Workshop on

"The Costs and Benefits of International Banking"
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Presentation to

"All banks great, small, and globa: Loan pricing and foreign

competition"

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All Banks Great, Small, and Global: Loan pricing and foreign competition

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Motivation

What happens to banks' market power when a country begins to allow foreign financial intermediation?

How do these changes in market structure affect aggregate output, consumption, and employment?

Foreign bank lending is important

- Cross-border lending by banks through foreign branches and at arms-length $> \$31$ trillion (BIS)

- $>$ half the size of world GDP (World Bank)

- $>$ one-third the size of foreign asset holdings totalled across all countries

Banking is an imperfectly competitive industry

- Almost one quarter of private lending worldwide originates from 15 multinational banks. (Bankscope, Euromoney)

- Empirically, we see net interest margins (NIMs) increase after liberalization toward takeovers by foreign banks, especially in developing countries

Modeling challenge

- current models of the open economy (FDI and trade) stress the role of heterogeneity in firm size

- current models of banks stress endogenous markups and head-to-head competition

- No existing model of global banks can address both issues at the same time without limiting the number of banks to ≤ 3

Existing literature

- Symmetric banks with arms-length foreign lending and endogenous entry
  - ▶ Agenor and Aizenman (2008), Ghironi and Stebunovs (2010), Olivero (2010)
- Heterogeneous banks with constant markups
  - ▶ Gerali, Neri, Sessa, and Signoretti (2010)
- Heterogeneous banks with FDI, limited number of banks
  - ▶ dell'Arriccia and Marquez (2008) and related innovations
- Heterogeneous banks with endogenous markups, all banks charge same interest rate
  - ▶ Mandelman 2006 and 2010

What we do

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  - Bertrand price competition
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- allow for arms-length cross-border lending
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- allow for takeovers of domestic banks by foreign ones
  - transfer of superior technology allows target bank to increase its markup without raising interest rates charged to borrowers

Consumers

- choose to consume or save real income
- save wealth in the form of bank deposits
- receive (endogenous) interest rate $\bar{r}$ on deposits

Firms

- a continuum on the [0,1] interval
- produce with identical technology

$$y(i) = h(i)^{1-\alpha}$$

- borrow to finance the wage bill (working capital)
- apply to a fraction n of all existing banks J when searching for a lender due to the burden of application fees
- get nJ interest rate quotes and use them to bargain with each potential lender

Banks

Transfer savings to firms in the form of working capital

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- have heterogeneous screening/monitoring abilities that yield marginal cost of lending $C_k(i)$, where $k = 1$ represents the lowest-cost bank to which some firm i applies for a loan
- charge a markup over the cost of lending, differs for each firm i
- markup never exceeds the point where MC=MR, $\bar{m}(i)$
- markup never exceeds the marginal cost of the second-best bank to which firm i applies

$$M(i) = \min\left\{\frac{C_2(i)}{C_1(i)}, \bar{m}(i)\right\}$$

Search

If we suppose that bank cost parameters are drawn from a Weibull distribution...

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then increasing the number of banks to which firms apply results (on average) in a lower markup and interest rate charged to any firm i.

Estimation and calibration

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Country	$\hat{T}$	$(\hat{T}_{low}, \hat{T}_{up})$	$\hat{\theta}$	$(\hat{\theta}_{low}, \hat{\theta}_{up})$
Germany	0.47	(0.32 , 0.66)	0.61	(0.53 , 0.70)
Greece	0.34	(0.14 , 0.61)	0.99	(0.73 , 1.34)
Switzerland	0.43	(0.22 , 0.63)	0.41	(0.35 , 0.47)
UK	0.35	(0.27 , 0.45)	0.77	(0.70 , 0.86)
USA	0.48	(0.45 , 0.52)	1.33	(1.28 , 1.39)

Bootstrapped 95% confidence intervals in parenthesis.
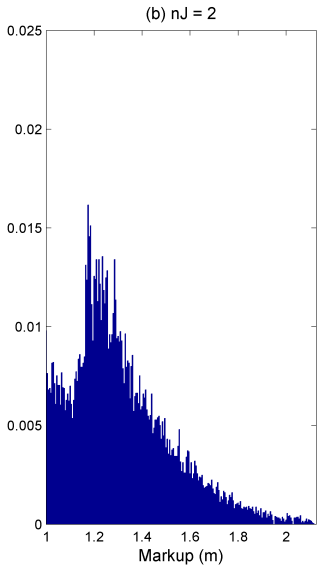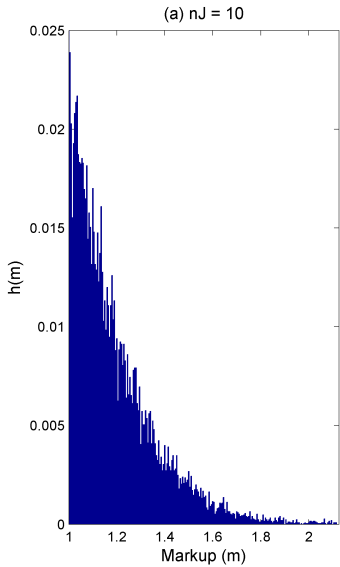
(a) nJ = 10

(b) nJ = 2

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Liberalizing to cross-border takeovers is quite different

- transfer of superior technology from parent makes a target bank even more efficient than its next best rival for any customer i
- markups increase
- target banks can not increase interest rates after a takeover (risk driving their customers to send out more loan applications)
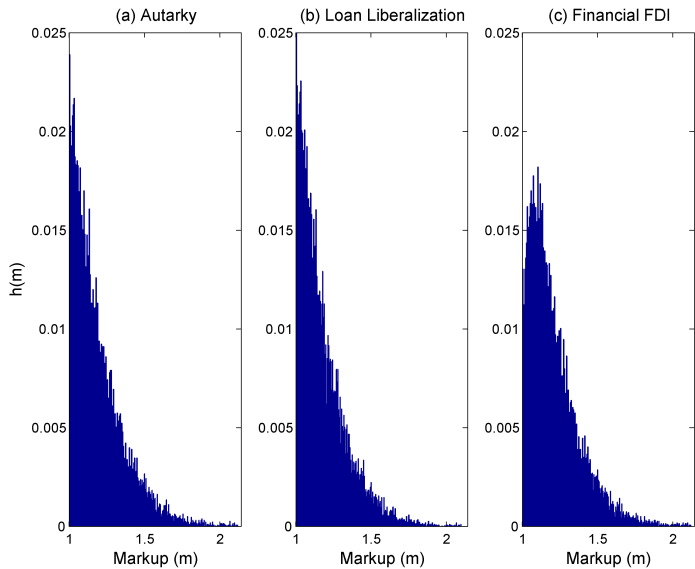
Effect of liberalization toward foreign lending

	%Δy	%Δq	%ΔM(i)	Δr(i)
(1) Symmetry, high domestic contestability	0.05	0.01	-1.01	-13 b.p.
$T = T^* = 0.48$, $n_h J = n_f^* J = 10$	(0.02)	(0.01)	(0.37)	(4 b.p.)
(2) Symmetry, low domestic contestability	0.62	0.37	-10.47	-221 b.p.
$T = T^* = 0.48$, $n_h J = n_f^* J = 2$	(0.17)	(0.06)	(1.31)	(33 b.p.)
(3) Asymmetry, high domestic contestability	1.81	0.32	-9.30	-519 b.p.
$T = 0.05$, $T^* = 1.52$, $n_h J = n_f^* J = 10$	(0.36)	(0.14)	(3.51)	(105 b.p.)
(4) Asymmetry, low domestic contestability	4.71	3.09	-14.07	-2214 b.p.
$T = 0.05$, $T^* = 1.52$, $n_h J = n_f^* J = 2$	(0.34)	(0.35)	(1.83)	(182 b.p.)
(5) Asymmetry, low domestic dispersion	1.00	-0.39	6.63	-144 b.p.
$T = 0.05$, $T^* = 1.52$, $n_h J = n_f^* J = 10$, $\theta = 4.4$	(0.13)	(0.10)	(3.83)	(19 b.p.)

Standard deviations are given in parenthesis. Changes in markups and interest rates are an average.

All changes are relative to autarkic levels. Level changes in interest rates are expressed in basis points.

Effect of liberalization toward foreign takeovers

	%Δy	%Δq	%ΔM(i)	Δr(i)
(1) Symmetry, high domestic contestability	0.02	-0.02	1.67	-0 b.p.
$T = T^* = 0.48$, $n_h J = n_f^* J = 10$	(0.02)	(0.02)	(0.71)	(0 b.p.)
(2) Symmetry, low domestic contestability	0.01	0.01	2.28	-4 b.p.
$T = T^* = 0.48$, $n_h J = n_f^* J = 2$	(0.03)	(0.03)	(0.64)	(2 b.p.)
(3) Asymmetry, high domestic contestability	0.47	-0.37	11.26	-33 b.p.
$T = 0.05$, $T^* = 1.52$, $n_h J = n_f^* J = 10$	(0.16)	(0.12)	(4.10)	(14 b.p.)
(4) Asymmetry, low domestic contestability	0.56	0.11	4.26	-216 b.p.
$T = 0.05$, $T^* = 1.52$, $n_h J = n_f^* J = 2$	(0.12)	(0.05)	(0.89)	(41 b.p.)
(5) Asymmetry, lower home dispersion	0.40	-0.42	18.97	0 b.p.
$T = 0.05$, $T^* = 1.52$, $n_h J = n_f^* J = 10$, $\theta = 4.4$	(0.06)	(0.07)	(3.31)	(0 b.p.)

Standard deviations are given in parenthesis. Changes in markups and interest rates are an average.

All changes are relative to autarkic levels. Level changes in interest rates are expressed in basis points.

Confronting the data

Our market structure effect from takeovers appears quantitatively important compared to information externalities.

- externality: merged banks can exploit new cost advantage over competitors by raising rates on continuing borrowers
  - ▶ only a few micro studies have matched data to explore this
  - ▶ Sapienza (2002), Montoriol-Garriga (2008), Hetland and Mjos (2010), Gormley (2010), Erel (2011)
  - ▶ no evidence that continuing borrowers face higher rates, despite obvious cherrypicking

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  - ▶ no evidence that continuing borrowers face higher rates, despite obvious cherrypicking
- borrowers dropped after merger should face higher rates from inferior lenders
  - ▶ only one micro study has matched data to explore this
  - ▶ Montoriol-Garriga (2008)
  - ▶ no statistically significant change in rates for borrowers who change lenders post-merger, even controlling for risk profile

Arms-length cross-border lending increases aggregate output, consumption, and employment more than cross-border takeovers

- especially when domestic contestability is low or domestic financial technologies are inferior (or both!!)

Cross-border takeovers have little effect on aggregate outcomes at all

Both policies are welfare-neutral

- decreasing returns to scale means that increases in working hours offset the effects of any increases in consumption on welfare

A new framework to analyze lending behavior when banks are large, small, and sometimes global.