Unequal Decoupling

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- **Many dimensions of cross-country heterogeneity**
  - *Inequality Within Countries*: income, wealth, income risk
  - *Economic Significance*: population, technology, external assets

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  - **Heterogeneous welfare effects** both across and within countries
- **Rich transition dynamics:**
  - Welfare effects differ from simple steady-state comparison
  - **Transition path matters** for the shape of welfare gains and losses

Outline for the Rest of the Talk

- **World, Heterogeneous-Agent Model**: General equilibrium across N countries
- **Calibration**: Matching income and wealth distributions across countries
- **Steady State Impact**: Effects of global fragmentation in the long run
- **Transition Dynamics**: Gradual closure and welfare implications
- **Welfare**: Winners and losers across and within countries

World Heterogeneous-Agent Model Overview

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- **Firms:**
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- **Market clearing:**
  - Homogeneous output good traded internationally
  - Aggregate world saving equals aggregate capital stock

▸ More Model Details in Appendix

Calibration: Income Process

- **Log-income**: persistent and transitory components of labor endowment $e_{i,j,t}$

$$\log(e_{i,j,t}) = z_{i,j,t} + \varepsilon_{i,j,t}$$

- **Transitory shock:**

$$\varepsilon_{i,j,t} \sim \mathcal{N}(0, \sigma_\varepsilon^2)$$

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- **Gaussian mixture** shock $\eta_{i,j,t}$

$$\eta_{i,j,t} \sim \begin{cases} \mathcal{N}(\mu_{\eta 1}, \sigma_{\eta 1}^2) & \text{w.p. } \theta \\ \mathcal{N}(\mu_{\eta 2}, \sigma_{\eta 2}^2) & \text{w.p. } 1-\theta \end{cases}$$

  - Higher-order income risk: variance, skewness, kurtosis

Calibration: Income Process, Parameters and Targets

- **Six parameters** that we calibrate for each country:

$$[\mu_{\eta 1}, \sigma_{\eta 1}, \sigma_{\eta 2}, \theta, \rho, \sigma_{\varepsilon}]$$

  - $\mu_{\eta 1}, \mu_{\eta 2}$, $\sigma_{\eta 1}, \sigma_{\eta 2}$: Means and variances of the frequent/rare persistent shock
  - θ: Probability of drawing frequent shock η_1
  - ρ: Persistence of the permanent component
  - σ_{ε}: Variance of transitory shock

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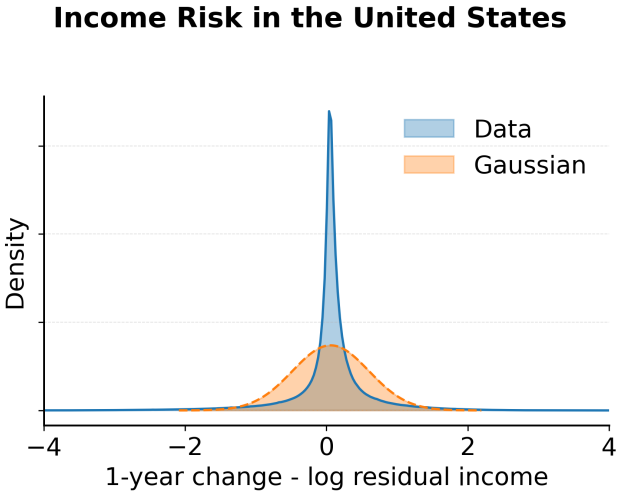
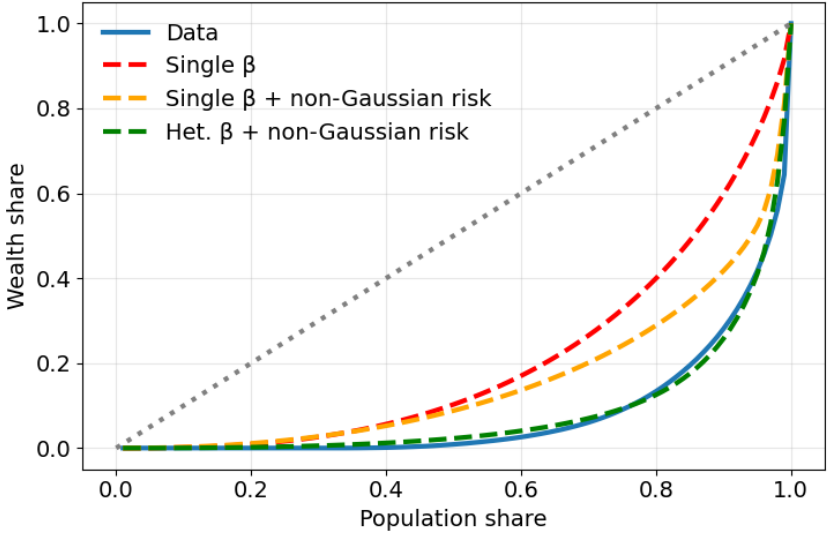
- **Macro parameters** ▸ Macro calibration
  - Country-specific $\bar{\beta}_j, \alpha_j, Z_j$, country size to match NFA positions, capital–output ratios, GDP shares, and normalize per-capita output
  - Standard real interest rate, depreciation, risk aversion

US Income Process: Data vs Gaussian



Non-Gaussian Income and the Wealth Distribution - United States



US-Exit Fragmentation Shock Steady-State Comparison

Global Fragmentation Shock: US-Exit

- **US-Exit Shock:** The U.S. reduce their (negative) Net Foreign Asset position to zero
  - A tax on U.S. residents' foreign borrowing induces this fragmentation
  - Alternative: U.S. defaulting on external liabilities??

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- Interest rate $r_{US} \uparrow$
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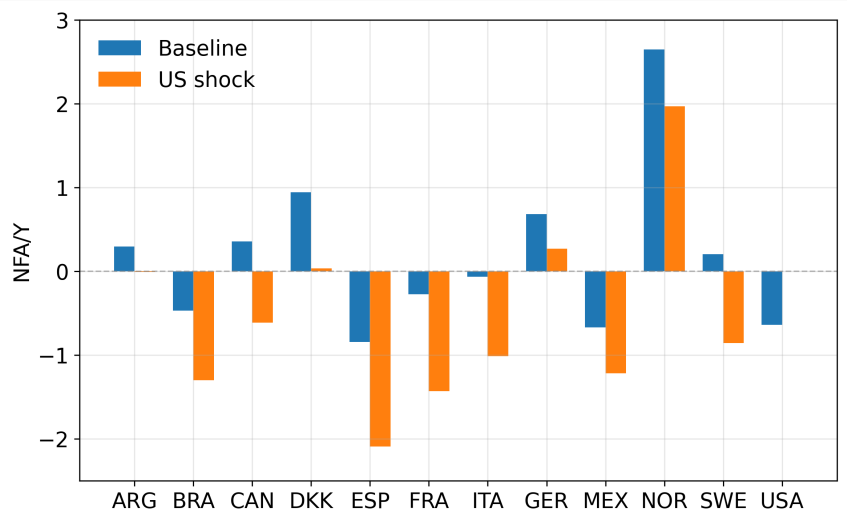
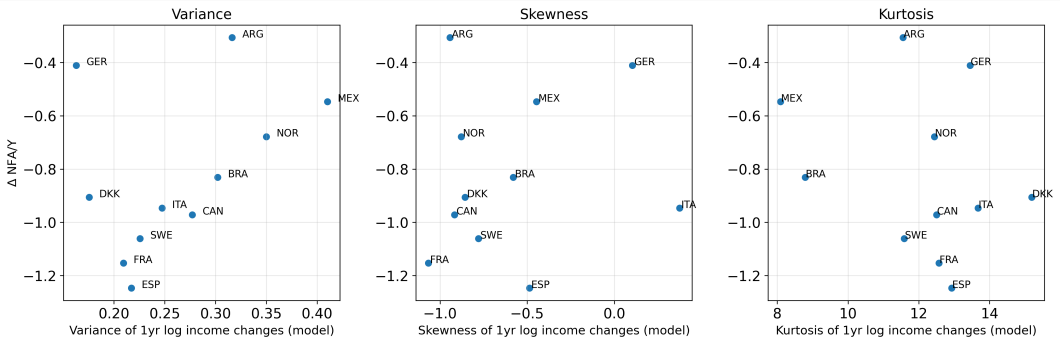
- **Next:** global distribution of NFAs, welfare across countries, and within countries

Distribution of NFAs after US-Exit



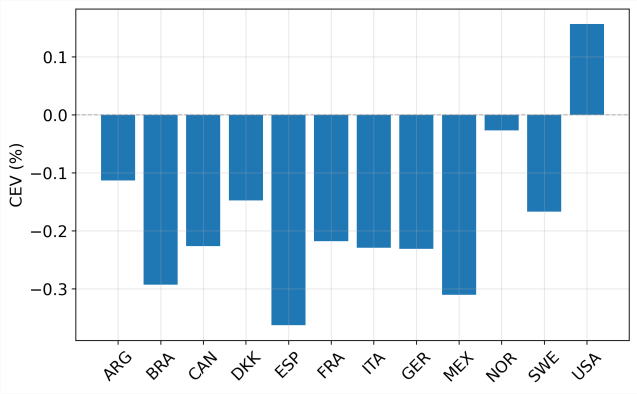
Distribution of NFAs after US-Exit – Why?

- **Elasticity of countries' NFA** to global interest rate is **linked to income risk**



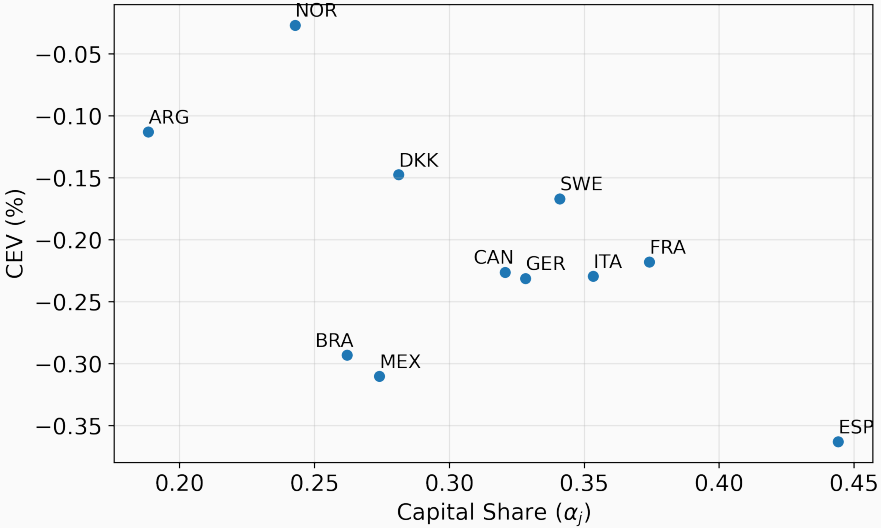
- Aggregate response of NFAs $\rightarrow$ **overall drop in world interest rate**

Welfare Across Countries - Consumption Equivalent

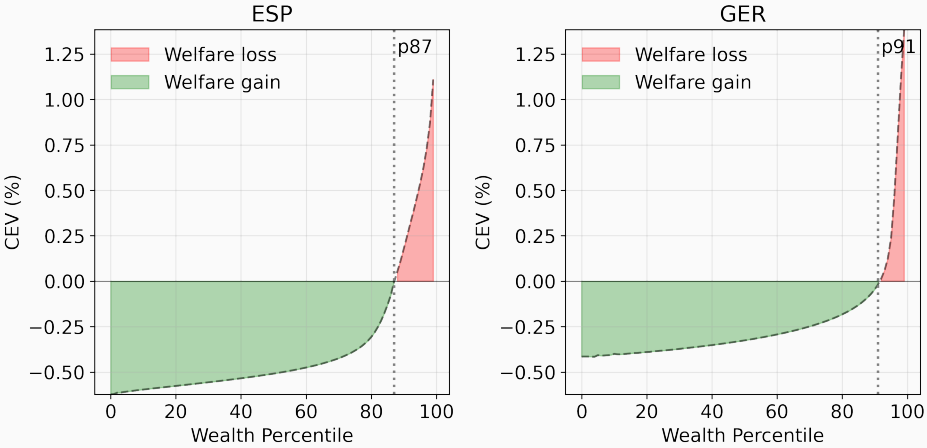


- Widespread welfare gains around the world ($CEV < 0$)
- Cheaper capital, higher output, wages
- Capital intensity α_j: key for strength of output response to fall in interest rate

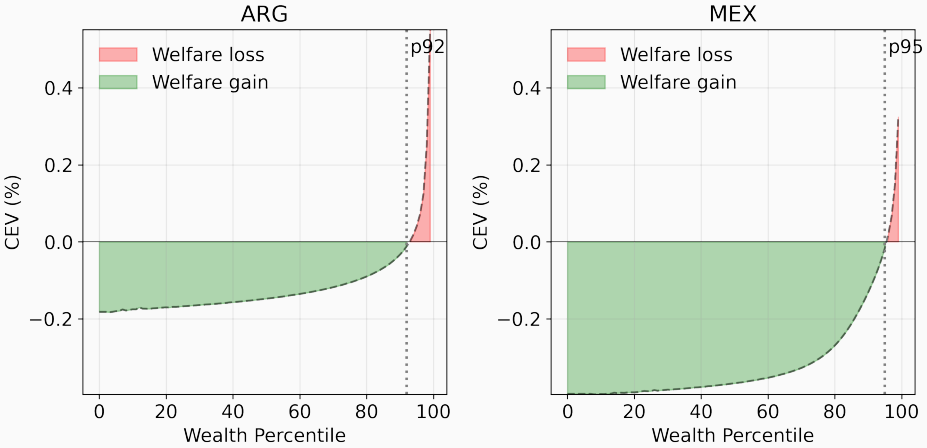
Capital Intensity and Welfare Across Countries



Welfare Within Countries: Spain - Germany



Welfare Within Countries: Argentina - Mexico



US-Exit Fragmentation Shock Transition

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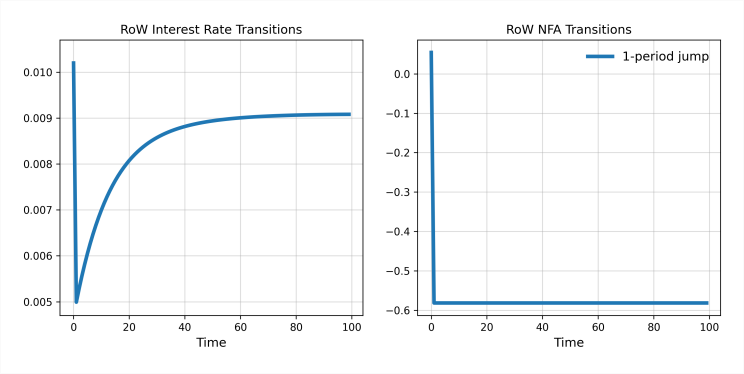
- World interest-rate dynamics closely track the NFA path

Interest Rate Paths and NFA Transitions

- **One-period shock:** interest rate collapses.



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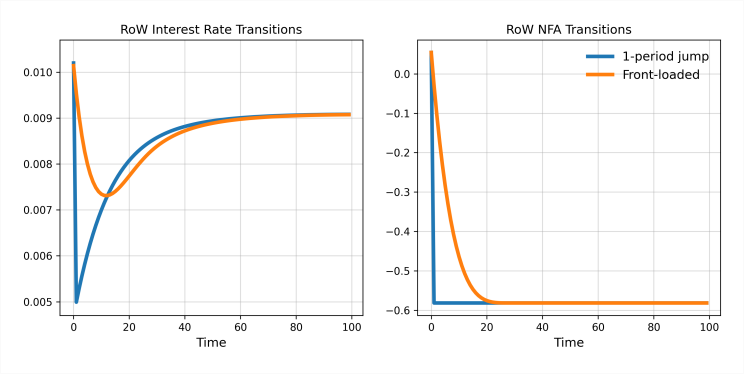

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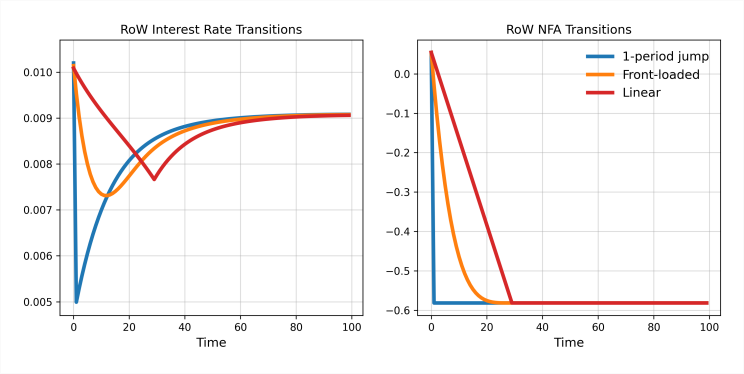

Interest Rate Paths and NFA Transitions

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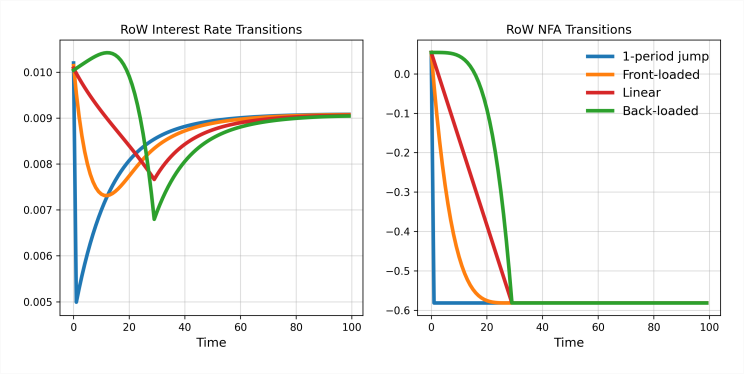
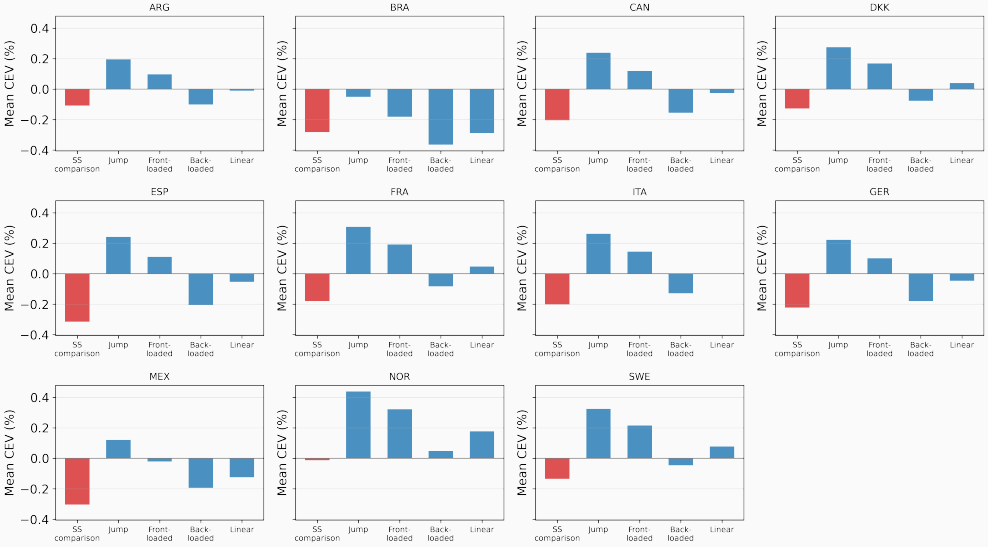
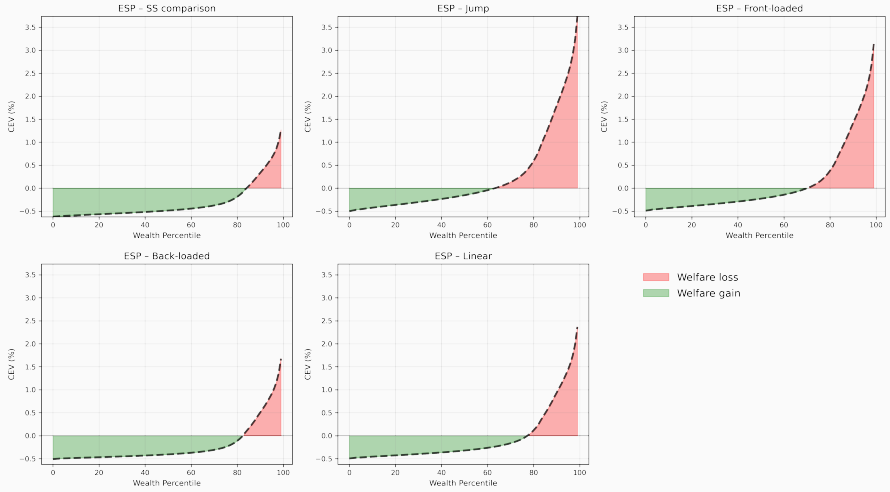
- **Back-loaded:** interest rate stays above steady state for 20 years.



Welfare Effects Depend on the Transition Path



Transition Welfare Within One Country - Spain



- Why such large losses? Big drop in $r_{ROW} \rightarrow$ Asset holders are worse-off

US-Exit Transition - Summing up

- The transition of the US from being a debtor to a financially closed economy can have a sizeable impact on the RoW welfare.
- RoW savers could lose a lot
- RoW workers are better off
- Specific deleveraging path matters.

Conclusion

- We build a novel (hopefully) exciting framework
- A shock in a big country can have sizable consequences in the RoW
  - Within and across country heterogeneity matters!
- We plan to
  - Use this framework to address other questions;
  - Enrich this framework with
    - Progressive taxation and after-tax income
    - Sectoral heterogeneity (trade shock)
    - New-Keynesian features (short-run dynamics)
  - ... open to suggestions and collaborations!

Thank you!

Appendix: Full Model Details

Households

- **Preferences**:

$$\max_{\{c_{i,j,t},a_{i,j,t+1}\}} \mathbb{E}_0 \sum_{t=0}^{\infty} \beta_{i,j}^t \frac{c_{i,j,t}^{1-\gamma}}{1-\gamma} \tag{1}$$

  - Ex-ante heterogeneity in time preferences: $\beta_{i,j}$

- **Budget and Borrowing Constraint**:

$$a_{i,j,t+1} + c_{i,j,t} = (1 + r_t)a_{i,j,t} + w_{j,t}e_{i,j,t} \tag{2}$$

$$a_{i,j,t+1} \geq 0 \tag{3}$$

  - Ex-post heterogeneity via labor endowment process $e_{i,j,t}$

- **Household Wealth**:
  - $a_{i,j,t}$ includes both capital and bond holdings Back to Model Overview

Production

- **Production Function:**

$$Y_{j,t} = F(Z_j, K_{j,t}, L_{j,t}) = Z_j K_{j,t}^{\alpha_j} L_{j,t}^{1-\alpha_j}$$

- **Representative Firm:**
  - Employs labor $L_{j,t}$ and pays wage $w_{j,t}$
  - Rents capital $K_{j,t}$ and pays rental rate $r_t^K = F_K(Z_j, K_{j,t}, L_{j,t})$

- **Return on Capital and on Bonds:**

$$r_t = r_t^K - \delta = \alpha_j \frac{Y_{j,t}}{K_{j,t}} - \delta$$

- **Aggregate Labor and Capital stock:**
  - Labor: $L_{j,t} = \mathbb{E}(e_{i,j,t}) = 1$
  - Capital accumulation: $K_{j,t+1} = (1-\delta)K_{j,t} + I_{j,t}$, where $I_{j,t}$= Investment

▸ Back to Model Overview

Equilibrium in the World Economy

- **Goods Market Clearing:**
  - Total consumption equals total output net of investment

$$\sum_j \omega_j \int_i c_{i,j,t}\, di = \sum_j \omega_j \left(Y_{j,t} - I_{j,t} \right)$$

  - ω_j denotes the relative size (mass) of country j

- **Asset Market Clearing:**

$$\sum_j \omega_j \int_i a_{i,j,t}\, di = \sum_j \omega_j K_{j,t}$$

▸ Back to Model Overview

Calibration – Macro Parameters

Parameter	Symbol	Value	Target
Real Interest Rate	r	0.01	World interest rate
Depreciation Rate	δ	0.05	Standard
Risk Aversion	γ	1	Standard
Discount Factor	$\bar{\beta}_j$	Country-specific	NFA Distribution
Productivity	Z_j	$Z_j = \frac{1}{K_j^{\alpha}}$	Normalize $Y_j = 1$
Capital Intensity	α_j	Country-specific	Capital-output ratio
Country Size	ω_j	Country-specific	GDP distribution

▸ Back to Micro Calibration

Calibration Micro - the USA

Table 1: Calibration of US Endowment Process

Moments	Data (GRID)	Estimated process	Discretized process	Parameters	
$\text{Var}(\Delta \log e)$	0.29	0.29	0.29	$\mu_{\eta 1}$	0.0078
$S(\Delta \log e)$	-0.90	-0.90	-0.90	$\sigma^2_{\eta 1}$	0.057
$K(\Delta \log e)$	13.4	13.3	13.4	$\sigma^2_{\eta 2}$	5.516
$\text{Var}(\Delta_5 \log e)$	0.58	0.58	0.58	θ	0.994
$S(\Delta_5 \log e)$	-0.65	-0.65	-0.64	ρ	0.859
$K(\Delta_5 \log e)$	8.75	8.77	8.65	σ^2_{ε}	0.092

▸ Back to Micro Calibration