Industry growth and capital allocation:

Does having a market- or bank-based system matter?

Beck and Levine

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Situation: Where we are?

KAIST

- Long debate on merits of bank-based and market-based financial system
  - Allen and Gale(1999), Boot and Thakor(1997), Gerschenkron(1962) Levine(1997), Stiglitz(1985), Stulz(2002), etc.

- Recently, Levine (2000) and Kunt &Maksimovic (2002) documented financial system's effect on economic growth.
  - None of financial system' s effects on economies
  - But, only focuses on GDP growth

Introduction

- GDP growth is not the only one for economic growth

- Should consider
  I. Industrial size expansion
  II. New establishment(or start-ups) creation
  III. Efficiency of capital allocation

Introduction

I. Are "*market-based or bank-based financial systems*" better at (a) industrial expansion, (b) new establishment creation, and (c) efficiency of capital allocation?

II. Is "*the developed financial market*" better at (a) industrial expansion, (b) new establishment creation, and (c) efficiency of capital allocation?

III. Is "*the developed legal environment*" better at (a) industrial expansion, (b) new establishment creation, and (c) efficiency of capital allocation?

Main Findings

I. Neither the bank-based nor market-based help industrial growth or efficiency of capital allocation.

II. Industries that are heavy users of external finance grow faster in countries with higher level of financial development and in countries with efficient legal systems.

Hypothesis Development:
Pros for bank-based system

Powerful banks…

- induce firms to reveal info.
  Gerschenkron (1962)
- provide affordable debt through economies of scale and scope
  Gerschenkron (1962)
- funnel staged financing through credible commitment
  Stulz (2002)
- impede hold-out problem and increase takeover threats
  Grossman and Hart (1980)

Hypothesis 1

: <u>Bank-based system promotes industry growth and capital allocation</u>

Hypothesis Development:
Cons for bank-based system

Powerful banks…

- stymie innovation by extracting informational rents from firms
  Hellwig (1991) Rajan (1992)
- reduce firm's incentives to take profitable projects due to extraction of large share of profits
  Rajan (1992)
- have an conservative bias
  Weinstein and Yafeh (1998) Morck and Nakamura (1999)
- can collude with managers against other outside investors hence make ineffective corporate control
  Hellwing (1998) Wenger and Kaserer (1998)

Hypothesis 2

: <u>Market-based system promotes industry growth and capital allocation</u>

Hypothesis Development:
Financial Development

- Neither the bank-based nor market-based financial system affects economies

- Developed financial market promotes growth through reduction in informational and transaction costs

  Levine (1997)

Hypothesis 3

: Developed financial markets promote industry growth and capital allocation

Hypothesis Development:
Legal Environment

- Legal systems that protect outside investors by enforcing contracts boost financial development

Hypothesis 4

:Legal efficiency promotes industry growth and capital allocation

Hypothesis Development: Summary

I. "Bank-based system" promotes industry growth and capital allocation

II. "Market-based system" promotes industry growth and capital allocation

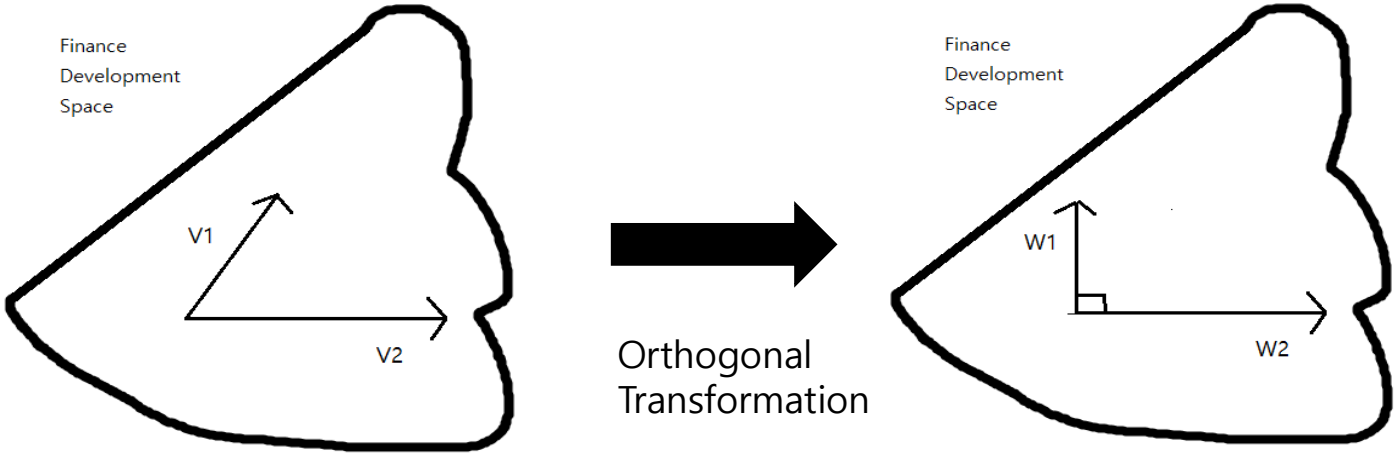
III. "Developed financial markets" promote industry growth and capital allocation

IV. "Legal efficiency" promotes industry growth and capital allocation

Data and Variables:
Data construction method

- **Principal Component Analysis (PCA)**

  e.g.) Choose 2 proxies, v1 & v2 that represent financial development



Choose the one of w1 and w2 which has large variance

Expected outcome: Find a measurement that ***represents*** financial development space ***well*** & ***reduce multicollinearity***

Data and Variables:
Dependent variables

KAIST

I. Industrial size expansion (var. Industry growth)

Annual growth rate of real value added(=cash+labor expense)

II. New establishment creation (var. Establishment growth)

Annual growth in the number of establishments

from Industrial Statistics Yearbook database

III. Efficiency of capital allocation (var. Industry elasticity)

Choose beta from following reg.

$$\mathrm{Ln}(I_{i,c,t}/I_{i,c,t-1}) = \alpha_c + \beta_c \mathrm{Ln}(V_{i,c.t}/V_{i,c,t-1}) + U_{i,c,t}$$

where I: gross fixed capital and V: value-added

from Industrial Statistics Yearbook database

Data and Variables:
Main independent variables

Indicators of financial structure

I. Structure-Aggregate

1st principal component of $\log(\frac{Value-Traded}{Bank\ Credit})$ and $\log(\frac{Mkt\ Capitalization}{Bank\ Credit})$

II. Restrict

Survey data about whether bank activities
(1) unrestricted, (2) permitted, (3) restricted (4) prohibited
computed in Barth (2001) based on survey WorldBank "bank regulation and supervision"

III. State-Ownership

Government ownership of 10 largest banks
computed in La Porta (2002)

Data and Variables:
Main independent variables

Indicators of financial development (var. Finance-Aggregate)

1st principal component of

$\log(\text{Private Credit} * \text{ValueTraded})$ &

$\log(\text{Private Credit} + \text{Mkt Capitalization})$

Indicators of legal environment (var. Judicial Efficiency)

Judicial Efficiency Index

computed from rating agency Business International Corporation

Data and Variables:
Industry Characteristic Factor

Indicators of external dependence

$$\frac{CAPEX - Cash}{CAPEX}$$

from Standard and Poor's Compustat

Indicators of labor intensity

$$\frac{Wages\ paied\ to\ employees}{Value\ Added}$$

from United Nations Industrial Development Organization's database

Indicators of R&D intensity

$$\frac{R\&D\ expenses}{Value\ Added}$$

from OECD Main Industrial Indicators database

Empirical Model

Model 1:

$$Growth_{i,k} = \sum_j \alpha_j Country_j + \sum_l \beta_l Industry_l + \gamma Share_{i,k} + \delta_1 (External_k * FD_i) + \delta_2 (External_k * FS_i) + \varepsilon_{i,k}, \quad (1)$$

i: country index, k: industry index

Empirical Model

Growth: Industrial expansion or New establishment creation

Model 2:

$$Elasticity_i = \delta_0 + \delta_1 FD_i + \delta_2 FS_i + \varepsilon_i$$

i: country index

Elasticity: Efficiency of capital allocation

RESULTS

A. Cross-country, cross industry						B. Cross-country				
	External dependence			Labor intensity			R&D intensity		Industry elasticity	
	(1) Industry growth	(2) Establishment growth		(3) Industry growth	(4) Establishment growth		(5) Industry growth	(6) Establishment growth		(7) Industry elasticity
Interaction (external dependence × Structure-Aggregate)	−2.595	0.011	Interaction (labor intensity × Structure-Aggregate)	−7.133	−1.946	Interaction (R&D intensity × Structure-Aggregate)	−0.138	−0.059	Structure-Aggregate	0.003
	(0.116)	*(0.992)*		*(0.243)*	*(0.711)*		*(0.297)*	*(0.566)*		*(0.948)*
Interaction (external dependence × Finance-Aggregate)	4.302	2.753	Interaction (labor intensity × Finance-Aggregate)	1.568	2.944	Interaction (R&D intensity × Finance-Aggregate)	0.146	0.117	Finance-Aggregate	0.159
	(0.002)	*(0.009)*		*(0.787)*	*(0.579)*		*(0.208)*	*(0.182)*		*(0.007)*
Countries	41	35	Countries	41	35	Countries	41	35	Countries	39
Observations	1222	1082	Observations	990	884	Observations	329	298		

RESULTS

A. Cross-country, cross-industry						B. Cross-country				
	External dependence			Labor intensity			R&D intensity		Industry elasticity	
	(1) Industry growth	(2) Establishment growth		(3) Industry growth	(4) Establishment growth		(5) Industry growth	(6) Establishment growth		(7) Industry elasticity
Interaction (external dependence × Restrict)	0.170	0.170	Interaction (labor intensity × Restrict)	1.859	−0.315	Interaction (R&D intensity × Restrict)	0.015	0.020	Restrict	−0.032
	(0.679)	*(0.508)*		*(0.269)*	*(0.783)*		*(0.525)*	*(0.277)*		*(0.061)*
Interaction (external dependence × Finance-Aggregate)	2.713	3.030	Interaction (labor intensity × Finance-Aggregate)	−0.608	0.932	Interaction (R&D intensity × Finance-Aggregate)	0.060	0.096	Finance-Aggregate	0.134
	(0.053)	*(0.001)*		*(0.900)*	*(0.810)*		*(0.314)*	*(0.030)*		*(0.007)*
Countries	40	35	Countries	40	35	Countries	40	35	Countries	37
Observations	1190	1082	Observations	964	884	Observations	322	298		

RESULTS

A. Cross-country, cross-industry						B. Cross country				
	External dependence			Labor intensity			R&D intensity		Industry elasticity	
	(1) Industry growth	(2) Establishment growth		(3) Industry growth	(4) Establishment growth		(5) Industry growth	(6) Establishment growth		(7) Industry elasticity
Interaction (external dependence × State Ownership)	0.002 *(0.980)*	0.030 *(0.462)*	Interaction (labor intensity × State Ownership)	0.370 *(0.233)*	−0.093 *(0.595)*	Interaction (R&D intensity × State Ownership)	0.005 *(0.271)*	0.004 *(0.269)*	State Ownership	−0.002 *(0.327)*
Interaction (external dependence × Finance-Aggregate)	2.375 *(0.066)*	3.290 *(0.001)*	Interaction (labor intensity × Finance-Aggregate)	3.532 *(0.595)*	−0.321 *(0.945)*	Interaction (R&D intensity × Finance-Aggregate)	0.130 *(0.196)*	0.130 *(0.058)*	Finance-Aggregate	0.133 *(0.032)*
Countries	41	35	Countries	41	35	Countries	41	35	Countries	39
Observations	1222	1082	Observations	990	884	Observations	329	298		

RESULTS

A. Cross-country, cross-industry						B. Cross-country								
	Structure-Aggregate			Restrict			State Ownership		Industry elasticity					
	(1) Industry growth	(2) Establish-ment growth		(3) Industry growth	(4) Establish-ment growth		(5) Industry growth	(6) Establish-ment growth		(7) Industry elasticity		(8) Industry elasticity		(9) Industry elasticity
Interaction (external dependence × Structure-Aggregate)	−1.173	0.096	Interaction (external dependence × Restrict)	−0.021	0.274	Interaction (external dependence × State Ownership)	−0.042	0.009	Structure-Aggregate	0.031	Restrict	−0.031	State Ownership	−0.002
	(0.551)	*(0.929)*		*(0.965)*	*(0.310)*		*(0.618)*	*(0.832)*		*(0.460)*		*(0.081)*		*(0.175)*
Interaction (external dependence × Judicial Efficiency)	1.265	1.061	Interaction (external dependence × Judicial Efficiency)	0.873	1.295	Interaction (external dependence × Judicial Efficiency)	0.577	1.157	Judicial Efficiency	0.075	Judicial Effciency	0.68	Judicial Effciency	0.064
	(0.012)	*(0.006)*		*(0.089)*	*(0.001)*		*(0.325)*	*(0.004)*		*(0.001)*		*(0.001)*		*(0.010)*
Countries	40	35	Countries	40	35	Countries	40	35	Countries	37	Countries	36	Countries	37
Observations	1190	1082	Observations	1190	1082	Observations	1190	1082	Observations	37	Observations	36	Observations	37

Conclusions

- Neither the bank-based nor market-based help industrial growth or efficiency of capital allocation.

- Industries that are heavy users of external finance grow faster in countries with higher level of financial development and in countries with efficient legal systems.

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