

## Part III: Trade in Financial Services

# What are the questions? Why do we care?

- Globalization in banking since early 1990s
- Banks today are multinational firms that provide financial services to customers in various countries
- Financial crisis has highlighted that multinational banks play pivotal role in the economy (contagion, difficult to resolve)
- Determinants of trade differ from the ones of trade in manufactures
- Trade in financial services has implications for capital flows, i.e. global imbalances
- Trade in financial services has implications for financial development

# Trade and FDI in banking: literature

## Theory:

- Early: Aliber (1984) and Grubel (1989)
- Lehner (2009)
- De Blas and Russ (2010)
- Niepmann (2011)

## Empirics:

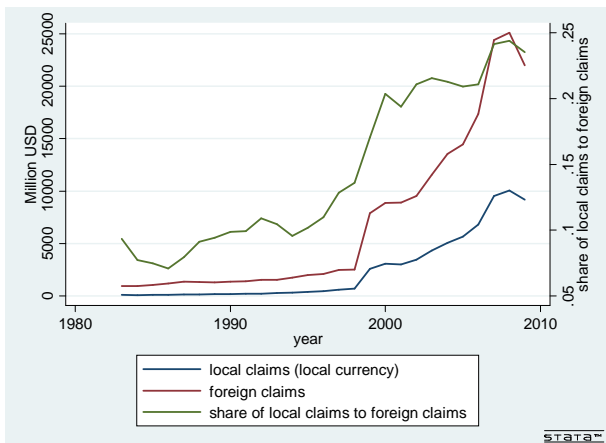
- Focarelli and Pozzolo (2005)
- Buch and Lipponer (2007), Buch et al. (2010)
- Claessens and van Horen (2007, 2010)

# Empirical evidence

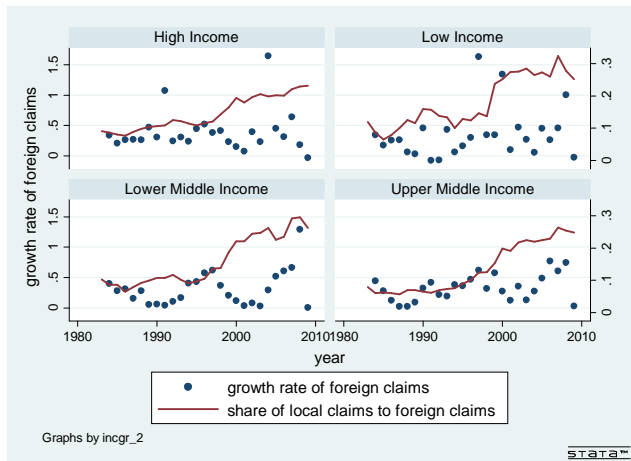
- Foreign bank asset holdings have increased massively
- Expansion through FDI (branches and subsidiaries)
- Consolidation through M&A, too
- Concerns countries of all income groups
- Impact of foreign bank entry on single banking sector can be large

## Evolution of (mean) foreign assets over time

Data: Consolidated Banking Statistics (BIS), approx. 25 source countries vis-a-vis large set of recipient countries

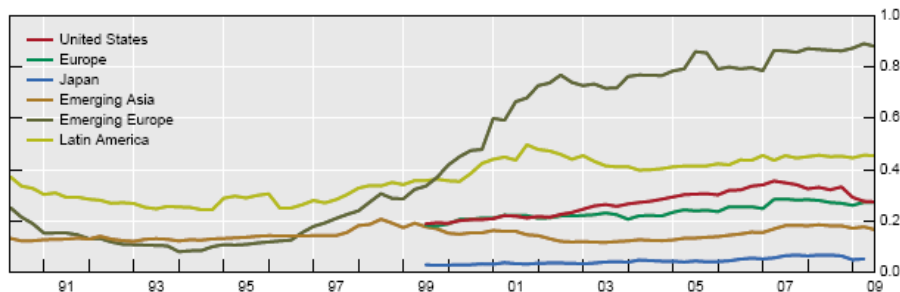


# Similar developments across recipient income groups



# Varying degrees of foreign bank participation

Foreign bank participation<sup>1</sup>



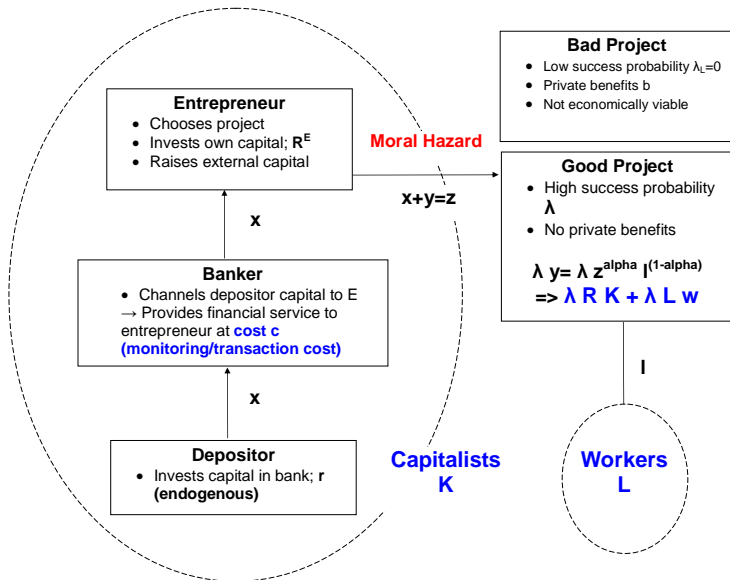
<sup>1</sup> Consolidated lending by foreign banks, as a share in the total bank lending to non-banks residing in a given country or region.

Sources: IMF; BIS International banking statistics.

Niepmann (2011):  
**Multinational and International Banking: Theory and Evidence**

# Closed Economy Model

# Setup



# Entrepreneur's Maximization Problem

$$\max_{x,y,R^E,R^B} U = z\lambda R^E + (1+r)(1-y) \quad (1)$$

$$s.t. \quad y \leq 1 \quad (BC) \quad (2)$$

$$z \leq x + y \quad (RC) \quad (3)$$

$$(\lambda(R - R^E) - c)z \geq (1+r)x \quad (PCD) \quad (4)$$

$$R^E \geq \frac{b}{\lambda} \quad (ICE) \quad (5)$$

- $R$  and  $r$  taken as given by E
- Solution: all constraints bind;  $U = \frac{(1+r)b}{(1+r)+b+c-\lambda R}$
- $z$  limited by how much E can borrow against 1 unit of internal capital

## Aggregation pins down $R$ (MPC)

- 2 periods: investment in  $t = 1$ ; production in  $t = 2$
- Perfectly competitive firms and constant returns to scale:  $y = F(z, l)$
- Financial frictions limit  $z$ ;
- Capital market clearing pins down number of firms:  $N = K/z$
- Labor market clearing ensures  $l = L/N$
- Wages  $w$  and return on capital  $R$  determined by marginal products:

$$F(L, K) + K = F_L(1, K/L)L + (1 + F_K(1, K/L))K = w L + R K, \quad (6)$$

where  $L$  is labor endowment and  $K$  is capital endowment

## Free entry pins down $r$ (financial interest rate)

- Capitalists can become E or D: equalization of rates of returns from each activity
- Entrepreneur has to pay fixed cost  $f^E$ , which he borrows from outside financier at interest rate  $r$
- Free entry ensures that E earns  $1 + r$  as well:

$$\frac{(1+r)b}{(1+r) + b + c - \lambda R} - (1+r)f^E = (1+r) \quad (7)$$

- Interest rate:

$$1 + r = \lambda R - c - \frac{bf}{1 + f^E}, \quad (8)$$

with  $R = (1 + F_K(1, \frac{K}{L}))$

- Wedge between marginal product of capital and financial interest rate due to financial friction
- The lower the efficiency of the banks and the higher private benefits, the lower the financial interest rate

# Open Economy Model

# Setup

- Two countries: country  $i$  and country  $j$
- Countries differ with respect to endowments, i.e. autarky capital-labor ratio  $\frac{K^a}{L^a}$  and monitoring cost  $c$
- No diversification motive: projects perfectly correlated
- Recall:

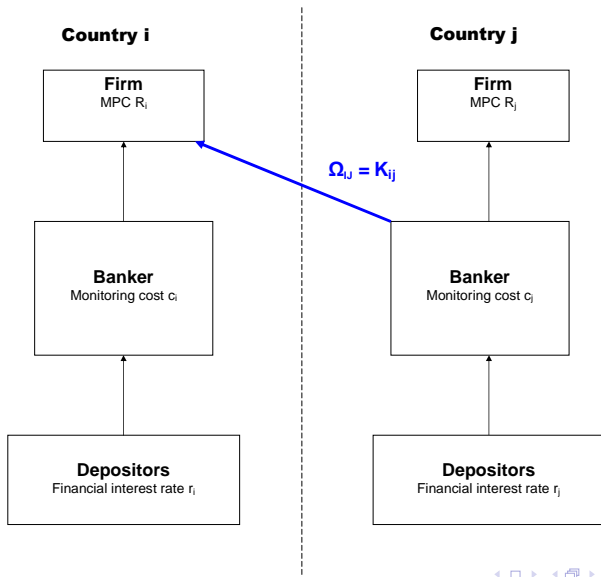
$$1 + r = \lambda(1 + F_K(1, \frac{K^a}{L^a})) - c - (.) \quad (9)$$

- Two phases of globalization:
  - 1 Financial liberalization: removal of capital controls, capital inflow also through lending by foreign banks, but restrictions on foreign bank entry (especially on retail business) → **cross-border lending**
  - 2 Banking sector liberalization: removal of restrictions on operations of foreign banks, harmonization → **local deposit taking**

# Capital Account Liberalization

- Firms, depositors and workers are immobile
- Firms can borrow from domestic or from foreign banks
- Deposit taking by a bank in a foreign country not allowed
- Whether cross-border lending or through local affiliate not explicitly considered
- Without loss of generality:  $c_i \geq c_j$
- When operating abroad, additional transaction cost  $\tau(c)$ ,  $\tau'(c) > 0$
- Set  $\tau_{ij}$  equal to 0, assume  $\tau_{ji} > \underline{\tau}$  and if  $c_i = c_j$ ,  $\tau_{ji} = \tau_{ji} = 0$
- Firms borrow the fixed cost at the domestic interest rate
- $\Omega_{ij}$  denotes foreign bank assets that banks from country  $j$  hold vis-a-vis firms in country  $i$

# Capital Account Liberalization



# Entrepreneur's Maximization Problem

Optimization problem of entrepreneur in country  $i$  served by banks from country  $j$ :

$$\underbrace{\max}_{x_{ij}, y_{ij}, z_{ij}, R^E} U_{ij} = z_{ij} \lambda R^E + (1 + r_i)(1 - y_{ij}) \quad (10)$$

$$s.t. \quad y_{ij} \leq 1 \quad (11)$$

$$z_{ij} \leq x_{ij} + y_{ij} \quad (12)$$

$$(\lambda(R_i - R^E) - c_j)z_{ij} \geq (1 + r_j)x_{ij} \quad (13)$$

$$R^E \geq \frac{b}{\lambda} \quad (14)$$

- E's utility:

$$U_{ij} = \frac{(1 + r_j)b}{1 + r_j + b + c_j - \lambda R_i} \quad (15)$$

- E faces monitoring costs of banks from country  $j$
- E must pay financial interest rate prevailing in country  $j$

# Equilibrium Conditions

- Firms are indifferent between drawing on funds from foreign or domestic banks or prefer their domestic banks
- In each country, capitalists are indifferent between becoming E or D
- Labor markets clear
- Capital market clears
- Cross-border capital flows are consistent with demand for financial services

## Equilibrium: Intuition

- Entrepreneurs can choose between two different combinations of  $r$  and  $c$
- They prefer a low financial interest rate and a low monitoring cost
- Import of foreign banking services implies import of capital
- Capital imports change  $R_i$  and  $R_j$  in the two countries, hence interest rates
- Remember:

$$R_i = 1 + F_{i,K} \left( 1, \frac{K_i^a + K_{ij}}{L_i^a} \right), \quad (16)$$

and

$$1 + r_i = \lambda R_i - c_i - \frac{bf}{1 + fE}, \quad (17)$$

# Equilibrium: Intuition

Case 1:  $c_i = c_j$

- All entrepreneurs prefer bank that offers the lower interest rate
- Import of foreign banking services until  $r_i = r_j$
- If  $\frac{K_j^a}{L_j^a} > \frac{K_i^a}{L_i^a} \Rightarrow \bar{K}_{ij} > 0$  and vice versa until  $R_i = R_j$

# Equilibrium: Intuition

Case 2:  $c_i > c_j$

- If  $r_i = r_j$ , bank with lower monitoring costs preferred
- Indifference condition requires that in equilibrium:  $\bar{r}_i < \bar{r}_j$
- One can show that in equilibrium also  $\bar{R}_i < \bar{R}_j$
- Differences in endowments (autarky capital labor ratios) determine equilibrium capital flows, i.e. trade in banking services:
  - ▶ If  $\frac{K_j^a}{L_j^a} \geq \frac{K_i^a}{L_i^a} \Rightarrow \bar{K}_{ij} > 0$
  - ▶ If  $\frac{K_j^a}{L_j^a} < \frac{K_i^a}{L_i^a}$ ,  $\bar{K}_{ij}$  depends on the relative strength of the two forces
- $\bar{K}_{ij}$  increases in  $\Delta c = c_i - c_j$  and in  $\Delta \frac{K^a}{L^a} = \frac{K_j^a}{L_j^a} - \frac{K_i^a}{L_i^a}$

## Proposition 1:

There exists a unique equilibrium in the open economy with capital account liberalization characterized by the equilibrium capital flow  $\bar{K}_{ij}$ .  $\bar{K}_{ij}$  corresponds to foreign bank assets  $\bar{\Omega}_{ij}$ .

Assume  $\Delta c = c_i - c_j \geq 0$ . Then:

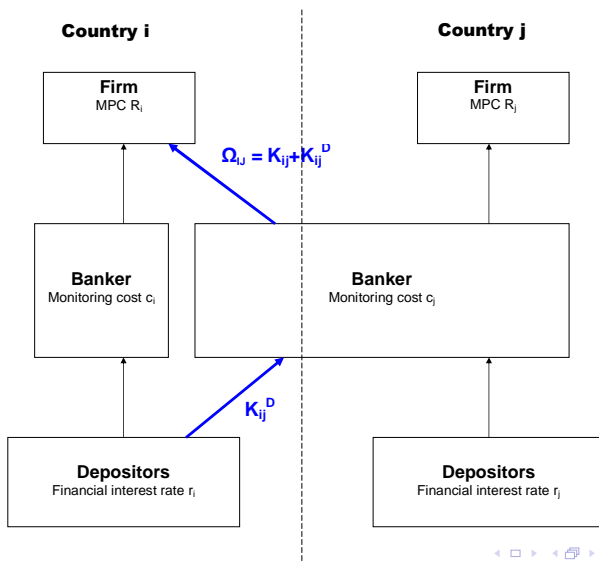
- (i) If  $U_{ij}^a > U_{ii}^a$  and  $U_{jj}^a > U_{ji}^a \Rightarrow \bar{K}_{ij} > 0$  and  $\bar{U}_{ij} = \bar{U}_{ii}$  and  $\bar{U}_{jj} \geq \bar{U}_{ji}$ .
- (ii) If  $U_{ij}^a \leq U_{ii}^a$  and  $U_{jj}^a \geq U_{ji}^a \Rightarrow \bar{K}_{ij} = 0$  and the equilibrium corresponds to the one under autarky.
- (iii) If  $U_{ij}^a < U_{ii}^a$  and  $U_{jj}^a < U_{ji}^a \Rightarrow \bar{K}_{ij} < 0$  and  $\bar{U}_{ij} \leq \bar{U}_{ii}$  and  $\bar{U}_{jj} = \bar{U}_{ji}$ .

In all three cases  $\bar{R}_i \leq \bar{R}_j$ .

$\bar{\Omega}_{ij}$  increases in  $\Delta K^a/L^a = K_j^a/L_j^a - K_i^a/L_i^a$  and  $\Delta c = c_i - c_j$ .

# Banking Sector Liberalization

Banks intermediate capital of depositors in both countries



# Entrepreneur's Maximization Problem

Optimization problem of entrepreneur using the services of a bank from country  $j$  that intermediates capital in both countries:

$$\underbrace{\max}_{x_{ij}, y_{ij}, z_{ij}, R^E, \alpha} U_{ij} = z_{ij} \lambda R^E + (1 + r_i) y_{ij} \quad (18)$$

$$s.t. \quad z_{ij} \leq x_{ij} + y_{ij} \quad (19)$$

$$(\lambda(R_i - R^E) - c_j) z_{ij} \geq ((1 + r_j) \alpha + (1 + r_i)(1 - \alpha)) x_{ij} \quad (20)$$

$$R^E \geq \frac{b}{\lambda}, \quad (21)$$

where  $\alpha$  is the fraction of depositor capital that comes from depositors in country  $j$

# Equilibrium

- Financial interest rates equalize because banks have access to depositor capital in both countries:  $\tilde{r}_i = \tilde{r}_j$
- With equal financial interest rates, entrepreneurs prefer banks with lower monitoring costs: **complete specialization**
- Banking sector with higher monitoring costs ceases to exist
- Interest rate equalization and identical monitoring costs imply MPC equalization:

$$F_{j,K} \left( 1, \frac{K_j^a - \tilde{K}_{ij}}{L_j} \right) = F_{i,K} \left( 1, \frac{K_i^a + \tilde{K}_{ij}}{L_i} \right) \quad (22)$$

- Foreign bank assets  $\Omega_{ij}$  consist of the (net) cross-border capital flow  $\tilde{K}_{ij}$  plus the capital that is raised from depositors in country  $i$   $\tilde{K}_{ij}^D$

## Proposition 2:

Assume  $c_i > c_j$ . Then there exists a unique equilibrium in the economy with liberalized capital accounts and banking sectors. The net capital flow  $\tilde{K}_{ij}$  is such that MPCs are equalized between countries. There is complete specialization where the banking sector of the country with the higher monitoring costs ceases to exist. Foreign bank assets  $\tilde{\Omega}_{ij} = \tilde{K}_{ij}^D + \tilde{K}_{ij}$ .  $\tilde{\Omega}_{ij}$  increases in  $\Delta K^a/L^a$ .

# Global versus International Banking

Case 1:  $\Delta c > 0$ ,  $\Delta \frac{K^a}{L^a} = 0$ :

- Net capital flow equal to zero
- Activities of banks from  $j$  in  $i$  funded through local intermediation: global banking only

Case 2:  $\Delta c = 0$ ,  $\Delta \frac{K^a}{L^a} \neq 0$ :

- Net capital flow determined, but not which bank operates where
- International banking only with  $\epsilon$ -cost of operating abroad
- No (major) impact of banking sector liberalization on cross-border banking expected

## Corollary 2:

International banking occurs if  $\Delta K^a/L^a \neq 0$ . Global banking occurs if  $\Delta c \neq 0$ .

# Effects of Banking Sector Liberalization

- Foreign bank assets  $\Omega_{ij}$  rise after banking sector liberalization if efficiency differences matter
- Trade in banking services expands due to possibility of local intermediation, i.e. local deposit taking
- Banking sector liberalization allows for the full exploitation of efficiency gains independently of differences in capital endowments

⇒ Foreign bank assets  $\Omega_{ij}$  are a function of country pair characteristics, namely:

- differences in bank efficiency  $\Delta c$
- differences in endowments  $\Delta \frac{K^a}{L^a}$
- degree of liberalization
- transaction costs

⇒ **Testable predictions**

# Remarks

- Empirical evidence suggests that differences in efficiency and endowments explain the levels of foreign bank assets very well
- Banking sector liberalization decreases financial frictions (import of more efficient banking services) and may therefore impact trade patterns
- Trade in financial services increases incentives for capital to flow to the South
- Distinction between global and international banking important to understand implications of different regulatory policies