A Global Safe Asset *for & from* Emerging Market Economies

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Central Bank of Chile Conference

Santiago de Chile, 16. Nov. 2017

Motivation – 3 Stylized Facts

1. Carry trade activities by
   - EME corporations and households
2. Flight-to-safety cross-border capital flows
3. Official reserve holdings

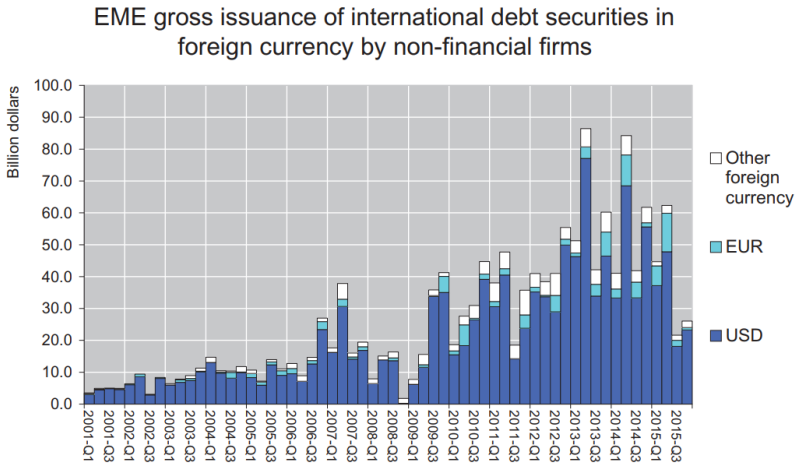
…

Global Financial Architecture

“from buffering approach to rechanneling approach”

Carry Trades

- EME corporate treasuries borrow in Dollars



Bruno & Shin 2016

Carry Trades

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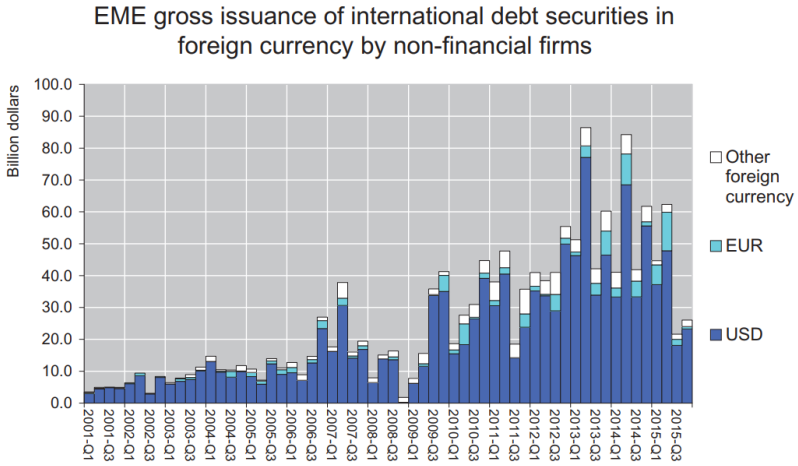
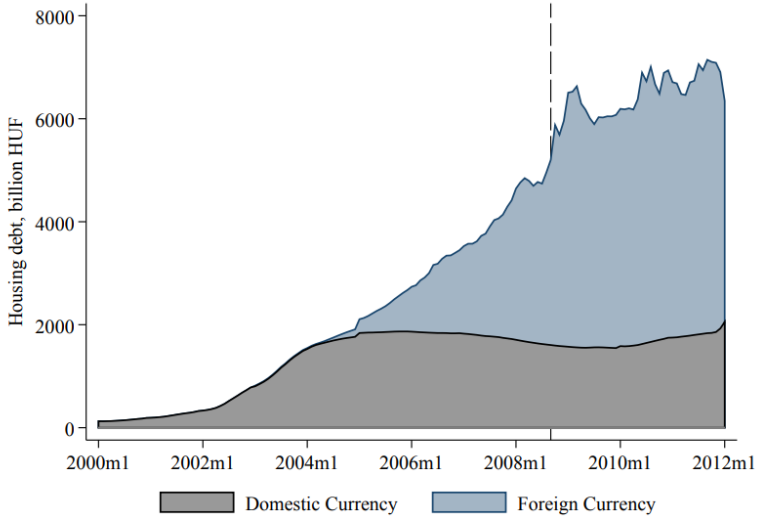


- Hungarian/Polish households borrow in Euros/Swiss Franc

Bruno & Shin 2016



(b) Housing debt in domestic and foreign currency

Verner 2017

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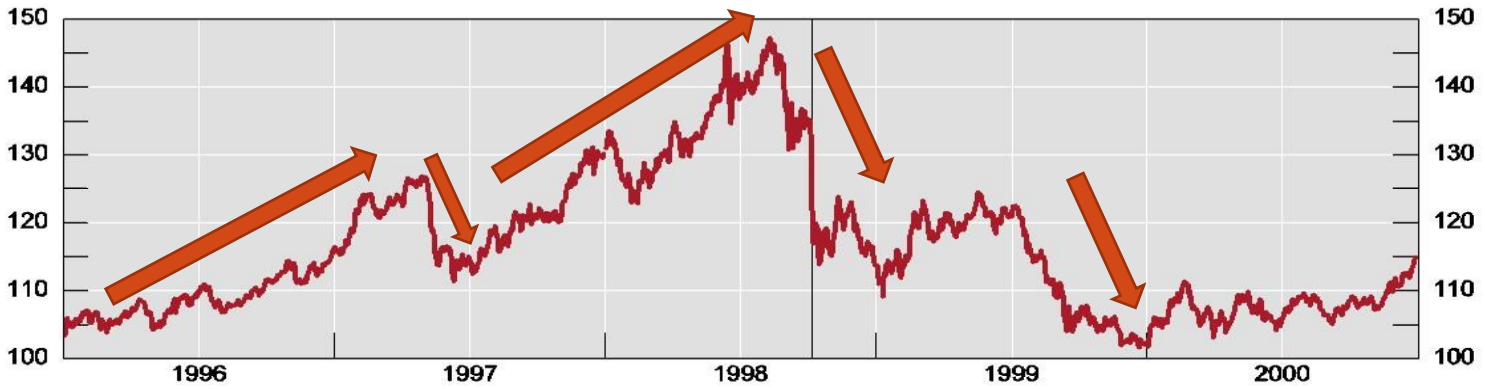
Carry Trades

- EME corporate treasuries borrow in Dollars
- Hungarian/Polish households borrow in Euros/Swiss Franc

- Sudden Stops:
  Carry Trade skewness – "up the stairs, down the lift"
  - Brunnermeier, Nagel & Pedersen 2012



Flight to Safety

- Risk-on, Risk-off Flight to safe asset

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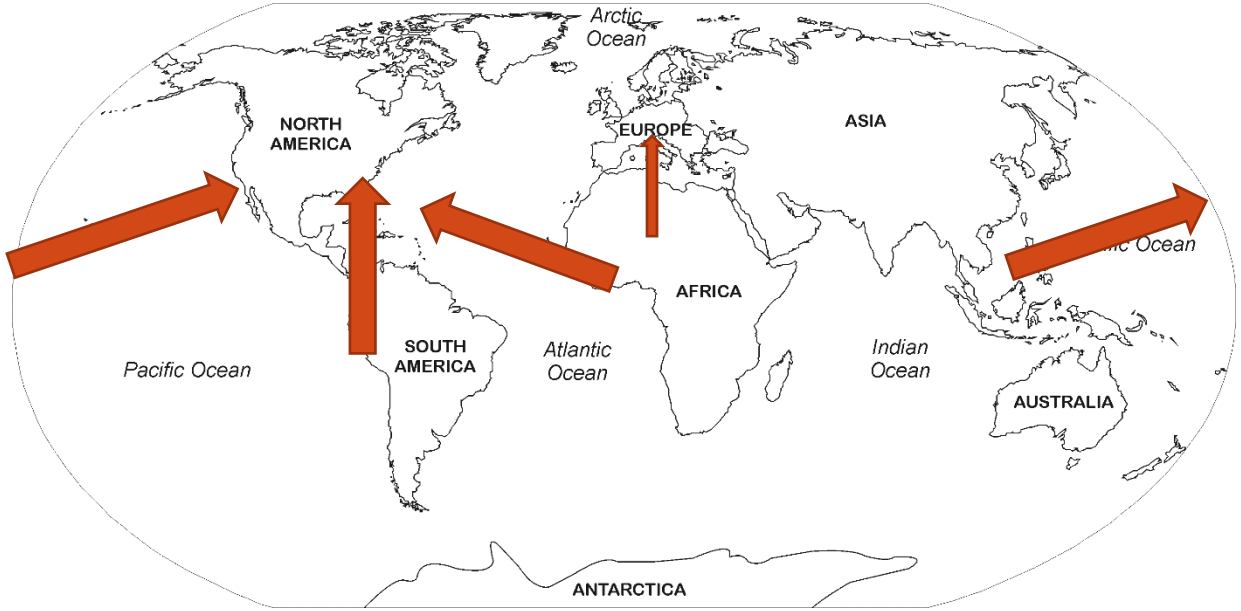
- If *asymmetrically supplied* by AE

  Flight to safety ➡ cross-border capital flows



Flight to Safety

- Risk-on, Risk-off Flight to safe asset

- If *asymmetrically supplied* by AE

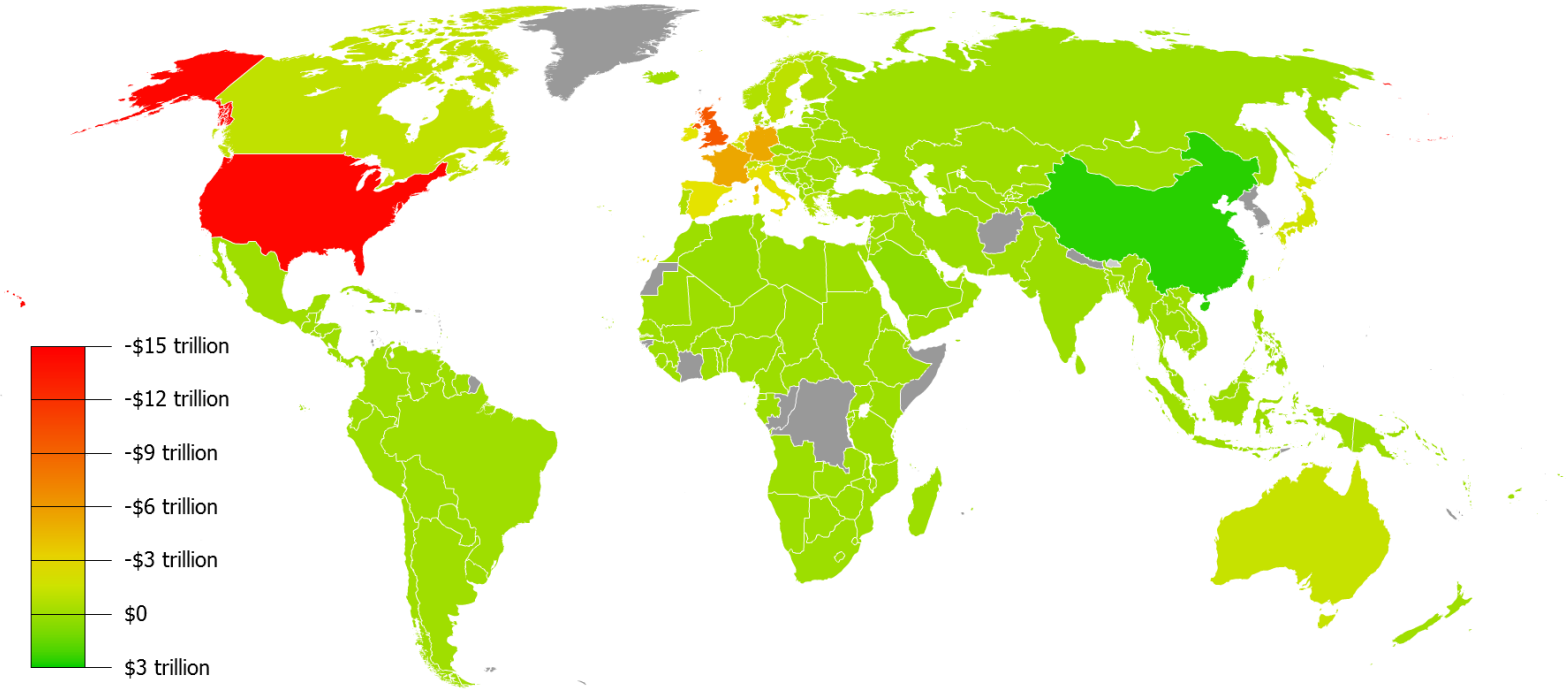
  Flight to safety ➡ cross-border capital flows

- At times of global crisis, issuance of new debt
  - For AE at inflated prices eases conditions
  - For EME at depressed prices worsens conditions

- Question: Who insures whom? (rich the poor OR poor the rich?)
  - Correct insurance only if
    buffer is large (and debt long-term) enough
    so that no new debt issuance needed & sale off safe asset

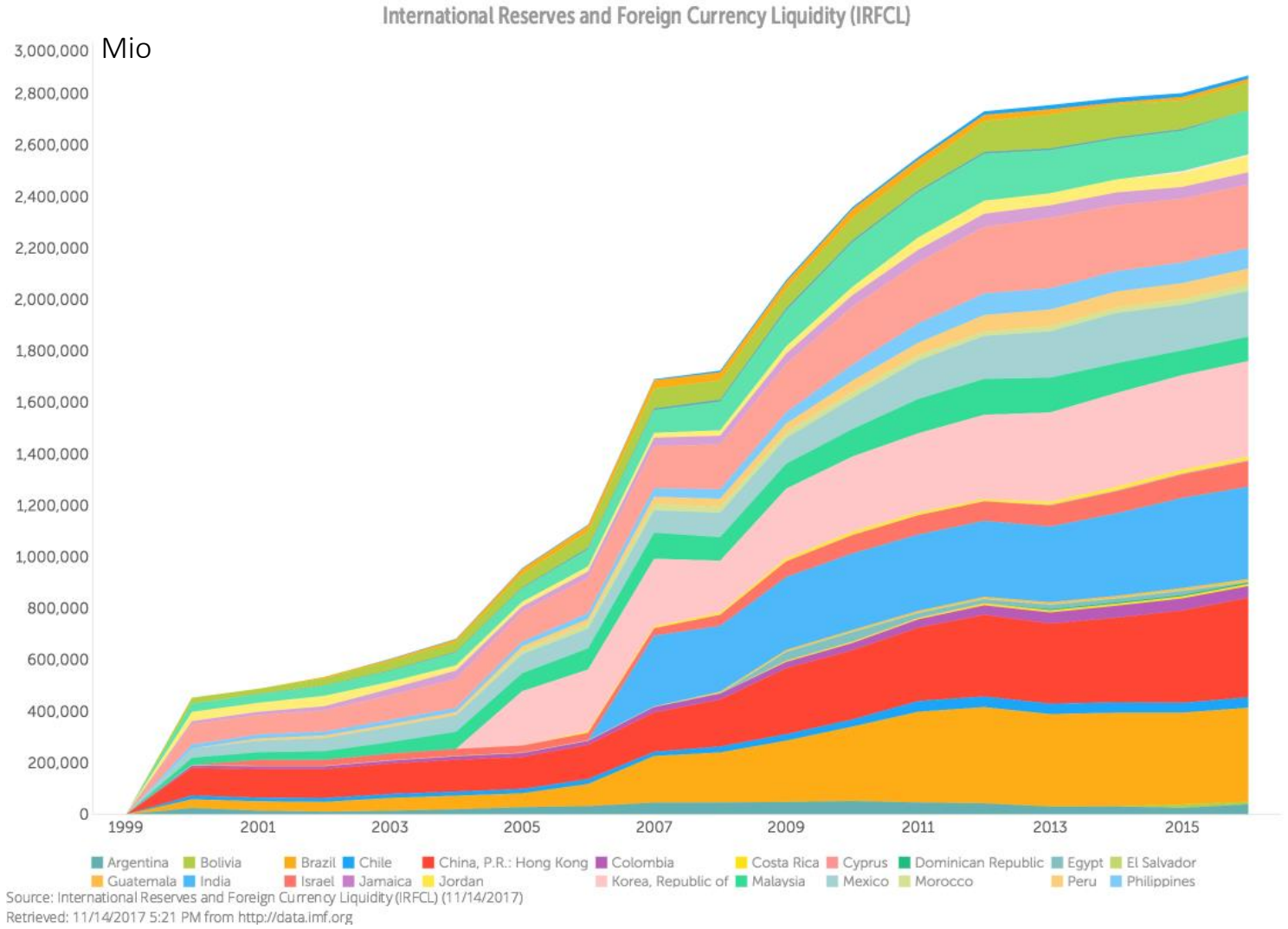
Official Reserves

- Sudden Stop
- South East Asia crisis ⇒ precautionary reserves



Source: Kieran (Wikipedia)
CIA World Factbook data 2011

Official Reserves (without China)



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"Buffer Approach"

- Precautionary Reserves

- Subsidizing carry trades

- IMF liquidity lines
- Central Swap line arrangements

Lean against Sudden Stop outflows

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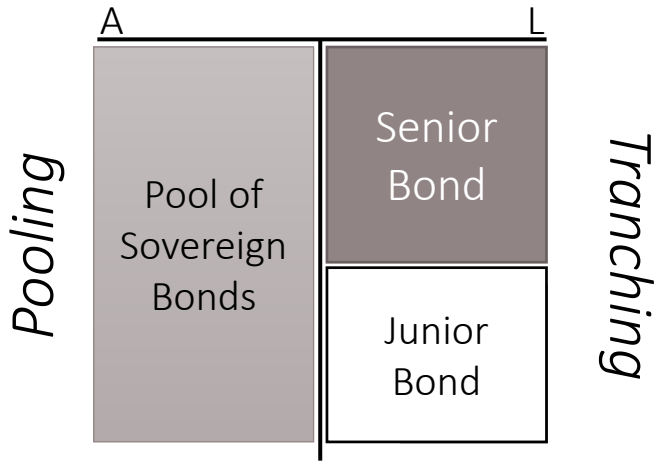
“Rechanneling Approach”

- Root cause: safe asset is supplied asymmetrically

"Rechanneling Approach"

- Root cause: safe asset is supplied asymmetrically

- Create globally supplied safe asset via pooling & tranching



Rechannel:
Instead of cross-border
Across asset classes

- Expand ESBies idea for euro area to EME:
  "SBBS (Sovereign-Bond Backed Securities) for the world"
  Euro-nomics group 2011, 2016, 2017 (including Ricardo Reis)

Overview

- Motivation
- What's a safe asset?
- Model
  - Autarky
  - Reserves and FX carry trades
- Sudden stop
  - Sufficient reserves to deter sudden stops
  - Insufficient reserves
    - Unanticipated sudden stops
    - Anticipated sudden stops
- Global Safe Asset from & for Emerging Market Economies

Safe assets

- “Good friend analogy” - like reserve assets

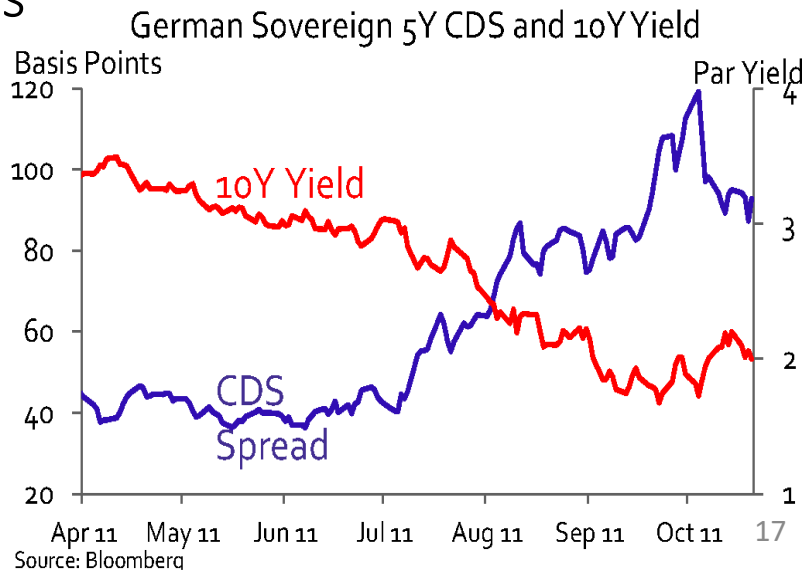
- “Safe asset tautology”

Safe assets

- "Good friend analogy" - like reserve assets
  - Safe/available at any horizon - "when it counts"
  - Precautionary buffer
    - held in addition to more risky assets
    - Risk ↑ ⇒ demand for safe assets ↑

Safe assets

- "Good friend analogy" - like reserve assets
  - Safe/available at any horizon - "when it counts"
  - Precautionary buffer
    - held in addition to more risky assets
    - Risk ↑ ⇒ demand for safe assets ↑
- "Safe asset tautology"
  - Safe because it is "perceived to be safe"
  - Safe independent of fundamentals
    - US Treasuries downgrade by S&P in 2011 ⇒ yield ↓
    - German CDS spread ↑ ⇒ yield ↓ during Euro crisis
  - Multiple equilibria
  - Bubble



Overview

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- What's a safe asset?
- Model
  - Autarky
  - Add reserve holdings and FX carry trades
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Baseline model – autarky -

- Each household can only operate one firm
  - Physical capital

$$\frac{dk_t^i}{k_t^i} = \Phi\left(\iota_t^i\right)dt + \tilde{\sigma}d\tilde{Z}_t^i$$

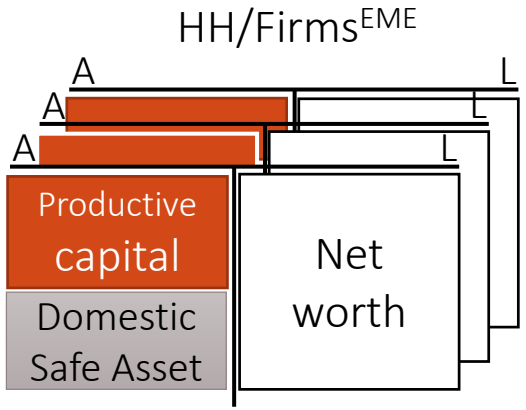
  - Output

$$y_t^i = Ak_t^i$$

of which $\iota_t^i k_t^i$ is used to produce new physical capital

Baseline model of "The I Theory of Money"

- Demand for safe asset



Stationary Equilibrium

- qK_t value of physical capital
  - $dr^{k,i} = \frac{A-\iota}{q}dt + \Phi\left(\iota^i\right)dt + \tilde{\sigma}d\tilde{Z}_t^i$
- pK_t value of safe asset (absent inflation)
  - $dr^D = \underbrace{\Phi(\iota)}_{g}\,dt$

Optimality (=) for $E\left[\int_0^\infty e^{-\rho t} \log c_t^i \, dt\right]$

- Investment rate, ι^i
- Portfolio choice, $x^{k,i}$
- Consumption, c^i

Optimality (=)

- Investment rate, ι^i
  - Tobin's q: $\Phi'(\iota) = \frac{1}{q}$ (static problem)
    - For $\Phi(\iota) = \iota^0 + \frac{1}{\kappa}\log(\kappa(\iota - \iota^0) + 1) \Rightarrow \iota = \iota^0 + \frac{1}{\kappa}(q - 1)$
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  - $E[dr^K - dr^D]/dt = Cov[dr^k - dr^D, \underbrace{\frac{dn_t}{n_t}}_{dr^K + x^{k,i}(dr^k - dr^D)}] = x^{k,i}(\tilde{\sigma})^2$

$$x^{k,i} = \frac{E[dr^K - dr^D]/dt}{(\tilde{\sigma})^2} = \frac{(A-\iota)/q}{(\tilde{\sigma})^2}$$

  - Dividend yield on capital must be ρ
- Consumption, c^i

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- Consumption, c^i
  - Demand $\rho N_t = \rho(q+p)K_t$

Optimality (=) & market clearing (=)

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Capital market clearing

  - Dividend yield on capital must be ρ
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Capital market clearing

  - Dividend yield on capital must be ρ
- Consumption, c^i

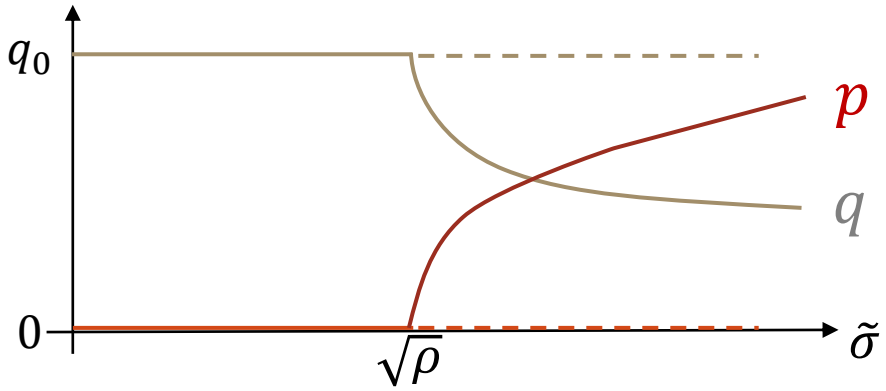
Output market clearing

  - Demand $\rho N_t = \rho(q+p)K_t = (A-\iota)K_t$ Supply

$$q = \underbrace{\left(\frac{q}{q+p}\right)}_{=x^{k,i}}(A-\iota)/\rho$$

Equilibrium

Equilibrium w/o Safe Asset	Safe Asset equilibrium
$p_0 = 0$	$p = \frac{\tilde{\sigma} - \sqrt{\rho}}{\sqrt{\rho}} q$
$q_0 = \frac{\kappa(A - \iota^0) + 1}{\kappa\rho + 1}$	$q = \frac{\kappa(A - \iota^0) + 1}{\kappa\sqrt{\rho}\tilde{\sigma} + 1}$



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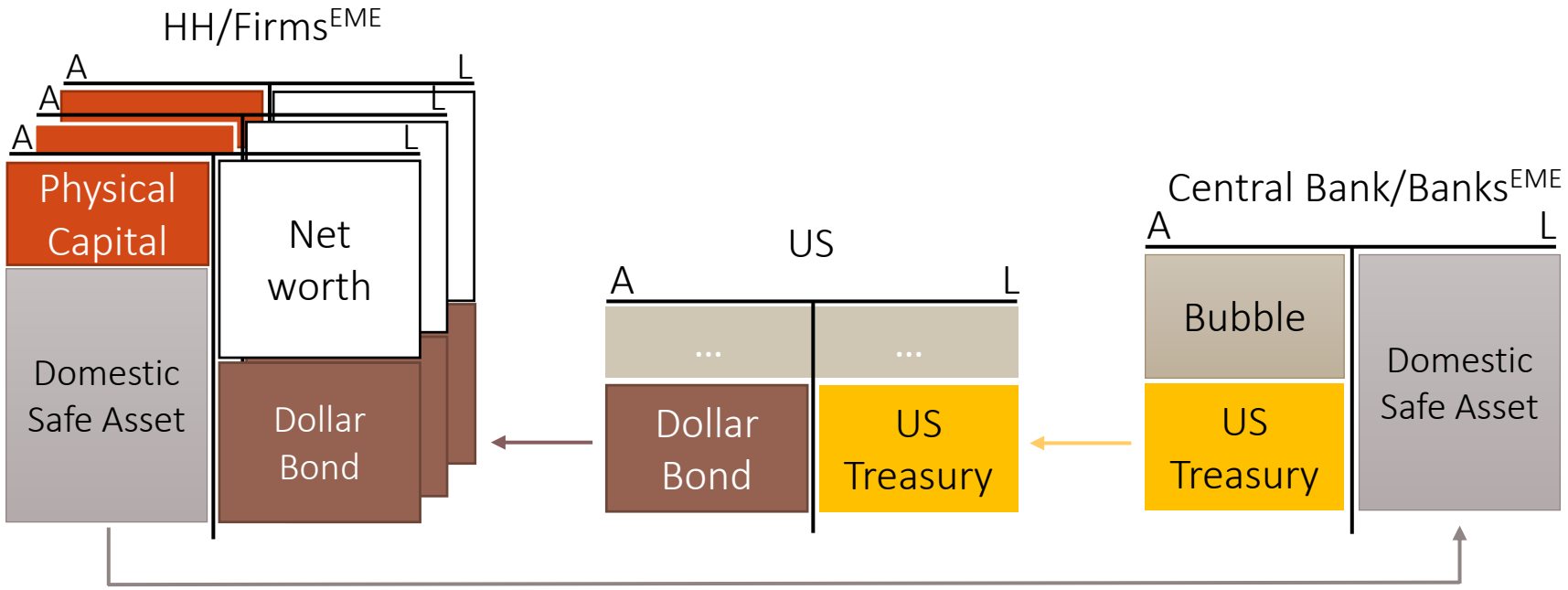
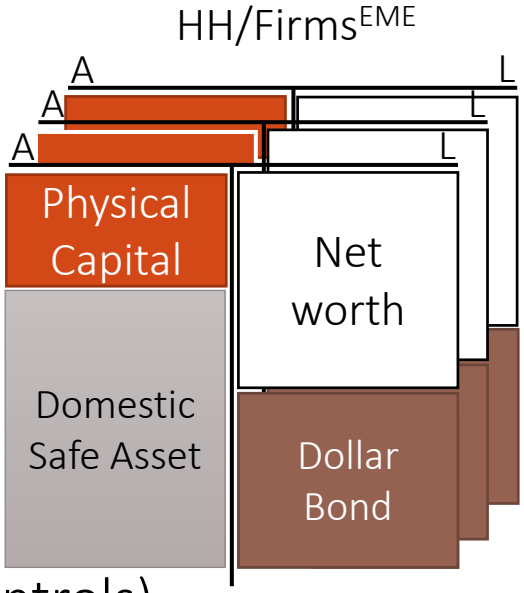
Our global economy



- Later we will have many EMEs

EME Firms/Households



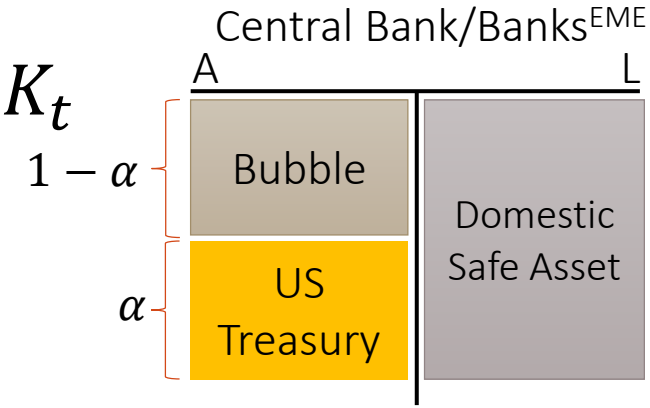
- Portfolio choice includes carry trades
  - $x^{k,i}$
  - $x^{D,i}$
  - $x^{\$,i} < 0$ … negative since borrowing at rate $\bar{r}^{\$}$
- Carry trades, since $r^D = \Phi(\iota) > \bar{r}^{\$}$
  - Limited by \$-borrowing constraint (capital controls)

$$B_t^{\$,i} \geq -\phi q k_t^i = -\phi n_t^i x^{k,i}$$

  - $x^{\$,i} = -\phi x^{k,i}$
- Capital holdings
  - $E[dr^k + \underbrace{\phi(r^D - \bar{r}^{\$})}_{\text{collateral boost}} - dr^D] = Cov[dr^k - dr^D, \frac{dn_t^i}{n_t^i}]$
  - $\frac{dn_t^i}{n_t^i} = x^{k,i} dr^k + \left(1 - x^{k,i} - x^{\$,i}\right) dr^D + x^{\$,i} \bar{r}^{\$} dt - \frac{c_t^i}{n_t^i} dt$
  - $x^{k,i} = \frac{1}{\tilde{\sigma}^2}\left(\frac{A-\iota}{q} + \Phi(\iota) - r^D + \phi(r^D - \bar{r}^{\$}\right)$

EME Central Bank and Banks

$$B_t + FX_t = D_t = pK_t$$



- Bubble grows $dB_t = B_t \Phi(\iota) dt$

- FX_t US Treasuries
  earn a real interest rate of $\underline{r}^{\$}$

$$dFX_t = \underline{r}^{\$} FX_t dt + \Delta FX_t$$

Newly acquired US Treasuries

- Domestic Safe Asset rate

$$\underline{r}^{\$} FX_t dt + B_t \Phi(\iota) dt - r^D pK_t dt = T dt$$

  - set aggregate transfer $T dt = 0$
  - $\Rightarrow \quad r^D = \alpha \underline{r}^{\$} + (1 - \alpha)\Phi(\iota)$

Market Clearing – on balance growth path

- Balanced growth path: $\frac{dD_t}{D_t} = \frac{dB_t^{\$}}{B_t^{\$}} = \frac{dK_t}{K_t} = \Phi(\iota)dt$
- Goods market

$$\rho N_t = (A - \iota)K_t - \left(\frac{dD_t}{D_t} - r^D D_t\right) - \left(\frac{dB_t}{B_t} - \bar{r}^{\$} B_t^{\$}\right)$$

$$\rho\left(q + p + b^{\$}\right) = A - \iota - \left(\Phi(\iota) - r^D\right)p - \left(\Phi(\iota) - \bar{r}^{\$}\right)b^{\$}$$

- Capital market

$$q = \left(q + p + b^{\$}\right)x^k$$

- Safe asset market

$$p = \left(q + p + b^{\$}\right)(1 - x^k - x^{\$})$$

- US dollar (debt) market clears by Walras' Law

Equilibrium effects

$$q = \frac{A - \iota}{\tilde{\sigma}\sqrt{\rho + \Phi(\iota) - r^D} - (\Phi(\iota) - r^D) - \phi(r^D - \bar{r}^{\$})},$$

$$\iota = \iota^0 + \frac{1}{\kappa}(q - 1),$$

$$r^D = \alpha \underline{r}^{\$} + (1 - \alpha)\Phi(\iota)$$

$$x^k = \frac{1}{\tilde{\sigma}^2}\left(\frac{A - \iota}{q} + \Phi(\iota) - r^D + \phi(r^D - \bar{r}^{\$}\right)$$

$$p = \frac{1 - x^k}{x^k} q.$$

- Two effects of reserves holdings
  - Reserves upkeep effect
    Reserves only grow at $\underline{r}^{\$}$ ⇒ have to constantly buy US Treasuries ⇒ $q \downarrow$
  - Portfolio rebalancing effect
    Holdings of domestic safe asset is less attractive compared to capital ⇒ $q \uparrow$
- Effects of carry trades
  - As capital serves as collateral, it is attractive ⇒ $q \uparrow$
  - Requires larger reserves (α) ⇒ above two effects

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Sudden Stop with high reserves

- Sun-spot which potentially triggers U.S. investors not to fund anymore
- Threshold depends on maturity structure of $ corporate bonds
  - Conservative: very short-term corporate bonds

- Proposition: With sufficient reserves,

$$\alpha p K_t \geq B_t^{\$} \iff \alpha p(\alpha) \geq b^{\$}(\alpha),$$

self-fulfilling suddens stops do not occur

Sudden Stops with insufficient reserves

- Public reserves are used up. Hence, $\alpha^{+} = 0$
- Jump of the exchange rate

- New steady state

Sudden Stops with insufficient reserves

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- Jump of the exchange rate by

Peso held by US investors

$$j^e = \frac{D_t^+ + (-B_t^{\$} - \alpha D_t)}{D_t} = \frac{p^+ - b^{\$}}{p} - \alpha$$

- New steady state is

$$q^+ = \frac{A - \iota^+}{\tilde{\sigma}\sqrt{\rho + \Phi(\iota) - r^D} - (\Phi(\iota) - r^D) - \phi(r^D - \bar{r}^{\$})},$$

$$\iota = \iota^0 + \frac{1}{\kappa}(q^+ - 1),$$

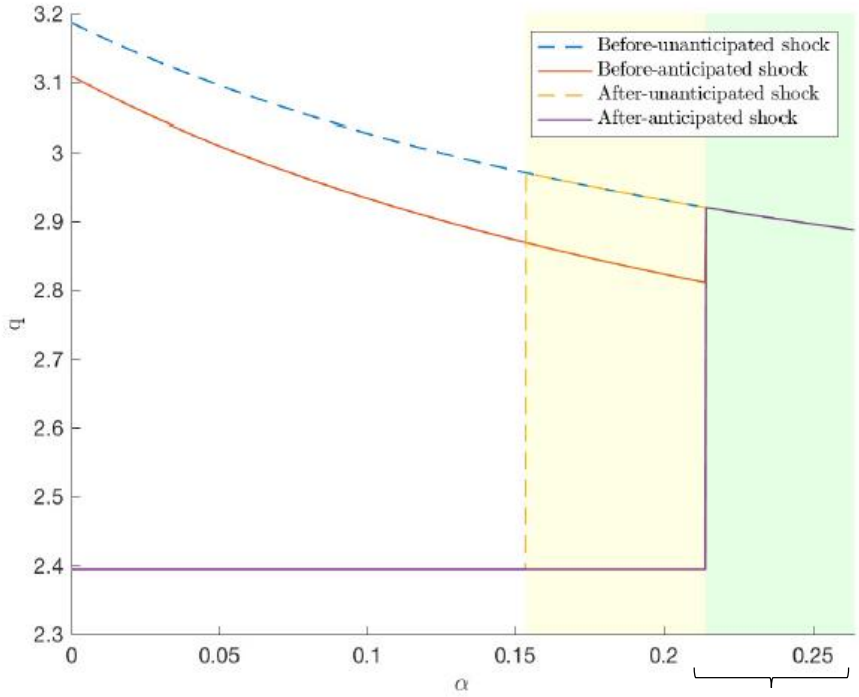
$$r^D = \alpha r^{\$} + (1 - \alpha)\Phi(\iota),$$

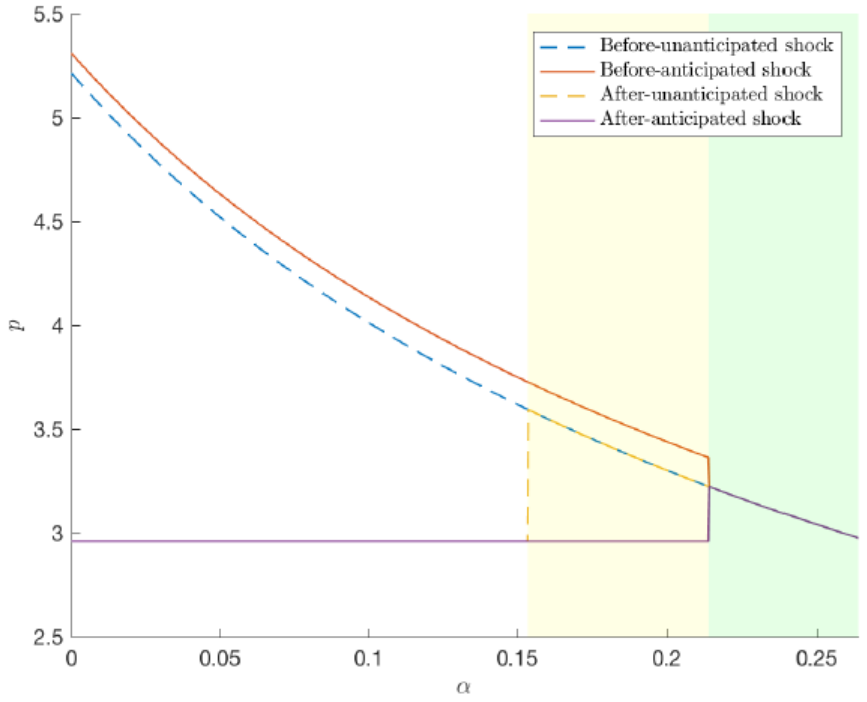
$$x^{k,+} = \frac{\sqrt{\rho}}{\tilde{\sigma}},$$

$$p^+ = \left(\frac{\tilde{\sigma}}{\sqrt{\rho}} - 1\right)\frac{A - \iota^+}{\tilde{\sigma}\sqrt{\rho}}.$$

Unanticipated vs. Anticipated Sudden Stop

- λ = arrival rate of sunspots ⇒ potential jump





Smaller α^+ afterwards

Figure 4: Capital price before and after crisis

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Unanticipated vs. Anticipated Sudden Stop

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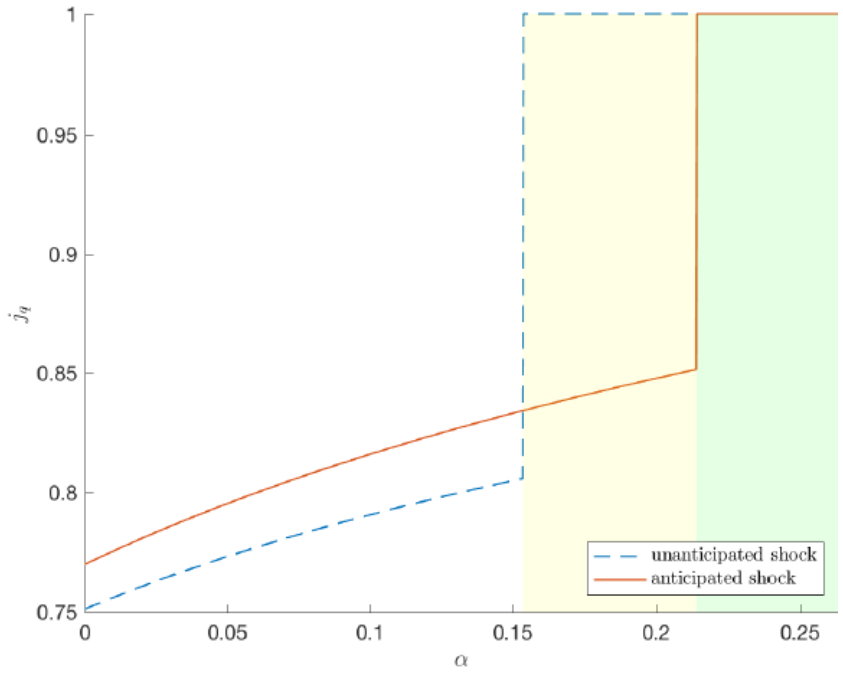
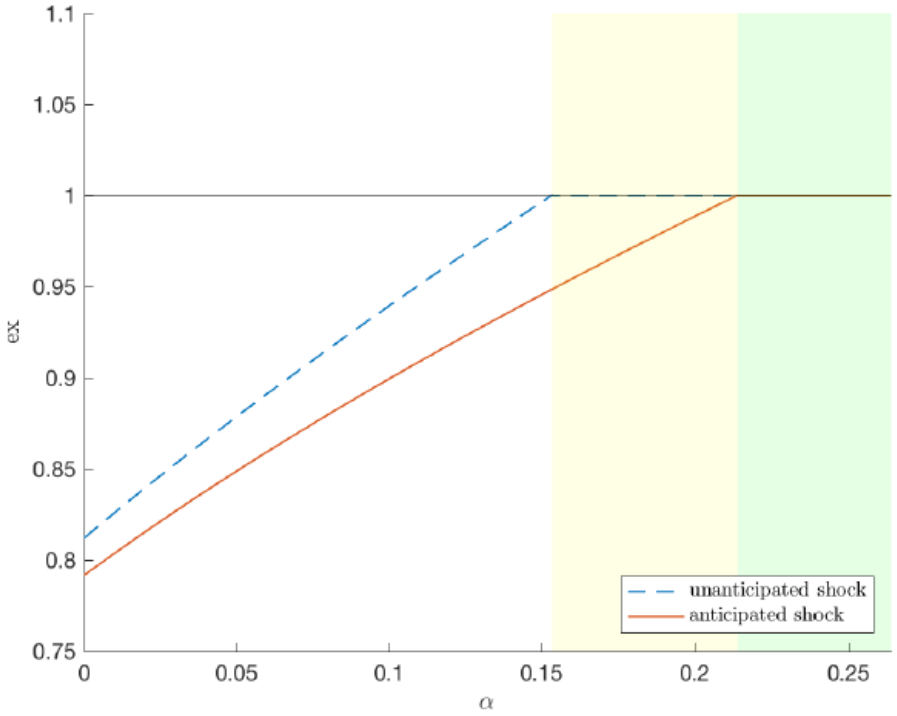


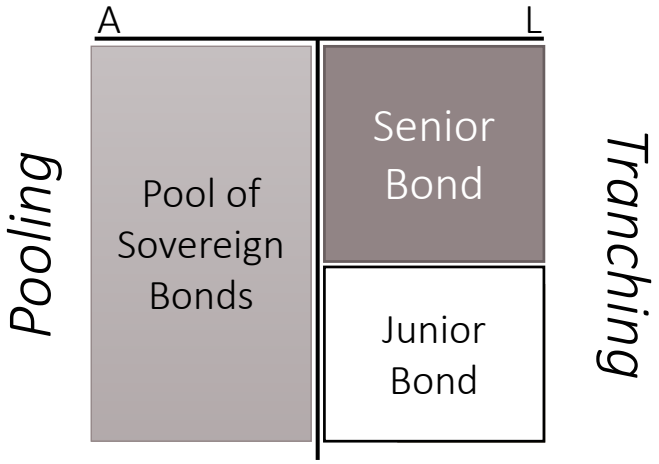
Jump down in capital price q



Jump down in exchange rate

Global Safe Asset

- Many emerging market economies
- Sunspots have potential to trigger systemic sudden stop
  - For Δ fraction of EMEs



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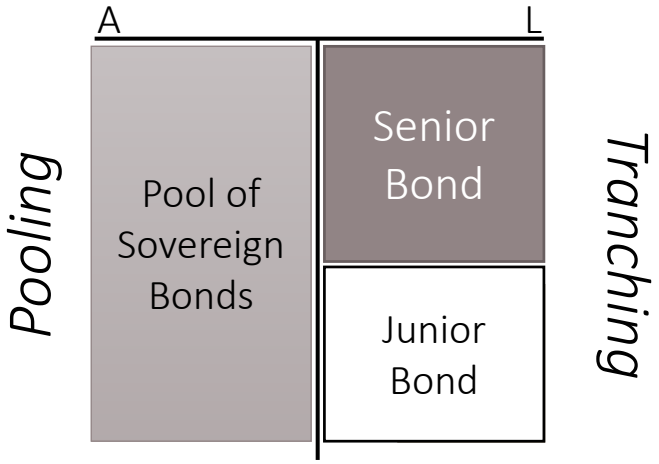

Junior bond has to absorb potential exchange rate risk

Global Safe Asset

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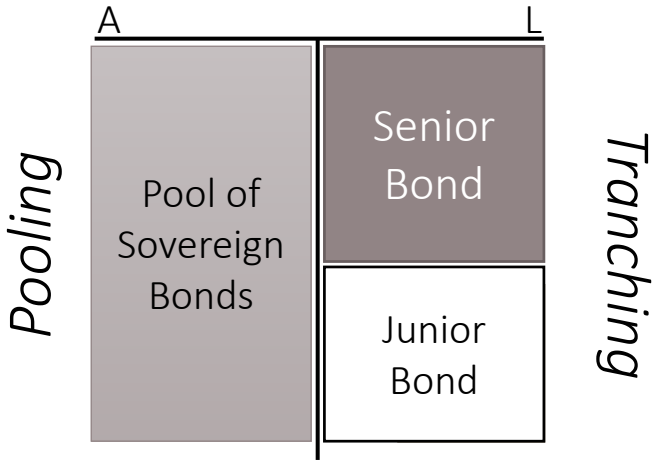

Junior Bond is also default free (no Sudden Stop)

- $r^{senior} = r^{junior} = \Phi(\iota_{GSA})$
- $q_{GSA} = \frac{A - \iota_{GSA}}{\tilde{\sigma}\sqrt{\rho} - \phi(\Phi(\iota_{GSA}) - \bar{r}^{\$})}$
- $\iota_{GSA} = \iota^0 + \frac{1}{\kappa}(q_{GSA} - 1)$
- $r^D_{GSA} = \Phi(\iota_{GSA})$

Global Safe Asset *from & for* EME

1. Carry trade activities by
   - EME corporations and
   - households
2. Flight Safety cross-border capital flows
3. Official reserve holdings

- Distorts World Economy
  - ⇒ lower growth
  - ⇒ favors citizens who have ability to do carry trade (redistributional aspects)
- "Rechannelling" Approach instead of "Buffer Approach" (Reserves, IMF, swap lines)
- Solution for root cause