The Global Firm

Lecture 6

Multinational Firms, FDI Flows and Imperfect Capital Markets

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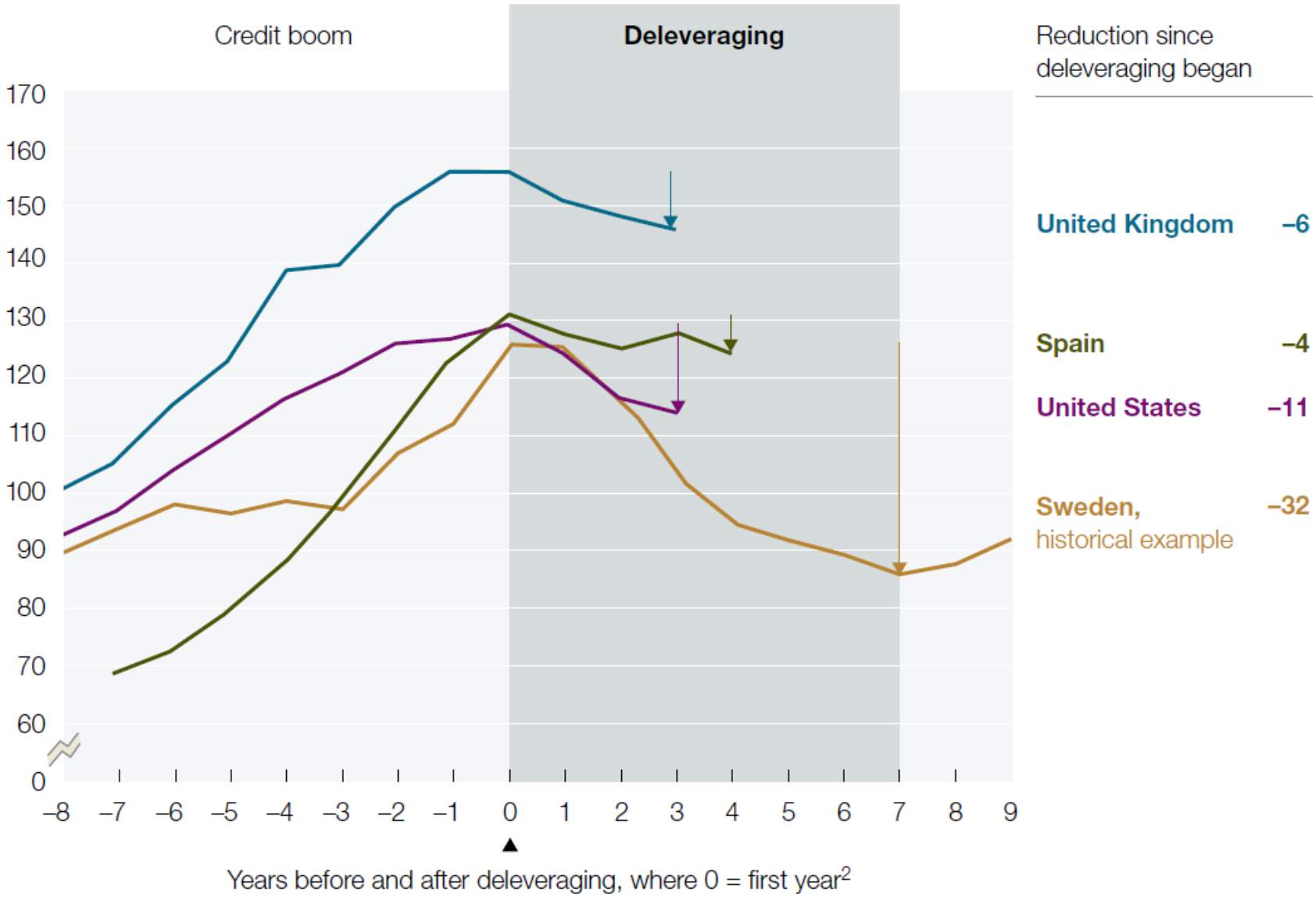
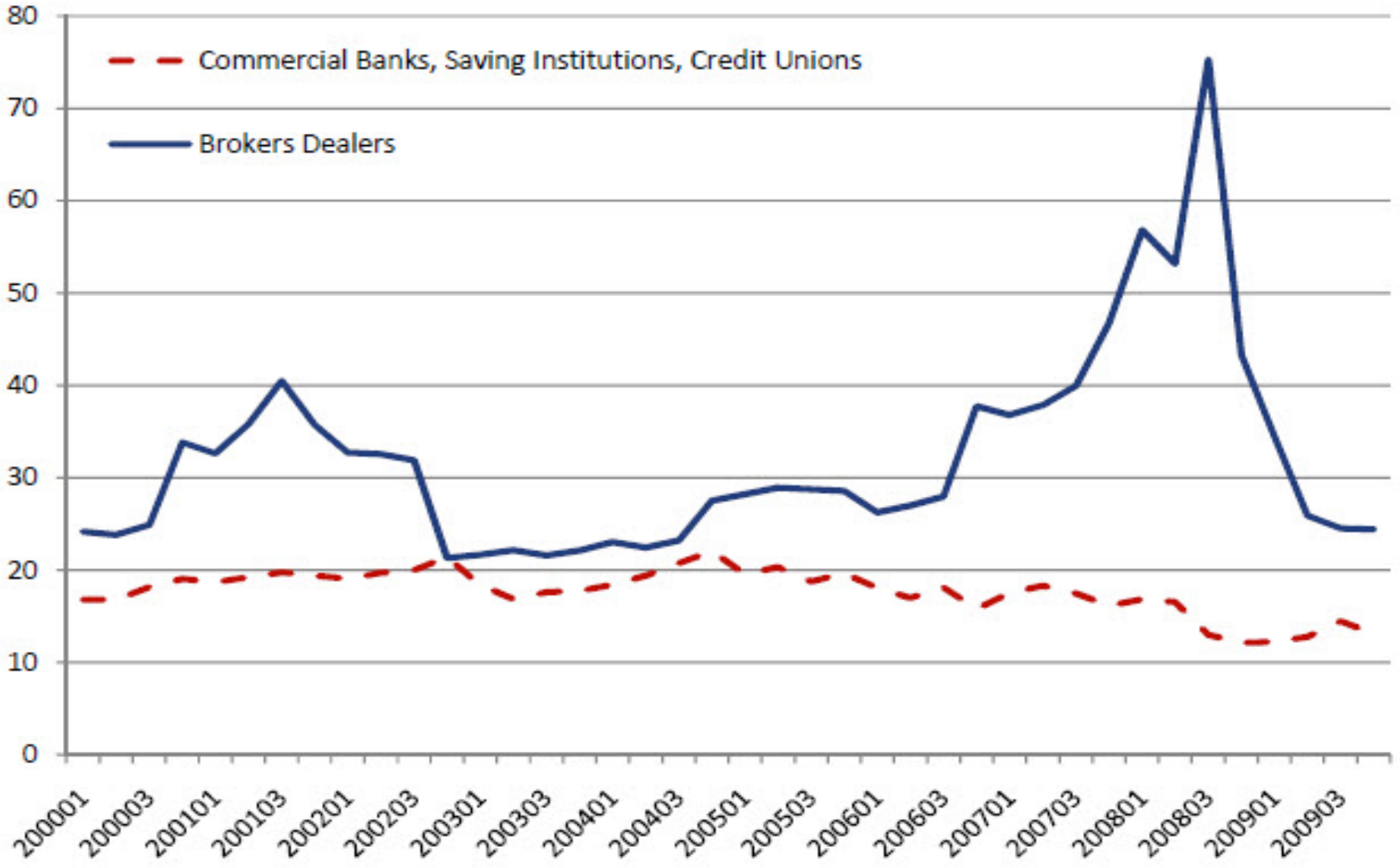
Big Picture

Household debt, % of gross annual disposable income[1]



Recent History of Financial Leverage



Bank Leverage Ratio 2011 vs. 2007: How Has Deleveraging Progressed So Far?

(*Source: Economist Online*)

Bank/Institution	Country	Unadjusted leverage	Leverage Ratio	Tier 1 Capital Ratio	Unadjusted leverage	Leveraga Ratio	Tier 1 Capital Ratio
		2007			*2011*		
J.P. Morgan	US	16.7	11.9	8.4%	**14.7**	8.3	12.1%
Bank of America	US	19.8	14.6	6.9%	**14.1**	11.9	8.4%
Wells Fargo	US	14.6	13.2	7.6%	11.1	8.7	11.5%
CitiGroup	US	24.8	14.0	7.1%	**14.3**	7.4	13.5%
Goldman Sachs	US	26.2	17.5	5.7%	11.8	7.2	13.8%
Morgan Stanley	US	32.6	17.6	5.7%	**14.4**	6.0	16.8%
Barclays	UK	37.8	12.8	7.8%	21.0	9.1	11.0%
RBS	UK	23.5	13.7	7.3%	19.0	7.4	13.5%
HSBC	UK	17.4	10.8	9.3%	**17.5**	8.2	12.2%
Deutsche Bank	Germany	54.6	11.6	8.6%	43.0	7.2	13.8%
Credit Suisse	Swiss	31.7	9.0	11.1%	31.7	5.6	17.7%
UBS	Swiss	64.0	11.4	8.8%	27.8	5.4	18.4%
BNP Paribas	France	41.6	13.7	7.3%	29.0	8.4	11.9%
Soc. Gen.	France	34.6	12.5	8.0%	22.3	8.8	11.3%
Credit Agricole	France	22.0	13.5	7.4%	22.4	9.1	11.0%

1. Leverage ratios are calculated as the inverse of tier 1 capital ratio (BASEL I, risk-adjusted).
2. Unadjusted leverage is the ratio between total assets and shareholder's equity.
3. Data for 2007 are from 2007 annual reports; data for 2011 are from banks' 2Q or 3Q/2011 quartely report.

Institution and MNEs

- By now, we have learned a few things about MNEs:
  - OLI framework
  - A framework of decision choice and the tradeoff between HFDI and VFDI, or both
  - HMS emphasized the multi-dimentionality of MNE's operations and the importance of host country's characteristics
- In recent years, increaingly, the focus has started to shift to incorporating institutions into economic analysis
- The relation between institutional quality and MNE's strategies attracted a lot of attentions and has become a very promising research area

Institution and MNEs

- Most MNEs operate in an environment where institutional quality is imperfect
- Imperfect institutions here could mean:
  - distorted price and incentive systems
  - imperfect capital-financial market
  - imperfect legal and regulatory environment, such as weak contract enforcement, weak protection of property rights, etc.
- How market imperfections (or market frictions/failures) affect MNE's decision choice?
- This is especially interesting as most MNEs tend to be knowledge-intensive, and intangible assets often matter much more than tangible assets. Firms constantly face the quesiton of
  - how to maintain the lead in technology and innovation,
  - While gaining access to new market, where instituations are second best

Pol Antras (QJE, 2009): introduction

Research question -

How costly financial contracting and weak investor protection influences MNE's operational, financing and invesmtent decisions?

Imperfect capital markets -

It mainly refers to the situation where contracts are hard to monitor, and investor (shareholder)'s rights may not be well protected so that local firms (entrepreneurs) may expropriate for their own benefits.

Imperfect capital markets are widespread in developing countries, but not uncommon in developed countries. For example, continental European countries tend to have less protection of investors' rights than the U.S.

Institution and MNEs

- Two measures for investor protection
  - Creditor rights (Djankov, McLiesh and Shleifer (or DMS), 2007)
    - Value 0-4, the higher the value, the stronger investor protection
    - Disadvantage: It's an index number
  - Private credit / GDP ratio (BDL, 1999)
    - Continuous variable, not index
    - More private credit, more vibrant private sector, often with stronger protection of property rights
    - A very popular measure for the level financial development and business conditions
    - Newest update in December 2009; download link: http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/FinStructure_2008_v2.xls

*Note: for detailed description of the data, please see p.1191 of Andras' paper.

An Example of Creditor Rights Index

Table 2
Credit institutions by legal origin. This table presents the means of the creditor rights, public registry, private bureau, and information-sharing variables at five-year intervals between 1978 and 2003. The data are shown by legal origin and *t*-tests on the differences between English and French legal origins are provided. The analysis covers 129 countries. [a] = Significant at the 1% level; [b] = Significant at the 5% level; [c] = Significant at the 10% level.

	1978	1983	1988	1993	1998	2003
A. Creditor rights						
English	2.417	2.417	2.444	2.361	2.333	2.278
French	1.311	1.311	1.311	1.328	1.297	1.313
German	2.429	2.429	2.429	2.143	2.333	2.333
Nordic	2.250	2.250	2.500	2.000	1.750	1.750
Socialist	.	.	.	2.000	2.273	2.182
All	1.787	1.787	1.806	1.774	1.812	1.797
t-test, English versus French	4.644[a]	4.644[a]	4.719[a]	4.298[a]	4.364[a]	4.039[a]

Pol Antras (2009): model

- 3 agents:
  - Inventor (**I**) in home country – think of it as a firm that could potentially become a MNE
  - Entrepreneur (**ER**) in foreign (host) country
  - External investors in foreign (host) country (**EI**)

- 3 periods:
  - date 0 – contracting stage
    - inventor I signs contract w/ foreign entrepreneur, ER, to produce a differentiated product using the new technology developed by I.
    - F is the transfer payment from I to ER, when F>0, I invests F with external investor, EI, into the project; when F<0, it's the royalty payment from ER to I.
    - ER then signs contract with EI, and he borrows E (amount) from EI.
  - date 1 - investment stage
    - ER invests (project starts)
  - date 2 – production/consumption stage
    - Investment return

Pol Antras (2009): model

Inventor (I)'s optimization problem:

$$\underset{F,\phi_I,x,\phi_E,E,C}{Max}\ \Pi_I = \phi_I P_H R(x) + (W - F)\beta - CR(x)$$

ϕ_I : Equity share of inventor, I, in foreign affiliate, or the co-investment

ϕ_E : Equity share of external investor, EI, in foreign affiliate

E : amount borrowed by ER from EI

F: transfer payment from I to ER

x : total investment for the project; R : profit function of x, follows diminishing return, i.e., $R^{'}(x) > 0$, $R^{"}(x) \leq 0$

C : coefficient of inventor monitoring. It measures the difficulty of monitoring.

P_H : probability of higher return when ER "behaves";

P_L: probability of lower return when ER "misbehaves".

Pol Antras (2009): model

$$\underset{F,\phi_I,x,\phi_E,E,C}{Max}\ \Pi_I = \phi_I P_H R(x) + (W - F)\beta - CR(x)$$

→ so $\phi_I P_H R(x)$ is inventor's share of profits

→ (W-F)β is inventor's gross return on its net wealth, and $\beta > 1$. It implies net return is $\beta - 1$. Think of this as the opportunity cost of co-investing in the project. So inventor decides between investing in the project and investing in other alternatives.

→ We assume monitoring cost is proportional to profits, so CR(x) is inventor's monitoring cost

Pol Antras (2009): model

For entrepreneur, ER -

ER invests in a risky projec, has potential to default, or he may transfer investments to his own pockets, or "misbehave' in other ways → "moral hazard" problem

Assume ER's expected payoff (or private benefit) from misbahaving is proportional to total profits, we have B R(x).

and coefficient B is a function of C and γ, where C is monitoring effort, γ measures level of investor protection

and B(C,γ) = (1-γ) δ(C), where $\delta'(C) < 0$, $\delta''(C) > 0$, indicating higher monitoring effort leads to lower expropriation, but at declining rate.

This function says 1) the higher level of investor protection, and 2) the harder the monitoring, the smaller of expropriated profits by ER's misbehaving. Taking derivatives, we have,

$$\frac{\partial B}{\partial \gamma} = -\delta(C) < 0,$$

$$\frac{\partial B}{\partial C} = (1-\gamma)\delta'(C) < 0,$$

$\frac{\partial^2 B}{\partial C \partial \gamma} = -\delta'(C) > 0 \rightarrow$ a substitution effect between monitoring cost, C, and investor protection, γ.

Pol Antras (2009): model

Inventor I maximize $\prod_I$, **subject to the following constraints:**

(i) Financing constraint of the project: $x \leq \mathrm{E} + \mathrm{F}$

(ii) Participation constraint for external investor, EI,

$$P_H \phi_E R(x) \geq E$$

(iii) Participation constraint for ER,

$$P_H (1 - \phi_E - \phi_I) R(x) \geq 0$$

Pol Antras (2009): model

(i) Incentive compability constraint (or ICC) for ER,

$$(P_H - P_L)(1 - \phi_E - \phi_I)R(x) \geq (1 - \gamma)\delta(c)R(x)$$

$\rightarrow$ expropriation benefits from misbehaving should be smaller than the return when diligently engaging in project

(v) ICC for inventor I,

$$(P_H - P_L)\phi_I R(x) \geq CR(x)$$

$\rightarrow$ the extra return from high performance (as a result of monitoring) should be greater than the monitoring cost itself.

Pol Antras (2009): model

Model's Main Prediction

From (v) $(P_H - P_L)\phi_I R(x) \geq CR(x)$, we have the optimal equity share $\tilde{\phi}_I$, $\tilde{\phi}_I = \frac{\tilde{C}}{P_H - P_L}$ (2)

Because $\frac{1}{P_H - P_L} > 0$, $\tilde{\phi}_I$ and $\tilde{C}$ must be positively correlated, i.e., $corr(\tilde{\phi}_I, \tilde{C}) > 0$.

Then what determines optimal monitoring cost, $\tilde{C}$?

Remember $\frac{\partial^2 B}{\partial C \partial \gamma} > 0$, so we have $corr(\tilde{C}, \gamma) < 0$.

Combining the results above, we must have:

$$corr(\tilde{\phi}_I, \gamma) < 0 \ ,$$

$\rightarrow$ which says the higher investor protection γ, the lower equity share ϕ_I from inventor (or parent company)

Pol Antras (2009): empirical test

Data Sources:

- Again, BEA annual survey of US Direct Investment Abroad, 1982 to 1999
- This paper used BEA *benchmark* surveys in four years (1982 1989, 1994, 1999) --- more extensive than other years
- BEA annual BE-93 survey ---data for arm's length technology transfers, royalty payments, licensing fees, etc.
- Creditor rights are from DMS (2007), financial development level is proxied by private credit to GDP ratio, from BDL (1999).

Testable Hypotheses

PROPOSITION 1. The share of equity held by the inventor is decreasing both in investor protection γ in Foreign and in the inventor's shadow value of cash β.

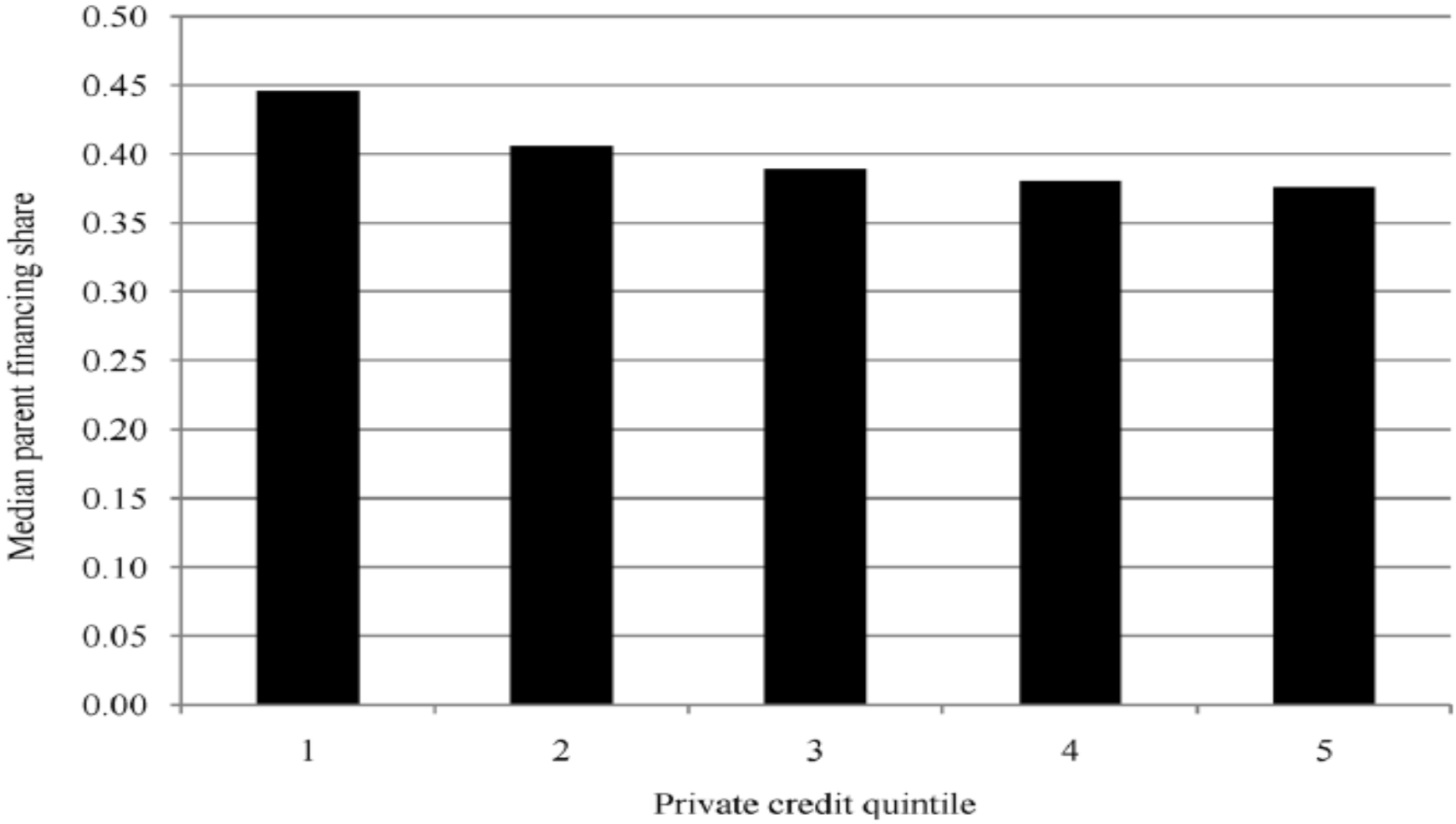
➔Priori expectation: negative coefficient

➔And implications on FDI flow

COROLLARY 1. Suppose that a transaction is recorded as an FDI transaction only if $\tilde{\phi}_I \geq \phi_I$.Then, there exists a threshold investor protection $\gamma^* \in [0, 1]$ such that the optimal contract entails FDI only if $\gamma < \gamma^*$.

➔ Priori expectation: negative coefficient between FDI share and investor protection, or positive coefficient between investor protection and share of arm's length technology transfer.

Share of Parent Financing and Level of Financial Development



Estimation Results

TABLE IV
PARENT OWNERSHIP DECISIONS

	Dependent variable: Share of affiliate equity owned by parent					
	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights	−0.0091	−0.0101	−0.0010			
	(0.0028)	(0.0035)	(0.0031)			
Creditor rights*			−0.0010			
log of parent R&D			(0.0003)			
Private credit				−0.0506	−0.0481	0.0078
				(0.0135)	(0.0174)	(0.0144)
Private credit*						−0.0057
log of parent R&D						(0.0009)

Share of Arm's Length Tech. Transfer and Level of Investor Protection

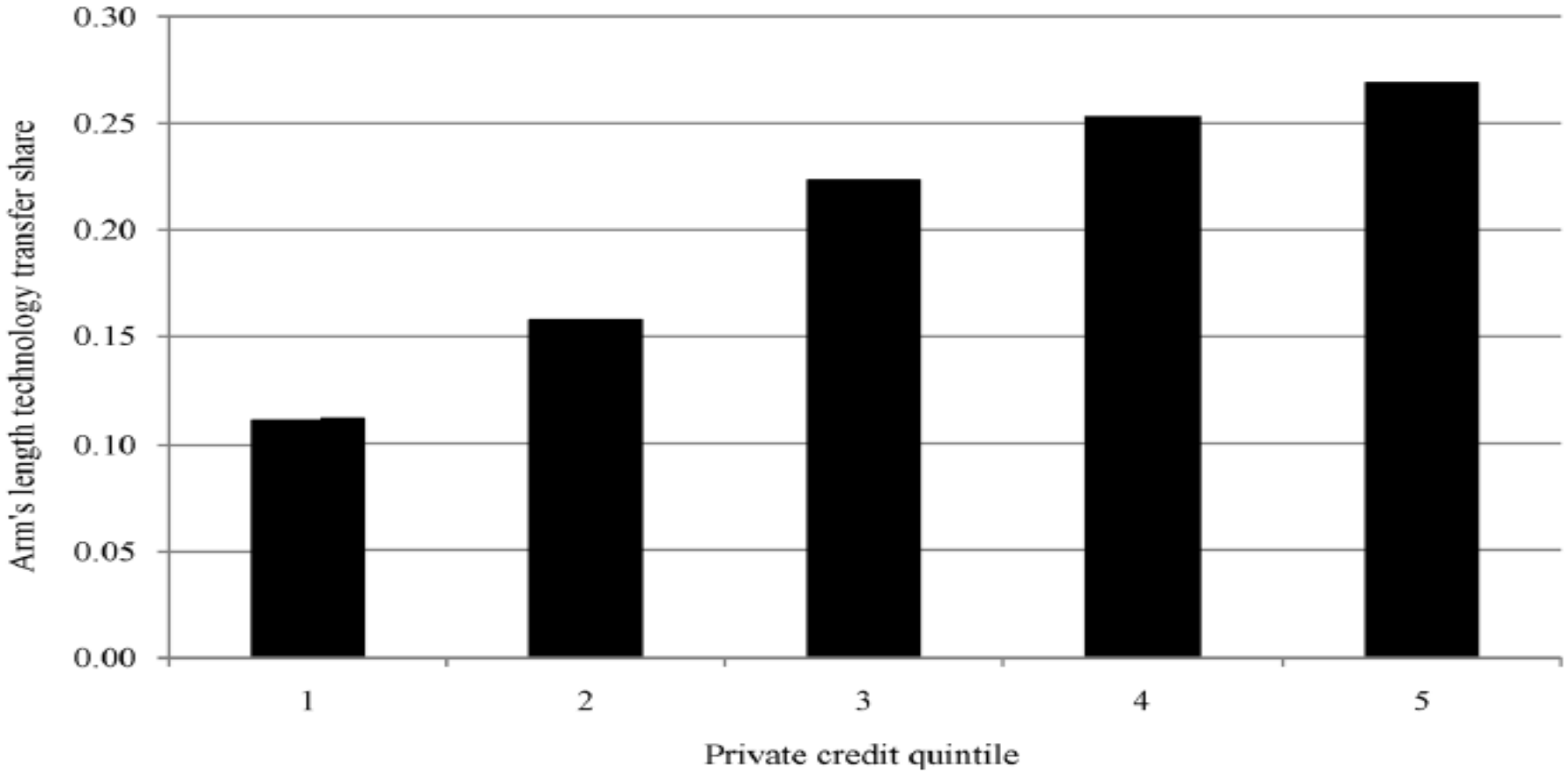


FIGURE I
Arm's Length Technology Transfer versus Direct Investment

Estimation Results

TABLE II

ARM'S LENGTH TECHNOLOGY TRANSFER VERSUS DIRECT INVESTMENT

	Dependent variable: Arm's length technology transfer dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights	0.0086	0.0131	0.0023			
	(0.0022)	(0.0026)	(0.0039)			
Creditor rights*			0.0016			
log of parent R&D			(0.0005)			
Private credit				0.0273	0.0295	−0.0606
				(0.0129)	(0.0147)	(0.0133)
Private credit*						0.0117
log of parent R&D						(0.0020)

Main Conclusions

- In contrast to Either (1986), multinational ownership arises
  - not from the uncertainty regarding valuation due to information assymetry
  - but from the need to monitor local agents in order to prevent potential mishavior or expropriation of property rights

- Property rights protection (here, investor rights protection) in host country is negatively associated with equity share of parent company (to achieve tighter monitoring)

- Similarly, investor protection is positively associated with arm's length transactions (relatively less FDIs) in host country, as the need for monitoring is less.

Next Time…

- We will dicuss MNE's impact on host countries' performance (firms, industries)
- Read Javorcik (AER, 2004), "Does FDI Increase the Productivity of Domestic Firms? In search of spillovers through backward linkages".
- **2nd group presentation**: Swenson, "Multinationals and the Creation of Chinese Trade Linkages." *Canadian Journal of Economics,* 2008.