External Adjustment, Global Imbalances and Global Safe Assets

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3-Global Safe Assets & Secular Stagnation

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Outline

Back to Safe Assets

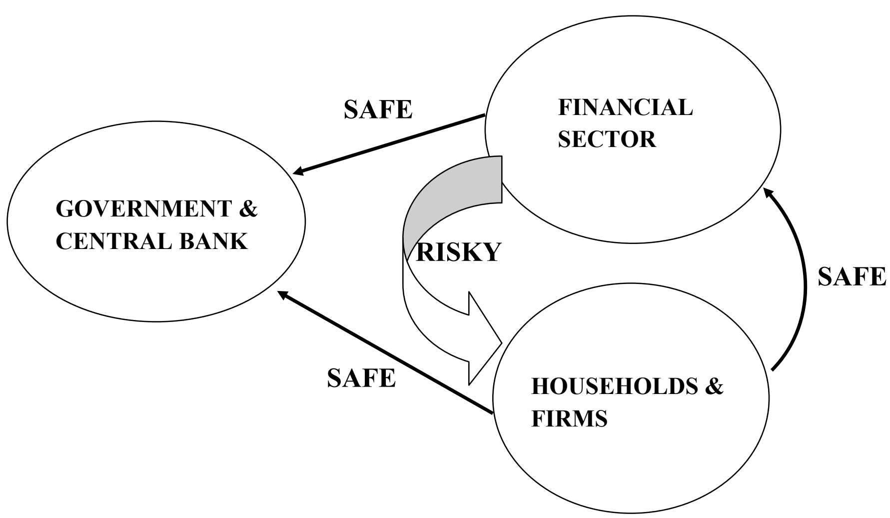
- Widespread concern that the global economy is running short of safe assets...
- ...and that this will affect negatively the global financial system

  "*the shrinking set of assets perceived as safe, now limited to mostly high-quality sovereign debt, coupled with growing demand, can have negative implications for global financial stability.*" (IMF GFS 2012).

- analyzes the issue from a global perspective, with a focus on two dimensions:
  - how the financial system reacts to a scarcity of stores of value generally
  - the role of monetary backstops for public debt
- In what follows, define a 'safe asset' as a liquid debt claim with good insurance properties (low 'beta')

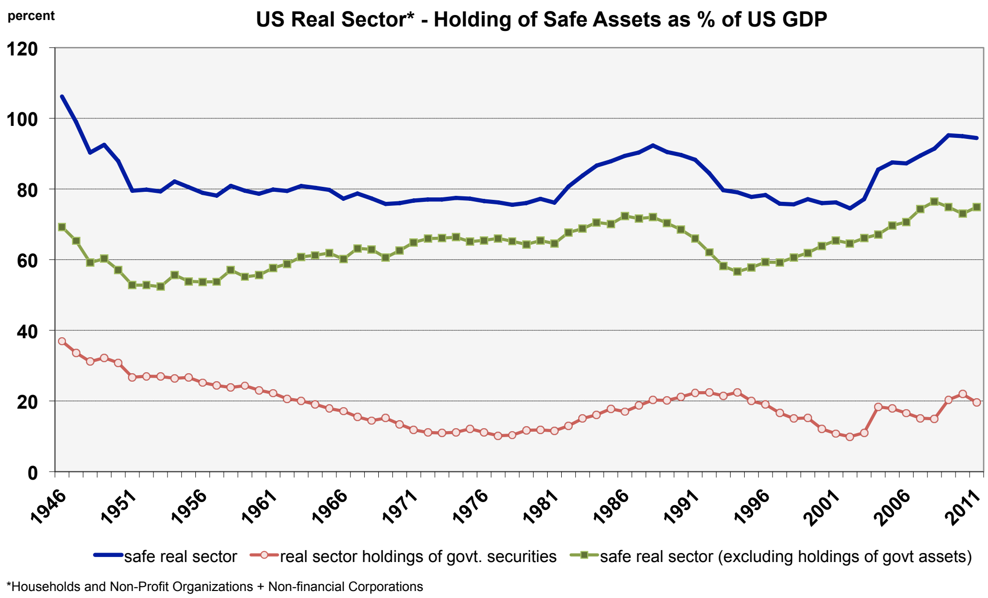
Demand for safe assets

Demand for safe assets: a sectoral decomposition



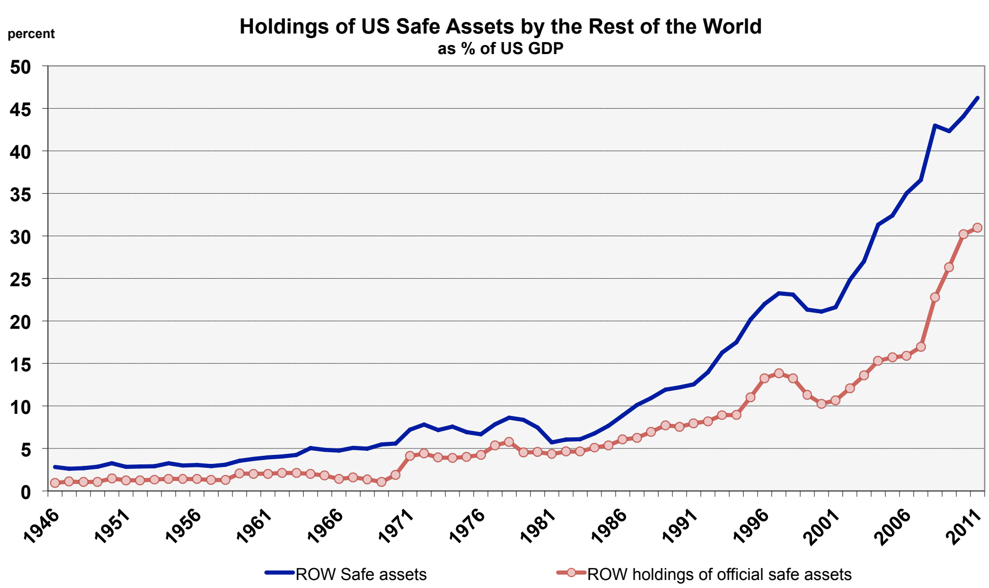
Demand for US safe assets: the real nonfinancial sector

The private real sector's demand for safe assets has been remarkably stable (US) (also true for UK, Germany, France...).

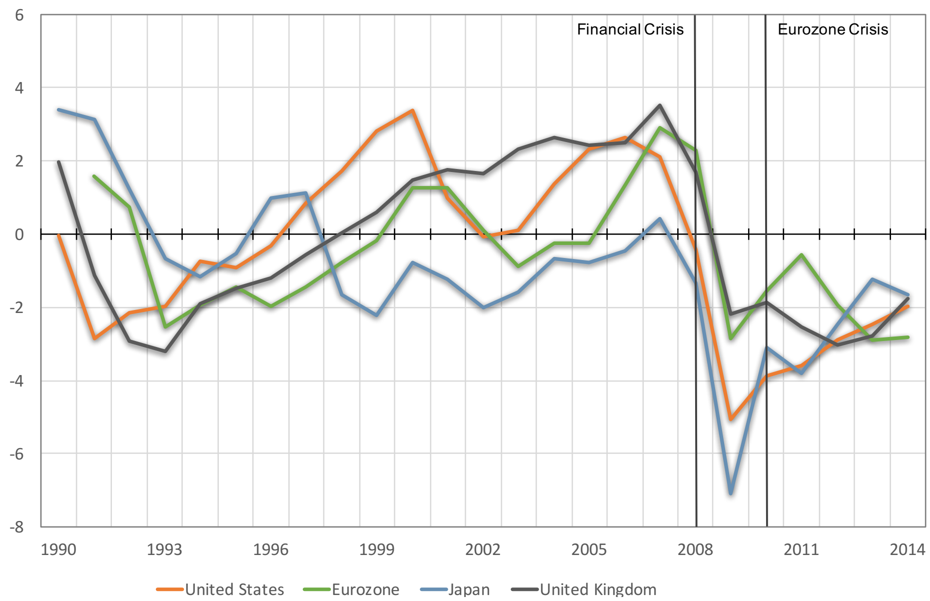


Demand for US safe assets: the rest of the world

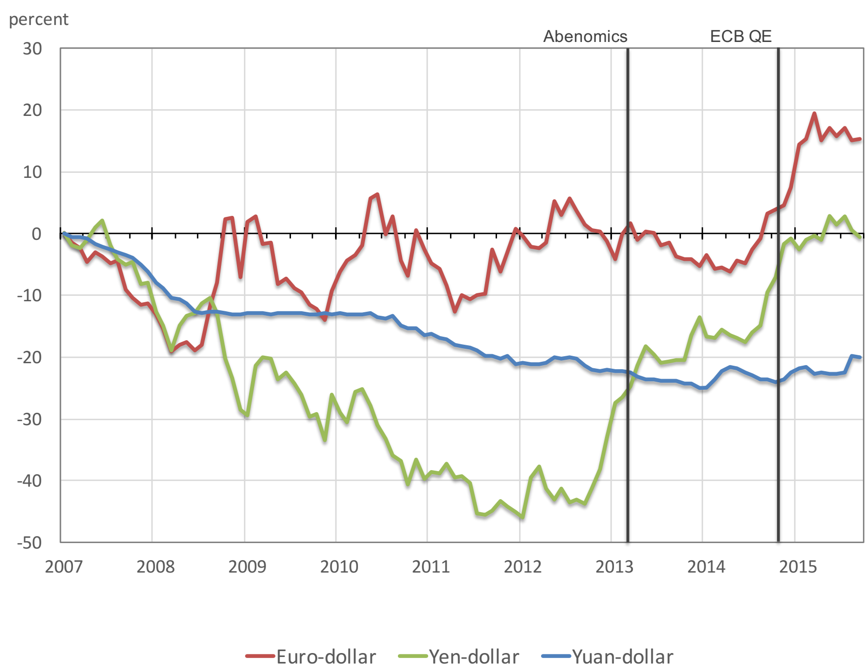
The increased demand for safe assets comes from (a) the US financial system and (b) the rest of the world (official and financial)



Zero Lower Bound: Output Gap (Advanced Economies), percent



ZLB: Global Exchange Rates



The figure reports $\ln(E/E_{2007m1})$ where E denotes the foreign currency value of the dollar.

Main Ideas

- ZLB tipping point for Global Imbalances (benign to malign):
  - no ZLB $\rightarrow$ propagation of low interest rates via CA surpluses
  - ZLB $\rightarrow$ propagation of recessions via CA surpluses
- Regime of increased policy interdependence ($\pm$ spillovers):
  - FX (zero sum)
  - inflation targets (positive sum)
  - government spending (positive sum)
  - public debt issuance (positive sum)
  - helicopter drops of money (positive sum)
  - some forms of QE (positive sum)

Two Countries

- Two countries: Home and Foreign
- Endowment X of H good grows at rate g
- Endowment X^* of F good grows at rate g
- Relative size (constant): $x = \frac{X}{X+X^*}$.

Home Assets

- Dividends δX capitalized by Lucas trees:
  - rate of depreciation ρ
  - rate of new trees creation ρ
- Public debt $D = dX$ financed by taxes τ

Home Agents

- OLG "perpetual youth" with birth/death Poisson rate θ;
- Earn income at birth, save it, and consume at death;
- Consumption shares on (H,F): $(x, 1-x)$;
- Income of newborns: $(1-\tau)(1-\delta)X+$ value of new trees

Financial Development/Securitization Capacity

- Interpret δ as financial development/securitization capacity, not capital share
- Only small part of capital income pledgeable to outside investors as "dividend" on tradable assets
- Depends on financial development/securitization capacity
- Interpret ρ as technological churn and expropriation risk
- V_t/PV_t depends on δ and ρ

$$PV_t = \int_t^\infty X_s e^{-\int_t^s r_u du} ds$$

$$V_t = \delta \int_t^\infty X_t e^{-\int_t^s (r_u+\rho) du} ds$$

Nominal Rigidities and Monetary Policy

- Competitive CES final good sector in each country
- Reinterpret endowment as non-traded input
  - transformed into variety of intermediate good sold monopolistically
  - H prices rigid in H currency, F prices rigid in F currency (PCP)
  - accommodate demand at posted price
- Capacity utilization $\xi \in [0, 1]$
- Truncated Taylor rule: $i = \max\{r^n - \psi(1-\xi), 0\}$
- Real interest rate $r = i$

Foreign

Same as H but different parameters:

- Financial development/securitization capacity: $\delta^* \neq \delta$
- Public debt to GDP ratio $d^* \neq d$ and taxes $\tau^* \neq \tau$
- Other differences (extensions):
  - demographics and credit constraints (savers/borrowers)
  - securitization capacity & demand for safe assets
  - inflation targets

Equilibrium Equations (along BGP)

- **Asset pricing** (V: value of H trees in H currency)

$$\begin{aligned} r^w V &= -\rho V + \delta \xi X \\ r^w V^* &= -\rho V^* + \delta^* \xi^* X^* \end{aligned}$$

- **Wealth accumulation** (W: H financial wealth in H currency):

$$\begin{aligned} \dot{W} &= gW = -\theta W + (1-\delta)(1-\tau)\xi X + r^w W + (\rho + g)V \\ \dot{W}^* &= gW^* = -\theta W^* + (1-\delta^*)(1-\tau^*)\xi^* X^* + r^w W^* + (\rho + g)V^* \end{aligned}$$

- **Government budget constraints**:

$$\begin{aligned} (r^w - g)D &= \tau(1-\delta)\xi X \\ (r^w - g)D^* &= \tau^*(1-\delta^*)\xi^* X^* \end{aligned}$$

- **Goods market clearing**: (E: nominal exchange rate)

$$\begin{aligned} x\theta(W + EW^*) &= \xi X \\ (1-x)\theta(W + EW^*) &= E\xi^* X^* \end{aligned}$$

ZLB "Complementary Slackness"

- No liquidity trap

$$r^w > 0 \quad \text{and} \quad \xi = \xi^* = 1$$

- Global liquidity trap

$$r^w = 0 \quad \text{and} \quad \xi, \xi^* \leq 1$$

- All or none world

No Liquidity Trap

- World interest rate as "average" of autarky interest rates

$$r^w = r^{w,n} = -\rho + \frac{\bar{\delta}\theta}{1 - \theta\bar{d}}$$

with

$$r^{a,n} = -\rho + \frac{\delta\theta}{1 - \theta d} \quad \text{and} \quad r^{a,n*} = -\rho + \frac{\delta^*\theta}{1 - \theta d^*}$$

- Net Foreign Assets and Current Account

$$\frac{NFA}{X} = \frac{(1 - \theta d)(r^w - r^{a,n})}{(g + \theta - r^w)(\rho + r^w)} \quad \text{and} \quad \frac{CA}{X} = g\frac{NFA}{X}$$

- Exchange rate

$$E = 1$$

Figure 1a: Standard Metzler Diagram - Home

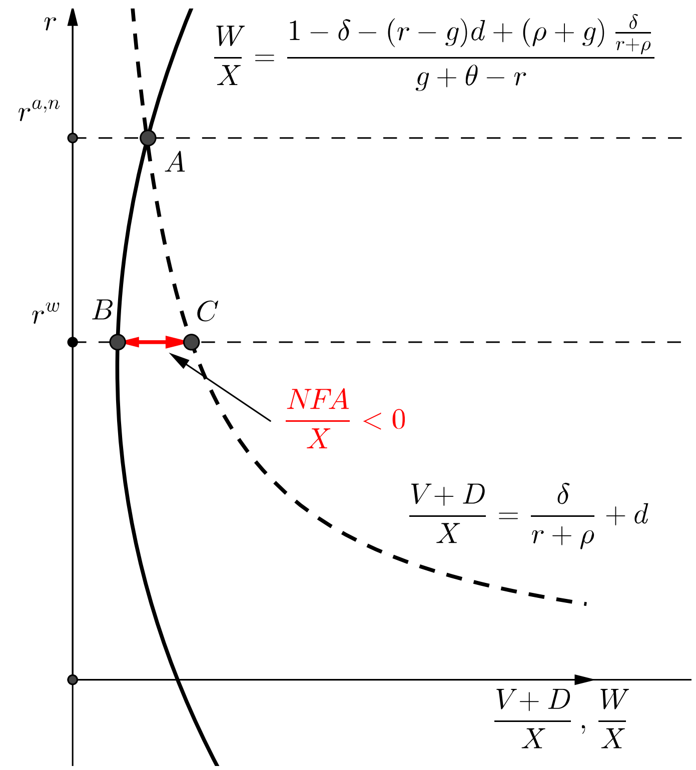
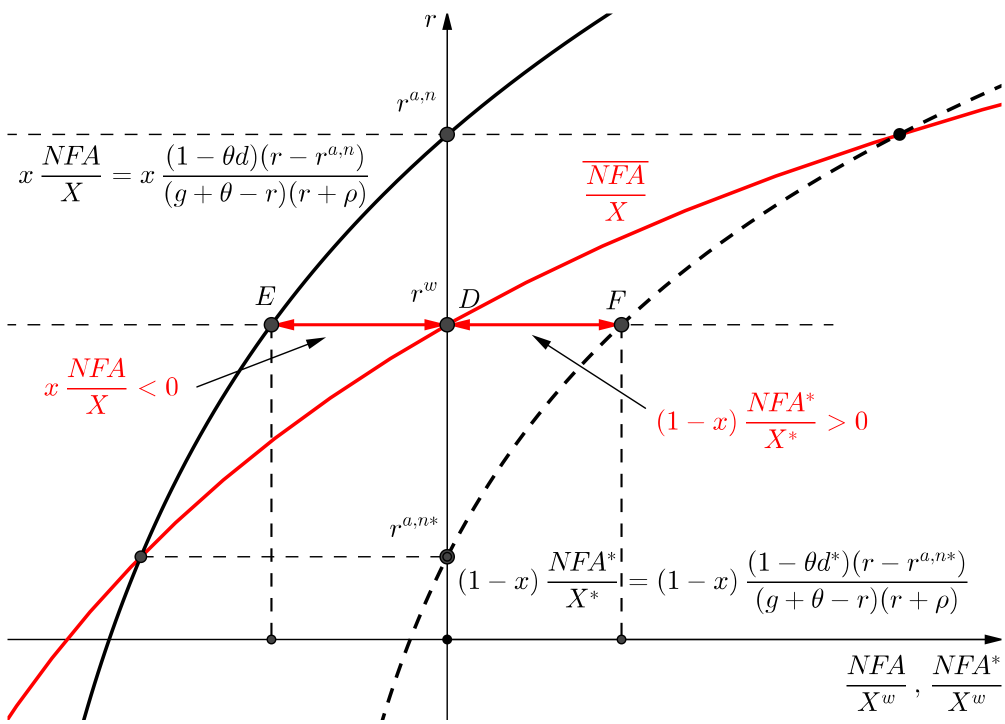


Figure 1b: Standard Metzler Diagram - Global



The global equilibrium interest rate r^w is such that world financial markets are in equilibrium: $\overline{\frac{NFA}{X}} = x\frac{NFA}{X} + (1-x)\frac{NFA^*}{X^*} = 0$.

Global Liquidity Trap

- World interest rate

$$r^w = 0$$

- Fixed-point equations for ξ and ξ^*

$$\xi = \frac{\theta}{g+\theta}[x\xi(1+\frac{g\delta}{\rho}) + (1-x)E\xi^*(1+\frac{g\delta^*}{\rho}) + xgd + (1-x)gd^*]$$

$$\xi^* = \frac{1}{E}\frac{\theta}{g+\theta}[x\xi(1+\frac{g\delta}{\rho}) + (1-x)E\xi^*(1+\frac{g\delta^*}{\rho}) + xgd + (1-x)gd^*]$$

- Multiple equilibria indexed by E...(Kareken-Wallace)

$$E = \frac{\xi}{\xi^*}$$

Global Liquidity Trap

- Output gaps as "FX-weighted averages" of autarky output gaps

$$\xi = x\frac{1-\frac{\delta\theta}{\rho}}{1-\frac{\bar{\delta}\theta}{\rho}}\xi^{a,l} + (1-x)\frac{1-\frac{\delta^*\theta}{\rho}}{1-\frac{\bar{\delta}\theta}{\rho}}E\xi^{a,l*}$$

$$\xi^* = x\frac{1-\frac{\delta\theta}{\rho}}{1-\frac{\bar{\delta}\theta}{\rho}}\frac{1}{E}\xi^{a,l} + (1-x)\frac{1-\frac{\delta^*\theta}{\rho}}{1-\frac{\bar{\delta}\theta}{\rho}}\xi^{a,l*}$$

with

$$\xi^{a,l} = 1 + \frac{1-\theta d}{1-\frac{\delta\theta}{\rho}}\frac{r^{a,n}}{\rho} \quad \text{and} \quad \xi^{a,l*} = 1 + \frac{1-\theta d^*}{1-\frac{\delta^*\theta}{\rho}}\frac{r^{a,n*}}{\rho}$$

- Net Foreign Assets and Current Account

$$\frac{NFA}{X} = \frac{(1-\frac{\delta\theta}{\rho})(\xi - \xi^{a,l})}{g+\theta} \quad \text{and} \quad \frac{CA}{X} = g\frac{NFA}{X}$$

Output Determination in the Global ZLB

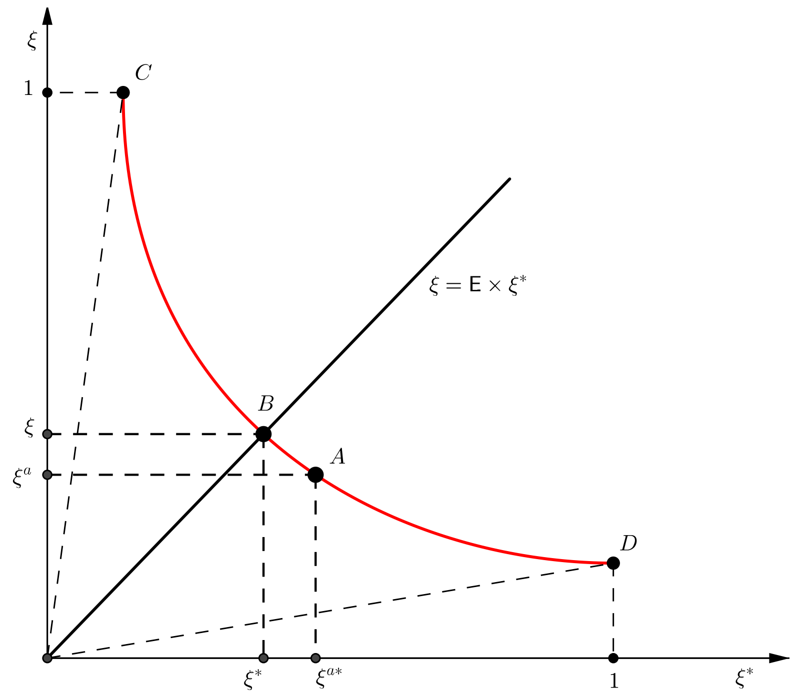
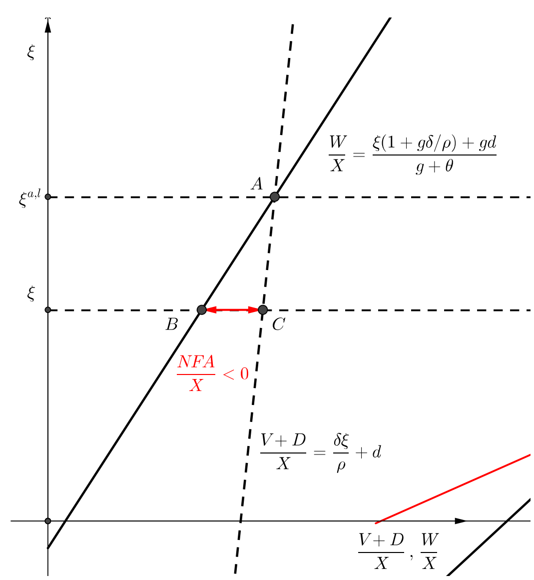


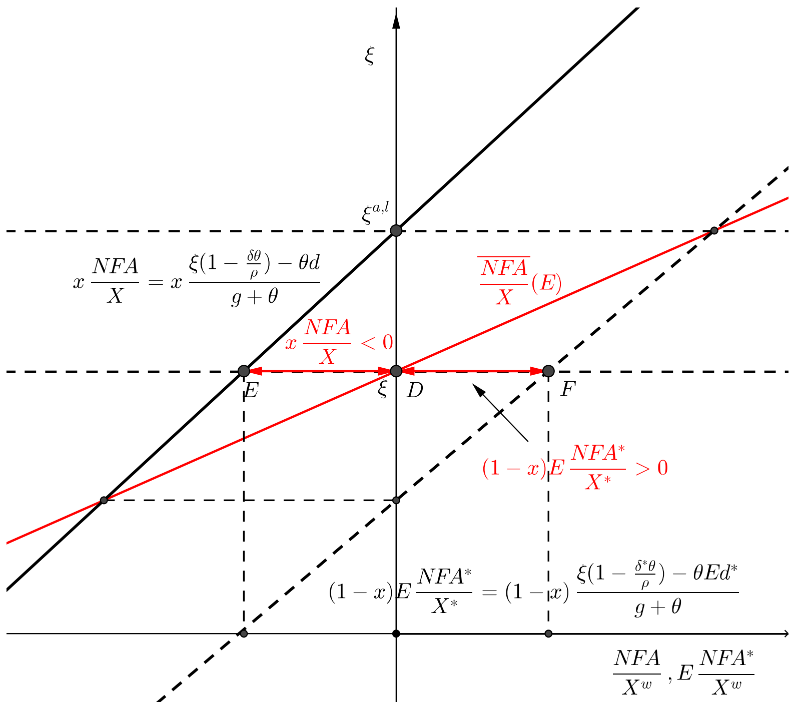
figure reports Home (ξ) and Foreign (ξ^*) output at the global ZLB, for different values of the exchange rate $E \in [\underline{E}, \bar{E}]$.

Figure 2a: Metzler Diagram in Quantities - Home



Given E, Metzler diagram in quantities reports the size of the net foreign position as a function of the domestic liquidity trap ξ. Higher output (high ξ) increases wealth more than asset supply, so NFA increases.

Figure 2b: Metzler Diagram in Quantities - Global



Given E, ξ is such that world financial markets are in equilibrium:
$\frac{\overline{NFA}}{X}(E) = x\frac{NFA}{X} + (1-x)E\frac{NFA^*}{X^*} = 0.$

Alternative Representation with "FX-weighted" Debt

- Output gaps

$$\xi = \frac{\theta\bar{d}(E)}{1-\frac{\bar{\delta}\theta}{\rho}} \quad \text{and} \quad \xi^* = \frac{1}{E}\frac{\theta\bar{d}(E)}{1-\frac{\bar{\delta}\theta}{\rho}}$$

as function of "FX-weighted" average debt to GDP

$$\bar{d}(E) = xd + (1-x)Ed^*$$

- Net Foreign Assets and Current Account

$$\frac{NFA}{X} = \frac{(1-\frac{\delta\theta}{\rho})}{g+\theta}\left[\frac{\theta\bar{d}(E)}{1-\frac{\bar{\delta}\theta}{\rho}} - \frac{\theta d}{1-\frac{\delta\theta}{\rho}}\right]$$

$$\frac{NFA}{X} = \frac{1-\frac{\delta\theta}{\rho}}{1-\frac{\bar{\delta}\theta}{\rho}}\frac{(1-x)d^*(E-E^a)}{g+\theta}$$

Currency Wars and Reserve Currency Paradox

- E determined by market coordination or FX intervention (peg)

- Beggar-thy-neighbor devaluations (zero-sum)

$$E \uparrow \Longrightarrow \xi \uparrow \xi^* \downarrow \frac{CA}{X} \uparrow$$

- Reserve currency paradox

Inflation

- 'Old' Keynesian Phillips curves (downward sticky prices)

$$[\pi_{H,t} + \kappa_0 + \kappa_1(1 - \xi_t)](1 - \xi_t) = 0$$

$$[\pi^*_{F,t} + \kappa^*_0 + \kappa^*_1(1 - \xi^*_t)](1 - \xi^*_t) = 0$$

- Taylor rules with inflation targets $\bar{\pi} > 0$ and $\bar{\pi}^* > 0$

$$i_t = \max\{0, r^n_t + \bar{\pi} + \phi(\pi_{H,t} - \bar{\pi})\}$$

$$i^*_t = \max\{0, r^{n*}_t + \bar{\pi}^* + \phi^*(\pi^*_{F,t} - \bar{\pi}^*)\}$$

Inflation

- With $r^{w,n} < 0$, multiple equilibria with different TOT: $S = \frac{EP_F^*}{P_H}$
- **No liquidity traps** equilibrium ($i > 0$, $i^* > 0$) if inflation targets high enough: $r^{w,n} + \min\{\bar{\pi}, \bar{\pi}^*\} > 0$
- **Global liquidity trap** equilibrium ($i = i^* = 0$) with deflationary spiral
  - at world level, more wage flexibility $\rightarrow$ deeper recession
  - at country level, more wage flexibility $\rightarrow$ shallower recession
- **Asymmetric liquidity trap** equilibrium ($i = 0$, $i^* > 0$)
  - no recession in one country
  - worse recession in the other
- Inflation targets (positive sum) vs. FX interventions (zero sum)

Government Spending, Public Debt, Helicopter Money

- Public debt expansion (positive sum)...

$$d \uparrow \Longrightarrow \xi \uparrow \xi^* \uparrow \frac{CA}{X} \downarrow$$

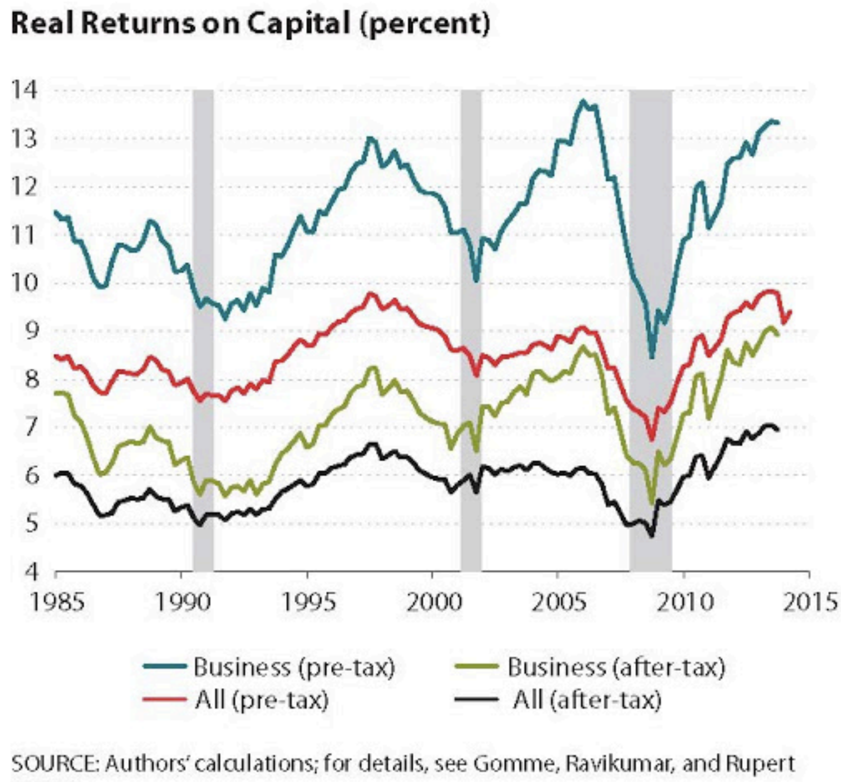
  ...but not if used to finance asset purchases
  (different in model with safe and risky assets)

- Equivalent to helicopter drops of money
- Government spending (positive sum)

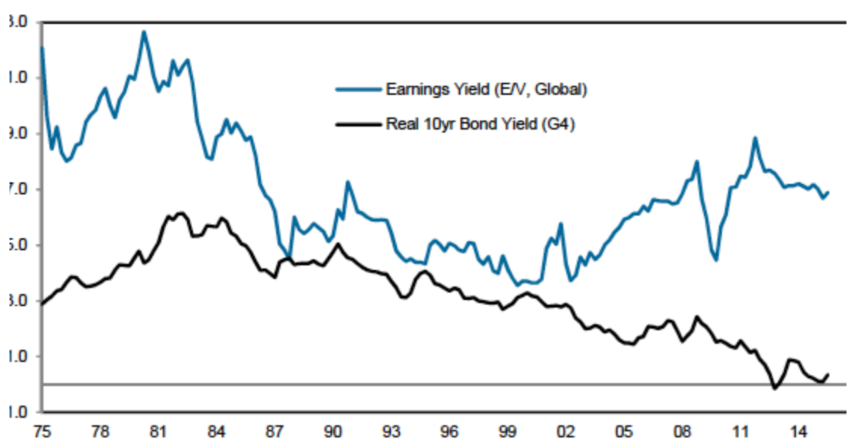
$$G \uparrow \Longrightarrow \xi \uparrow \xi^* \uparrow \frac{CA}{X} \downarrow$$

  Domestic multiplier > 1 in SR
  (net asset supply boost + inflation boost through stimulus) More foreign leakage in LR
  (TOT appreciation)

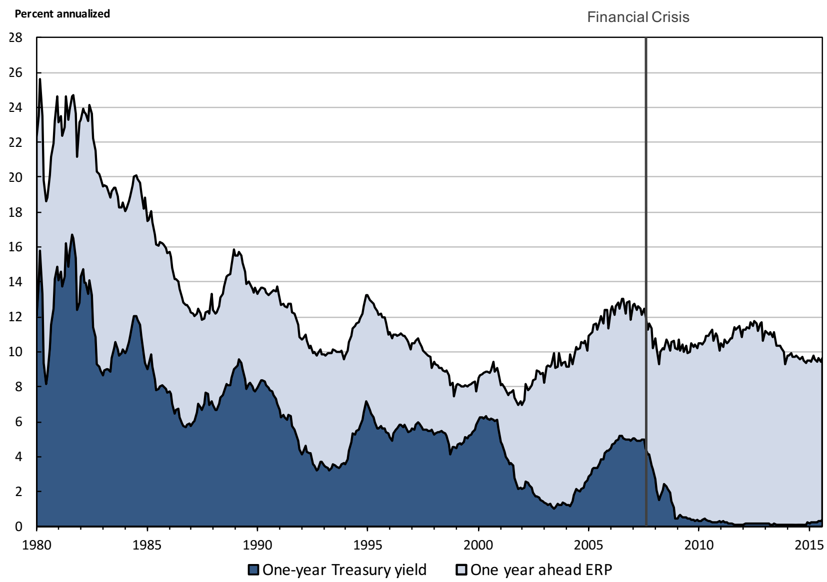
U.S. MPK



U.S. Interest Rate and Equity Dividend Yield



U.S. Interest Rate and Equity Risk Premium



Source: one-year Treasury yield: Federal Reserve H.15; ERP: Duarte & Rosa (2015).

Safe Assets and Global Safe Asset Shortages

- Endogenous risk premia
- Links reserve currency paradox and exorbitant privilege
- Can have ZLB in one country but not other ($\neq$ real interest rates)
- Policy:
  - QE issue debt/purchase risky (not safe!) assets (positive sum)
  - support private securitization capacity (positive sum)
  - forward guidance (reduced effectiveness)

Safe Assets: Shocks and Preferences

- Disaster shock /w Poisson rate $\lambda \to 0$: output drops $\mu < 1$
- Set $d = d^* = 0$ and $\delta = \delta^*$
- Fraction α 'Knightians' (infinitely risk averse), $1 - \alpha$ Risk Neutral.
- Knightians have *full* home bias.
- Neutrals have *'some'* home bias

Safe Assets: Securitization & Tranching

- Fraction $\phi < 1$ of H dividend tranched and recombined.:
  - Poisson puts (pay nothing until Poisson shock)
  - Poisson calls (pay only until the Poisson shock)
- Knightians invest in safe assets combining puts and calls
- Neutrals invest in the rest
- Constrained regime: safe assets are scarce & Knightians price safe assets at the margin (safety premium).

Modified UIP and Risk Premia

- Fix exchange rate immediately after the shock E^+
- No-arbitrage requires:

$$\frac{r^w - r^K}{r^w - r^{K*}} = \frac{E}{E^+}$$

- modified UIP equation: the country with a high safety premium ($r^K < r^{K*}$) has a currency that will appreciate when the shock occurs ($E > E^+$).
- Reserve Currency Paradox: if Home's currency is expected to appreciate in bad times ($E > E^+$), then $r^K < r^{K*}$ and Home is more likely to experience a liquidity trap
- if $\phi > \phi^*$ then $NFA/X < 0$: exorbitant privilege.
- Metzler diagram in safe assets

Conclusion

- traps in one country propagate to other countries
- in the benchmark model, trap is global or not at all
- the relative size of traps is controlled by the exchange rate. Powerful beggar-thy-neighbor effects
- 'Metzler diagram in quantities' links global imbalances to relative traps
- general result: reserve countries suffer a disproportionate share of the trap (the paradox of the reserve currency)