Global Collateral:

How Financial Innovation Drives Capital Flows and Increases Financial Instability

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Introduction

- Massive gross international capital flows among developed economies
- Evidence that financial integration increases volatility and co-movement
- (We think) evidence suggests capital flows not *just* driven by diversification/liquidity motives

Introduction

Collateral-driven flows

- We provide a model of **collateral-driven** capital flows which **increase volatility** of **asset prices** and **flows**
- We define financial innovation as **new collateral** or **new promises** backed by collateral
- We show that cross-border differences in ability to collateralize financial promises are enough to generate capital flows

Introduction

Intuition

- Trade in financial assets allows countries to **share scarce collateral**
- Our insight is that the extent to which a country can collateralize assets is the feature that differentiates countries that are otherwise similarly financially developed
- Our model gives precise predictions for global flows, asset prices, and the volatility of flows and prices

Preview of Results

Static Model

- Results from Static Model:
  - Foreign buys Home assets (which are **better collateral**) and Home buys Foreign assets (which are **cheaper**)
  - Home runs **current account deficit** financed by asset sales
  - Financial integration **increases Home** asset prices and **decreases Foreign** asset prices

Preview of Results

Dynamic Model

- Results from Dynamic Model:
  - Financial integration **increases volatility** of asset prices in **both** countries
  - Gross and net flows **collapse** following bad news

Related Literature

- **"Global Imbalances"** (interest rates, risk sharing, risk premia): Caballero, Farhi, Gourinchas (2008), Mendoza, Quadrini, Ríos-Rull (2009), Angeletos-Panousi (2011), Maggiori (2017)
- **Gross flows**: Lane, Milesi-Ferretti (2007), Obstfeld (2012), Shin (2012), Caballero-Simsek (2017)
- **Collateral and financial innovation**: Geanakoplos (1997,2003), Fostel-Geanakoplos (2012,2015), Gong-Phelan (2017)

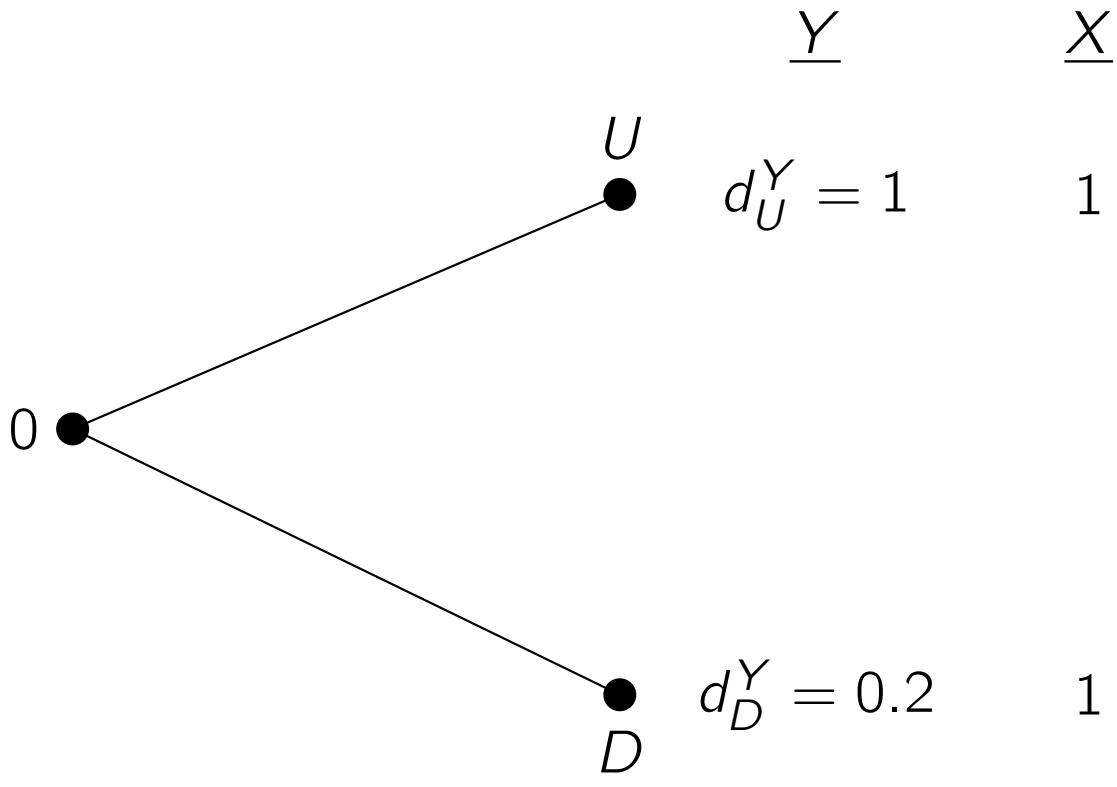
Presentation Outline

The Model

Asset Payoffs, Uncertainty

- 2 periods, with uncertainty given by $S = \{0, U, D\}$
- Risky asset Y, durable goods X (risk-free asset)
- Price of Y at 0 is p, price of X normalized to 1

Parameterization for talk:



The Model

Investors

- Continuum of risk-neutral investors indexed by $i \in (0, 1)$ with preferences

$$U^i(c_U, c_D) = \gamma_U^i c_U + \gamma_D^i c_D$$

- Subjective probabilities only source of heterogeneity
- Higher i more optimistic ($\gamma(i)$ increasing and continuous)
- Each investor endowed with (e^X, e^Y) units of (X, Y)

The Model

Financial Contracts and Collateral

- A financial contract consists of promised payments backed (w.l.o.g.) by 1 unit of Y serving as collateral

$$j = \Big((j_U, j_D), 1_Y \Big)$$

- Contract j promises (j_U, j_D)
- Denote the set of contracts by J
- Contract $j \in J$ has price π^j

The Model

Financial Contracts and Collateral

- Repayment enforceability problems: collateral enforces repayment
- Agents default whenever promise exceeds value of collateral (i.e., $j_s > d_s^Y$)

The Model

Financial Innovation and Collateral

- In our model, financial innovation changes the set of contracts J
- Main analysis focuses on differences in available promises
- Leverage: **non-contingent** promises (debt)

$$J^Y = \{j : j = ((j, j), 1)\} \text{ for all } j$$

- Tranching: **contingent** promises—(w.l.o.g.) single promise, "down tranche"

$$j^T = (0, d_D^Y)$$

Equilibrium and Parametrization

- A collateral equilibrium is a set of allocations, asset prices, and contract prices such that agents optimize and markets clear
- For talk we parametrize model with
  - Endowments: $e^Y = e^X = 1$
  - Beliefs: $\gamma(i) = 1 - (1 - i)^2$
  - Results are completely robust

Presentation Outline

Static Model of Global Flows

- Consider 2 countries, Home and Foreign ($*$), as just described
- Completely symmetric in everything except **countries have different sets of financial contracts**, $J \neq J^*$
  - Asset payoffs for Y and Y^* identical
  - Investors have same preferences
  - Home investors endowed with one unit each of Y, X
  - Foreign investors endowed with one unit each of Y^*, X^*

Static Model of Global Flows

Financial Contracts

- Countries have different abilities to collateralize assets, different J's
  - Foreign assets can be **leveraged** (used to issue non-contingent debt)
  - Home assets can be **tranched** (used to issue contingent promises)

Presentation Outline

Autarky in Foreign

Leverage

- Leverage: agents can use one unit of Y^* to issue **non-contingent** promises (debt) (j, j)
- Every contract j is **priced** in equilibrium
- Which contract(s) **traded** in equilibrium?

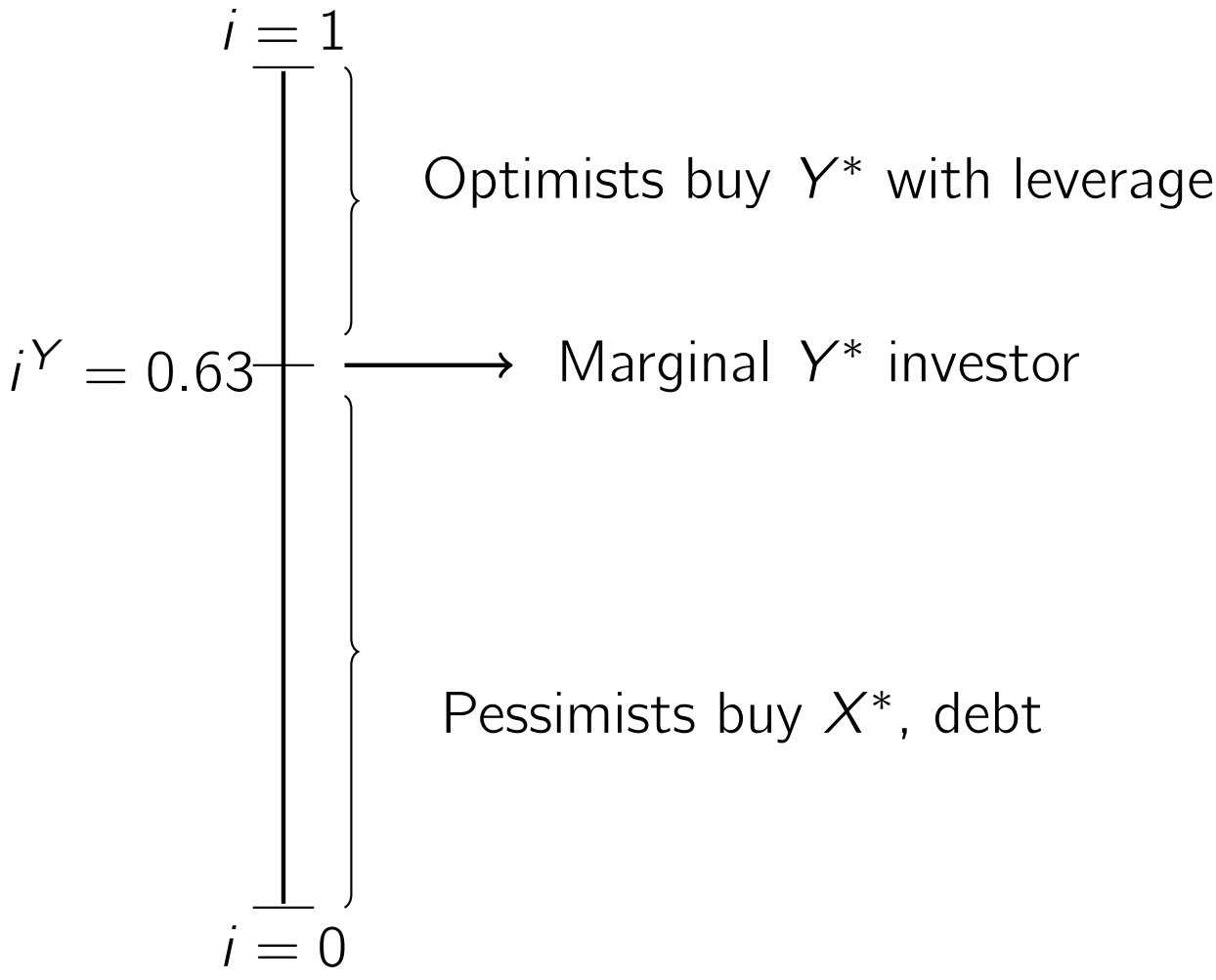
Autarky in Foreign

Endogenous Leverage

- In equilibrium, the **only traded** contract is **default-free**, $j = 0.2$ (see Fostel-Geanakoplos 2012)
  - Optimists buy risky asset **and borrow using asset as collateral**, borrowing 0.2 for every unit of Y^*
  - Pessimists hold goods X^* and risk-free debt
- Asset price p^* equals "payoff value" plus "collateral value"

Autarky in Foreign (leverage)

Equilibrium Regime



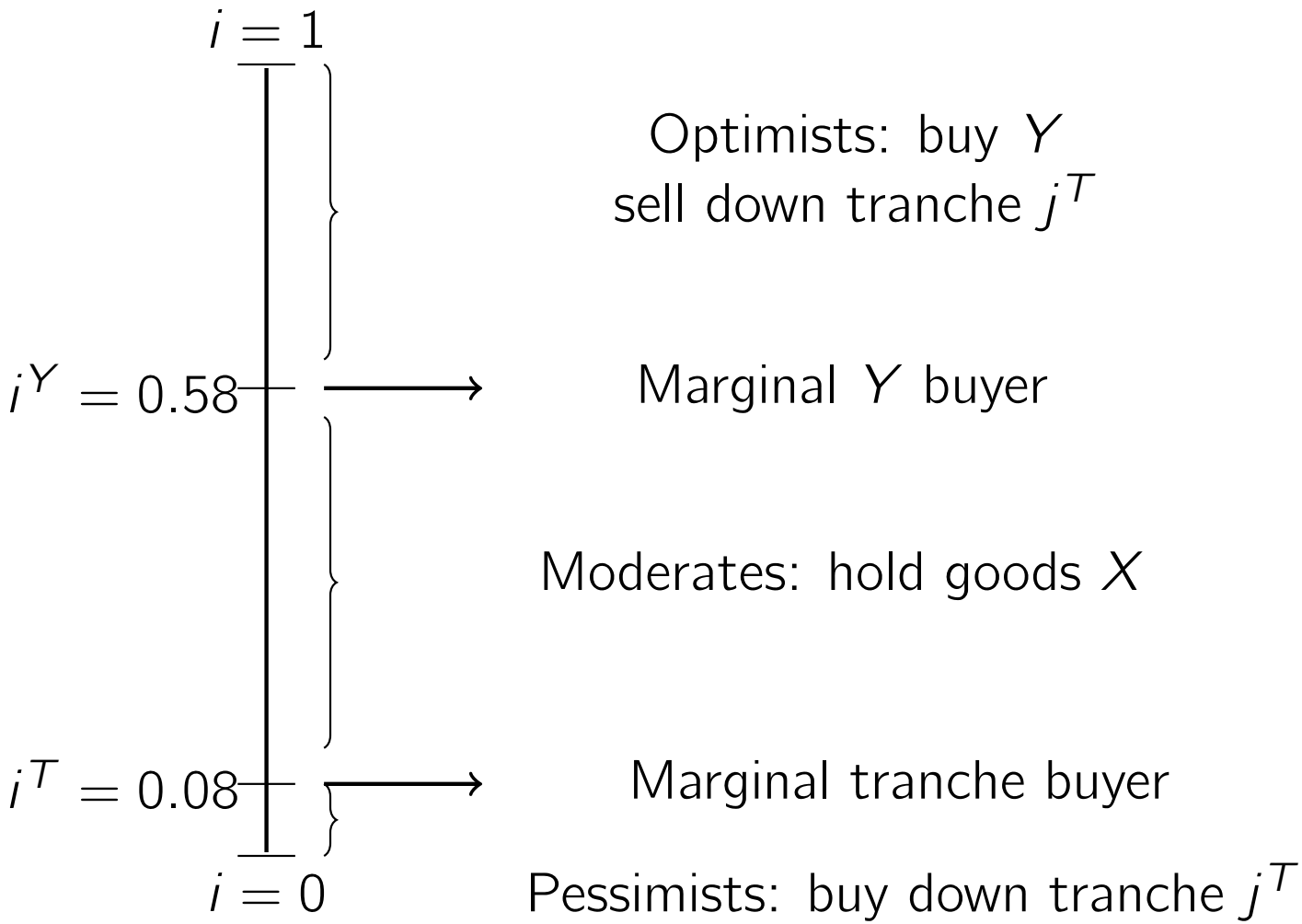
Presentation Outline

Autarky in Home

- Agents can use Home asset Y to issue down tranche j^T delivering $\begin{pmatrix} 0 \\ 0.2 \end{pmatrix}$
  - Optimists buy risky asset **and issue tranche using asset as collateral**, borrowing π^T for every unit of Y
  - Moderates hold goods X
  - Pessimists hold **down tranche**
- Asset price p equals "payoff value" plus "collateral value"—but the collateral value is higher because Y is better collateral

Autarky in Home (tranching)

Equilibrium Regime



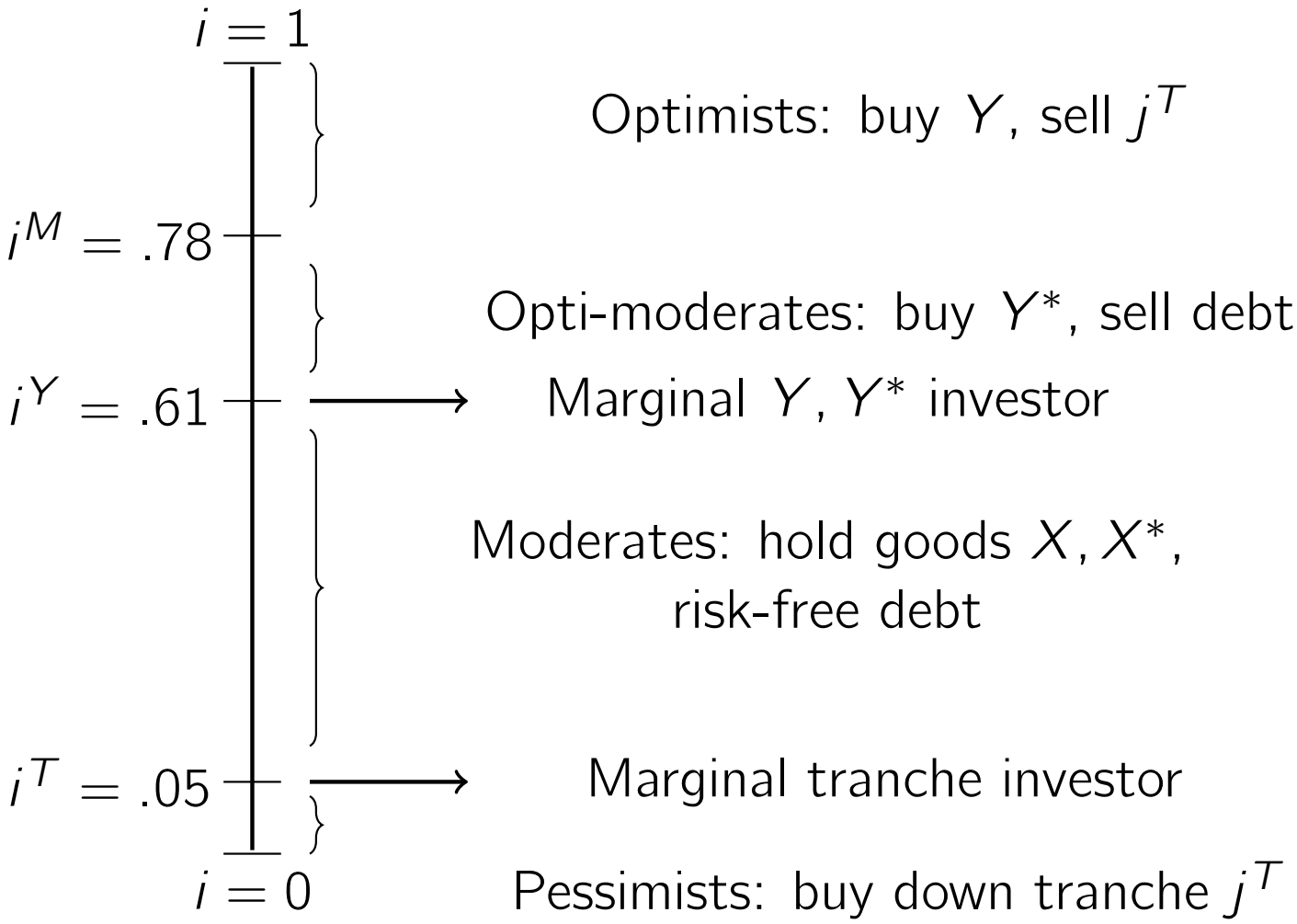
Presentation Outline

Financial Integration

- With financial integration, countries trade assets and financial promises (debt, tranches)
  - All agents can use Home asset Y as collateral **to issue down tranches**
  - All agents can use Foreign asset Y^* as collateral **to issue debt**
  - All agents can buy debt and tranches
- After financial integration, same marginal buyers in each country (countries' fundamentals are identical, only J and J^* different)

Financial Integration

Equilibrium Regime



Financial Integration

Theoretical Results

- **Proposition 1:** With financial integration, Home price always exceeds Foreign price: $\hat{p} > \hat{p}^*$ (true in autarky if $\gamma(i)$ concave)
- **Proposition 2:** Financial integration increases Home price and decreases Foreign price: $\hat{p} > p$ and $\hat{p}^* < p^*$
- **Proposition 3:** Home runs a current account deficit, financed by the sale of risky assets.

Financial Integration

Equilibrium Prices

	Autarky	Financial Integration
p	1	1.029 $\uparrow$
p^*	0.893	0.878 $\downarrow$
π^T	0.168	0.182 $\uparrow$
$\pi^{0.2}$	0.2	0.2

- Foreign **demand for tranches increases collateral value of** Y (Home Bubble)
- Foreign price falls because Home asset is attractive alternative (relative collateral value falls)

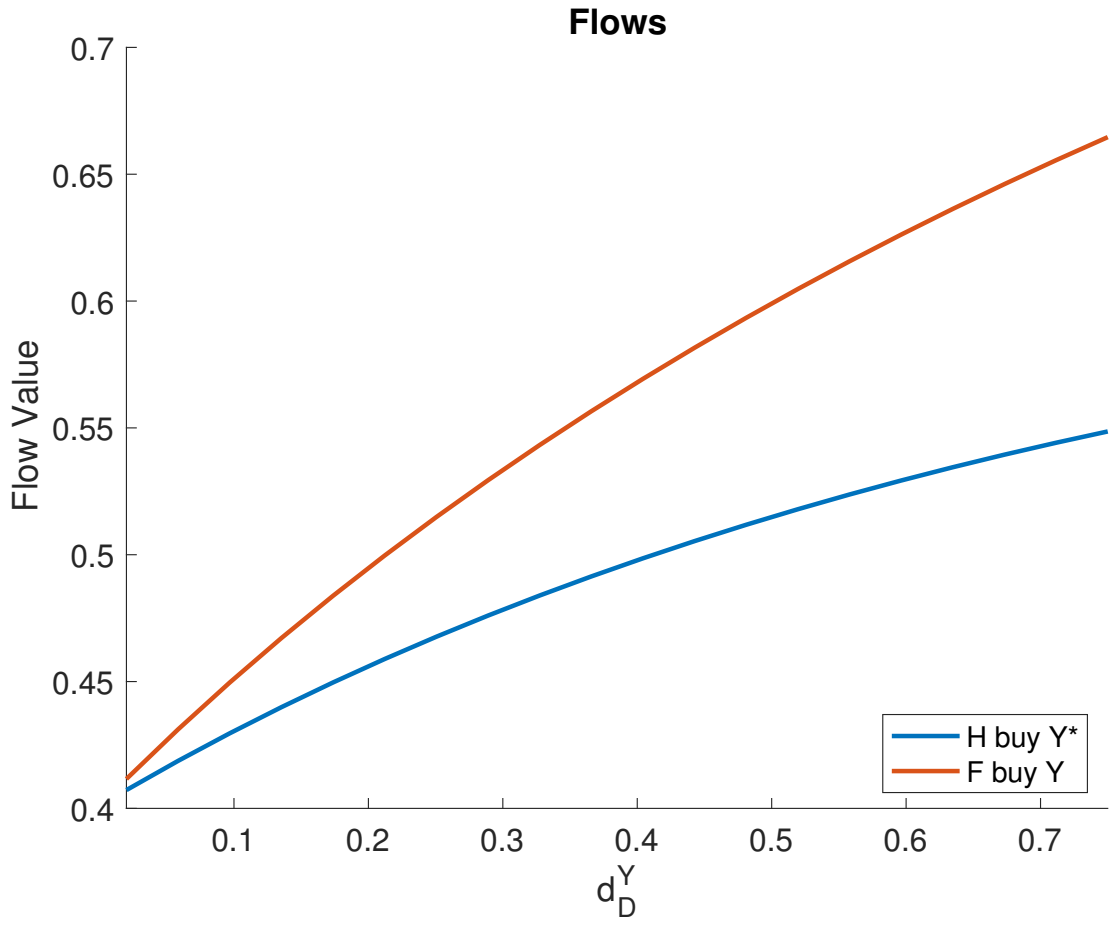
Financial Integration

Equilibrium Global Flows

- Our model predicts the following financial flows
  - Foreign buy 0.495 of Y
  - Home buy 0.456 of Y^*
  - Home buy 0.04 of X^*
- Flows driven by desire to share scarce collateral
- Flows affected by borrowing capacity of risky assets, captured by d_D^Y

Financial Integration

Comparative Statics: Flows increase with borrowing capacity d_D^Y



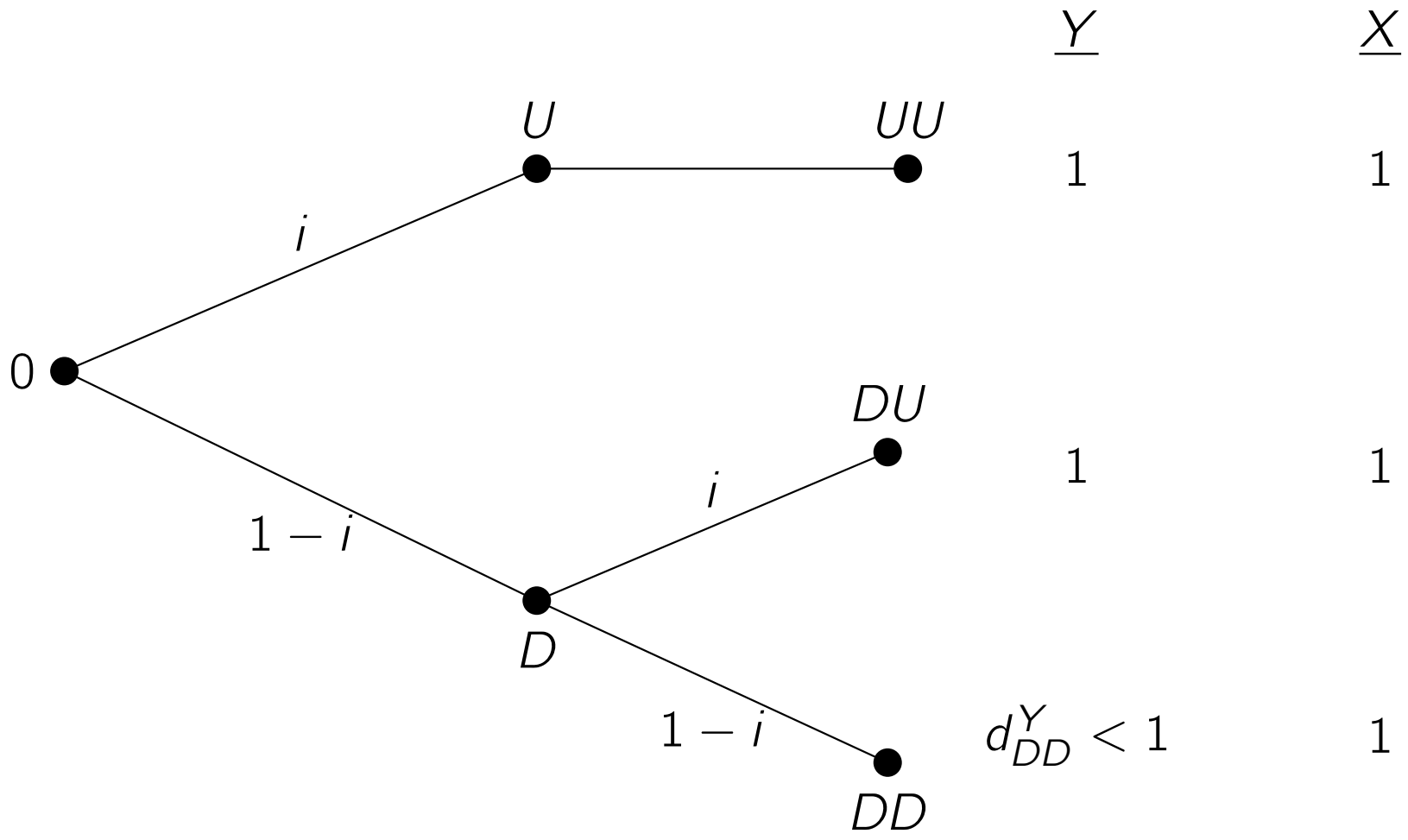
Presentation Outline

Dynamic Model of Global Flows

- Static model predicts flows and price changes
- We use a 3-period model model to consider the effects of financial integration on volatility of asset prices and flows

Dynamic Model of Global Flows

Asset Payoffs with Three Periods

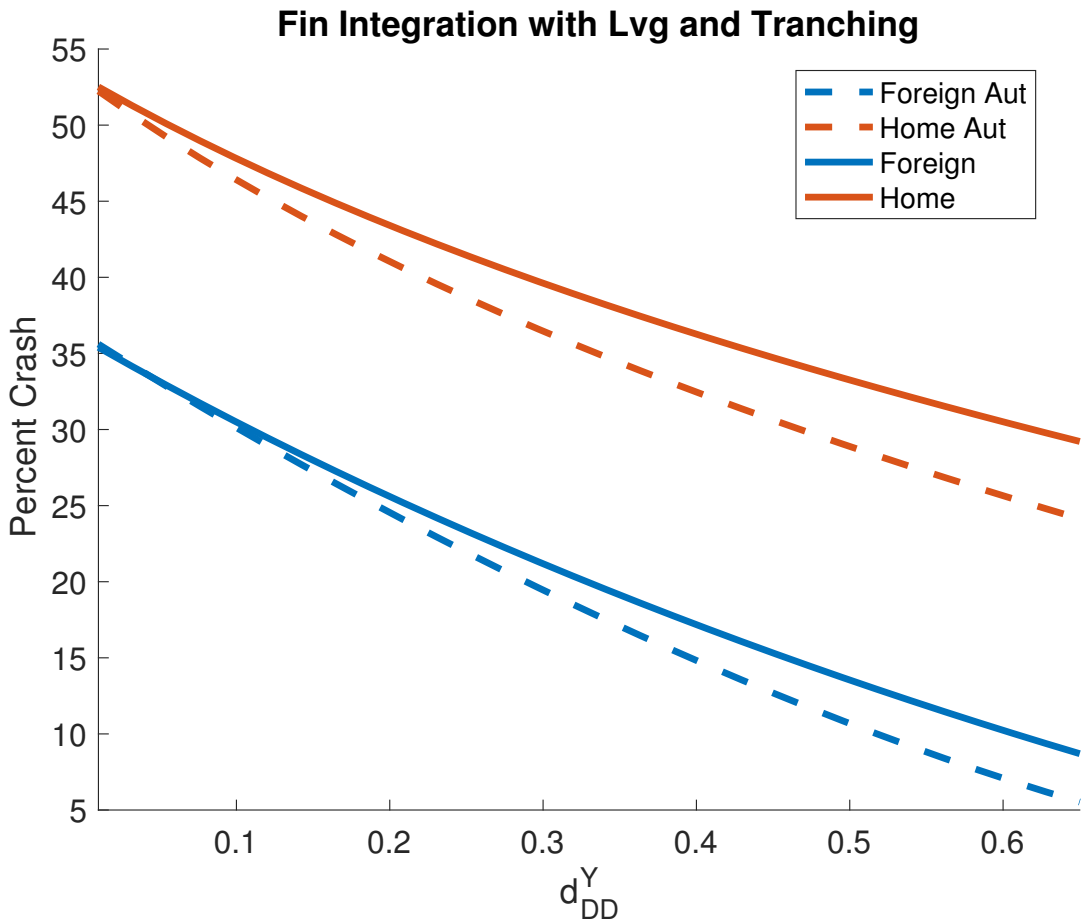


Dynamic Model of Global Flows

- Key results:
  - **Price crashes increase** in both countries
  - **Flows collapse** following bad news,
  - with bigger collapse the greater the decrease in borrowing capacity

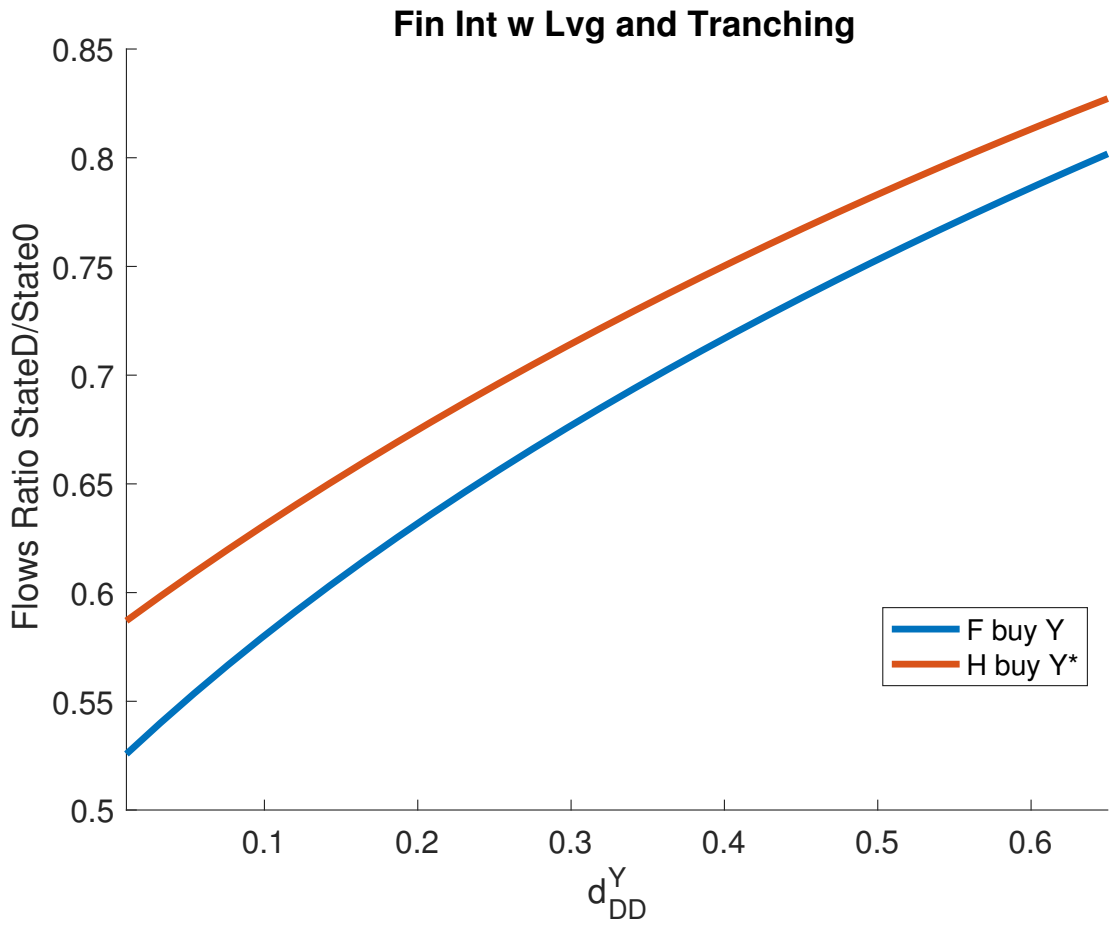
Dynamic Model of Global Flows

Comparative Dynamics: Price Crashes



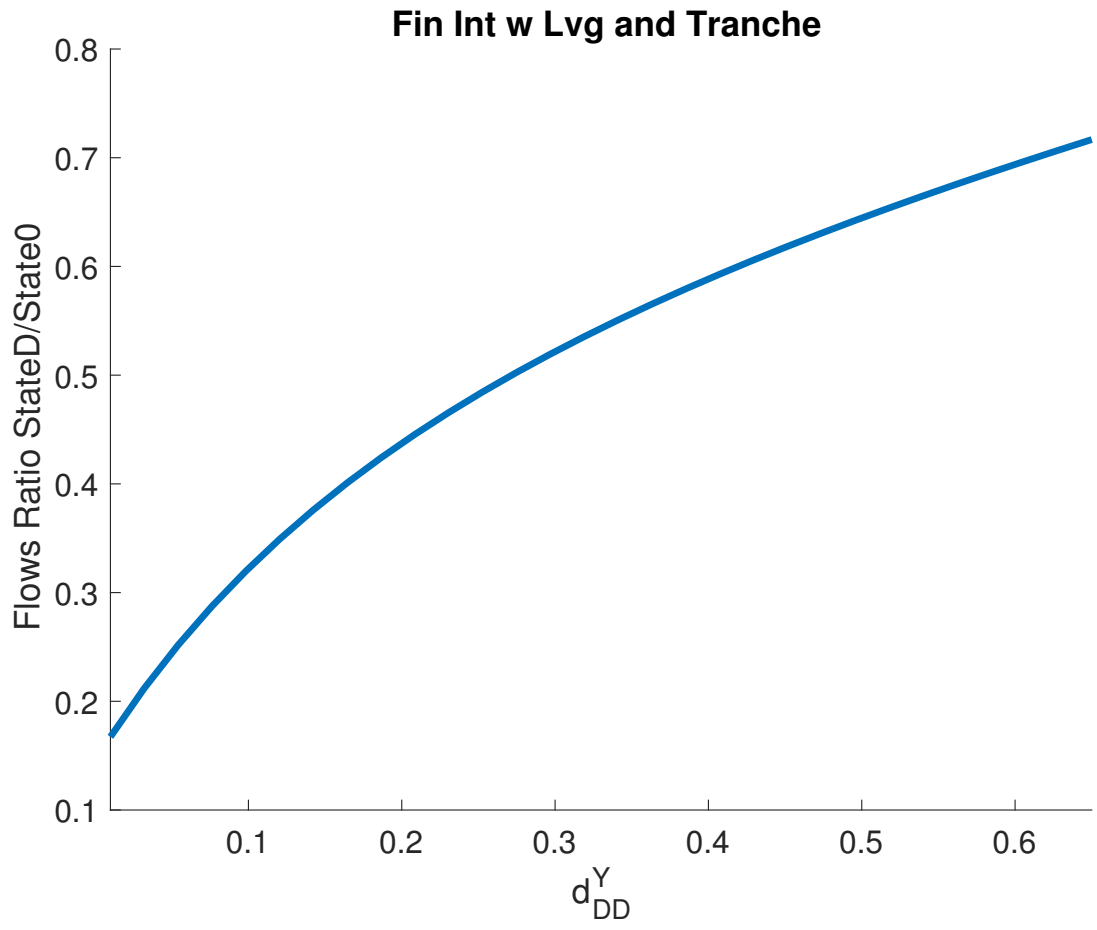
Dynamic Model of Global Flows

Comparative Dynamics: Gross Flows



Dynamic Model of Global Flows

Comparative Dynamics: Net Flows



Conclusion

- Financial innovations in one country—tranching versus just leverage—can drive capital flows
- Cross-border flows emerge as a way of sharing collateral
- Financial integration increases price volatility globally
- Flows collapse following bad news