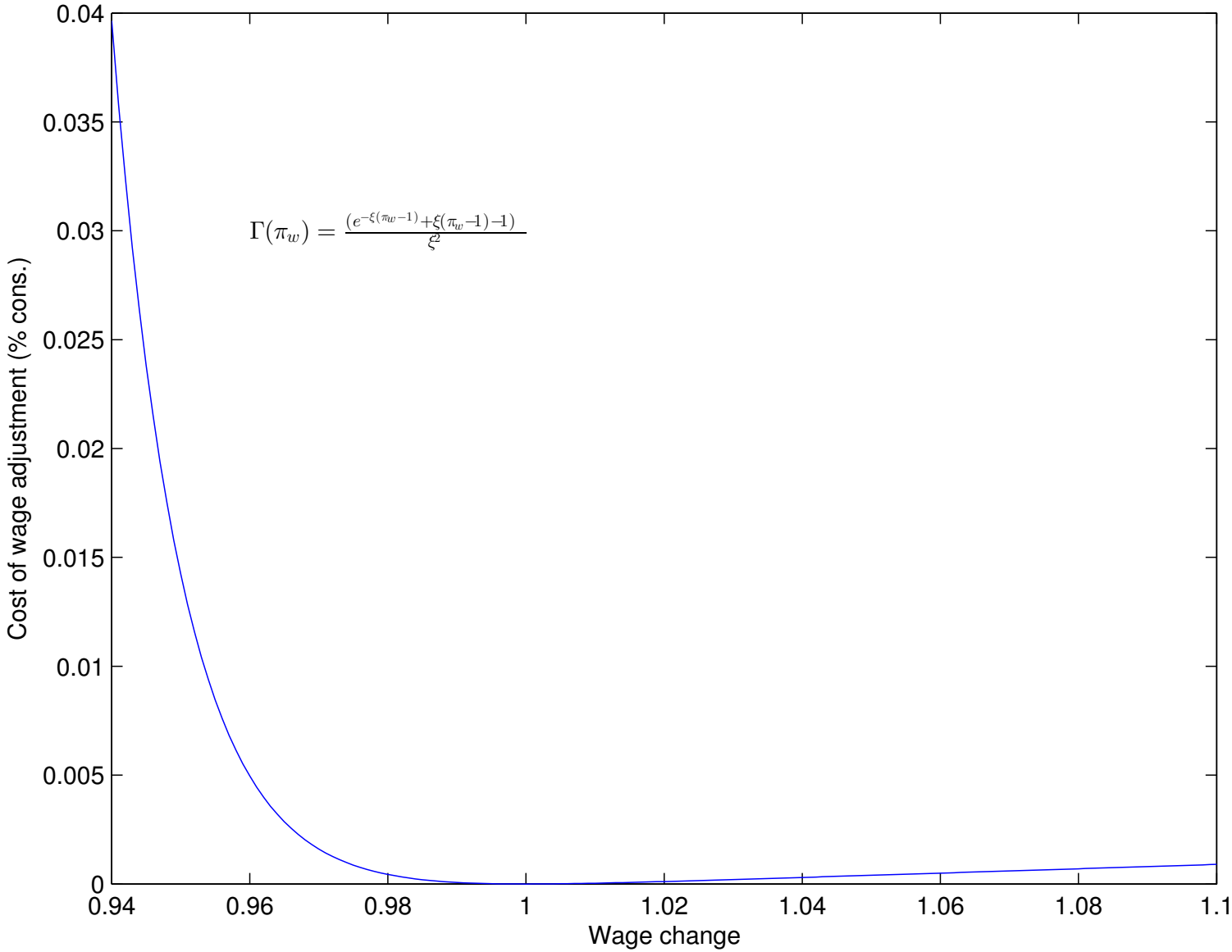
Interest Premium: Linex



Downward Nominal Wage Rigidity



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