Step Away from the Zero Lower Bound: Policy Options for Small Open Economies in a World of Secular Stagnation

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This paper

Secular Stagnation: World output depressed because world savings cannot be absorbed at full employment (Summers 2013, Hansen 1938)

- Real interest rates 'stuck above market clearing level'
- Depressed demand generates negative output gaps

National economies are at the mercy of global economic and financial developments

- Exports are a large component of domestic demand
- Countries are open to foreign capital flows
- Real interest rates are highly correlated across countries

Question: In an environment of global secular stagnation, how can policy in a small open economy (SOE) respond to achieve growth and price stability?

This paper

Main Results:

- A SOE can escape stagnation by depreciating its exchange rate and accumulating NFAs

- If stagnation is due to asset shortage, acquiring foreign assets can alleviate the domestic shortage
- But the resulting depreciation can reduce domestic welfare while increasing domestic employment

- Relaxing the effective lower bound (ELB) makes matters worse

- Countries must take world real rate as given
- So lower nominal rates lead to lower inflation

Outline

1. Model
2. Results
3. Empirical evidence
4. Conclusion

Our Model

As in Eggertsson et al (2016):

- Home country vs. 'rest of the world' (ROW)
- Each country: overlapping generations as outlined below
- Asset markets incomplete, trade in bonds
- Downward nominal wage rigidity

with the following modifications:

- Small open economy (SOE) limit: two countries perfectly symmetric but relative size (and possibly policy parameters)
- Goods markets imperfectly integrated: international relative prices

Households

Domestic households maximize

$$\max_{\{C_t^y, C_{t+1}^m, C_{t+2}^o\}} \left\{ \frac{(C_t^y)^{1-\rho}}{1-\rho} + \beta \frac{(C_{t+1}^m)^{1-\rho}}{1-\rho} + \beta^2 \frac{(C_{t+2}^o)^{1-\rho}}{1-\rho} \right\}$$

subject to

$$\begin{aligned} C_t^y &= B_t^y \\ C_{t+1}^m &= P_{H,t+1}/P_{t+1} Y_{t+1} - (1+r_t) B_t^y + B_{t+1}^m \\ C_{t+2}^o &= -(1+r_{t+1}) B_{t+1}^m \\ -(1+r_t) B_t^y &\leq D_t. \end{aligned}$$

Equilibrium: borrowing (by young) equals saving (by middle-aged)

Goods Market

- **Domestic consumption basket** ($C_{H,t}/C_{F,t}$ demand for domestically-produced/ROW-produced goods)

$$C_t^i = [(1-\omega)^{\frac{1}{\sigma}}(C_{H,t}^i)^{\frac{\sigma-1}{\sigma}} + \omega^{\frac{1}{\sigma}}(C_{F,t}^i)^{\frac{\sigma-1}{\sigma}}]^{\frac{\sigma}{\sigma-1}}, i\epsilon\{y, m, o\}$$

- **Expenditure minimization interlinks consumer and producer price indexes** (P_H/P_F domestic/ROW PPI)

$$P_t = [(1-\omega)(P_{H,t})^{1-\sigma} + \omega(P_{F,t})^{1-\sigma}]^{\frac{1}{1-\sigma}}$$

- Assume the **law of one price** holds at the level of each good:

$$P_{H,t} = \varepsilon_t P_{H,t}^*, P_{F,t} = \varepsilon_t P_{F,t}^*,$$

- **Real exchange rate** (ε_t nominal exchange rate)

$$Q_t = (\varepsilon_t P_t^*)/P_t$$

Asset Markets

- Saving in terms of CPI-denoted bonds and non-indexed bonds that pay in terms of domestic and foreign currency·

The following conditions hold:

- **Fisher equations** (i/r nominal/real interest rate, Π CPI inflation)

$$(1+i_t) = (1+r_t)\Pi_{t+1}$$

$$(1+i_t^*) = (1+r_t^*)\Pi_{t+1}^*$$

- **Uncovered interest parity**

$$(1+i_t) = (1+i_t^*)\varepsilon_{t+1}/\varepsilon_t$$

Main Equations

- **Phillips curve**

$$Y_t = \begin{cases} \left[\gamma Y_{t-1}^{\frac{\alpha-1}{\alpha}} / \Pi_{H,t} + (1-\gamma)(Y^f)^{\frac{a-1}{a}}\right]^{\frac{a}{a-1}} & \text{if } \Pi_{H,t} < \left(Y^f / Y_{t-1}\right)^{\frac{1-a}{a}} \\ Y^f & \text{otherwise} \end{cases}$$

- **Monetary policy**

$$\Pi_{H,t} = \overline{\Pi} \text{ s.t } i_t > 0, \;\; i_t = 0 \text{ else}$$

- **Domestic goods market**

$$Y_t = (P_t / P_{H,t})^{\sigma}\left((1-\omega) C_t + \omega Q_t^{\sigma} Y^*\right)$$

- **Asset market**

$$NFA_t = B_t^y + B_t^m = -\frac{D_t}{1+r_t} + \frac{1}{1+\left[\beta(1+r_t)^{1-\rho}\right]^{\frac{-1}{\rho}}}\left[\frac{P_{H,t}}{P_t} Y_t - D_{t-1}\right]$$

- **Flow budget** (P_H PPI, P CPI, C agg. cons., Y output)

$$P_t C_t + NFA_t = P_{H,t} Y_t + (1+i_{t-1}) NFA_{t-1}$$

Existence of full employment steady state

In a global secular stagnation, SOE can be in either of two steady states.

Stagnation Steady State:

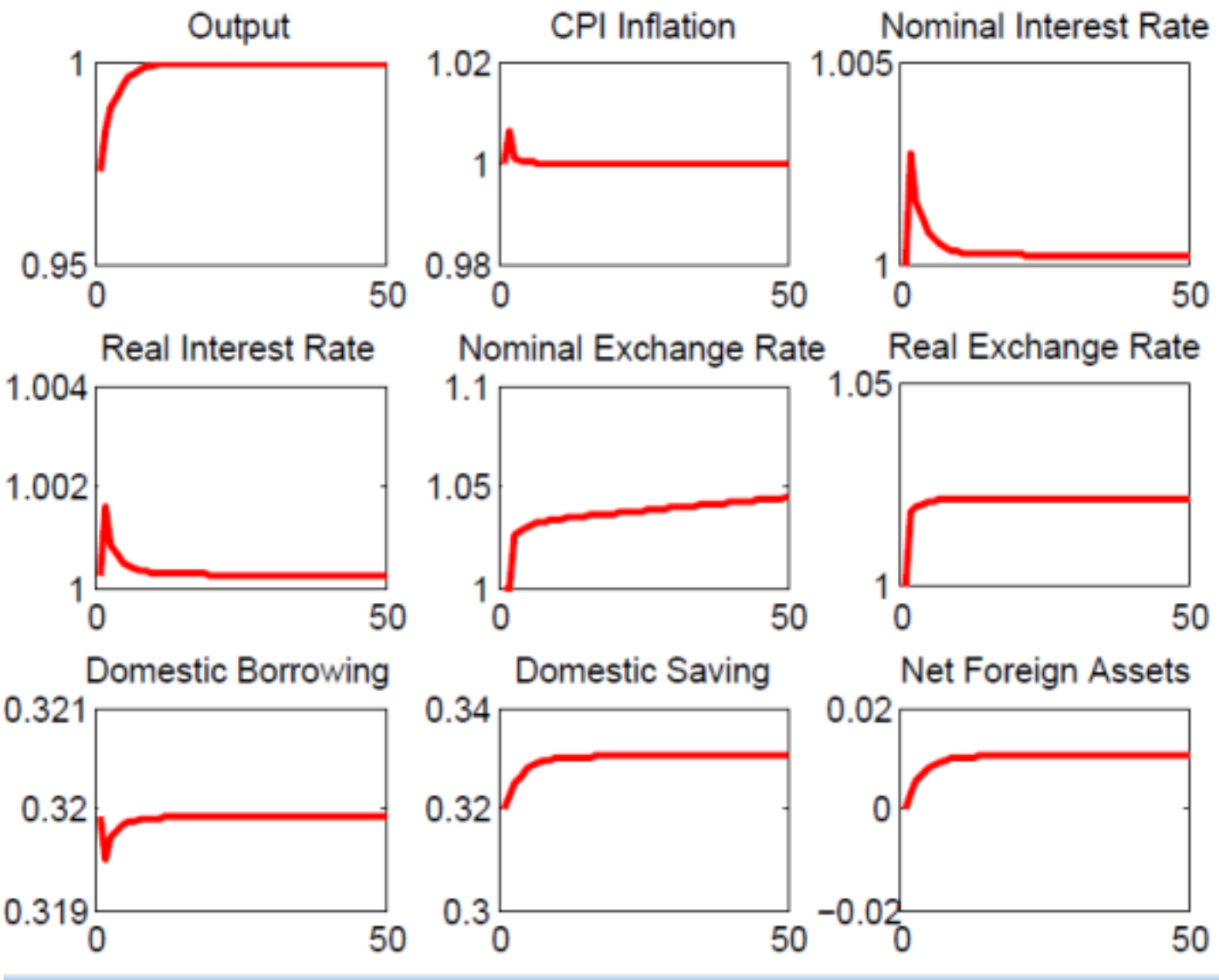
1. Real interest rate same as abroad $r = r^*$ by UIP and too high
2. Inflation the same as ROW: $\Pi = \Pi^* < 1$
3. Output below potential: $Y < Y^f$, same as abroad
4. Real exchange rate is constant

Existence of full employment steady state

Full employment steady state

1. Real interest rate same as r^* by UIP and too high—remains true
2. Inflation at target $\Pi = \overline{\Pi}$, output at potential $Y = Y^f$
3. Nominal exchange rates constantly depreciates (by UIP) $\varepsilon_{t+1}/\varepsilon_t = (1 + i_t) = (\Pi^*)^{-1} > 1$
4. Real exchange rate is weaker than in stagnation steady state $Q^f > Q^u$
5. With sufficiently high trade elasticity, NFA are larger than in stagnation steady state: $NFA > 0$

Transition to Full Employment steady state



Transition to Full Employment steady state

Comments:

- Escape path resembles Svensson's (2003) 'Foolproof Method'

  Commitment to crawling peg depreciation of the exchange rate

- An element of 'neo-Fisherianism' (Cochrane 2014)

  Recovery: nominal and real interest rates actually rise

- Crucial: real depreciation (to reach full employment) and capital flows (to allocate excess saving)

Valuation effects and macroeconomic dynamics along the escape path

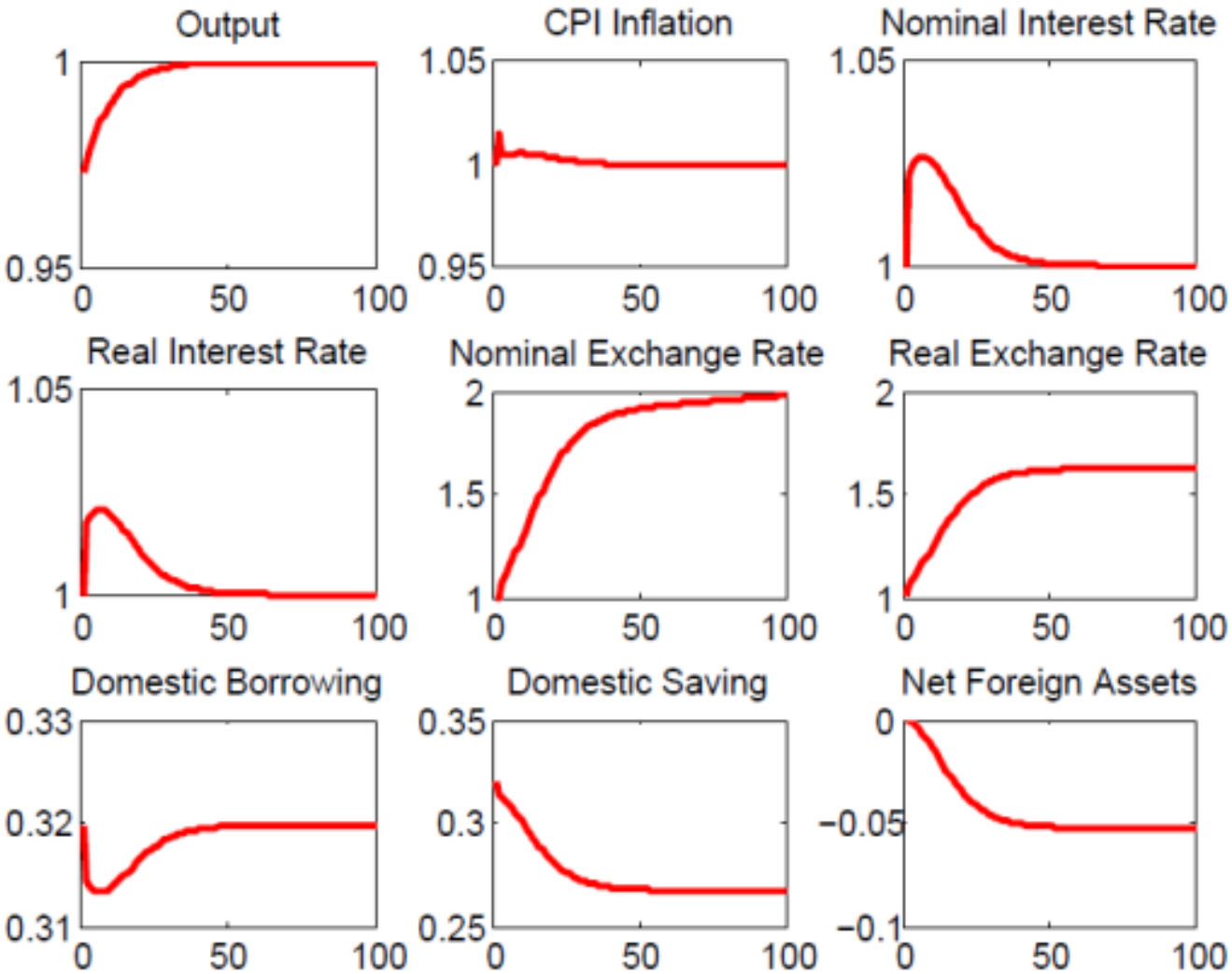
Depreciation reduces the value of a country's production in terms of consumption (foreign output).
Incomplete markets: potentially large income and wealth effects.
Low vs High trade elasticities:

- Higher rate of depreciation
- Output expands at lower rates than the fall of relative prices: domestic incomes fall
- The country runs a deficit

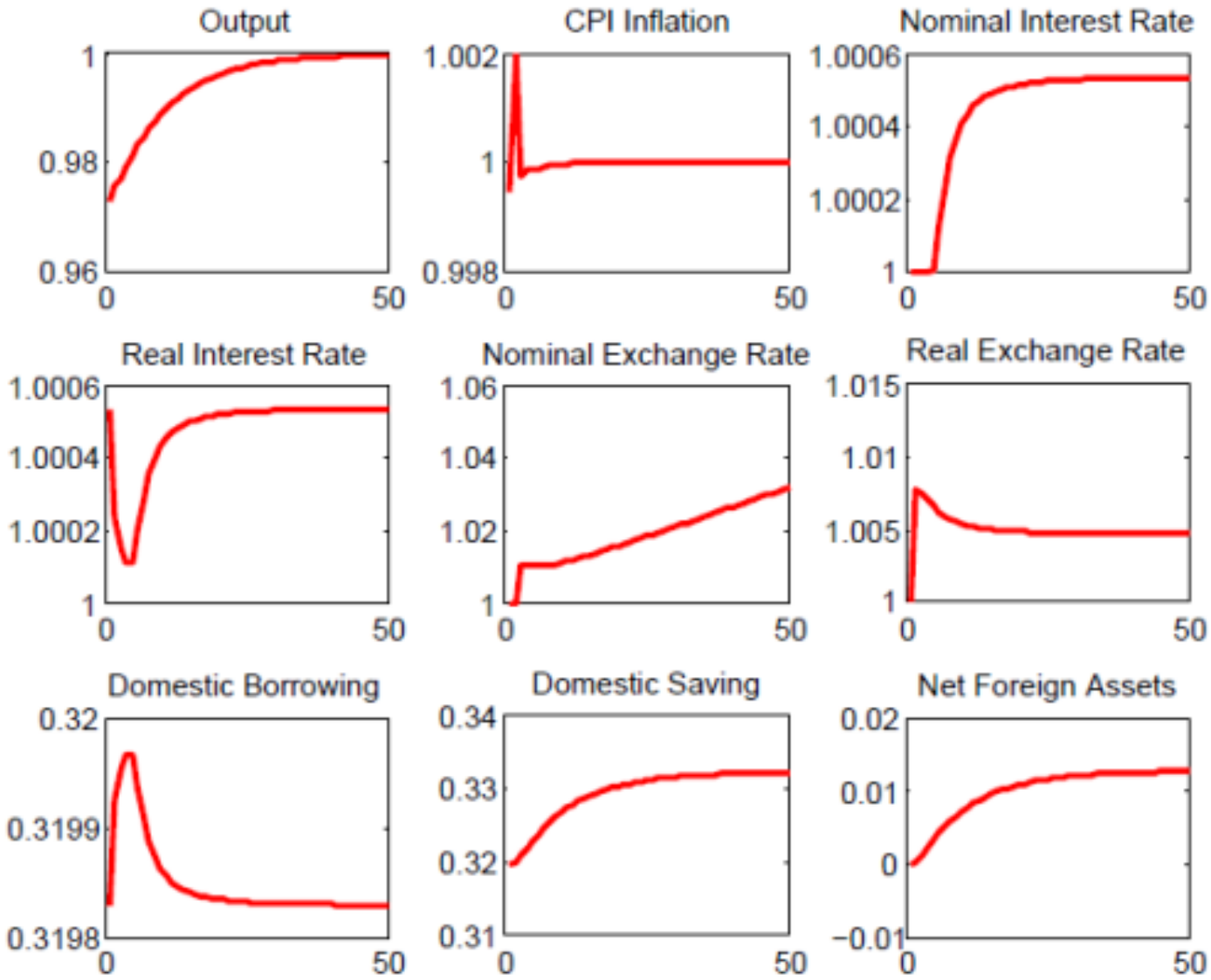
Time varying elasticities: from short to high

- Nominal interest rate remains at ELB for a short period
- Exchange rate overshoots on impact followed by an appreciation

Low trade elasticity

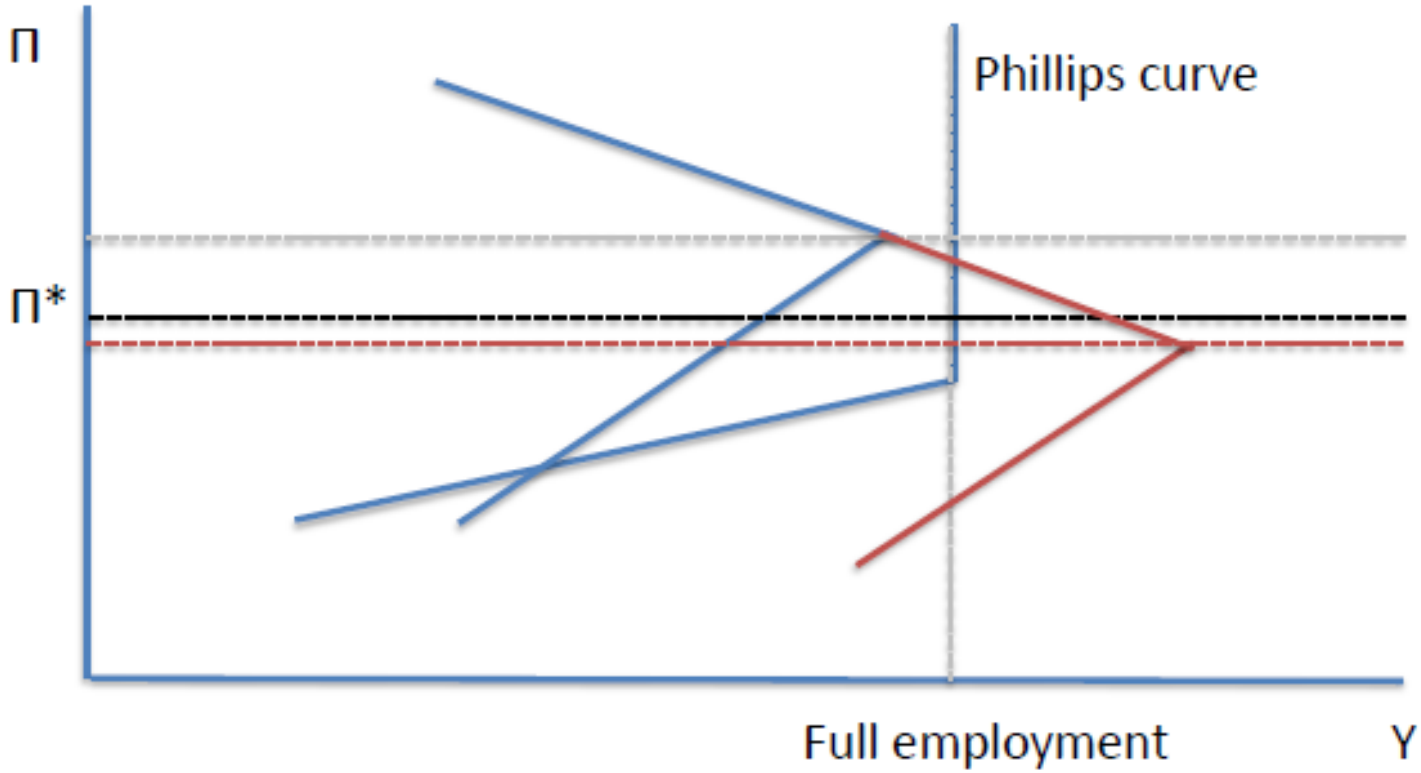


Elasticities rising as a function of time



Relaxing the ELB

In a **closed economy**, relaxing the ELB can lower the real rate and restore full employment.



Relaxing the ELB in a SOE

In an **open economy**

- In steady state, domestic real interest rate is pinned down at the world level
- Lower nominal interest rates mean more currency appreciation
- And hence deflation in import prices and CPI, and thus more unemployment
- Combine Fisher equation and UIP :

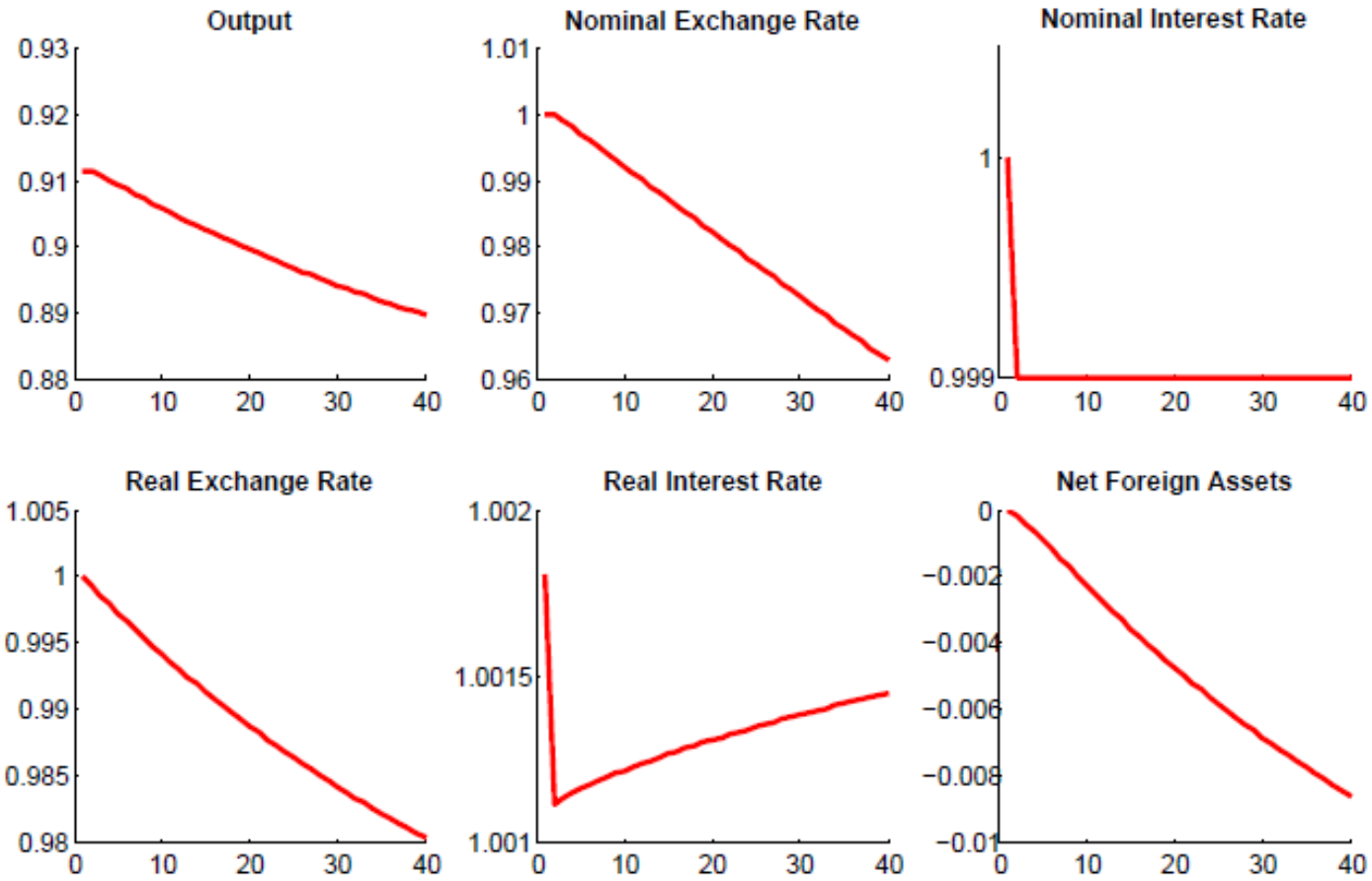
$$(1 + r_t) = (1 + r_t^*) Q_{t+1} / Q_t \tag{1}$$

- ELB: from Fisher equation:

$$(1 - i_{ELB}) = (1 + r^*)\Pi$$

$\rightarrow \Pi$ falls, exacerbating stagnation from Phillips curve

Relaxing the ELB in an Open Economy



Some evidence on the classical adjustment mechanism at work during global recession

- Is there any evidence that, in a global slowdown, employment is increasing in net foreign assets, and decreasing in the real exchange rate?
- Estimate the following regression:

$$\widehat{y}_{it} = \alpha_i^0 \left(1 + \alpha_i^1 \bar{y}_t\right) + \beta^0 \left(1 + \beta^1 \bar{y}_t\right) nfa_{it} + \gamma^0 \left(1 + \gamma^1 \bar{y}_t\right) q_{it} \quad (2)$$

- Broad panel of countries, annual data 1980-2011
- Focus on partial correlation: $\left\{\beta^1, \gamma^1\right\} < 0$?

	(1)	(2)	(3)	(4)
VARIABLES	y-gap	y-gap	u-gap_neg	u_gap_neg
NFA/Y	0.040	0.107	0.292***	-0.020
	[0.15]	[0.15]	[0.10]	[0.11]
Terms of Trade	8.731***	9.852***	2.045*	0.051
	[2.26]	[2.25]	[1.21]	[1.22]
NFA*mean(y-gap)		-0.136***		
		[0.06]		
Terms of Trade*mean(y-gap)		-4.374***		
		[0.82]		
NFA*mean(u-gap_neg)				-0.490***
				[0.11]
Terms of Trade*mean(u-gap_neg)				-6.558***
				[1.10]
Observations	1,965	1,965	1,029	1,029
R-squared	0.008	0.029	0.014	0.079
Number of countries	85	85	37	37

Conclusion

Can small open economies maintain growth and price stability in a world of permanently depressed demand?

- Model-based analysis
- Valuation effects and macroeconomic dynamics along the escape path

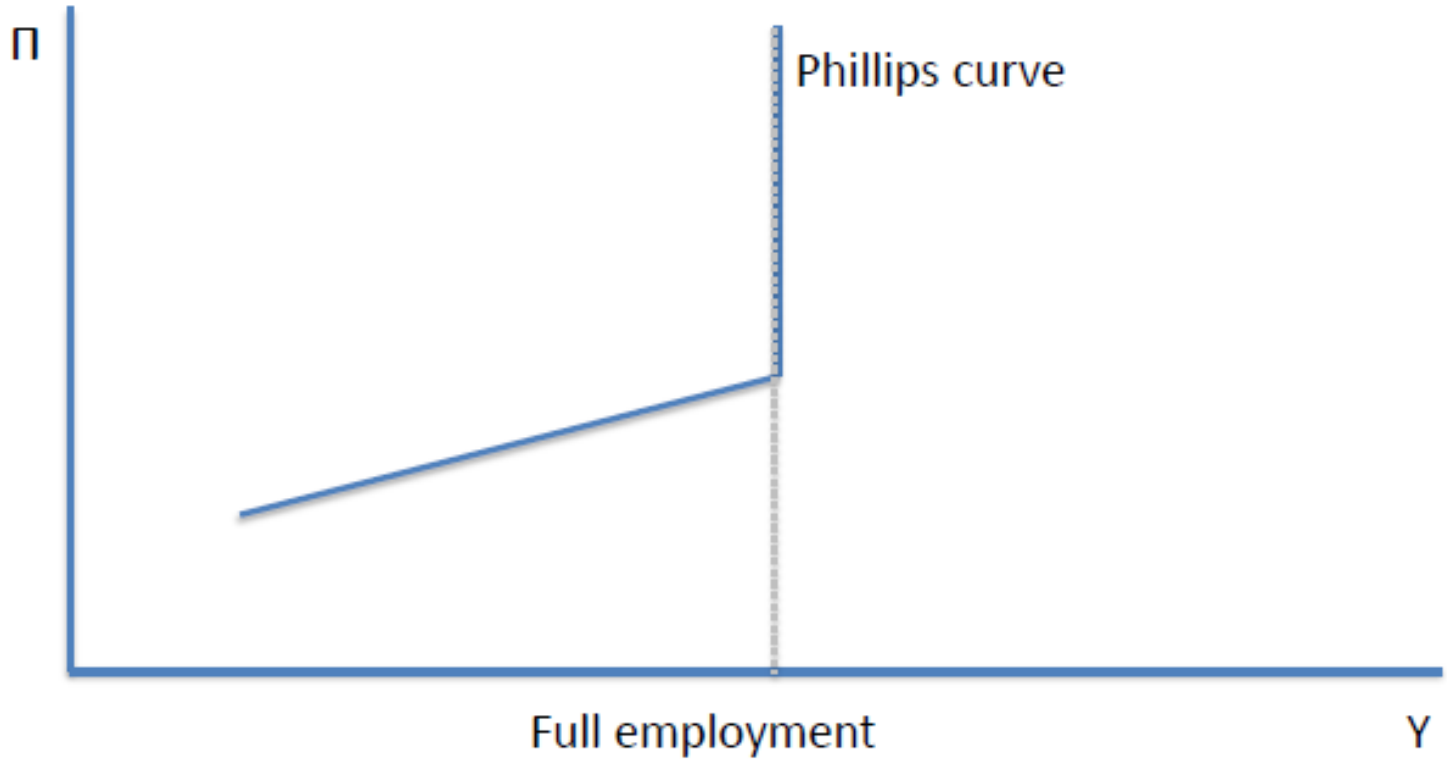
Take away

- To escape stagnation, a SOE needs to let its exchange rate to depreciate to (a) insulate the economy from deflationary drift abroad and (b) weaken its terms of trade and raise demand for its output.
- While employment returns to full, composition of aggregate demand changes: the share of net export rises relative to consumption
- If trade elasticity is low, wealth effects from real depreciation can actually hurt consumption, lowering overall welfare
- Lowering the ELB can be counterproductive

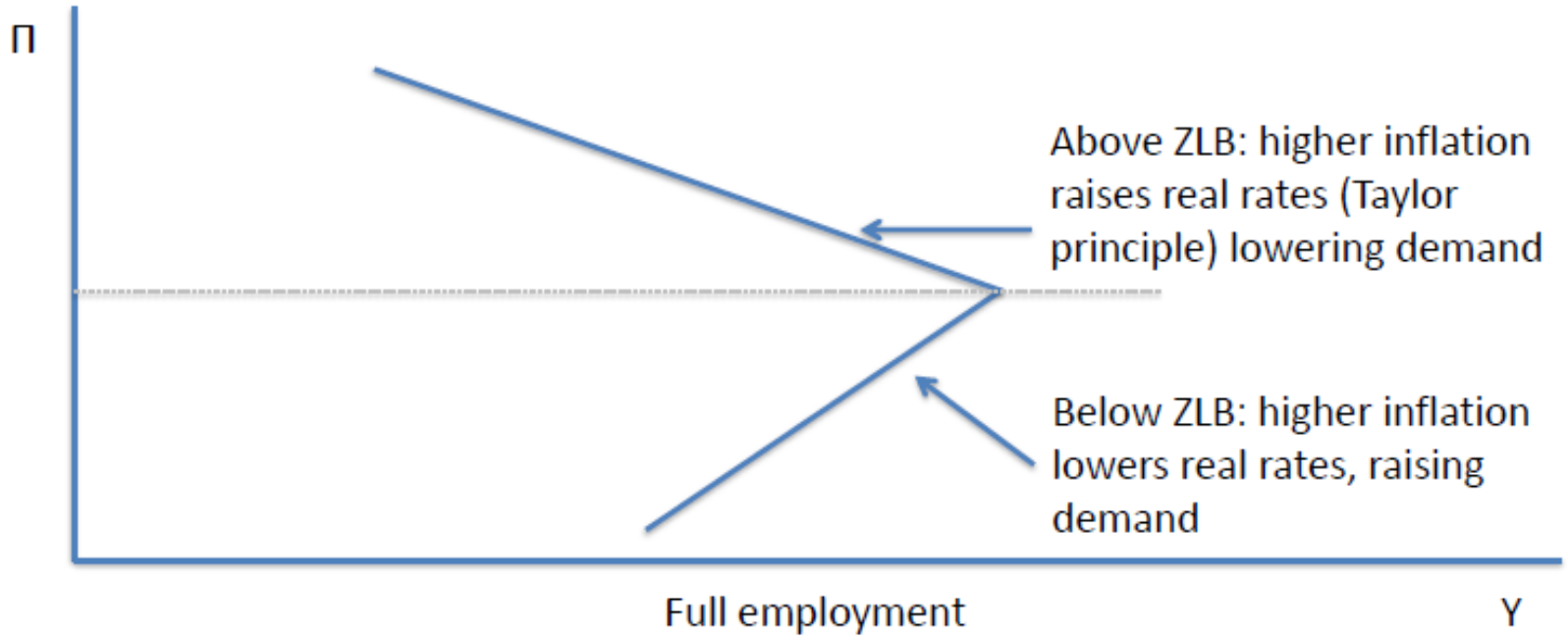
Thank you!

Appendix

Phillips curve

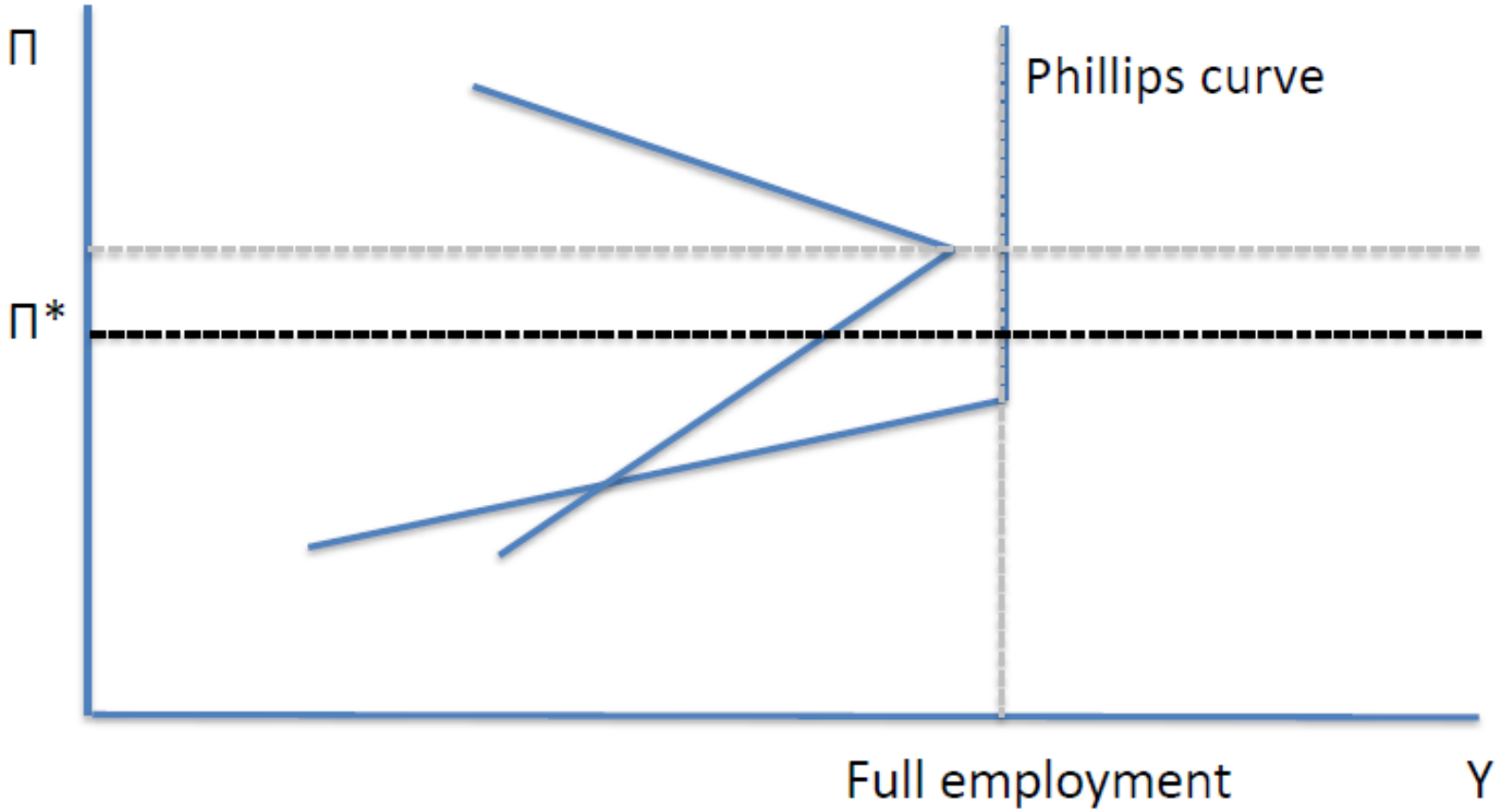


Demand' curve with ELB



Secular Stagnation

In secular stagnation, the ELB binds at a higher inflation rate



Full employment equilibrium