A Contagious Malady? Open Economy Dimensions of Secular Stagnation

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Secular Stagnation

- Hansen (1938), Summers (2014)
- A situation in which the natural rate of interest is negative for an arbitrarily long time.
- Central bank needs to set *negative real rate of interest* for market to clear.
- Can't get it with nominal interest rate cuts.
- Prospects for a ***very long*** demand recession.

The problem

$$0 > r_t^n < r_t$$

Demographics
Fall in relative price of investment
Debt Deleveraging
Increase in inequality
Global savings glut

ZLB and Central bank unwillingness to tolerate inflation puts a bound on this

Open Economy Dimensions of Secular Stagnation

- How does financial markets integration affect the prospect of secular stagnation?
- Is it linked Bernanke's global savings glut hypothesis?
- If so: Should we push for opening up of financial flows to prevent it as suggested by Bernanke?
- Is there role for currency depreciation to escape secular stagnation?
- How is the case for fiscal policy affected by open economy dimension?
- The paper: Address this question in a two country open economy model

Results: World Secular Stagnation

- Derive natural rate with an without financial integration

Autarky

$$r_t^{n,A} > 0$$

Domestic: Normal

$$r_t^{n,A*} < 0$$

Foreign: Secular Stagnation

Financial Integrations

$$r_t^{n,W}$$

Show how it depends on **reserve accumulation** in OLG model.
Relative size of countries matters as well as relative returns.

< 0

WORLD STAGNATION.
Domestic may prefer financial Autarky

> 0

WORLD RECOVERY

Results: World Stagnation

$$r_t^{n,W} < 0$$

- Either domestic or foreign can be stagnated (multiplicity).

- One country can escape a trap at the expense of the other (exchange rate looks like beggar they neighbor policy).

- Expansionary fiscal policies have strong positive externalities (and thus may be undersupplied).

- Strong gains from cooperation.

Stucture of the talk

$$0 > r_t^n < r_t$$

1. Natural rate in OLG. Eggertsson and Mehrotra (2014) + open economy + international reserve accumulations

2. Add ZLB and nominal frictions. Autarky or integration better?

Households

$$\max_{C_t^y, C_{t+1}^m, C_{t+2}^o} \mathbb{E}_t \left\{ \log C_t^y + \beta \log C_{t+1}^m + \beta^2 \log C_{t+2}^o \right\}$$

Budget constraints

$$C_t^y = B_t^y$$

$$C_{t+1}^m = Y_{t+1} - (1 + r_t)B_t^y + B_{t+1}^m$$

$$C_{t+2}^o = -(1 + r_{t+1})B_{t+1}^m$$

$$(1 + r_t)B_t^i \leq D_t$$

Equilibrium conditions

International dimensions: An identical country of size 1-ω

Young

$$C_t^y = B_t^y = \frac{D_t}{1 + r_t}$$

Applies also

Middle aged

$$(C_t^m)^{-1} = \beta \mathbb{E}_t (1 + r_t)(C_{t+1}^o)^{-1}$$

for foreign *

Old

$$C_t^o = -(1 + r_{t-1})B_{t-1}^m$$

$$1 + r_t = 1 + r_t^*$$

Market clearing in bond market

$$N_t B_t^y + N_t^* B_t^{y*} B_t^m - N_{t-1} B_t^m - N_{t-1}^* B_t^{m*}$$

$$1 + r_t^W = \frac{1 + \beta}{\beta} \frac{\omega D_t + (1 - \omega) D_t^*}{\omega Y_t + (1 - \omega) Y_t^* - \omega D_{t-1} - (1 - \omega) D_{t-1}^*}$$

Open Economy dimensions

$$1 + r_t^{autarky} = \frac{1+\beta}{\beta} \frac{(1+g_t)D_t}{Y_t - D_{t-1}} \qquad 1 + r_t^{autarky*} = \frac{1+\beta}{\beta} \frac{(1+g_t)D_t^*}{Y_t^* - D_{t-1}^*}$$

$$1 + r_t^W = \frac{1+\beta}{\beta} \frac{\omega D_t + (1-\omega)D_t^*}{\omega Y_t + (1-\omega)Y_t^* - \omega D_{t-1} - (1-\omega)D_{t-1}^*}$$

$$\text{If } r_t^{autarky} > r_t^{autarky*}, \text{ then } r_t^{autarky} > r_t^W > r_t^{autarky*}$$

Global saving glut

- After East Asian crisis those countries started accumulating large reserve of US Treasuries without increasing their own debt.
- This reduced world real interest rate.
- Relevant? In principle not in a model with Ricardian Equivalence
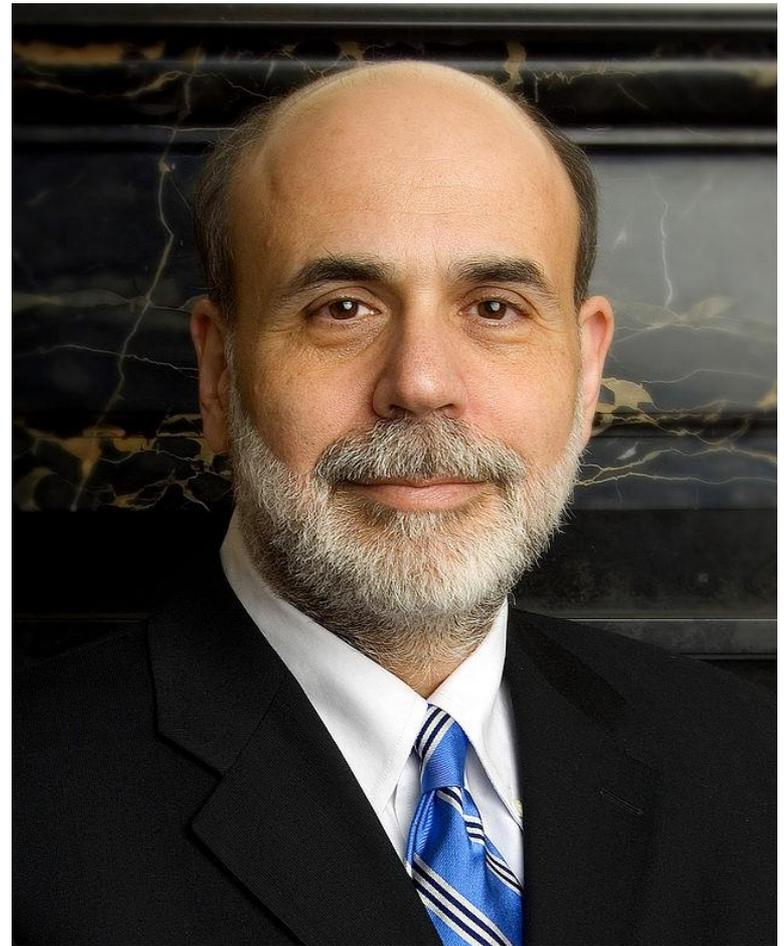
Reserve accumulation

Consider each government issuing its own debt.

Fiscal rules:

- No taxes on young,

- real value of debt fixed.

- $$T_{t+1}^o = \beta \left(1 + r_t\right) T_t^m$$

The holding of foreign government of government debt.

Imagine now one government buys the debt of the other.

Show in paper:

$$1 + r_t^W = \frac{1 + \beta}{\beta} \frac{\omega(D_t + B_t^g) + (1 - \omega)(D_t^* + B_t^{g*})}{\omega(Y_t - D_{t-1}) + (1 - \omega)(Y_t^* - D_{t-1}^* + \frac{1+\beta}{\beta} B_t^{g,F})}$$
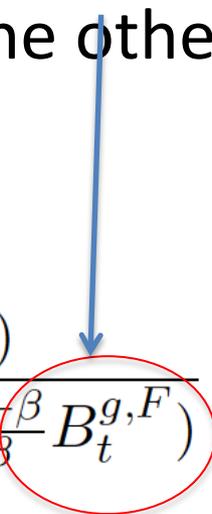
Global saving glut

- Introducing open economy OLG gives a natural way of thinking about the global savings glut.
- Breakdown of Ricardian equivalence means the supply of government debt becomes important.
- The "excess" savings in emerging markets is putting downward pressure on interest rate.
- They are piling up US government debt and not creating other saving vehicles to replace them.
- Perfectly compatible with other forces for secular stagnation.

The problem: Globally low interest rates

$$0 > r_t^n < r_t$$

Demographics
Fall in relative price of investment
Debt Deleveraging
Increase in inequality
Global savings glut

Bounded ZLB and Central bank unwillingness to tolerate inflation

AD: Nominal price determination

Woodford's cashless limit

$$(C_t^m)^{-1} = (1+i_t)\beta E_t (C_{t+1}^o)^{-1}\frac{P_t}{P_{t+1}}$$

$$(C_t^{m*})^{-1} = (1+i_t^*)\beta E_t (C_{t+1}^{o*})^{-1}\frac{P_t^*}{P_{t+1}^*}$$

$$S_t = \frac{P_t}{P_t^*}$$

Interest rate parity

Government sets *i*

$$1+i_t^* = (1+i_t)\frac{S_t}{S_{t+1}}$$

AD: Monetary Policy --Inflation Target

$$\Pi_t = \bar{\Pi} \text{ if } i_t \geq 0 \text{ otherwise } i_t = 0 \text{ and } \Pi_t < 1$$

$$\Pi_t^* = \bar{\Pi}^* \text{ if } i_t^* \geq 0 \text{ otherwise } i_t^* = 0 \text{ and } \Pi_t^* < 1$$

Scenarios

Normal

$$P_t = \bar{P} \quad P_t^* = \bar{P}^*$$

$$i_t \geq 0 \quad i_t^* \geq 0$$

Symmetric Stagnation

$$P_t < \bar{P} \quad P_t^* < \bar{P}^*$$

$$i_t = 0 \quad i_t^* = 0$$

Asymmetric Domestic Stagnation

$$P_t < \bar{P} \quad P_t^* = \bar{P}^*$$

$$i_t = 0 \quad i_t^* \geq 0$$

Asymmetric Foreign Stagnation

$$P_t = \bar{P} \quad P_t^* < \bar{P}^*$$

$$i_t \geq 0 \quad i_t^* = 0$$

Aggregate Demand: Steady State

$$Y + Y^* = \frac{1 + \beta}{\beta} \frac{D + D^*}{1 + r^w} + D + D^* \qquad \text{IS}$$

$$\Pi = \bar{\Pi} \; or \; i = 0$$

$$\Pi^* = \bar{\Pi}^* \; or \; i^* = 0 \qquad \textbf{Monetary Policy}$$

$$1 + r^w = \frac{1 + i}{\Pi}$$

$$1 + r^w = \frac{1 + i^*}{\Pi^*} \qquad \textbf{Fisher Equations}$$

Aggregate Demand: Symmetric
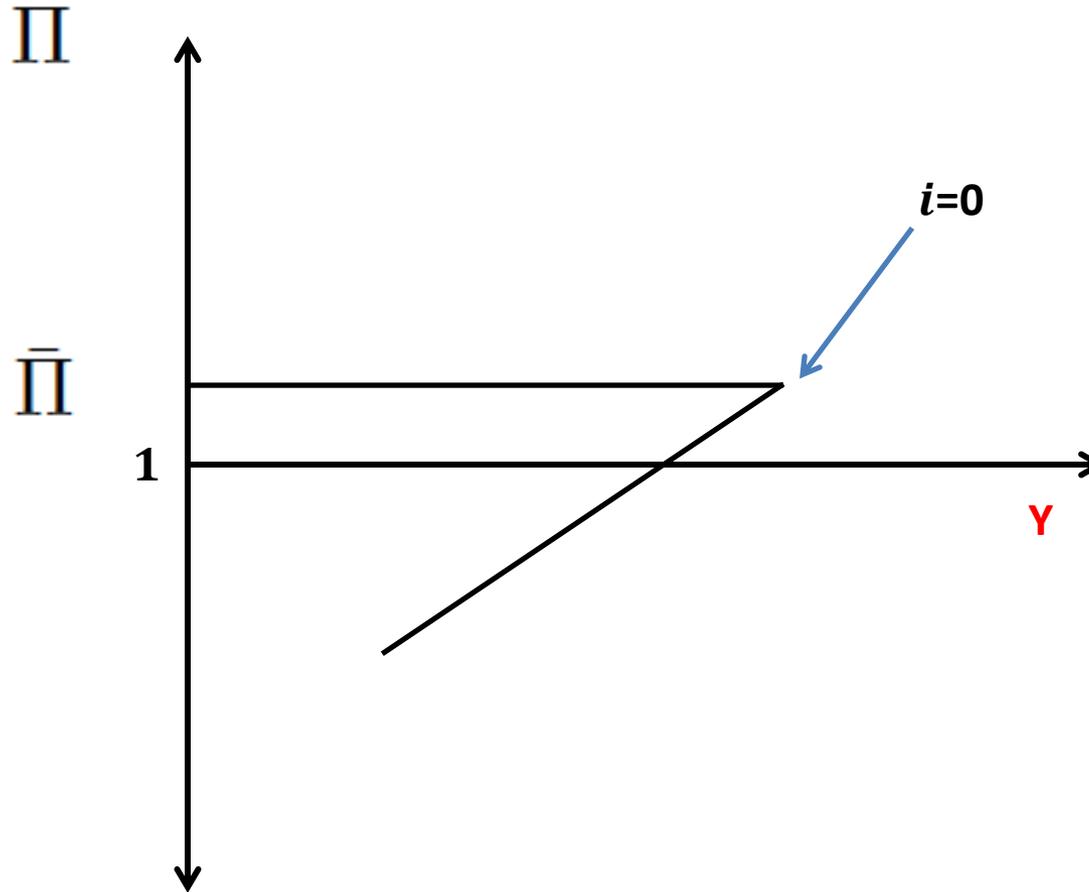
The Model: Aggregate Supply

- Output produce by labor: $\qquad Y = AL^{\alpha}$

- Middle aged would like to supply $\qquad \bar{L}$

- Labor demand $\qquad\qquad W/P = \alpha AL^{\alpha}$

- Downward nominal wage rigidity

$$W_t = \max\{W^*, \gamma W_{t-1} + (1-\gamma)W^*\}$$

where $W^* = P\alpha A\bar{L}^{\alpha}$

Two regimes:

$$Y = \begin{cases} Y^f & \text{if } \Pi \geq 1 \\ Y^f \left(\frac{1-\frac{\gamma}{\Pi}}{1-\gamma}\right)^{\frac{\alpha}{1-\alpha}} & \text{otherwise} \end{cases}$$

Aggregate Supply: Symmetric
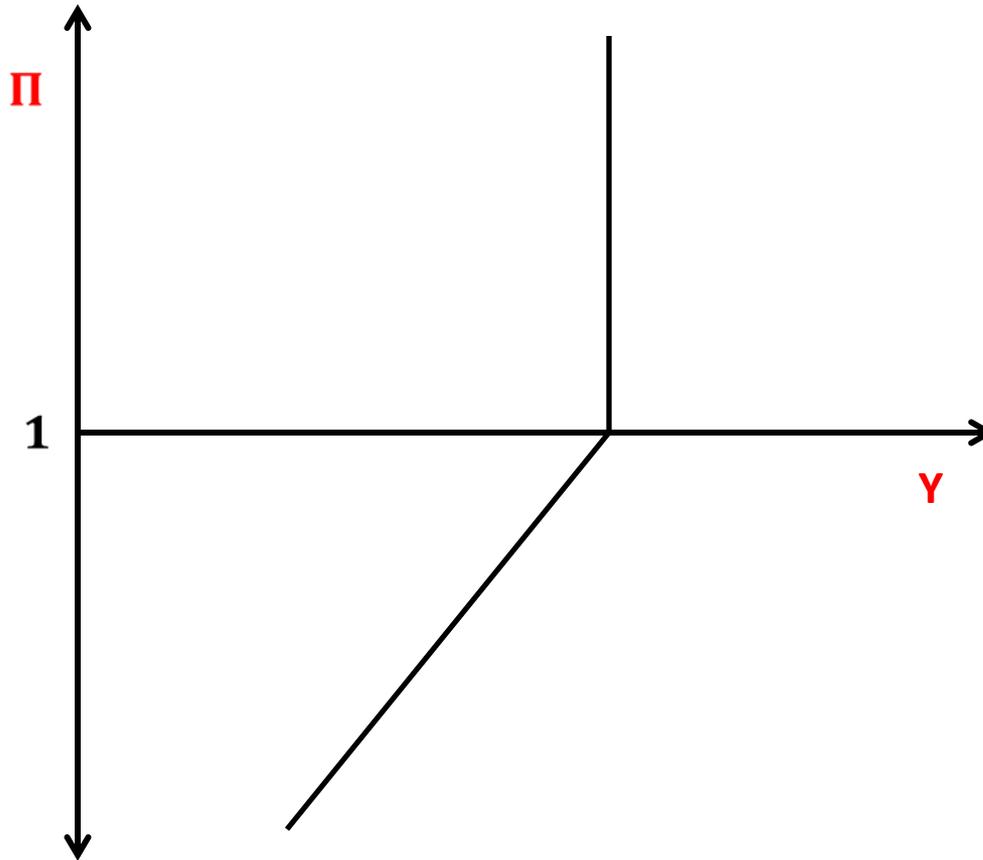
Equilibrium: Symmetric
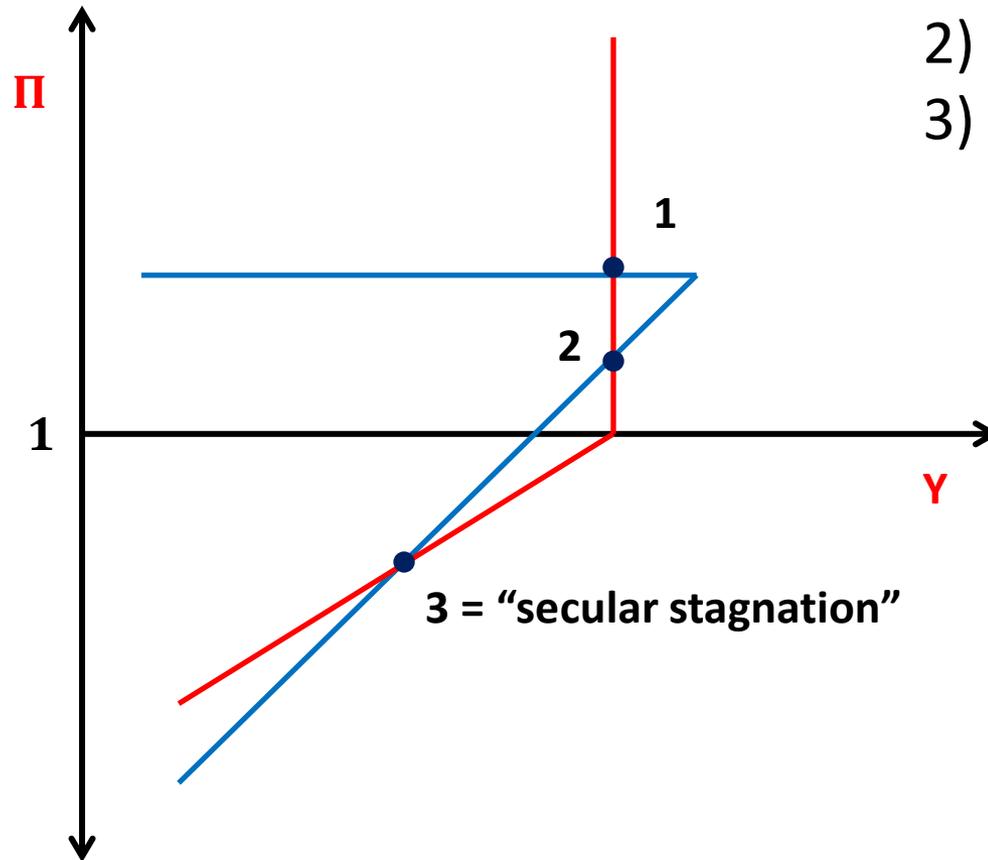
Tree solutions
1) $\Pi > 1$, $i > 0$ $r = r^n$, $Y = Y^f$
2) $\Pi > 1$, $i = 0$ $r = r^n$, $Y = Y^f$
3) $\Pi < 1$, $i = 0$ $r > r^n$, $Y < Y^f$

1

2

3 = "secular stagnation"

Better off in financial autarky?

- Observe that in a symmetric equilibrium: both countries in secular stagnation.

- Implication: Domestic better of imposing capital controls since it has positive natural rate in autarky.

  → Eliminates the secular stagnation equilibria.
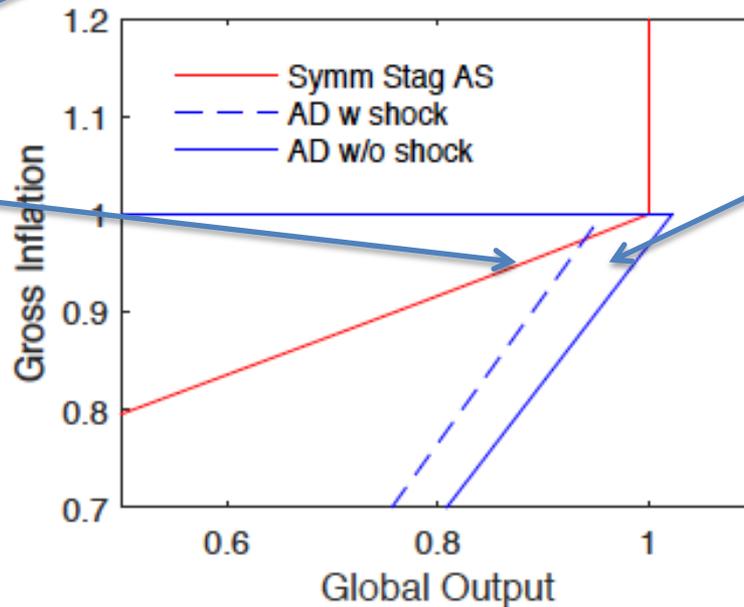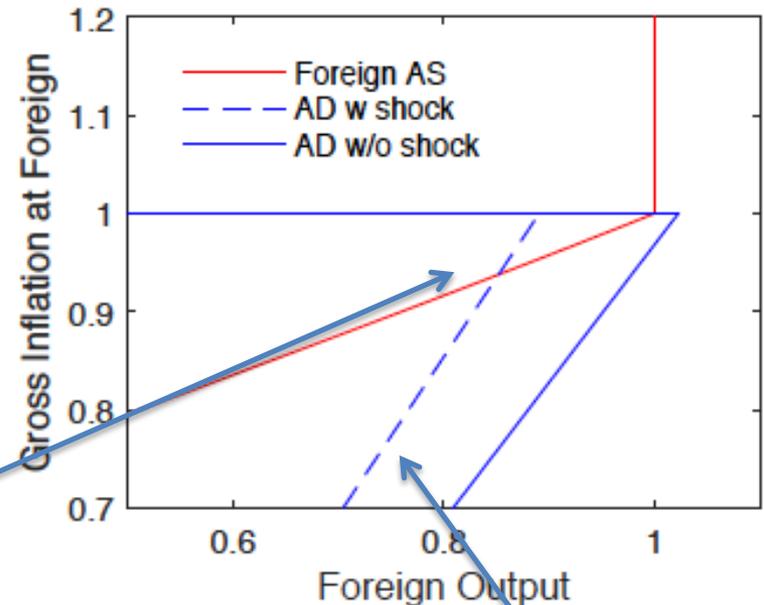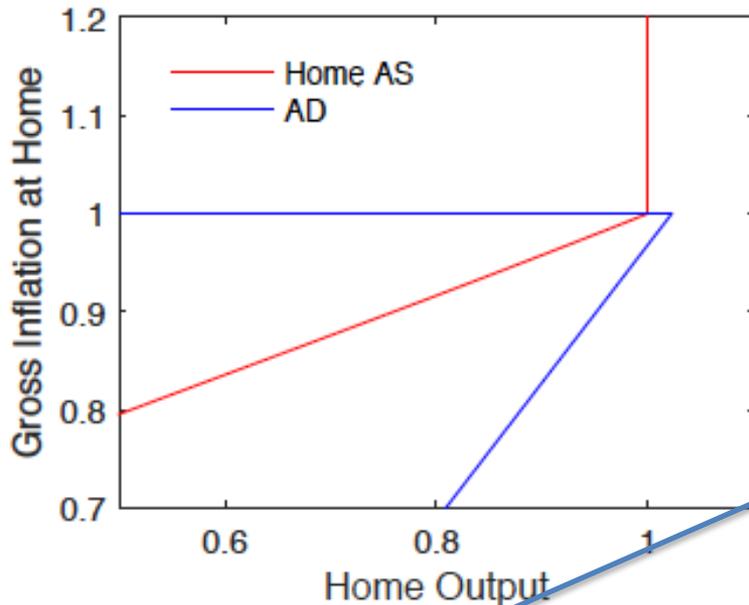
Foreign economy gains by financial Integration but domestic looses

Contagious malady with financial integration

Figure 4: Stagnation Equilibria: Symmetric & Asymmetric

Home AS
AD - World Stagnation
AD - Home Stagnation

Gross Inflation at Home

Home Output

Both home and foreign in stagnation

Only home in stagnation
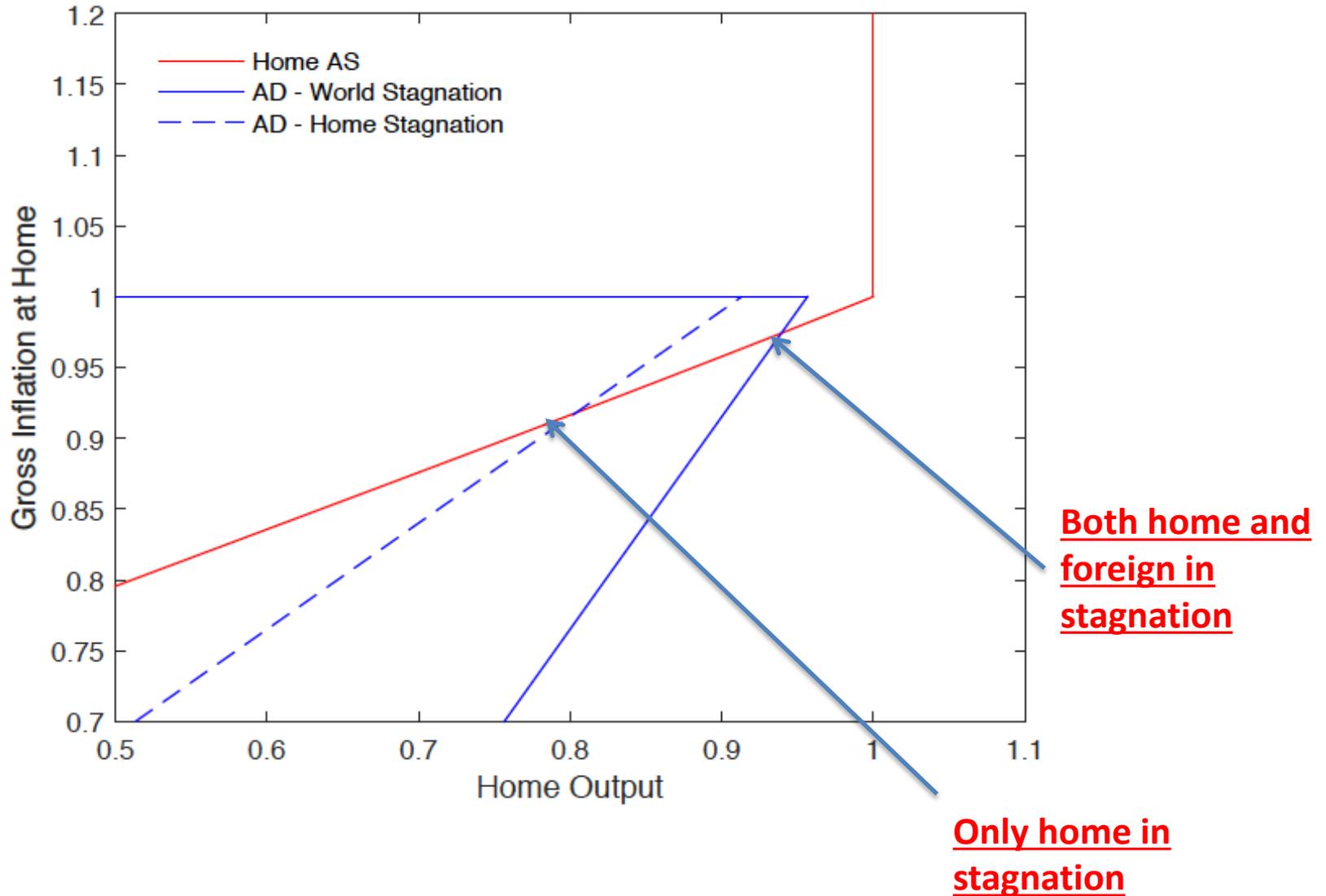
Multiplicity

- Not pinned down if **both** in secular stagnation

or

- only **one**

and when so then indetermined if
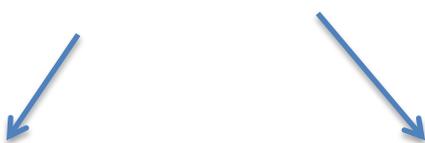
Domestic or **Foreign**

Monetary Policy: Solutions
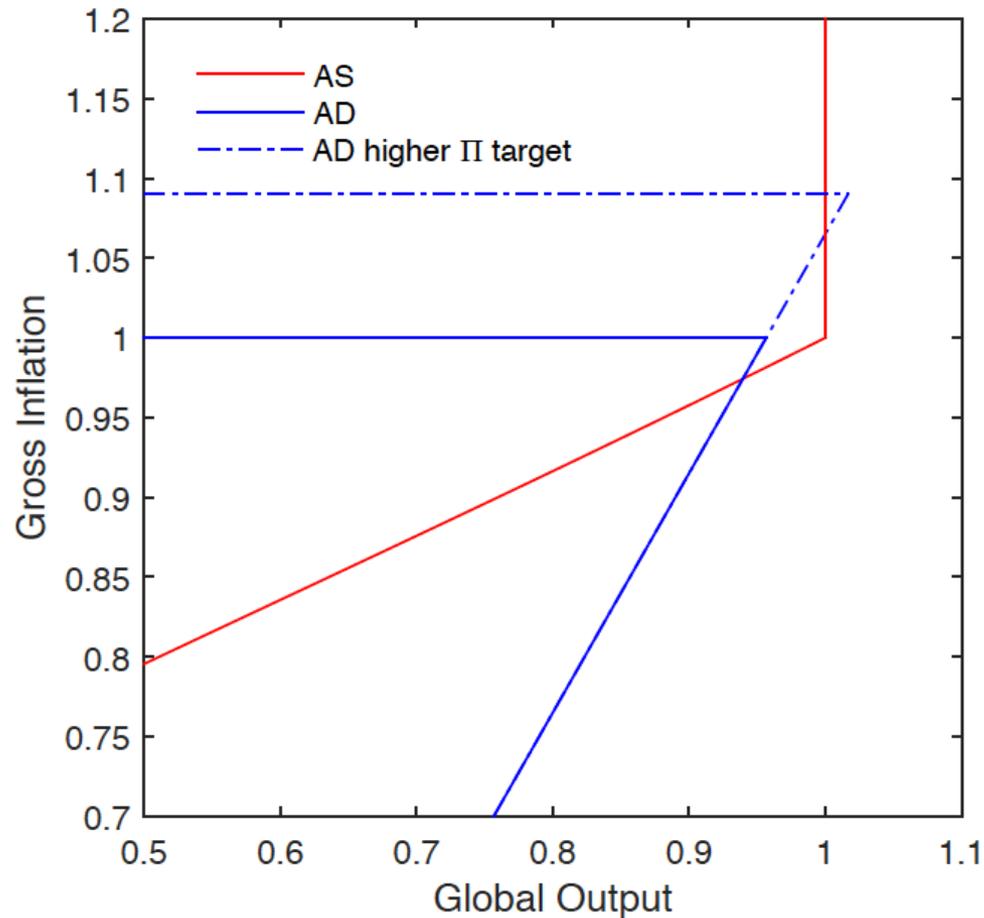
Monetary Policy: Currency wars

- Nominal exchange rate is the ratio of the price level in the two countries

- At ZLB each country loses control of its price level.

- Exchange rate pinned down by interest rate parity in the model

$$1 + i_t^* = (1 + i_t)\frac{S_t}{S_{t+1}}$$

Currency wars

- Imagine each country could commit to a given nominal rate path for exchange rate (e.g. via commitment about future policy or "interventions").

- What does it imply for equilibrium?

- Consider a situation in which the domestic economy is in secular stagnation and the foreign is not.

$$\frac{S_{t+1}}{S_t} = (\Pi^D)^{-1} \quad > 1$$

- Exchange rate continously appreciating.

Proposition 8. *Suppose* $r^{W,Natural} < 0$, *the inflation targets are given by* $\bar{\Pi} = \bar{\Pi}^* = 1$, *and the nominal exchange rate is pegged at* $\bar{S}_{t+1} = S_t = \bar{S}$. *Then the global symmetric secular stagnation equilibria is the unique solution of the model.*

Domestic economy in secular stagnation, exports deflation and SS by pegging its nominal exchange rate.

Proposition 9. *Suppose* $\frac{S_{t+1}}{S_t} < \Pi^{FS*}$ *and the world natural rate of interest is negative. Then there exists no equilibrium in which the domestic economy is in a secular stagnation, but, if* $\bar{\Pi}^* = 1$, *the foreign economy must always be secular stagnation.*

A policy of depreciation of domestic relative to foreign enforces the ***assymetric*** secular stagnation (unless the foreign successfully commits to higher inflation as well)

BOTTOMLINE: Problem with exchange rate as way out is that it only tells us something about the price level in a relative to b. What is needed is a general increase in prices. No change in nominal exchange rate needed for that.

Fiscal Policy

- How is fiscal policy affected by opening of economy?
- Consider spending financed by tax on working.
- Fiscal policy has an effect through the world natural rate of interest.
- Very strong spillover effects

$$1 + r_t^A = \frac{1 + \beta}{\beta} \frac{D_t}{Y_t - G_t - D_{t-1}}$$

$$1 + r_t^W = \frac{1 + \beta}{\beta} \frac{D_t + D_t^*}{Y_t - G_t + Y_t^* - G_t^* - D_{t-1} - D_{t-1}^*}$$

Large multiplier in secular stagnation

$$\frac{dY^W}{dG} = 0$$

$$\frac{dY^W}{dG} = 2.78$$

$$\frac{dY}{dG} = 0$$

$$\frac{dY}{dG} = 1.39$$

Normal

Symmetric secular stagnation

Gains from international coordination

- The gains from fiscal expansion is borne in both countries.

- Countries have an incentive to free-ride on the effort of the other

- Show in the paper some policy games in which case undersupply of government spending without coordination.

Debt

- Can show similar result with debt issuance.

- Key issue: What type of limits might there exist on debt issuance?

- ***The model is crying for government debt.***

$$1 + r_t^W = \frac{1+\beta}{\beta} \frac{\omega(D_t + B_t^g) + (1-\omega)(D_t^* + B_t^{g*})}{\omega(Y_t - D_{t-1}) + (1-\omega)(Y_t^* - D_{t-1}^* + \frac{1+\beta}{\beta} B_t^{g,F})}$$

Fiscal vs. monetary
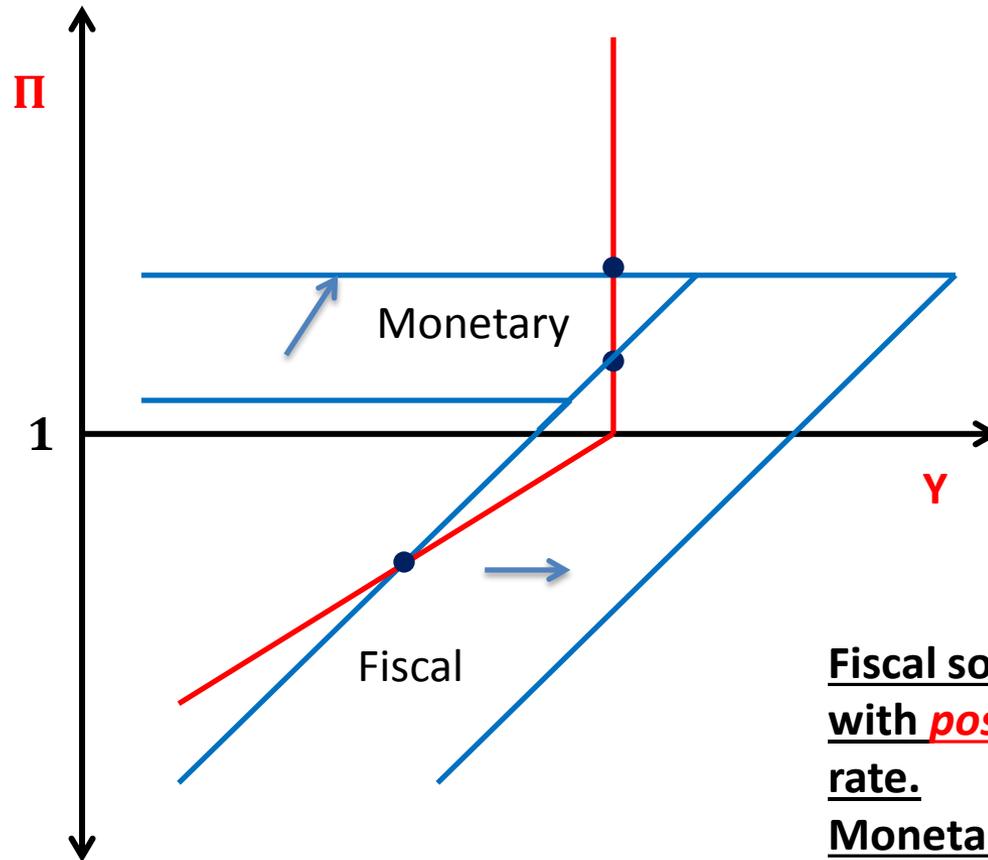
Monetary policy allows for a better equilibria

Fiscal policy eliminates the secular stagnation equilibria

Fiscal solution associated with *positive* real interest rate.
Monetary solution with *negative* real interest rate.

Conclusions

- Secular Stagnation a global phenomena
- Not at all obvious if increasing financial integration solves it: May simply drag all countries down not experiencing the problem.
- Government spending or debt issued solve the problem.
- Permanent increase in inflation (if credible) also does.