Capital account liberalization and banking industry risks

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Motivation

Capital account liberalization

- Economic Growth: Eichengreen (2001); Quinn and Toyoda (2008)
- **Financial Crisis**: Singh (2003); Reinhart and Rogoff (2009)

Flaws in extant literature

Motivation

capital account liberalization $\Rightarrow$ banking industry risks

- The key role of financial intermediaries
- Informative dataset: bank-level
- Various dimensions of risks

Motivation

Capital account liberalization *does* significantly affect bank risks.

- Conditional on domestic financial freedom
- Trade-off among various risk dimensions
- Categories and directions matter
- Possible channel
  - Bank income structure
  - Bank debt structure

Empirical Methodology

- **Baseline model**: *Dynamic panel fixed-effect model*

$$RISK_{i,j,t} = \beta_0 + \beta_1 RISK_{i,j,t-1} + \beta_2 KA_{j,t} + \beta_3 DFR_{i,j,t} + \beta_4 KA_{j,t} * DFR_{i,j,t}$$
$$+\beta_5 BANK_{i,j,t} + \beta_6 MACRO_{j,t} + v_i + u_t + \varepsilon_{i,j,t}$$

- **Data**
  - Accounting data from *Bankscope*; Stock market data from *Datastream*
  - Filtering: 1%-99% (Weiβ *et al.*, 2014)

Range	**2000-2013**
Obs	**16,991**
Countries	**36 developed + 35 developing**
Bank types	725 commercial banks
	705 bank holding & holding companies
	38 saving banks
	27 cooperative banks

Measuring banking industry risks

- **Risk-taking**
  - Z-score, NPL and leverage: Laeven and Lavine (2009); Agoraki (2011)

$$Z - score = \frac{ROA + EA}{\sigma(ROA)}$$

- **Structural credit risk**
  - One-year ahead default probability
  - Moody's KMV model: Duan *et al.* (2005)
- **Systemic risk**
  - Marginal expected shortfall (MES): Acharya *et al.* (2010)

$$MES = \sum_{m:\ system\ in\ 5\%\ tail} r_{m,i,j,t}$$

- **Systematic and idiosyncratic risk**
  - Altunbas *et al.*(2015)

$$R_{i,j,t} = \beta_{i,j,t} R_{m,j,t} + \varepsilon_{i,j,t}$$

- **Total risk**
  - S.D. of daily log excess return of the banking industry

Measuring capital account liberalization

De jure

- Government's policy stance
- Fernandez *et al.* (2015): a dummy for each category $\Longrightarrow$ [0,1] indicator

De facto

- Actual size of cross-border capital flow
- Lane and Milesi-Ferretti (2007): *financial integration index*

Other included variables

Domestic financial freedom

- A [0,1] indicator provided by the Heritage Foundation

  - The extent of government regulation of financial services
  - The degree of state intervention in banks and other financial firms through direct and indirect ownership
  - The government influence on the allocation of credit
  - The extent of financial and capital market development
  - Openness to foreign competition

Control variables

- Determinants of risks
  ownership, regulation, competition, tier 1 capital ratio, loan/asset ratio, etc.

- Other control variables
  bank size, fixed asset ratio, rule of law, GDP per capita, GDP growth, etc.

Empirical Results

Baseline model

	Z-score	Systemic Risk	Total Risk
KA	**-0.868**	**0.030**	0.007
	(0.417)**	**(0.011)*****	(0.016)
Domestic	0.287	**0.040**	0.001
	(0.521)	**(0.012)*****	(0.015)
KA*Domestic	**2.412**	**-0.047**	-0.011
	(0.661)***	**(0.014)*****	(0.023)
	...	...	...
	...	...	...
N	7,487	6,216	732
R^2	0.63	0.68	0.47
Bank Effect	YES	YES	YES
Year Effect	YES	YES	YES

Empirical Results

Baseline model

	Z-score	Default	Systemic	Systematic	Idiosyncratic
KA	**-0.868**	0.016	**0.030**	**0.260**	**-0.007**
	(0.417)**	(0.158)	**(0.011)*****	**(0.121)****	**(0.002)*****
Domestic	0.287	-0.088	**0.040**	**0.403**	**-0.010**
	(0.521)	(0.193)	**(0.012)*****	**(0.142)*****	**(0.003)*****
KA*Domestic	**2.412**	-0.007	**-0.047**	**-0.363**	0.005
	(0.661)***	(0.233)	**(0.014)*****	**(0.166)****	(0.003)
	...	...	...	...	...
	...	...	...	...	...
N	7,487	2,377	6,216	5,613	5,613
R^2	0.63	0.55	0.68	0.78	0.88
Bank Effect	YES	YES	YES	YES	YES
Year Effect	YES	YES	YES	YES	YES

Liberalization Directions and Categories

- **Direction matters**

$$RISK_{i,j,t} = \beta_0 + \beta_1 RISK_{i,j,t-1} + \beta_2 DFR_{i,j,t} + \beta_3 InKA_{j,t} + \beta_4 OutKA_{j,t}$$
$$+\beta_5 InKA_{j,t} * DFR_{i,j,t} + \beta_6 OutKA_{j,t} * DFR_{i,j,t} + \beta_7 BANK_{i,j,t} + \beta_7 MACRO_{j,t} + v_i + u_t + \varepsilon_{i,j,t}$$

  - Buiter and Taci (2003); Giannetti (2007); Aizenman and Pasricha (2013)

- **Category matters**

$$RISK_{i,j,t} = \beta_0 + \beta_1 RISK_{i,j,t-1} + \beta_2 CategoryKA_{j,t} + \beta_3 DFR_{i,j,t}$$
$$+\beta_4 CategoryKA_{j,t} * DFR_{i,j,t} + \beta_5 BANK_{i,j,t} + \beta_6 MACRO_{j,t} + v_i + u_t + \varepsilon_{i,j,t}$$

Transmission mechanism

- **Outline**
  - *Capital account liberalization affects bank income and funding structure*

$$Fundingstructure_{i,j,t} = \beta_0 + \beta_1 Fundingstructure_{i,j,t-1} + \beta_2 KA_{j,t} + \beta_3 DFR_{i,j,t} + \beta_4 KA_{j,t} * DFR_{i,j,t} + \beta_5 BANK_{i,j,t} + \beta_6 MACRO_{j,t} + v_i + u_t + \varepsilon_{i,j,t}$$

$$Incomestructure_{i,j,t} = \beta_0 + \beta_1 Incomestructure_{i,j,t-1} + \beta_2 KA_{j,t} + \beta_3 DFR_{i,j,t} + \beta_4 KA_{j,t} * DFR_{i,j,t} + \beta_5 BANK_{i,j,t} + \beta_6 MACRO_{j,t} + v_i + u_t + \varepsilon_{i,j,t}$$

  - *Bank income and funding structure affects bank risks*

Transmission mechanism

- **Capital account liberalization affects bank income and funding structure**

	Deposit Funding	Noninterest Income Ratio
KA	**-7.937**	**8.547**
	(2.614)* **	**(4.018)** **
Domestic	**-9.871**	-3.654
	(3.065)* **	(4.251)
KA*Domestic	**8.168**	1.131
	(3.628) **	(5.735)
	...	...
	...	...
N	8,831	5,468
R^2	0.95	0.86
Bank Effect	YES	YES
Year Effect	YES	YES

Transmission mechanism

- **Bank income and funding structure affects bank risks**
  - **Literature**
    - Stiroh(2004); Demurgic-Kunt and Huizinga (2010); Lepetit et al. (2008); Baele et al. (2007); Wanger (2010); Brunnermeier et al. (2012)
  - **Our empirical approach**

$$RISK_{i,j,t} = \beta_0 + \beta_1 RISK_{i,j,t-1} + \beta_2 Fundingstructure_{i,j,t} + \beta_3 Fundingstructure^2_{i,j,t} + \beta_4 BANK_{i,j,t} + \beta_5 MACRO_{j,t} + v_i + u_t + \varepsilon_{i,j,t}$$

$$RISK_{i,j,t} = \beta_0 + \beta_1 RISK_{i,j,t-1} + \beta_2 Incomestructure_{i,j,t} + \beta_3 Incomestructure^2_{i,j,t} + \beta_4 BANK_{i,j,t} + \beta_5 MACRO_{j,t} + v_i + u_t + \varepsilon_{i,j,t}$$

Transmission mechanism

- **Bank funding structure affects bank risks**

	Z-score $*10^3$	Default $*10^3$	Systemic $*10^3$	Systematic $*10^3$	Idiosyncratic $*10^3$
Deposit Funding	**19.084**	-1.770	**(0.022**	-1.988	**0.090**
	(7.032)* **	(2.822)	**(0.156)***	(1.752)	**(0.033)*** **
Deposit Funding2	**-0.195**	0.003	-0.001	0.019	**-0.001**
	(0.058)* **	(0.022)	(0.001)	(0.013)	**(0.000)*** **
	...	...	...	...	...
	...	...	...	...	...
N	7,402	2,383	6,261	5,644	5,644
R^2	0.62	0.54	0.68	0.78	0.88
Bank Effect	YES	YES	YES	YES	YES
Year Effect	YES	YES	YES	YES	YES

Transmission mechanism

- **Bank income structure affects bank risks**

	Z-score $*10^3$	Default $*10^3$	Systemic $*10^3$	Systematic $*10^3$	Idiosyncratic $*10^3$
Nonin Share	**3.455**	-0.296	0.020	**-0.777**	0.000
	(1.893)*	(0.264)	(0.025)	**(0.191)*****	(0.003)
Nonin Share2	**-0.029**	-0.001	-0.001	-0.000	**0.000**
	(0.010)***	(0.001)	(0.000)	(0.001)	**(0.000)*****
	...	...	...	...	...
	...	...	...	...	...
N	5,237	1,441	4,488	4,072	4,072
R^2	0.66	0.70	0.71	0.87	0.86
Bank Effect	YES	YES	YES	YES	YES
Year Effect	YES	YES	YES	YES	YES

Robustness check

- **Issues of endogeneity**
  - 2000-2007 subsample
  - GMM-IV: lagged value
- **Sample selection**
  - including non-listed banks
- **Measurements**
  - De jure index of capital account liberalization
  - Alternative measurements of banking industry risks

Conclusion

- A new framework for analyzing policy
- Potential Trade-off of capital account liberalization on banking industry risks
- Possible transmission channels

- The importance of liberalization sequence
- Monetary policy and regulations: identifying the risk-taking channels

Thank You!