

The 19th *Seoul Journal of Economics* International Symposium  
co-hosted by the WCU and BK21 Economics Program

# **Comparative Evolution of the East Asian Firms**

**November 3, 2011**

International Conference Room (#340),  
College of Social Sciences (Bldg. 16),  
Seoul National University

**Organized by  
Institute of Economic Research,  
Seoul National University,  
Department of Economics,  
Seoul National University (WCU, BK21)**



*The 19th SJE-WCU-BK21 International Symposium*

## **Comparative Evolution of the East Asian Firms**

November 3 (Thursday), 2011

Location: International Conference Room (#340), Bldg. #16, Seoul National University

**09:00–09:20 Registration**

**09:20–09:30 Welcoming Remarks**

*Keehyun Hong* (Department Chairman, Seoul National University)

**Introduction of the Symposium**

*Keun Lee* (Seoul National University)

**09:30–12:00 Session I: Evolution of Business Groups in Asia**

**Chair:** *Keehyun Hong* (Seoul National University)

**Speaker 1:** *Asli M. Colpan* (Kyoto University)

**“Competitive Dynamics of Business Groups in Late-Industrialization”**

**Discussants:** *Youngjae Lim* (Korea Development Institute)

and *Hyun Jong Kim* (Korea Economic Research Institute)

[Short break]

**Speaker 2:** *Takashi Hikino* (Kyoto University)

**“Business Groups in Japan: Too Many Categories, Too Much Confusion”**

**Discussants:** *Woochan Kim* (Korea Development Institute)

and *Sung Wook Joh* (Seoul National University)

**Speaker 3:** *Keun Lee* (Seoul National University)

**“The Evolution of Business Groups in Korea”**

**Discussants:** *Hicheon Kim* (Korea University)

and *Jin Bang Kim* (Inha University)

**12:00–14:00 Luncheon Keynote Speech (Faculty Conference Room, #312)**

**Speaker:** *Masahiko Aoki* (Stanford University)

**“Evolution of the Firms and Institutions in East Asia”**

**Chair:** *Keun Lee* (Seoul National University)

**Discussants:** *Chenggang Xu* (The University of Hong Kong)

and *Keunkwan Ryu* (Seoul National University)

**14:00–14:15 Coffee Break**

**14:15–15:55 Session II: Firms in China**

**Chair:** *Byung-Yeon Kim* (Seoul National University)

**Speaker 4:** *Chenggang Xu* (The University of Hong Kong)

**“Political Rents and Firms in China”**

(Co-authored with *Di Guo*, *B-Y Kim* and *KunJiang*)

**Discussants:** *Woojin Kim* (Seoul National University),  
and *Donghoon Hahn* (The Catholic University of Korea)

**Speaker 5:** *Di Guo* (The University of Hong Kong)

**“Venture Capital Investment and the Growth of Entrepreneurial Firms:  
Evidence from China”**

(Co-authored with *KunJiang*)

**Discussants:** *Jooyoung Kwak* (Yonsei University)  
and *Young-Sam Kang* (WCU, Department of Economics, Seoul National University)

**15:55–16:10 Coffee Break**

**16:10–17:50 Session III: Comparing Firms in Korea, Japan, and U.S.A.**

**Chair:** *Jisoon Lee* (Seoul National University)

**Speaker 6:** *Tsutomu Miyagawa* (Gakushuin University)

**“Comparing the Management Practices of the Korean and Japanese Firms,  
Based on the Joint Survey”**

**Discussants:** *Jeong-Dong Lee* (Seoul National University)  
and *Elias Sanidas* (Seoul National University)

**Speaker 7:** *Buru Im* (BK21, Department of Economics, Seoul National University)

**“Comparing the Catching-up Firms with the Advanced Firms: Korea vs.  
U.S.A.”**

(Co-authored with *Keun Lee*)

**Discussants:** *Yongyul Kim* (Hongik University)  
and *Woo seok Ok* (University of Incheon)

**17:50–18:00 Concluding Remarks**

**19:00–20:30 Dinner**

**Organizer**

*Keun Lee* (Editor, Seoul Journal of Economics, Seoul National University, Tel: 02-880-5434,  
E-mail: [sje@plaza.snu.ac.kr](mailto:sje@plaza.snu.ac.kr))

*Byung-Yeon Kim* (Visiting Professor at Kyoto University, Director, World Class University,  
Seoul National University, Tel: 02-880-6393, E-mail: [kimby@snu.ac.kr](mailto:kimby@snu.ac.kr))

## **Session I: Evolution of Business Groups in Asia**

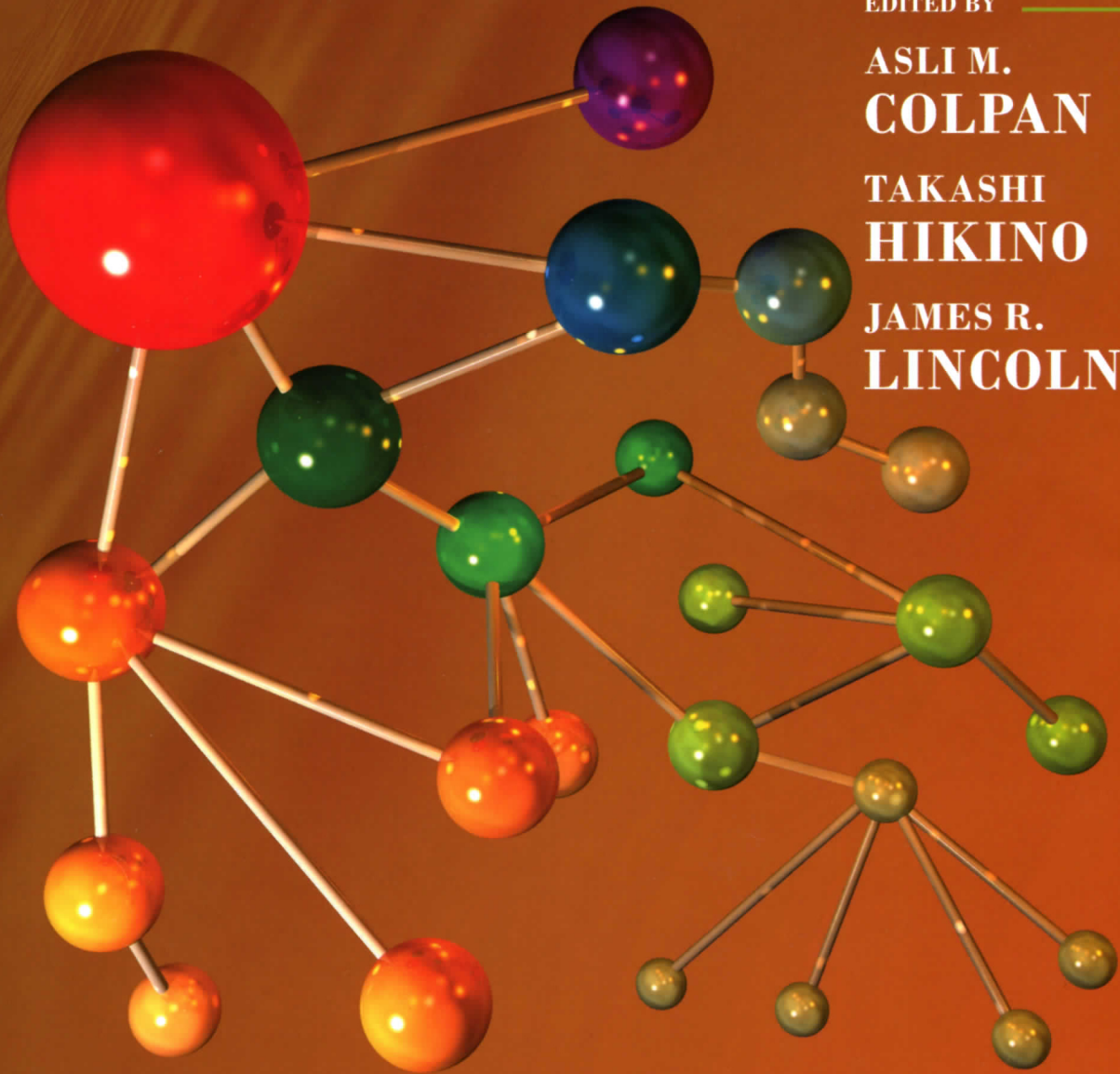


EDITED BY

ASLI M.  
**COLPAN**

TAKASHI  
**HIKINO**

JAMES R.  
**LINCOLN**



≡ The Oxford Handbook *of*  
**BUSINESS**  
**GROUPS**

# **CONTENTS**

*List of Figures*

*List of Tables*

*Abbreviations*

*Notes on Contributors*

1. Introduction

Asli M. Colpan, Takashi Hikino and James R. Lincoln

## **PART I: THEORETICAL AND HISTORICAL OVERVIEW**

2. Foundations of business groups: Toward an integrated framework

Asli M. Colpan and Takashi Hikino

3. Business groups in historical perspectives

Geoffrey Jones and Asli M. Colpan

## **PART II: NATIONAL EXPERIENCES OF BUSINESS**

### **Group 1: Asia**

4. Business groups in prewar Japan: Historical formation and legacy

Hideaki Miyajima and Shinya Kawamoto

5. Business networks in post-war Japan: Whither the *keiretsu*?

James R. Lincoln and Masahiro Shimotani

6. Business groups in South Korea

Hicheon Kim

7. Business groups in Taiwan

Chi-Nien Chung and Ishtiaq P. Mahmood

8. Business groups in China

Keun Lee and Young Sam Kang

9. Business groups in Thailand

Akira Suehiro and Natenapha Wailerdsak

10. Business groups in Singapore

Lai Si Tsui-Auch and Toru Yoshikawa

11. Business groups in India

Jayati Sarkar

### **Group 2: Latin America**

12. Business groups in Argentina

Eduardo Fracchia, Luiz Mesquita and Juan Quiroga



13. Business groups in Brazil  
Dante M. Aldrighi and Fernando A. S. Postali

14. Business groups in Chile  
:Fernando Lefort

15. Business groups in Mexico  
Taeko Hoshino

### **Group 3: The Middle East, Eastern Europe, and Africa**

16. Business groups in Israel  
Konstantin Kosenko and Yishay Yafeh

17. Business groups in Turkey  
Asli M. Colpan

18. Business groups in Russia  
Sergei Guriev

19. Business groups in South Africa  
Andrea Goldstein

### **PART III: ECONOMIC, SOCIOPOLITICAL AND MANAGERIAL UNDERPINNINGS OF BUSINESS GROUPS**

20. Business groups in emerging markets: Paragons or parasites?  
Tarun Khanna and Yisyah Yafeh

21. The Riddle of the great pyramids  
Randall Morck

22. Economic institutions and the boundaries of business groups  
Richard N. Langlois

23. Business groups and the state: The politics of expansion, restructuring and collapse  
Ben Ross Schneider

24. Corporate governance of business groups  
Brian K. Boyd and Robert E. Hoskisson

25. The kin and the professional: Top leadership in family business groups  
Behlul Usdiken

26. Diversification strategy and business groups  
Andrew Delios and Xufei Ma

27. Capability building in business groups  
Mauro Guillen

28. Technological innovation and business groups  
Mike Hobday and Asli M. Colpan



# **“Competitive Dynamics of Business Groups in Late-Industrialization”**

*Asli M. Colpan* (Kyoto University)





## Competitive Dynamics of Business Groups in Late-Industrialization

The 19<sup>th</sup> SJE-WCU-BK21 International Symposium

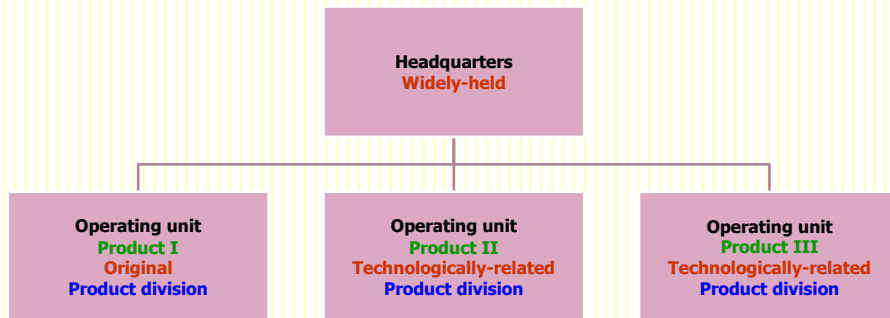
November 3, 2011

Kyoto University  
Graduate School of Management and The Hakubi Center  
Associate Professor  
Asli M. Colpan

## Big Business in Mature Industrial Economies

- Industry-specific large enterprises play a key role.  
=> **Multidivisional enterprises** diversifying into **related product categories**.
- A numerous and scattered shareholders own the enterprises, while professionals manage the enterprises.  
=> The principle of **separation of ownership and control**
- Today's textbooks present this type as the **typical and most effective model of big business**.

## Multidivisional Structural Model



## Typical Structure of the Multidivisional Enterprise (DuPont, 1922)

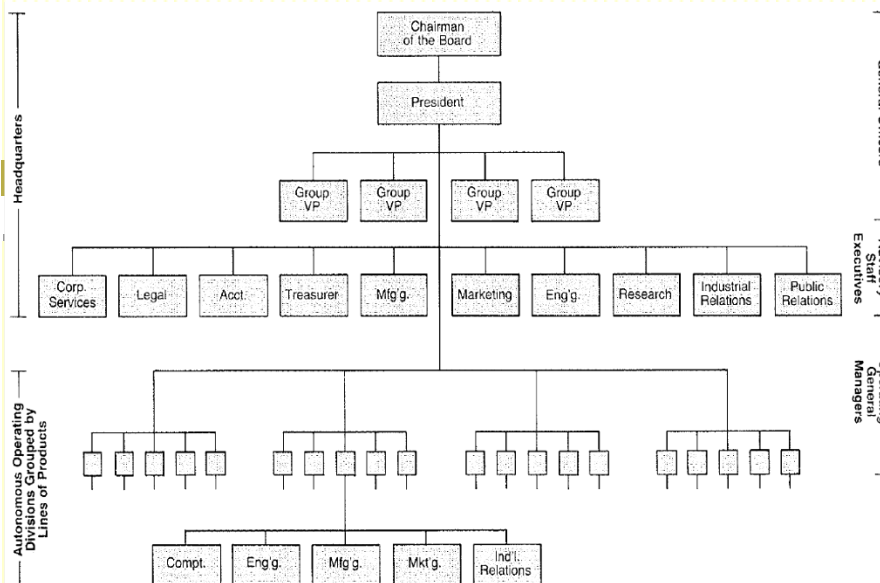


Table 2.3. *Distribution of the 200 largest industrial enterprises in the United States, by industry, ranked by assets, 1917–1988*

Group	Industry	1917	1930	1948	1973	1988
20	Food	29	31	27	22	18
21	Tobacco	6	5	5	3	3
22	Textiles	6	4	8	3	2
23	Apparel	3	0	0	0	1
24	Lumber	3	4	2	3	7
25	Furniture	0	1	1	0	1
26	Paper	5	8	6	10	9
27	Printing and publishing	2	2	2	1	9
28	Chemicals	20	20	23	28	40
29	Petroleum	22	26	22	26	18
30	Rubber	5	5	5	5	1
31	Leather	4	2	2	0	0
32	Stone, clay, and glass	5	8	6	8	6
33	Primary metals	31	23	23	18	10
34	Fabricated metals	11	10	6	4	5
35	Machinery	17	19	23	13	13
36	Electrical machinery	5	5	7	15	21
37	Transportation equipment	24	23	29	22	20
38	Instruments	1	2	1	2	4
39	Miscellaneous	1	2	2	1	1
—	Conglomerate	0	0	0	16	11
	Total	200	200	200	200	200

Sources: For 1917, 1930, 1948, and 1973, Alfred D. Chandler, Jr., *Scale and Scope: Dynamics of Industrial Capitalism* (Cambridge, Mass.: Harvard University Press, 1990), p. 19, with some modifications for the 1973 figures based on new information. For 1988, compiled, classified, and calculated from the *Fortune* 500, 1988 in *Fortune*, 24 April 1989, pp. 345–399. Industrial classification for individual companies is checked against information in *Moody's Industrial Manual*.

Table 2.9. *Industrial distribution of the 500 largest industrial enterprises in the world, 1962 and 1993 (ranked by sales)*

SIC	Industry	1962	1993
20	Food	53	47
208	Beverages	10	16
21	Tobacco	9	5
22	Textiles	24	8
23	Apparel	0	2
24	Lumber	0	0
25	Furniture	0	0
26	Paper	22	23
27	Printing and publishing	5	12
28	Chemicals	36	53
283	Drugs and pharmaceuticals	23	26
29	Petroleum	36	48
30	Rubber	9	11
31	Leather	0	0
32	Stone, clay, and glass	14	21
33	Primary metals	79	39
34	Fabricated metal products	10	8
35	Nonelectrical machinery	39	26
357	Office and computing machines	9	18
36	Electrical machinery	44	39
37	Transportation equipment	62	59
38	Instruments	1	10
39	Miscellaneous	11	4
—	Conglomerates	0	12
—	Diversified groups	1	13
	Total	497	500

Note: Enterprises, including private and state-owned, are from market economies only and are ranked by sales. Firms included are manufacturers which often engage in such related activities as mining and distribution. Because of the lack of adequate data 497 companies are listed for 1962. The companies of late industrialization may be underrepresented thanks to different corporate structures and disclosure standards.  
Source: For 1962, adopted and reorganized from John H. Dunning and Robert D. Pearce, *The World's Largest Industrial Enterprises, 1962–1983* (New York: St. Martin's Press, 1985), pp. 51, 171–180. For 1993, compiled and reorganized from "Fortune's Global 500," *Fortune*, 25 July 1994.

Table 2.10. Country distribution of the 500 largest industrial enterprises in the world, 1962 and 1993 (ranked by sales)

Country	1962	1993
<i>Developed market economies (except Japan)</i>		
United States	298	160
Great Britain	55	43
Germany	36	32
France	27	26
Sweden	8	12
Australia	2	10
Switzerland	6	9
The Netherlands	5	9
Canada	13	7
Italy	7	7
Belgium	3	4
Spain	0	3
Norway	0	3
Finland	0	3
Austria	1	2
Others	0	3
Total	462	333
Japan	31	135
<i>Late-industrializing countries</i>		
South Korea	0	11
South Africa	2	4
India	1	5
Mexico	1	3
Turkey	0	3
Others	0	6
Total	4	32
Total	497	500

*Note:* Enterprises, including private and state-owned, are from market economies only and are ranked by sales. Firms included are manufacturers which often engage in such related activities as mining and distribution. Because of the lack of adequate data 497 companies are listed for 1962. The companies of late industrialization may be underrepresented thanks to different corporate structures and disclosure standards. Country identification is based on the location of the headquarters, not the legal address of incorporation. Schulumberger for 1962 and McDermott International for 1993, therefore, are both classified as U.S. corporations.

*Source:* For 1962, adopted and reorganized from John H. Dunning and Robert D. Pearce, *The World's Largest Industrial Enterprises, 1962-1983* (New York: St. Martins Press, 1985). For 1993, compiled and reorganized from "Fortune's Global 500," *Fortune*, 25 July 1994.

## The Contribution of Business Groups to National Economies

- The economic role of business groups in late industrialization
- The emergence, resilience and effectiveness of business groups



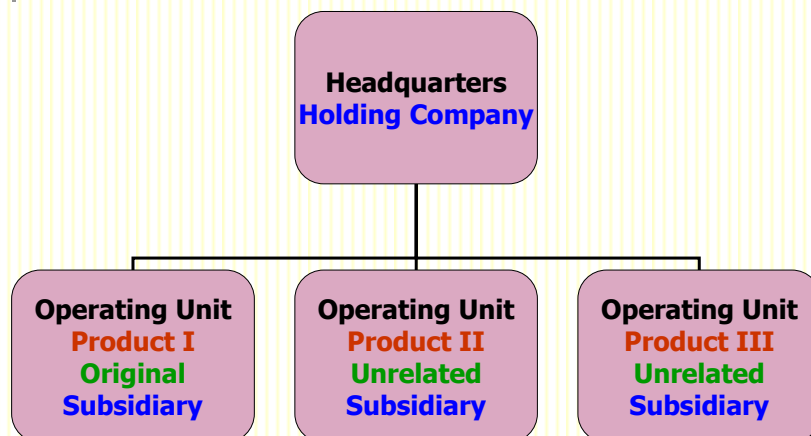


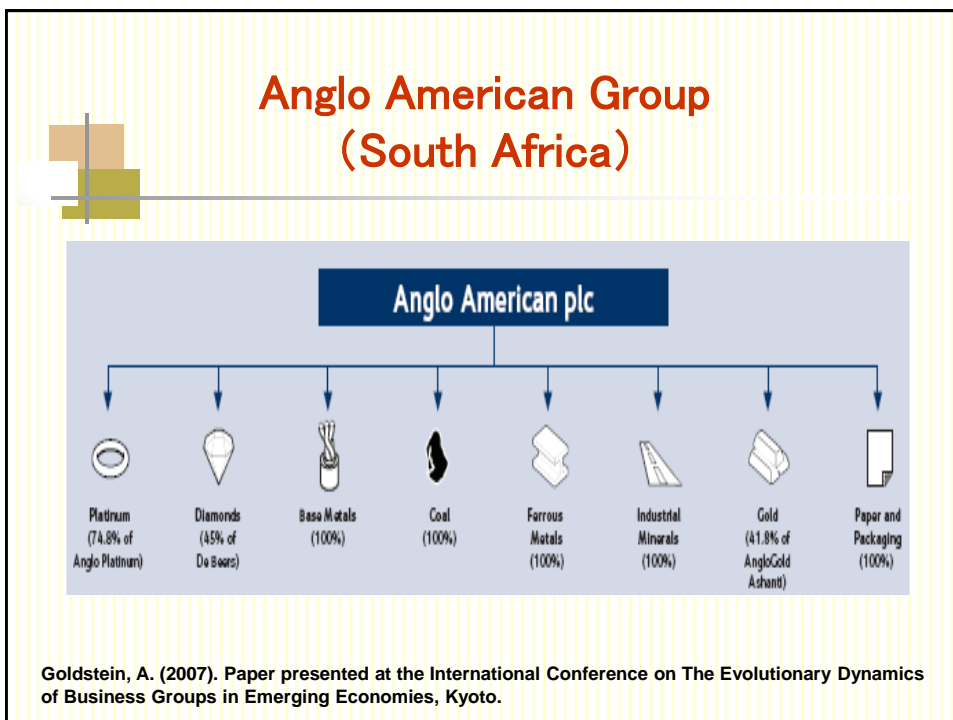
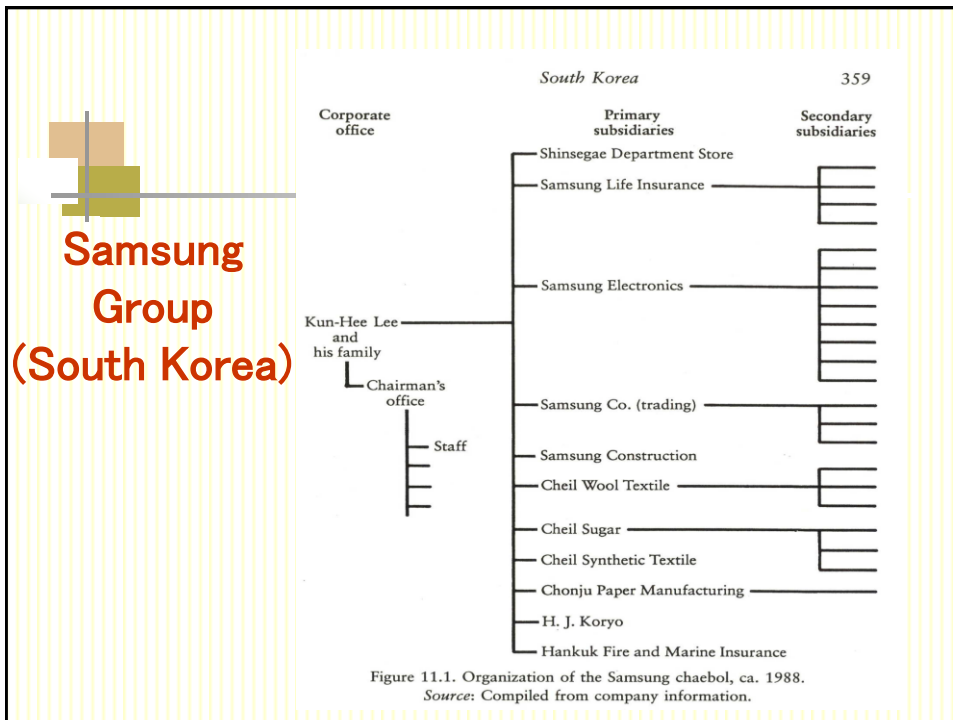
## A Working Definition of Business Groups

- A generic form of large enterprises that mostly exhibit the extensive portfolio of unrelated products and industries
- Central control and equity ties (mostly pyramidal in structure)
- Most often family ownership and control

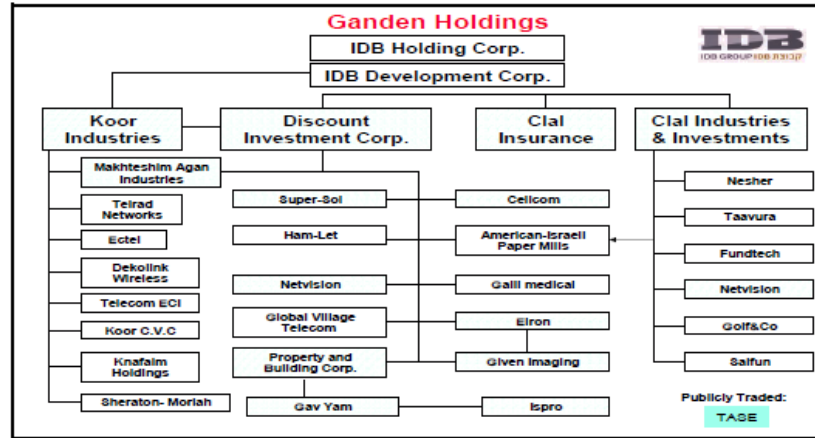


## Generic Structure of Business Groups



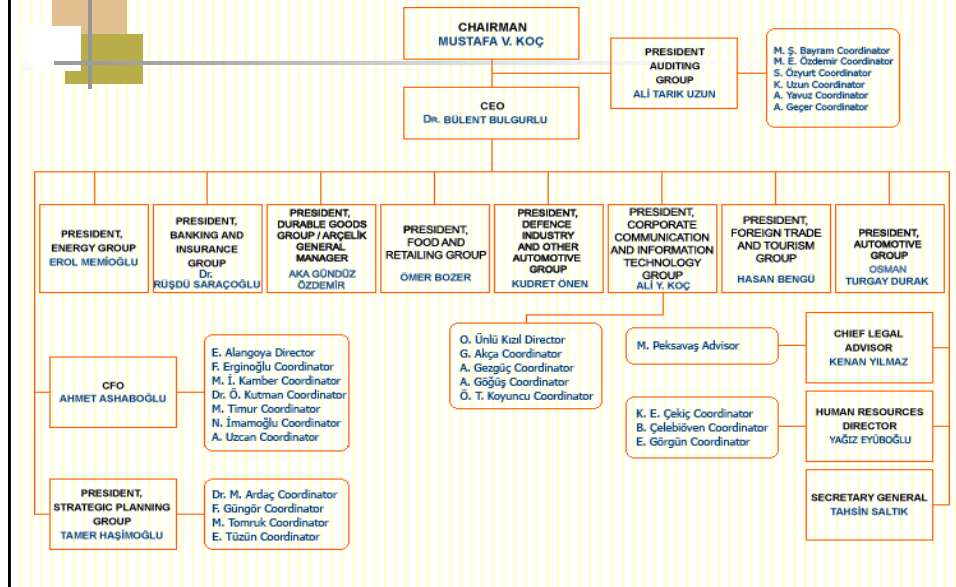


## IDB Group (Israel)



Kosenko, K and Yafeh, Y. (2007). Paper presented at the International Conference on The Evolutionary Dynamics of Business Groups in Emerging Economies, Kyoto.

## Koç Group (Turkey)

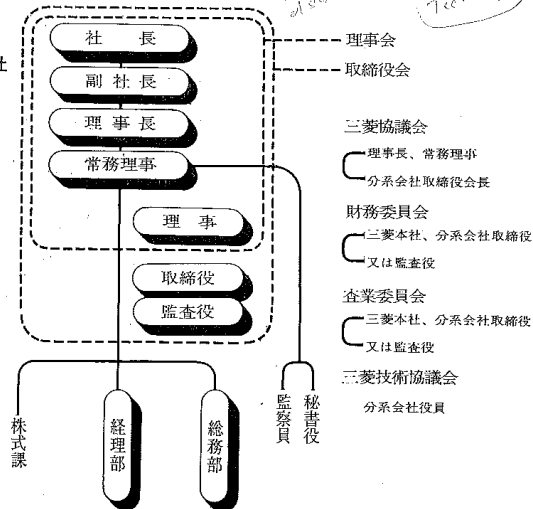


## Mitsubishi Zaibatsu (Japan), 1943

1943 Name changes only  
昭和18年2月 株式会社三菱本社

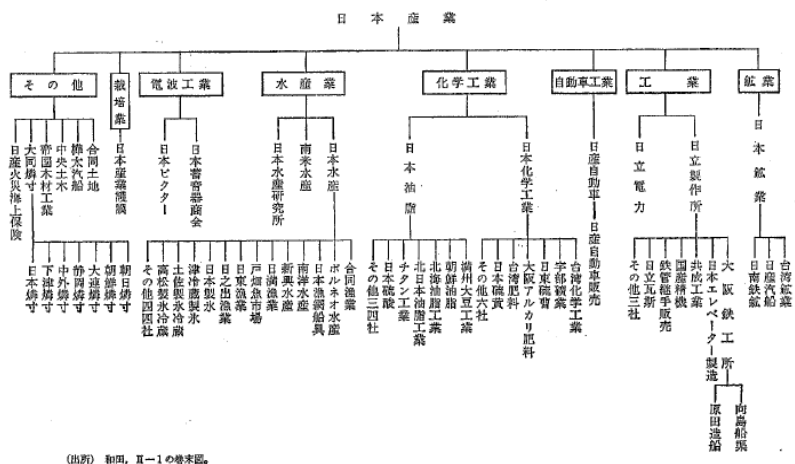
(分限会社)

三菱重工業株式会社  
三菱倉庫株式会社  
三菱商事株式会社  
三菱鉱業株式会社  
株式会社三菱銀行  
三菱電機株式会社  
三菱信託株式会社  
三菱地所株式会社  
三菱石油株式会社  
日本化成工業株式会社  
三菱製鋼株式会社



## Nissan Zaibatsu (Japan), 1937

図 1-2 日産コンツェルン組織図 (昭和12年6月)



(出所) 和同、II-1の巻末図。

## The Economic Role of Business Groups in Late-Industrializing Nations

- The “business group” is most often the most representative form of large enterprises in emerging markets since the early decades of the 20th century.
- State-owned enterprises have declined their presence, except for China.
- Multidivisional enterprises have not become representative.

### Late-Industrializing Nations in the Sample

	1820	1870	1913	1950	1960	1970	1980	1990	2000	2006
Japan	669	737	1,387	1,921	3,986	9,714	13,428	18,789	20,738	22,462
S. Korea	600	604	869	854	1,226	2,167	4,114	8,704	14,375	18,356
Taiwan	550	550	747	924	1,492	2,980	5,869	9,886	16,835	19,860
China	600	530	552	448	662	778	1,061	1,871	3,421	6,048
Thailand	570	608	841	817	1,078	1,694	2,554	4,633	6,398	8,215
Singapore	683	682	1,279	2,219	2,310	4,439	9,058	14,220	22,518	26,162
India	533	533	673	619	753	868	938	1,309	1,892	2,598
Argentina	n.a.	1,311	3,797	4,987	5,559	7,302	8,206	6,433	8,581	9,679
Brazil	646	713	811	1,672	2,335	3,057	5,195	4,920	5,532	5,835
Chile	694	1,290	2,988	3,670	4,270	5,231	5,680	6,401	10,309	12,516
Mexico	759	674	1,732	2,365	3,155	4,320	6,320	6,085	7,275	7,753
Israel	n.a.	n.a.	n.a.	2,817	4,663	8,101	10,984	13,067	16,172	16,997
Turkey	643	825	1,213	1,623	2,247	3,078	4,022	5,399	6,446	7,717
Russia	688	943	1,488	2,841	3,945	5,575	6,427	7,779	5,277	7,831
South Africa	415	858	1,602	2,535	3,041	4,045	4,390	3,834	3,890	4,543
USA	1,257	2,445	5,301	9,561	11,328	15,030	18,577	23,201	28,467	31,049
Canada	904	1,695	4,447	7,291	8,753	12,050	16,176	18,872	22,488	24,951
Belgium	1,319	2,692	4,220	5,462	6,952	10,611	14,467	17,197	20,656	22,729
France	1,135	1,876	3,485	5,186	7,398	11,410	14,766	17,647	20,422	21,809
Germany	1,077	1,839	3,648	3,881	7,705	10,839	14,114	15,929	18,944	19,993
Italy	1,117	1,499	2,564	3,502	5,916	9,719	13,149	16,313	18,774	19,802
Sweden	1,198	1,662	3,096	6,739	8,688	12,716	14,937	17,609	20,710	24,204
UK	1,706	3,190	4,921	6,939	8,645	10,767	12,931	16,430	20,353	23,013

## Largest Economic Agents in Late-Industrialization (2007)

Rank	Enterprise/Group name	Revenues (US\$ million)	Country	Year	Controlling owner	Industry <sup>†</sup>
1	Samsung	161,780	South Korea	2007	Family	Diversified
2	China Petrochemical Co. (Sinopec)	159,260	China	2007	Government	Petroleum, natural gas and petrochemi
3	State Grid. Co. of China	132,885	China	2007	Government	Electric power
4	China National Petroleum Co	129,798	China	2007	Government	Petroleum, natural gas and petrochemi
5	Petrobras	112,046	Brazil	2007	Government	Petroleum, natural gas and petrochemi
6	Pemex	103,961	Mexico	2007	Government	Mining and petroleum
7	Gazprom	98,642	Russia	2007	Government	Gas and energy
8	Hyundai Motor	83,392	South Korea	2007	Family	Diversified
9	SK	75,784	South Korea	2007	Family	Diversified
10	LG	71,498	South Korea	2007	Family	Diversified
11	Lukoil	67,205	Russia	2007	Family	Petroleum, natural gas and petrochemi
12	Petronas	66,218	Malaysia	2007	Government	Petroleum, natural gas and petrochemi
13	Tata Group	62,500	India	2008	Family	Diversified
14	Indian Oil	57,427	India	2007	Government	Petroleum
15	Temasek Holding	54,000	Singapore	2008	Government	Diversified
16	Industrial & Commercial Bank of China	51,526	China	2007	Government	Commercial banking
17	Carso	51,199	Mexico	2006	Family	Diversified
18	PTT	51,193	Thailand	2007	Government	Petroleum, natural gas and petrochemi
19	Korea Electric Power	50,271	South Korea	2007	Government	Electric power
20	Fornosa Plastics	49,519	Taiwan	2006	Family	Diversified
21	Hon Hai	47,571	Taiwan	2006	Family	Diversified
22	China Mobile Telecommunications Co.	47,055	China	2007	Government	Telecommunications
23	China Life Insurance	43,440	China	2007	Government	Insurance
24	China Construction Bank	41,307	China	2007	Government	Commercial banking
25	Koc Holding	39,392	Turkey	2007	Family	Diversified

## Big Business in Late-Industrializing Nations (2007)

- We made a list of players with revenues > US\$ 20,000m
- Out of 78 Players,  
53 are Business Groups.
- Out of 53 Business Groups,  
17 belong to China, stands out as an anomaly.  
They are state-owned enterprises/not diversified.
- If we put China aside and look at the rest of the business groups, common pattern is:  
Family ownership,  
Technologically-unrelated diversification.

## Largest *Private* Economic Agents in Late-Industrialization, 2007

2007*					
Rank	Name	Country	Revenues (US\$ million)	Control	Industry
1	Samsung	161,780 S.Korea	family	diversified	
2	Hyundai Motor	83,392 S.Korea	family	diversified	
3	SK	75,784 S.Korea	family	diversified	
4	LG	71,498 S.Korea	family	diversified	
5	Tata Group	62,500 India	family	diversified	
6	Carso	51,199 Mexico	family	diversified	
7	Formosa Plastics	49,519 Taiwan	family	diversified	
8	Hon Hai	47,571 Taiwan	family	diversified	
9	Koc Holding	39,392 Turkey	family	diversified	
10	BHP Billiton Plc	39,210 South Africa/Australia	institutional shareholders	petroleum and resources	
11	Bradesco	38,264 Brazil	family	diversified	
12	Reliance Group	35,915 India	family	diversified	
13	Vale (CVRD)	34,080 Brazil	pension funds	diversified	
14	GS	33,478 S.Korea	family	diversified	
15	Posco	31,163 S.Korea	institutional shareholders	steel	
16	Lotte	31,070 S.Korea	family	diversified	
17	Anglo American (includes De Beers)	29,532 South Africa/UK	institutional shareholders	diversified	
18	Aditya Birla Group	29,200 India	family	diversified	
19	Itaúsa	28,961 Brazil	family	diversified	
20	Hutchison Whampoa	28,035 Hong Kong	family	diversified	
21	Flextronics International	27,558 Singapore	institutional shareholders	electronics	
22	Quanta Computer	23,665 Taiwan	family	computer	
23	Noble Group	23,497 Hong Kong	family	diversified	
24	Asustek	22,993 Taiwan	family	computer	
25	Hanwha	22,496 S.Korea	family	diversified	

## Largest *Private* Economic Agents in Late-Industrialization, 1987

1987					
Rank	Name	Revenues	Country	Control	Industry
		(US\$ million)			
1	Hyundai	25,243	South Korea	family	diversified
2	Samsung	21,053	South Korea	family	diversified
3	Lucky Goldstar (later LG)	14,422	South Korea	family	diversified
4	Daewoo	13,437	South Korea	family	diversified
5	Barlow Rand	7,617	South Africa	prof. <sup>†</sup>	diversified
6	Sunkyong (later SK)	6,781	South Korea	family	diversified
7	Tata Group	4,866	India	family	diversified
8	Koc Holding	4,738	Turkey	family	diversified
9	Ssangyong	4,582	South Korea	family	diversified
10	Sabancı Group	4,582	Turkey	family	diversified
11	Korea Explosives (later Hanhwa)	3,563	South Korea	family	diversified
12	Hyosung	3,257	South Korea	family	diversified
13	De Beers	3,091	South Africa	family	diversified
14	Formosa Plastics	2,955	Taiwan	family	diversified
15	Birla Group	2,932	India	family	diversified
16	Swire Pacific	2,585	Hong Kong	family	diversified
17	Koor Industries	2,571	Israel	union <sup>‡</sup>	diversified
18	Jardine Matheson	1,628	Hong Kong	family	diversified
19	AECI	1,607	South Africa	family	chemicals
20	Copersucar	1,512	Brazil	coop. <sup>§</sup>	food
21	Doosan	1,478	South Korea	family	diversified
22	Sasol	1,417	South Africa	govt. <sup>¶</sup>	chemicals
23	Alfa	1,380	Mexico	family	diversified
24	Tatung	1,248	Taiwan	family	electronics
25	Modi Group	1,070	India	family	diversified



## In the Tables of 1987 and 2007:

- We observe the resilience of business groups at the national level
- We find that those business groups *collectively* created dynamic national economies that achieved high growth performance.

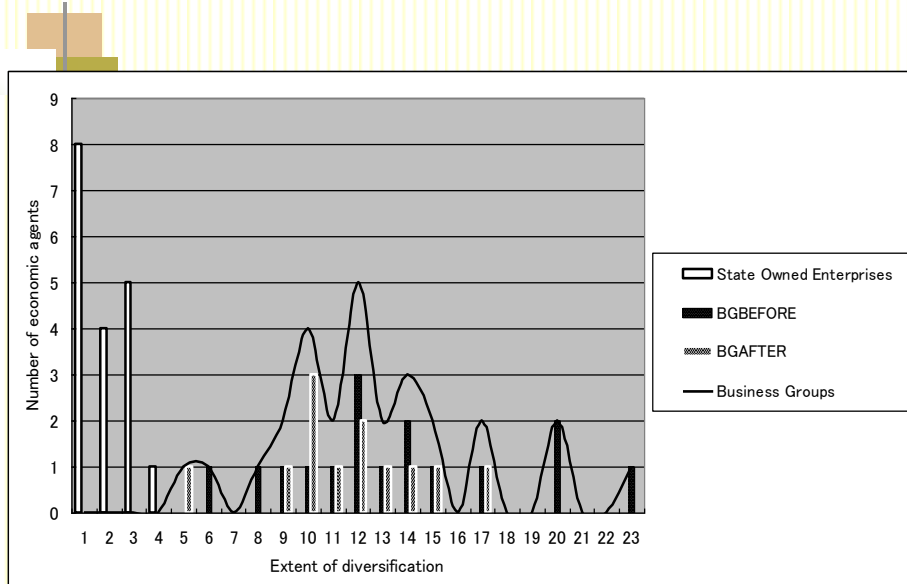


## The Case of Turkey: Overview of the Largest Economic Agents

- Among the largest 50 economic agents,
- 26: BG owned by families
  - 1: BG owned by armed forces pension fund
  - 1: BG owned by employees fund and political party
  - 1: Specialized firm owned by family
  - 18: State-owned enterprises
  - 3: Subsidiaries of multinational firms
  - 0: Multidivisional enterprises



## Extent of Industry Diversification in Turkey



## Why Business Groups Emerge in Late-Industrializing Economies?

### Economic Environment Hypothesis

- As long as market mechanism remains **immature and imperfect** in late developing economies, business groups play a positive role.
- As economy develops, business groups play less and less roles, while multidivisional enterprises become a dominant form of big business.
- **From Paragons to Parasites!**



## Resilience of Business Groups and Economic Development

- Do business groups decline and disappear in the long-run as the **economic environmental hypothesis** suggests?

**The answer in the real economy: No!**

- From Paragons to Parasites? Business groups may continue to be paragons.
- Dynamic economies such as South Korea, as well as Taiwan and Singapore exhibit the continuing significance of business groups.



## Why Business Groups Remain Effective?

- **Economic Environment Hypothesis:** External factors such as the economic environment is not an adequate explanation.
- **Internal Resource Hypothesis:** Internal factors such as intra-group competitive resources.

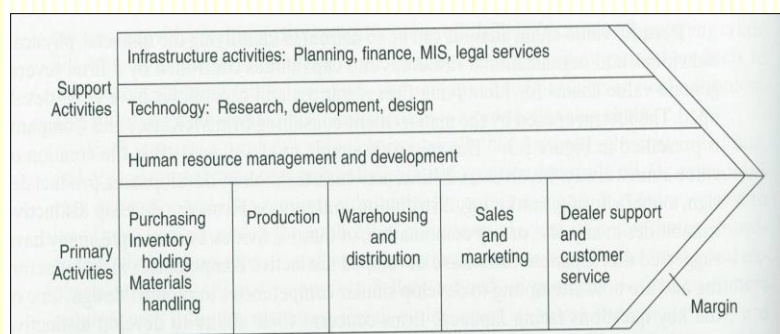
=> What are the **unique competitive resources** within business groups that are ***different from technology-related resources*** in multidivisional enterprises?

## Competitive Resources within Business Groups

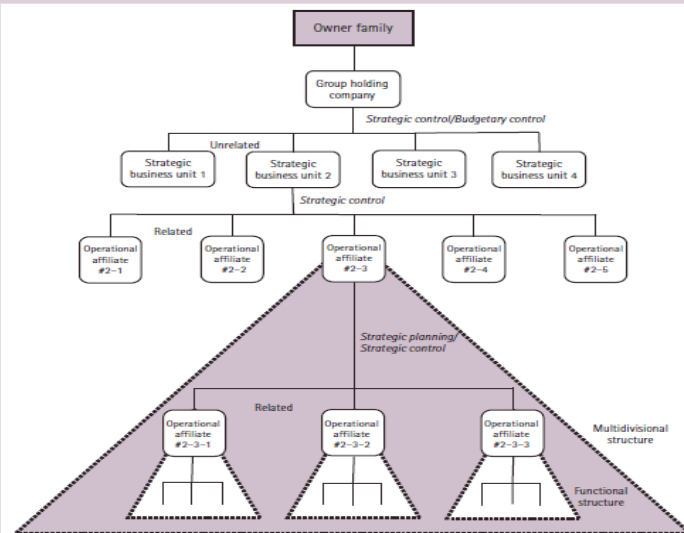
- Competitive resources should not always be product and technology-related.
  - The accumulated knowledge can be achieved in other resources than technology and generate similar competitive outcomes.
- => Human resources, marketing know-how, business model, organizational structure, financial resources
- => A large-scale accumulation of **product-transcending competitive resources**

## ‘Value Chain’

### Competitive resources in product-transcending activities



## New Organization of Business Groups?



## After All, Many Business Groups and Conglomerates Are Alive and Well in Mature Economies!

- Mature industrial economies exhibit many business groups and conglomerate firms with **diversified product/industry portfolios**:
- Conglomerate enterprises:  
Berkshire Hathaway (U.S.); Virgin Group (U.K.); LVMH (France); Jarden (U.S.)
- Family-controlled business groups: Investor A.B. (Wallenbergs, Sweden); Exor (Agnellis, Italy); Quandts (Germany); Bronfmans (Canada); Pritzkers (U.S.)



## Concluding Remarks (1)

- The significance of business groups has not declined in the individual dynamic economies/global economy. If any, it has increased!
- As economy develops and gets competitive, individual business groups may dissolve/disappear.
- But some can be viable and add value if they have developed unique competitive resources.
- Strategy rather than solely market environment!



## Concluding Remarks (2)

- Business groups should not remain a business and organization model that is effective only in the economic environment of immature markets.
- The conventional myth of business groups being replaced by multidivisional enterprises as economy develops should be reexamined.



**Thank you so much for listening!**

**“Business Groups in Japan: Too Many Categories, Too Much Confusion”**

*Takashi Hikino* (Kyoto University)





# **Business Groups in Japan: Their Evolutionary Pattern in Comparative Perspectives**

*The 19<sup>th</sup> SJE-WCU-BK21 International Symposium*

## **Comparative Evolution of the East Asia Firms**

November 3, 2011

**Takashi Hikino**

Graduate School of Management  
Graduate School of Economics  
Kyoto University

## **Perspectives of Presentation**

- **Research on the evolution of the Japanese “business groups” remains confused, because the firm has historically formulated many varied and complicated organizational arrangements since before World War II.**
- **Scholars have not quite developed clear categorical distinctions and robust analytical framework. The abundance of detailed empirical research on the historical development of business groups has ironically resulted in more categorical and theoretical confusion.**

## Categorical Distinctions and Analytical Robustness of Japanese Business Groups and Networks

- W. Mark Fruin, Review of James R. Lincoln and Michael L. Gerlach, *Japan's Network Economy: Structure, Persistence, and Change*, 2004. *Business History Review*, 2005.
- The review concludes: The book “**leaves its most pressing distinctions unmade and its most tantalizing questions unanswered.**”  
*Keiretsu* (系列) or interfirm linkage  
≠ *Kigyo shudan* (企業集団) or corporate groups  
= *Kigyo gurupu* (企業グループ) or enterprise groups

### *Kigyo Shudan, Kigyo Gurupu, Keiretsu?* 企業集団、企業グループ、系列

Fourth, the book fails to maintain a distinction between two very different kinds of business groups. All members of the Big Six are intermarket groups, called *kigyo shudan* or *kigyo gurupu* in Japan. That is, each group is composed of firms offering banking, trading, logistical support, engineering, and other specialized services to each other. (Such groups are sometimes called “horizontal groups,” or “horizontal *keiretsu*” as Lincoln and Gerlach refer to them, but such phrases are misleading, because “horizontal” has specific meanings in the context of diversification strategies and antitrust law.) The other kind of group, called *keiretsu* in Japan, is based on vertical integration in production and distribution. Outputs of certain firms in a group are the inputs of others, as exemplified by Toyota Motor and its suppliers.

## Origins of Six Large Corporate Groups 六大企業集團の歴史的経緯

To meet the second goal, they examine the six large federations of firms in postwar Japan that make up what is known as the Big Six: three legacy or namesake groups (Mitsubishi, Mitsui, and Sumitomo), which have their origins in *zaibatsu* founded in the nineteenth century or earlier; and three nonlegacy groups (DKB, Fuyo, and Sanwa), which are composed of *shinko*, or “new,” *zaibatsu* founded in the twentieth century. *Zaibatsu* were groups of diversified firms that appeared in the late nineteenth century following the sale of previously government-owned enterprises to private parties.

## Categorical Distinctions or Confusions?

- *Kigyo shudan* (企業集團) are “intermarket groups,” while *keiretsu* (系列) remain intramarket groups.
- *Keiretsu* is based on the “vertical integration in production and distribution (such as) Toyota Motor and its suppliers.”
- *Kigyo shudan* or corporate groups are the same as *kigyo gurupu* (企業グループ) or enterprise groups.
- Three nonlegacy (non-*zaibatsu*) groups (DKB, Fuyo, and Sanwa) “are composed of *shinko*, or “new,” *zaibatsu* (新興財閥) founded in the twentieth century.”

## Categories of *Keiretsu* 系列

(企業)系列 *alliance, federation, network, grouping*

Sociological perspectives:

- 横(水平)系列 *horizontal keiretsu* or *kigyo shudan*
- 縦(垂直)系列 *vertical or hierarchical keiretsu*

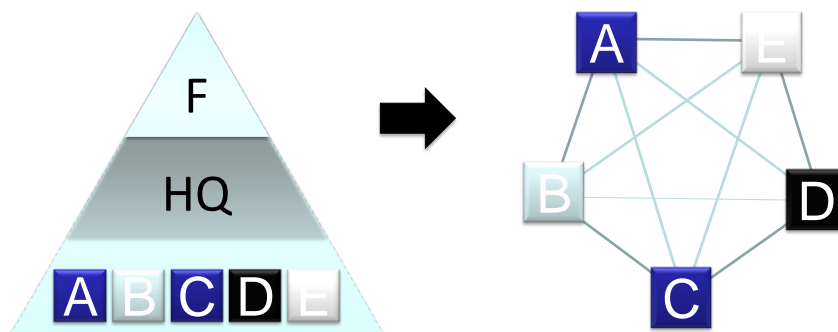
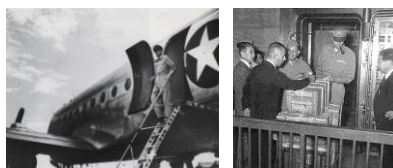
Business perspectives:

- 取引系列 *transaction keiretsu*
- 販売系列 *distribution keiretsu*

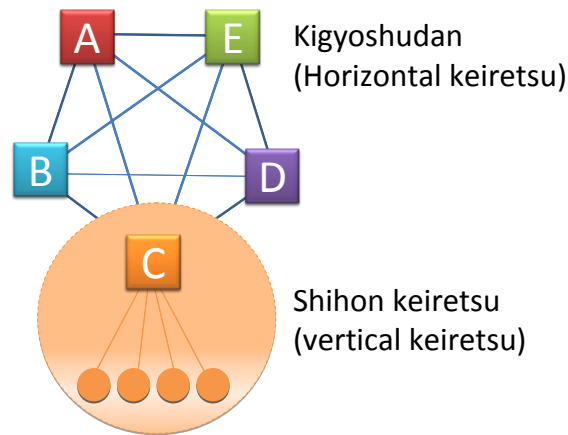
Finance perspectives:

- 資本系列 *equity keiretsu*
- 融資系列 *loan keiretsu* or the “Main Bank” relationship

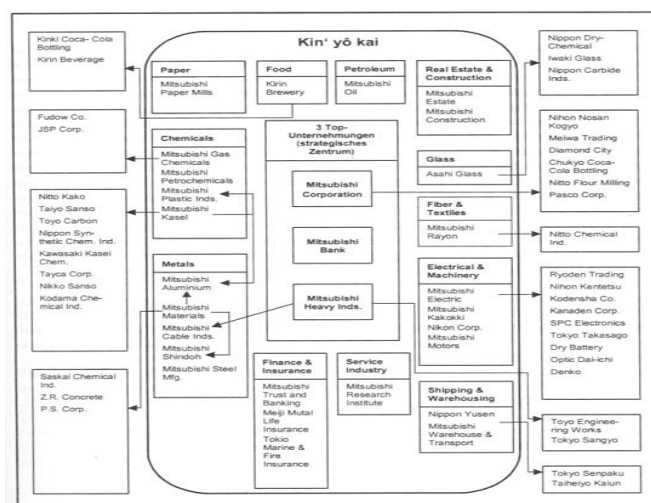
## From *Zaibatsu* to *Kigyo Shudan*: Dissolution of *Zaibatsu* after WWII



## Horizontal and Vertical Keiretsu: *Kigyo Shudan* vs. *Shihon Keiretsu*

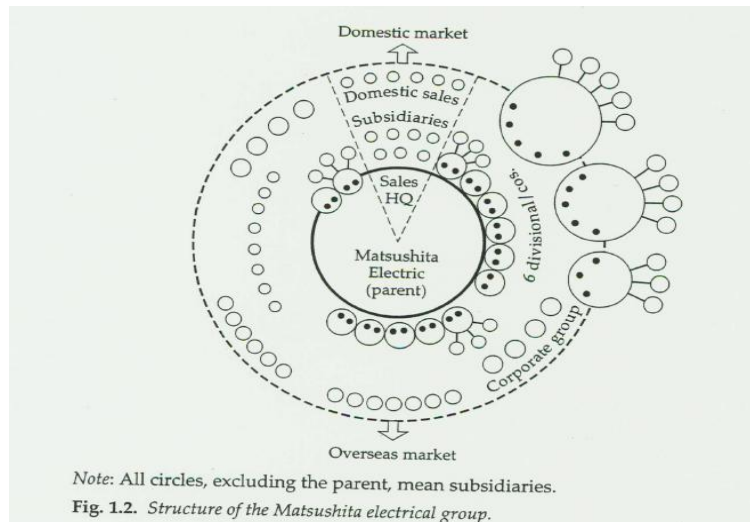


## *Kigyo Shudan* or Corporate Group: Mitsubishi Group



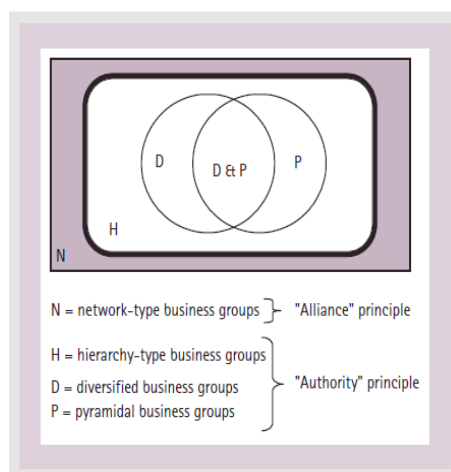
Source: Dogwell Marketing Group

## Shihon Keiretsu or Vertical Keiretsu: Matsushita Group



Source: Shimotani and Shiba, 1997

## The Major Categories of Business Groups



- Diversified business groups: **zaibatsu**
- Network-type business groups: **kigyo shudan**
- Hierarchy-type business groups: vertical business groups or **shihon keiretsu**; holding company + operating subsidiaries

Source: Colpan, Hikino and Lincoln, 2010

## Pinning Down the Evolutionary Characteristics of Japanese Business Groups

Distinguishing three important business groups:

- Pre-World War II family-controlled **zaibatsu** groups (with unrelated diversification strategy)
- Post-World War II **kigyo shudan** or corporate groups (with unrelated diversification strategy)
- Pre- and Post-World War II vertical **shihon keiretsu** or **kigyo gurupu** (with related diversification strategy)

## Operational Procedure

- Choosing the countries against which Japan can be compared: **Turkey** (late industrialization and emerging market) and **the United States** (early industrialization and mature market)
- **Controlling the level of economic maturity / market imperfection: GDP per capita**
- Comparing the distribution of groups and group-affiliated firms relative to independent firms

## Product Market Imperfection and Characteristic Diversification Strategy

“LG My father and I started a **cosmetic cream** factory in the late 1940s. At the time, no company could supply us with plastic cups of adequate quality for cream jars, so we had to start a **plastics** business, Plastic caps alone were not sufficient to run the plastic molding plant, so we added combs, toothbrushes, and soap boxes. This plastic business also led us to manufacture **electric fan blades** and **telephone cases**, which in turn led us to manufacture **electrical and electronic products** and **telecommunications equipment**. The plastics business also took us into **oil refining**, which needed a tanker **shipping** company. The oil refining company alone was paying an insurance premium amounting to more than half the total revenue of the largest **insurance** company in Korea. Thus, an insurance company was started. **This natural step-by-step evolution through related businesses** resulted in the Lucky-Goldstar (LG) group as we see it today.”

Koo Cha-Kyung, Chair

### Developmental Levels of National Economies

	1820	1870	1913	1950	1960	1970	1980	1990	2000	2006
Japan	669	737	1,387	1,921	3,986	9,714	13,428	18,789	20,738	22,462
S. Korea	600	604	869	854	1,226	2,167	4,114	8,704	14,375	18,356
Taiwan	550	550	747	924	1,492	2,980	5,869	9,886	16,835	19,860
China	600	530	552	448	662	778	1,061	1,871	3,421	6,048
Thailand	570	608	841	817	1,078	1,694	2,554	4,633	6,398	8,215
Singapore	683	682	1,279	2,219	2,310	4,439	9,058	14,220	22,518	26,162
India	533	533	673	619	753	868	938	1,309	1,892	2,598
Argentina	n.a.	1,311	3,797	4,987	5,559	7,302	8,206	6,433	8,581	9,679
Brazil	646	713	811	1,672	2,335	3,057	5,195	4,920	5,532	5,835
Chile	694	1,290	2,988	3,670	4,270	5,231	5,680	6,401	10,309	12,516
Mexico	759	674	1,732	2,365	3,155	4,320	6,320	6,085	7,275	7,753
Israel	n.a.	n.a.	n.a.	2,817	4,663	8,101	10,984	13,067	16,172	16,997
Turkey	643	825	1,213	1,623	2,247	3,078	4,022	5,399	6,446	7,717
Russia	688	943	1,488	2,841	3,945	5,575	6,427	7,779	5,277	7,831
South Africa	415	858	1,602	2,535	3,041	4,045	4,390	3,834	3,890	4,543
USA	1,257	2,445	5,301	9,561	11,328	15,030	18,577	23,201	28,467	31,049
Canada	904	1,695	4,447	7,291	8,753	12,050	16,176	18,872	22,488	24,951
Belgium	1,319	2,692	4,220	5,462	6,952	10,611	14,467	17,197	20,656	22,729
France	1,135	1,876	3,485	5,186	7,398	11,410	14,766	17,647	20,422	21,809
Germany	1,077	1,839	3,648	3,881	7,705	10,839	14,114	15,929	18,944	19,993
Italy	1,117	1,499	2,564	3,502	5,916	9,719	13,149	16,313	18,774	19,802
Sweden	1,198	1,662	3,096	6,739	8,688	12,716	14,937	17,609	20,710	24,204
UK	1,706	3,190	4,921	6,939	8,645	10,767	12,931	16,430	20,353	23,013

Source: Compiled from Maddison, 2009.



### **The Case of Turkey: Overview of the Largest Economic Agents**

Among the largest 50 economic agents、

- **26: Diversified BG owned by families**
- 1: BG owned by armed forces pension fund
- 1: BG owned by employees fund and political party
- 1: Specialized firm owned by family
- **18: State-owned enterprises**
- 3: Subsidiaries of multinational firms
- **0: Multidivisional enterprises**

Source: Asli Colpan, 2010

### **The Case of Turkey in 2005: Product Strategy of the 50 Largest Businesses**

Among the largest 50 firms and business groups:

- **Single products:** 12
- **Dominant products:** 10
- **Related products:** 0
- **Unrelated products:** 28

Based on Asli M. Colpan, 2010.

### The Case of the United States in 1930: Product Strategy of the 50 Largest Businesses

Among the largest 50 firms:

- Single products: 9
- Dominant products: 26
- Related products: 15
- Unrelated products: 0

Source: Compiled and calculated from Alfred D. Chandler, Jr. with Takashi Hikino, 1990.

### The Case of Japan in 1930, 1954 and 1973: Product Strategy of the 50 Largest Businesses

Among the largest 50 firms (and operating subsidiaries of *zaibatsu* groups):

	1930	1954	1973
• Single products:	46	33	23
• Dominant products:	4	18	16
• Related products:	0	9	11
• Unrelated products:	0	0	0

Note: For 1930 the figures represent those of independent firms and subsidiaries of *zaibatsu* groups.

Source: Compiled and calculated from W. Mark Fruin, 1992.

**The Case of Japan in 1930:  
*Zaibatsu* Affiliation of the 50 Largest Businesses**

**Among the largest 50 firms:**

	<b>1930</b>
• <b><i>Zaibatsu</i>-affiliated firms:</b>	<b>32</b>
• <b>Independent firms:</b>	<b>18</b>

Source: Compiled and calculated from W. Mark Fruin, 1992.

**The Case of Japan in 1973:  
Group Affiliation of the 50 Largest Businesses**

**Among the largest 50 firms:**

	<b>1973</b>
• <b>Affiliated to one of the <i>Six Kigyo Shudan</i>:</b>	<b>35</b>
• <b>Independent firms:</b>	<b>15</b>

Source: Compiled and calculated from W. Mark Fruin, 1992.

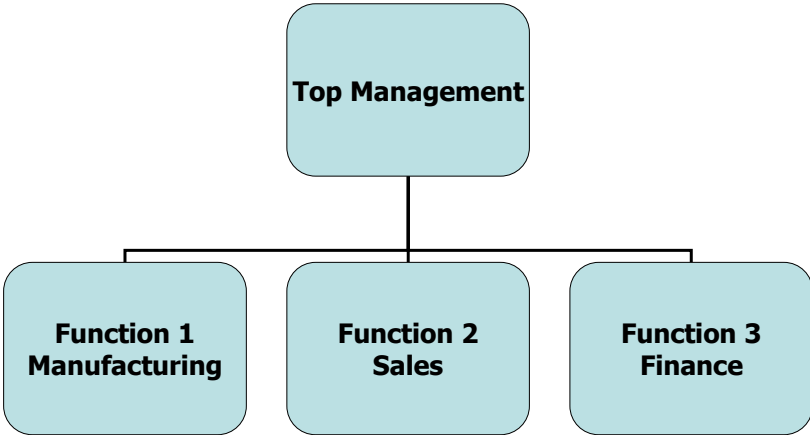
## Uniqueness of Japan's Business Groups

- Extensive affiliation of large firms to **zaibatsu groups before World War II**
- Extensive affiliation of large firms to **kigyo shudan after World War II**
- **Presence of independent firms** which have often been the core enterprise of **vertical or hierarchical business groups**
- **Middle point** between Turkey (in which little large independent private enterprises are detected) and the United States (where no diversified business groups are represented)

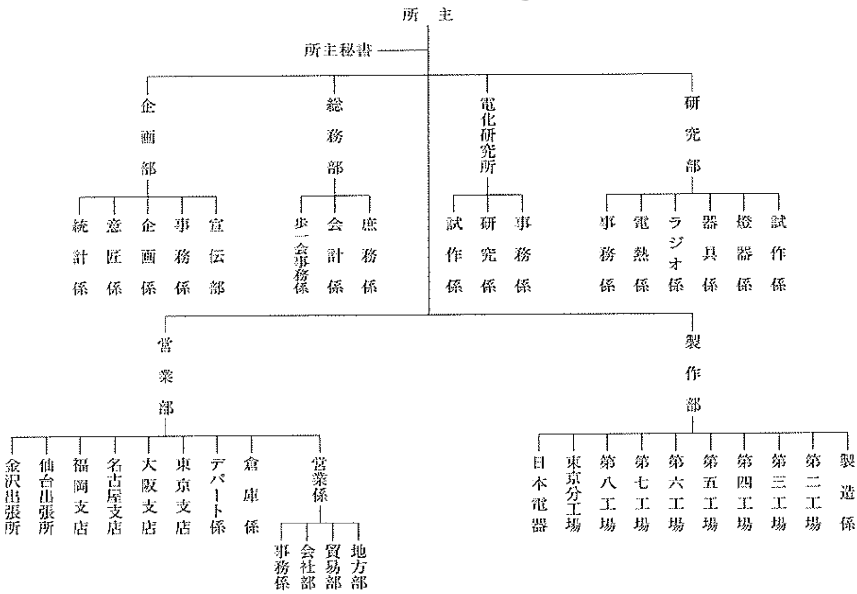
## Matsushita's Evolutionary Path

- Matsushita Electrical Industrial Co. (now Panasonic) represents an important pattern of the development of **large independent enterprises**.
- Matsushita has experienced various structural arrangements from functional structure to intra-firm "company" organizations, although the company has basically held onto the product strategy of related diversification.

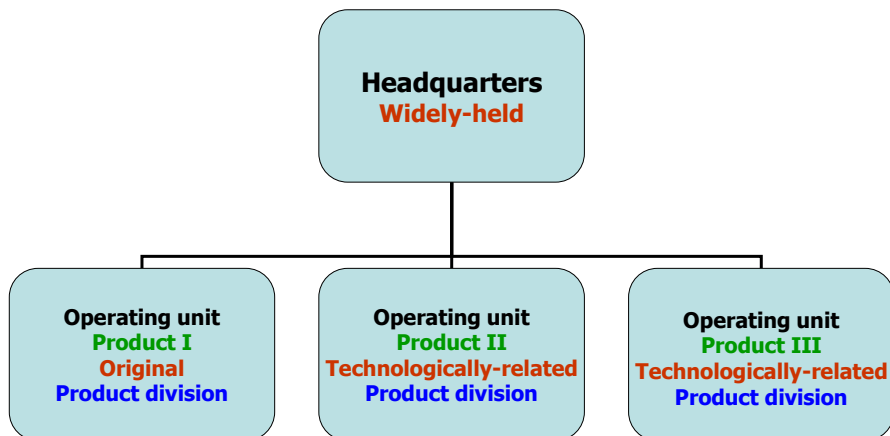
# Basic Structure of Functionally-Organized Enterprises



## Matsushita Functional Organization, 1932



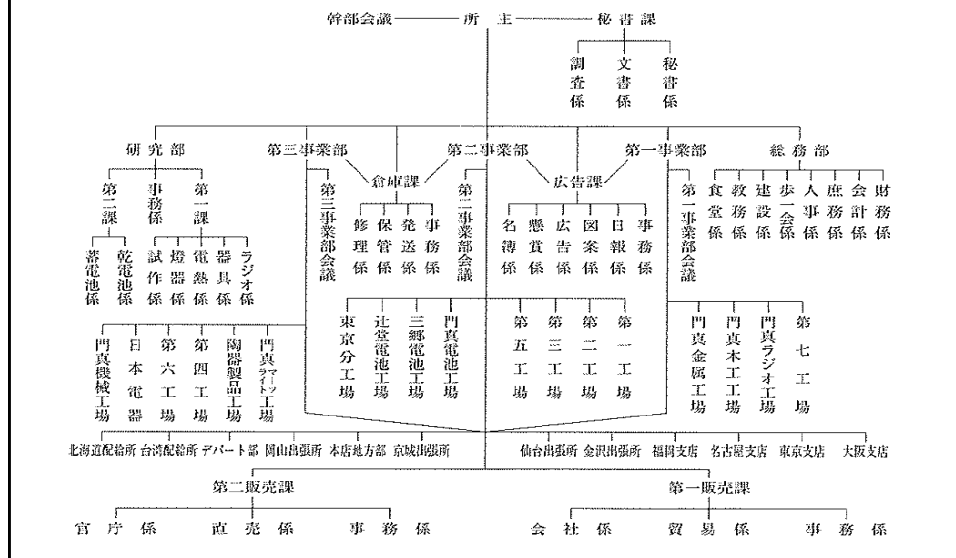
## Basic Structure of Multidivisional Enterprises



## Konosuke Matsushita (松下幸之助) Introducing the “Multidivisional Structure” (事業部制), 1933

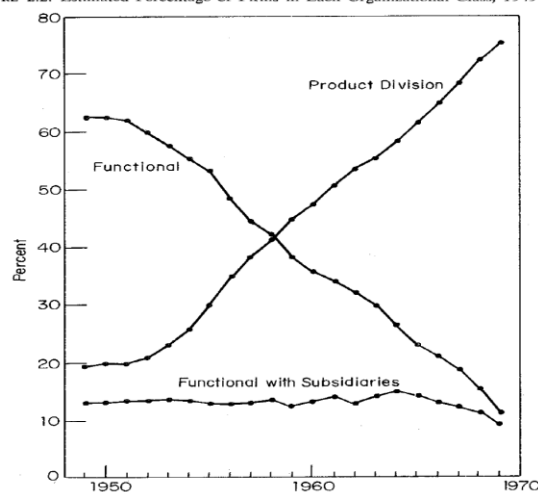


## Matsushita's Multidivisional Structure, 1933



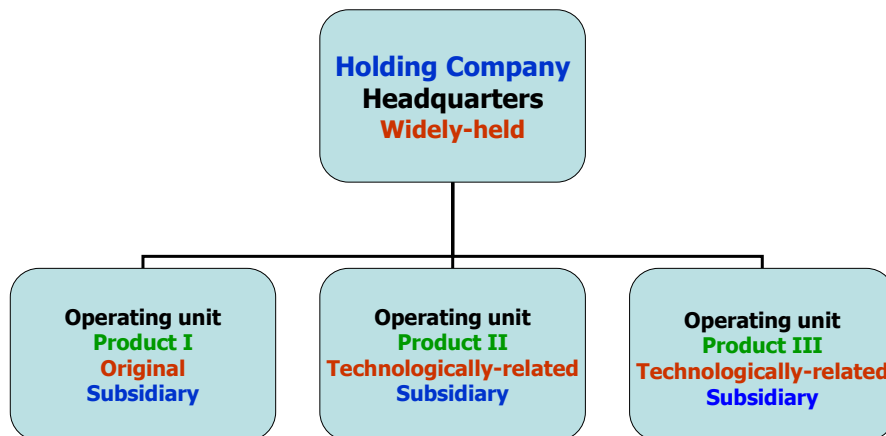
## From Functional to Multidivisional Structure: The U.S. Pattern

FIGURE 2.2. Estimated Percentage of Firms in Each Organizational Class, 1949-1969.

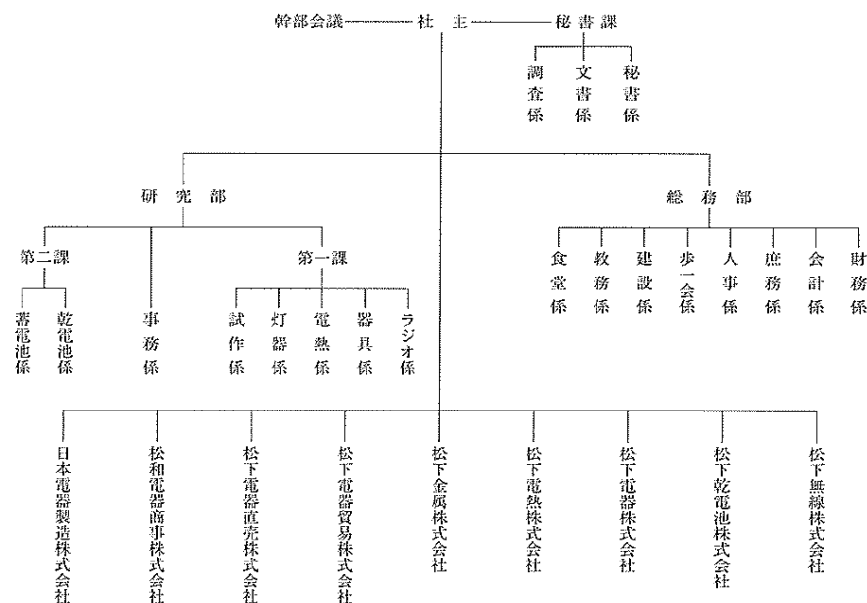


Source: Richard Rumelt, 1974

## Basic Structure of Holding Company + Subsidiary Enterprises: Prototype of Vertical *Keiretsu*



## Matsushita's Holding Company Structure, 1935





## **Conclusion**

- **Scholars should make clear categorical distinctions and establish analytical robustness in the analysis of various groupings that Japanese firms have historically developed.**
- **Japan represents a unique case of the combination of the prevalence of diversified business groups and their successor in *kigyo shudan* or corporate groups and the presence of independent firms with related product portfolios. This uniqueness has resulted from its historical standing as the last of early industrializers and the first of late industrializing economies.**



# **“The Evolution of Business Groups in Korea”**

*Keun Lee* (Seoul National University)





Volume 24, Issue 3, September 2010

ISSN 0889-1583



# Journal of **THE JAPANESE AND INTERNATIONAL ECONOMIES**

An International Journal  
Published in Cooperation with the Tokyo Center for Economic Research

## **Editor-in-Chief**

**Takeo Hoshi**, University of California, San Diego

## **Editorial Board**

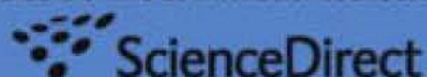
**Shin-Ichi Fukada**, University of Tokyo

**Hideshi Itoh**, Hitotsubashi University

**Takao Kato**, Colgate University

**John Ries**, University of British Columbia

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)







Contents lists available at ScienceDirect

## Journal of The Japanese and International Economies

journal homepage: [www.elsevier.com/locate/jjie](http://www.elsevier.com/locate/jjie)



# Long-term evolution of the firm value and behavior of business groups: Korean chaebols between weak premium, strong discount, and strong premium

Keun Lee<sup>a,\*</sup>, Ji Youn Kim<sup>a</sup>, Oonkyu Lee<sup>b</sup>

<sup>a</sup> Department of Economics, Seoul National University, Shillim-dong, Seoul 151-746, Republic of Korea

<sup>b</sup> Techno-Economics and Policy Program (TEPP), Seoul National University, Seoul, Republic of Korea

### ARTICLE INFO

#### Article history:

Received 10 May 2008

Revised 19 January 2010

Available online 1 February 2010

#### JEL classification:

G32

G34

#### Keywords:

Chaebol

Business groups

Value loss/gain

Over-investment

Diversification

### ABSTRACT

**Lee, Keun, Kim, Ji Youn, and Lee, Oonkyu**—Long-term evolution of the firm value and behavior of business groups: Korean chaebols between weak premium, strong discount, and strong premium

This paper analyzes the long-term evolution of the costs and benefits associated with chaebols or diversified business groups in Korea. Chaebol-affiliated firms in Korea have experienced dramatic changes in their costs and benefits along three time periods (1984–1988, 1990–1995, and 2001–2005). They did not suffer a value loss relative to non-affiliated firms in the 1980s, but did so in the 1990s. In the post-crisis period, however, they began to show value gains.

To identify the causes of these changes, we examine if chaebol firms prioritize profit stability over profit maximization, overinvest in low-return businesses, cross-subsidize the low-performing affiliates of their group, and possess greater debt capacity, consequently enjoying lower tax burdens. We discover that in the 1980s, chaebol firms generally enjoyed various perks, such as tax breaks, but shied away from excessive investment activities. In the 1990s, their performance worsened because of substantial over-investment, despite several advantages. However, after massive restructuring and sorting out following the 1997 Asian financial crisis, chaebols emerged as very profitable firms correcting over-investment despite the absence of tax perks and debt-carrying advantages. *J. Japanese Int. Economies* **24** (3) (2010) 412–440. Department of Economics, Seoul National University,

\* Corresponding author. Fax: +82 886 4231.

E-mail address: [kenneth@snu.ac.kr](mailto:kenneth@snu.ac.kr) (K. Lee).

Shillim-dong, Seoul 151-746, Republic of Korea; Techno-Economics and Policy Program (TEPP), Seoul National University, Seoul, Republic of Korea.

© 2010 Elsevier Inc. All rights reserved.

## 1. Introduction

Business groups are a staple in numerous economies, including India (Bertrand et al., 2002; Ghemawat and Khanna, 1998), Chile (Khanna and Palepu 2000b, 1999b), and China (Keister, 1998), as well as Japan and Korea where the keiretsu and chaebols, respectively, have been symbols of economic growth. Since the early works of scholars such as Leff (1978) and Goto (1982), there has been a surge of literature on the subject (Kock and Guillen, 2001; Khanna, 2000; Khanna and Palepu, 2000a, 1999a, 1997; Feenstra and Hamilton, 1995; Guillen, 2000; Granovetter, 1994; Powell and Smith-Doerr, 1994; Joh, 2003; LaPorta et al., 1999; Shin and Park, 1999). Recently, a survey article has even appeared in the *Journal of Economic Literature* (Khanna and Yishay, 2007).

While performance comparisons between group firms and stand-alone firms have been the central topic of recent academic research, the results have never been conclusive. For example, in earlier studies on the Japanese keiretsu, such as those of Hoshi et al. (1990, 1991) and Ferris et al. (1995), group affiliation is viewed as beneficial, owing to the reductions in agency, bankruptcy, and monitoring costs and relaxing of liquidity constraints. However, later studies on keiretsu, such as those of Weinstein and Yafeh (1998), Morck and Nakamura (1999), and Kang and Stulz (2000), report significant costs to group membership owing to the presence of an affiliated bank.

Studies on Korean business groups have likewise revealed diverging results, although their ownership structures are fairly different from those of the Japanese keiretsu.<sup>1</sup> Korean chaebols are large corporate groupings of firms that are under family control and operate in several industries. An earlier work by Chang and Choi (1988) anchored on data from the 1970s and 1980s credits chaebols with higher profitability relative to non-chaebol firms. In contrast, a number of studies in the 1990s, with the exception of Chang and Hong (2000), associate chaebol firms with poorer relative efficiency.

Choi and Cowing (1999) and Joh (2003) compare group-affiliated firms to non-group firms in the mid-1990s and confirm that the relative financial efficiency of chaebol firms is lower. Using early-to mid-1990s data, Ferris et al. (2003) conclude that chaebol-affiliated firms suffer a value loss relative to non-affiliated firms. E. Kim (2006) is an exception, because his study yielded both negative and positive impacts of family ownership and higher debt ratio on firm behavior.

Based on previous literature, it is obvious that there was no consensus with regard to the net advantages that may result from membership in a business group. It is our view that the key to resolving this performance divergence issue is to have a long-term perspective.

Majority of existing studies have utilized data for different or short periods and have produced varying results. However, we employ longer-term data to examine the long-term performance of business groups in a consistent manner. For this purpose, Korean chaebols have been identified as an ideal choice for study as they underwent dramatic changes during the last two decades, including the Asian financial crisis of 1997.

An examination of the 1980s business landscape is interesting because chaebols in the said decade were inclined to have greater shares owned by families, and thus the gap between cash flow rights and control rights was smaller.<sup>2</sup> This gap or wedge has been argued to be the source of agency costs and associated excessive investment. Furthermore, we believe that an examination of the post-crisis period is important as business groups underwent substantial reform and restructuring.

<sup>1</sup> Ferris et al. noted the following differences. First, chaebols use explicit centralized control, whereas the linkages within a keiretsu are more informal (Hattori, 1989; Shin and Park, 1999). Second, chaebols do not employ a “main” bank system (Hattori, 1989).

<sup>2</sup> Official data, released by the Fair Trade Commission of Korea as reported in Chang (2003, p. 164) show that the shares held by owner-families in the top 30 business groups in Korea steadily declined from 15.1% in 1987 to 8.5% in 1997, and to less than 5% in 2000.



At present, there are a number of anecdotal stories and academic articles, such as the work of Choo et al. (2009), claiming that the surviving business groups are currently performing better than stand-alone companies. While Choo et al. (2009) explain changing productive efficiency by estimating frontier production functions over the long term with focus on increased technological capabilities of chaebols, this paper taps financial performance indicators and focuses on several hypotheses regarding the behavior of chaebol firms.

Methodologically and conceptually, we follow the work of Ferris et al. (2003), whose study follows those of Berger and Ofek (1995), Lang and Stulz (1994), and Servaes (1996); the latter reports the existence of a “diversification discount” in the value of a diversified firm or business group. Specifically, these researchers posit that the diversified firm’s market value is less than the sum of the imputed market values of its component single-segment firms. Ferris et al. (2003) report that chaebol-affiliated firms are valued at a discount, relative to comparable firms that lack chaebol affiliation, and that the chaebol as an aggregate is valued less than the sum of the imputed value of its component firms. These findings suggest that the discounted value of conglomerate firms is not merely a U.S. phenomenon, but a global occurrence. Adopting the same method, we have learned that the situation has changed following the crisis, with the chaebols faring better than stand-alone firms and valued at a premium to comparable firms; while during the 1980s there was no significant difference between the group firms and non-group firms.

As indicators of relative performance change, we examine the three hypotheses of over-investment, cross-subsidization, and related/unrelated diversification. The *over-investment hypothesis*, as maintained by Stulz (1990), claims that diversified firms will excessively invest in lines of business with poor investment prospects, thus adversely influencing their value. This behavior has been explained by agency costs of owners who actually own a negligible share but who control the whole empire, owing to cross or circular shareholdings among affiliates (Bebchuk et al., 2000). The *cross-subsidization hypothesis* (Meyer et al., 1992) predicts that failing business segments create greater value loss as part of a conglomerate than as stand-alone segments because independent firms cannot rely on a parent for operating subsidy. Regarding *diversification hypothesis*, we examine whether the business groups pursuing related, rather than unrelated diversification incur less value losses.

While Ferris et al. (2003) attest to the validity of all three hypotheses for Korean chaebols and, subsequently, in explaining value losses, we arrive at somewhat different results, both for the post-crisis period and the 1980s. We discover that during the post-crisis period, or from 2001 to 2005, the over-investment and diversification hypotheses offer little explanation while cross-subsidization visibly weakens. More importantly, profitability improvement is now reflected in the value premium associated with group firms.

We further examine the *profit stability hypothesis* (Nakatani, 1984; Prowse, 1992), which proposes that business groups like the Japanese keiretsu tend to value profit stability at the expense of profit levels. They conjecture that the keiretsu emphasizes the stability of profits because earnings stability is more likely to assure the keiretsu’s survival. We can see if chaebols replicate the same risk management behavior of keiretsus. While Ferris et al. assert the soundness of this hypothesis for the 1990s business landscape, we find that after the crisis, the restructured chaebols boasted of higher profitability with less variation.

Following Ferris et al. (2003), we also examine the benefits arising from membership in a business group. The first is the high-debt-carrying capacity (Lewellen, 1971), such that chaebols can combine affiliates with imperfectly correlated earnings and thus reduce the risk of the firm’s debt, which tends to increase the firm’s debt capacity. This is often called the “co-insurance effect,” which can operate in business-affiliated firms. The firm’s increased debt capacity subsequently generates increased tax shields and, correspondingly, less tax paid for the business conglomerate.

We examine chaebols’ increased use of debt and whether any differences in leverage allow chaebols to reduce their tax expenditures. We discover that chaebols are significantly more leveraged than non-chaebol firms only during the 1990s, and thus chaebol firms’ tax shield advantages receded from 2001 to 2005, whereas there were some in the pre-crisis period.

The paper is organized as follows. In the next section, we introduce the Korean chaebols, and in Section 3, we describe the nature of the data and identify important characteristics of chaebols compared with non-chaebols. Section 4 provides a measurement of the excess values and Tobin’s Q values

of the chaebols compared with non-chaebols. Section 5 examines the three sources for the chaining performance (excess values) of chaebol firms, namely, over-investment, cross-subsidization, and diversification. Section 6 examines the advantage of chaebols, such as debt capacity, tax advantages, and profit stability. Section 7 provides a synthesis of the overall results over the three sub-periods. The paper concludes in Section 8.

## 2. Introducing the Chaebols

In Korea, chaebols are usually perceived as family-controlled business groups and thus are kinds of business groups, defined in Granovetter (1994) as a collection of firms bound together in some formal and/or informal ways, characterized by an intermediate level of binding, namely, neither bound merely by short-term strategic alliances nor legally consolidated into a single entity. In this paper, the term *chaebol* refers to the whole business group as a unit consisting of numerous members or affiliate companies, whereas *chaebol firms*, *chaebol affiliates*, or *group firms* refer to individual firms that belong to a chaebol business group. These affiliate firms are legal persons, often listed in the stock market and mostly interlocked by circular shareholdings among them whereas a business group or a chaebol itself is not a legal person.

The Korean economy has been dominated by chaebols, which contributed approximately 40% of its total output as of 1996 (Chang, 2003). Their origin goes back to the 1950s when a few private businesses arose out of the rent-seeking and business opportunities surrounding American foreign aid allocation (Amsden, 1989, pp. 38–40). In the absence of proprietary technology for use in related industries and in the presence of potentially high profit rates in “pre-modernized” startup industries, their pattern of diversification tended to be opportunistic and technologically unrelated (Amsden and Hikino, 1994). In their early days, chaebols were less capable and pursued rent-seeking behavior, and any market-winning capabilities would be more about how to build, maintain, and utilize their connections and network with the government, which is in charge of key resource allocation (Kim et al., 2004). Over time, these business groups diversified into whatever related or unrelated sectors they think are promising or profitable owing to market demand or government industrial policy, thereby accumulating certain capabilities.

While they used to be tightly owned by founding families, the shares by families became smaller and smaller as many of them went for public listing to raise more funds for growth. The data compiled by the Korea Fair Trade Commission (KFTC) reported in Chang (2003, p. 164) and Jwa (2002, Table 3.5) show that the shares held by owner-families in the top 30 business groups in Korea declined steadily from 15.1% in 1987 to 8.5% in 1997, and to less than 5% in 2000. At the same time, the shares held by the affiliated firms increased from 30% to 40% during this period. Thus, with increasing separation of real ownership (cash flow rights) and control rights, the so-called controlling minority structure (CMS) (Bebchuk et al., 2000) in the ownership of Korean chaebols emerged. This structure has been used throughout as a device for the owner-controller to maintain control over group-affiliated firms while simultaneously financing their growth. However, under the CMS structure, the separation of real ownership and control rights provides the owner-controller with an incentive to seek private benefits by pursuing unjustifiable growth and subsidizing and maintaining even loss-incurring affiliates, as discussed in Johnson et al. (2000). The separation of cash flow rights and control might deepen over the long term, unless government regulation or reform exists to reduce private benefits that accrue to the owner-controller.

Such opportunistic behavior sowed the seeds for the financial crisis in 1997. There are several previous studies that pursue this line of thought. Ferris et al. (2003) and Kim (2002) find that chaebol-affiliated firms tend to invest too much on low Q sectors and too little on high Q sectors, thus overinvesting in low-performing industries. Joh (2003) also finds that portions of shares held by the owner-controller are positively associated with levels of financial efficiency, and that the gap between cash flow rights (owner's share) and control rights in the business groups is negatively associated. However, it is also not easy to reconcile this agency cost thesis with the post-crisis turnaround of the surviving chaebols, given the same and persistent family-controlled structure in chaebols, as pointed out by Choo et al. (2009).

Given the post-crisis turnaround of the chaebol firms, one might reason that there might have been some success in post-crisis governance reform and restructuring within the chaebols. As the post-crisis reforms in Korea focused on corporate governance issues (Haggard et al., 2003), such as appointment of independent board members, Korean chaebols have now become more transparent and accountable. Many chaebols have achieved lower debt ratio and higher profitability. Other than governance reform-related reasons, Choo et al. (2009) point out the enhanced technological capabilities as another important factor responsible for the superior post-crisis performance of chaebols.

### 3. The data and characteristics of chaebol firms

Since 1987, the KFTC has been compiling a list of the top 30 business groups as measured by asset size and has subjected them to special monitoring and restrictions. The 30 groups are generally perceived as the so-called chaebols.<sup>3</sup> Many empirical studies on Korean chaebols adopt this definition of chaebols, that is, the top 30 business groups in terms of asset size. For this study, the main sources of data for Korean firms are the Korea Information Service's (KIS) Value Plus and, secondarily, the Korea Securities Research Institute's (KSRI) Stock Database, both of which have been widely used in the literature, including Chang (2003). For the pre-1987 period, we simply selected the top 30 based on their total asset ranking among Korea's 50 major financial groups, based on the information from the Management Efficiency Research Institute (1986). Furthermore, in determining whether or not a firm belongs to a chaebol, we used the Annuals of the Korean Firms (*Hoe-sa-yon-gam*) published by the Maeil-Business Newspaper.

Using the Annuals, we made a list of the chaebol-affiliated firms and stand-alone firms every year, and adjusted them in view of mergers and acquisitions (M&As), delisting or death, and name changes. For this kind of work, each firm's publicly released annual report was employed as additional material. This enabled us to compile the database of listed firms divided into chaebol-affiliated firms and non-chaebol firms during the periods 1984–1988, 1990–1995, and 1998–2005.<sup>4</sup> We drew tables illustrating the comparative results over the three periods.

The periods chosen represent the different periods with some intervals between them, following similar divisions in Choo et al. (2009). For the post-crisis period, we mainly refer to the results for the period covering 2001–2005 to arrive at clear-cut results because the period of 1998–2000 served as a transition period for post-crisis restructuring. A comparison of the results from the pre- and post-crisis period should be interpreted carefully because we are not dealing with the same samples of firms or balanced panel across the periods but with different samples of firms after many of them disappeared after restructuring and bankruptcy processes. Thus, we have done some robustness check, for example, with the same sample of firms existing both in the 1990s and the 2000s, as shown in Appendix Table 1B.

Following the usual practices, we limited our study to non-financial firms belonging to industries with a certain size.<sup>5</sup> Naturally, these sample selection criteria tended to reduce sample sizes to a certain extent. We also eliminated certain chaebol group-year observations from our analysis because data were available merely for one member firm. In the case of the period covering 2001–2005, we eliminated 27 chaebol group-year observations from our analysis because data were available for only one member firm. For the 1984–1988 periods, 40 group-year observations were dropped. And for the 1990–1995 period, 18 group-year observations were dropped, while Ferris et al. (2003) dropped one chaebol.<sup>6</sup> Our final

<sup>3</sup> There are some firms that are loosely affiliated with one another, but these “minor” chaebol firms do not belong to a major chaebol group. Similar to Ferris et al. (2003) and Shin and Park (1999), we eliminated these minor chaebol firms when we constructed our sample.

<sup>4</sup> Here, the sample of the listed firms do not mean that these firms remain listed throughout the three sub-periods. Firms are included in the sub-period when they were listed, even though they were de-listed at later sub-periods.

<sup>5</sup> As stated in Ferris et al. (2003), this sample screening criteria have the following reasons. First, operating income for financial firms is not meaningful. Second, sales must be significantly greater than zero to avoid distorted valuation multiples. Thus, the sample firms' sales are over 10 billion similar to what Ferris et al. (2003) stated. Third, each industry must have at least five non-chaebol firms to obtain statistically meaningful industry medians. This third criterion was used only when we calculate the excess values following Ferris et al. (2003) but not when we just use Tobin's Q.

<sup>6</sup> This difference is due to the definition of chaebols. While Ferris et al. fixed each firm's affiliation to a chaebol based on the information as of 1994, and then extended that definition to earlier years, our definition checks for every year whether each firm belong to a chaebol group or not.

sample consisted of 255 chaebol firm-year observations (with 81 chaebol group-year observations) and 791 non-chaebol firm-year observations in the period covering 1984–1988. In the case of the period covering 1990–1995, the numbers are 682 chaebol firm-year observations (with 162 chaebol group-year observations) and 2,135 non-chaebol firm-year observations. We utilized 469 chaebol firm-year observations (with 103 chaebol group-year observations) and 3,996 non-chaebol firm-year observations in the period covering 2001–2005.

In Panel A of [Table 1](#), we present comparative descriptive statistics between chaebol and non-chaebol affiliated firms. We first notice that chaebol firms have been significantly larger than non-chaebol firms, and the size gap has increased over time. Compared to non-chaebol firms, the total assets of the average chaebol firms were more than four times larger during the 1984–1988 period, about five times larger during the 1990–1995 period, and nine times larger during the 2001–2005 period. Average sales generated by chaebol firms were approximately seven times greater than those of non-chaebol firms during the 1984–1988 period. The sales gap between chaebol and non-chaebol firms further expanded in the 1990s and 2000s. Despite chaebol firms' consistent characteristics, we notice several important changes that occurred after the crisis or in the 2000s.

First, while chaebol firms had a higher investment tendency (as measured by the ratio of capital expenditure to sales) than non-chaebol firms had in the 1990s, the ratio in the 2000s shows no significant difference between the two groups of firms. Second, in terms of financial leverage (debt-to-asset ratio), chaebols had a significantly higher ratio (about 75%) than the typical non-chaebol firm both in the 1980s and the 1990s from 1990 to 1995. However, the situation changed after the crisis, and the gap was drastically reduced to insignificant levels, with chaebol firms' leverage ratio reaching 54%, compared to non-chaebol firms' 51%. This change was partly triggered by new regulatory rules, where chaebols were compelled to reduce their debt-to-equity ratio to less than 200% after the crisis.

Third, while chaebol firms possessed lower average betas (as determined from the market model using monthly returns from our sample period) than non-chaebol firms during the 1990–1995, in other periods of the 1980s and the 2000s, chaebols were observed on average to have higher betas compared to non-chaebol firms. Chaebols' betas were 0.905/0.842 in the 1984–1988/2001–2005 periods, whereas those of non-chaebol firms were 0.624/0.712. This pattern is consistent with the interpretation that chaebol firms have now become more vulnerable to market movements, losing the former benefits from belonging to diversified business groups. Fourth, a comparison of taxes-to-sales ratios suggests that while chaebol-affiliated firms were paying less taxes than non-chaebol firms during the 1980s and the 1990s' pre-crisis period, they now appear to pay more taxes compared to non-chaebol firms.

Fifth, chaebol firms had barely matched non-chaebol firms in their dividend payout ratios in the 1980s and the 1990s; however, after the crisis, chaebols have begun to pay significantly more dividends than non-chaebols have. Finally, a simple measure of financial performance demonstrates that chaebol firms are now performing better than non-chaebol firms. The median market-to-book value ratios or proximate Tobin's *Q* ratio are higher in chaebol firms than in non-chaebol firms in the 2000s and the 1980s, whereas in the 1990–1995 period, the reverse was true. In terms of the mean values, while chaebol firms had a lower ratio in the 1990s, the gap is not significant in the 2000s.

In Panel B of [Table 1](#), we turn to the group-level, compared to the firm-level in Panel A, descriptive statistics for the business groups. Regarding diversification tendency, in the 1984–1988 period, chaebol groups' median number of affiliated firms was 2 and the median number of industries they conduct business in was 2. Further diversification was apparent from 1990 to 1995, as the median rose to 4 and 3, respectively. In the period covering 2001–2005, the medians were maintained at 4 and 3, respectively. In terms of the median HHI index of relatedness or concentration, it decreased to 0.537 in the 1990s from 0.602 in the 1980s and then increased again to 0.606 in the 2000s. This trend was the same even if considered in the mean value of the HHI. Other financial characteristics of the chaebol addressing such issues as liquidity, size, dividend payout, capital expenditures, and effective tax rates are likewise provided.

In summary, the results shown in [Table 1](#) present the typical chaebol firm as significantly larger and predisposed to investing heavily compared to the non-chaebol firm; these tendencies have not changed over the crisis period. However, in other respects, there are dramatic changes recorded over the crisis period. These reversals have happened in favor of chaebols in terms of debt-to-asset ratio,

**Table 1**  
Descriptive statistics: chaebol firms, non-chaebol firms and chaebol groups.

Characteristics	1984–1988			1990–1995			2001–2005		
	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference
<i>Panel A: comparative firm-level characteristics</i>									
Total assets (billions of won)	374.812 [204.873] (471.510)	81.684 [45.423] (209.739)	293.127*** 159.449***	876.726 [457.563] (1334.237)	167.315 [76.433] (633.123)	709.411*** 381.130***	2764.318 [1021.089] (5472.088)	302.078 [81.595] (2138.508)	2462.240*** 939.494***
Total debt-to-total asset	0.754 [0.775] (0.119)	0.718 [0.698] (0.331)	0.037** 0.076***	0.757 [0.760] (0.131)	0.672 [0.660] (0.371)	0.086*** 0.100***	0.537 [0.537] (0.263)	0.506 [0.451] (0.827)	0.031 0.086***
Sales (billions of won)	637.507 [217.294] (1097.157)	80.650 [53.368] (146.883)	556.857*** 163.926***	1043.908 [415.416] (2226.571)	130.105 [68.241] (369.645)	913.804*** 347.175***	3251.776 [1058.967] (6940.562)	239.912 [79.447] (1029.758)	3011.864*** 979.520***
Capital expenditure/sales	0.086 [0.039] (0.237)	0.037 [0.039] (1.287)	0.049 0.000	0.114 [0.058] (0.245)	0.086 [0.053] (0.212)	0.028*** 0.005**	0.031 [0.005] (0.481)	0.027 [0.008] (0.438)	0.004 −0.003
Current assets/current liabilities	1.173 [1.059] (0.522)	1.355 [1.235] (0.556)	−0.181*** −0.175***	1.069 [1.027] (0.428)	1.512 [1.347] (0.824)	−0.443*** −0.320***	1.186 [1.049] (0.765)	2.300 [1.557] (2.674)	−1.115*** −0.508***
Dividends paid/net income	0.533 [0.366] (0.729)	0.521 [0.323] (1.541)	0.012 0.043***	0.601 [0.401] (3.100)	0.578 [0.315] (2.515)	0.023 0.086***	0.353 [0.161] (2.844)	0.182 [0.088] (0.487)	0.171*** 0.072***
Market-to-book ratio	1.009 [0.983] (0.194)	0.989 [0.938] (0.335)	0.020 0.045***	1.039 [1.020] (0.148)	1.093 [1.032] (0.382)	−0.054*** −0.012**	1.040 [0.902] (0.564)	1.050 [0.843] (1.112)	−0.010 0.058***
Taxes/sales	0.011 [0.008] (0.011)	0.020 [0.015] (0.018)	−0.009*** −0.007***	0.007 [0.004] (0.008)	0.014 [0.009] (0.018)	−0.007*** −0.005***	0.016 [0.014] (0.027)	0.013 [0.008] (0.103)	0.003 0.006***
Beta	0.905 [0.887] (0.846)	0.624 [0.641] (1.014)	0.281*** 0.246***	0.933 [0.841] (8.345)	1.502 [0.677] (17.439)	−0.570 0.164***	0.842 [0.890] (1.181)	0.712 [0.650] (1.373)	0.130** 0.240***
Residual investment	−6.62E−10 [−0.085] (0.523)	8.80E−10 [−0.074] (0.447)	0.000 −0.011	−7.94E−12 [−0.031] (0.277)	−1.78E−11 [−0.053] (0.591)	0.000 0.022**	6.30E−11 [−0.017] (0.318)	2.08E−10 [−0.034] (0.451)	0.000 0.017
Number of observations	255	791		682	2135		469	3996	

Table 1 (continued)

Characteristics	1984–1988			1990–1995			2001–2005		
	Median	Mean	Standard deviation	Median	Mean	Standard deviation	Median	Mean	Standard deviation
<i>Panel B: chaebol-group-level statistics</i>									
Number of member firms	2.000	3.148	1.783	4.000	4.210	2.397	4.000	4.553	2.754
Number of industries	2.000	2.975	1.565	3.000	3.722	1.985	3.000	3.699	2.287
Number of firms with negative operating income	0.000	0.086	0.283	0.000	0.191	0.395	0.000	0.282	0.452
Total assets (billions of won)	594.548	1179.963	1385.453	1964.293	3690.908	4703.509	5102.058	12587.040	17297.290
Total debt-to-total asset	0.779	0.739	0.107	0.781	0.776	0.066	0.563	0.551	0.156
Sales (billions of won)	606.110	2006.965	2808.590	1701.823	4394.722	7370.509	4464.470	14806.630	22138.160
Capital expenditure/sales	0.033	0.071	0.103	0.069	0.109	0.236	0.009	0.004	0.103
Current assets/current liabilities	1.130	1.173	0.355	1.021	1.121	0.556	0.896	0.968	0.444
Dividends paid/net income	0.444	0.746	2.155	0.392	0.477	5.753	0.141	0.228	1.207
Market-to-book ratio	0.970	0.973	0.170	1.014	1.020	0.084	0.930	0.989	0.305
Taxes/sales	0.007	0.009	0.007	0.005	0.007	0.006	0.017	0.016	0.019
Mean beta	0.883	0.827	0.556	0.841	0.820	3.194	0.853	0.846	0.510
1/number of 3-digits industry	0.500	0.408	0.161	0.333	0.332	0.134	0.333	0.411	0.290
Mean correlation between cashflow and capex	0.011	0.043	0.271	0.005	−0.011	0.298	0.000	0.002	0.232
Median correlation between cashflow and capex	0.000	0.068	0.324	−0.003	0.003	0.357	0.000	0.022	0.278
HHI index of relatedness (concentration)	0.602	0.634	0.187	0.537	0.585	0.185	0.606	0.641	0.261
Over-investment	0.000	0.038	0.111	0.009	0.090	0.205	0.000	−0.018	0.190
Number of observations	81			162			103		

Notes: Panel A contains comparative means [medians] (standard deviations) between chaebol and non-chaebol firms. Differences are evaluated using a *t*-statistics and the Wilcoxon rank-sum test. Statistical significance at the 1%, 5%, and 10% levels are denoted by \*\*\*, \*\*, and \* respectively. The observations numbers of residual investment are 145 for chaebol firms and 418 for non-chaebol firms in 1984–1988. In periods of 1990–1996, the numbers are 449 and 1,363, respectively. The numbers are 208 and 1,257, respectively in 2001–2005 periods. In Panel B chaebol group variables are aggregated across member firms. Residual investment in Panel A is estimated residuals from the investment function, and serves as a measure of firm-level over-investment. Over-investment in Panel B is defined as the sum of the capital expenditures of each of its member firms whose Tobin's *Q* is in the lowest quartile in each year as scaled by total sales.



market-to-book value ratio, and dividends-to-net income ratio, although they no longer enjoy tax advantages associated with debt ratios. The sources of such changes would be an interesting issue to look into. One source might be the correction of investment inefficiencies as confirmed by Choo et al. (2009). We will progress to a more rigorous analysis of this issue.

#### 4. Measuring and comparing the excess values and proxy Tobin's Q

In Table 2, we estimate firm excess value by utilizing a method similar to that of Berger and Ofek (1995) and the method applied to Korean chaebols in Lee et al. (2008). Specifically, firm excess value is calculated as the natural log of the ratio of the firm's actual value (i.e., market value of the firm's equity plus the book value of its debt) to its imputed value.<sup>7</sup> Imputed value is calculated as the firm's total assets multiplied by the industry median value-to-assets ratio.<sup>8</sup> For the group-level analysis, the actual value of each group is estimated as the sum of the actual value of each member firm, following the method of Ferris et al. (2003). The imputed value for each chaebol is the sum of each member firm's imputed value. Given that a proxy Tobin's Q can be defined as the ratio of market value of equity plus a book value of debt to asset, this excess value for a firm is equivalent to the ratio of Tobin's Q of a firm to the industry median Tobin's Q, namely, an industry-adjusted Tobin's Q.

It must be noted that Table 2 depicts an interesting evolution of the excess values for chaebol firms. In the early period (1984–1988), both the mean and median values are significantly positive, but in the 1990–1995 period, both values are significantly negative. Finally, in the post-crisis period of 2001–2005, both values are significantly positive again. When we examine whether these values are significantly different from those that we calculated for non-chaebol firms, we find that they are significantly lower than those for non-chaebols in the 1990s but significantly higher than those for non-chaebols in the 1980s and the post-crisis period. The pattern holds in terms of both the median and mean excess value, though the levels of significance are different. We further observe that the evolutionary pattern is retained when measured at the group level, as illustrated at the bottom row of Table 2.

In Table 3, we provide more rigorous evidence on the relationship between value loss/premium in the firm and grouping strategy while controlling for several factors which, according to Berger and Ofek (1995), may influence the value-loss level in a diversified firm. Specifically, we control for the firm's use of leverage, profitability, and growth opportunities, as well as size, by adding the variable of total asset.<sup>9</sup> In addition, we follow Ferris et al. (2003) in including a beta to control the risk difference because chaebols are often hypothesized to experience a lower level of systematic risk relative to non-chaebol firms. The firm's use of financial leverage is measured by its total debt-to-total assets ratio; its profitability is estimated by the operating profit margin; and the firm's growth opportunities are proxied by the ratio of capital expenditures to sales.<sup>10</sup> The most important variable in this regression is a chaebol membership dummy variable, which assumes a value of one if the firm belongs to a chaebol, and zero if otherwise. As a dependent variable, we try both the proxy Tobin's Q and the excess values, with the results of the former presented in Table 3 and the latter in Appendix Table 1A, as the results are quite similar each other.

The results shown in Table 3 again confirm the dramatic shift of discount and premium of the chaebol firm's performance. In the upper panel displaying the results of the three representative periods, the coefficient of the chaebol dummy variable during the 1984–1988 period is positive and statistically significant. In the 1990–1995 period, the coefficient takes a significantly negative value of

<sup>7</sup> We follow Ferris et al. (2003) by eliminating firms with extreme excess values from our sample. Extreme excess value is defined as actual value either more than four times the firm's imputed value or less than one-fourth of the imputed value.

<sup>8</sup> Following Ferris et al. (2003) and Berger and Ofek (1995), the industry median is drawn from a sample of non-chaebol firms.

<sup>9</sup> Another possible explanatory variable on excess value is firm size, as suggested by Berger and Ofek (1995). However, following Ferris et al. (2003), we do not include this owing to a high correlation with the chaebol dummy. As noted there, the theoretical relationship between size and excess value is contentious and the empirical evidence is inconsistent with Lang and Stulz (1994) finding a negative relation, Berger and Ofek (1995) finding a positive one, and finally, Lins and Servaes (1999) confirming the inconsistency of size as an explanatory variable on excess value.

<sup>10</sup> Ferris et al. (2003) observe that the results remain qualitatively identical when they standardize profitability and growth opportunities by total assets, and that this holds true whenever they use profitability and growth opportunities in any of the reported regression analyses.

**Table 2**  
Measuring excess value at the firm and group levels.

Time period	1984–1988					1990–1995					2001–2005				
	Median		Mean		N	Median		Mean		N	Median		Mean		N
	First	Third	First	Third		First	Third	First	Third		First	Third	First	Third	
<i>Firm</i>															
Chaebol firms	0.015 <sup>*,5</sup>	0.022 <sup>***,5</sup>	−0.055	0.096	0.148	255	−0.029 <sup>***,1</sup>	−0.024 <sup>***,1</sup>	−0.101	0.042	0.130	682	0.097 <sup>***,1</sup>	0.122 <sup>***,1</sup>	463
Non-chaebol firms	0.000	−0.001	−0.083	0.067	0.157	788	0.000	0.008 <sup>**</sup>	−0.087	0.088	0.189	2128	0.000	0.016 <sup>***</sup>	3938
<i>Chaebol</i>															
Chaebol group	0.018 <sup>***</sup>	−0.003	−0.034	0.067	0.127	81	−0.027 <sup>***</sup>	−0.028 <sup>***</sup>	−0.074	0.015	0.079	162	0.164 <sup>***</sup>	0.182 <sup>***</sup>	103

*Notes:* The group excess value is the chaebol's actual value to the chaebol's imputed value. The chaebol's actual value is the sum of its member firms' actual value while the imputed value of the chaebol is the sum of each member firm's imputed value. The samples include firm-year observations and chaebol group-year observations. The Wilcoxon signed-rank test is used to evaluate statistical significance for median values and a *t*-test is used to assess statistical significance for mean values. Statistical significance at the 1%, 5% and 10% levels are indicated by \*\*\*, \*\*, and \*, respectively. Statistically significant differences at the 1%, 5% and 10% level between chaebol and non-chaebol firms are indicated by 1, 5, and 10, respectively.



**Table 3**

Annual firm-level regressions of Tobin Q.

Sample	Number of observations	Intercept	Chaebol dummy	ln(total_asset)	Leverage	EBIT/sales	Capex/sales	Beta
1984–1988	1022 (0.622)	1.128*** (0.000)	0.057*** (0.002)	−0.044*** (0.000)	0.815*** (0.000)	0.356*** (0.001)	−0.001 (0.602)	0.035*** (0.000)
1990–1995	2814 (0.560)	1.647*** (0.000)	−0.020* (0.051)	−0.059*** (0.000)	0.768*** (0.000)	0.144 (0.305)	−0.050*** (0.001)	−0.000 (0.974)
2001–2005	2765 (0.220)	0.838*** (0.000)	0.131*** (0.000)	−0.018** (0.050)	0.712*** (0.000)	0.141 (0.287)	−0.002 (0.935)	0.019*** (0.001)
1984	168 (0.862)	0.722*** (0.000)	0.014 (0.308)	−0.029*** (0.000)	0.855*** (0.000)	0.397*** (0.001)	−0.002** (0.024)	0.006 (0.258)
1985	177 (0.768)	0.748*** (0.000)	0.010 (0.476)	−0.025*** (0.000)	0.765*** (0.000)	0.222** (0.041)	0.044 (0.198)	0.045*** (0.000)
1986	189 (0.880)	0.936*** (0.000)	0.065** (0.032)	−0.042*** (0.000)	0.900*** (0.000)	0.360*** (0.001)	0.004 (0.847)	0.079*** (0.000)
1987	217 (0.737)	1.707*** (0.000)	0.062* (0.065)	−0.070*** (0.000)	0.864*** (0.000)	0.211* (0.057)	0.083 (0.295)	−0.047*** (0.000)
1988	271 (0.658)	1.738*** (0.000)	0.120*** (0.007)	−0.069*** (0.000)	0.827*** (0.000)	0.292 (0.255)	−0.001 (0.986)	0.024* (0.081)
1990	436 (0.729)	1.874*** (0.000)	0.042* (0.069)	−0.076*** (0.000)	0.866*** (0.000)	0.183 (0.181)	−0.010 (0.807)	0.000 (0.942)
1991	454 (0.750)	1.222*** (0.000)	0.030* (0.080)	−0.044*** (0.000)	0.820*** (0.000)	0.101 (0.446)	−0.085*** (0.000)	0.001 (0.274)
1992	461 (0.448)	1.721*** (0.000)	0.010 (0.552)	−0.060*** (0.000)	0.601*** (0.000)	0.171 (0.213)	−0.033*** (0.005)	0.000 (0.395)
1993	472 (0.762)	1.811*** (0.000)	−0.030 (0.194)	−0.066*** (0.000)	0.802*** (0.000)	−0.262 (0.162)	−0.033 (0.524)	0.015 (0.287)
1994	484 (0.380)	2.485*** (0.000)	−0.052** (0.032)	−0.094*** (0.000)	0.631*** (0.000)	0.896*** (0.000)	0.049 (0.448)	0.001** (0.013)
1995	507 (0.390)	1.692*** (0.000)	−0.017 (0.513)	−0.059*** (0.000)	0.632*** (0.000)	0.619*** (0.000)	−0.053* (0.095)	−0.000 (0.789)
2001	540 (0.703)	1.635*** (0.000)	0.083** (0.014)	−0.068*** (0.000)	0.817*** (0.000)	−0.002 (0.985)	−0.009 (0.622)	0.069 (0.113)
2002	536 (0.609)	1.099*** (0.000)	0.093*** (0.005)	−0.038*** (0.003)	0.798*** (0.000)	−0.176 (0.152)	0.024 (0.312)	0.014 (0.354)
2003	519 (0.309)	0.668** (0.012)	0.165*** (0.001)	−0.017 (0.240)	0.592*** (0.000)	−0.090 (0.680)	0.001 (0.964)	0.255*** (0.000)
2004	586 (0.228)	0.212 (0.338)	0.072 (0.153)	0.011 (0.347)	0.732*** (0.000)	0.781** (0.011)	−0.076 (0.386)	0.008 (0.176)
2005	584 (0.017)	1.798*** (0.006)	0.271** (0.022)	−0.046 (0.128)	0.255 (0.197)	0.543 (0.128)	0.082 (0.502)	0.013 (0.136)

Notes: Dependent variable is firm Tobin Q. Tobin Q is calculated by (market value + total debt)/total asset. Leverage is total liabilities divided by total assets. Firm profitability is calculated as operating income standardized by sales while firm growth is estimated by the capital expenditures to sales ratio. Beta is estimated from the market model using monthly returns. The *p*-values (parentheses) are reported. Statistical significance at the 1%, 5%, and 10% levels are indicated by \*\*\*, \*\*, and \* respectively.

−0.020 and, finally, after the crisis and restructuring, we get a significant premium of 13.1%. The annual regressions revealed at the bottom panel of Table 3 more closely trace the turnaround of the discount back to the premium of chaebol firms.

One might say that this is due to the possible survivorship bias, such that loss-incurring chaebol firms disappear, while good ones survive the crisis. However, as noted in Choo et al. (2009), the exit

ratios for the chaebol and non-chaebol firms are not that different. To check it more rigorously, however, we have run additional regressions with a sample of firms that exist for both the 1990s and the 2000s. The results are shown in Appendix Table 1B, and the pattern is consistent in showing a significant turnaround of chaebol firms. In sum, while the results for the 1990s showing a discount is consistent with the similar estimation in Lee et al. (2008) and Ferris et al. (2003), we have discovered a new and interesting pattern of premium in the 2000s after the restructuring since the financial crisis in 1997, as well as the premium in the 1980s.

## 5. Sources for the changes: over-investment, diversification, and cross-subsidization

In this section, we test if the value performance of chaebols can be attributed to over-investment, diversification, and/or cross-subsidization.

First, similar to the idea of Berger and Ofek (1995) and Ferris et al. (2003), we estimate a chaebol's over-investment. There are two ways to deal with over-investment. The one measures the extent to which capital expenditure within the chaebol is skewed towards those firms which have the lowest Tobin's Q out of the chaebol-member firms. The other measures the degree that capital expenditures within the chaebol are skewed to firms in industries that have a low Tobin's Q in the economy as a whole. While we have tried both, we present the results with the first method, which is the sum of the capital expenditures of each of its member firms whose Tobin's Q is in the lowest quartile in each year as scaled by total sales. Thus, higher values of over-investment indicate greater investment by firms operating with a low Tobin's Q.

Second, we first measure relatedness as the inverse of the number of distinct three-digit industry classification codes in which the chaebol operates.<sup>11</sup> Another measure we tried is the one that is used often in the literature, namely, HHI (Herfindahl index of specialization).<sup>12</sup> However, given a few objections to the measures based on industry classification,<sup>13</sup> we try other measures that take into account cross-subsidization behavior of chaebol firms. Whited (2001) and Khanna and Tice (2001) argued that the relatedness of operations between firms can temper the value reduction that often stems from a policy of corporate diversification. Thus, we estimate the mean (median) cross-correlations between capital expenditures and cash flow across members of a given chaebol and use them as additional measures of the relatedness of diversification within a chaebol. It reflects the idea that a high correlation between an affiliate's level of capital expenditures and another affiliate's cash flows might better capture the degree of relatedness that exists within a business group. We then include these four measures of relatedness in our regression of chaebols' excess values. This is to test the argument proposed in Maksimovic and Phillips (1999) and Khanna and Tice (2001) that affiliated firms operating in related segments are functionally less diverse and, consequently, might not suffer a valuation loss to the same degree as conglomerates whose holdings are unrelated.

In Table 4A, we examine the impact of over-investment and related diversification on the proxy Tobin's Q value measured at the level of a business group (not at the firm-level) while controlling for group-level leverage, profitability, and capital expenditures. We observe in Table 4A that the coefficient on over-investment is negative and significant in the 1980s and negative but only marginally significant with *p*-values of 11–20% in the 1990s; however, the coefficients are not significant at all and getting close to zero in the post-crisis period of 2001–2005. The results for the 1990s are not much different from those by Ferris et al. (2003), and the results for the 2000s imply that over-investment is no longer a factor that pushes for discount of chaebol firms. Actual values of this measure of group-level over-investment are shown in Table 1B. We can see there that this tendency of over-investment was highest during the 1990s but close to zero or even negative in the 2000s. When we tried the

<sup>11</sup> The KSE constructs a series of four-digit industry classification codes that span all listings on the exchange. Our use of three digits is to prevent overestimation of the degree of diversity within the chaebol.

<sup>12</sup> We calculate HHI following Berger and Ofek (1995). That is,  $HHI = \sum (S_i^2) / (\sum S_i)^2$ , where *S* is sales and *i* means industry sector which operating by chaebol member firm. And also, *j* indicates chaebol member firm.

<sup>13</sup> As stated in Ferris et al. (2003), Maksimovic and Phillips (1999) and Khanna and Tice (2001) argue that segments operating in different industries might still be related through such linkages as common distribution channels or a vertical integration of production activity.

**Table 4A**  
Chaebols and the over-investment hypothesis: dependent variable is group-level Tobin Q.

Variable	1984–1988					1990–1995					2001–2005				
	Coefficient (p-value)					Coefficient (p-value)					Coefficient (p-value)				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Intercept	0.985 <sup>***</sup> (0.000)	0.945 <sup>***</sup> (0.000)	0.913 <sup>***</sup> (0.000)	1.068 <sup>***</sup> (0.000)	0.903 <sup>***</sup> (0.000)	0.781 <sup>***</sup> (0.000)	0.758 <sup>***</sup> (0.000)	0.766 <sup>***</sup> (0.000)	0.775 <sup>***</sup> (0.000)	0.763 <sup>***</sup> (0.000)	1.061 <sup>***</sup> (0.000)	0.787 <sup>***</sup> (0.000)	0.795 <sup>***</sup> (0.000)	0.952 <sup>***</sup> (0.000)	0.823 <sup>***</sup> (0.000)
Over-investment	–0.393 <sup>**</sup> (0.044)	–0.349 <sup>*</sup> (0.076)	–0.362 <sup>*</sup> (0.070)	–0.375 <sup>**</sup> (0.049)	–0.379 <sup>*</sup> (0.053)	–0.055 (0.112)	–0.046 (0.181)	–0.046 (0.173)	–0.045 (0.198)	–0.043 (0.213)	0.011 (0.914)	–0.008 (0.935)	–0.013 (0.900)	–0.008 (0.943)	–0.024 (0.815)
Leverage	0.158 (0.463)	0.140 (0.527)	0.181 (0.406)	0.155 (0.462)	0.190 (0.379)	0.367 <sup>***</sup> (0.000)	0.356 <sup>***</sup> (0.000)	0.342 <sup>**</sup> (0.000)	0.347 <sup>***</sup> (0.000)	0.353 <sup>***</sup> (0.000)	0.034 (0.889)	0.228 (0.314)	0.220 (0.341)	0.117 (0.643)	0.169 (0.499)
Operating income/sales	–1.170 <sup>*</sup> (0.056)	–1.426 <sup>**</sup> (0.021)	–1.373 <sup>**</sup> (0.028)	–1.321 <sup>**</sup> (0.026)	–1.317 <sup>**</sup> (0.031)	–0.028 (0.900)	–0.089 (0.687)	–0.026 (0.906)	–0.090 (0.696)	–0.110 (0.621)	1.098 <sup>*</sup> (0.068)	1.008 <sup>*</sup> (0.066)	0.991 <sup>*</sup> (0.077)	1.165 <sup>**</sup> (0.039)	0.986 <sup>*</sup> (0.089)
Capex/sales	0.453 <sup>**</sup> (0.034)	0.390 <sup>*</sup> (0.072)	0.417 <sup>*</sup> (0.054)	0.471 <sup>**</sup> (0.025)	0.427 <sup>**</sup> (0.046)	–0.043 (0.155)	–0.045 (0.131)	–0.046 (0.124)	–0.052 <sup>*</sup> (0.091)	–0.055 <sup>*</sup> (0.066)	0.703 <sup>**</sup> (0.039)	0.846 <sup>**</sup> (0.020)	0.851 <sup>**</sup> (0.019)	0.820 <sup>**</sup> (0.026)	0.869 <sup>**</sup> (0.017)
Relatedness	–0.169 (0.153)	0.062 (0.287)	0.032 (0.652)	–0.224 <sup>**</sup> (0.021)		–0.101 <sup>**</sup> (0.039)	0.034 <sup>*</sup> (0.055)	0.048 <sup>**</sup> (0.026)	–0.015 (0.687)		–0.413 <sup>***</sup> (0.000)	0.125 (0.363)	0.097 (0.555)	–0.176 <sup>*</sup> (0.080)	
Number of obs.	81	81	81	81	81	162	162	162	162	162	103	103	103	103	103
Adjusted R <sup>2</sup>	0.120	0.110	0.098	0.159	0.108	0.122	0.119	0.127	0.099	0.104	0.230	0.088	0.080	0.097	0.084

Notes: Dependent variable is group-level Tobin Q. The chaebol's Tobin Q is the sum of its member firms' market value and total debt to the sum of its member firms' total asset. This value is the same as the weighted average group Tobin Q with member firms' asset as the weights. Total asset and total debt are all book value. The over-investment measure is calculated as the sum of the capital expenditures of member firms whose Tobin's Q is in the lowest quartile for each year, scaled by total sales. For the relatedness, (1)–(4) are 1/number of 3-digit industries, median cross-correlation and mean cross-correlation, 1-HHI, respectively. Model (5) does not include relatedness variable. The p-values are in parentheses. Statistical significance at the 1%, 5%, and 10% levels are indicated by \*\*\*, \*\*, and \* respectively.

second method of measuring over-investment (in low  $Q$  sectors), we still found the negative coefficients throughout the three sub-periods but varying levels of significance over the three sub-periods, especially insignificance for the 1980s and 1990s. These results combined seems to suggest that value losses in the past chaebols are more associated with over-investment by low performing (low  $Q$ ) affiliates within a group than with investment into low  $Q$  sectors.

To further confirm this pattern at the firm-level, we try more examinations. We have tried additional regressions to check the impact of over-investment at the firm-level, which might be different from the results at the group level. In Table 4B, we present the results at the firm-level and thus with more observations. To measure the degree of over-investment, we follow the practice in Choo et al. (2009) and have first estimated the investment function, following Scharfstein and Stein (2000), and then have taken the residual from this investment function as the degree of over-investment.<sup>14</sup> Now as shown in Panel (a) of Table 4B, the coefficient of the variable representing the firm-level over-investment is quite significant and negative as a determinant of Tobin  $Q$  in the 1990s, and positive and insignificant in the 2000s. This pattern is an exact replication of the pattern observed in Choo et al. (2009), where the dependent variable is a measure of productive efficiency. The mean and median values of these residuals from investment function are shown in Table 1A as “residual investment.” As shown there, the values for chaebol firms are bigger than those of non-chaebol firms in the 1990s, indicating over-investment of chaebol firms. While the results in the pre-crisis period confirm that over-investment is a source of value loss in the diversified firm, the insignificance of this over-investment variable in the post-crisis period suggests that the impact of this on firm values has become less important than before.

Now, the results in Panel (b) of Table 4B is to test an additional hypothesis that those over-investment in the 1990s was paid off in longer term and leading to value gain in the 2000s. To test this, we have used the Tobin  $Q$  in 10 year later of each firm as the dependent variable, and the current values for explanatory variables. Sample firms are limited to those exiting in both the 1990s and 2000s. Very interestingly, the results show that over-investment was paid off for chaebol firms but was not the case for non-chaebol firms and whole sample firms.

Another possible explanation for the value loss observed in chaebols is the subsidization of poorly performing affiliates by other members of the chaebol. The existence of this kind of subsidization behavior has been confirmed in terms of internal capital market argument in Shin and Park (1999). Our results shown in Table 2 have already shown that a variable representing profitability has a negative impact on its firm value. However, its impact (namely, impact of losses by an affiliate) on group-level valuation was not really tested. To verify this, we use negative cash flow (i.e.,  $EBIT < 0$ ) as the measure of a poorly performing firm and as the trigger for a likely cross-subsidy. We test whether the presence of a negative cash flow firm in a group has a negative effect on the value of a business group. If confirmed, this implies that unprofitable chaebol affiliates drain value from other members of the chaebol group through cross-subsidies.

The results with a group-level Tobin's  $Q$  as the dependent variables in Table 4C show that cross-subsidization has negatively affected the value of chaebols in the 1990s although the level of significance is marginal, ranging around 10%, depending upon the measure of relatedness. However, in the post-crisis period and in the 1980s, the coefficients of the negative cash flow variables are far from being significantly different from zero, regardless of diverse measures of related diversification. This result seems to suggest that cross-subsidization has been some source for value discount for chaebol groups in the 1990s but not so in the 1980s and the 2000s.

As a next step along this line of thought, we go on (as suggested by a referee) to see if there is any evidence that the chaebol that were most dramatically restructured saw the largest increase in alignment of value and operating performance post-crisis. To see these effects (dramatic restructuring), we identified the firms whose EBIT (=operating income/sales) has turned from belonging to the lowest 25% group to belonging to the top 50% and then identified through an EBIT dummy the business

<sup>14</sup> The following model is estimated for each period, with reference to Scharfstein and Stein (2000).  $Ginv_{it} = \beta_0 + \beta_1 Ginv_{it-1} + \beta_2 Q_{it-1} + \beta_3 indQ_{it-1} + \beta_4 CF_{it-1} + \beta_5 Chae_i + \delta' D + v_t$ , where  $Ginv_{it} = I_{it}/K_{it-1}$  (gross investment),  $CF_{it-1} = CF_{it}/K_{it-1}$  (cash flow),  $Q$  is Tobin's  $Q$ ,  $indQ$  is industry-level Tobin's  $Q$ ,  $\delta$  is a coefficients vector,  $D$  is a vector of industry dummies,  $v_t$  is year dummies, respectively.

**Table 4B**  
The over-investment Hypothesis: dependent variable is individual firm Tobin Q.

Variable	Coefficient ( <i>p</i> -value)					
	(a) Current impacts			(b) Impacts after 10 years		
	1984–1988	1990–1995	2001–2005	1991–1995 all firms	1991–1995 chaebol firms	1991–1995 non-chaebol firms
Intercept	0.358 <sup>***</sup> (0.000)	0.629 <sup>***</sup> (0.000)	0.573 <sup>***</sup> (0.000)	0.645 <sup>***</sup> (0.000)	0.507 <sup>***</sup> (0.001)	0.625 <sup>***</sup> (0.000)
Over-investment	0.002 (0.954)	−0.043 <sup>***</sup> (0.004)	0.023 (0.503)	−0.002 (0.967)	0.264 <sup>**</sup> (0.049)	−0.009 (0.861)
Leverage	0.883 <sup>***</sup> (0.000)	0.689 <sup>***</sup> (0.000)	0.642 <sup>***</sup> (0.000)	0.207 <sup>***</sup> (0.006)	0.539 <sup>***</sup> (0.002)	0.196 <sup>***</sup> (0.006)
Operating income/sales	0.271 <sup>***</sup> (0.009)	−0.145 (0.111)	0.200 (0.136)	0.539 <sup>**</sup> (0.010)	0.424 (0.426)	0.588 <sup>***</sup> (0.009)
Capex/sales	−0.035 (0.492)	−0.021 (0.510)	−0.013 (0.832)	0.072 (0.441)	−0.203 (0.192)	0.079 (0.387)
Number of obs.	563	1810	1465	1234	274	960
Adjusted <i>R</i> <sup>2</sup>	0.746	0.465	0.086	0.0169	0.0319	0.0158

Notes: Dependent variable is individual firm's Tobin Q in current years in (a), and in 10 years later in (b). Individual firm Tobin Q is calculated by (market value + total debt)/total asset. Total asset and total debt are all book value. Over-investment variable is the residuals obtained from estimation of investment functions.

**Table 4C**  
Chaebols and the cross-subsidization hypothesis: dependent variable is group-level Tobin Q.

Variable	1984–1988					1990–1995					2001–2005				
	Coefficient (p-value)					Coefficient (p-value)					Coefficient (p-value)				
	Chaebol groups					Chaebol groups					Chaebol groups				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Intercept	0.863 (0.007)	0.807 <sup>***</sup> (0.010)	0.803 <sup>***</sup> (0.010)	0.958 <sup>***</sup> (0.002)	0.791 <sup>***</sup> (0.007)	0.342 <sup>***</sup> (0.000)	0.738 <sup>***</sup> (0.000)	0.726 <sup>***</sup> (0.000)	0.733 <sup>***</sup> (0.000)	0.729 <sup>***</sup> (0.000)	1.119 <sup>***</sup> (0.000)	0.854 <sup>***</sup> (0.000)	0.818 <sup>***</sup> (0.000)	0.969 <sup>***</sup> (0.000)	0.812 <sup>***</sup> (0.000)
Negative cashflow dummy															
Leverage	0.289 (0.394)	0.311 (0.354)	0.312 (0.348)	0.277 (0.400)	0.313 (0.350)	0.836 <sup>***</sup> (0.000)	0.440 <sup>***</sup> (0.000)	0.412 <sup>***</sup> (0.000)	0.401 <sup>***</sup> (0.000)	0.413 <sup>***</sup> (0.000)	0.763 <sup>***</sup> (0.000)	0.119 (0.618)	0.172 (0.476)	0.105 (0.672)	0.182 (0.455)
Operating income/sales	–0.914 <sup>***</sup> (0.021)	–1.132 <sup>***</sup> (0.031)	–1.129 <sup>***</sup> (0.038)	–1.067 <sup>***</sup> (0.016)	–1.062 <sup>***</sup> (0.014)	0.485 <sup>***</sup> (0.000)	–0.224 (0.354)	–0.238 (0.328)	–0.183 (0.454)	–0.270 (0.282)	–0.030 (0.896)	0.996 (0.102)	1.037 <sup>***</sup> (0.045)	1.139 <sup>***</sup> (0.048)	1.002 <sup>***</sup> (0.094)
Capex/sales	0.286 (0.196)	0.250 (0.234)	0.253 (0.227)	0.310 (0.147)	0.263 (0.208)	0.002 (0.009)	–0.066 <sup>***</sup> (0.013)	–0.065 <sup>***</sup> (0.016)	–0.066 <sup>***</sup> (0.014)	–0.073 <sup>***</sup> (0.008)	–0.089 <sup>***</sup> (0.000)	0.651 <sup>***</sup> (0.056)	0.851 <sup>***</sup> (0.042)	0.806 <sup>***</sup> (0.031)	0.879 <sup>***</sup> (0.017)
Relatedness	–0.156 (0.163)	–0.035 (0.637)	–0.032 (0.705)	–0.224 <sup>***</sup> (0.001)	–0.224 <sup>***</sup> (0.001)		–0.098 <sup>***</sup> (0.043)	0.031 <sup>***</sup> (0.088)	0.044 <sup>***</sup> (0.039)	–0.003 (0.939)		–0.431 <sup>***</sup> (0.000)	–0.114 (0.133)	–0.029 (0.772)	–0.182 <sup>***</sup> (0.076)
Number of obs.	81	81	81	81	81	791	162	162	162	162	103	103	103	103	3994
Adjusted R <sup>2</sup>	0.071	0.056	0.054	0.114	0.064	0.660	0.125	0.119	0.126	0.102	0.236	0.094	0.076	0.097	0.085

Notes: For the chaebol group-level analysis, the negative cash flow dummy = 1 when one of the chaebol's member firms has negative operating income. For the non-chaebol firm analysis, the negative cash flow indicator = 1 when the firm has negative operating income.

groups that have as member firms such firms with dramatic performance changes. We then ran group-level regressions with this EBIT dummy. Although not reported here (but shown to referees), this dummy variable is found to have a positive and significant coefficient during the 2000s.

Finally, we can discuss the impact of diversification on the value based on the results presented in both [Tables 4A and 4C](#). On the basis of the coefficients of the variable representing relatedness included in both regressions of over-investment and cross-subsidization, we find the following patterns among the different measures of related diversification.

First of all, two similar measures of relatedness based on cross-correlations between capital expenditure and cash flow among affiliates in a group show a consistent pattern of positive and signs in all periods though significant only in the 1990s. Our finding for the 1990s then suggests that any business groups pursuing unrelated diversification in terms of this measure suffered value loss in the 1990s. Surprisingly, two other measures of relatedness (or inversely measures of diversification), namely, inverse of the number of industries and the Herfindahl index of concentration, show negative coefficients in all the three periods, and mostly significant ones, especially in the 2000s. We find the same and positive signs with the Entropy index of diversification, although not reported here. This finding implies that those business groups pursuing diversification and operating in a larger number of industries with a higher degree of diversification are enjoying value gains.<sup>15</sup> Then, an interesting inference that emerges, combining this result with those about over-investment and subsidization, is that value discount in Korea or a dynamic emerging economy is not so much associated with diversification itself as over-investment into low-return businesses or cross-subsidization of loss-incurring businesses.

Furthermore, we notice a new variable rising as an important factor in value determination at the group level: real performance measured by operating income divided by sales. In both [Tables 4A and 4C](#), this variable shows a consistent pattern of an insignificant coefficient in the 1990s and a positive and significant sign in the 2000s. This finding at the group level is interesting because firm-level regressions of Tobin's Q in [Table 3](#) all show a positive and significant sign of this variable in all three periods. This may be a reflection of the shift in investors' perception about the group-level financial performance reflecting stock prices. It might imply that in the 1990s, group-level accounting profitability was not meaningful to predict group-level market performance probably because of a high degree of intra-group resource sharing or manipulations, and that such perception and the practice seems to have changed in the 2000s. With some restructuring to make firms more accountable and transparent, investors seem to perceive a linkage between groups' accounting performance and valuations. We will call this linkage the performance hypothesis.

## 6. Other behavioral characteristics of chaebols: profit stabilization, debt capacity, and tax advantage

### 6.1. Profit stability hypothesis

In this subsection, we test whether the profit objective of chaebols is similar to that of the Japanese keiretsu discussed in [Nakatani \(1984\)](#) and [Prowse \(1992\)](#), which is profit stability over maximization. Overall, the results in [Table 5](#) support the hypothesis strongly for the 1990s and less strongly for the 1980s. For the post-crisis period, however, results are rather contrary to the prediction by the hypothesis, because chaebol firms boast of higher performance with lower variations. A more detailed discussion follows.

In [Table 5](#), we examine the mean (median) industry-adjusted annual operating returns (EBIT) on assets and net income on assets for chaebol and non-chaebol firms. We find that chaebol-affiliated firms show negative value of profitability and thus underperformed relative to non-chaebol firms in two periods: 1984–1988 and 1990–1995. Moreover, the standard deviations of these

<sup>15</sup> The conclusion remains tentative to a certain extent because of still limited nature of diversification measures tried here; they are limited in really measuring relatedness of production or relatedness of technological capabilities. This should be one of the most promising areas of future research.

**Table 5**  
Chaebols and the profit stability Hypothesis.

Time Period	1984–1988			1990–1995			2001–2005		
	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference
<i>Panel A: accounting measures of profitability</i>									
Operating income/total assets	–0.012 [–0.013] (0.043)	0.000 [–0.000] (0.054)	–0.012*** –0.013*** –0.011***	–0.006 [–0.004] (0.036)	–0.003 [0.000] (0.080)	–0.003 –0.004*** –0.044***	0.015 [0.012] (0.077)	–0.020 [–0.000] (0.455)	0.035*** 0.012*** –0.378***
Net income/total assets	–0.003 [–0.004] (0.032)	–0.000 [0.000] (0.055)	–0.003*** –0.004*** –0.023***	–0.009 [–0.006] (0.028)	–0.006 [–0.000] (0.152)	–0.003*** –0.006*** –0.124***	–0.004 [0.009] (0.232)	–0.043 [0.000] (0.676)	0.039*** 0.009*** –0.444***
Number of observations	255	791		680	2135		466	3996	
<i>Panel B: monthly stock market measures of return</i>									
AR(E)	–0.001 [–0.014] (0.015)	–0.004 [–0.017] (0.017)	0.003 0.003 –0.002***	–0.003 [–0.012] (0.009)	0.002 [–0.009] (0.013)	–0.006*** –0.002** –0.004***	0.005 [–0.012] (0.040)	–0.002 [–0.026] (0.083)	0.007*** 0.013*** –0.043***
AR(V)	0.006 [–0.010] (0.015)	0.003 [–0.014] (0.019)	0.003 0.004** –0.004***	0.003 [–0.004] (0.011)	0.008 [–0.003] (0.018)	–0.006*** –0.002*** –0.007***	0.020 [0.003] (0.040)	0.012 [–0.012] (0.085)	0.008* 0.015*** –0.045***
Number of observations	2981	8841		8119	25,296		4990	27,332	

(continued on next page)



Table 5 (continued)

Time Period	1984–1988			1990–1995			2001–2005		
	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference
<i>Panel C: long-run stock market performance: chaebol firms versus all non-chaebol firms</i>									
HPR	6.609 [6.423] (9.560)	6.149 [5.130] (15.748)	0.459 1.293* –6.188**	0.109 [–0.089] (0.567)	0.451 [0.152] (1.218)	–0.342*** –0.241*** –0.651***	6.608 [4.774] (31.124)	3.511 [1.875] (57.325)	3.096*** 2.899*** –26.200***
Wealth relative	1.064 [1.211]			0.764 [0.790]			1.686 [2.009]		
Number of observations	37	124		106	282		48	281	
<i>Panel D: long-run stock market performance: chaebol firms versus matched non-chaebol firms</i>									
HPR	6.609 [6.423] (9.560)	6.374 [5.005] (17.543)	0.234 1.418 –7.982**	0.109 [–0.089] (0.567)	0.645 [0.292] (1.541)	–0.536*** –0.381*** –0.974***	6.608 [4.774] (31.124)	5.029 [2.877] (36.208)	1.578 1.897** –5.084
Wealth relative	1.032 [1.236]			0.674 [0.705]			1.262 [1.489]		
Number of observations	37	43		106	169		48	69	

Notes: Means, medians [brackets], and variances (parentheses) are reported. A negative difference indicates that chaebol firms are less profitable than non-chaebol firms. The statistical significance of the difference in means, medians, and variances is assessed using a t-test, a nonparametric median test, and an F-test, respectively. Statistical significance at the 1%, 5% and 10% levels are indicated by \*\*\*, \*\*, and \* respectively. Stock market returns (Panel B) are market-adjusted abnormal returns (i.e., stock returns in excess of market returns), AR(E) and AR(V) are abnormal returns using equally-weighted and value-weighted market returns, respectively. HPR denotes holding period return (Panel C).  $HPR_i = \prod_{t=1,2,\dots,\text{end-period}} (1 + \text{ret}_{i,t}) - 1$  for each stock  $i$ , where  $\text{ret}_{i,t}$  are monthly returns from the first month of the sample period to the last month of the sample period. Panel D also reports HPR, but contrasts chaebol firms to a matched sample of non-chaebol firms based on industry membership and market capitalization. We calculate a wealth relative (Panels C and D) as the ratio of 1 plus the mean (median) HPR for chaebol firms divided by 1 plus the mean (median) HPR for non-chaebol firms.

accounting-based profitability measures (Panel A) as well as month stock market returns (Panel B) are lower for chaebol firms in all time periods. Together, these findings are consistent with the claim that chaebols place greater emphasis on stability rather than the level of returns. This finding suggests a partial explanation of the value loss observed for chaebols.

However, the situation is quite different after the crisis. In the 2001–2005 period, chaebols demonstrate higher profitability with lower variations although with varying levels of significance. The changed behavior of chaebols after the crisis remains the same when gauged using market-based measures of profitability. In Panel B, we present market-based measures of profitability by examining the mean (median) monthly abnormal returns for chaebol and non-chaebol firms. Similar to the results for the accounting-based profitability measures, we discover both a lower level of return and return variability for chaebol firms in the 1990s. However, in the post-crisis period, chaebols firms began to record higher rates of return with lower variance.

In Panels C and D, we examine the long-term performance of chaebols relative to non-chaebol firms. Employing a methodological approach similar to that of [Spiess and Affleck-Graves \(1995\)](#), we first compare a mean (median) holding period return (HPR) over the entire sample period between chaebol and non-chaebol firms.<sup>16</sup> From this analysis, we note that the long-term performance of chaebol firms is significantly lower than that of non-chaebol firms in the period covering 1990–1995, but higher than that of the non-chaebol firms in the post-crisis period. We likewise calculate a 60-month wealth relative based on HPRs and discover that it is merely 0.764 for the 1990–1995 period, 1.064 for the 1984–1988 period, and 1.686 for the 2001–2005 period.<sup>17</sup>

In Panel D, we sharpen our comparison of holding period returns by constructing a sample of non-chaebol firms matched on the basis of industry membership and firm size, and find a consistent pattern. The variance of the holding period returns is lower for chaebol member firms than for non-chaebol firms in the periods covering 1990–1995 and 2001–2005, although significantly lower only during the 1990s. The mean wealth relative was 1.032 in the 1980s, declined to 0.674 in the 1990s, and resurfaced to 1.262 in the post-crisis period.

When these results are combined with those reported in Panels A–C, we can conclude that chaebols tend to show lower variations of accounting profits than do non-chaebols, but with higher profitability in the post-crisis period and lower profitability in the pre-crisis period. In terms of market-based measure of returns, chaebol firms demonstrate lower return and variation only during the 1990s but higher return with lower variations results in the 1980s and 2000s.

Our interpretations are as follows. Given a stable and long-lasting family ownership, there is reason to say that family firms would pursue long-run survival more than those in advanced countries that pursue short-run profit maximization for dividend payment for shareholders. Furthermore, their level of capability in a specific field or technology is weak and thus it would be more dangerous to specialize in a specific sector or industries. Thus, from the point of view of controlling families, diversification or running business in more sectors is one way of risk diversification. Now the post-crisis results with high return and less variation make sense because some (survived) chaebol firms are those with higher levels of technological capabilities as confirmed by [Choo et al. \(2009\)](#) and thus afford more specialization in a smaller number of sectors.

## 6.2. Debt capacity and advantage in taxation

We now test for the existence of possible financial benefits that may be attributed to chaebol membership. One such possible benefit is a co-insurance effect ([Ferris et al., 2003](#)). If chaebol members are able to co-insure each other's debt because of an imperfect correlation between their cash flows, then the debt capacity of chaebol firms should increase. Further, any increased borrowing by chaebol firms likewise increases the size of the interest tax shields that are available to the firms.

<sup>16</sup> Holding period returns (HPR) are calculated as:  $[H_{t=1,2,\dots,\text{end-period}}(1 + \text{ret}_{i,t})] - 1$  for each stock  $i$ , where  $\text{ret}_{i,t}$  are monthly returns calculated from the first month to the last month of our sample period.

<sup>17</sup> The wealth-relative is estimated as the ratio of 1 plus the mean (median) HPR for chaebol firms divided by 1 plus the mean (median) HPR for non-chaebol firms. Therefore, the wealth relative indicates the magnitude of performance of chaebol firms as compared to non-chaebol firms.

In Panel A of Table 6, we compare mean (median) debt ratios between chaebol and non-chaebol firms. In the 2001–2005 period, a simple comparison of unadjusted debt ratios shows that chaebol firms utilize 3.1% more debt to finance their assets than do non-chaebol firms. When we industry-adjust our debt ratios, the mean difference decreases to an insignificant level of 0.6%, whereas the median difference remains at the significant level of 4.2%. These results are basically the same as those by Ferris et al. (2003) for the 1990–1995 period reported in the same table. The same results hold for the 1980s. This greater use of debt for chaebol firms is consistent with the predictions of the co-insurance hypothesis and suggests that membership in a chaebol increases a firm's debt capacity.

To further examine possible co-insurance effects in the capital structure decisions of chaebol-affiliated firms, we present the results from a multiple regression analysis in Panel B. We regress industry-adjusted total debt-to-total assets against a chaebol dummy variable, firm size (log of total assets), firm profitability (operating profit margin), and firm growth (capital expenditures to sales).

**Table 6**  
Chaebols and the debt-capacity.

	1984–1988			1990–1995			2001–2005		
	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference
<i>Panel A: financial leverage summary statistics</i>									
Total debt-to assets	0.754	0.718	0.036***	0.757	0.672	0.086***	0.537	0.506	0.031**
	[0.775] (0.119)	[0.698] (0.331)	0.076*** −0.212***	[0.760] (0.131)	[0.660] (0.371)	0.100*** −0.240***	[0.537] (0.263)	[0.451] (0.827)	0.086*** −0.564***
Industry-adjusted leverage	0.035	0.016	0.019*	0.078	0.012	0.067***	0.060	0.054	0.006
	[0.051] (0.109)	[0.000] (0.327)	0.051*** −0.218***	[0.078] (0.130)	[0.000] (0.363)	0.078*** −0.233***	[0.042] (0.271)	[0.000] (0.821)	0.042*** −0.550***
Number of observations	255	791		682	2135		469	3996	
	<hr/>			<hr/>			<hr/>		
	1984–1988			1990–1995			2001–2005		
	(1)	(2)		(1)	(2)		(1)	(2)	
<i>Panel B: regression result on industry-adjusted leverage</i>									
Intercept	0.178 (0.558)	0.094*** (0.000)		−0.241** (0.044)	0.123** (0.014)		−0.062 (0.631)	0.093*** (0.000)	
Chaebol dummy	0.011 (0.505)	0.004 (0.813)		0.027* (0.065)	0.060*** (0.000)		0.018 (0.544)	0.037* (0.066)	
Log of total assets	−0.005 (0.767)			0.020*** (0.002)			0.009 (0.229)		
Operating income/sales	−0.831*** (0.000)	−0.826*** (0.000)		−1.506** (0.019)	−1.480** (0.021)		−0.974*** (0.000)	−0.962*** (0.000)	
Capex/sales	−0.000 (0.923)	−0.000 (0.926)		−0.089*** (0.003)	−0.079*** (0.009)		−0.129 (0.395)	−0.129 (0.395)	
Number of observations	1046	1046		2815	2815		4458	4458	
Adjusted R <sup>2</sup>	0.037	0.037		0.113	0.109		0.045	0.045	

*Note:* The leverage ratio is calculated as total debt-to-total assets. The industry-adjusted leverage ratio is the difference between a firm's actual leverage ratio and its imputed leverage ratio. Imputed leverage is calculated as the firms total assets multiplied by the industry's median leverage ratio. For the summary statistics, we report means, medians (in brackets), and standard deviations (in parentheses) for chaebol firms and non-chaebol firms separately. Differences between chaebol firms and non-chaebol firms are assessed using a *t*-statistic (for means) and a nonparametric median test (for medians), respectively. Statistical significance at the 1%, 5% and 10% levels are indicated by \*\*\*, \*\* and \* respectively. The total sample includes all chaebol and non-chaebol firm-years. The *p*-values are in parentheses. Statistical significance at the 1%, 5% and 10% levels are indicated by \*\*\*, \*\* and \* respectively.

On the basis of estimated coefficient for the chaebol dummy variable, we observe that while chaebol firms borrow 2.7% more of their assets than do non-chaebol firms in 1990–1995, chaebol firms borrow only 1.8% more of their assets than do non-chaebol firms in 2001–2005, and the coefficient is far from being significant. This result implies that chaebol firms no longer have debt capacity advantage after the crisis, which implies the possibility of their being subject to higher scrutiny by the banks when lending. Further, it is related to the fact that chaebol firms were subject to the restructuring “order” from the government to reduce the debt-to-equity ratio to lower than 200%.

Next, an important implication of the debt-capacity hypothesis is that the increased use of debt will generate additional tax shields which, in turn, will result in less tax paid by chaebol-affiliated firms. In Panel A of Table 7, we find that chaebol firms experience a tax rate that is close to half the tax rate incurred by non-chaebol firms (i.e., total tax expenditure scaled by total sales is 0.011 for chaebol firms versus 0.020 for non-chaebol firms in 1984–1988 and 0.007 for chaebol firms versus 0.014 for non-chaebol firms in 1990–1995 and 0.016 for chaebol firms versus 0.013 for non-chaebol firms in 2001–2005). After an industry-wide adjustment of these tax rates,

**Table 7**  
Interest tax shields and taxes-paid.

	1984–1988			1990–1995			2001–2005		
	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference	Chaebol firms	Non-chaebol firms	Difference
<i>[Panel A]</i>									
Taxes/sales	0.011 [0.008] (0.011)	0.020 [0.015] (0.018)	−0.009*** −0.007*** −0.007***	0.007 [0.004] (0.008)	0.014 [0.009] (0.018)	−0.007*** −0.005*** −0.010***	0.016 [0.014] (0.027)	0.013 [0.008] (0.103)	0.003* 0.006*** −0.076***
Industry-adjusted taxes	−0.004 [−0.002] (0.010)	0.001 [0.000] (0.012)	−0.005*** −0.002*** −0.002***	−0.003 [−0.003] (0.009)	0.003 [0.000] (0.016)	−0.006*** −0.003*** −0.007***	0.001 [0.001] (0.024)	0.001 [0.000] (0.102)	−0.000 0.001 −0.078***
Number of observations	255	791		682	2135		468	3996	
		1984–1988			1990–1995			2001–2005	
		(1)	(2)		(1)	(2)		(1)	(2)
<i>[Panel B]</i>									
Intercept		0.023*** (0.000)	0.002** (0.011)		0.013*** (0.001)	0.005*** (0.000)		0.045 (0.394)	−0.002 (0.712)
Chaebol dummy		−0.003*** (0.005)	−0.005*** (0.000)		−0.005*** (0.000)	−0.006*** (0.000)		0.003 (0.579)	−0.003 (0.308)
Log of total assets		−0.001*** (0.001)			−0.001** (0.035)			−0.003 (0.422)	
Operating income/sales		−0.011* (0.093)	−0.010** (0.050)		−0.025** (0.012)	−0.026** (0.010)		0.109 (0.445)	0.106 (0.447)
Capex/sales		−0.000*** (0.000)	−0.000 (0.251)		0.001 (0.728)	0.000 (0.819)		−0.031* (0.086)	−0.031* (0.086)
Number of observations		1046	1046		2815	2815		4458	4458
Adjusted R <sup>2</sup>		0.04	0.03		0.041	0.04		0.035	0.034

*Note:* All taxes paid calculations are standardized by total sales. Industry-adjusted taxes-paid is the difference between a firm's actual taxes-paid and its imputed taxes-paid. Imputed taxes-paid is calculated as the firm's operating income multiplied by the industry's median taxes-paid to operating income ratio. For the summary statistics, we report means, [medians], and (standard deviations) separately for chaebol and non-chaebol firms. Differences between chaebol and non-chaebol firms are measured with a *t*-statistic and a nonparametric median test. Statistical significance at the 1%, 5% and 10% levels are indicated by \*\*\*, \*\* and \* respectively. In Panel B the regression analysis, the dependent variable is industry-adjusted taxes-paid. The *p*-values are in parentheses. Statistical significance at the 1%, 5% and 10% levels are indicated by \*\*\*, \*\* and \* respectively.

**Table 8**

Summary of the overall results.

	1984–1988	1990–1995	2001–2005
Excess value (firm-level gap with non-chaebols)	+	–*	+*
Excess value (group-level: median)	+	–*	+*
Tobin Q (firm-level regression chaebol dummy)	+	–	+*
Profit stability hypothesis	Yes*/No*	Yes*	No*
Accounting profitability	Low return and low variance	Low return and low variance	High return and low variance
Stock market return	High return and low variance	Low return and low variance*	High return and low variance
Over-investment hypothesis (group/firm-level)	Yes/No	Yes/yes	No/No
Performance hypothesis	–*	No	+
Cross-subsidization hypothesis (regressions)	No	Yes	Yes
Debt-capacity advantage (regressions)	No	Yes*	No
Tax advantage (regressions)	Yes*	Yes*	No
Characteristics of Chaebol firms	Some chaebol advantage	Strong chaebol advantage	No chaebol advantage
	Weaker cost of over-investment	Stronger costs of over-investment	No cost of over-investment
	Negative performance impact	No performance impact	Strong performance impact
	Premium	Strong discount	Strong premium
	Family-owned and diversifying	Family-owned and diversified	Family-owned and diversified

the difference remains statistically significant.<sup>18</sup> This result indicates that chaebol firms enjoy lower effective tax rates than do non-chaebol-affiliated firms. However, in the period covering 2001–2005, tax shield advantages of chaebol firms have completely disappeared.

In Panel B of Table 7 we provide the results of a regression of industry-adjusted taxes-paid against a chaebol dummy variable and the same set of control variables used in Table 6. We observe a significant negative coefficient for the chaebol dummy variable in the pre-crisis periods, and an insignificant one in the 2001–2005 period. This result is consistent with the results with univariate calculations. This suggests that chaebol firms no longer enjoy tax savings from the higher interest tax shields.

## 7. A synthesis and causes for the post-crisis turnaround: ever-evolving nature of the firms in emerging economies

Let us summarize the results of our analysis on the evolution of the business groups in Korea over the sub-periods 1984–1988, 1990–1995, and 2001–2005. Table 8 provides a summary of the main results. At the bottom of the table, we attempt to characterize the differences in the chaebols firms across the three periods.

In the 1980s, chaebols enjoyed benefits such as tax advantages but did not commit excessive investments, thus they performed better than non-chaebols in several aspects. However, in the 1990s, chaebols significantly underperformed compared to non-chaebol firms in almost every aspect, despite strong advantages such as higher debt-carrying capacity and lower taxation, because the costs of over-investment and cross-subsidization outweighed the benefits. Their behavior could be typically

<sup>18</sup> To calculate industry-adjusted taxes, we follow Ferris et al. (2003). They calculate the difference between a firm's actual taxes paid and its imputed taxes paid. Imputed taxes paid are estimated as the firm's operating income multiplied by the industry's median taxes paid-to-operating income ratio.

characterized by lower profitability with lower variations. Now, in the post-crisis period, the chaebols lost all the advantages, but their performance was better than that of non-chaebols. In summary, during the 1980s the costs and benefits of business groups structure were characterized by some premium, during the 1990s there were net costs, and finally after restructuring there were net gains.

The over-investment in the 1990s may be related to agency costs of the minority but controlling owner as verified by numerous empirical studies focused on the gap between cash flow rights and control right of the controlling owner (Joh, 2003; Bae et al., 2002; Lemmon and Lins, 2003). The net benefits in the 1980s may be related to the smaller gap between cash flow and control rights in this period, as the Korean chaebols evolved from family-owned firms to concentrated ownership in the 1960s and 1970s. However, the post-crisis turnaround may be explained by factors other than the ownership structure and diversification, because the same ownership structure is still maintained despite some business restructuring.

Causes for this turnaround can be discussed in terms of changes occurred both at each affiliate and group level, and this paper has provided the results by the analysis at these two levels. First, at the firm-level, each surviving affiliate of chaebols is now not only less overinvesting but also showing improved productive and financial efficiency, which seems to come from enhanced technological capabilities (Choo et al., 2009), somewhat improved corporate governance (Black et al., 2006), and diverse firm-level adjustment during the 1998–2000 transition period; regressions with the same sample of firms for the pre- and post-crisis confirms improved performance of survival affiliates of business groups. As discussed in Choo et al. (2009), chaebols invested much in R&D in the 1990s, making them have a significantly larger number of patents than non-chaebols. Thus, they are now reaping the rewards from their earlier investment. In the regressions reported in Choo et al. (2009), the variable of technological capabilities measured in patent data was not significant during the 1990s but became significant during the post-crisis period, which implies that higher technological capabilities contribute to higher performance only during the post-crisis period. Technology did not play much of a role before the 1997 crisis when market imperfection and artificial rents were more important. Technological capabilities only became important with the emergence of globalization and liberalization after the 1997 crisis.

Now, at the same time, there was a group-level restructuring during the 1998–2001 transition period, namely closing down, selling off or merging of low-performing affiliates. While the group-level regressions conducted in this paper, especially with a restructuring dummy, confirm this reasoning, such group-level restructuring are widely observed. For example, as a part of the corporate restructuring effort, the Samsung group liquidated or merged several affiliated firms and sold several affiliates to other firms such as foreign companies. With these changes, the number of affiliated firms of the group changed dramatically. According to the figure released by the KFTC, while the number was originally only 55, it increased to peak at 80 in 1997, the year of the financial crisis. Then, it was reduced to 61 in 1998, to 49 in 1999, and down to 45 in 2000. Corresponding to this reduction of the number of affiliates, the number of sectors doing business also changed substantially (Kim, 2005). The number remained at about 30 sectors during the mid-1990s or before the 1997 crisis but decreased to 27 sectors by 2000. With the restructuring, the debt ratio of the Samsung group decreased from a 371% in 1997 to 125.3% in 1999, and finally to 102.7% in 2000 (Song, 2005).

Overall, this post-crisis turnaround suggests that ownership/governance structure alone cannot explain the performance of the firms. Furthermore, given that they remain basically diversified even in the 2000s, we can infer that value discount in Korea or a dynamically emerging economy was not so much associated with diversification itself as over-investment into low-return businesses or cross-subsidization of loss-incurring businesses. These two things should be separated.

Then, a related key question is whether chaebols have a capability to see long-term investment opportunities before others do. Thus, it could be case that they appear to be overinvesting at the time of investment but that they make wise long-term bets based on their superior investment identification capability. We have confirmed this in Table 4B by showing that over-investment in the 1990s has led to value gains in the 2000s. Another treatment of this issue was done by one of the authors and reported in Kim (2009). To test the (longer term) investment efficiency of the Korean business



groups, Kim (2009) focused on the acquisition cases by Korean business groups that acquired the existing firms by purchasing shares. If the target firms' performance improves after being acquired, we can infer that chaebols have a capability to see long-term investment opportunities correctly. Kim (2009) found that profitability (=operating income/total asset) of target firms acquired from business groups improved significantly after three years following acquisition. She also found that labor productivity (=sales/employee) and sales growth rate also significantly increased three years after acquisition.

## **8. Summary and concluding remarks**

This paper has extended earlier works on business groups to a longer period to test if the same findings still hold true, such as value loss for group firms associated with over-investment, diversification, and cross-subsidization. In general, we discover dramatic changes over the two decades from weak premium in the 1980s, strong discount in the 1990s, and back to strong premium during the post-crisis period.

Specifically, this paper finds that during the post-crisis period, the over-investment and diversification hypotheses fail to offer any explanations while cross-subsidization is visibly weakened. More importantly, profitability is the main cause for the value premium associated with group firms. We likewise discover that while profit stability hypothesis was valid for the 1990s, it was not so after the restructuring, as the surviving chaebols boasted of higher profitability with less variation. Further, it is verified that chaebols are significantly more leveraged than non-chaebol firms only during the 1990s, and chaebol firms' tax shield advantages disappeared in 2001–2005, whereas there were several during the pre-crisis period. In sum, it is important to note that in the post-crisis period, the value of chaebol firms correlates to welfare-enhancing factors e.g. strong performance, whereas in the pre-crisis period performance differences are related to welfare decreasing factors such as lower tax burdens and cross-subsidization. Also, we find that the "over-investment" in the 1990s was the source of value gains in the 2000s.

The turnaround of chaebols' performance is not surprising as chaebols have both advantages and disadvantages. Ferris et al. (2003) predicted in their final remarks that if over-investment, cross-subsidy, and an emphasis on earnings stability are appropriately controlled, the chaebol structure can generate shareholder benefits. They still remain family-controlled and diversified but are now showing a quite different performance after correcting former weaknesses. This post-crisis turnaround suggests that ownership/governance structure alone cannot explain the performance of the firms. Given this, what we would like to emphasize is the ever-evolving or dynamic nature of the firms in emerging economies, which should be one of their most important differentiating factors, compared to the firms in more advanced economies. This implies that formulating conclusions based on analysis of data from a specific period of time can be dangerous in studies on firm behavior in emerging economies, where environment, institutions, and almost everything changes quite rapidly. A future research topic, related to this evolving nature of firms, is about "re-diversification" such that Chaebols are now or mostly recently diversifying and increasing again the number of affiliates, whereas they did "re-focusing" and reduced sharply the number during the restructuring period of 1998–2000.

## **Acknowledgments**

This paper has been presented in several meetings, including the Convention of the Korean Economic Association and a seminar at the Nihon University. The authors would like to thank Professor Kenneth Kim for providing valuable assistance during the initial stage of research and also to two anonymous referees for their three rounds of comments. Any possible errors are our responsibilities. This research was supported by World Class University (WCU) program through the Korea Science and Engineering Foundation funded by the Ministry of Education, Science and Technology (R32-20055).

## Appendix

See Appendix Tables 1A and 1B.

**Table 1A**

Annual regressions of firm excess value.

Sample	Number of observations (Adjusted $R^2$ )	Intercept	Chaebol dummy	ln(total_asset)	Leverage	EBIT/sales	Capex/sales	Beta
1984–1988	1019 (0.326)	0.048 (0.571)	0.035*** (0.005)	−0.024*** (0.000)	0.509*** (0.000)	0.188*** (0.009)	−0.002* (0.058)	0.011** (0.028)
1990–1995	2808 (0.234)	0.348*** (0.000)	−0.011 (0.120)	−0.034*** (0.000)	0.379*** (0.000)	0.363*** (0.000)	−0.039*** (0.003)	0.000 (0.709)
2001–2005	2744 (0.290)	−0.228** (0.026)	0.115*** (0.000)	−0.009* (0.098)	0.717*** (0.000)	0.436*** (0.000)	−0.025* (0.094)	0.005 (0.190)
1984	168 (0.724)	−0.301** (0.039)	−0.005 (0.803)	−0.014* (0.086)	0.674*** (0.000)	0.580*** (0.000)	−0.001 (0.737)	−0.001 (0.858)
1985	177 (0.680)	−0.175 (0.112)	0.005 (0.774)	−0.024*** (0.000)	0.768*** (0.000)	0.345*** (0.005)	0.004 (0.934)	0.028*** (0.000)
1986	188 (0.488)	−0.218 (0.220)	0.035 (0.182)	−0.019** (0.040)	0.670*** (0.000)	0.298** (0.022)	−0.057 (0.232)	0.059*** (0.000)
1987	216 (0.271)	0.314* (0.063)	0.027 (0.257)	−0.035*** (0.000)	0.487*** (0.000)	0.070 (0.538)	0.017 (0.759)	−0.033*** (0.001)
1988	270 (0.128)	0.449*** (0.009)	0.065** (0.014)	−0.036*** (0.000)	0.295*** (0.000)	−0.042 (0.786)	−0.017 (0.670)	0.028** (0.023)
1990	434 (0.212)	0.359*** (0.009)	0.018 (0.351)	−0.035*** (0.000)	0.406*** (0.000)	0.211* (0.055)	−0.010 (0.773)	−0.000 (0.513)
1991	453 (0.379)	0.035 (0.779)	0.033* (0.074)	−0.021*** (0.004)	0.485*** (0.000)	0.373*** (0.002)	−0.095*** (0.004)	0.001 (0.263)
1992	461 (0.335)	0.548*** (0.000)	0.006 (0.709)	−0.045*** (0.000)	0.389*** (0.000)	0.304*** (0.007)	−0.005 (0.712)	0.000 (0.403)
1993	471 (0.265)	0.380*** (0.001)	−0.008 (0.593)	−0.034*** (0.000)	0.350*** (0.000)	0.365*** (0.003)	−0.055 (0.333)	0.013 (0.126)
1994	483 (0.185)	0.654*** (0.000)	−0.054*** (0.003)	−0.048*** (0.000)	0.286*** (0.000)	0.740*** (0.000)	0.013 (0.744)	0.001 (0.131)
1995	506 (0.213)	0.389*** (0.001)	−0.028 (0.125)	−0.034*** (0.000)	0.374*** (0.000)	0.430*** (0.001)	−0.089*** (0.002)	0.000 (0.667)
2001	536 (0.500)	0.600*** (0.003)	0.082** (0.021)	−0.054*** (0.000)	0.666*** (0.000)	0.356*** (0.002)	0.003 (0.906)	0.065 (0.137)
2002	534 (0.344)	0.138 (0.499)	0.082** (0.028)	−0.031*** (0.005)	0.792*** (0.000)	0.403*** (0.003)	−0.015 (0.668)	0.007 (0.673)
2003	518 (0.299)	−0.341 (0.171)	0.164*** (0.001)	−0.008 (0.533)	0.748*** (0.000)	0.140 (0.523)	−0.005 (0.817)	0.226*** (0.000)
2004	582 (0.317)	−0.813*** (0.000)	0.092** (0.021)	0.020* (0.084)	0.812*** (0.000)	0.673*** (0.003)	−0.045 (0.450)	0.002 (0.664)
2005	574 (0.147)	−0.501** (0.042)	0.117** (0.016)	0.005 (0.662)	0.672*** (0.000)	0.671*** (0.004)	−0.046 (0.488)	0.002 (0.830)

Note: Leverage is total liabilities divided by total assets. Firm profitability is calculated as operating income standardized by sales while firm growth is estimated by the capital expenditures to sales ratio. Beta is estimated from the market model using monthly returns. The  $p$ -values (parentheses) are reported. Statistical significance at the 1%, 5%, and 10% levels are indicated by \*\*\*, \*\*, and \* respectively.



**Table 1B**

Annual regressions of Tobin Q: Robustness Test Result with samples of firms existing both in 1990s and 2000s.

Sample	Number of Observations	Intercept	Chaebol dummy	ln(total_asset)	Leverage	EBIT /sales	Capex/sales	Beta
1990–1995	1818 (0.616)	1.673*** (0.000)	−0.024** (0.040)	−0.061*** (0.000)	0.804*** (0.000)	0.082 (0.633)	−0.072*** (0.000)	0.000 (0.986)
2001–2005	1515 (0.109)	0.549* (0.094)	0.082** (0.017)	−0.003 (0.872)	0.593*** (0.000)	0.216 (0.211)	0.040 (0.363)	0.016 (0.274)
1990	303 (0.747)	1.982*** (0.000)	0.046 (0.101)	−0.084*** (0.000)	0.872*** (0.000)	0.283 (0.111)	0.060 (0.559)	0.000 (0.940)
1991	303 (0.768)	1.488*** (0.000)	0.041* (0.053)	−0.058*** (0.000)	0.828*** (0.000)	−0.009 (0.958)	−0.109*** (0.001)	0.000 (0.586)
1992	303 (0.189)	1.701*** (0.000)	0.022 (0.280)	−0.051*** (0.000)	0.373*** (0.006)	0.266* (0.080)	−0.002 (0.942)	−0.010 (0.381)
1993	303 (0.800)	1.906*** (0.000)	−0.030 (0.304)	−0.074*** (0.000)	0.833*** (0.000)	−0.295 (0.148)	−0.063 (0.286)	0.053* (0.067)
1994	303 (0.462)	2.268*** (0.000)	−0.064** (0.024)	−0.085*** (0.000)	0.715*** (0.000)	0.939*** (0.003)	0.003 (0.945)	0.001*** (0.000)
1995	303 (0.483)	1.575*** (0.000)	−0.044* (0.074)	−0.055*** (0.000)	0.694*** (0.000)	0.712*** (0.003)	−0.086 (0.164)	0.020 (0.501)
2001	303 (0.405)	0.962*** (0.008)	0.081** (0.050)	−0.035* (0.067)	0.660*** (0.000)	0.436** (0.034)	0.004 (0.922)	0.175*** (0.003)
2002	303 (0.375)	0.694** (0.032)	0.069* (0.093)	−0.016 (0.364)	0.675*** (0.000)	0.418*** (0.007)	−0.102 (0.287)	−0.016 (0.632)
2003	303 (0.287)	0.175 (0.628)	0.090* (0.062)	0.008 (0.696)	0.531*** (0.000)	0.859*** (0.000)	0.182*** (0.007)	0.205*** (0.000)
2004	303 (0.281)	−0.284 (0.387)	0.039 (0.459)	0.035* (0.051)	0.723*** (0.000)	0.642*** (0.001)	0.004 (0.898)	0.010 (0.578)
2005	303 (0.012)	1.941*** (0.009)	0.200 (0.171)	−0.059 (0.125)	0.505** (0.017)	−0.086 (0.869)	0.196 (0.463)	−0.024 (0.388)

Note: Dependent variable is firm Tobin Q. Firm Tobin Q is calculated by (market value + total debt)/total asset. Leverage is total liabilities divided by total assets. Firm profitability is calculated as operating income standardized by sales while firm growth is estimated by the capital expenditures to sales ratio. Beta is estimated from the market model using monthly returns. The p-values (parentheses) are reported. Statistical significance at the 1%, 5%, and 10% levels are indicated by \*\*\*, \*\*, and \* respectively.

## References

- Amsden, A.H., 1989. *Asia's Next Giant: South Korea and Late Industrialization*. Oxford University Press, New York and Oxford.
- Amsden, A.H., Hikino, Takashi, 1994. Project execution capability, organizational know-how and conglomerate growth in late industrialization. *Ind. Corp. Change* 3 (1), 111–147.
- Bae, K.H., Kang, J.K., Kim, J.M., 2002. Tunneling or value added? Evidence from mergers by Korean business groups. *J. Finan. Econ.* 57 (6), 2695–2740.
- Bebchuk, L., Kraakman, R., Triantis, G., 2000. Stock pyramids, cross-ownership, and dual class equity: the creation and agency costs of separating control from cash flow rights. In: Morck, Randall K. (Ed.), *Concentrated Corporate Ownership*. The University of Chicago Press.
- Berger, P., Ofek, E., 1995. Diversification's effect on firm value. *J. Finan. Econ.* 37, 39–65.
- Black, Bernard S., Hasung, Jang, Woochan, Kim, 2006. Does Corporate Governance Predict Firms' Market Values? Evidence from Korea. *J. Law Econ. Organ.* 22 (2), 366–413.
- Bertrand, M., Mehta, P., Mullainathan, S., 2002. Ferreting out or tunneling: an application to Indian Business Groups. *Quart. J. Econ.* 117 (1), 121–148.
- Chang, S. Jin, 2003. *Financial Crisis and Transformation of Korean Business Groups, the Rise and Fall of Chaebol*. Cambridge University Press.
- Chang, Sea-jin, Hong, J., 2000. Economic performance of the group-affiliated companies in Korea: resource sharing and internal business transactions. *Acad. Manage. J.* 43 (3), 429–448.
- Chang, Sea-jin, Choi, Unghwan, 1988. Strategy, structure and performance of Korean business groups: a transactions cost approach. *J. Ind. Econ.* 37 (2), 141–158.
- Choi, Jeong-Pyo, Cowing, Thomas, 1999. Firm behavior and group affiliation: the strategic role of the corporate grouping for Korean firms. *J. Asian Econ.* 10, 195–209.
- Choo, Kineung, Lee, Keun, Ryu, K., Yoon, J., 2009. Performance change of the business groups over two decades: investment inefficiency and technological capabilities. *Econ. Devel. Cult. Change* 57 (2), 359–386.
- Feenstra, Robert C., Hamilton, Gary G., 1995. Varieties of hierarchies and markets: an introduction. *Ind. Corp. Change* 4, 51–91.
- Ferris, S.P., Kumar, R., Sarin, A., 1995. The role of corporate groupings in controlling agency conflicts: the case of keiretsu. *Pacific Basin Finance J.* 3, 319–335.

- Ferris, S.P., Kim, K.A., Kitsabunnarat, P., 2003. The costs (and benefits?) of diversified business groups: the case of Korean chaebols. *J. Banking Finance* 27, 251–273.
- Ghemawat, P., Khanna, T., 1998. The nature of diversified business groups: a research design and two case study. *J. Ind. Econ.* XLVI (1), 35–62.
- Goto, Akira, 1982. Business groups in market economy. *Europ. Econ. Rev.* 19, 53–70.
- Granovetter, M., 1994. Business Groups. *Handbook of Economic Sociology*. Princeton University Press, Princeton, NJ (Chapter 18).
- Guillen, M., 2000. Business Groups in emerging economies: a resource-based view. *Acad. Manage. J.* 43 (3), 362–380.
- Haggard, Stephan, Lim, W., Kim, E., 2003. *Economic Crisis and Corporate Restructuring in Korea – Reforming the Chaebol*. Cambridge University Press.
- Hattori, T., 1989. Japanese zaibatsu and Korean chaebol. In: Chung, K.-H., Lee, H.-C. (Eds.), *Korean Managerial Dynamics*. Praeger Publishers, New York.
- Hoshi, T., Kashyap, A., Scharfstein, D., 1990. The role of banks in reducing the costs of financial distress in Japan. *J. Finan. Econ.* 27, 67–88.
- Hoshi, T., Kashyap, A., Scharfstein, D., 1991. Corporate structure, liquidity, and investment: evidence from Japanese industrial groups. *Quart. J. Econ.* 106, 33–60.
- Johnson, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2000. Tunneling. *Amer. Econ. Rev.* 90, 22–27.
- Joh, Sung Wook, 2003. Corporate governance and firm profitability: evidence from Korea before the economic crisis. *J. Finan. Econ.* 68, 287–322.
- Jwa, Sung-Hee, 2002. *The Evolution of Large Corporations in Korea*. Edward Elgar.
- Kang, J.-K., Stulz, R.M., 2000. Do banking shocks affect borrowing firm performance? An analysis of the Japanese experience. *J. Bus.* 73, 1–24.
- Keister, Lisa A., 1998. Engineering growth: business group structure and firm performance in China's transition economy. *Amer. J. Sociology* 104 (2), 404–440.
- Khanna, Tarun, Yishay, Yafeh, 2007. Business groups in emerging markets: paragons or parasites? *J. Econ. Lit.*
- Khanna, N., Tice, S., 2001. The bright side of internal capital markets. *J. Finance* 56 (4), 1489–1528.
- Khanna, T., 2000. Business groups and social welfare in emerging markets: existing evidence and unanswered questions. *Europ. Econ. Rev.* 44, 748–761.
- Khanna, T., Palepu, K., 1997. Why focused strategies may be wrong for emerging markets. *Harvard Bus. Rev.* (July–August), 41–51.
- Khanna, T., Palepu, K., 1999a. The Right way to restructure conglomerates in emerging markets. *Harvard Bus. Rev.* (July–August).
- Khanna, T., Palepu, K., 1999b. Policy shocks, market intermediaries, and corporate strategy: evidence from Chile and India. *J. Econ. Manage. Strategy* 8 (2).
- Khanna, T., Palepu, K., 2000a. Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. *J. Finance* 55 (2), 867–891.
- Khanna, T., Palepu, K., 2000b. The future of business groups in emerging markets: long-run evidence from Chile. *Acad. Manage. J.* 43 (3), 268–285.
- Kim, Chulsoo, 2002. Is the investment of Korean conglomerates inefficient? *Korean Econ. Rev.* 18 (1), 5–24.
- Kim, Euysung, 2006. The impact of family ownership and capital structures on productivity performance of Korean manufacturing firms: Corporate governance and the “chaebol problem”. *J. Japanese Int. Economies* 20 (2), 209–233.
- Kim, H., Hoskisson, R., Tihanyi, L., Hong, J., 2004. Evolution and restructuring of diversified business groups in emerging markets. *Asia Pacific J. Manage.* 21 (1–2), 25–48.
- Kim, Ji Youn, 2009. *Acquisition activities by Korean Business Groups and Target Firms' Performance Changes*, Doctoral Dissertation, Seoul National University (in Korean).
- Kim, Jinbang, 2005. *Ownership Structure of the Chaebols*. Nanam, Seoul (in Korean).
- Kock, Carl J., Guillen, Mauro F., 2001. Strategy and structure in developing countries: business groups as an evolutionary response to opportunities for unrelated diversification. *Ind. Corp. Change* 10 (1), 77–113.
- Korea Information Service (KIS), the KIS Value Database. Its updated version (KIS Value III, KIS Value Library). Available from: <<http://www.kisvalue.com>>.
- Korea Securities Research Institute (KSRI), the KSRI Stock Database. Information on this DB available from: <<http://www.ksri.org/Store/data.asp>>.
- Lang, L.H.P., Stulz, R.M., 1994. Tobin's q, corporate diversification and firm performance. *J. Polit. Economy* 102, 1248–1280.
- LaPorta, R., Lopez-De-Silanes, F., Shleifer, A., 1999. Corporate ownership around the world. *J. Finance* 54, 471–517.
- Lee, Keon-Bum, Peng, M., Lee, Keun, 2008. From diversification premium to diversification discount during institutional transitions: the case of Korean chaebols. *J. World Bus.* 43 (1), 47–65.
- Leff, N., 1978. Industrial organization and entrepreneurship in developing countries: the economic groups. *Econ. Devel. Cult. Change* 26, 661–675.
- Lemmon, Michael L., Lins, Larl V., 2003. Ownership structure, corporate governance and firms value: evidence from the East Asian financial crisis. *J. Finance* 58 (4), 1445–1468.
- Lewellen, W.G., 1971. A pure financial rationale for the conglomerate merger. *J. Finance* 26, 521–537.
- Lins, Karl, Servaes, Henri, 1999. International evidence on the value of corporate diversification. *J. Finance* 54, 2215–2240.
- Maeil-Business Newspaper, Various Years, *Annals of the Korean Firms* (Hoesa yon-gam: in Korean).
- Management Efficiency Research Institute, 1986. *Korea's Fifty Major Financial Groups* (in Korean).
- Maksimovic, V., Phillips, G., 1999. Do Conglomerate Firms Allocate Resources Inefficiently? University of Maryland Working Paper.
- Meyer, M., Milgrom, P., Roberts, J., 1992. Organizational prospects, influence costs, and ownership changes. *J. Econ. Manage. Strategy* 1, 9–35.
- Morck, R., Nakamura, M., 1999. Banks and corporate control in Japan. *J. Finance* 54, 319–339.
- Nakatani, I., 1984. The economic role of corporate financial groupings. In: Aoki, M. (Ed.), *Economic Analysis of the Japanese Firm*. Elsevier, New York.

- Powell, W., Smith-Doerr, L., 1994. Networks and Economic Life. *Handbook of Economic Sociology*. Princeton University Press. pp. 368–402.
- Prowse, S., 1992. The structure of corporate ownership in Japan. *J. Finance* 47, 1121–1140.
- Scharfstein, David, Stein, Jeremy, 2000. The dark side of internal capital markets: divisional rent-seeking and inefficient investment. *J. Finance* 55 (6), 2537–2564.
- Servaes, H., 1996. The value of diversification during the conglomerate merger wave. *J. Finance* 51, 1201–1225.
- Shin, H., Park, Y.S., 1999. Financing constraints and internal capital markets: evidence from Korean chaebols. *J. Corp. Finance* 5, 169–191.
- Spiess, D.K., Affleck-Graves, J., 1995. Underperformance in long-run stock returns following seasoned equity offerings. *J. Finan. Econ.* 38, 243–267.
- Song, Won-Keun, 2005. *Business Structure of Chaebols and Concentration of Economic Power*. Nanam Press, Seoul (in Korean).
- Stulz, R.M., 1990. Managerial discretion and optimal financing policies. *J. Finan. Econ.* 26, 3–27.
- Weinstein, D.E., Yafeh, Y., 1998. On the cost of a bank centered financial system: evidence from the changing main bank relations in Japan. *J. Finance* 53, 635–672.
- Whited, T.M., 2001. Is it inefficient investment that causes the diversification discount? *J. Finance* 56 (5), 1667–1691.



# **Keynote Speech**



**“Evolution of the Firms and Institutions in East Asia”**

*Masahiko Aoki* (Stanford University)





AN ORGANIZATIONAL CHALLENGE IN EAST ASIA:  
HOW TO PREPARE FOR COMPLEXITY, UNCERTAINTY, AND INNOVATION

Masahiko Aoki  
Stanford University

November, 2011

Summary: China, Japan, and Korea together now constitute the largest economic zone in the world in real terms of aggregate GDP (PPP), slightly surpassing Western offshoots (US, Australia and NZ) and the EU. There are many challenges facing these economies, such as not to be trapped in “mid-income trap” for China, how to face the aging of populations for all the three economies, and so on. Prompted by the recent nuclear catastrophe in Fukushima, Japan, I will take up another important challenge that all Asian economies may face, that is, how to prepare and cope with ever-increasing complexity and uncertainty in industrial coordination. This question has important bearings on needed improvement in per worker productivity for Asian economies. This lecture calls for attention to the value and power of a new decentralized coordination mode called modularity. This mode is considered as fitting better the complexity, large uncertainty of the economy, as well as incentive provision for needed innovation. I contrast its property over the traditional horizontal coordination (e.g., the “just in time” mode) and the vertical centralization mode.

- In the year 2010, the aggregate real GDP (PPP) of China, Japan, South Korea, Hong Kong, and Taiwan surpassed that of both North America and the European Union. According to Maddison’s well-cited estimate, these economies together also constituted the largest economic zone in 1820, producing more than one-third of the world’s total GDP. However, their share dropped by more than three quarters toward the middle of the next century, which was then followed by the successive miracles of Japan, the Asian Tigers, and now China.
- Having achieved the largest economic zone in the world, what kind of challenges do East Asian economies face? GDP per capita (PPP basis) of the coastal provinces of China was US\$ 10,616 in 2009, which happens to be almost equal to the World Bank estimate of the world average, while that of the inland provinces

was 55 percent smaller (US\$ 4,755). Thus Coastal China has undoubtedly reached the stage of the middle-income state. One frequently discussed subject matter in development economics is whether China can avoid the Middle Income Trap by transiting to a more human-capital based development pattern?

- Also, looking ahead, China, Japan and Korea will alike face a significant degree of shrinkage in the economically active segments of the population in coming years. In Japan, the share of working-age population (age 15 to 65) is projected to decline to as low as a half of the population by mid century, if there is no reversal in the declining rate of total fertility rate. The share in China already reached its peak in 2010, and even the absolute size of the potential labor force is projected to start shrinking after ten years. In South Korea the share of the potential labor force will not reach its peak (73percent) until 2015, but it will then start to decline to about 55 percent over the next 35 years, as opposed to the 50 years needed for Japan to experience the same magnitude of shrinkage. How will East Asian economies be able to sustain per capita income growth even with the declining share of the potential work force?
- These two major challenges evidently call for needs for these economies to upgrade their industrial capacity in terms of per worker output. Given the prospective of inevitable decline of the saving rate due to population aging, an increase in labor productivity must rely more and more on improvements in human-capital based technology and TFP. In this talk I would like to focus on possible improvements in industrial coordination as a source of TFP. More specifically, I would like to discuss such problems as how to cope with the increasing complexity of the economy, how to prepare for and cope with large uncertainty, and how to promote innovation.
- The problem of how to cope with economic risk has been mostly dealt with in economics as a subject of financial economics. But, obviously various shocks and irregular events originate in, and/or have direct impacts on, the real economy.

Think of a series of recent events in Asia: public transportation disasters in China, power failure in Korea, industrial damages and interruptions being caused by the flood in Thailand, and the Fukushima nuclear catastrophe. In some cases, human errors are apparent, while in other cases natural shocks may appear to have trigger crises. However, even the latter cases may not be regarded merely as freak accidents brought about by “unforeseeable” forces of nature, but caused, in part at least, by the failure of coordination and the lack of preparedness. As the real economy progresses and enhances its complexity, ways how to prepare for external shocks and how to avoid the grave consequences of human errors becomes important agenda for economic development.

- The exclusive concern of financial aspect of risk in economics may be thought of as derived from the now-orthodox view on corporations that they are to be governed by financial markets. However, an analysis of the “real” economic risk/uncertainty may call for an alternative focus, that is, on the aspect of corporate firms as mechanisms of coordination of productive activities. In a recent book of mine entitled as *Corporations in Evolving Diversity: Cognition, Governance and Institutions*, I tried to call attention to the nature of corporations as a device for associational cognition. Corporations as a permanent corporate body can cognize and store what a mere collection of individuals cannot. Indeed it is telling that the legal concept of corporations first emerged in the early medieval period in the forms of Roman Catholic Church and universities like Bologna, Oxford, Paris. To borrow an expression of the founder of corporate law, Blackstone, they were “founded [for study and prayer], for the encouragement and support of religion and learning” (Blackstone 1765–9).
- Varied structures of associational cognition may be analytically distinguished in terms of modes of organizational coordination. In economics, three modes of organizational coordination has been identified and studied: vertical (centralized), horizontal, and modular modes.

- The nature of the vertical or centralized mode of coordination is well known. The top management formulates event-contingent action plans for subordinate operational units, and operational units are supposed just to follow them. If organization is exposed only to small uncertain events, then this mode can operate at cheap cost without an overwhelming problem. Even if an unexpected shock occurs, ad hoc command by the top commander will do, if technology involved is simple enough. However, if technology becomes complex so that precise and swift use of information on the spot is crucial, the centralized coordination may become problematical.
- The horizontal coordination mode is for constituent units engaged in complementary actions to mutually share information as regards evolving states and continually negotiates on outputs of each other to make the system respond to it smoothly. A classical example was found the “just-in-time”. There were continual communications and negotiations between Toyota and upper tier supplies, as well as among suppliers at subsequent tiers, to meet changing market demands. An analysis shows that the horizontal coordination mode performs better than the centralized vertical mode in dealing with continually changing external environment because of better use of information at site.
- The Tohoku disaster revealed however that the horizontal coordination is not without a problem either. After the disaster, Toyota themselves discovered that their supply chains had been extended as deep as to seven tiers and that their outputs, such as semiconductors and chemicals not categorically in the machinery industry, were critical for continual production of automobiles of higher quality. If we take into consideration the magnitude of natural disaster, as well as the scarcity of qualified suppliers on the global scale, the disruption of smooth production may be considered as inescapable, albeit unfortunate. Actually, mutual help and assistance in response to the destruction of production facilities, and continual coordination and negotiations for recovery immediately

started to take place horizontally along the supply chain after March 11<sup>th</sup> disaster and the recovery of the automobile industry has been considerably quick (in the third quarter of 2011 after three months of the disaster, the level of automobile production was even higher than the same period of the last year). Yet how to make the “just in time” method compatible with the requirement for the preparedness of “just in case” has been now posed as a challenge for the system of supply chain in general. The current Thai disaster reinforces its urgency.

- There is yet another story to horizontal coordination. On March 11, 2011, following a magnitude 9.0 earthquake of the second largest in scientific historical records, nuclear reactors owned by TEPCO began their systematic shutdowns. In shutdown mode, cooling water should have reduced the reactors’ remaining decay heat. However, soon it became clear that not only was electric power from the transmission grid unavailable because of earthquake damage, but also the plant’s back-up generators located near the sea level had failed in the tsunami of more than 15 meters high. Between various stakeholders, including the Prime Minister Kan and his advisors, the nuclear power regulator, TEPCO headquarters, and Fukushima plants, there were continuous verbal exchanges, continuous mutual guessing of each others’ intentions, and continuous hesitations to disclose unfavorable information: the situation that Kan described as a “language game” after his resignation from the prime minister. During this period of indecision, fuel melted inside multiple reactors and hydrogen explosions occurred at the plant. This may be considered as a stark example of the failure of horizontal coordination. It is vulnerable to a high degree of instability under large shock.
- TEPCO is a regional monopoly of enormous size that integrates power generation plants of various types, transmission grids, and distribution systems. In the normal state of affairs, there was “seamless” horizontal coordination

among these functions to meet fluctuating electric power demand forthcoming under fixed regulated pricing. As a consequence, TEPCO boasted of its “quality of power supply,” i.e., the extremely low probability of power. However, when they faced the big shock, the ambiguity of decision-making locus and the aspect of horizontal negotiation within the TEPCO, as well as between the government, regulator and the TEPCO, failed to contain its impacts in a more reasonable level.

- I hear from some people in Asia that the real cause of the problem in Fukushima is the lack of leadership. Does Japan need more centralized authority, relying more on vertical control? In this respect, Japan may need to learn from South Korea. However, I would like to point out that the case of Three Mile Island is also telling. In that crisis President Jimmy Carter went to visit the site, primarily to calm the public. Although he had been a nuclear submarine officer and had experience with pressurized water reactors, he wasn't there to direct things. The plant manager was given ultimate authority and finally resolved the crisis by opening the vent valves on his own judgment. In spite of societal tensions at that time, the actual radiation emission was kept to a manageable level. Likewise, the decision of plant manager at Fukushima to inject seawater to cool off the reactors in defiance of the order of TEPCO headquarters actually saved the catastrophe to become of more serious magnitude. In a very complex system, information available to experts at the site is crucial in the even of big shock. However, how can it be effectively utilized?
- An alternative to the centralized and horizontal coordination could be the so-called modular system in which constituent units, each specialized in a specialized function, are connected through open interface rules. As long as it follows the rules, each unit can “encapsulate” its own function without intervention by other units.
- A modular mode is implemented most prominently in the ITC industry. Where companies such as Microsoft, Apple, Google, Samson and others provide

common platforms that in effect specify open interface rules, to which many small-to large firms are connected to as modules specialized in the designs of various applications, physical devices, etc. This mode is known to excel in self-organizing innovations, because a system can evolve through substitutions, additions, and conversions of component modules as far as they follow the open interface rules.

- Further the so-called “defense in depth” in the complex system, such as nuclear power plants, toward highly uncertain external shocks may be considered as an application of the principle of modularity to the engineering system; that is, the installment of multiple, modular safety-devices to be triggered by one after another contingent on evolving risk situation.
- Let me suggest the ways to apply the power of modularity to the power industry as an illustration. Suppose that the Independent System Operator (the ISO) owns the transmission grid as a crucial infra-structure or platform. Potential electric power suppliers, as well as retailers and large corporate customers-cum-independent generators, are to be assured equal accesses to it under rules that the ISO sets and implements. To avoid problems like those of the 2000–2001 California power crisis, as well as to provide incentives for investments in power generating assets (possibly, including investments in safer nuclear plants), market rules for matching supply and demand are to be carefully designed and implemented by the ISO with the support on information technology.
- As mentioned, a disintegrated, modular structure can be innovation- and environment-friendly. By competitively linking suppliers and customers through an electric/information transmission system, there will be high-powered incentives for energy conservation, on one hand, and the development of alternative energy sources and power storage (batteries), on the other. Various firms outside the traditional electric power industry may also become active players, e.g., members of industries in information technology, plug-in

automobile, architectural design and construction, new generations of batteries and electric equipments, and the like. The definition of Schumpeterian innovation is “creative destruction and recombination.” A reform of the power industry in the direction that I suggest may a crucial institutional innovation in this sense.

- I have discussed some problematic issues with the traditional centralized and horizontal coordination in responding to large external shock, while submitting potential values of the modular mode in coping with large uncertainty and promoting innovation. However, these properties would certainly depend on various technological parameters as well as the availability and distribution of human resources that fit. I hope that my talk provide one possible framework for considering how East Asian economies can upgrade its industrial coordination to cope with the increasing complexity and uncertainty as well as to promote innovation.



# THE FIVE-PHASES OF ECONOMIC DEVELOPMENT AND INSTITUTIONAL EVOLUTION IN CHINA AND JAPAN<sup>1</sup>

MASAHIKO AOKI

STANFORD UNIVERSITY

In the year 2010, the aggregate real GDP (PPP) of China, Japan, South Korea, and Taiwan, China surpassed that of both North America and the European Union. According to Maddison's well-cited estimate, these economies together also constituted the largest economic zone in 1820, producing more than one-third of the world's total GDP.<sup>2</sup> However, their share dropped by more than three quarters toward the middle of the next century, which was then followed by the successive miracles of Japan, the Asian Tigers, and now China. What accounts for such a dramatic fall from historical heights and then the resurrection of the region as a whole? Is there anything unique about East Asia? What implications does this experience have for future development?

To account for the basic mechanism of GDP per capita behavior over time and across economies, in the past few decades development economists have been examining the implications of endogenous interactions between technology and demography. Core insights from their studies can be summarized briefly as follows. Over a very long run of human history, new ideas developed as population size increased (e.g., Lee 1988, Kremer 1993, Jones 1999). But in dominantly agrarian economies, the fruits of technological progress were channeled into population growth, which did not help per capita GDP growth because of diminishing returns to scale of agricultural technology. This state is referred to as the Malthusian trap or equilibrium (e.g., Hansen & Prescott 2002, Clark 2007). It does not, however, necessarily imply that this state lacks dynamism.

As the state of new ideas passed a threshold point and constant returns to scale technology free from the limits of land supply became profitable, the industrial revolution set in with physical and human resources starting to be re-allocated to urban industries (e.g., Jorgenson 1961, Galor & Weil 2000, Hansen & Prescott 2002). There was also an increase in working-age population brought about by the decline in infant

---

<sup>1</sup> This is to be presented as the Presidential Lecture at the XVth World Congress of the International Economic Association to be held in Beijing, July 4-8, 2001. I express sincere gratitude to Beth Cary, Wenmeng Feng of CDRF, Beijing, and Yoko Yamamoto formerly of VCASI, Tokyo, for their excellent editing and research assistance.

<sup>2</sup> The aggregate share of China, Japan, and Korea in the world production in 1820 was 36.6 percent vis-à-vis Western Europe's 23.8 percent share. The share of the U.S. at that time was a mere 1.8 percent (Maddison, 2006, various tables). East Asian share went down to 7.9 percent by 1950.

mortality and rise in immigration in the case of Western Europe offshoots. The hike in GDP per capita growth occasioned by this demographic shift is referred to as the demographic gift (e.g., Bloom & Williamson 1998) or as the population bonus in East Asia. However, as continuing technological progress tends to increase the preference for, returns to, and/or cost (to parents) of human capital investment, people are inclined to have fewer children (e.g., Becker, Murphy & Tamura 1990, Galor & Weil 1996, 2000, Lucas 2002). This demographic transition leads to the modern growth regime in which the increase in GDP per capita is sustained by Lucas-Romer technology, if not at a rate comparable to the previous transitional phase. But this may not be the End of History, as I will discuss shortly.

The transition from the Malthusian state to modern endogenous growth is usually modeled after stylized facts drawn from advanced Western economies. However, the theoretical innovation of the new approach is an understanding of different levels of per capita income as successive stages in the normal process of development rather than as different balanced growth paths conditioned by different parameters (e.g., Galor & Weil 2000, Hansen & Prescott 2002, Galor 2011). From such a unified perspective, then, the miracles of the East Asian economies are not really miracles, but catching-up phenomena (e.g., Bloom & Williamson 1998, Ngai 2004). To better understand the development process in general, we may also wish to know why there are differences in the timing, duration, and institutional forms of successive developmental phases across economies, say between the West and the East, or among China, Japan, and Korea within East Asia. Moreover, what implications may be drawn from these differences to unravel future possibilities of development?

As a way of introducing this discussion, let me begin by identifying phases of development for China, Japan, and South Korea, relying only on the bare numbers of GNP (PPP basis), population and its distribution over age groups and sectoral employment. For the moment I will set aside institutional forms. Following the unified approach, I will start with the Malthusian phase of economic development, or the M-phase in short, in which agricultural employment is high, say more than 80 percent,<sup>3</sup> and per capita income is low and stationary. According to this simple criterion, there would not be much argument in identifying the developmental stages of China in the late Qing Dynasty, Japan in the late Tokugawa, and South Korea in the late Chosŏn Dynasty as being in the M-phase.

A difficulty of phase identification arises in discerning the onset of the transition to the post-Malthusian phase. For Japan it is conventional to regard the transition as triggered by the Meiji Restoration. Indeed, GDP per capita grew at the compound rate of 1.92 percent from 1870 to the pre-War peak in 1941, in comparison to 0.19 percent during the years 1820 to 1870 according to Maddison's estimation in terms of 1990 International dollars.<sup>4</sup> However, the pace of reduction in agricultural employment

---

<sup>3</sup> Needless to say, in this stage a large proportion of farmers was also engaged in various non-agricultural activities such as handicraft manufacturing for domestic consumption as well as for markets.

<sup>4</sup> According to Ohkawa & Rosovsky (1973), Table 2-1, per capita GNP growth rates were 1.64 percent for 1917-1931 and 4.48 percent for 1931-37.

remained rather slow, keeping the employment level at fourteen million throughout the pre-War period.<sup>5</sup> Thus Hayashi & Prescott (2008) described their hypothesis as “the transition from Malthus to Solow was inhibited by the barrier to labor mobility” in this phase.

For China and Korea, how to characterize the pre-War period is a thorny question. According to Maddison, China’s per capita GDP growth between 1870 and 1936 was merely 0.09 percent, while the population growth rate was 0.52 percent, as if typical Malthusian phenomena ensued.<sup>6</sup> The share of agricultural employment remained at 83.5% percent even in 1952. South Korea’s GDP per capita almost doubled in the period between 1911 and 1938, but it was under the colonial rule of Japan. It sharply dropped, after the end of World War II; and the 1911 level of per capita income was not regained until the end of the Korean War in 1953. Japan’s GDP per capita also sharply declined after 1941, and did not recover its previous peak until 1956.

Certainly the tolls of imperial aggression and colonialism, the Great Depression, World War II and the Korean War, and China’s civil war and Revolution defy a mechanistic application of the Malthusian criterion to the first half of the twentieth-century in East Asia. Therefore, by leaving aside for a while the characterization of the pre-War developmental phase of China and South Korea (or, alternatively, by regarding that period as a kind of transitory phase), let us move on to see if data in the second half of the century can suggest a clearer picture of the developmental pattern in East Asia. Applying macro accounting to official data on China, Japan, and South Korea, I have tried to identify successive development phases by distinct patterns of sources of per capita GDP growth. The sources are: (1) demographic-economic change in the ratio of total employment to total population,  $g(E/N)$ ; (2) structural transformation,  $g(S)$ , composed of the shift of employment share from the primary industry, referred to below as the A-sector, to the secondary and tertiary industries, referred to below as the I-sector, and relative increase of output per worker in the A-sector vis-à-vis that in the I-sector; and

#### TABLE: SOURCES OF PER CAPITA INCOME GROWTH: CHINA, JAPAN AND SOUTH KOREA

---

<sup>5</sup> The share of agricultural employment was reduced from 64 percent in 1885 to 42 percent in 1940, but it jumped up to 59 percent in 1950 as many soldiers and civilians who returned from abroad after WWII went back to rural areas because of the shortage of food and urban jobs.

<sup>6</sup> I note that some recent studies assert that the degree of poor industrial development as these macro figures would suggest is might be somewhat misleading. For example Eastman notes that per capita cloth consumption nearly doubled between the 1870s and the late 1920s (Eastman 1988: p.95). Rawsy estimates that industrial output grew by an average of 8.1 percent during the years between of 1912 and -1936 (Rawski, 1989: pp.70-71). A previous study by Chang (1969) also provides a similar estimate of 8.439 percent growth in industrial value-added (including Manchuria) between the period 1912 and 1942. It is to be noted, however, that industry yet occupied a small place during the four decades of the Republican period, as the base of growth was very low, and that the linkage between the modern industry and the rural economy remained rather tangential (e.g., Feuerwerker 1995, pp.101-121). According to Perkin’s estimate, the share of modern industrial output in GDP remained at 7.463% in 1933, while pre-modern manufacturing’s share was 12.4% (Perkins 1975, p.117) .

		Starting Y/N (Maddison)	g(Y/N) (Maddison)	g(Y/N) (Official)	G(L/N)	G(S)	G(Y <sub>i</sub> /L <sub>i</sub> )	Phase
CHINA	1870-1938	530	0.09					M
	1870-1951	530	-0.24					
	1952-1967	537	1.90	3.53	0.76	-0.58	0.77	G
	1967-1977	712	2.31	4.26	0.28	1.65	0.28	
	1977-1989	895	6.13	8.12	1.44	3.47	3.21	K
	1990-1999	1,858	6.44	9.49	0.03	1.07	8.39	K/H
	1999-2008	3,259	-	9.32	0.30	1.60	7.41	
JAPAN	1880-1944	863	2.03					G
	1880-1955	863	1.57					
	1955-1959	2,771	6.42	6.32	1.43	2.34	2.54	K
	1959-1969	3,554	9.58	8.13	0.91	0.98	6.24	
	1969-1979	8,874	4.02	3.80	-0.41	0.62	3.59	
	1979-1989	13,163	3.15	3.81	0.23	0.40	3.18	H
	1989-1999	17,942	1.41	0.91	0.10	0.28	0.53	
	1999-2008	20,641	-	1.70	-0.34	0.10	1.93	PD?
SOUTH KOREA	1911-1944	777	1.64					
	1911-1963	777	0.82					
	1963-1970	1,186	7.39					
	1970-1979	1,954	9.14	7.81	2.22	2.29	3.29	G/K
	1980-1989	4,144	6.91	8.62	1.60	2.27	4.74	
	1989-1999	8,027	5.12	5.47	0.51	0.11	4.86	H
	1999-2008	13,222	-	4.60	1.22	0.11	3.28	

(3) changes in per worker output in the I-sector,  $g(Y_I/E_I)$  (this last item may be further decomposed in changes in TFP (Total Factor Productivity) and capital-output ratio, provided that reliable sectoral capital stock data are available).<sup>7</sup> The above table

<sup>7</sup> The decomposition is calculated as follows. Let  $Y$  = GDP,  $N$  = population size,  $E$  = total employment,  $Y_i$  = output of the  $i$ -th sector,  $i = A$  (primary),  $I$  (second & tertiary),  $E_i$  = employment in the  $i$ -th sector,  $i = A, I$ . As  $Y = Y_A + Y_I$ ,  $E = E_A + E_I$ ,

$$y = Y/N = E/N[E_A/E \times Y_A/E_A + E_I/E \times Y_I/E_I] = E/N \times Y_I/E_I [1 - \alpha\Delta]$$

where  $\alpha = E_A/E$  and  $\Delta = [E_I - E_A]/E_I$ . Let  $[1 - \alpha\Delta] = S$ , which measures impacts of structural change due to reduction in agricultural share of employment. If the employment share of A-sector  $\alpha$  goes down and/or productivity differential between the MS-sector and A-sector  $\Delta$  is narrowed, this measure tends to go up,

summarizes the results, with Maddison's estimate of the per capita GDP growth rates for a comparative reference.<sup>8</sup>

Together with the previous observation as regards prewar Japan, it is suggested that the post-Malthusian stage can be decomposed into two sub-phases: That is, the first phase of national industrialization characterized by moderate per capita GDP growth with a moderate degree of structural transformation: 1952-1977 for China and 1880-1956 for Japan, followed by the second phase of very high per capita GDP growth under rapid structural transformation combined with demographic gift: 1977-1989 for China 1955-1969 for Japan. The first sub phase corresponds to the era known for the conspicuous government involvement in industrial accumulation. So let us refer to it as the G-phase.<sup>9</sup>

In the second sub-phase, demographic factors, i.e., an increase in the labor force share in the total population and the shift of the employment share from the A-sector to the I-sector contributed to between one-quarter to one-half of the very high per capita income growth in.<sup>10</sup> A classical paper by Simon Kuznets (1957) characterizes the

---

having positive effect on GDP per capita  $y$ . Denoting the rates of growth of the various variables by  $g(\cdot)$ , it holds that :

$$g(y) = [g(E) - g(N)] + g(Y_I / E_I) + g(S)$$

If  $K_{MS}$  = input of capital service in the MS-sector and  $\theta_{MS}$  = capital share in the I-sector is available, then the growth of labor productivity in the I-sector can be further decomposed as

$$g(Y_I / E_I) = [1/(1-\theta_I)] g(TFP_I) + [\theta_I/(1-\theta_I)] g(K_I / Y_I)$$

<sup>8</sup> Maddison's estimate of China's per capita GDP growth in terms of 1990 International Geary-Khamas Dollars (I\$) tends to be lower than estimates based on official statistics. Since officials of provincial governments in China are rewarded for superior growth performance (e.g., Li & Zhou 2005), they tend to overstate growth output. Many research efforts have been made to correct this problem and they are neatly surveyed in Cao et al (2009), together with their own results. See Young (2003) for careful checking and adjustments of Chinese official data in general. In the calculation of China's per capita GDP growth rates in the Table, the year 1989-90 is not taken into account, because there was a substantial revision in the official estimate of employment, resulting in a discrepancy as large as 72 million between old and new series. Likewise, Korean official data of sectoral output are available on current factor costs basis between 1970 and 1979 and then on current price basis, thereafter. Therefore, growth rates between 1979-1980 are not taken into account.

<sup>9</sup> In China, agriculture provided RMB 600 billion for industrialization between 1951 and 1978, while state investment in agriculture was RMB 176 billion (Wu 2004/2005: p.117). However, the high contribution of per worker output in the I-sector in the early phase (the early 1950's) may be largely attributable to an improvement in the management of industrial facilities and human resources inherited from the old regime (e.g., Perkins 1975; Feuerwerker, 1995, pp.100-121). For Japan, Teranishi (1982) showed that the role of financial markets in financing industrial growth was not important in the G-phase, but that of fiscal mechanism was significant in the form of de facto subsidies to non-agricultural sector – calculated as industrial differential in tax burden -- before the WWI, and in the form of formal subsidies to non-agricultural sector after 1923. The ratio of non-agricultural subsidies to total tax revenues amounted to 31.8 percent in the years between 1928 and 1932.

<sup>10</sup> My accounting method may underestimate the impact of demographic gifts on GDP per capita growth, because it measures only the direct effect of labor inputs. However, the relative increase in the working-age population may contribute to an increase in savings as well, which can increase the capital-labor ratio

reduction in the agricultural employment-share across economies and over time as “quantitative aspects of the economic growth.” In East Asia, this shift was compressed into much shorter periods than in Western Europe,<sup>11</sup> supplemented by demographic gift due to the rising fertility and the declining infant mortality in the preceding G-phase.<sup>12</sup> Thus I refer to this second sub-phase of the post-Malthusian stage as the K-phase, reminiscent of the Kuznets process. We see that in South Korea the K-phase was coalesced into the G-phase. This was because the mobility of the rural population had already begun at a significant rate prior to national industrialization during the colonial period and the years of Korean War.<sup>13</sup>

As the K-phase works out its course, the possibility of sustained GDP per capita growth hinges on the ability of the economy to steadily improve on per worker output in the I-sector, particularly in terms of TFP and human capital investment. Let us refer to this phase as the H-phase, reminiscent of human-capital based, endogenous growth. Japan appears to have succeeded in this transition in the period between 1970s and 1980s, but failed to sustain the continued growth of per worker output in the next decade, with a modicum of turnaround in the 2000’s. Surely there involved an element of the failure of macro economic management, but I suggest below that the failure of the institutional arrangements to respond to the emergent demographic transition has begun to cast shadow on per capita income growth. On the other hand, South Korea has been succeeding in sustaining high per worker output in the I-sector on the last two decades (1989-2008). A conspicuous increase in the labor participation ratio in the 2000s is partially due to the demographic gifts bestowed by the second generation of

---

that enhances industrial output per labor. Higgins and Williamson (1996, 1997) estimate that the 13.6 % upward swing in the savings rate in East Asia between 1970 and 1992 can be almost entirely accounted for by falling dependency rate in East Asia, which raised accumulation rates by 3.4 percent and augmented the growth in GDP per capita by 1.5 %.

<sup>11</sup> According to Kuznets (1957), it took 84 years for France to reduce agricultural employment share from 52 percent in 1866 to 33 percent in 1950.

<sup>12</sup> In Japan the crude birth rate stayed at high level of more than 30 percent between 1900-1947. Then it steadily went down to less than 10 percent after 1990. In China the crude birth rate shot up to more than 40 percent in 1963 in reaction to a decrease of population due to the Great Leap Forward and remained at the level of more than 30 percent until 1970. In the 1970s the rate steadily declined below 20 percent even before the official introduction of the one child policy.

<sup>13</sup> During the colonial period, the coherence of the traditional village was weakened because of the Japanese interests in landownership and the relative decline in the price of rice, while wage-earning opportunities outside Korea became relatively better. According to an authoritative study by Kwon (1977), by the year 1940, 14 percent of the ethnic Koreans were living in Japan and Manchuria. A large proportion of them (about three quarters of those working in Japan) returned to Korea after WWII and tended to settle in the urban areas. The net rural-urban migration during 1949-1955 is estimated by T.H. Kwon to range between 650, 000 to 750, 000 out of the total population of 20 millions in 1950. In Kangwŏn Province, 21 percent of the population migrated from the rural sector. During the period 1963 – 1969, for which official employment data are available, the share of the A-sector employment in total employment was already reduced from 62.9 percent to 50.2 percent. However, for this period, the official sectoral output data on market price basis are not available (for me).

post-war baby boomers, but also reflects the rapid decline of dependency ratio due to fertility decline: the typical H-phase phenomenon at an extraordinary acceleration.<sup>14</sup>

For the period from 1990 to the present, China's continuing high growth of GDP per capita is no longer supported by demographic gifts as a result of the one-child policy, but the contribution of the structural transformation still accounted for close to one-quarter of per capita GDP growth in the 2000s. Whether or not the contribution of the structural transformation will continue to persist constitutes the crux of economic-demographic debates in China now.<sup>15</sup> For both Japan and South Korea, the turning points from the K-phase to the H-phase (around 1970 and 1990 respectively) are marked by the reduction in the share of agricultural employment to below 20 percent. In China, the share of agricultural employment in 2009 was 26.4 percent in the coastal provinces and 46.3 percent in the inland provinces. If the 20 percent share is used as a rule of thumb, the transition out of the K-phase may soon occur, or even have already occurred in the coastal area, but may not be so imminent in the inland area. Incidentally, GDP per capita (PPP basis) in the coastal provinces in 2009 is US\$ 10,616, which happens to be almost equal to the World Bank estimate of the world average, while that of the inland provinces is 55 percent smaller (US\$ 4,755).<sup>16</sup>

China appears to continue to enjoy robust improvements in output per worker in the I-sector. However, the figure reported in Table may be somewhat overrepresented in this respect, as the official data may underestimate the level of labor inputs in the I-sector as discussed by Cai and Wang (2007). (To the degree that this is the case, the contribution of structural transformation might be even higher than the Table indicates because of the relatively higher improvement in per-worker output in the A-sector). How much of the growth in industrial output per worker is due to TFP/human-capital investment cannot be known for sure without reliable capital stock data that are still

---

<sup>14</sup> Between 1985 and 2005, the proportion of those under the age of 15 in total population was reduced by more than 10 percent.

<sup>15</sup> The debate is often phrased as whether or not the Chinese economy is facing the Lewisian turning point. But this way of formulating the issue appears to be misleading, because the Lewisian model mechanically combines two distinct models: the classical model of unlimited labor supply and the neoclassical model of the competitive labor market the transition. This is not in accord with the unified approach of recent vintage as briefly described at beginning of this paper as it ignores aspects of rational choice by the farmers under institutional constraints that may appear to be the presence of surplus labor. See Jorgenson (1967) for an earlier critique of the Lewisian theory in favor of a rational choice model.

<sup>16</sup> Using official Chinese data, the division between the coastal provinces (Beijing, Tianjin, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong) and inland provinces (Hebei, Shanxi, Jilin, Helongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Xizang, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang) is made on the basis of a cluster analysis of correlates between gross provincial product per capita and the share of agricultural employment across provinces. This analysis detects only one conspicuous outlier in Inner Mongolia where the agricultural employment share is relatively high (48.8 percent), but per capita gross product is comparable to those of coastal provinces because of high mining output. This province is excluded in the calculation. The conversion of per capita outputs to US\$ is based on the PPP conversion ratio of the World Bank. The World Bank estimate of the world average is US\$ 10,691.

unavailable in the public domain. However, notable scholarly researches estimating TFP have been published, which are neatly surveyed by Cao et al (2009). According to their own industry-based study, for the 1982-2000 period TFP growth in the I-sector was 1.8 percent (2.1 percent in secondary industry and - 0.3 percent in tertiary industry) and the major source of per worker output growth was capital accumulation rather than TFP.

Looking further ahead, the three East Asian economies will face a significant degree of shrinkage in the economically active segments of the population. In Japan, where the highest life expectancy in the world has been achieved, the share of the potential labor force (aged 15 – 65) is projected to decline to as low as a half of the population by mid century. The share in China already reached its peak in 2010, and even the absolute size of the potential labor force is projected to start shrinking after ten years. In South Korea the share of the potential labor force will not reach its peak (73percent) until 2015, but the pace of aging will become even faster than in Japan thereafter.<sup>17</sup>

These dramatic demographic changes in East Asia are the consequence of the lower fertility that is characteristic of the H-phase, combined with the extension of life expectancy due to improved healthcare and life comforts made available in the same phase. Furthermore, the increasing rate of human capital investment through longer schooling tends to diminish the actual work participation by the younger cohorts. These three trends are taking place at a greater unprecedented speed in East Asia than elsewhere, because the transition from the G-phase to the H-phase was compressed into a much shorter period of time. Per capita income may continue to grow, provided that there will be a further increase in per worker output, as well as the development of balancing forces to increase the rate of labor participation and reverse the decline in fertility and so on. But if such a development of a technological and demographic nature calls for substantially new ways of playing societal games, it would be apt to consider the possibility of a new phase in economic development: the phase of post-demographic transition, or the PD-phase in short. It is arguable to what extent the tendency toward population aging and low fertility is universal. However, as indicated by the fact that the sustainability of the social entitlement system and, accordingly, that of public finance, becoming a common serious issue across all the developed economies, East Asian countries may be just getting ahead in a “new demographic transition” (Eggleston & Fuchs, 2011).

I have thus far identified five successive phases of the development process -- M, G, K, H plus PD, which suggest a common development pattern across the East Asian economies as well as largely consistent with the unified approach to development. However, in spite of general commonality as regards the quantitative nature of developmental phases, there are also differences in timing and duration of each phase across the East Asian economies and beyond. Why? And what implications are there for

---

<sup>17</sup> The South Korean share of the age group between 15 and 65 is expected to reach 73 percent in 2015. It will then start to decline to about 55 percent over the next 35 years, as opposed to the 50 years needed for Japan to experience the same magnitude of shrinkage.



future development? These questions evidently call for an explicit consideration of institutions that I have abstracted so far. However, the notion of institutions has not been easily agreed upon among economists and beyond. One of the recent approaches popular among economists is to measure the quality of institutions of each economy by their distance from presumably ideal institutional arrangements composed of, say, the rule of law, generalized trust relationships, protection of minority shareholder in corporate governance and the like, and regress economic performance on these indices. But what does such a distance imply? Can, and ought, such distances be narrowed simply by enlightened government policy and innovative entrepreneurial behavior so that all the economies converge on the “modern growth regime” supported by those ideal institutional arrangements? Although such diagnoses and prescriptions appear to be clear, they may not be very helpful in understanding the nature of the paths that the East Asian economies have been taking and in making predictions for their future trajectories and prescribing policy for them.

Instead of exogenous view of institutions, I adopt the following conceptual framework for understanding institutions and their dynamics, as elaborated on in my recent works (Aoki 2001, 2010, 2011). Institutions are commonly cognized, salient patterns by which societal games are recursively played and expected to be played. Such patterns may be summarily and publicly represented by laws, norms, organizations, social rules, and other external artifacts, which may be referred to as substantive forms of institutions. The essential function of these public representations is to mediate between the state of play and agents’ individual beliefs in a recursive manner. Individual beliefs in conjunction with individuals’ incentives generate states of play, while the salient features of the recursive states of play provide reasons to believe those public representations. Through such a stable mediation of institutions between people’s cognition (beliefs) and actual play of societal games, a specific pattern of per capita income and demographic behavior is generated in society. As such, institutions could be subjected to game-theoretic equilibrium analysis.

But institutions also change. Then, the basic aspects of the institutional trajectory over the development process may be characterized as punctuated equilibria as a first approximation, i.e., as a sequence of successive equilibria. However, these successive equilibria are not disjointed from each other, but may be linked in a path-dependent manner. In each phase the state of play is not in a precisely stationary position. It is in constant motions induced by changes in the per capita income level, demographic factors such as the age composition of the population determined by previous generations and so on. These emergent changes generate experimental and new ways of play in response, which anticipate and constrain transitions to the next phase of the state of play. Then, salient patterns of the new state of play will be summarized and publicized in the new substantive form of institutions. Thus, institutions should be viewed as co-evolving with economic-demographic dynamics rather than determining economic and demographic performance in an irreversible way.

This much is simple enough. However, in order to understand varied patterns of co-evolution across economies, historical sources of variations need to be identified.<sup>18</sup>

New-Institutional Economics submits that the establishment of the modern economy was made possible on the basis of the third party-enforcement of contracts and property rights to which governments themselves are subjected. The transition to this state from the pre-modern state was intermediated by the emergence of anonymous exchanges within cities and across cities under various experimental arrangements of contract enforcement (e.g., Greif 2006). Also, the emergence of impersonal perpetuated organizations – corporations -- is considered to provide as the “doorstep condition” for the transition (North et al 2009). In contrast, it is generally reckoned that in East Asia exchanges were traditionally less anonymous and supported by more tangible, specific relationships, such as kinship, dynastic hierarchies, and trust building among restricted groups, which deterred the autonomous development of competitive market exchange. The historian Landes (2006) also notes that Chinese technology stopped progressing to initiate its own Industrial Revolution because of the lack of “a free market and institutionalized property rights” and “totalitarian control over all the activities of social life.” But, he added that “agriculture being the chief exception.”(p.6)

The M-phases of the East Asian countries were dominated by agrarian economies where individual peasant families cultivated small plots, not more than a few acres, which they owned or leased through contracts. This form of self-managed peasant farming was clearly distinct from the forms of M-stage agriculture in other economies, such as the large-scale plantations in Western Offshoots and colonial economies, serfdom in central and eastern Europe, and mobile cultivation in sub-Saharan Africa.<sup>19</sup> As discussed forcefully by Oshima (1987), Hayami & Otsuka (1993) and others, self-management by peasants without hierarchical monitoring better fit the conditions of monsoon agriculture that required attentive human care to vegetation in response to the changing climatic conditions<sup>20</sup> On a similar ecological-agricultural basis,

---

<sup>18</sup> This procedure may be thought of as being related to the instrumental method used to quantitatively measure the impact of institutions on economic performance (e.g., Hall & Jones 1999; Acemoglu, Johnson & Robinson 2001). In order to cope with a possible endogeneity problem, these authors seek exogenous sources of institutional variations (instrumental variables) in language (as a parameter measuring the facility of access to the Western institutions) and disease environment (as a parameter affecting the facility of settlement as colonial policy), respectively. My concern is rather to understand qualitatively the mechanism of co-evolution of demographic-economic performance and institutions. I emphasize below agriculture-related climate conditions and geo-political situations preceding the M-phase as important sources of variation between institutional trajectories of China and Japan.

<sup>19</sup> Arguably there was a modicum of similarity between the yeomen prior to the enclosure and the East Asian peasants in terms of land-holding, self-managed farming See Pomerantz (2000) for other examples of similarity between Western Europe and East Asia prior to the spread of colonization by the European.

<sup>20</sup> Environmental conditions more closely match the wet farming more in the Yangzi River region of China and Japan islands, but not necessarily everywhere in East Asia. In northern China climate conditions are less favorable for wet farming and water transportation, while natural disasters leading to famine were more severe. Perkins (1969) argues that these conditions explain the higher rate of tenancy in the

however, diverse institutional forms evolved even within East Asia with regard to the enforcement of property rights in farmland and lease contracts, trust relations and inheritance practices among peasants, as well as tax relationships among peasants, landlords, and governments as an essential element of the political state. In my view, these institutionalized arrangements cannot be simply summarized for the East Asian economies as a whole in terms of such generic notions as Confucianism (as opposed to Protestantism in the West), totalitarianism (as opposed to liberal democracy), landlord exploitation, kinships (as opposed to the rule of law), and so on. And those differences in the M-phase, some more obvious and others subtler, appear to be non-negligible sources for bifurcation of institutional trajectories of the two economies and thus for their economic performance. Let me illustrate this point as regards a couple of contrasting institutional forms between China and Japan.

Though founded on similar family-based peasant economies in the M-phase, the inheritance practices were different between China and Japan. In China there was the longstanding tradition of partible inheritance among sons.<sup>21</sup> It may be that this practice was sustained because of its consistency with the interests of the successive dynasties to restrain the emergence of counter-powers based on large landownership.<sup>22</sup> In any case, this practice limited the unit size of farmland ownership and made its turnover fluid. However, even if families were forced to sell their own farmlands, they often continued to cultivate the plots under lease contracts from the buyers. Land became the object of investments by gentries, merchants, and better-off farmers. Thus, intricate

---

northern China (pp. 87-98). Huang (1985) argues that dry farming produced fewer surpluses in northern China so that tenancy rates were lower. Instead, the managerial farming in which the principal cultivators worked together with a few laborers was more frequently observable, side by side with family farming. In Korea an influential book on farming instructions, edited under the direction of King Sejong (1418-50), advised against the use of wet farming because it was risky and vulnerable to rain shortages. However, this problem was overcome by the development of irrigation systems in the late eighteenth and nineteenth centuries, which was accompanied by an important institutional transformation of the traditional serfdom regime under the rule of the *yangban*. *Yangban* was mandarin-like gentry with bureaucratic backgrounds in the dynasty and they “owned” *nobi* (serfs) as the objects for inheritance and sale (an authoritative study of the late Chonson Dynasty by Palais 1996 thus translates *nobi* as the slaves). This regime gradually evolved into a family-based regime of peasant cultivation through the upward mobility of commoners and *nobi* to higher social status. It was made possible by the “discovery” of family lineage records by commoners and even *nobi*, on the basis of which they purchased free status from the government. By the mid-nineteenth century the proportion of local *yangban* is estimated to have become close to a majority of the local population. See Aoki (2001) pp. 55-58 for a comparison of Japan and Korea in terms of history vs. ecology in institutional evolution in the M-phase.

<sup>21</sup> The only customary exception to the equal division among sons was to set up lineage trusts, especially in the form of land ownership (e.g., Ruskola, 2000; Zheng, 2001). This practice obviously was for avoiding the minute division of kinship wealth and for preserving it in perpetuity. This exception was legitimized as fulfilling the responsibility of ancestral rites that was consistent with the orthodox legal tradition. However, most farming households were too poor to place land as a perpetual trust.

<sup>22</sup> Shang Yang, a legalist philosopher and chief advisor to the Shi-huan-di of the Qin dynasty who founded the basic structure of succeeding dynasties for two millennia, made a rule that male adults should not live together under a single roof, of which violation was to be penalized by double taxation.

networks of leasing contracts evolved within and across villages and these contracts were “sold and bought like stocks” even without the knowledge of the peasants cultivating the transacted plots. However, tax obligations were placed on the owners, some small and some large. How, then, were rental contracts and tax obligations enforced?

In this regard, organizations called the landlord bursaries (*zuzhang*) active in the late Qing and early Republican periods in the advanced Jiangnan region are illustrative. The workings of these organizations were documented and analyzed in a book of some 700 pages by Muramatsu (1970) who examined numerous private land-lease contracts and their enforcement records housed at the Harvard-Yenching Institute, Japan’s National Diet Library, Toyo Bunko Library and so on. As his study appears to be relatively unknown to non-Japanese readers, I take it up here as illustrative of a prevailing feature of contract-enforcement mechanism in China’s M-phase.<sup>23</sup> These organizations acted as agents for multiple landlords who owned large numbers of small plots of land widely scattered and mutually intermeshed. They collected rents from hundreds, sometimes thousands, of peasant tenants, paid taxes to magistrates and received fees for these services.<sup>24</sup> They were normally created by, and served, gentry families, but also entrusted by other landowners even of different clans. Thus, although family metaphors and ancestral rites were often invoked to perpetuate their activities beyond a single generation and to be politically correct, they may be considered to be a quintessential example of corporations *a la* Chinese style, or what Ruskola (2000) calls a clan corporation.”<sup>25</sup> Namely, landlord participation in them was voluntary rather than natural kin-groups based; members drew the benefits of a steady stream of rents from their activities that otherwise would be costly to secure; they were perpetual beyond the lifespan of any natural person; and they internalized administrative structures independent of particular persons. They were even equipped with a small army of the physically strong to literally enforce rent payments, while relying on the legal/physical

---

<sup>23</sup> A brief English summary of his research is found in Muramatsu (1966), which pointed out that the same institutions had been studied in Fei (1939/1946) under the name of a “rent-collecting bureau,” which I have not yet had a chance to read. There are brief references to the Muramatsu’s article in Perkins (1969), p.102, Feuerwerker (1980, 1983/1995), p.25-6, 35, and Zelin (1986). Also see Eastman (1988), p.78n.

<sup>24</sup> According to Muramatsu (1970), about 20 – 30 percent of rent revenues were paid as taxes, 10 percent to the bursary as a fee, and the remaining 60-70 percent were to landlords in the late nineteenth century. However, the share of landlords started to decline dramatically after 1920, while tax shares went up (pp.31-43). For this, see also Perkins (1975), p.124.

<sup>25</sup> Although Ruskola basically applies this concept to the lineage (ancestral) trusts, his elaborate legal analysis of their nature can be even more forcefully applied to the landlord bursary. He describes this notion as follows: “clan corporations’ vehement insistence on kinship as its organizing principle did not mean that they were ‘just’ family affairs. Rather, kinship was often a finely wrought legal fiction that legitimized the existence of private enterprises by profit-seeking individuals in a state in which Confucianism was the official orthodoxy”(2000:1617-8). He provides evidence that in the case of ancestral fund ownership interests were even transferable. Also see Zelin (2009) and Zelin *et al* (2004) for the critical role of contracts and property rights, not necessarily kinship-based, in Chinese development.

assurances of the magistrates, whenever there was a need to punish rent arrears and settle contract disputes on their own behalf.

There were thus strategic complementarities between dynastic administration and the landlord bursaries. For the Qing dynasty of nomad origin that had only a weak power basis in the rural areas,<sup>26</sup> endorsing/assisting the (coercive) enforcement of private contracts by the latter was a way to secure tax collection. On the other hand, the large landholders were able to legitimize the forceful collection of rents by acting as quasi-public agents to collect for the dynasty.<sup>27</sup> Although I draw on this case from the rural economy, essentially the same practices appeared to have prevailed in the domain of commerce as well. For example, they may be considered to correspond to what some Sinologists call “the brokerage concept of administration”: the governments’ use of local-elite leadership as brokers to solve regulatory problems with limited government resources.<sup>28</sup> In order to pursue this line of argument below, let me use the word corporate body in reference to any organization in perpetuity either in political or business.<sup>29</sup> In recognizing the interpenetration of the state and intermediate corporate bodies of property owners as an important element of M-phase institutional arrangement, one question arises. As I noted, there were extensive contractual relationships among small peasant families as well who were not able to rely upon such quasi-public mechanisms. Then, how were private contracts among those enforced? An answer to this question may be more sharply highlighted in a comparative perspective. With this in mind, let me now turn to the contemporaneous scene of Tokugawa Japan.

The administrative structure of Tokugawa Japan was composed of about three hundred, semi-autonomous *Han* governments with the Tokugawa-*Bakufu* government at the apex of the structure (*Baku-Han* regime). In my view, the nature of this construct can be characterized more as a quasi-centralization or as a quasi-coalition than as that of a rigidly centralized hierarchy, although there was no exit option for any *Han* government from the structure. There are two aspects to this. First, the power of the *Bakufu* vis-a-vis the *Han* was based only on the threat of terminating the jurisdiction of any *Han* government in the case of serious judicial offense to this political order. Such penal actions were actually exercised in only a few minor cases. On the other hand, each *Han* had exclusive rights of collecting a fixed amount of the tax set in terms of quantity of rice from each village under its jurisdiction. Otherwise, the *Bakufu* was not to intervene in the internal affairs and rules of *Han*, while in turn the *Han* were not to intervene in the internal affairs of villages, as long as village’s collective tax obligations

---

<sup>26</sup> According to Hsiao (1960: 50), there was only one district magistrate per 250,000 people.

<sup>27</sup> In the northern China the magistrate and the village were in more direct contract (by the reason as suggested in note 18), which had an important implication for the transition to the Phase-G.

<sup>28</sup> See, for example, Duara (1988: Ch.2), Eastman (1988; Ch. 6).

<sup>29</sup> Aoki (2011) provides the following generic definition of corporations: “Corporations are voluntary, permanent associations of natural persons engaged in some purposeful associative activities, having unique identity, and embodied in rule-based, self-governing organizations” (p. 4). It discusses varied substantive forms incorporating this generic property that co-evolve with specific social and political institutions.

(*mura-uke*: village contracts) were met. Landownership by farmers was registered with the self-governing village office (*mura-yakuba*), and transactions on farmlands were in principle possible only within the village, and not beyond the border of the village.<sup>30</sup> Property rights disputes within the village were legally appealable to the magistrate's office (*daikansho*), but in practice they were resolved within the village through the mediation by the influential household heads who served as village officials.<sup>31</sup> The separation of samurai power from the village and the quasi-coalitional governance structure may be considered as a stable geopolitical solution to the century-long Warrior period (1493-1615) in which fierce competition for political hegemony had been waged among rural-based samurai powers in relatively smaller geographical arena.

By being in the position of residual claimants after the payment of the collective tax obligations, village members had common interests in building and sustaining farming infrastructure, such as irrigation networks for wet farming and mutual help in farming activities, etc. To control freeriding over collective efforts, a strict social norm of compliance in cooperative actions was imposed on member households with the threat of social ostracism for deviants.<sup>32</sup> This institutional arrangement was facilitated and made effectuated by making the households the basic unit of economic and political life in the village, and primogeniture became the inheritance norm.<sup>33</sup> This practice encouraged the outflow of non-heir sons to neighboring cities, which contributed to the growth of world-class cities in the eighteenth century.

The difference between China and Japan in terms of state-peasant relationship had parallel impacts on the mode of trust relations among peasants. The kind of norm that evolved in the context of the village in Tokugawa Japan, as noted above, may be characterized as *categorical*, in that mutual obligations and trust were directed towards all the members in the village and only towards them. Membership in the village defined the necessary and sufficient conditions for the applicability of a norm of cooperation and mutual monitoring. Categorical norms and quasi-centralized governance may be then considered to be institutional complements.<sup>34</sup> The village tax-contracting system promoted the incentives for member farmers as residual claimants on the one hand, while peer monitoring among member farmers within the village made tax collection secured for the governments on the other hand.

In contrast, in the Chinese villages where the turnover of ownership of farmlands was frequent and mobility across socio-economic strata was fluid, collective interests encompassing all members of the village were comparatively more difficult to evolve.

---

<sup>30</sup> Toward the end of Tokugawa period, some farm lands were placed as collateral for farmers' loans from urban merchants and in the case of contract default de facto ownership was transferred to the latter in spite of repeated ordinance by the *Bakufu* government to prohibit the practice.

<sup>31</sup> Ishii (1966), Watanabe & Gomi (2002)

<sup>32</sup> For this see Aoki (2001), Chapter 2.2.

<sup>33</sup> The *Bakufu* issued several ordinances restricting the division of small-sized farmland by individual farmers in the late seventeenth century and thereafter.

<sup>34</sup> For the concept of institutional complementarities, see Aoki (2001), pp.225-229, 267-274.

Yet, there were certainly needs for horizontal economic relations among peasants in terms of mutual help in farming and household affairs, money-lending in times of need, and even land-leasing in response to idiosyncratic family circumstances. Reciprocal relationships accommodating these exchanges had to be strategically supported by mutual investments in individual social capital among those having potentially common concerns and stakes. Further, to make such specific reciprocal relationship enforceable and credible, they needed to be monitored by third parties who themselves were a part of the linkage of such relationships. The mode of trust relations that embeds private contracting within a specific network of people may be characterized as *selectively constitutive*, in contrast to categorical. Unlike the norm of categorical trust, it needs to be constructed pro-actively by individuals. From a comparative perspective, I posit that such reasoning can reveal the essential nature of the so-called *guanxi* (social relations in Chinese).<sup>35</sup> Both categorical and selectively constitutive trust relationships are conceptually contrasted with the notion of generalized trust based on the expectation of unspecified obligations of reciprocity in a population and supported by the internalization of norms.

*Guanxi* is often regarded as essentially kinship-based, downplaying the strategic aspects of its construction through conscious mutual effort to invest in individual social capital. However, kinship is not an assurance of automatic fulfillment of mutual obligations and trust, although the metaphor of kinship is often mobilized to induce and reinforce such obligations and trust. A rich fieldwork on pre-War northern villages by the Mantetsu research group records many telling stories about the declining role of kinship relations in contract enforcement and trust-relations in the village.<sup>36</sup> For

---

<sup>35</sup> For a similar comparative analysis of *guanxi*, see Herrmann-Pillath (2010). The terminology “categorical” is due to him (in his case “categorical collectivism”). There is an on-going controversy among anthropological Sinologists as regards whether *guanxi* is emotion-based or strategy-oriented (e.g., Gold *et al*, 2002). However, they do not need to be considered as mutually exclusive. From an inter-disciplinary comparative institutional perspective, trust relationship may be theoretically conceptualized more broadly than the reputation effects in the economic transaction domain. Suppose that agents in a particular domain of the societal game (e.g., a village, a population) exchange social symbols such as words, gestures, gifts, help, etc., in order to impact on others’ emotional payoffs (*ganqing* in Chinese). If one does so with the expectation of reciprocity from others, then such actions may be regarded in the reduced form as investment in one’s own individual social capital. As evolutionary biology indicates, the human being is innately endowed with the capacity to infer others’ intentions and their behavioral consequences that other species do not have. Also, as recent neuro-scientific research confirms, there are trade-offs between emotional payoff and material/hedonistic payoff, as if “neuro-currency” (Montague and Berns 2002) is being circulated in the network of neurons within the individual brain (e.g., Fehr and Camerer 2007, Izuma *et al* 2008). People may then refrain from freeriding on others’ collective efforts or pursuing exclusively self-interests at the expense of others in economic exchanges, if they feel they will depreciate their own social capital in doing so. Thus social norms and trust relationships may evolve as an equilibrium outcome of the linked games between the domains of social-exchange and other societal exchange, embedding and regulating actions in the latte (Aoki 2010, Chapter 3 and 4).

<sup>36</sup> Voluminous surveys of northern and east-central China villages, the *Mantetsu Survey*, were conducted between 1935 and 1942 by researchers of the Northern China Economic Research Institute of the South Manchuria Railroad Company (Mantetsu), the largest Japanese company that was instrumental in Japan’s imperial rule. Mantetsu contributed a quarter of the Japanese government’s tax revenues in the 1920s

example, even between a mother and a son, leasing had to be collateralized: if her son did not have money, the mother would rather lease her plot to another, even if he was of different lineage, and so on. Such observations clearly indicate that the culture of contracts was strongly solidified and prevailed widely.<sup>37</sup> What kinship could do was to provide better information about farmers' interlocutors within which contracts took place; it also provided a sanctioning mechanism for defectors. So it is not surprising that contract existed within the context of extended kinship. However, it did not guarantee that transactions would occur; it simply provides a more favorable context within which to negotiate a contract.<sup>38</sup>

I have discussed representative institutional arrangements in the M-phase of China and Japan in terms of state-peasant relations (taxation on farmlands) and norms regulating agents' behavior. Let me recapitulate their essences. Chinese farmers did not have a beneficial access to the quasi-statist corporate body (such as the landlord bursary), but they strategically substituted *guanxi*-embedded private contracting for it (and for the neutral state that did not exist). On the other hand, the large property owners were able to strategically link an access to such a body with mutual investments in their own *guanxi* so that payoffs from each of them were reinforced. Thus, the vertical and horizontal relations together weaved social fabric in intricate manners. In Tokugawa Japan, on the other hand, the samurai bureaucrats who resided in the Baku-Han capital cities and the peasants in the villages were separated physically, socially, and legally from each other. As a consequence, the village contracting system (accordingly, the quasi-coalitional political governance) and the categorical norms of cooperation in the village evolved as complementary institutions. These differences in the strategic nature of M-phase institutional arrangements was, as already noted, in collective responses to irreversible historical and geopolitical conditions prevailing then in China and Japan respectively. How would they in turn leave their traces on subsequent institutional trajectories?

I mentioned that the initial phase of the post-Malthusian stage in East Asia is characterized by strong government intervention in industrial capital accumulation. This is the theme that was extensively discussed in the development literature in the past.

---

(Young 1999). The teams of researchers that included ex-Marxists students and later-to-become-respectable-scholars recorded voluminous interviews with farmers, county chiefs, tax-contractors, policemen, and so on, without interviewers' opinions. About forty years later, some of those sites were re-visited by Huang, then a Stanford researcher, and he confirmed the reliability of the survey in spite of its undeniable intelligence-gathering aspects and described agrarian development between the two periods in his own book (1970). He includes a detailed description and critical assessment of the *Mantetsu Survey* in this book, pp.34-43.

<sup>37</sup> For the important role of privately enforced contracts in Chinese development vis-à-vis kinship ties, see Muramatsu (1949/1975), Ruskola (2000), chapters in Zelin et al (2004).

<sup>38</sup> In passing, I speculate that kinship may have provided a much stronger basis for trust relations in Korea than in Japan and China. Categorical norms may be comparatively harder to evolve when the members of the village are less homogenous (cf. note 18), while the fast and early mobility of peasants family members out of the village (cf., note 12) may make credible information sharing and monitoring relatively less costly within a kinship group (and also possibly among people who have the same home village).



However, even in England where the transition is considered to be more privately motivated and driven, the role of government was not negligible in her own style.<sup>39</sup> So I pose a question as to how the institutional differences in the M-phase between China and Japan cast path-dependent shadows on the mode of government's role in transition to the G-phase in guise of institutional change. The literature of economic history has established that handicraft manufacturing and production of various cash products developed in rural economies of Japan and China to an extent not inferior to Western Europe as late as 1750 (e.g., Tanimoto 1989, Pomeranz 1993, 2000, Clark 2007). But from there a factory-based production system did not evolved in a way to move the industrial revolution in the sense referred to in the beginning. In China, when merchants who intermediated market transactions became wealthy, they were more interested in human capital investment to achieve the status and prestige of the scholar-official class, spending on conspicuous and cultural consumption and investing in money-yielding farmland and lending. In Japan, the nature of quasi-centralized state that separated samurai-bureaucrats, farmers, handicrafters and merchants as distinct social strata prevented anyone from combining talents for industrial development. Thus, when Western technology that fit the factory system became exogenously available as a potential threat to the independence of the state and the integrity of the society, its actual adoption called for a transformation in the substantive form of the state.

This transformation might have been comparatively easier in Japan because of the quasi-centralized, quasi-coalitional nature of the Tokugawa political regime. It took the form of the take-over of the state by lower-class samurai-bureaucrats of four Han (eventually two after a civil war between them), by making the restoration of Emperor's rule as a legitimizing device. The new Meiji government abolished the *Baku-Han* quasi-coalitional regime and attempted to centralize administrative functions, formerly encapsulated within each *Han* government, to promote the formation of integrated national markets. It decreed that ownership of land (including farmland) be registered at the national registry, and any dispute over property rights and breaches of contracts be settled by the courts according to law. In lieu of the village contracting system, farmland taxation was fixed in monetary terms and imposed on individual landowners. However, these seemingly market-oriented reforms gradually generated unintended consequences under the pressure of categorical norms still prevailing at the village level.

Farmers of small landholdings were exposed to deflationary pressure in the early 1880s, which resulted in an increase of the proportion of tenancy lands from 20-30 percent in the 1880s to more than 40 percent in the 1890s.<sup>40</sup> Those who amassed landholdings tended to become absentee landlords like their contemporaneous

---

<sup>39</sup> For example, the enactment of the Joint Stock Companies Act 1844 allowed incorporation to be organized by the mere act of registration without getting a special charter, which led to the development of corporate market economy (Ahlering & Deakin 2007, Aoki 2011). See Pomerantz (2000) for a noteworthy comparative view on the role of "visible hands" in the transition from the Malthusian phase to the industrial revolution in the West.

<sup>40</sup> Western scholars often erroneously believe that the absentee landownership was historically dominant since the Tokugawa period, but this was not the case.

counterparts in China. However, in order to legitimize the rent-capturing positions, they tried to rely on the traditional norms rather than a corporate body of their own, like the landlord bursary in the M-phase of China. In exchange for the provision of village collective goods, such as schools, festivals, scholarships for able children of farmers and the like, they made use of the norms of membership duties among tenant peasants to secure their rent payments. As already noted, between the Meiji Restoration and the end of the WWII, the number of agricultural employment remained constant at 14 millions, reflecting the continued practice of primogeniture and the social norms of mutual monitoring among households. Hayashi and Prescott (2008) estimates the economic effects of the restraints on the free mobility of labor out of agriculture cost 40 percent of per worker industrial output during the period, blaming the Confucian-spirited civic law imposed by the Meiji government (actually it emulated French civic law).

From the 1930s on, the position of absentee landlords became increasingly encroached upon by market forces as well as by government policies to protect peasant farmers to ensure the security of the food supply and societal stability. This tendency culminated in the post-war Land Reform that redistributed the ownership of all farmlands to farming households. By securing property rights in land ownership, farming households were able to choose their working hours in agriculture and elsewhere on the basis of economic calculations, paving the road to the K-phase. The new generation of farm households left the rural landscape behind and joined corporate organizations in the cities after their schooling. As well known, the mode of the categorical norm of cooperation was transplanted into these new work environments, contributing to the high growth of per worker output during the K-phase and the heyday of the H-phase. Later I will touch on its eventual consequences in the face of transition to the PD-phase.

In contrast, the transition to the G-phase in China was not so smooth because of the nature of its political state in the M-phase. The late Qing dynasty made some efforts to adopt a kind of bureaucratic-led industrial policy, such as promotion of merchants-managed firms under bureaucratic supervision (*guandu shangban*), establishment of government-business joint enterprises in arsenals, shipyards, and so on (*guanshang heban*) as well as to invitations to merchants (*zhaoshang*) to engage in the transportation of the products of government monopolies such as salt.<sup>41</sup> Some of these became profitable when managed by able bureaucrat-business persons, but most of them were short-lived. After the collapse of the Qing dynasty, there was a brief period when private businesses were emergent. However, military groups, political and imperial powers soon began to compete for their political control over the commercial and industrial domains. By 1947 the Nationalist government came to control more than two-fifths of total industrial production by the return to the tradition of *guandu shangban*. But their control over rural areas did not develop in such a way as to mobilize resources from there for industrial development. The Nationalist government gave up the land tax to the Provincial governments. The provincial governments then

---

<sup>41</sup> For business management of companies under these industrial policies, see Fuerwerker (1958), Eastman (1988: chaps. 7, 8), Zelin (2009).

subcontracted land tax collection to county chiefs whose positions were occupied by ex-gentry or new rural elites who had *guanxi* with military elites in the Provincial governments. After fulfilling the negotiated contractual obligations to the Provincial governments, the county chiefs were able to claim the residual of the collected taxes, which motivated them to squeeze the share of landowners' rents including those for the small landholders by the use of police force.<sup>42</sup> Thus, the basic structure of the interpenetration of weak state power and private interests of strong intermediate corporate bodies (in this case, county governments) remained in a manner analogous to the M-phase.<sup>43</sup>

The G-phase finally came to be institutionalized in the form of the People's Communes in the late 1950s posterior to a brief episode of the egalitarian land reform after Revolution. Apart from its political and ideological connotations, economic relationships between the government and 120 million rural households were made direct with the People's Communes as the exclusive intermediary bodies.<sup>44</sup> This was in essence the wholesale incorporation of rural households at the expense of the traditional culture of private contracting. In this way, economic and demographic features of the G-phase transpired à la Chinese. Material resources for industrial accumulation were extracted from the agricultural sector through direct agricultural taxation and state-monopoly procurements and then invested in state-owned enterprises, another types of intermediate corporate bodies, in the form of direct subsidies and price-controls

On the other hand, the exit of farmers from agriculture was restrained by the mandatory membership requirements (*hukou*) in the commune. Their incomes were basically determined not by their marginal products but by per worker output (with some differentials) after tax payments to the government and various collective investments. That might be one of the important incentive reasons for the hike in fertility in the 1960s,<sup>45</sup> of which unintended consequence was a demographic gift to the next K-phase. Further, the collectivization of farming made social relations among peers at the level of the production teams (with an average size of between twenty to thirty households) relatively more inclusive rather than selective. This made possible all-inclusive collective actions such as the adoption of new crop varieties and chemical fertilizers, investment in water control, tractor plowing, and so on, which were not possible during the previous transitory phase. Indeed, between 1970 and 1977, per worker output in the A-sector increased by a compounded annual rate of 2.32 percent,

---

<sup>42</sup><sup>42</sup> The *Mantetsu Survey* on land tax collection at the county level is extensively cited in Muramatsu (1949/1975: 137-45), according to which the expenditure for the police force in a representative county of Shandong province amounted to one-third of land tax revenue in 1941. Huang (1985: p277) also reports that expenditures for police and military guards in one county of Hebei province exceeded 60 percent of its official budgets.

<sup>43</sup> This statement excludes any consideration of communist-controlled China during the period.

<sup>44</sup> See J. Lin (1994). For the political aspects of People's Communes, see Wu (2005), Chapter 3.

<sup>45</sup> Total fertility rate rose as high as 7.5 percent in 1963.

in comparison to stagnant a 0.21 percent in the I-sector.<sup>46</sup> Thus a stage for the transition to the K-phase was set. The actual onset of the transition was triggered by the restoration of private contracting, not by political design: that is, experiments at the village level to contract out the collective obligations of tax payments to member households through the subletting of village-owned plots to them. Indeed, to quote Professor Jinglian Wu, “Chinese reform started from the village, from the bottom, and we may even say that it was the invention of farmers themselves.” (Wu. 2007: p. v)<sup>47</sup>.

I have already referred to the quantitative achievements after the transition to the K-phase. While impressive performance in terms of GDP per capita growth has been making since then, various institutional issues have been presented and many of them have been responded in ways that facilitate growth. Presently, institutional reforms in the areas of inequality, real estate, labor shortage, local finance, and so on are becoming widely and earnestly discussed to make the compounded transition to the H-phase and to the PD-phases facilitated and secured. Obviously, I am not qualified to add anything substantive to the debate among Chinese economists. Let me briefly touch on, however, how the framework that I have been presenting might be relevant. Specifically, I wonder if aspects of those issues are interrelated in a manner inherent to the crucial question of relationships between the state, intermediate corporate bodies, and people in a new guise. As representative intermediate corporate bodies, we may think of local governments and state-owned corporations, but I will focus on the former.

In the last twenty years or so, massive migration from the A-sector to the I-sector has occurred in the form of the so-called “floating population” amounting some 200 million people and will still be occurring. The 2007 Property Rights Law stipulates that the farmers’ contractual use-rights to village-owned farmland are extendable up to 30 years, and includes the rights to lease and sell the rights. Thus, de facto ownership rights appear to have been endowed to households with rural *hukou*. The important of this can be confirmed in the light of comparative perspective, as suggested by the case of post-WWII land reform in Japan. Yet, the households who now reside and work in the urban areas but still have rural *huko* (household registration) may find the opportunity costs of selling the subcontracting rights to be too high. First, their employment opportunities, social security packages including those for their parents remaining in rural areas, equal opportunities for children to proceed to higher education, and so on are not secure enough, even though there have been notable improvements in certain respects, especially in the big cities. Second, opportunities for farmers to realize capital gains from the sale of the contractual use-rights may be limited in practice, because markets may be under de facto monopsonistic control of local governments. Indeed, a large share of fiscal revenues of local government amounting more than one-fifth of the total are financed by the development surplus realized from their acting as local

---

<sup>46</sup> The rather large contribution of structural transformation in this period reported in Table 1 reflects this relative increase in per worker output in the A-sector rather than emigration from the A-sector to the I-sector.

<sup>47</sup> See Wu (2004/2005), chapter 3 for detailed historical descriptions and economic and political analysis of the household contracting system. Also, Lin (1993) is an important contribution to this subject.

monopsony vis-a-vis farmers, while selling use-rights of land to urban developers through auctions.

But there is a cause to it. Local governments have constitutional obligations to provide social security and social protections in the areas of health, education and the like to people with *hukou* under their jurisdiction. On the other hand, their fiscal basis became seriously squeezed through the public finance reform in the 1990s to make integrated national markets by centralizing revenues from value added taxes and income taxes. In that sense, the origins of China's real estate boom may be considered to be partially fiscal rather than purely financial. However, the responsibility of local governments to provide welfare benefits will increase as the population ages. Particularly, the 1960s baby-boomers who remain in the rural areas may find it increasingly difficult to migrate because of their age and skills. Who will care for them after ten years or more? The prospective transition to the PD-phase may make the scope of kinship in social protection diminished.

Thus, the challenge that China is facing is compounded: it is not only an intermediate corporate body problem inherent in tradition, nor is it only labor and housing shortage problems emerging out of the Lewisian turning point from the K-phase to the H-phase, nor is it only a question of how local governments can finance equitable welfare programs to cope with the coming of the PD-phase "before China becomes affluent" (Cai and Wang 2006). Indeed, all these issues are mutually interrelated, for which solutions need to be complementary as well as path-dependently viable. They are newly emergent problems, but at the same time uniquely traditional problems in that the role of intermediate corporate bodies (in this case, local governments) between the state and people is the underlying issue.<sup>48</sup> These problems can be therefore solved gradually by the wisdom of the Chinese people, not over night by a mere emulation of Western style rules.<sup>49</sup>

*Guanxi* will continue to play an indispensable role supporting the social fabric in the process of searching for a solution, while it will adapt its substance in linkage to economic and demographic changes that will unfold in the process. It is hard to predict how this traditional institution will evolve. But one thing appears to be clear. As kinship relationships decline in its scope, the constitutive nature of *guanxi* as trust-relationships

---

<sup>48</sup> Qian & Weingast (1995) also focuses on provincial governments as a positive driving force of growth in the China's development prior to a fiscal system reform in the mid 1990s. See also Li & Zhou (2005).

<sup>49</sup> One solution could be to allow the migrating households to enjoy the full benefits of urban citizenship in exchange for the sale of subcontracting rights to farmland, if they so choose. Capital gains from sales of subcontracting rights may be taxed to finance part of the fiscal obligations of local governments. Also, as the zoning of farmland is desirable to secure food supplies and to prevent disorderly private development, the role of local governments in regulating real estate transactions will remain indispensable in one way or another. Then, one of the crucial questions is, as publically well-recognized, how to make relationships efficient, fair, caring, and transparent between farmers and urban citizens, on the one hand, and provincial and county governments on the other. For this, it appears to be crucial to design the tax system in the areas of property rights, social security, inheritance and so on, as well as fiscal transfer scheme between the central government and local governments, to make the latter fiscally viable under transparent rules. Cf. Cai & Wang (2006, 2008), Tao & Shi (2010) for related proposals.

will further transpire. According to a demographer's estimate, the size of the typical kinship network has fallen to about 10 percent of what it was a few decades ago (Tuljapurkar, 2010).<sup>50</sup>

Let me switch back to Japan. The challenge of how to adapt the substantive forms of institutions to emergent situations is not simple for Japan either. The two features I have extracted as the inherent nature of Japanese institutional arrangements, quasi-centralized nature of governance and categorical norms, still permeate the ways societal games are played in contemporary contexts. They manifested themselves most dramatically in the recent March-11 disaster. When the natural disaster of the earthquake and tsunami shook the North East Coast of Japan's main island, four nuclear reactors at Fukushima Daiichi Nuclear Plant of TEPCO shut down automatically in seconds. The reactors were then supposed to be cooled down so that a critical reaction would not be triggered by decay heat. However, soon it became clear that all power sources to the cooling system had been knocked out. The imminent question was who had the ultimate authority and responsibility to decide what to do at this critical moment; but this was not clear to anybody. Between the Prime Minister's Office, safety regulators, TEPCO's top management, and the plant manager, there were continual exchanges of words, mutual guess-work and suspicions about others' intentions, hesitations on taking action, unwillingness to disclose unfavorable information, and so on. Very soon, meltdowns in the reactors and subsequent hydrogen explosions occurred, as the opening of the vent valves to release pressure built up in the reactors was delayed, perhaps because of the lack of preparation as well as by hesitation to do so. The whole picture of the situations has yet to be made clearer. But this episode is telling.

During the Three Mile Island crisis President Jimmy Carter went to visit the site, primarily to calm the public. Although he had been a nuclear submarine officer and had experience with pressurized water reactors, he wasn't there to direct things. The plant manager was given ultimate authority and finally resolved the crisis by opening the vent valves on his own judgment. In spite of major social tensions at that time, the actual radiation emission was kept to a manageable level. When Chernobyl's Water Coolant Reactor exploded because of mishandling by site-engineers, Gorbachev, who was at the head of the chain of command, kept his silence for eighteen days. He eventually sent in 500,000 so-called "liquidators," composed mainly of Soviet Army Reservists, virtually unprotected to shovel off highly radioactive graphite debris. There is still no account of their health status today.

These three episodes, albeit in extremely critical circumstances, are remindful of three prototypes of system models that have been analyzed by economists, system analysts, system engineers, and others. Imagine that systems are composed of multiple modules distinct in their functions, tasks, and so on. Systems may then be distinguished by ways in which the functions/activities of these modules are coordinated: that is, either (1) by open interface rules designed ex ante, while the workings of each module

---

<sup>50</sup> The size of a kinship network is proportional to the square of the total fertility rate (Goodman, Keyfitz, & Pullman 1974). As China's TFR has fallen from 5 to around 1.5 from the G-phase to the K-phase, the conclusion follows

are encapsulated from each other to make the best use of expertise internalized in it as far as they follow the interface rules (open-rule-based modular system); (2) continuous, on-going negotiations among agents in charge of modules on their outputs, while direct interventions in the internal workings of others are mutually refrained from (negotiation-based modular system); or (3) by hierarchical chains of downward commands and upward reports (classical hierarchy).

This three-way comparison of system design, though extremely stylized, may still entail a few important implications. It is well established that the open-rule-based modular system is superior in its self-organizing innovative capacity, because constituent modules can be evolutionarily substituted, added or superseded by improved ones as far as the latter's functions are consistent with the open interface rules.<sup>51</sup> Further, it may have advantage in dealing with large system shocks in the world of complexity, provided that some modules encapsulate highly specialized functions that can be triggered in response to signals indicating emergency. On the other hand, the negotiation-based modular system may be superior in adapting its systemic output performance to mildly changing environments. The classical hierarchy is more economical when the tasks of modules are standardized and the degree of complementarities among them is low. Theoretically, there are various trade-offs in performance characteristics, like this and others, between the three proto-types of system design (e.g., Aoki 1986, 2011, Baldwin and Clark 2000). Although any effective organizations in the real world may be hybrids of the three to varying degrees, it is clear that the quasi-centralized nature of the governance of an organization would have an affinity to the continuous negotiation-based system, if categorical norms are internalized within each task modules.

The March-11 nuclear disaster revealed aspects of comparative weaknesses of the corporate form internalized in TEPCO. They integrate the generation, transmission, distribution, and retail of power as a regional monopoly and have a strong tendency toward the continual negotiation-based system. The seemingly seamless coordination among these varied functions may have performed well in terms of minimizing the risk of power outage in mildly changing environments. But when they faced this severe crisis, negotiated responses among concerned agents failed to contain the impacts of the natural disaster to a moderate level. Even more importantly, the failure of power sources for the coolant system may not have been just the consequence of this natural disaster of a magnitude beyond human imagination. Warnings of possible disaster of that magnitude had been expressed during the preceding years in official meetings of the government to discuss safety regulations, debates in the Diet, as well as specialists' writings based on research in historical documents and geological engineering findings. Yet, the entrenched group of nuclear specialists within TEPCO and their academic allies had not heeded these warnings, while regulators as well as top management of TEPCO, lacking expertise in nuclear engineering, did not dare intervene. Nuclear energy

---

<sup>51</sup> This property suggests the essence of comparative advantage in the area of industrial innovation of Silicon Valley cluster of venture businesses vis-à-vis the monopolistically integrated old IBM, a quintessential case of the classical hierarchy. For this, see Baldwin & Clark (2000)

specialists share a norm of cooperation categorically specific to their profession. It is telling that this entrenched group is nicknamed the “nuclear power village.”

The March-11 disaster disclosed some essential problems inherent in the Japanese system, political and corporate, in acute ways. At the same time, however, it may suggest a certain degree of hope in direction as well. The Japanese people were calm, orderly, compassionate, and helpful to others when facing this crisis. Thus, norms of trust and reciprocity proved to be extendable beyond traditional categories. And this is what is needed to adapt institutional arrangements to the emergent complexity of the world as well as to the post-demographic transition. The system of social entitlements designed under the stable demographic perspective in the early H-phase is not fiscally sustainable, although government debts are still held almost entirely by the Japanese themselves. Postponing a political solution to this possible crisis of fiscal sustainability only increases the burden on future generations. Further, as European and American responses to the demographic transition suggest, the prospect of aging of the population may not be an inevitable burden to society. Immigration, senior and gender development, reversal of fertility decline,<sup>52</sup> evolution toward a care economy, inflow as well as outflow of foreign direct investment (FDI), and so on can not only mitigate the problem, but may make the coming mature society livelier and richer in diversity, although moderation in per capita income growth may be inevitable. However, in order to make these options viable, various interest groups differentiated by the broad categories of gender, generation, ethnicity, nationality, and such must be accommodated and reconciled in political process. This requires a fundamental transformation of the political institutions shaped in the heyday of the H-phase and firmly embedded in the categorical norms of vested interests. In my view, the fact that Japan has not yet found a practical solution to this is a fundamental reason for the societal stagnation of the last two decades.

Perhaps I have tried to cover too many topics in my talk, for which I apologize. However, I have just wanted to convey several simple points. On one hand, there is commonality of development processes across economies, as the insight of the unified approach to development predicts, so that we can mutually better understand issues involved in development of each other. On the other hand, there are also differences in the onset, duration, and institutional forms of developmental phases. In order to understand this, a comparative analysis of the co-evolution of economy, demography, and institutions is essential. I have tried to illustrate this point using the China-Japan comparison as referential points. There can be one more point on the top of these

---

<sup>52</sup> Myrskylä, Kohler and Billari (2009) show that, using new cross-sectional and longitudinal analyses of the total fertility rate and the human development index (HDI) of the United Nations Development Program, a fundamental change in the demographic transition might have been occurring. Although development continues to promote fertility decline at low and medium HDI levels, further development can reverse the declining trend in fertility. They showed that among highly developed countries, fertility decline may have been reversed, but that the only exceptions to this are Japan, Korea, and Canada. It is noteworthy, however, that the decline in the total fertility rate has been recently slightly reversed in Japan. It rose to 1.39 in 2010 after it hit 1.26 in 2005.



insights, although I do not have enough time and readiness to elaborate on this today. That is, precisely because of differences and varieties in developmental processes, there can be potential complementarities among developmental strategies of economies, which are not possible in a homogenous world. Thus, gains from trade may not be limited to the domain of commodity exchanges but also can be derived in the domains of mutual flow of human beings, organizations, information, and ideas. Scholarly exchanges among us economists also constitute a part of this process, in which the value of a congress like this one lies. I am very much looking forward to learning from diverse views and approaches during this week.

Thank you very much for your attention.

## References

- Acemoglu, D., S. Johnson & J. A. Robinson (2001). "The colonial origins of comparative development: an empirical investigation," *American Economic Review* 91: 1369-1401.
- Ahlering, B., & S. Deakin (2007). "Labor regulation, corporate governance, and legal origin: a case of institutional complementarities," *Law and Society Review* 41: 865-908.
- Aoki, M. (1986). "Horizontal vs. vertical information structure of the firm," *American Economic Review* 76: 971-983.
- Aoki, M. (2001). *Toward a Comparative Institutional Analysis*, MIT Press.
- Aoki, M. (2010). *Corporations in Evolving Diversity: Cognition, Governance and Institutions*, Oxford University Press.
- Aoki, M. (2011). "Institutions as cognitive media between strategic interactions and individual beliefs," *Journal of Economic Behavior & Organization* 79: 20-34.
- Baldwin, C. Y., & K. Clark (2000). *Design Rules: The Power of Modularity*, Vol. 1, MIT Press.
- Becker, G. S., K. M. Murphy & R. Tamura (1990). "Human capital, fertility, and economic growth," *Journal of Political Economy* 98: S12-S37.
- Bloom, D., & J. G. Williamson (1998). "Demographic transitions and economic miracles in emerging Asia," *World Bank Economic Review* 12: 419-55.
- Cai, F., & M. Wang (2006). "Challenge facing China's economic growth in its aging but not affluent era," *China and World Economy* 14: 20-31.
- Cai, F., & M. Wang (2008). "A counterfactual analysis on unlimited surplus labor in rural china," *China and World Economy* 16: 51-65.
- Cao, J., M. S. Ho, D. W. Jorgenson, R. Ren, L. Sun & X. Yue (2009). "Industrial and aggregate measures of productivity growth in China, 1982–2000," *Review of Income and Wealth* 55, Special Issue 1: 485-513
- Chang, J. K., (1969). *Industrial Development in Pre-Communist China: A Quantitative Analysis*. Chicago: Aldine.
- Clark, G. (2007). *A Farewell to Alms: A Brief Economic History of the World*, Princeton University Press.
- Duara, P. (1988). *Culture, Power, and the Modernizing State: Rural North China, 1900–1940*, Stanford University Press.

Eastman, L.E. (1988). *Family, Fields and Ancestors: Constancy and Change in China's Social and Economic History, 1550-1949*, Oxford University Press.

Eggleston, K. N., & V. Fuchs (2011). "The implications of the new demographic transition," preliminary working paper, Stanford University.

Fehr, E., & C. F. Camerer (2007). "Social neuroeconomics: The neural circuitry of social preferences," *Trends in Cognitive Sciences* 11: 419-27.

Fei, H. (1939/1946). *Peasant Life in China*, New York: Oxford University Press

Feuerwerker, A. (1958) *China's Early Industrialization: Sheng Hsuan-huai (1844-1916) and Mandarin Enterprise*, Harvard University Press.

Feuerwerker, A. (1980, 1983/1995). *The Chinese Economy, 1870–1949*, University of Michigan Press (originally published in Volume 11 and 12 of *the Cambridge History of China*, Cambridge University Press).

Galor, O. (2011). *Unified Growth Theory*, Princeton University Press.

Galor, O., & D. N. Weil (1996). "The ender gap, fertility, and growth," *American Economic Review* 86: 374-87.

Galor, O., & D. N. Weil (2000). "Population, technology, and growth: from Malthusian stagnation to the demographic transition and beyond", *American Economic Review* 90:806-28.

Gold, T., D. Guthrie & D. Wank, eds (2002). *Social Connections in China: Institutions, Culture, and the Changing Nature of Guanxi*, Cambridge University Press.

Goodman, L. G., N. Keyfitz, & T. Pullman (1974). "Family transformation and the frequency of various kinship relationships," *Theoretical Population Biology* 5: 1-27.

Greif, A. (2006). *Institutions and the Path to the Modern Economy: Lessons from Medieval Trade*, Cambridge University Press.

Guinnane, T. W. (2011). "The historical fertility transition: a guide for economists," *Journal of Economic Literature*, forthcoming.

Hall, R., & C. Jones (1999). "Why do some countries produce so much more output per worker than others?" *Quarterly Journal of Economics* 114: 83-116.

Hansen, G. D., & E. Prescott (2002). "Malthus to Solow," *American Economic Review* 92: 1205-17.

Hayami, Y., & Y. Otsuka (1993). *The Economics of Contract Choice: An Agrarian Perspective*, Clarendon Press.

- Hayashi, F., & E. Prescott (2008). "The Depressing effect of agricultural institutions on the prewar Japanese economy," *Journal of Political Economy* 116: 573-632.
- Herrmann-Pillath, C. (2010). "Social capital, Chinese style: individualism, relational collectivism and the cultural embeddedness of the institutions-performance link", *China Economic Journal* 2: 325-50.
- Hsiao, K. (1960). *Rural China: Imperial Control in the Nineteenth Century*. University of Washington Press.
- Huang, P.C.C. (1985). *The Peasant Economy and Social Change in North China*, Stanford University Press.
- Ishii, S. 石井紫郎(1966).日本国制史研究-権力と土地所有(*Historical Study of the Japan's State Institutions: Power and Landownership*), University of Tokyo Press
- Izuma, K., D.N. Saito, & N. Sadato (2008). "Processing of social and monetary rewards in the human striatum," *Neuron* 58: 284-94.
- Jones, C. (2001). "Was an industrial revolution inevitable? Economic growth over the very long run," *Advances in Macroeconomics* 1: 1-42
- Jorgenson, D. (1961) "The development of a dual economy," *Economic Journal* 71: 309-34.
- Jorgenson, D. (1967). "Surplus agricultural labor and the development of a dual economy," *Oxford Economic Papers*, 19: pp288-312.
- Kremer, M. (1993). "Population growth and technological change: one million B.C. to 1990," *Quarterly Journal of Economics* 108: 681-716
- Kuznets, S. (1957). "Quantitative aspects of the economic growth of nations II: industrial distribution of national product and labor force," *Economic Development and Cultural Change*, Supplement to 5: 3-110.
- Kwon, TH. (1977), *Demography of Korea: Population Change and its Components in Korea: 1250-1966*, Seoul National University Press.
- Landes, D. S. (2006). "Why Europe and the West? Why not China?" *Journal of Economic Perspectives* 20(2): 3-22.
- Lee, R.D. (1988). "Induced population growth and induced technological progress: their interaction in the accelerating stage," *Mathematical Population Studies* 1: 265-88.
- Lewis, W. A., (1954). "Economic development with unlimited supplies of labour," *Manchester School* 22: 139-91.
- Li, H. & L. Zhou (2005). "Political turnover and economic performance: the incentive role of personnel control in China," *Journal of Public Economics* 89: 1743-1762.

Lin, J. Y. 林毅夫 (1994). 制度技术与中国农业发展 (*Institutions and Technology in China's Agricultural Development*), Shanghai People's Publisher.

Lucas, R. E. (1988). "On the mechanics of economic development", *Journal of Monetary Economics* 22: 3-42.

Lucas, R.E. (2002). *Lectures on Economic Growth*, Harvard University Press.

Maddison, A. (2001, 2003). *The World Economy*. Volume 1: *A Millennial Perspective* and Volume 2: *Historical Statistics*, OECD Publishing.

Maddison, A. (2007). *Contours of the World Economy, 1-2030 AD: Essays in Macro-Economic History*, Oxford University Press.

Montague, P. R., & G. S. Berns (2002). "Neural economics and the biological substrates of evaluation," *Neuron*, 36: 265-84.

Muramatsu, Y. 村松祐次 (1949/1975). 中国経済の社会態制 (*The Societal System of the Chinese Economy*), Toyo Keizai Publishers.

Muramatsu, Y. (1966). "A documentary study of Chinese landlordism in the late Ch'ing and the early Republican Kiangnan". *Bulletin of the School of Oriental and African Studies*, 29: pp. 566-99.

Muramatsu, Y. 村松祐次 (1970). 近代江南の租棧：中国地主制度の研究 (*The Land Bursary in Modern Jiangnan: A Study of Chinese Landlordism*), University of Tokyo Press.

Myrskylä, M., H. Kohler, & F. Billari (2009). "Advances in development reverse fertility declines," *Nature* 460/6: 741-3.

Ngai, L. R. (2004). "Barriers and the transition to modern growth," *Journal of Monetary Economics* 51: 1353-83.

North, D., J. J. Wallis, & B. R. Weingast (2009). *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*, Cambridge University Press.

Ohkawa, K., & H. Rosovsky (1973). *Japanese Economic Growth: Trend Acceleration in the Twentieth Century*, Stanford University Press .

Oshima, H. (1987). *Economic Growth in Monsoon Asia: A Comparative Survey*, University of Tokyo Press.

Palais, J. B. (1996). *Confucian Statecraft and Korean Institutions: Yu Hyŏngwŏn and the Late Chŏnson Dynasty*, University of Washington Press.

Perkins, D. (1969). *Agricultural Development in China: 1368-1968*, Edinburgh at the University Press.

Perkins, D. (1975). "Growth and changing structure of China's twentieth-century economy," in D. Perkins, ed., *China's Modern Economy in Historical Perspective*, Stanford University Press: 115-161.

Pomerantz, K. (1993). *The Making of a Hinterland: State, Society, and Economy in Inland North China, 1853-1937*, University of California Press.

Pomerantz, K. (2000). *Great Divergence: China, Europe and the Making of the Modern World Economy*, Princeton University Press.

Qian, Y., & B. Weingast (1995). "Federalism Chinese style: the political basis for economic success in China," *World Politics* 48: 50-81.

Rawski, T. G. (1989). *Economic Growth in Prewar China*, University of California Press.

Romer, P. (1990). "Endogenous technological change," *Journal of Political Economy* 98: S71-S102.

Ruskola, T. (2000). "Conceptualizing corporations and kinship: company law and development theory in a Chinese perspective," *Stanford Law Review* 52:1598-1729.

Steinfeld, E. S. (2000). *Forging Reform in China: The Fate of State-Owned Industry*, Cambridge University Press.

Tanimoto, M. 谷本雅之(1989) 日本における在来的経済発展と織物業—市場形成と家族経済 (*Indigenous Economic Development and Textile Industry in Japan: Market Formation and Family Economy*), University of Nagoya Press.

Tao, R., & C. Shi 陶然・史晨(2010). "刘易斯转折点悖论"与户籍-土地-财税制度联动改革 ("The contradictory theory of the Lewisian turning point" and the coordinated reform of registration-land-public finance institutions), *CIDEG Policy Research Working Paper Series: 2010A0101*, Tsinghua University.

Teranishi, J. 寺西重郎 (1982). 日本の経済発展と金融 (*Economic Development and Finance in Japan*), University of Tokyo Press.

Tuljapurkar, S. (2010). "How demography shapes individual, social, and economic transitions in Asia," in K. Eggleston & S. Tuljapurkar, Eds. *Aging Asia: The Economic and Social Implications of Rapid Demographic Changes in China, Japan and South Korea*, Brookings Institutions, 35-42. .

Watanabe, H. & F. Gomi, eds. 渡辺尚久・五味文彦編 (2002). 土地所有史 (*History of Land Ownership*), Yamakawa Publishers.

Wu, J. 吴敬琏 (2004/2005). 当代中国经济改革, Far East Publishers. English translation: *Understanding and Interpreting Chinese Economic Reform*, Mason Ohio: Thomson/South Western.

Young, A. (2003). "Gold into base metals: productivity growth in the People's Republic of China during the reform period," *Journal of Political Economy* 111: 1220-61.

Young, L. (1999). *Japan's Total Empire: Manchuria and the Culture of Wartime Imperialism*, University of California Press.

Zelin, M. (1986). "The rights of tenants in Mid-Qing Sichuan: a study of land-related lawsuits in the Baxian archives," *Journal of Asian Studies*: 45:499-526.

Zelin, M. (2009). "The firm in early modern China", *Journal of Economic Behavior and Organization* 71: 623-637.

Zelin, M., J.K. Ocko & R. Gardella, eds. (2004). *Contract and Property in Early Modern China*, Stanford University Press.

Zheng, Z. (2001). *Family Lineage Organization and Social Change in Ming and Qing Fujian*, University of Hawaii Press.

# Corporations:

architecture, governance, varieties

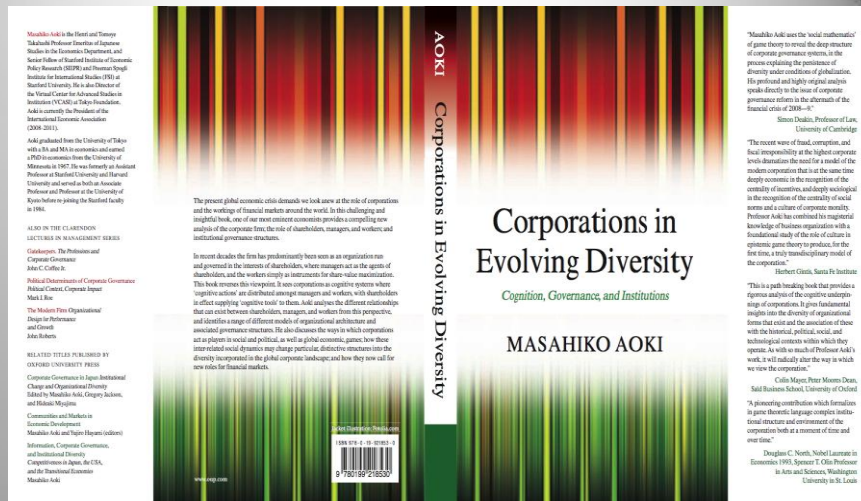
Masahiko Aoki  
Stanford University

## What are corporations?

- The conventional notion of the corporate firm: the nexus of contracts with the shareholders having the residual claimant status cum residual rights of control. Contracts are enforced by the state.
- However, the legal notion of “corporations” as permanent entities historically emerged prior to the birth of modern nation states and business corporations: Roman Catholic Church, universities are created as corporations “for the encouragement and support of religion and learning.” (Blackstone, 18c. )



## More in this book



Corporations are voluntary, permanent associations of natural persons engaged in some purposeful associative activities, having unique identity, and embodied in rule-based, self-governing organizations.

## Basic frame of this talk

- This talk focuses on the aspect of the corporate firm as a system of *associational cognition*.
- It identifies five generic architectural modes of such systems (based on the *analysis of cognitive-assets essentialities*).
- It then derives the fair-efficient-governance structure for each of them as equilibrium (of a *potential game*).

## The Organization as Coalition Cognition

- First, let us consider the simplest model of purposeful cooperation by associational members (coalition) as basis for justifying the “team” approach to the corporate firm.
- The transferable organizational value:  $V = F(x_1, \dots, x_i, \dots, x_N)$
- The payoff of the  $i$ -th agent:
$$u_i(x_i) = G_i(V) - c_i(x_i), \text{ or } 0 \text{ if } x_i = 0,$$
where  $\sum_i G_i = V$ .
- Do the interests of the members of organization coincide? That is, does the team approach to the corporate firm make a sense? If so, when and how?

## When do the coalitional game become a team?

- The game  $\mathbf{u}$  is a *potential game* if there exists a single potential function  $P(x)$  such that

$$P(x_1, \dots, x_i', \dots, x_N) - P(x_1, \dots, x_i'', \dots, x_N) = u_i(x_i') - u_i(x_i'')$$

for all  $x_i', x_i''$  ( $i=1, \dots, N$ ) and for all  $x_j$  ( $j \neq i$ )

- Then, Nash equilibrium of  $\mathbf{u}$  coincides with that of an identical interest game  $\mathbf{P}$  in which every agent has the identical payoff function  $P$ .
- The organizational game  $\mathbf{u}$  becomes a potential game (and thus a team) if and only if  $G_i(F(x))$  is the Shapley value on the game  $\mathbf{u}$ . (Monderer and Shapley 1996).

## Fairness-efficiency norm underlying organizations

- The Shapley value (Nash bargaining solution) is the unique solution arising in a coalition game that satisfies the conditions of symmetry, marginalism, and efficiency.
- It may be the only agreement that would emerge in the original position under the Rawlsian veil of ignorance. As such it represents the deep structure of the fairness norm that everyone actually uses in daily life" (Binmore).
- If games within organizations are embedded in a fairness norm shared by the members of a society, then they become potential games.

## The firm as a system of associational cognition

- Cognitive activities are distributed between the management (M) and the workers (W).
- Physical assets are indispensable as tools of associational cognition. First we assume the unification of M and ownership rights to them (later we deal with the case of separation). However, use-control rights is to be determined endogenously with OA.
- Is W essential to M? Is M essential to W?

## The concept of cognitive-asset essentiality

- $V = F(M, W; R)$  where  $R \in [1, 0]$  is the use-rights control of K ( $R=1$  is the full control by M).
- Can M or W enhance its cognitive capacities only with the use-control rights over K, even if a partner is switched to anyone recruited from competitive markets? (Hart).

$\partial^2 F / \partial M \partial R > 0$ ? when  $W=0 \Rightarrow$  yes, then W is not essential for M.

$\partial^2 F / \partial W \partial R < 0$ ? when  $M=0 \Rightarrow$  yes, then M is not essential for W.

## Varieties of cognitive architecture by distribution of essentiality

MCA \ WCA	Essential	Semi-essential	Non-essential
	Essential	Semi-essential	Non-essential
Essential			Classical hierarchies
Semi-essential			

## Institutional forms

MCA \ WCA	Essential	Semi-essential	Non-essential
	Essential	Semi-essential	Non-essential
Essential	Globally emergent?	Traditional AA	Classical hierarchies
Semi-essential	Traditional SV	Traditional G	
		Traditional J	

## Types of architecture of association cognition

MCA \ WCA	Essential	Semi-essential	Non-essential
	Essential	Delegated hierarchies	Classical hierarchies
Semi-essential	Encapsulated in WCA	Industry-embedding	
		Assimilated	

## Primitive CG (assignment of use-right as team-solution cum equilibrium

MCA \ WCA	Essential	Semi-essential	Non-essential
	Essential	Partial Delegation	MCA (property rights theory)
Semi-essential	Contingent delegation to modules	Joint consultation	
		Sharing	

## Equilibrium governance roles of external finance

MCA \ WCA	Essential	Semi-essential	Non-essential
	Essential	Semi-essential	Non-essential
Essential	Monitoring of long-term V maximization	residual maximization	
Semi-essential	Governing tournament	Co-determination	
		Contingent governance	

## Examples of emergent reciprocity models

- Human-asset-intensive teams (professional organizations)
- Platform-type industrial organizations (e.g., Microsoft, Nintendo, Facebook)
- R&A-type organizations (e.g., Cisco Systems)
- Combination of market monitoring of HRM in depth.
- Ideal nuclear power plants?





## **Session II: Firms in China**



# **“Political Rents and Firms in China”**

*Chenggang Xu* (The University of Hong Kong)

*(Co-authored with Di Guo, B-Y Kim and KunJiang)*



# Political Economy of Private Firms in China

Di Guo, University of Hong Kong

Kun Jiang, University of Hong Kong

Byung-Yeon Kim, Seoul National University

Chenggang Xu, University of Hong Kong and WCU-SNU

*The 19th SJE-WCU-BK21 International Symposium*

Comparative Evolution of the East Asian Firms

Seoul, 3 Nov 2011

## China's Institution and the Party

- The fundamental institution of China is regionally decentralized authoritarianism (RDA) (Xu, 2010)
  - Highly centralized polity through personal control
  - Economic resources and administrative implementations are highly decentralized to local governments
- The core of the nationwide political control is the Communist Party of China (CPC)
  - The legislation, People's Congress (PC) is controlled by the CPC at all levels from the national down to county
  - Appointments of all important posts are controlled by the Party (e.g., CEOs of large SOEs, banks etc.)
- The market reform since 1978 is designed by the Party to legitimize/maintain the Party's ruling position
  - Standard communist ideology: state ownership

## Dramatic growth of China's Private Sector

- Private sector takes off since late 1990s, soon becomes the driving force of China's growth
  - The output share of private sector in national GDP has increased from 2.5% in 1998 to 47% in 2009
- The most drastic change was during 1998-2005
  - Private sector's output was increased by 20 fold in this period
    - In some years the annual growth rate reached 70%
  - Its share in the national GDP was enlarged from 2.5% to 25%
- The corresponding legal/institutional changes
  - Silent large scale privatization since 1997 (the 15<sup>th</sup> CPC National Congress) as a reaction to deep troubles of the state sector
  - Recruit entrepreneurs into the party: Amendment to CPC Constitution, 2002 (the 16<sup>th</sup> CPC National Congress)
  - Legal protection of private property rights: Amendment to the PRC Constitution, 2004

## Dramatic growth of China's Private Sector

Year	Private Industrial Enterprises		Loans to Private enterprises & Individuals	
	Gross Output (mil Yuan)	% GDP	Loans (mil Yuan)	% GDP
1998	2082.9	2.5%	471.7	0.57%
1999	3244.6	3.7%	579.1	0.65%
2000	5220.4	5.3%	654.6	0.67%
2001	8760.9	8.1%	918	0.85%
2002	12950.9	10.9%	1058.8	0.89%
2003	20980.2	15.5%	1461.6	1.08%
2004	35141.3	22.0%	2081.6	1.30%
2005	47778.2	25.7%	2180.8	1.17%
2006	67239.8	30.9%	2667.6	1.23%
2007	94023.3	35.1%	3507.7	1.31%
2008	136340.3	43.1%	4221.2	1.33%
2009	162026.2	47.2%	7117	2.07%

## The Party and the private sector

- Associated with the fast growing of the private sector, the Party faced serious challenges
  - The growth rate of the CPC members in reserve had been negative between 1998 and 2001
- The Party was losing ground in private sector
  - The private sector's share of CPC member declined between 1998 and 2001
- To reconcile, as a response, in year 2000 Jiang Zemin, the Chairman of the CPC declared that the CPC should legitimately recruit entrepreneurs at large scale
  - The CPC constitution was amended accordingly in year 2002
- The party regained the upper hand in private sector since 2003
  - The share of party members among entrepreneurs was increased from 20% in 2000 to 41% in 2006

Year	CPC Members		CPC Members in reserve	
	Total Number (10000)	Growth	Total Number (10000)	Growth
1991	5151.7	2.38%	177.7	
1992	5279.3	2.48%	191.7	7.87%
1993	5406.5	2.41%	193.9	1.18%
1994	5540.7	2.48%	203.1	4.71%
1995	5703.3	2.93%	235.8	16.11%
1996	5873.1	2.98%	251.2	6.54%
1997	6041.7	2.87%	253.5	0.91%
1998	6187.7	2.42%	243.2	-4.05%
1999	6322.1	2.17%	240.1	-1.29%
2000	6451.7	2.05%	232.7	-3.08%
2001	6574.9	1.91%	231.2	-0.64%
2002	6694.1	1.81%	232.4	0.50%
2003	6823.2	1.93%	241.8	4.08%
2004	6960.3	2.01%	259.0	7.10%
2005	7080.0	1.72%	269.3	3.97%
2006	7239.1	2.25%	286.0	6.20%
2007	7415.3	2.43%	294.7	3.05%
2008	7593.1	2.40%	312.1	5.88%
2009	7799.5	2.72%		
2010	8026.9	2.92%		

Moreover, the private sector's share of CPC member declined when private sector was fast growing until 2003

Year	SOE	Private Sector
1991	35.07%	2.78%
1992	34.90%	2.83%
1993	35.22%	2.83%
1994	34.44%	3.20%
1995	34.20%	3.19%
1996	34.01%	3.08%
1997	33.56%	3.00%
1998	32.37%	2.76%
1999	32.37%	2.40%
2000	31.89%	2.29%
2001	32.63%	1.86%
2002	31.88%	1.70%
2003	29.09%	3.08%
2004	28.26%	3.60%
2005	27.95%	3.87%
2006	27.75%	4.15%
2007	27.40%	4.55%
2008	27.17%	4.71%

## Dynamics of political capital & rent creation

- Over the period that the party in private sector experienced down and up, what is the dynamics of rents enjoyed by party members?
  - A significant proportion of entrepreneurs are political elites: in 2010 among entrepreneurs
  - 42% are party members; 22% are PC members
- Dynamics of these political elites' capacities in obtaining rents
  - e.g. bank loans, land, etc.
- The implications of political elites' rents to social welfare
  - With resource obtained under favorable conditions do they perform better than others?



## Factor allocation distortion: Background and literature

- Factor allocation distortion cost China dearly
  - China loses half or more productivity than that of the US due to misallocation of capital and other resources (Hsieh and Klenow, 2009; Song and Wu, 2011)
  - The misallocation of factors in China resulted in a 33% reduction of TFP (Brandt, Tombe and Zhu, 2010)
  - China's growth model relies on low-cost capital and land etc. The big gap between marginal product of capital and capital cost makes China exceptional in the world (IMF, 2011)
- But a concrete mechanism or source of allocation distortion is yet to be identified

## Political capital vs. political rent: Background and literature

- Having politically connected top executives is detrimental to firm efficacy (Fan et al., 2007)
- Political ties is beneficial to firms' obtaining resources and is efficiency-enhancing (Peng and Luo, 2000; Li et al., 2008; Francis et al., 2009)
- Most of the existing literature investigate listed companies, of which most are formally SOEs
- A few existing studies on private firms examines cross-section data in only one year, the changes over time is not studied

## Our major findings

- The party was losing ground in private sector when the sector was at a jump-start stage; but later regained control in this sector
  - From 1995 to 2000, the proportion of entrepreneurs who want to join the party declined sharply
  - The trend was reversed after 2005
- Associated with the party's losing ground, political rent is negligible
  - Firms owned by CPC or PC members do not gain more resources than others before 2005
- Associated with the party's regaining control, political rent becomes significant
  - Firms owned by CPC or PC members obtain significantly more land and bank loans than others after 2005
- Political rent does not contribute to productivity
  - With more scarce resources, CPC and PC member-owned firms do not perform better than the rest for the whole period

## Data

- Four cross-sectional surveys on private sector in China in 1995, 2000, 2006, 2010
  - 1995 Survey: 2869 firms from 160 cities
  - 2000 Survey: 3073 firms from 129 cities
  - 2006 Survey: 3837 firms from 109 cities
  - 2010 Survey: 4624 firms from 158 cities
- Collected by The United Front Work Department of CPC Central Committee, The National Association of Industry and Commerce, and The State Administration for Industry and Commerce
- Data collection: face-to-face questionnaire random sampling survey
- The stratification variables used in stratified sampling scheme
  - The distribution of private firms in provinces
  - The economic development of cities/counties
  - Distribution of the private firms in urban and rural areas within a city/county
  - Distribution of the private firms by industry within a city/county
  - The sampling strategy for the four cross-sectional surveys

### Basic observations from raw data

- The size of firms owned by CPC/PC members is larger than that of other firms in the whole period, the gap is particularly large for the firms owned by the PC members
- The gap of firm size between CPC/PC member owned and that of others has been increasing from 1995 to 2010
  - For CPC members, the gap is increased from 20% to 100%
  - For CP members, the gap is increased from 100% to 200%
- The proportion of CPC/PC members in all entrepreneurs has been increasing over time
- CPC/PC member entrepreneurs are better protected than others from red tapes and corruptions since 2006
  - Before 2006 the difference between the two groups is insignificant

### Summary Statistics: 1995

	CPC Owner			PC Owner			Non CPC/PC Owner			Full Sample		
Variable	Obs	Mean	S.D	Obs	Mean	S.D.	Obs	Mean	S.D.	Obs	Mean	S.D.
Firm_age	468	6.2	4.3	287	8.4	4.2	1896	6.3	4.3	2781	6.3	4.2
State_share (%)	466	1.2	5.4	285	1.0	5.0	1882	0.6	3.7	2766	0.8	4.3
CEO_share (%)	470	89.9	23.0	286	87.7	25.2	1876	92.0	20.5	2764	91.4	21.0
Sales (RMB mil)	180	6.7	1960	99	11.9	2390	886	5.3	1410	1236	5.6	1490.0
# of employee	468	104.0	177.3	293	160.7	224.9	1887	80.7	149.9	2774	85.0	153.2
Equity (RMB mil)	447	2.7	7.1	275	4.8	10.6	1642	2.1	6.3	2681	2.4	6.8
Donation/Profit (%)	426	2.4	3.6	258	2.6	3.4	1646	2.3	3.5	2441	2.3	3.6
Forced Fee/Profit (%)	421	1.8	3.1	253	1.9	3.2	1635	1.8	3.1	2413	1.8	3.1
PR Fee/Profit (%)	428	5.3	6.8	262	5.0	5.3	1664	5.3	6.1	2466	5.4	6.3
ROE	385	0.62	1.19	220	0.68	1.27	1483	0.68	1.34	2167	0.65	1.27
ROA	388	0.18	0.25	219	0.17	0.26	1480	0.21	0.34	2176	0.21	0.32

Summary Statistics: 2000												
	CPC Owner			PC Owner			Non CPC/PC Owner			Full Sample		
Variable	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D
Firm_age	600	10.6	6.3	482	13.0	6.1	1047	10.6	5.9	3022	11.2	6.0
State_share (%)	54	0.3	2.0	47	0.0	0.0	130	0.0	0.0	260	0.2	2.3
CEO_share(%)	486	72.6	30.4	375	75.5	28.8	920	81.0	25.6	2333	78.2	27.7
Sales (RMB mil)	559	18.6	39.8	432	28.2	49.8	991	9.9	26.9	2738	15.9	37.0
# of employees	568	216.3	636.6	456	319.3	730.2	1022	92.5	230.9	2861	171.1	637.2
Equity (RMB mil)	509	9.4	21.3	386	13.7	26.2	935	4.5	12.8	2405	7.8	19.7
Bankloan/Equity	338	0.6	0.9	258	0.7	1.0	526	0.3	0.7	1406	0.5	0.8
Donation/sales	354	0.5%	1.0%	281	0.4%	0.9%	588	0.5%	1.0%	1639	0.5%	1.0%
Forced Fee/sales	302	0.5%	1.0%	223	0.3%	0.7%	550	0.5%	1.1%	1403	0.5%	1.1%
PR Fee/sales	371	1.1%	1.7%	282	0.8%	1.4%	656	1.4%	2.1%	1770	1.3%	2.0%
ROS	473	0.1	0.1	371	0.1	0.1	810	0.1	0.1	2256	0.1	0.1
ROA	339	0.1	0.1	258	0.1	0.1	573	0.1	0.2	1458	0.1	0.2
ROE	422	0.2	0.3	330	0.2	0.3	751	0.2	0.3	1943	0.2	0.3

Summary Statistics: 2006												
	CPC Owner			PC Owner			Non CPC/PC Owner			Full Sample		
Variable	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D
Firm_age	1336	7.4	4.4	696	8.4	4.5	1703	6.6	4.3	3678	7.0	4.4
State_share (%)	1044	0.8	4.9	548	0.6	3.6	1330	0.3	2.9	2828	0.5	3.8
CEO_share(%)	1188	64.5	28.3	630	67.3	26.6	1504	70.2	25.4	3228	68.2	26.7
Sales (RMB mil)	1207	53.9	118.6	656	86.9	145.7	1413	21.4	57.3	3153	39.2	96.8
# of employees	1299	209.1	423.5	688	357.1	548.5	1648	106.0	262.5	3564	157.9	348.7
Equity (RMB mil)	939	12.2	24.6	511	20.6	32.6	1151	7.1	18.6	2498	10.2	22.6
Bankloan/Equity	845	0.7	1.7	457	0.9	1.8	1039	0.4	1.2	2233	0.6	1.5
Land/Equity (%)	1219	9.6	14.7	635	10.8	14.3	1546	6.9	13.7	3317	8.3	14.3
Donation/sales	880	0.4%	1.1%	521	0.5%	1.3%	1029	0.6%	1.3%	2271	0.5%	1.2%
Forced Fee/sales	752	0.5%	1.4%	428	0.5%	1.6%	913	0.8%	2.0%	1975	0.7%	1.7%
PR Fee/sales	955	1.1%	2.5%	532	1.0%	2.5%	1121	1.6%	3.2%	2462	1.4%	2.9%
ROS	1098	0.1	0.2	599	0.1	0.1	1284	0.1	0.2	2857	0.1	0.2
ROE	845	0.3	0.6	471	0.4	0.7	979	0.3	0.5	2173	0.3	0.6

<b>Summary Statistics: 2010</b>												
	CPC Owner			PC Owner			Non CPC/PC Owner			Full Sample		
Variable	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D
Firm_age	1710	8.9	4.5	928	10.2	4.2	1625	7.9	4.7	4291	8.7	4.7
State_share (%)	1357	0.4	3.8	708	0.3	2.8	1364	0.2	2.8	3434	0.3	3.3
CEO_share(%)	1526	61.7	29.5	803	64.3	28.7	1471	67.3	28.2	3801	65.2	28.8
sales (mil)	1696	74.9	182.3	924	122.6	242.1	1595	33.1	114.4	4200	57.8	160.1
# of employees	1754	198.4	381.0	965	320.1	491.8	1639	94.3	255.3	4356	157.2	341.3
Equity	1313	21.8	46.8	709	35.6	59.9	1353	10.1	33.1	3331	17.4	42.5
Bankloan/Equity	1059	0.9	2.5	607	1.1	2.5	1070	0.7	2.0	2635	0.8	2.3
Land/Equity (%)	1486	6.6	12.2	771	8.1	12.8	1430	5.9	12.8	3666	6.3	12.5
Donation/sales	1511	0.6%	1.9%	839	0.8%	2.2%	1437	0.5%	1.4%	3731	0.6%	1.8%
Forced Fee/sales	951	0.9%	2.6%	494	0.7%	2.5%	977	0.6%	2.1%	2312	0.7%	2.3%
PR Fee/sales	1181	1.9%	5.0%	627	1.7%	5.1%	1170	2.4%	6.1%	2879	2.1%	5.5%
ROS	1567	0.1	0.2	863	0.1	0.2	1455	0.1	0.2	3830	0.1	0.2
ROE	1252	0.4	0.8	678	0.4	0.8	1270	0.3	0.7	3128	0.3	0.8

<b>Down and up: Entrepreneurs' perspectives on the Party</b>				
	1995	2000	2006	2010
Is the entrepreneur a CPC member?	17%	19.90%	40.50%	41.50%
Does the entrepreneur want to join CPC if he/she is not a member yet?	23.6%	14.15%	24.48%	48.25%
Did the entrepreneur join the Party before you startup?			84.20%	
Does the entrepreneur regard joining CPC be helpful to improve his/her status?	17.90%	7.80%	35.50%	
Does the entrepreneur regard being a PC member be helpful for his/her status?	33.40%	27.10%	48%	
No. of observation	2869	3073	3837	4624

Entrepreneurs' Perceptions on the importance of being a Party member to their economic status								
	1995		2000		2006		2010	
CPC	-0.129		-0.079		0.015		-0.299***	
	(0.103)		(0.090)		(0.076)		(0.062)	
NCP		-0.751***		-0.332***		-0.574***		-0.634***
		(0.143)		(0.111)		(0.088)		(0.077)
Gender_F	0.474***	0.407***	0.338***	0.372**	-0.029	0.015	0.348***	0.343***
	(0.124)	(0.135)	(0.121)	(0.15)	(0.109)	(0.104)	(0.087)	(0.094)
Edu-cation	0.019	0.052	0.0589	0.204*	-0.245**	-0.198**	-0.262***	-0.281***
	(0.080)	(0.089)	(0.089)	(0.11)	(0.106)	(0.100)	(0.101)	(0.108)
Age	0.010**	0.014***	0.015***	0.014**	-0.002	-0.002	-0.008**	-0.010***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.004)	(0.004)	(0.004)
Firm_age	-0.052***	-0.041***	-0.032***	-0.027***	-0.062***	-0.050***	-0.069***	-0.065***
	(0.010)	(0.010)	(0.006)	(0.008)	(0.009)	(0.008)	(0.007)	(0.008)
Firm_size	1.64E-12	-1.22E-12	-0.000**	-0.000**	-0.000***	-0.000***	-0.000**	-6.1E-07
	(9.50E-12)	(1.05E-11)	(5.7E-06)	(9.5E-06)	(2.6E-06)	(2.4E-06)	(4.4E-07)	(3.7E-07)
N	2148	1776	2458	1544	2527	2738	3521	3016

## From political capital to economic capital Monetary rents enjoyed by CPC/PC members

- No observable extra rents at earlier periods
  - Firms owned by CPC or PC members and other firms were indifferent in borrowing bank loans in 1995 and 2000.
- Substantial more rents enjoyed by CPC/PC members in 2006 and 2010
  - Firms owned by CPC and PC members borrowed significantly more bank loans than those owned by non-CPC or non-PC members
  - Firms owned by CPC or PC members enjoyed significantly higher chances in obtaining bank loans than other firms

OLS Regression on Bank Loans over Total Sales of the Firm						
Bankloans/sales	2000		2006		2010	
EN_CPC	0.483 (0.337)		0.0638*** (0.0213)		0.644* (0.339)	
EN_PC		0.336 (0.450)		0.091*** (0.024)		1.050** (0.428)
Gender_F	0.943** (0.449)	1.442** (0.612)	-0.074** (0.0336)	-0.090*** (0.0316)	-0.266 (0.488)	-0.324 (0.548)
EN_Edu	-0.748** (0.333)	-0.324 (0.451)	0.030 (0.030)	0.029 (0.028)	0.264 (0.556)	0.342 (0.623)
EN_Age	-0.018 (0.017)	-0.007 (0.024)	-0.002 (0.001)	-0.001 (0.001)	-0.014 (0.023)	-0.015 (0.023)
Firm_age	-0.015 (0.023)	-0.041 (0.032)	0.008*** (0.002)	0.007*** (0.002)	0.0537 (0.036)	0.046 (0.041)
Firm_size	-1.29E-05 (1.30E-05)	-3.44E-05 (3.25E-05)	6.93E-07 (5.18E-07)	5.03E-07 (5.14E-07)	-6.93E-07 (1.45E-06)	-7.3E-07 (1.53E-06)
State_share	0.011 (0.021)	0.005 (0.041)	-0.001 (0.001)	-0.001 (0.001)	-0.009 (0.023)	-0.008 (0.029)
Constant	2.601** (1.039)	1.694 (1.509)	0.0669 (0.077)	0.0404 (0.074)	0.282 (1.229)	0.200 (1.389)
N	2502	1560	1993	2143	2454	2191

Logit Regression Whether the Firm Has Bank Loans								
	1995 <span>H1</span>		2000		2006		2010	
EN_CPC	0.095 (0.086)		0.152 (0.096)		0.288*** (0.063)		0.077*** (0.020)	
EN_PC		-0.018 (0.122)		0.935*** (0.135)		0.390*** (0.074)		0.194*** (0.023)
Gender_F	-0.192* (0.116)	-0.136 (0.127)	-0.116 (0.139)	-0.105 (0.170)	-0.248*** (0.095)	-0.295*** (0.090)	-0.068** (0.028)	-0.061** (0.029)
EN_Edu	-0.034 (0.069)	0.023 (0.077)	0.049 (0.094)	-0.037 (0.111)	0.061 (0.086)	0.052 (0.082)	0.032 (0.032)	0.013 (0.034)
EN_Age	-0.007* (0.004)	-0.004 (0.004)	-0.012** (0.005)	-0.013** (0.006)	-0.008** (0.004)	-0.004 (0.004)	0.0006 (0.001)	0.001 (0.001)
Firm_age	0.0002 (0.008)	-0.006 (0.009)	0.015** (0.007)	0.009 (0.008)	0.034*** (0.007)	0.031*** (0.007)	0.015*** (0.002)	0.013*** (0.002)
Firm_size	1.17e-11 (8.09e-12)	1.03e-11 (8.96e-12)	8.66E-05*** (1.89E-05)	5.57E-05*** (2.00E-05)	1.06E-05*** (2.37E-06)	9.92E-06*** (2.39E-06)	7.11E-08 (8.45E-08)	5.34E-08 (8.35E-08)
State_share	0.0181*** (0.004)	0.0160*** (0.005)	-0.045* (0.026)	-0.023 (0.029)	-0.003 (0.003)	-0.003 (0.003)	-2.91E-04 (0.001)	-3.99E-05 (0.002)
Constant	-0.404* (0.227)	-0.427 (0.278)	1.098*** (0.300)	1.834*** (0.393)	0.407* (0.230)	0.255 (0.223)	0.496*** (0.071)	0.468*** (0.075)
N	2097	1735	1353	895	1985	2134	2514	2191

## Slide 22

---

- H1** For 1995, we do not have question on whether the firm has bank loans. the question is what the major ways for financing the investment in infrastructures and fixed assets. We use this as a proxy for the bank loan dummy.

HKU, 10/24/2011

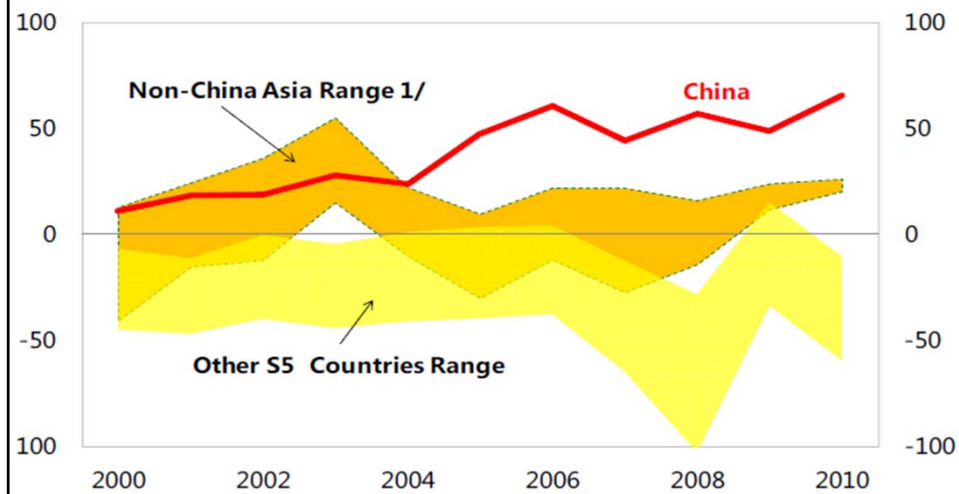


## Imputed "Subsidy" to Capital in China

(In % of the marginal product of capital) (IMF, 2011)

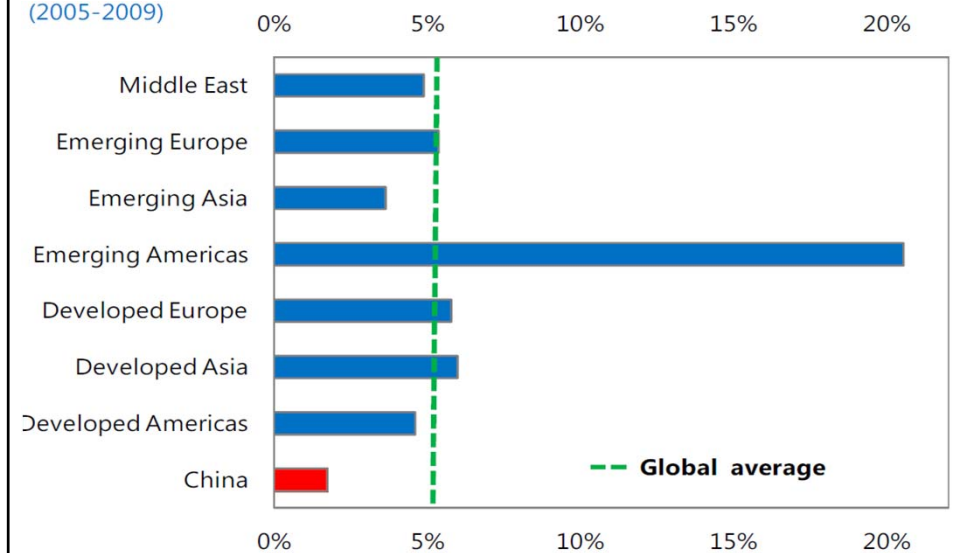
1/ Includes Indonesia, Korea, Singapore, and Taiwan Province of China

- Given heavy subsidy to capital, particularly after 2004, anyone obtains bank loans implies benefited from rents



## With exceptionally low costs of capital, capital allocation depends on other factors

Source of data: IMF estimate based on 37,000 firms from 53 countries (2005-2009)



Firms owned by CPC/PC members borrow more,  
not because they face different financial constraints

- Financial constraints faced by firms owned by CPC/PC members are statistically indifferent from those of other firms
  - They did not borrow more/less than others from the informal financial sector, which has higher costs
  - They did not respond questions on financial constraints differently from others
- They are more likely to distribute dividends to owners (themselves) than others
  - If they were more financially constrained they should be less likely to distribute dividends than others

<b>Logit Regressions on Whether the Firm has Informal Loans</b>						
	<b>1995</b>		<b>2000</b>		<b>2006</b>	
EN_CPC	0.020 (0.094)		0.024 (0.066)		0.098 (0.119)	
EN_PC		0.025 (0.126)		0.109 (0.082)		-0.049 (0.141)
Gender_F	-0.264** (0.130)	-0.193 (0.135)	-0.204** (0.092)	-0.223* (0.114)	-0.050 (0.181)	-0.032 (0.166)
EN_Edu	0.142* (0.075)	0.124 (0.081)	-0.127* (0.065)	-0.079 (0.080)	-0.198 (0.148)	-0.184 (0.138)
EN_Age	0.008* (0.004)	0.006 (0.005)	-0.006* (0.003)	-0.007 (0.004)	0.001 (0.007)	0.003 (0.007)
Firm_age	-0.013 (0.009)	-0.011 (0.009)	0.004 (0.005)	0.012** (0.006)	-0.024* (0.014)	-0.019 (0.013)
Firm_size	-1.53e-11* (8.84e-12)	-6.19e-12 (9.48e-12)	-1.36e-05** (5.58e-06)	-6.21e-06 (6.58e-06)	-1.67e-06 (4.21e-06)	-1.10e-06 (3.88e-06)
State_share	-0.001 (0.006)	-0.002 (0.007)	0.008 (0.005)	0.007 (0.008)	-0.020 (0.017)	-0.017 (0.017)
Constant	-1.071*** (0.244)	-1.080*** (0.298)	0.125 (0.203)	-0.256 (0.270)	-1.334*** (0.402)	-1.427*** (0.385)
N	2097	1735	2407	1520	1881	2133

<b>Logit Regressions on Whether the Firm Distributed Dividends</b>								
	<b>1995</b>		<b>2000</b>		<b>2006</b>		<b>2010</b>	
EN_CPC	-0.025 (0.081)		0.298*** (0.100)		0.208*** (0.071)		0.250*** (0.060)	
EN_PC		0.156 (0.111)		0.284** (0.124)		-0.0290 (0.082)		0.395*** (0.075)
Gender_F	0.086 (0.103)	0.090 (0.111)	-0.065 (0.139)	-0.196 (0.179)	-0.134 (0.101)	-0.196** (0.097)	0.022 (0.083)	-0.050 (0.088)
EN_Edu	0.117* (0.065)	0.135* (0.071)	0.375*** (0.101)	0.250** (0.120)	-0.001 (0.097)	0.073 (0.0920)	-0.057 (0.096)	-0.067 (0.101)
EN_Age	-0.002 (0.004)	-0.003 (0.004)	-0.003 (0.005)	-0.001 (0.006)	-0.003 (0.004)	0.0003 (0.004)	-0.006 (0.004)	-0.004 (0.004)
Firm_age	0.025*** (0.007)	0.023*** (0.008)	-0.006 (0.007)	-0.011 (0.008)	-0.0004 (0.008)	-0.005 (0.008)	0.011* (0.006)	0.004 (0.007)
Firm_size	-1.00E-11 (7.78e-12)	-1.38e-11 (8.49e-12)	2.03e-05** (9.50e-06)	9.80e-06 (9.42e-06)	2.95e-06 (2.60e-06)	1.33e-06 (1.93e-06)	1.08e-07 (3.20e-07)	6.69e-08 (3.46e-07)
State_share	0.001 (0.005)	0.003 (0.006)	-0.082** (0.036)	-0.100** (0.050)	0.0005 (0.004)	0.001 (0.004)	0.003 (0.004)	-0.002 (0.005)
Constant	-0.533** (0.222)	-0.352 (0.272)	-0.061 (0.304)	0.009 (0.388)	0.094 (0.252)	0.018 (0.244)	-0.025 (0.214)	-0.017 (0.228)
N	1726	1433	1026	676	1517	1603	2005	1798

<b>Logit Regressions for Entrepreneurs' Views on Whether it is Hard to Gain Bank Loans</b>								
	<b>1995</b>		<b>2000</b>		<b>2006</b>		<b>2010</b>	
EN_CPC	-0.171** (0.080)		-0.037 (0.070)		0.053 (0.069)		0.033 (0.050)	
EN_PC		-0.045 (0.107)		-0.010 (0.085)		-0.053 (0.078)		0.088 (0.062)
Gender_F	-0.143 (0.096)	-0.140 (0.104)	0.151 (0.092)	0.129 (0.113)	0.044 (0.101)	0.049 (0.095)	-0.081 (0.070)	-0.036 (0.075)
EN_Edu	0.289*** (0.062)	0.308*** (0.068)	-0.263*** (0.068)	-0.289*** (0.0826)	-0.0693 (0.096)	-0.00964 (0.090)	-0.102 (0.078)	-0.0920 (0.085)
EN_Age	-0.004 (0.004)	-0.004 (0.004)	0.004 (0.004)	0.006 (0.004)	-0.0006 (0.004)	0.001 (0.004)	-0.002 (0.003)	-0.002 (0.003)
Firm_age	-0.016** (0.007)	-0.016** (0.008)	0.001 (0.005)	0.003 (0.006)	0.010 (0.008)	0.012* (0.007)	-0.001 (0.005)	-0.001 (0.006)
Firm_size	-1.19e-11 (7.58e-12)	-1.00e-11 (8.28e-12)	5.96e-06* (3.49e-06)	4.40e-06 (6.17e-06)	-8.52e-07 (1.70e-06)	-1.16e-07 (1.56e-06)	3.61e-06*** (1.18e-06)	4.01e-06*** (1.28e-06)
State_share	0.008 (0.005)	0.004 (0.005)	-0.002 (0.005)	0.022 (0.014)	-0.004 (0.003)	-0.004 (0.003)	-0.001 (0.003)	-0.002 (0.004)
Constant	0.821*** (0.217)	0.707*** (0.260)	-0.803*** (0.219)	-0.682** (0.283)	0.872*** (0.247)	0.757*** (0.238)	0.012 (0.176)	-0.051 (0.190)
N	1978	1641	2290	1440	2021	2180	2957	2576

## From political capital to economic capital: CPC/PC-member owners and rents of land

- No observable extra rents at earlier periods
  - Firms owned by CPC or PC members and other firms were indifferent in obtaining land in 1995 and 2000.
- PC members enjoyed substantial rents in 2006 and 2010
  - For firms owned by PC members, the land over equity ratio is significantly higher than those of other firms in 2006 and 2010.
  - For firms owned by CPC members, the land value over total equity ratio is significantly higher than those of other firms in 2006 but not in 2010.
    - Land prices in 2010 were much too high that only top elites are able to enjoy the rent

<b>Logit Regressions for Entrepreneurs' Views on Whether it is Hard to Gain Access to Land</b>				
	<b>1995</b>		<b>2000</b>	
EN_CPC	-0.090 (0.078)		0.058 (0.074)	
EN_PC		0.006 (0.104)		-0.029 (0.091)
Gender_F	0.012 (0.095)	-0.007 (0.103)	-0.192* (0.099)	-0.310** (0.123)
EN_Edu	0.205*** (0.061)	0.222*** (0.067)	-0.102 (0.074)	0.0240 (0.091)
EN_Age	-0.008** (0.003)	-0.010*** (0.004)	0.002 (0.004)	0.008 (0.005)
Firm_age	0.005 (0.007)	0.008 (0.008)	-0.009* (0.005)	-0.010 (0.007)
Firm_size	-7.22e-12 (7.21e-12)	-9.12e-12 (7.84e-12)	1.10e-05 (6.88e-06)	1.37e-05 (9.93e-06)
State_share	-0.004 (0.004)	-0.005 (0.005)	0.001 (0.006)	0.012 (0.013)
Constant	-0.428** (0.214)	-0.458* (0.260)	0.700*** (0.232)	0.557* (0.312)
N	1054	1632	2022	1298

<b>OLS Regressions for the Land Value over Total Equity</b>				
	<b>2006</b>		<b>2010</b>	
EN_CPC	3.935** (1.875)		0.648 (1.638)	
EN_PC		5.441*** (2.038)		4.410** (1.982)
Gender_F	-3.358 (2.837)	-4.511* (2.660)	-6.865*** (2.533)	-6.591** (2.773)
EN_Edu	0.653 (2.523)	0.905 (2.360)	-0.233 (2.574)	-2.098 (2.782)
EN_Age	-0.0280 (0.118)	0.003 (0.109)	0.0350 (0.100)	-0.0199 (0.108)
Firm_age	1.238*** (0.211)	1.212*** (0.194)	1.263*** (0.174)	1.294*** (0.191)
Firm_size	4.40e-05 (4.60e-05)	1.51e-05 (4.16e-05)	-2.18e-05 (2.63e-05)	-4.32e-05 (3.32e-05)
State_share	0.0178 (0.0959)	0.036 (0.094)	0.114 (0.101)	0.065 (0.132)
Constant	-10.69 (6.587)	-11.56* (6.281)	-16.26*** (5.934)	-10.75* (6.374)
N	1987	2146	2819	2450

### Do Firms Owned by CPC and PC Members Perform Better?

- In general CPC/PC member-owned firms do not perform differently from others in 1995 and 2010
- Only CPC member-owned firms outperform the others in ROE in 2000
- Only PC member-owned firms outperform the others in ROE in 2006

<b>Regressions for the Performance of the Firm (ROE)</b>								
	<b>1995</b>		<b>2000</b>		<b>2006</b>		<b>2010</b>	
EN_CPC	0.031 (0.072)		<b>0.024*</b> <b>(0.014)</b>		-0.004 (0.017)		0.018 (0.017)	
EN_PC		0.058 (0.103)		0.021 (0.018)		<b>0.036*</b> <b>(0.020)</b>		0.010 (0.020)
Gender_F	0.098 (0.077)	0.110 (0.081)	0.027 (0.019)	0.051** (0.024)	0.034 (0.025)	0.035 (0.024)	0.031 (0.024)	0.044* (0.025)
EN_Edu	-0.093* (0.054)	-0.108* (0.059)	-0.022 (0.014)	-0.029* (0.017)	-0.0005 (0.024)	-0.008 (0.022)	0.008 (0.027)	0.037 (0.027)
EN_Age	-0.005* (0.003)	-0.005 (0.003)	-0.001* (0.0007)	-0.0008 (0.0009)	-0.001 (0.001)	-0.001 (0.001)	-0.002** (0.001)	-0.002* (0.001)
Firm_age	0.026*** (0.006)	0.028*** (0.007)	-0.003*** (0.001)	-0.003*** (0.001)	-0.001 (0.002)	-0.001 (0.002)	0.002 (0.002)	0.004** (0.002)
Firm_size	5.87e-10 (1.44e-09)	9.37e-10 (1.62e-09)	5.15e-07 (4.99e-07)	3.10e-06** (1.31e-06)	1.79e-06*** (4.86e-07)	1.92e-06*** (4.24e-07)	2.61e-07** (1.03e-07)	2.48e-07** (1.02e-07)
State_share	0.008* (0.004)	0.010** (0.005)	-0.032*** (0.007)	-0.076*** (0.020)	-0.0001 (0.001)	-0.0002 (0.001)	-0.0007 (0.001)	-0.001 (0.001)
Constant	0.598*** (0.178)	0.495** (0.229)	0.292*** (0.045)	0.206*** (0.060)	0.306*** (0.063)	0.304*** (0.060)	0.351*** (0.059)	0.277*** (0.062)
N	972	842	1780	1180	1748	1868	2568	2268

## Conclusion

- The impacts of the CPC to the private sector declined sharply in the late 1990s.
- The CPC reformed the Party by recruiting entrepreneurs
  - ‘Three Representatives’ “theory”
  - Providing more rent-seeking opportunities to those who follow the party.
- When the private sector was unimportant, CPC/PC-member entrepreneurs did not have much rent-seeking opportunities.
- CPC/PC-members’ political rents grow along with the growth of the private sector and the reform of the Party
- In general the political rents enjoyed by CPC/PC-member entrepreneurs do not contribute to productivity

# **“Venture Capital Investment and the Growth of Entrepreneurial Firms: Evidence from China”**

*Di Guo* (The University of Hong Kong)

*(Co-authored with KunJiang)*





# Venture Capital Investment and the Growth of Entrepreneurial Firms: Evidence from China

Di Guo  
Kun Jiang

August 2011

## Venture Capital, Entrepreneurship, Innovation

- VC financing is vital in spurring start-up high-tech in the US
  - Almost all the US high-tech giants were funded by VCs
  - VC-backed firms are more innovative (Kortum and Lerner, 2000; Hellman and Puri, 2000)
  - VC-backed firms generate more revenue (National Venture Capital Association, 2010)
  - VC: IPO accelerator (Gompers, 1997; Gompers and Lerner, 2001)
- Globalization of venture capital investment
  - Over 30 VC associations around the world
  - VC promotion programs around the world: duplications of Silicon Valley model
  - **Outcomes outside the US are mixed (Lerner, 2009)**

## Spectacular VC Development in China

- Become one of the largest in the world
  - China (including Hong Kong) has been ranked as the 2<sup>nd</sup> largest venture capital market since 2001.
  - VC investment in China in 2008 is equivalent to the 1994 level of the US (VC/GDP ratio is ½ of the US))
- Foreign venture capital funds play essential roles
  - > 60% of total venture investments were made by FVCFs.
  - Almost all mainstream FVCFs have entered into China's market
- VC play major roles in spurring start-up high-tech firms in China
  - 62% VC investments are in high tech sectors
  - 'New fortune' tales: Sina, Sohu, Alibaba, Sinovel Wind Group etc.

## Spectacular VC Development in China (*cont.*)

- VCs in China have major impacts on global markets
  - From 2000 to 2010, over 500 VC (or PE) backed Chinese firms went public
  - 207 out of 339 new IPOs in the 1<sup>st</sup> half of 2011 in 13 exchange markets are Chinese firms, among which 94 are VC (or PE) backed, with proceeds of US\$16.64B
  - Average return of the 94 VC-backed IPOs for 259 VC/PE funds is 8.15 times
  - Sinovel Wind Group's listing brought 180-540 times of return for its VC/PE investors.
- VC development affects China's growth sustainability and the global economy
  - But research in this area is very limited

## Understanding VCs in China

- Weak protection of property rights and private sectors (e.g. Allen et al., 2005)
- Weak corporate governance rules
  - limited partnership was not legal till June 2007
  - preferred security & convertible security were not recognized till 2005
  - separation of ownership and voting rights are not legal in China
- Restrictions on fundraising of private equity investors
- Restrictions on foreign financial institutions

## Understanding VCs in China (*cont.*)

- How to explain the rapid growth of VC industry under China's weak institutions?
- There is no literature on China's VC investment at firm-level
- Questions to be addressed:
  - Do VC-backed firms in China perform better and invest more in R&D activities than not-VC-financed firms?
  - What is the mechanism of VC finance in China?
    - Do VCs *select* better and more R&D oriented companies at the first place?
    - In addition to financing, do VCs *add additional value* to the entrepreneurial firms?

## The Estimates

- Our data:
  - A panel of all VC-backed manufacturing firms in China with sales  $\geq \frac{1}{2}$  million RMB in the period of 1998 and 2008
  - A control group of non-VC-backed firms which share similar characteristics with VC-backed firms
- Our estimates: financial performance, R&D spending
  - VC-backed firms vs. non-VC-backed counterparts
  - VC-backed firms: before and after VC investment
  - VC-backed firms: firms backed by different VCs, i.e. foreign (mostly US) VCs vs. Chinese domestic VCs

## Our Major Discoveries

- Basic findings: VC-backed firms substantially outperform non-VC-backed firms
- Selection effect: better firms are picked up by VCs
- VCs' value-add effect: VC-backed firms experience magnified growth and R&D investment after the investment is made.
  - the gap between the VC-backed and non-VC-backed firms in terms of ROS, labor productivity and R&D investment is further widened.

## Identification Concerns

- VCs' selection effects
  - We find the project selection criteria identified by VCs are consistent with the measurements we employed to estimate the performance and R&D activities
- VCs' value add effects
  - We find VCs improve corporate governance  $\Rightarrow$  performance  $\uparrow$
  - We find better motivated/experienced VCs generate better outcomes than other VCs
  - Use an exogenous policy shock to further confirm the causality: VCs' contribution leads to firms' performance  $\uparrow$

## Identification Concerns: Value Add Effect

- We find VCs improve corporate governance  $\Rightarrow$  performance  $\uparrow$ 
  - Evidence: Compared with non-VC-backed firms, the management of VC-backed firms is under more rigorous shareholder control
- We find better motivated/experienced VCs generate better outcomes than other VCs
  - Evidence: foreign VCs have stronger impacts on entrepreneurial firms' performance/R&D than domestic VCs
- Use an exogenous policy shock to further confirm the causality: VCs' contribution leads to firms' performance  $\uparrow$ 
  - VC funding was increased by 7 folds following 2004 regulatory changes on investment: an exogenous change on VC supply side
  - Estimated VCs' value-add effect from the firms which received VC finance since this exogenous shock is the same or even stronger than that before this shock

## Contributions to the literature

- The first paper that systematically studies VC finance in China based on firm level panel data
- It is also a major contribution on studying VC finance outside of the US
- Improves our understanding in finance and R&D in China
  - Corporate finance in China (Allen et al., 2005; Cull and Xu, 2006)
  - R&D in China (Hu and Jefferson, 2005, 2007)
- We handle identification problems better
  - Kortum and Lerner (2000) and Brav and Gompers (1997)
- Other related literature
  - Gompers and Lerner (2001), Kaplan and Stromberg (2004), Kaplan et al. (2009) study mechanisms, decisions and roles of VC financing

## Data and Sample

- **Data**
  - ‘VentureXpert’ database
  - China’s Manufacturing Firm Survey Database (1998-2008): full
- **Sample:**
  - 269 VC-backed manufacturing firms (full sample covered China’s Manufacturing Firm Survey Database
    - Sales > RMB 5 mil
    - Receiving its first round of venture capital investment between 2000 and 2006
  - Control groups (1-1 and 1-5 pairs)
    - Industry, location and total assets
    - Industry, location and number of employees

## Variables

- Performance and R&D activities of the VC-backed firms
  - ROS
  - labor productivity
  - R&D activity: R&D spending over total sales
- Control variables:
  - leverage ratio of the VC-backed firms
  - ownership structure of the VC-backed firm: the percentage of the state shares and private shares
  - employee treatments: average wage of employees
- Type of VC firms:
  - Foreign vs. Domestic: the headquarter location of the lead venture capital firm

## Summary Statistics of the Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Total asset (10000RMB)	269	766355.9	2145355	2826	2.58E+07
The number of employee	269	1104.632	2324.74	18	27316
Sales (10000RMB)	269	530734.4	821358.6	5820	3688629
ROS	269	0.107	0.158	-0.494	0.520
Net profits per employee(10000RMB)	268	76.549	118.419	-81.938	565.54
R&D expenditure over total sales	168	0.012	0.026	0	0.131
Leverage ratio	269	0.546	0.214	0.025	1.831013
% state shares	217	0.029	0.119	0	1
% private shares	213	0.161	0.252	0	1

## Correlation Matrix of Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Total asset	1								
(2) The number of employee	0.625***	1							
(3) Sales	0.617***	0.421***	1						
(4) ROS	0.076***	0.004	0.084***	1					
(5) Net profits per employee	0.135***	-0.019***	0.244***	0.597***	1				
(6) R&D expenditure over total sales	0.024***	-0.0001	-0.044***	0.166***	0.077***	1			
(7) Leverage	0.001	0.009***	0.024***	-0.326***	-0.213***	-0.088***	1		
(8) State share	0.129***	0.162***	0.073***	0.005	-0.015***	0.017***	0.016***	1	
(9) Private share	-0.078***	-0.058***	-0.129***	-0.019***	-0.103***	-0.001	0.033***	-0.14***	1

## The Findings: VCs' Selection Effects

- If a firm's ROS increases by 0.1 from its mean, the probability of being selected by VCs increases by 4.9%
- If a firm's net profit per employee increases by 76.5 from its mean, the probability of being selected by VCs increases by 4.9%
- If a firm increases its investment in R&D by 0.01 from its mean, the probability of being selected by VCs increases by 1.6%



<b>T-tests on Performance and R&amp;D Investment between the two Groups (one to five matching by number of employees)</b>					
<b>t=0</b>	VC-backed firms	Control group	Dif.	t-statistics	z-statistics
<b>ROS</b>	0.107	0.041	0.066	8.298***	9.789***
<b>Net profits per employee</b>	76.549	28.854	47.695	8.625***	10.90***
<b>R&amp;D expenditure over total sales</b>	0.012	0.006	0.006	3.741***	5.281***
<b>t=1</b>	VC-backed firms	Control group	Dif.	t-statistics	z-statistics
<b>ROS</b>	0.116	0.041	0.075	7.940***	8.180***
<b>Net profits per employee</b>	80.565	30.129	50.436	7.499***	8.957***
<b>R&amp;D expenditure over total sales</b>	0.013	0.004	0.009	4.419***	4.919***
<b>t=2</b>	VC-backed firms	Control group	Dif.	t-statistics	z-statistics
<b>ROS</b>	0.118	0.049	0.069	5.138***	4.949***
<b>Net profits per employee</b>	81.886	34.167	47.719	4.811***	6.073***
<b>R&amp;D expenditure over total sales</b>	0.015	0.005	0.010	3.503***	4.067***

<b>Logit Regression of Probability of Being Backed by VCs</b>				
	<b>Panel (1)</b>	<b>Panel (2)</b>	<b>Panel (3)</b>	<b>Panel (4)</b>
<b>ROS</b>	3.606 (0.910)***	2.173851 (0.999)**	3.689 (0.771)***	3.034 (0.850)***
<b>Net profits per employee</b>	0.003 (0.001)***	0.004 (0.0011)***	-0.0006 (0.001)	-0.0003 (0.001)
<b>R&amp;D expenditure over total sales</b>		11.615 (3.746)***		12.715 (3.871)***
<b>Leverage</b>	0.439 (0.386)	0.704 (0.441)	0.128 (0.379)	0.158 (0.427)
<b>State share ratio</b>	-0.619 (0.673)	-1.314 (0.970)	-0.561 (0.636)	-0.942 (0.831)
<b>Private share ratio</b>	0.309 (0.294)	0.662 (0.321)**	0.548 (0.292)*	0.654 (0.313)**
<b>_cons</b>	-2.216 (0.254)***	-2.488 (0.294)***	-1.978 (0.246)***	-2.091 (0.281)***
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000
<b>Number of obs</b>	1176	920	1224	957

## The Findings: VC-backed vs. Non-VC-backed Firms

- VC-backed firms outperform non-VC-backed ones in performance and R&D investment
  - VC-backed firms' ROS is higher than non-VC-backed firms' ROS by 0.06, which is about 60% of the average value of the ROS of the VC-backed firms at the time of VCs' entry
  - VC-backed firms' net profits over the number of employee is higher than that of non-VC-backed firms by 26.75, which is about 35% of the average labor productivity of VC-backed firms at the time of VCs' entry
  - Firms backed by VCs invest more than non-VC-backed ones by average

## The Findings: VC-backed firms before and after VC Investment

- VC-backed firms experience magnified growth in performance and R&D investment
  - VCs' treatment effect increases by 0.01 after VCs' entry, which is about 10% of the average of the ROS of the VC-backed firms at the time of venture capital investment is made.
  - VCs' treatment effect increases by 7.53 after VCs' entry, which is about 10% of the average net profits over the number of employee of the VC-backed firms at the time of VCs' entry
  - R&D expenditure over total sales increases by about 0.1% after VCs' entry, which counts for about 10 % of the average of that of VC-backed firms at the time when the investment is made

OLS Regression of Firms' Performance and R&D Investment						
	1	2	3	4	5	6
	ROS		Net profits per employee		R&D expenditure over total sales	
<b>Treatment Effect Dummy</b>	0.061 (0.012)***	0.045 (0.012)***	26.747 (6.836)***	15.290 (7.287)**	0.007 (0.002)***	0.004 (0.003)
<b>VC_entry Dummy</b>	0.003 (0.003)	0.001 (0.003)	8.397 (1.848)***	7.598 (1.856)***	0.000 (0.001)	0.000 (0.001)
<b>Interaction</b>		0.010 (0.003)***		7.527 (1.730)***		0.001 (0.001)*
<b>Employee treatment</b>	0.000 (0.0001)***	0.000 (0.0001)** *	0.989 (0.053)***	0.985 (0.053)***	0.000 (0.000)***	0.000 (0.000)***
<b>Leverage</b>	-0.084 (0.007)***	-0.084 (0.007)***	-33.756 (3.778)***	-33.654 (3.771)***	-0.001 (0.002)	-0.001 (0.002)
<b>State share ratio</b>	-0.004 (0.01)	-0.004 (0.01)	1.110 (5.408)	1.379 (5.398)	0.000 (0.003)	0.001 (0.003)
<b>Private share ratio</b>	-0.003 (0.005)	-0.002 (0.005)	-5.558 (2.964)*	-5.275 (2.960)*	-0.001 (0.001)	0.000 (0.001)
<b>_cons</b>	0.086 (0.005)***	0.086 (0.005)***	25.330 (2.809)***	25.399 (2.799)***	0.003 (0.002)***	0.003 (0.002)***
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000	0.000	0.000

## Identification: Do VCs Select or Attract Better Firms?

- Limited financing sources for Chinese private firms
  - Less than 10% private firms have the chance to gain bank loans in China
- Interviews with 37 VCs in China finds the project assessment criteria identified by VCs are consistent with our estimations
  - VCs' investment decision-making process is highly selective. The selection rate is 1.3%.
  - VCs conduct rigorous due diligence for potential projects
  - Financial performance and technological improvements are the major concerns of VCs
    - 18 out of the 38 criteria are related to the product, market and financial considerations of the entrepreneurial company
    - half of the ten essential criteria are related to the market, product and financial outlook of the project

## Identification Concerns: Do VCs Add value ?

- The mechanisms of VC investment
  - Literature: VCs exert numerous efforts to monitor their portfolio companies to avoid agency issues and uncertainty (Gompers & Lerner, 2001; Hellmann and Puri, 2002; Sahlman, 1990).
- Corporate governance and firms' performance
  - Compared with non-VC-backed firms, the management of VC-backed firms is under more rigorous shareholder control

### Corporate Governance of 76 VC-backed and 280 non-VC-backed Firms in China

Corporate Governance Measurements	VC-backed firms	Non-VC-backed firms	Dif.	T-Statistics
% of Shareholder Approval Required to Amend Bylaws	63.28	60.24	3.04	2.154**
% of Shareholder Approval Required to Amend Charter	65.73	62.90	2.83	2.014**
% of Shareholder Approval Required to Call Special Meetings	27.833	23.4921	4.341	1.709*
% of Shareholder Approval Required To Act By Written Consent	85.87	71.07	14.80	3.706***
%CEO holding	22.289	27.419	-5.129	-1.456

## Identification Concerns: Value Add Effect

- We find VCs improve corporate governance  $\Rightarrow$  performance $\uparrow$ 
  - Evidence: Compared with non-VC-backed firms, the management of VC-backed firms is under more rigorous shareholder control
- We find better motivated/experienced VCs generate better outcomes than other VCs
  - Evidence: foreign VCs have stronger impacts on entrepreneurial firms' performance/R&D than domestic VCs
- Use an exogenous policy shock to further confirm the causality: VCs' contribution leads to firms' performance  $\uparrow$ 
  - VC funding was increased by 7 folds following 2004 regulatory changes on investment: an exogenous change on VC supply side
  - Estimated VCs' value-add effect from the firms which received VC finance since this exogenous shock is the same or even stronger than that before this shock

## Identification Concerns: Do VCs Add value ? (*cont.*)

- Use the linkage between VCs' efforts and experience and the performance of VC-backed firms to confirm the causality
- The mechanisms of VC investment
  - Double-sided agency relationships of venture capital investment:
    - VCs-ultimate fund investors; VCs –entrepreneurs
  - Efforts and experience of VCs are the key for success
- Do better motivated/experienced VCs generate better outcomes than other VCs?

## Identification Concerns: Do VCs Add value ? (*cont.*)

- VCFs are divided into two groups due to regulations
  - Foreign VCFs:
    - Higher-powered incentives: over 80% are structured as limited partnership
    - More experienced: average age is 11.5
  - Domestic VCFs:
    - Lower-powered incentives: almost all are structured as limited liability companies
    - Less experienced: average age: 6.33

## Identification Concerns: Do VCs Add value ? (*cont.*)

- Evidence: foreign VCs have stronger impacts on entrepreneurial firms' performance/R&D growth after the investment is made
  - After foreign VC's entry, the ROS of VC-backed firm increases by 0.015
  - After foreign VC's entry, the net profits over the number of employee of foreign VC-backed firms further increase by 11.40
  - After foreign VC's entry, the R&D expenditure of the firm increases by 0.002
  - No significant effects on the above measurements seen from domestic VCs after the ex-ante selection is adjusted

### Performance and R&D Investment of Foreign VC-backed Firms and Domestic VC-backed Firms

	1	2	3	4	5	6
	ROS		Net profits per employee		R&D expenditure over total sales	
China VC treatment	0.061 (0.015)***	0.053 (0.016)***	11.073 (8.725)	8.058 (9.271)	0.007 (0.003)**	0.007 (0.003)**
Foreign VC treatment	0.058 (0.021)***	0.028 (0.023)	57.488 (12.285)***	34.089 (13.228)***	0.009 (0.0048)**	0.001 (0.008)
VC_entry Dummy	0.003 (0.003)	0.001 (0.003)	8.271 (1.8489)***	7.609 (1.8578)***	0.000 (0.0007)	0.000 (0.0007)
China_VC_interaction		0.006 (0.004)		2.274 (2.506)		0.000 (0.0007)
Foreign_VC_interaction		0.015 (0.004)***		11.402 (2.543)***		0.002 (0.0008)***
Employee treatment	0.000 (0.0001)***	0.000 (0.0001)***	0.987 (0.053)***	0.984 (0.053)***	0.000 (0.00002)***	0.000 (0.00002)***
Leverage	-0.083 (0.007)***	-0.083 (0.007)***	-33.673 (3.778)***	-33.732 (3.77)***	-0.001 (0.002)	-0.002 (0.002)
State share ratio	-0.004 (0.01)	-0.004 (0.01)	1.045 (5.41)	1.384 (5.398)	0.000 (0.003)	0.001 (0.003)
Private share ratio	-0.003 (0.005)	-0.002 (0.005)	-5.329 (2.966)*	-5.151 (2.962)*	-0.001 (0.001)	0.000 (0.001)
_cons	0.086 (0.005)***	0.086 (0.005)***	25.294 (2.807)***	25.437 (2.792)***	0.003 (0.001)***	0.003 (0.001)***
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000
Number of obs	5740	5740	5742	5742	2597	2597

## Identification Concerns: Do VCs Add value ? (*cont.*)

- Use an exogenous policy shock to further confirm the causality: VCs' contribution leads to firms' performance ↑
- Exogenous policy shocks in 2004 and 2005
  - Constitutional rights of the private sector were fully recognized in 2004
  - Bankruptcy Law was in effect in 2004
  - Convertible security and preferred stock are recognized legally
  - 'Interim Administrative Measures for the Start-up Investment Enterprises' was approved in 2005
- The consequence of the policy changes: newly committed venture capital funds in 2005 jumped by more than seven times to \$4.69 Billion from \$646 million in the year 2004

## Identification Concerns: Do VCs Add value ? (*cont.*)

- The approach: repeat the estimates on VC-backed firms after 2005
- Evidence: VCs' value added effect stays robust when we isolate venture capital investment from alternative factors
  - VC-backed firms enjoy further faster growth than non-VC-backed firms after the investment is made after 2005
  - The performance improvements of the entrepreneurial firms depend on who are the investors

<b>Firm's Performance: VC-backed firms and non-VC-backed firms after 2005</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	ROS		Net profits per employee	
<b>Treatment Effect Dummy</b>	0.072 (0.014)***	0.048 (0.015)***	39.135 (9.146)***	20.965 (10.228)**
<b>VC_entry Dummy</b>	0.006 (0.004)	0.004 (0.004)	9.926 (2.256)***	8.966 (2.266)***
<b>Interaction</b>		0.010 (0.003)***		7.784 (1.996)***
<b>Employee treatment</b>	0.000 (0.0001)**	0.000 (0.0001)*	0.708 (0.065)***	0.706 (0.065)***
<b>Leverage</b>	-0.085 (0.008)***	-0.084 (0.008)***	-32.210 (5.230)***	-32.013 (5.220)***
<b>State share ratio</b>	-0.007 (0.014)	-0.007 (0.014)	6.426 (9.024)	6.781 (9.005)
<b>Private share ratio</b>	-0.001 (0.006)	-0.001 (0.006)	-8.787 (3.928)**	-8.400 (3.922)**
<b>_cons</b>	0.088 (0.006)***	0.088 (0.006)***	30.485 (3.687)***	30.565 (3.677)***
<b>Number of obs</b>	3361	3361	3362	3362
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000



<b>Firms' Performance: foreign and domestic VC-backed firms and non-VC-backed firms after 2005</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	ROS		Net profits per employee	
<b>China VC treatment</b>	0.063 (0.018)***	0.057 (0.020)***	9.453 (11.668)	4.223 (12.967)
<b>Foreign VC treatment</b>	0.091 (0.024)***	0.043 (0.028)	92.647 (15.874)***	59.762 (18.214)***
<b>VC_entry Dummy</b>	0.005 (0.004)	0.004 (0.004)	9.726 (2.254)***	8.978 (2.264)***
<b>Chian_VC_interaction</b>		0.003 (0.004)		2.624 (2.884)
<b>Foreign_VC_interaction</b>		0.016 (0.005)***		10.728 (2.952)***
<b>Employee treatment</b>	0.000 (0.0001)**	0.000 (0.0001)*	0.708 (0.065)***	0.705 (0.065)***
<b>Leverage</b>	-0.085 (0.008)***	-0.084 (0.008)***	-32.218 (5.218)***	-32.170 (5.208)***
<b>State share ratio</b>	-0.007 (0.014)	-0.006 (0.014)	6.230 (9.002)	6.761 (8.986)
<b>Private share ratio</b>	-0.001 (0.006)	0.000 (0.006)	-8.446 (3.925)**	-8.198 (3.919)**

## Conclusion

- VCs indeed contribute to the growth and R&D activities of entrepreneurial firms in China
- The contributions are made in two ways:
  - Ex-ante project selection
  - Ex-post value add effects
- Different types of VCs contribute in different ways
  - Domestic VCs, which are under lower-powered incentives and less experienced, normally contribute to ex-ante selection
  - Foreign VCs, which are more experienced and under higher-powered incentives, contribute in both ways.

# Venture Capital Investment and the Growth of Entrepreneurial Firms: Evidence from China

Di Guo

Faculty of Business and Economics

The University of Hong Kong

[diguo@hku.hk](mailto:diguo@hku.hk)

Kun Jiang

Faculty of Business and Economics

The University of Hong Kong

[jiangkun@hku.hk](mailto:jiangkun@hku.hk)

## Abstract

This study examines the contributions of venture capital investment to the performance and R&D activities of entrepreneurial firms. Based on a panel dataset of Chinese manufacturing firms, we investigate the performance and R&D activities of VC-backed and non-VC-backed companies during the period of 1998-2008. Moreover, interviews with 37 VCs are combined to gain in-depth understanding in institutional issues and further explain the results of the econometric analysis. We find venture capital investment in China contribute to entrepreneurship in China in two ways. First, VCs pick up better performed firms and firms investing more in R&D activities to invest. If a firm's ROS increases by 0.1 from its mean and its net profit per employee increases by 76.5 from its mean, the probability that it will be selected by VCs will increase by 4.9% and 3.1% respectively. At the same time, if a firm increases its investment in R&D by 0.01 from its mean, the probability that it is selected by VCs increases by 1.6%. Second, we find VCs play important roles on improving the growth of the entrepreneurial firms. After receiving investment from VCs, by average, firms achieve higher ROS and labor productivity by 10% and invest more in R&D activities by 10% comparing to their non-VC-backed counterparts. These finding stay robust after dealing with identification issues.

Keywords: venture capital investment, entrepreneurial firms, R&D, China

## 1. Introduction

Ample anecdotes link the great success of Silicon Valley in nurturing young high-technology companies to the development of the local venture capital market. It is widely accepted that venture capital investment is an effective way to finance newly-established innovative firms, which hardly have access to bank loans. Researchers suggest venture capitalists (VCs) not only provide capital to projects with growth potentials, but also exert intensive monitoring efforts and provide value-added supports to them. In this way, VCs differentiate themselves from traditional financiers to better deal with the profound information issues and uncertainty of the investment. If this is the case, two natural questions arise concerning the role of VCs in the growth and R&D activities of the entrepreneurial firms: 1) Do VC-backed firms really outperform those non-VC-backed firms in terms of growth and innovation? 2) If so, whether this is because VCs are good at choosing better companies *ex ante*, or, they are capable help the entrepreneurial firms to perform better after the investment is made?

Topics concerning the impacts of venture capital investment on the entrepreneurial companies have attracted intensive interest from researchers in the past two decades. For instance, Kortum and Kortum and Lerner (2000) examine the relationship between the patented inventions and venture capital investment on both industry level and firm level in the U.S. The authors find that venture capital activity significantly increased the propensity to patent that corporate R&D. Additionally, based on a survey of entrepreneurial firms in Silicon Valley, Hellmann and Puri (2000) find VC-backed firms bring new products to the market faster than those non-VC-backed ones. At the same time, the authors also discover that VCs' intervene is important for the professionalization and development of the young companies, in particular, the formulation of human resource policies and strategic management decisions (Hellmann and Puri, 2002). Devila et al. (2003) also provide evidence that VC-backed companies grow faster than non-VC-backed ones by using the increase of employee number as a proxy for growth.

Another set of extant studies is focused on the role of venture capital investment playing on IPO of the entrepreneurial firms. The findings, however, are mixed. For instance, Megginson and Weiss (1991) and Barry et al. (1990) find VC-backed IPOs are less under-priced than those non-VC-backed. Brav and Gompers (1997) further proved that VC-backed firms outperform non-VC-backed IPOs over a five-year period when the returns are weighted equally. However, Bradley and Jorden (2002) find that once they control for industry for industry effects and underwriter quality, there is no difference in underpricing between VC-backed and non-VC-backed IPOs. Further, Lee and Wahal (2004) discover that after the deal with the potential selectivity biases, VC-backed IPOs are significantly under-priced than those non-VC-backed ones.

While the existing studies have answered our first question in some way, the second, however, is left yet for more cautious examinations. That is, although the above studies have provided solid analysis on the differences between VC-back and non-VC-backed companies and most of them suggest VC-backed firms outperform the rest, it is problematic to claim the observed differences are contributed by VCs. It might be the case that there are some other unobservable factors such as entrepreneurial opportunities, technological opportunities or policy changes etc. Although Kortum and Lerner (2000) and Brav and Gompers (1997), attempt to solve the identification issues and prove that the difference between the two groups of firms is indeed related to venture capital investment, we are lack of knowledge whether the source of the differences in

performance caused by VCs' ex-ante projects selection, or, by VCs' monitoring and supporting efforts after the investment is made (Kortum and Lerner, 2000).

This study attempts to fill the research gap by comparing the performance of VC-backed firms and a control group of non-VC-backed firms before and after venture capital investment is made based on firm-level panel data of manufacturing firms between 1998 and 2008 in China. We match a sample of 269 VC-backed firms with 1345 non-VC-backed firms in the same industry and same geography location as closely as possible by size measured by either total assets or number of employees. We first compare the performance and R&D activities of VC-backed and non-VC-backed. It finds VC-backed firms outperform in many aspects including profitability, labor productivity and new product sales. We then estimate which kind of firms are more likely to receive venture capital investment to identify whether VCs indeed choose better performed companies ex-ante. The analysis confirms that, indeed, firms are more likely to be backed by venture capital investment if they have higher profitability and higher labor productivity and, invest more in R&D activities.

At the third step, we estimate the value-added effects of venture capital investment. We compare VC-backed and non-VC-backed firms along the panel to test whether firms' performance increase or decrease after VC's entry. We find that VC-backed firms outperform non-VC-backed firms both before and after VCs' entry in profitability and labor productivity in general, while the effects are significantly stronger after VCs' involvement in particular. VC's entry explains 10% of the growth of the above two indicators on average. We also find similar results for R&D spending. That is, VC-backed firms invest more in R&D activities than non-VC-backed ones.

We further consider the identification issues for the findings on VCs' ex-ante selection. Although we empirically show that VCs do invest in better performed companies, the alternative explanation is that VCs attract, rather than select good firms. We address this issue by comparing project assessment criteria identified by VCs and the findings from our systemic analysis. Interviews suggest that the investment decision-making process is highly selective. In particular, financial performance and technological improvements are the major concerns when VCs make the investment decisions that is consistent to what we have found from the systemic comparison between VC-backed and non-VC-backed firms.

We then turn to the identification issues for VCs' value added effect assumptions. Empirically, we find firms experience magnified growth of firms after venture capital investment is made. However, the effects of VCs' involvements may be inflated by unobservable factors such as market opportunities, entrepreneurial and technological opportunities. We address this concern with three different approaches. The first two approaches focus on the mechanisms behind the value added effect assumptions. We attempt to explore the linkage between VCs' incentives and VCs' control over their portfolio companies with the performance and R&D activities of the VC-backed firms. We first compare some major corporate governance terms of VC-backed and non-VC-backed firms. Indeed, we find the management of VC-backed firms is under more shareholders' control than those of non-VC-backed firms. We then turn to the linkage between VCs' incentives and their impacts on the performance of the VC-backed firms. If VCs' involvements really contribute to the growth of the entrepreneurial firms, we expect to see stronger effects with firms backed by VCs who are more motivated. Based on interviews with VCs and secondary document analysis, we find that venture capital firms are divided into two distinct groups due to the regulatory restrictions. Foreign VCs are provided higher-powered

incentives than their domestic counterparts. We find significant difference in performance and R&D activities between firms backed by the two groups of VCs. That is, with higher-powered incentives, foreign VCs do have more significant and positive impacts on the entrepreneurial firms' financial performance and R&C investment than domestic ones.

We further address the identification issue by estimating the dynamics of the effects of VCs' entry before and after some major events in venture capital industry. In the year 2004 and 2005, a series of aggressive policy and law changes occurred in China that was closely related to venture capital industry. These changes led a sharp increase in the funds committed to venture capital. This type of exogenous change should identify the role of venture capital investment since it is unlikely to be related to the arrival of entrepreneurial opportunities. After addressing the causality concerns, the results stay robust that suggest VCs' ex post involvements have a strong and positive impact on firms' performance and R&D investment.

This paper is organized as follows. Section 2 provides an overview of China's venture capital industry. Section 3 describes the data and sample. Section 4 presents the findings. Section 5 addresses the identification issues. Section 6 concludes this study.

## **2. China's Venture Capital Industry**

### **2.1 Overview of China's Venture Capital Industry**

Venture capital programs were initiated by the Chinese central government in the mid-1980s as a part of science and technology reform. The industry has experienced tremendous dynamics together with the transformation from a centrally planned economy to a more market-based system in this country. In the first ten years, the industry was mere a concept that the major players were local and central governments. The first breakthrough of China's venture capital industry did not come until the late 1990s when the sources of venture funds were enriched. First, in 1996, large corporations, universities and individuals were allowed to enter into this market for the first time<sup>1</sup>. At the same time, foreign venture capital firms finally gained legal recognition for their investment activities in China in 2001<sup>2</sup>. Since then, an increasing number of mainstream foreign venture capital firms entered into China. However, the flow of new venture funds between 1995 and 2004 never exceeded ten millions with 2002 as an exception.

Year 2005 saw a great shift in new venture funds commitment in China's venture capital market. The newly raised funds increased from US\$ 699 Mil in 2004 to US\$ 4067 in 2005. The reason behind this phenomenon is a series policy and law changes related to venture investment in 2004 and 2005. First, private property right protection was constitutionalized in 2004 that encourage both VCs and entrepreneurs to make long run investment. Second, the Small and Medium Enterprise Board (SME) of Shenzhen Stock Exchange opened in August 2004 after over five years' discussion. Associated with this, the government substantially relaxed the approval procedures for Chinese firms to go IPO on overseas markets. These regulations not only

---

<sup>1</sup> Individuals and corporations were not allowed to invest in venture capital funds before 1996. This restriction was removed with the passage of the law on "Promoting the Industrialization of China's Technological Achievements" in 1996. This law had, for the first time, legalized venture capital investment as a commercial activity and permitted funds to be raised from diverse sources including national or local governments, enterprises, organizations, and individuals.

<sup>2</sup> In 2001, the Ministry of Foreign Trade and Economic Cooperation (MoFTEC), together with the Ministry of Science and Technology (MoST) and the State Administration for Industry and Commerce (SAIC) issued the 'Provisional Regulations on the Establishment of Foreign Invested Venture Capital Investment Enterprises' (the 'VC Regulations'). By clarifying the registration requirements for foreign venture capital institutions, the regulation was the first effort from China's government to confirm the legitimacy of foreign venture capital firms in China.

provided more chances for entrepreneurial firms to access public financial markets but also significantly enriched the divestment channels of venture investment. Third, convertible security and preferred stock, which are often used by VCs to protect their investment from downside risks, were legalized in China in 2005. All these institutional changes together with the strong economic growth in this country attracted a wave of funds flow into this industry.

## **2.2 The Domestic VCFs and Foreign VCFs**

China's venture capital market has attracted intensive interests from global players. It is one of the most favored investment destinations for VCs around the world<sup>3</sup>. The amount of investment made by foreign venture capital firms consisted over 65% of the total investment in China between 2001 and 2008<sup>4</sup>. However, due to regulatory restrictions, foreign and domestic VCFs grew and evolved following different historical paths and they developed different organizational forms to cope with their unique institutional requirements. As a result, these two groups of VCFs differ from each other in many aspects such as the ownership structure, the decision-making process, the information flow through the organization, the compensation schemes and the funds sources etc.

Currently, domestic VCFs are mainly established as state-owned subsidiaries or spin-offs of local governments, large corporations and prestigious universities in China. They are normally under the controls of the higher-level supervisional organizations or large institutional shareholders. At the same time, almost all domestic VCFs are structured as limited liability companies in China since limited partnership was not legal as an organizational form till June, 2007. Interviews with VCs show that the top managers and the investment professionals do not claim the residual revenues since neither of them hold the share of the domestic VCFs. They are normally compensated with fixed salary plus bonus. The bonus is usually determined by the company-wide performance (Guo, 2008). Besides, the limited companies are normally managed under a functional division structure that is more centralized in decision-making. All investment decisions are made by top managers based on the information reported by investment managers. Moreover, most of the executive managers in domestic venture capital firms are former governmental officers or managers of SOEs. They are normally appointed by governmental bureaus or their parental corporations. Very often they do not little private equity financing expertise before they join in the venture capital firms (Guo, 2008).

Foreign VCFs have been struggling for their legitimacy in China. First of all, China's capital control regime implies that foreign institutional investors hardly operate in this market. The regulations have been gradually relaxed since the year 2001 that foreign institutional investors may legally invest and raise fund in China if they register as qualified foreign investment institutions (QFIIs). However, the threshold of the requirements for registration as a QFII is too high that most of foreign venture capital firms are qualified<sup>5</sup>.

---

<sup>3</sup> See 'Global Trend in Venture Capital 2006 Survey' released by Delloitte & Touche LLP.

<sup>4</sup> This is calculated by the author based on Zero2IPO annual report. There was no accurate statistical data on venture capital investment prior 2001.

<sup>5</sup> According to the 'Provisional Regulations on the Establishment of Foreign Invested Venture Capital Investment Enterprises' (the 'VC Regulations') issued on August 29, 2001, foreign venture capital firms are allowed to register as qualified foreign institutional investors. However, they have to go through very strict approval process at various government agencies for registration which is time-consuming. In addition, the rigid requirements for registered capital (at least \$20 mil and, 15% of this amount must be paid in within 3 months after the issue of the business license; the remainder must be paid in within 3 years whether or not attractive investments are available) are also constraints for foreign venture capital firms. Later, in January 2003, the amendment of 'Provisional Regulations for Establishment of Foreign-Invested Venture Capital

Facing rigorous capital control and other legal restrictions, foreign VCFs have been seeking for effective vehicles to accommodate their investment in China. Before the mid-1990s, they mainly worked as joint ventures with domestic investors in order to overcome the regulatory restrictions and build relationships with China's government or large SOEs for helps in deal sourcing, project governing and administrative protections under the weak institutions. However, the total capital inflow of FVCFs was slim in size at that time and the performance of the FVCFs was far from satisfactory (Feng, 2004).

With more experience accumulated, foreign VCFs have explored some new ways to accommodate their investment in China since the late 1990s. The most popular approach is to invest in China with an 'offshore model'. That is, the foreign VCFs incorporate overseas and raise funds from international markets. Without registering in China, they set representative offices to search, evaluate and manage the investment in China. The registration of their portfolio companies follows a 'round-trip model'. When a foreign VCF decides to invest in a project, they would help the founders to register an overseas holding company. Both the VCF and the major founders of the company hold the majority shares of the holding company. The holding company then invests back in the original enterprise in mainland China, normally with hundred percentage controls. In this way, both the corporate governance of the foreign VCFs and their portfolio companies are less restricted by the Chinese laws (Guo, 2008).

With the 'offshore model', the majority of FVCFs operating in China are structured under limited partnership. Limited partnership is a dominant organizational form of VCFs in the US. Scholars suggest it provides strong incentives for VCs to maximize the profits by aligning the interests of the parties (Sallman, 1990; Gompers and Lerner, 1996). Interviews with VCs show that the corporate governance and operation of the VCFs under limited partnership in China are similar to those of the VCFs under the same corporate structure in the US (Guo, 2008). That is, the investors of venture funds are limited partners who contribute the majority of the capital whereas VCs are general partners who contribute the minority of the capital. VCs, as general partners subject to unlimited liability, are responsible for managing the funds without the need for approvals from limited partners. Normally, VCs charge 15-20 percentage of the total profit as carrier interests and 1.5-3 percentage of the fund as annual management fee. This is a typical 'pay-for-performance' compensation structure. The relationship between the parties is more 'market-oriented'. At the same time, the limited partnership is governed under a multi-functional division structure that is more decentralized in decision-making. Each VC normally has his/her own team to deals with nearly the whole process of an investment case though the final investment decision is made based on the advice of the investment committee and the consensus of all general partners in the partnership. It is therefore a flat organization that the general partners work more independently than those in limited companies.

Besides the corporate governance, these two types of VCFs also differ from each other in fund sources and the legal systems under which they are governed due to the regulatory restrictions. FVCFs mainly raise funds from international markets. The sources of the funds are primarily pension funds, insurance corporations, university endowments and wealthy individuals that is similar to the practice in the US. As a comparison, however, according to Chinese laws, pension

---

Investment Enterprise' was approved by SAIC, MOFTEC, STA, MoST, SAFE. This version further clarified the procedures in foreign venture capital firms' registration and reduced the requirements for capital utilization. According to this revised version, the capital from foreign investors should be exploited within 5 years. It is much relaxed comparing the 2001 version that requires the utilization of capital within 3 years.

funds, insurance corporations and banks, are not allowed to invest in fields with high risks like venture capital funds. Therefore, for DVCFs, the major sources of funds are from government agents, large corporations and universities. This has restricted the fund size of DVCFs. As a result, the DVCFs are much smaller in scale than the FVCFs. In 2006, the average capital under each FVCF's management was \$255 million whereas it was only \$37 million for the DVCFs (Zero2IPO, 2007). At the same time, with the 'Offshore strategy', the business activities of the FVCFs and their portfolio companies are regulated by overseas laws. In this way, they have more chances to avoid the legal restrictions in China such as the prohibition on the use of convertible security, preferred stock etc. However, some of the most widely used mechanisms in venture capital investment could not be employed by domestic VCFs for a long time. Even though the restrictions have been gradually relaxed since 2004 when the Company Law was amended, there are still many problems left.

### **3. Data**

#### **3.1 Data and Sample**

We collect the information on VC-backed firms by combining two datasets. The investment information on VC-backed firms and their investors is collected from 'VentureXpert' database. Detailed financial and ownership structure information on these VC-backed firms before and after the investment is made is from China's Manufacturing Firm Survey Database (1998-2008).

First, we extract a name list of 2527 VC-backed firms from 'VentureXpert' database. These firms received their first venture capital investment prior January of 2011. The names are in English, we then confirm the Chinese names of these firms by searching their websites and other online sources. In total, we get Chinese names of 2518 firms.

After that, we match the Chinese name list with China's Manufacturing Firm Survey Database (2007). This database consists of virtually all manufacturing firms in China with annual sales of at least 5 million RMB (US\$750,000), including all SOEs, individually owned firms, joint ventures, and foreign firms. It is published by the National Bureau of Statistics of China every year since 1998. These firms produce over 90% of China's Gross Industrial Output. This database is also used by Chuang and Hsu (2004), Hsieh and Klenow (2009). After matching, we totally get 536 VC-backed firms covered by China's Manufacturing Firm Survey Database (2007). The sharp cut of the number of firms is understandable since a large amount of VC-backed firms are in internet service or software related industries that are not covered in this manufacturing firm survey. Additionally, there are also a large number of firms received the first round of venture capital investment after the year 2007. We then screen out firms which received the first round of venture capital investment prior 2000 and after 2006. This screening strategy is driven by our intention to capture the performance and R&D of the firms before and after venture capital investment. Given our panel is between year 1998 and 2008, we cut two years for both ends for estimating the before and after effects. Finally, it leaves us 269 VC-backed firms in 2007 survey data.

After we get the VC-backed firms, we construct the control group for the comparison purpose. To make sure that our results are not driven by a specific matching method, we build up the control group in several ways. We employ both one to one and one to five matched pairs methodology where a sample of VC-backed firms is matched by industry and location with an equivalent set of non-VC-backed firms in size. The size is measured by either the total assets or



the number of employees. We try to match the 269 VC-backed firms with non-VC-backed firms in the same industry and same geography location as closely as possible by size in the year when the VC-backed firms received the first round of venture capital investment. The universe of the non-VC backed firms from which the matched sample is constructed form China's Manufacturing Firm Survey Database.

### **3.2 Variables**

We employ two major measurements to estimate the performance of the firms that include the profitability and labor productivity. Profitability is measured by return on sales (ROS) of the firm. Labor productivity is measured by net profits per employee. We use R&D expenditure over total sales to estimate R&D investment.

We further include four control variables that are leverage ratio, the percentage of the state shares and private shares, and, employee treatments. Venture capital investment does not require collaterals. However, investing in entrepreneurial firms is associated with serious information issues and uncertainty. We hence expect that the liquidation value of the firms is a concern of VCs when they make investment decisions. Firm with lower leverage ratio are expected to have more chance to be picked up by VCs. Additionally, VCs are expected to be deeply involved in the governance of their portfolio companies. We suspect the ownership structure of the firms might be of another concern of VCs since the major institutional shareholders would affect to what extent VCs may influence the decision-making of their portfolio companies. It is expected that VCs may prefer firms with less state shares given it is normally believed that state owners are not solely profit-oriented that may be conflicting with VCs' interest. At the same time, the state ownership may also affect VCs' governance after the investment is made. Last, we include employee treatment factor into the panel analysis. Employee treatment is measured by average wage of an employee. Employee treatment may be associated with firms' performance and R&D activities no matter is serves as an inducing or an outcome factor (Pfeffer, 1996; Titman, 1984). We therefore control this effect when we examine the performance and R&D investment dynamics of the firm after venture capital investment is made.

At the same time, we also estimate the performance and R&D activities of companies backed by foreign and domestic VCs separately. As mentioned, venture capital firms are divided into two distinct groups due to regulatory restrictions. These two groups differ in many aspects including organizational, incentives schemes, decision-making process etc. In order to gain more insights on the relationship between VCs' incentives and their contributions to entrepreneurship, we compare the performance and R&D activities of the companies backed by these two groups of VCs. Venture capital firms normally syndicate the investments, and normally the lead venture capital firm is more intensively involved in governing the portfolio companies. So, we choose the headquarter location of the lead venture capital firm to determine whether the firms is backed by a foreign VCs or domestic ones. Following the previous literature (Lee and Wahal, 2004; and Nahata, 2008), we define the lead venture capital investor as the one that makes the largest total investment across all rounds of funding in an entrepreneurial firm.

### **3.3 Summary Statistics**

Table 1 provides summary statistics for the 269 VC-backed firms. It presents the means, minimums, maximums and standard deviations of firms' operational, financial and corporate

governance statistics for the VC-backed firms. It shows that the average value of VC-backed firms' ROS is about 0.1. These VC-backed firms use about 1% of their total sales to support R&D activities, and both state owned firms and private owned ones may be backed by VCs. Based on the fact that the mean of percentage of state shares is less than one fifth of that of private shares, it seems that VCs prefer firms with more private shares to state shares. Table 2 shows the correlation coefficient matrix among our key variables.

**Table 1 Summary Statistics of the Variables**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Total asset (10000RMB)</b>	269	766355.9	2145355	2826	2.58E+07
<b>The number of employee</b>	269	1104.632	2324.74	18	27316
<b>Sales (10000RMB)</b>	269	530734.4	821358.6	5820	3688629
<b>ROS</b>	269	0.107	0.158	-0.494	0.520
<b>Net profits per employee(10000RMB)</b>	268	76.549	118.419	-81.938	565.54
<b>R&amp;D expenditure over total sales</b>	168	0.012	0.026	0	0.131
<b>Leverage ratio</b>	269	0.546	0.214	0.025	1.831013
<b>% state shares</b>	217	0.029	0.119	0	1
<b>% private shares</b>	213	0.161	0.252	0	1

**Table 2 Correlation Matrix of Variables**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Total asset	1								
(2) The number of employee	0.625***	1							
(3) Sales	0.617***	0.421***	1						
(4) ROS	0.076***	0.004	0.084***	1					
(5) Net profits per employee	0.135***	-0.019***	0.244***	0.597***	1				
(6) R&D expenditure over total sales	0.024***	-0.0001	-0.044***	0.166***	0.077***	1			
(7) Leverage	0.001	0.009***	0.024***	-0.326***	-0.213***	-0.088***	1		
(8) State share	0.129***	0.162***	0.073***	0.005	-0.015***	0.017***	0.016***	1	
(9) Private share	-0.078***	-0.058***	-0.129***	-0.019***	-0.103***	-0.001	0.033***	-0.14***	1

Notes: \*\*\* correlation is significant at level 0.01; \*\* correlation is significant at level 0.05

Table3 reports the differences in profitability, productivity, innovation output and R&D input for VC versus non-VC-backed firms using a standard t-test. Panel (1) reports the difference between VC-backed firms and control group both of whose size are measured by the total number of employees. In this panel, we compare VC-backed firms and non-VC-backed firms from the onset of VC investment to two years later. In the year of VCs' entry, we find that compared with firms in the control group, VC-backed firms have statistically better profitability. Panel (1) shows that VC-backed firms' ROS is twice higher than that of non-VC-backed firms. It also shows that VC-backed firms have higher labor productivity. We find that VC-backed firms' net profit per

employee is about three times larger than that of non-VC-backed firms. Last, we find that these differences persist for at least two years after VC's entry, and these differences increase as time goes by.

**Table 3 T-tests on Performance and R&D Investment between the two Groups**

Panel (1): one to five matching by number of employees					
<b>t=0</b>					
	VC-backed firms	Control group	difference	t-statistics	z-statistics
<b>ROS</b>	0.107	0.041	0.066	8.298***	9.789***
<b>Net profits per employee</b>	76.549	28.854	47.695	8.625***	10.90***
<b>R&amp;D expenditure over total sales</b>	0.012	0.006	0.006	3.741***	5.281***
<b>t=1</b>					
	VC-backed firms	Control group	difference	t-statistics	z-statistics
<b>ROS</b>	0.116	0.041	0.075	7.940***	8.180***
<b>Net profits per employee</b>	80.565	30.129	50.436	7.499***	8.957***
<b>R&amp;D expenditure over total sales</b>	0.013	0.004	0.009	4.419***	4.919***
<b>t=2</b>					
	VC-backed firms	Control group	difference	t-statistics	z-statistics
<b>ROS</b>	0.118	0.049	0.069	5.138***	4.949***
<b>Net profits per employee</b>	81.886	34.167	47.719	4.811***	6.073***
<b>R&amp;D expenditure over total sales</b>	0.015	0.005	0.010	3.503***	4.067***
Panel (2): one to five matched by total assets					
	VC backed firms	Control group	difference	t-statistics	z-statistics
<b>t=0</b>					
<b>ROS</b>	0.107	0.053	0.054	5.849***	7.605***
<b>Net profits per employee</b>	76.549	55.455	21.094	2.713**	6.132***
<b>R&amp;D expenditure over total sales</b>	0.012	0.006	0.007	4.203***	4.350***
<b>t=1</b>					
	VC-backed firms	Control group	difference	t-statistics	z-statistics
<b>ROS</b>	0.116	0.050	0.066	5.911***	6.888***
<b>Net profits per employee</b>	80.565	57.192	23.373	2.474**	5.489***
<b>R&amp;D expenditure over total sales</b>	0.0129	0.005	0.008	3.821***	3.899***
<b>t=2</b>					
	VC-backed firms	Control group	difference	t-statistics	z-statistics
<b>ROS</b>	0.118	0.051	0.067	4.744***	4.411***
<b>Net profits per employee</b>	81.886	46.235	35.651	3.256***	4.259***
<b>R&amp;D expenditure over total sales</b>	0.015	0.006	0.009	2.852**	3.149**

Notes: \*\*\* correlation is significant at level 0.01; \*\*correlation is significant at level 0.05; \* correlation is significant at level 0.10

Panel (2) of Table 3 reports the difference between VC-backed firms and control group both of whose size are measured by total assets. We find that our main conclusions still hold when we change matching method, which shows that our findings are robust to different control groups.

Finally, in order to ensure our results are not affected by outliers, we apply the Wilcoxon test on the median. We use the two-tailed Wilcoxon rank-sum test to check whether or not the median in years before and after distress has significantly changed according to the Wilcoxon z-statistic (Kazmier and Pohl, 1984). Table 3 indicates that our results are robust to outliers.

## 4. Findings and Discussions

### 4.1 Do VCs Support better Companies?

In order to find out whether VCs indeed choose to invest in better performed firms, we conduct a logit regression to test which kind of firms are more likely to be selected out by VC firms. This is a cross section data analysis. The dependent variable is a dummy variable that equals to one if the firm is backed by VCs while equals to zero if otherwise.

Panel (1) of Table 4 presents the logit regression results. It shows that profitability and labor productivity are significantly correlated with the dummy variable representing venture capital investment. The results imply that firms are more likely to be backed by venture capital firms if they have higher profitability and labor productivity. Specifically, we find that if a firm's ROS increases by 0.1 from its mean (about 100% of its mean), the probability that it will be selected by VCs will increase by 4.9%. Similarly, we find that if a firm's net profit per employee increases by 76.5 from its mean (100% of its mean), the probability that it will be backed by VCs will increase by 3.1%.

**Table 4 Logit Regression of Probability of Being Backed by Venture Capital Investment**

	<b>Panel (1)</b>	<b>Panel (2)</b>	<b>Panel (3)</b>	<b>Panel (4)</b>
<b>ROS</b>	3.606 (0.9096418)***	2.173851 (0.9998747)**	3.689 (0.7706943)***	3.033824 (0.8502608)***
<b>Net profits per employee</b>	0.0029432 (0.0009905)***	0.0043439 (0.0011319)***	-0.000582 (0.0007805)	-0.0003107 (0.0008352)
<b>R&amp;D expendituer over total sales</b>		11.61517 (3.74582)***		12.71496 (3.871424)***
<b>Leverage</b>	0.439248 (0.3859808)	0.7036508 (0.4407021)	0.1284381 (0.3786606)	0.157588 (0.4272382)
<b>State share ratio</b>	-0.6186079 (0.6732765)	-1.313883 (0.9701459)	-0.5608419 (0.6358358)	-0.941511 (0.8306812)
<b>Private share ratio</b>	0.3085971 (0.293535)	0.661777 (0.3205354)**	0.5479125 (0.2915364)*	0.6544217 (0.3128471)**
<b>_cons</b>	-2.215987 (0.2540593)***	-2.488284 (0.2940386)***	-1.977591 (0.2463642)***	-2.091407 (0.2810868)***
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000
<b>Number of obs</b>	1176	920	1224	957

Notes: \*\*\* correlation is significant at level 0.01; \*\* correlation is significant at level 0.05; \* correlation is significant at level 0.10

R&D investment is supposed to be related to the firm's performance. We hence control R&D expenditure in the Panel (2). The data on R&D is available only after year 2005, so the number

of observations drops from 1176 to 920 when we incorporate R&D into our regressions. As seen in Panel (2) of Table 4, the main conclusion still holds that the profitability and labor productivity have significant and positive relationship with the probability the firm being selected by VCs. Furthermore, VC' investment decision is also significantly and positively related to R&D expenditure. It shows that if a firm increases its investment in R&D by 0.01 from its mean (100% of its mean), the probability that it is selected by VCs increases by 1.6%.

In both regressions we also control the leverage ratio, state share ratio and private share ratio. Interestingly, we find no statistically significant relationship between VCs' investment decisions with the leverage ratio of the entrepreneurial firm. It suggests that VCs do not take liquidation value of the firm into consideration when they conduct projects selection that is a little bit counter intuition. However, this might exactly reflect the value of venture capital investment. That is, VCs may see some missing variables that are not seen from the financial statements. The missing variables might be an innovative technology, a completely new and promising business model, or, an underdeveloped but promising market. It often happens that entrepreneurs, who have new ideas, are financial constrained. They have to borrow from families or friends at the startup stage. And, for most entrepreneurial businesses, in particular the innovative ones, it takes a few years to break even. In traditional view, they might be over leveraged. However, it might be the case that VCs with their expertise, may see the intangible value of the projects that compensate the so called 'downside risks' of the entrepreneurial firms.

Meanwhile, VCs do have preference in the ownership structure of the entrepreneurial firms when they make investment decisions in China. As seen in panel (2) of Table 4, the percentage of private shares of a firm is significantly and positively associated with VCs' choice. When the percentage of private shares of a firm increases by 3% from its mean (100% of its mean), the probability of being chosen by VCs increases by 0.27%.

In Panel (1) and Panel (2), we use the number of employees to construct the control group. In contrast, we use the total assets to find the control group in Panel (3) and Panel (4) to do the robust checks. The two panels confirm our findings again.

To summarize, we find companies with better financial performance do have higher probability to be funded by VCs. At the same time, companies, which invest more in R&D activities also have more chance to be financed by venture capital investment (Kortum and Lerner, 2000; MacMillan et al., 1985). Moreover, our results also suggest traditional financial theories do not always apply to venture capital investment. For instance, no evidence shows firms' leverage ratio, which is normally an important factor banks would take into considerations when they make investment decisions, has relationship with venture capital investment decisions.

## **4.2 Do VCs Add Value?**

We have found that VCs normally invest firms with better financial performance and more R&D investment in the last section. In order to estimate VC's value add effects, we extend our analysis from cross section analysis to panel data analysis to control unobserved firm specific effect. We compare VC-backed and non-VC-backed firms along a long panel from year 1998 to year 2008 to capture the evolvement of the firms' operations and to find out whether firms may further improve their performance and R&D investment after VCs' entry.

Several dummy variables are included into the panel analysis to capture the changes of the entrepreneurial firm's situation related to venture capital investment with the period of the examination. *The treatment effect dummy* is used to separate VC-backed firms from non-VC-backed ones. The dummy equals to one if the firms is backed by VCs and equals to zero if otherwise. If the coefficient of this variable is significantly positive, it implies that VC-backed firms have higher efficiency in general. *VC entry dummy* separates the whole period into two parts: i.e. the period before VCs' entry and after VCs' entry. The dummy variable equals to zero for the period before venture capital investment is made while equals to one for the period after the investment is made. The value of this variable for the control group is determined by its peer in the VC-backed group. This dummy is used to test the structural change effect before and after the entry of the venture capital investment. If the coefficient of this variable is significantly positive, it implies that the firms' performances increase after VC's entry no matter whether they are really backed by VC or not. To test whether the increases of performance after VC's entry are same for VC-backed and non VC-backed firms, we include an interaction term of the treatment effects dummy and VC entry dummy in to our regression. This interaction term equals to one if this observation is for a VC-backed firm in the period after the venture capital investment is made. If the coefficient of this variable is significantly positive, it indicates that the increase of the performance for VC-backed firms before and after the investment is made is larger than that for non VC-backed firms.

In Table 5, we report the regressions on the performance and R&D activities of VC-backed firms and the control group of non-VC-backed firms, which was constructed by using the number of employee. Panel (1) and (2) of Table 5 present the regressions on profitability, which is measured by ROS. Panel (1) shows that the firm's ROS is significantly and positively correlated with the treatment effect dummy variable. It indicates that VC-backed firms have higher profitability than non-VC-backed firms before the venture capital investment is made. On average, VC-backed firms' ROS is higher than non-VC-backed firms' ROS by 0.06, which is about 60% of the average value of the ROS of the VC-backed firms at the time of VCs' entry. More importantly, Panel (2) shows that the treatment effect increases by 0.01 after VCs' entry, which is about 10% of the average of the ROS of the VC-backed firms at the time of venture capital investment is made. It indicates that the gap in profitability between VC-backed firms and non-VC-backed firms is further widened after the venture capital investment is made.

We examine labor productivity in panel (3) and panel (4). The findings are similar to what we find with the profitability. VC-backed firms have higher labor productivity than non-VC-backed firms before the VC's entry. On average, VC-backed firms' net profits over the number of employee is higher than that of non-VC-backed firms by 26.75, which is about 35% of the average labor productivity of VC-backed firms at the time of VCs' entry. Moreover, this treatment effect increases by 7.53 after the venture capital investment is made. This increase counts about 10 % of the average of the net profits over the number of employee of the VC-backed firms at the time of VCs' entry. In implies that after the venture capital investment is made, firms' labor productivity is further improved.

Panel (5) and (6) present the regressions on firms' R&D expenditure over total sales. The interaction term in Panel (6) is significantly positive that implies firms invest more in R&D activities after the venture capital investment is made. On average, the R&D expenditure over

total sales increases by about 0.1%, which counts for about 10 % of the average of that of VC-backed firms at the time when the investment is made.

We also use a second control group matched by the total assets to repeat the above estimates. We find that our main conclusions stay robust.

**Table 5 OLS Regression Analysis of Firms' Performance and R&D Investment**

	1	2	3	4	5	6
	ROS		Net profits per employee		R&D expenditure over total sales	
<b>Treatment Effect Dummy</b>	0.061 (0.012)***	0.045 (0.012)***	26.747 (6.836)***	15.290 (7.287)**	0.007 (0.0021)***	0.004 (0.003)
<b>VC_entry Dummy</b>	0.003 (0.003)	0.001 (0.003)	8.397 (1.848)***	7.598 (1.856)***	0.000 (0.00074)	0.000 (0.0007)
<b>Interaction</b>		0.010 (0.003)***		7.527 (1.730)***		0.001 (0.00050)*
<b>Employee treatment</b>	0.000 (0.0001)***	0.000 (0.0001)***	0.989 (0.053)***	0.985 (0.053)***	0.000 (0.00002)***	0.000 (0.00002)***
<b>Leverage</b>	-0.084 (0.007)***	-0.084 (0.007)***	-33.756 (3.778)***	-33.654 (3.771)***	-0.001 (0.002)	-0.001 (0.002)
<b>State share ratio</b>	-0.004 (0.01)	-0.004 (0.01)	1.110 (5.408)	1.379 (5.398)	0.000 (0.003)	0.001 (0.003)
<b>Private share ratio</b>	-0.003 (0.005)	-0.002 (0.005)	-5.558 (2.964)*	-5.275 (2.960)*	-0.001 (0.001)	0.000 (0.001)
<b>_cons</b>	0.086 (0.005)***	0.086 (0.005)***	25.330 (2.809)***	25.399 (2.799)***	0.003 (0.0019)***	0.003 (0.0019)***
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000	0.000	0.000
<b>Number of obs</b>	5750	5750	5752	5752	2601	2601

Notes: \*\*\* correlation is significant at level 0.01; \*\* correlation is significant at level 0.05; \* correlation is significant at level 0.10

To summarize, we find that in general, VC-backed firms outperform non-VC-backed ones in profitability and labor productivity. More importantly, the performance differences between the two groups of firms are further magnified after venture capital investment is made. Similar phenomena are seen in firms' R&D activities. Firms backed by VCs invest more than non-VC-backed ones by average. Moreover, after the investment is made, the gap between the VC-backed and non-VC-backed firms in terms of R&D investment is widened.

## 5. Addressing the Identification Issues

### 5.1 Edogeneity Concerns with VCs' ex-ante Selection Assumptions

The logit regressions in section 4 show a strong and positive relationship between firms' performance and R&D investment with the probability of being backed by venture capital investment. At the same time, we also find VCs' treatment effect is positively correlated to firms' performance and R&D expenditure in the panel data examinations. However, we may not

conclude that the findings are caused by VCs' ex-ante project selection efforts since there might be some other unobservable factors contributing to these results.

One alternative explanation of these findings is that VCs attract, rather than pick up, firms with higher profitability, labor productivity and R&D investment. That is, it might be the case that entrepreneurs approach VCs only when their firms are in a good situation since seeking VCs' investment itself not without costs that they want to minimize the uncertainty of being rejected by VCs. Or, it might be the case that only those entrepreneurs, who are able to achieve better financial performance, have the vision and knowledge on the potential added value that VCs may lead to them together with the capital infused. It is hard for us to rule out these alternative explanations since we do not have the information on which entrepreneur seeks for venture capital investment, nor do we have information on which project is rejected by VCs. Nonetheless, we attempt to address this concern with interviews with VCs.

First of all, interviews with VCs show that the ex-ante project assessment process is very selective and the rejection rate is very high. We conducted interviews with 37 VCs in China between 2005 and 2006. The method and sample of the interviews are shown in Appendix 1. According to the interviews, only 1.3 out of 100 business plans submitted to VCs receive investment in China. Over 85 percentage VCs suggest that it takes more than three months for them to assess the project before they make the investment decisions. Moreover, VCs indeed devote numerous efforts in ex-ante project selection. All VCs visit the entrepreneurial firm more than six times before the investment decision is made. During the due diligence process, they assess the project with various ways including visiting the customers and suppliers of the company, track the business and personal records of the entrepreneur and management team, consulting experts in relevant market and technology, and consulting accounting and auditing firms. Moreover, all VCs interviewed emphasize that they go through financial statements of the projects carefully when they evaluate the projects.

In particular, the interviews demonstrate that VCs' consider the financial performance and technological improvements of the entrepreneurial projects as important aspects when they make the investment decisions. As seen in Table A-2, 18 out of the 38 criteria are related to the product, market and financial considerations of the entrepreneurial company. At the same time, we also asked VCs to list ten essential criteria without which they would definitely reject the project regardless other aspects. As seen in Table A-3, again, half of the ten essential criteria are related to the market, product and financial outlook of the project. ROS, labor productivity and R&D investment are measurements not only reflecting a firm's financial situation, but also stating a firm's market penetration situation and strategies for technological improvements. At the same time, it also indirectly reflects the capability of the entrepreneur and the management team. Although some important factors, for example, the personality of the entrepreneur and the features of the management team, are missed in our regressions, our estimates do cover important elements of VCs' ex-ante selection.

In summary, the interviews suggest that VCs do exert many efforts in ex-ante project selection and the selection criteria are consistent with what we have found from the regression analysis. We do not, however, seek to claim that the ex-ante selection of venture capital investment is the single explanation for the results of the statistical examinations. Rather, we suggest that these supportive findings from the interviews to some extent help us to identify the underlying mechanisms behind our regression estimates.



## **5.2 Identification Issues on VCs' Value Added Effect**

The regressions in section 4 not only show a strong and positive relationship between venture capital investment and firms' performance and R&D investment, but also suggest that the extent of the positive effect of venture capital investment is further increased after the investment is made. The firm-level panel data analysis helps us to capture firm-specific factors that ease the endogeneity challenges to some extent given we have estimated the performance and R&D investment of firms both before and after the venture capital infused. However, we do have identification concerns. That is, there might be some missing variables rather than VCs' involvements that contribute to the magnified performance improvements and R&D investment after the venture capital investment is made. For instance, we have shown that VCs indeed choose to invest in better-performed companies *ex ante*. It might be the case that these better performed companies, which are picked up by VCs, have better chance to catch some external opportunities than those non-VC-backed ones and hence grow at a further faster pace after the venture capital investment is made. If those external opportunities including market opportunities, technological opportunities or policy related opportunities coincidentally happen at or after the venture capital investment is made, the value added effects we suggested in the empirical examinations may be inflated.

We address above endogeneity issues with three steps. The first two approaches are mainly focused on the channels through which VCs may add value to their portfolio companies. We first examine corporate governance of VC-backed and non-VC-backed firms to see whether the managers of VC-backed firms are indeed under more shareholders' control than those non-VC-backed ones. Second, we link VCs' incentives, *ex-post* monitoring efforts and VC-backed firms' performance by examining firms backed by domestic and foreign VCs. The third approach aims to isolate VCs' effects from other factors that may affect firms' performance and R&D activities by examining the relationship between VCs' involvements and firms' performance after an exogenous shock.

### **5.2.1 Corporate Governance of VC-backed and non-VC-backed Firms**

The essential argument of VCs' value added effect is that VCs are active investors, who participate in the management of their portfolio companies. Studies suggest that one of the important channels for VCs' involvements is to help their portfolio companies building up a better governance structure (Hellmann and Puri, 2002). The logic is that with a better corporate governance structure, VCs may more effectively monitor the managers and mitigate the inefficiencies arising from moral hazard and adverse selection. Consequently, VC-backed firms outperform those non-VC-backed ones. Alongside with this reasoning line, we hence wonder if indeed there is difference between VC-backed and non-VC-backed firms in the corporate governance. We suggest that if VC-backed firms are under better corporate governance than the others, it may to some extent help us to identify the mechanism of VCs' impacts on their portfolio companies we observed in the examinations in Section 4.

Due to the data constraints, we are not able to conduct firm-level analysis of our sampled firms. We use CapitalIQ, a Standard & Poor's database, to extract some major corporate governance information on 76 VC-backed firms and 280 non-VC-backed firms in China. We focus on the percentage of shareholder approval needed to amend the firm's Bylaws and Charter; the

percentage of shareholder approval needed to act by written consent and call special meetings, and, the percentage of CEO's holding.

Table 6 present the T-test results for the comparison between VC-backed and non-VC-backed firms. It shows that by average, for VC-backed firms, significantly higher ratio of shareholder approval is required to amend Bylaws and Charter. At the same time, in VC-backed firms, the executives need to have significantly more supports from shareholders if they want to call a special meeting or they act by written consent. Moreover, in VC-backed firms, the CEOs' holding is lower than in non-VC-backed firms though statistically, the difference is not significant.

**Table 6 T-tests on Corporate Governance of VC-backed and non-VC-backed firms**

<b>Corporate Governance Measurements</b>	<b>VC-backed firms</b>	<b>Non-VC-backed firms</b>	<b>Difference</b>	<b>T-Statistics</b>
<b>% of Shareholder Approval Required to Amend Bylaws</b>	63.28	60.24	3.04	2.154**
<b>% of Shareholder Approval Required to Amend Charter</b>	65.73	62.90	2.83	2.014**
<b>% of Shareholder Approval Required to Call Special Meetings</b>	27.8333	23.4921	4.3412	1.709*
<b>% of Shareholder Approval Required To Act By Written Consent</b>	85.87	71.07	14.80	3.706***
<b>%CEO holding</b>	22.2891	27.4185	-5.1293	-1.456

Notes: \*\*\* correlation is significant at level 0.01; \*\* correlation is significant at level 0.05; \* correlation is significant at level 0.10

The T-test results demonstrate that indeed, the executives' decision-making of the VC-backed firms is under more rigorous control than those of the non-VC-backed firms. It is by no means to claim we may identify VCs' value added effects with these simple examinations for sure. However, we suggest this provides more insights on VCs' monitoring activities and, leads us closer to explore the bridge between VCs' involvements and the performance and R&D activities of VC-backed firms.

### **5.2.3 VCs' Incentive, Expertise and the Performance of VC-backed Firms**

In this subsection, we attempt to address the identification issues of the value added effects by further linking the incentives and experience of VCs and their value added activities with the performance and R&D activities of VC-backed firms. As mentioned, the foundation of the value added effect argument is that VCs exert ex post efforts to monitor and support their portfolio companies. It suggests two major requirements from VCs to really add value to the entrepreneurial companies: expertise to provide helpful suggestions and monitor efficiently, and, motivations to exert efforts and utilize the expertise. Neither is dispensable. The logic therefore implies that if VCs indeed add value to their portfolio companies, we should expect companies backed by VCs with more expertise and higher incentives outperform those backed by VCs with less expertise and lower incentives.

The institutional settings in China provide a perfect opportunity for us to test the above assumptions. As mentioned in section 2, VCFs in China are divided into two distinctive groups

due to the regulatory institutions. These exogenous factors including the restrictions on limited partnership, foreign institutional investors and capital control, determine these two types of VCFs vary from each other in many ways. According to our interviews with 37 VCs from 34 venture capital firms, 19 out of 22 foreign VCFs are structured as limited partnership while all the domestic ones are structured as limited companies. In general, foreign VCFs are more decentralized in decision-making and they provide high-powered ‘pay-for-performance’ compensations to individuals. In contrast, domestic ones are more centralized in decision-making and the compensations are not directly and closely to individuals’ performance. To summarize, foreign venture capital firms provide higher-powered incentives to VCs comparing to their domestic counterparts do.

At the same time, foreign VCs are much more experienced than domestic ones. Venture capital is still a new concept in China that the country is lack of experts in private equity investment in general. According to our interviews with VCs in 2005 and 2006, foreign firms have longer experience in venture capital industry than domestic ones. The average age of the foreign venture capital firms was 11.5 while it was 6.33 for domestic ones in 2006. Moreover, associated with the above mentioned restrictions in governance and incentive schemes, it is hard for domestic VCFs to attract experienced venture capital experts from overseas markets. According to our interviews, domestic VCs are former governmental officers or managers of large corporations. By contrast, most of foreign VCs have investment banking or entrepreneurial experience that is closely related to private equity financing. The learning curve theory suggests more experience and accumulated knowledge may not only help to reduce costs but also improve efficiency (Spence, 1981; Ghemawat. and Spence, 1985). We hence suggest foreign VCs have more expertise in monitoring and providing supports to their portfolio companies than domestic ones.

Given the distinctions between foreign and domestic venture capital firms are exogenous, it builds up a good condition for us to conduct a comparison between the firms backed by them. We suggest that if indeed VCs’ involvements are important for entrepreneurial firms’ growth and R&D spending decisions, we should expect firms backed by foreign venture capital firms, which have more experienced investment experts and provide higher-powered incentives to VCs, outperform those backed by domestic venture capital firms.

Table 7 reports firms’ performance and R&D activities for foreign and domestic VC-backed firms separately. As seen in Panel (1), we find that both domestic VC-backed and foreign VC-backed firms have significantly higher profitability than non VC-backed firms in general, but this treatment effect is stronger for domestic VC-backed firms. It shows that on average, a domestic VC-backed firm has higher ROS than a firm in the control group by 0.061, while a foreign VC-backed firm has higher ROS than a firm in the control group by 0.058. In panel (2), we control two more interactions: one is used to control the effect of domestic VCs’ entry and the other is used to control the effect of foreign VCs’ entry. It shows that the effect of domestic VCs’ entry is still positively associated with the firm’ ROS, but statistically insignificant. These results suggest that domestic VCs pick up entrepreneurial firms with higher profitability ex-ante. However, when the ex-ante selection is adjusted, domestic VCs do not help these firms to gain more profits than non-VC-backed ones after the investment is made. On the contrary, we find a significant and positive relationship between the foreign VCs’ entry and the firm’s ROS even after control the treatment effect. After foreign VC’s entry, the ROS of foreign VC-backed firm increases by 0.015. It suggests that the profitability of the foreign VC-backed firms is higher than their non-

VC-backed counterparts both before and after the investment is made while the difference is magnified after the investment is made.

In Panel (3) and panel (4), we examine firms' labor productivity. Although Table 5 shows that VC-backed firms enjoy higher labor productivity than non-VC-backed firms in general, panel (3) of Table 7 suggests that this effect mainly comes from foreign VCs. On average, firms backed by foreign VCs have higher productivity than those backed by domestic VCs and those non VC-backed firms. Specifically, foreign VC-backed firms' productivity is about 57.49 higher than others, which is about 75% of the mean value of the productivity of VC-backed firms at the time of VCs' entry. Furthermore, in panel (4), we find that foreign VCs not only pick firms with higher productivity, they are also able to magnify the difference further. After foreign VC's entry, the net profits over the number of employee of foreign VC-backed firms further increase by 11.40.

In Panel (5) and panel (6), we examine R&D expenditure over total sales. We find that in general, firms backed by both domestic VCs and foreign VCs invest more than those non-VC-backed firms. In particular, if we do not take VCs' entry effect into account, the marginal effect of foreign VCs is about 0.002 higher than that of domestic VCs. However, when we put VCs' entry effect into the calculation in Panel (8), we find two interesting changes: Primarily, the treatment effect of foreign VCs is dropped while the interaction term, which indicates the time period after foreign venture investment is made, is significantly and positively related to R&D investment. After foreign VC's entry, the R&D expenditure of the firm increases by 0.002. By contrast, the treatment effect of domestic VCs stays significantly positive while the domestic VCs' entry effect turns to be insignificant. The results indicate that foreign VC-backed firms do not necessarily invest significantly more in R&D activities than non-VC-backed ones before the investment is made. However, they do spend more in R&D activities after the venture capital investment is made. On the contrary, the difference in R&D investment between domestic VC-backed firms and their counterparts in the control group is mainly contributed by ex-ante selection. That is, domestic VCs indeed invest firms, which spend more in R&D activities when

**Table 7 Regression Analysis on Performance and R&D Investment: foreign and domestic VC-backed firms and non-VC-backed firms**

	1	2	3	4	5	6
	ROS		Net profits per employee		R&D expenditure over total sales	
<b>China VC treatment</b>	0.061 (0.015)***	0.053 (0.016)***	11.073 (8.725)	8.058 (9.271)	0.007 (0.003)**	0.007 (0.003)**
<b>Foreign VC treatment</b>	0.058 (0.021)***	0.028 (0.023)	57.488 (12.285)***	34.089 (13.228)***	0.009 (0.0048)**	0.001 (0.008)
<b>VC_entry Dummy</b>	0.003 (0.003)	0.001 (0.003)	8.271 (1.8489)***	7.609 (1.8578)***	0.000 (0.0007)	0.000 (0.0007)
<b>China_VC_interaction</b>		0.006 (0.004)		2.274 (2.506)		0.000 (0.0007)
<b>Foreign_VC_interaction</b>		0.015 (0.004)***		11.402 (2.543)***		0.002 (0.0008)***

<b>Employee treatment</b>	0.000 (0.0001)***	0.000 (0.0001)***	0.987 (0.053)***	0.984 (0.053)***	0.000 (0.00002)***	0.000 (0.00002)***
<b>Leverage</b>	-0.083 (0.007)***	-0.083 (0.007)***	-33.673 (3.778)***	-33.732 (3.77)***	-0.001 (0.002)	-0.002 (0.002)
<b>State share ratio</b>	-0.004 (0.01)	-0.004 (0.01)	1.045 (5.41)	1.384 (5.398)	0.000 (0.003)	0.001 (0.003)
<b>Private share ratio</b>	-0.003 (0.005)	-0.002 (0.005)	-5.329 (2.966)*	-5.151 (2.962)*	-0.001 (0.001)	0.000 (0.001)
<b>_cons</b>	0.086 (0.005)***	0.086 (0.005)***	25.294 (2.807)***	25.437 (2.792)***	0.003 (0.001)***	0.003 (0.001)***
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000	0.000	0.000
<b>Number of obs</b>	5740	5740	5742	5742	2597	2597

Notes: \*\*\* correlation is significant at level 0.01; \*\* correlation is significant at level 0.05; \* correlation is significant at level 0.10

they make the investment decisions. However, there is no evidence that those firms spend significantly more than non-VC-backed firms after the domestic VCs' investment is infused.

The findings are robust to different matching methods for the control group. Our main references hold when we use the total assets to find the control group.

Additionally, in order to rule out the potential selection biases between foreign and domestic VC-backed firms, we also conduct T-tests to compare the performance and R&D expenditure of firms by foreign and domestic venture capital firms. At the same time, we conduct a set of logit regressions to test whether the likelihood of being backed by the two types of VCs is different. We find no statistically significant difference between the two groups at the time when the investment is made.

In general, the above examinations support our assumptions on the relationship between VCs' incentives and the performance of their portfolio companies. Primarily, both domestic and foreign VC-backed firms outperform their non-VC-backed counterparts in profitability, labor productivity and R&D investment. However, the effect for domestic VC-backed firms mainly comes from the ex-ante project selection. That is, domestic VCs mainly pick up companies with higher profitability, labor productivity and higher degree of R&D intensity when they make the investment decisions. As a comparison, we find foreign VC-backed firms not only outperform non-VC-backed ones at the time when the investment is made, they experience significantly faster growth and invest substantially more in R&D activities than their counterparts in the control group after the investment is made.

### 5.2.3 Effects of Venture Capital Investment or other Opportunities?

In the forgoing two subsections, we focused on uncovering the potential channels through which VCs' may affect the entrepreneurial firms' performance and R&D activities to identify VCs' value added effect. In this subsection, we attempt to examine whether the findings on the magnified performance improvements and R&D investment after venture capital investment is made are caused by other external factors such as market opportunities, technological

improvements or policy changes, rather than venture capital investment. To address this issue, we repeat our examinations after an exogenous shock in venture capital industry.

In the year 2004 and 2005, China issued a series of laws and policies to relax regulations on private sections and private equity investment. First of all, the constitutional rights of the private sector were fully and clearly recognized at The Tenth National People Congress in 2004. In the same year, Bankruptcy Law was in effect. These two legal changes provide substantially better protection for external investors. At the same time, the ‘Interim Administrative Measures for the Start-up Investment Enterprises’ was approved by the State Council in September of 2005. It established partially uniform rules for both domestic and foreign VC firms in terms of preferential treatment and financial support. It also confirmed the legitimacy of using convertible security and preferred stock by both domestic and foreign VC firms. In particular, the State Administration of Foreign Exchange (SAFE) issued Circular 75 in October of 2005, which confirmed that the use of offshore special purpose vehicles as holding companies for PRC investments is permitted as long as proper foreign exchange registrations are made with SAFE. This is the first time legally recognize the ‘offshore incorporation model’ of venture capital investment in China.

As a result, the newly committed venture capital funds in 2005 jumped by more than seven times to \$4.69 Billion from \$646 million in the year 2004. That is, the supply side of the venture capital investment was sharply shifted in 2005. This exogenous change is a direct result of the relaxation of venture capital market while is unlikely related to market or technological opportunities of entrepreneurial firms. Hence, if we find the relationship between firms’ performance and R&D activities with VCs’ entry stays robust after the year 2005, it may help to control the effects of the alternative explanations while identify the effect of venture capital investment.

The results are shown in Table 8. We estimate performance and R&D activities for firms which receive the first round of venture capital investment after the year 2005. Panel (1) and Panel (2) focus on firms’ ROS. We still obtain statistically significant estimates of the treatment effect and the interaction term. The magnitudes for both effects are not shown much difference from the results for the whole examination period. Panel (3) and Panel (4) present the results on firms’ labor productivity, which is measured by the net profits per employee. Again, firms’ labor productivity is significantly and positively associated with the treatment effect and the interaction term. More importantly, it shows that the magnitudes of the effects are increased substantially for firms backed by VCs after 2005. These results indicate that our estimates stay robust after the year 2005 when the venture capital market was experienced a sharp exogenous change. We are not able to test the year effect on R&D investment since R&D expenditure data are only available for years between 2005 and 2008.

**Table 8 Regression Analysis of Firm’s Performance: VC-backed firms and non-VC-backed firms after 2005**

	1	2	3	4
	ROS		Net profits per employee	

<b>Treatment Effect Dummy</b>	0.072 (0.0137219)***	0.048 (0.0154304)***	39.135 (9.146245)***	20.965 (10.22884)**
<b>VC_entry Dummy</b>	0.006 (0.0035995)	0.004 (0.0036172)	9.926 (2.255649)***	8.966 (2.265874)***
<b>Interaction</b>		0.010 (0.00303787)***		7.784 (1.995893)***
<b>Employee treatment</b>	0.000 (0.0001034)**	0.000 (0.0001033)*	0.708 (0.0653003)***	0.706 (0.0651964)***
<b>Leverage</b>	-0.085 (0.0081917)***	-0.084 (0.0081802)***	-32.210 (5.229991)***	-32.013 (5.219065)***
<b>State share ratio</b>	-0.007 (0.0141398)	-0.007 (0.0141192)	6.426 (9.024414)	6.781 (9.00487)
<b>Private share ratio</b>	-0.001 (0.0061949)	-0.001 (0.0061877)	-8.787 (3.927673)**	-8.400 (3.921614)**
<b>_cons</b>	0.088 (0.0057106)***	0.088 (0.0057026)***	30.485 (3.687201)***	30.565 (3.677195)***
<b>Number of obs</b>	3361	3361	3362	3362
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000

Notes: \*\*\* correlation is significant at level 0.01; \*\* correlation is significant at level 0.05; \* correlation is significant at level 0.10

We also examine firms' ROS and labor productivity after the year 2005 for foreign VC-backed and domestic VC-backed firms and their counterparts separately. The results are presented in Table 9. The findings are again similar to what we have found with the examinations for the whole period of time. That is, firms backed by foreign venture capital firms, which provide higher-powered incentives to VCs, experience magnified performance improvements after the investment is made than those non-VC-backed counterparts. Domestic VC-backed firms also experience faster growth after the investment is made. However, statistically, the effect is not significant.

**Table 9 Regression Analysis of Firms' Performance: foreign and domestic VC-backed firms and non-VC-backed firms after 2005**

	1	2	3	4
	ROS		Net profits per employee	
<b>China VC treatment</b>	0.063 (0.0176507)***	0.057 (0.0196738)***	9.453 (11.66783)	4.223 (12.96657)
<b>Foreign VC treatment</b>	0.091 (0.0239358)***	0.043 (0.0277017)	92.647 (15.87387)***	59.762 (18.21448)***
<b>VC_entry Dummy</b>	0.005 (0.0036018)	0.004 (0.0036172)	9.726 (2.254283)***	8.978 (2.264247)***
<b>Chian_VC_interaction</b>		0.003 (0.00437939)		2.624 (2.88362)
<b>Foreign_VC_interaction</b>		0.016 (0.00456081)***		10.728 (2.951521)***
<b>Employee treatment</b>	0.000 (0.0001035)**	0.000 (0.0001034)*	0.708 (0.0652262)***	0.705 (0.0651461)***
<b>Leverage</b>	-0.085 (0.008196)***	-0.084 (0.0081848)***	-32.218 (5.217783)***	-32.170 (5.208441)***

<b>State share ratio</b>	-0.007 (0.0141456)	-0.006 (0.0141269)	6.230 (9.002018)	6.761 (8.986027)
<b>Private share ratio</b>	-0.001 (0.0062044)	0.000 (0.0061962)	-8.446 (3.924582)**	-8.198 (3.919275)**
<b>_cons</b>	0.088 (0.0057142)***	0.088 (0.0057073)***	30.482 (3.674767)***	30.628 (3.666228)***
<b>Number of obs</b>	3356	3356	3357	3357
<b>Prob &gt; chi2</b>	0.000	0.000	0.000	0.000

Notes: \*\*\* correlation is significant at level 0.01; \*\* correlation is significant at level 0.05; \* correlation is significant at level 0.10

Both the above examinations are repeated with the other set of control group of firms, which are matched by total assets. Our results stay robust.

In summary, the examinations in Table 8 and Table 9 are largely consistent with our findings for the whole panel in section 4. VC-backed firms enjoy further faster growth than non-VC-backed firms after the investment is made. Additionally, the performance improvements of the entrepreneurial firms depend on who are the investors. More importantly, VCs' value added effect stays robust when we isolate venture capital investment from alternative factors that may have impacts on firms' performance and R&D activities by estimating the effect after an exogenous shock.

## 6. Conclusion

This paper examines the contribution of venture capital investment to entrepreneurial firms' growth and R&D activities in China. Based on firm-level panel data, we find two types of contributions of venture capital investment. First, we find VCs in China indeed invest in firms with better financial performance and investing more in R&D activities. Second, we find those entrepreneurial firms which are backed by venture capital investment experience magnified performance improvement and R&D investment after the investment is made. We use different ways to address the endogeneity issues, the results stay robust. We suggest that VCs not only have the capability to choose better projects but also add value to their portfolio companies after the investment is made.

This study contributes to the existing literature on venture capital investment in two aspects. First, it is the first study examines venture capital investment effects based on firm-level panel data that compares both the selection and ex post value added effects of venture capital investment. It tries to answer a long puzzling question: if indeed VC-backed firms outperform non-VC-backed ones, whether the source of the advantages by which projects are chosen ex ante, or, it is the monitoring and control after the investment is made (Kortum and Lerner, 2000). Second, it is among the first efforts to systematically examine the contribution of venture capital investment to firms' performance and R&D activities in China. It not only provides evidence on the contribution of venture capital investment to entrepreneurial firms in China, but also raises questions for further research. First, does venture capital investment also spur innovation in China if they matter on firms' financial performance and R&D investment? Second, why and how venture capital investment may help entrepreneurial firms under the outrageously weak institutions in China?



## References

- Barry, C., Muscarella, C., Peavy III, J. and Vetsuypens, M., 1990. The Role of Venture Capital in the Creation of Public Companies: Evidence from the Going-public Process. *Journal of Financial Economics*, Vol. 27, No.2, pp.447-471
- Bradley, D. and Jordan, B., 2002. Partial Adjustment to Public Information and IPO Underpricing. *Journal of Financial and Quantitative Analysis*, Vol. 37, pp. 595 - 616.
- Brav, A. and Gompers, P., 1997. Myth or Reality? The Long-Run Underperformance of Initial Public Offerings: Evidence from Venture and Nonventure Capital-Backed Companies. *Journal of Finance*, Vol. 52, No. 5, pp. 1791-1821
- Chuang, Y. and Hsu. P., 2004. FDI, Trade, and Spillover Efficiency: Evidence from China's Manufacturing Sector. *Applied Economics*, Vol. 36, No. 10, pp. 1103-1115
- Davila, A., Foster, G. and Gupta, M., 2003. Venture Capital Financing and the Growth of Startup Firms. *Journal of Business Venturing*, Vol., No.6, pp. 689-708
- Feng, Z., 2004. Venture Capital Investment in China. PhD thesis, Pardee Rand Graduate School
- Ghemawat. P. and Spence. M., 1985. Learning Curve Spillovers and Market Performance. *The Quarterly Journal of Economics*, Vol.100, pp. 839-852
- Hellmann, T. and Puri, M., 2000, The Interaction between Product Market and Financing Strategy: The Role of Venture Capital. *Review of Financial Studies*, Vol. 13, No. 4, pp. 959-984
- Hellmann, T. and Puri, M., 2002. Venture Capital and the Professionalization of Start-up Firms: Empirical Evidence. *Journal of Finance*, Vol. 57, No. 1, pp. 169-197
- Hsieh, C. T. and Klenow P. J., 2009. Misallocation and Manufacturing TFP in China and India. *Quarterly Journal of Economics*, Vol. 124, No. 4, pp. 1403-1448
- Kortum, S. and Lerner, J., 2000. Assessing the Contribution of Venture Capital to Innovation. *The RAND Journal of Economics*, Vol. 31, No. 4, pp. 674-692
- Lee, P. and Wahal, S., 2004. Grandstanding, certification and the underpricing of venture capital backed IPOs. *Journal of Financial Economics*, Vol. 73, No.2, pp. 375-407
- Macmillan, L.C., Siegel, R. and SubbaNarasimha, P., 1985. Criteria Used by Venture Capitalists to Evaluate New Venture Proposals. *Journal of Business Venturing*, Vol. 1, No. 1, pp. 119-128
- Meggison, W.L. and Weiss, K.A., 1991. Venture Capitalist Certification in Initial Public Offerings. *Journal of Finance*, Vol. 46, pp. 879-903

- Nahata, R., 2008, Venture Capital Reputation and Investment Performance. *Journal of Financial Economics*, Vol. 90, pp. 127-151
- Pfeffer, J., 1996. *Competitive Advantage Through People: Unleashing the Power of the Work Force*. Harvard Business School Press: Cambridge, MA
- Sahlman, W., 1990. The Structure and Governance of Venture Capital Organizations. *Journal of Financial Economics*, Vol. 27, pp. 473-524.
- Spence, M., 1981. The Learning Curve and Competition. *The Bell Journal of Economics*, Vol.12, No.1, pp.49-70.
- Titman, S., 1984. The Effect of Capital Structure on a Firm's Liquidation Decision. *Journal of Financial Economics*, Vol. 13, pp. 137-151

## Appendix. Interview Data and Sample

We conducted interviews with VCs in Beijing, Shanghai and Shenzhen between 2005 and 2006. The purpose of the interviews are focused on exploring the management of venture capital firms and VCs' investment activities in China including ex-ante project selection, due diligence process, contract design and ex-post monitoring activities.

Convenience sampling and snowballing sampling strategies were chosen for the interviews. With the referrals of my interviewees, we tried to access VCs venture capitalists that are more active in China's market. In total, 37 VCs from 34 VCFs were interviewed. Among the 37 VCs, 24 are from 22 foreign VCFs while 13 are from 12 domestic ones as shown in Table A-1. The majority of foreign venture capital firms are from the US. In addition, 19 out of the 22 foreign venture capital firms are structured as limited partnership whereas three are structured as limited companies. As for the domestic venture capital firms, the majority are from Beijing. In addition, all of them are structured as limited companies. Despite the small sample size, this study covers venture capitalists from some of the most active VCFs in China. The 34 VCFs have invested in over 600 deals in China which consist more than one third of the total venture capital investment by the number of deals till the end of 2006. The venture capitalists interviewed were mainly from larger VCFs measured by the fund size. 18 of the 37 VCs are from the top 30 venture capital firms in China.

**Table A-1 Sample of Interviews with VCs**

INTERVIEWEE	ORGANIZATION	INTERVIEW METHODS*	LOCATION OF THE VCF	FVCF OR DVCF*	STRUCTURE OF THE VCF	POSITION OF THE VC
VC1	VCF1	UI&SI	California	FVCF	LPVCF	Partner
VC2	VCF2	SI	California	FVCF	LPVCF	Vice President
VC3	VCF3	UI& SI	California	FVCF	LCVCF	Investment Manager
VC4	VCF4	2UI&SI	Beijing	DVCF	LCVCF	General Manager
VC5	VCF5	SI	Beijing	DVCF	LCVCF	Investment Manager
VC6	VCF6	SI	London	FVCF	LPVCF	Partner
VC7	VCF7	SI	Washington	FVCF	LPVCF	Investment Manager
VC8	VCF8	SI	Beijing	DVCF	LCVCF	General Manager
VC9	VCF9	SI	California	FVCF	LPVCF	Partner
VC10	VCF10	SI	Cologne	FVCF	LPVCF	Investment Manager
VC11	VCF11	SI	California	FVCF	LPVCF	Vice President
VC12	VCF12	SI	California	FVCF	LPVCF	Investment Manager
VC13	VCF13	SI	Singapore	FVCF	LCVCF	Vice President
VC14	VCF14	SI	California	FVCF	LPVCF	Partner
VC15	VCF15	SI	California	FVCF	LPVCF	Partner

VC16	VCF16	2 UI&SI	California	FVCF	LPVCF	Partner
VC17	VCF16	UI&SI	California	FVCF	LPVCF	Investment Manager
VC18	VCF17	SI	Massachusetts	FVCF	LPVCF	Partner
VC19	VCF18	SI	Tokyo	FVCF	LPVCF	Vice President
VC20	VCF19	SI	New York	FVCF	LPVCF	Partner
VC21	VCF20	UI&SI	Beijing	DVCF	LCVCF	Vice President
VC22	VCF20	SI	Beijing	DVCF	LCVCF	Investment Manager
VC23	VCF21	SI	Shanghai	DVCF	LCVCF	General Manager
VC24	VCF22	UI&SI	Shenzhen	DVCF	LCVCF	General Manager
VC25	VCF23	SI	Taipei	FVCF	LPVCF	Vice President
VC26	VCF24	SI	California	FVCF	LPVCF	Partner
VC27	VCF25	SI	New York	FVCF	LPVCF	Investment Manager
VC28	VCF26	SI	Hong Kong	FVCF	LPVCF	Partner
VC29	VCF27	SI	Oberhaching	FVCF	LCVCF	Investment Manager
VC30	VCF28	SI	Beijing	DVCF	LCVCF	Investment manager
VC31	VCF29	SI	Beijing	DVCF	LCVCF	General Manager
VC32	VCF30	SI	Beijing	DVCF	LCVCF	Vice President
VC33	VCF31	SI	Shanghai	DVCF	LCVCF	Vice President
VC34	VCF32	SI	California	FVCF	LPVCF	Vice President
VC35	VCF33	SI	New York	FVCF	LPVCF	Vice President
VC36	VCF34	SI	Beijing	DVCF	LCVCF	Investment manager
VC37	VCF21	SI	Shanghai	DVCF	LCVCF	Investment manager

\*: UI: unstructured interviews; SI: semi-structured interviews

**Table A-2 VCs' ex-ante Project Assessment Criteria in China**

Project selection criteria: Likert Scale: 0-4	Mean	SD
Group I: The personality of the entrepreneur: The entrepreneur:		
1. is honest enough.	3.68	0.475
2. is capable of sustained intense effort.	3.65	0.485
3. is able to evaluate and react to risk well.	3.35	0.544
4. articulates in discussing venture.	2.88	0.409

5. attends to detail.	2.38	0.551
6. has a personality compatible with mine.	1.97	0.870
7. has rich social network.	3.03	0.388
Group II: The capability of the entrepreneur: The entrepreneur:		
8. is thoroughly familiar with the market targeted by the project.	3.74	0.448
9. has demonstrated leadership ability in past.	3.21	0.410
10. has a track record relevant to venture.	2.91	0.514
11. was referred to me by a trustworthy source.	2.26	0.618
12. has overseas educational and working experience.	2.09	0.933
13. I am already familiar with the entrepreneur's reputation.	2.03	0.627
Group III: The characteristics of the product or service		
14. The product is proprietary or can otherwise be protected.	2.94	0.629
15. The product enjoys demonstrated market acceptance.	3.26	0.511
16. The product has been developed to the point of a functioning prototype.	2.18	0.576
17. The product may be described as "high tech."	2.15	0.702
18. The product has great potentials for export.	2.03	0.460
19. The product or service is complementary to our other portfolios.	2.09	0.621
Group IV: The characteristics of the market of the product or service		
20. The target market enjoys a significant growth rate.	3.71	0.462
21. The venture will stimulate an existing market.	2.35	0.485
22. The venture is an industry with which I am familiar.	2.06	0.547
23. There is little threat of competition during the first three years.	2.82	0.387
24. The venture will create a new market.	1.94	0.489
25. The market size is scalable.	3.18	0.576
Group V: Financial considerations with this project		
26. I require a return equal to at least 10 times my investment within 5-10 years.	3.24	0.606
27. I require an investment that can be easily made liquid (e.g., taken public or acquired).	2.94	0.422
28. I require a return equal to at least 10 times my investment within at least 5 years.	2.76	0.431
29. I will not be expected to make subsequent investments.	1.94	0.600
30. I will not participate in latter rounds of investment.	1.24	0.606
31. It is easy to find further investors or bank loans for the project.	2.38	0.511
Group VI: Geographical considerations with this project		

32. The project is located in capital city or other major cities in China.	2.26	0.511
33. The project is located within 50 miles to my office.	1.24	0.431
34. It is easy to access needed human resources in the location.	3.00	0.492
35. Local public policy is friendly to SMEs and venture industry.	2.97	0.460
Group IV: The features of the management team: (Please score 1 for the single item below that you suggest the most essential one for the venture to go forward)		
36. The project is initiated by one person and he/she has relevant experience to the idea.	5.9%	
37. The project is initiated by more than one person, each having similar relevant experience.	8.8%	
38. The venture is initiated by more than one person, the individuals constituting a functionally balanced management team.	58.8%	
39. None of the above factors are essential for the venture to go forward.	26.5%	

**Table A-3 Ten Essential Project Selection Criteria Identified by VCs**

	Number	%
1. The entrepreneur is thoroughly familiar with the market targeted by the project.	25	73.5
2. The entrepreneur is capable of sustained intense effort.	23	67.6
3. The entrepreneur is honest enough.	22	64.7
4. The target market enjoys a significant growth rate.	20	58.8
5. The entrepreneur is able to evaluate and react to risk well.	13	38.2
6. I require a return equal to at least 10 times my investment within 5-10 years.	11	32.4
7. The product enjoys demonstrated market acceptance.	10	29.4
8. The market size is scalable.	9	26.5
9. The product is proprietary or can otherwise be protected.	6	17.6
10. Local public policy is friendly to SMEs and venture industry.	4	11.8

## **Session III: Comparing Firms in Korea, Japan and U.S.A.**





**“Comparing the Management Practices of the Korean and Japanese Firms, Based on the Joint Survey”**

*Tsutomu Miyagawa* (Gakushuin University)



# **Comparing the Management Practices and Firm Performance in Korean and Japanese Firms**

## **-An Empirical Study Using Interview Surveys-\***

**This version: October 2011**

**Tsutomu Miyagawa**  
**(Gakushuin University and RIETI)**

**Keun Lee**  
**(Seoul National University)**

**Shigesaburo Kabe**  
**(Japan Center for Economic Research)**

**Junhyup Lee**  
**(Seoul National University)**

**YoungGak Kim**  
**(Hitotsubashi University)**

**Kazuma Edamura**  
**(Institute of Intellectual Property)**

---

\* This paper is a revised version of RIETI Discussion Paper 10-e-013. We thank Professors Mitsuhiro Fukao (Japan Center for Economic Research and Keio University) and Haruo Horaguchi (Hosei University) for their insightful comments. Professors Masahisa Fujita (President of RIETI), Kyoji Fukao (Hitotsubashi University), Mr. Masayuki Morikawa (Vice, President, RIETI), other members of the project entitled 'Research on Intangible Assets in Japan' at RIETI, and participants at the seminar in RIETI and CAED Tokyo Conference held in October, 2009 also gave us helpful comments to improve our paper. We also thank Professor Takizawa of Toyo University, and Mr. Kawakami for their excellent research assistance. The interview survey in Korea was supported by Japan Center for Economic Research and Nikkei Inc.

## **Abstract**

After the financial crises in 1997, the Korean economic performance has overcome the Japanese economic performance. We examine this performance gap between Japan and Korea at the firm level. We conducted interview surveys on organizational and human resource management in Japanese and Korean firms based on Bloom and Van Reenen (2007). The average management scores resulting from the interview surveys in Japanese firms were higher than in Korean firms. The gap in the scores between Japan and Korea can be explained by more conservative human resource management practices in Korean small and medium sized firms. We regressed some indicators representing management practices on firm performance. Estimation results suggest that our management score is positively associated with firm performance in Japanese and Korean firms. Performance gap associated with management practices between Japanese and Korean firms is found in large firms or firms in the service sector.

Keywords: Intangible assets, Management practices, Organizational capital, Human resource management

JEL classification numbers: D21, L23, M11, M12, M15, M51

Contact: Tsutomu Miyagawa  
Faculty of Economics, Gakushuin University  
1-5-1 Mejiro, Toshima-ku, Tokyo, 171-8588, Japan  
Tel: +81-3-5992-2257  
Fax: +81-3-5992-1007  
[E-mail: 19990230@gakushuin.ac.jp](mailto:19990230@gakushuin.ac.jp)

## 1. Introduction

In 1997, Japan and Korea suffered from the financial crises and successive deep recessions. However, the recovery processes in the two countries are contrasting. Although the Japanese economy has stagnated for a long time due to the large non-performing loans, the Korean economy recovered rapidly. As a result, firm performance in Korea overcame that in Japan in some competing industries such as electric machineries and electric devices as shown in Fukao et, al (2008). In the growth accounting using the framework of McGrattan and Prescott (2005, 2010), Miyagawa and Takizawa (2011) showed that the labor productivity gap between Japan and Korea after the financial crises was explained by the difference in accumulation in intangible assets as well as that in TFP growth.

The role of intangible assets on the economic performance was found by the empirical studies in the first half of 2000s. When the IT revolution started in the middle of the 1990s, many economists and policymakers believed that the rapid growth in the IT industry and IT investment contributed to the acceleration in US economic growth. Therefore, many advanced countries supported the IT industry and encouraged IT investment in their own countries. However, the gaps in rates of economic or productivity growth between the US and other advanced countries have remained intact even in the early 2000s. Since then, many economists have paid attention to the complementary role of intangible assets in productivity growth. That is, they started to believe that without intangible assets, IT assets do not contribute to productivity growth at the firm and aggregated level.<sup>1</sup>

Corrado, Hulten and Sichel (hereafter referred to as CHS) (2005, 2009), estimated the investment in intangible assets at the aggregate US economy level, classifying intangible assets into three categories: computerized information, innovative property, and economic competencies. Following CHS (2009), many researchers in other advanced countries tried to

---

<sup>1</sup> Economic Report of the President 2007 stated ‘Only when they (businesses) made intangible investments to complement their IT investments did productivity growth really take off.’ (p. 56)

estimate intangible investment.<sup>2</sup> Comparing the estimation results in Japan with those in the US and the UK, Fukao et al (2009) and Pyo, Chun and Rhee (2011) found the following characteristics of intangible investment in Japan and Korea. First, investment in computerized information measured as a share of GDP in Japan and Korea is almost the same as that in the US and the UK. Second, due to the large R&D investment levels in Japan, the ratio of investment in innovative property to GDP in Japan is greater than that in the US and the UK. Third, as for investment in economic competencies, the investment/GDP ratio in Japan and Korea is much smaller than that in the US and the UK.

The third category includes investment in brand equity, firm-specific human capital, and organizational reform. Among these, the investment in firm-specific human capital and organizational reform in Japan is much smaller than that in the US and the UK. However, it is difficult to estimate these investment amounts at the aggregate level and to compare these among advanced countries.<sup>3</sup> In addition, these investments depend on management practices at the firm level. Therefore, recent studies on intangible investment have focused on management practices on human resource management and organizational reform at the firm level using micro-data.

Bloom and Van Reenen (2007) examined the effects of management practices on firm performance based on interview surveys of plant managers. Management practices were converted to scores based on interview results, and these scores were included as independent variables when they estimated the production function. Estimation results showed that the productivity differences corresponded to the differences in average management score. US firms got the highest score of the four countries studied (France, Germany, the UK, and the US). They believed that the low score in continental European firms was partly explained by weak competition and the prevalence of many family-owned firms.

---

<sup>2</sup> See Marrano, Haskel and Wallis (2009) for the UK, Hao, Manole and van Ark (2008) for Germany and France, and Fukao et al. (2009) for Japan.

<sup>3</sup> For example, CHS (2009) does not account for the investment in firm specific human capital through on-the-job training while this type of investment is very important in Japanese and Korean firms.

In Japan, Kurokawa and Minetaki (2006), Kanamori and Motohashi (2006), and Shinozaki (2007) examined the effects of organizational reform resulting from IT investment on firm performance by using the *Basic Survey on Business Enterprise Activities* and *IT Workplace Survey*. Their studies suggested that organizational reform resulting from IT investment was partially responsible for improving firm performance.

While our paper also focuses on the effects of organizational reform and human resource management on firm performance, there are three different features from the previous studies in Japan. First, we examined more comprehensive management practices on organizational and human resource management than earlier studies in Japan. Second, we compared the interview scores and firm performances between Japanese and Korean firms. . Third, we studied the effects of management practices on firm performance using not only official surveys but also interview surveys following Bloom and Van Reenen (2007).,

The second feature of our study reflects the recent perception that the Korean firms are rapidly catching up with the Japanese firms in terms of productivity and market shares in several sectors. Jung Lee, and Fukao (2008) notes that while productivity of the Korean firms were as low as half of that of the Japanese firms in the mid 1980s, there had been substantial catch-up with productivity of the Korean firms were on average within the 10 percent range in the late 1990s. Jung and Lee (2010) find both sectoral-level and firm-level factors responsible for the productivity convergence; while explicit knowledge oriented sectors, like IT, tend to show faster catch-up, firm-level factors, such as innovation capability and export-orientation, were also significant. Joo and Lee (2010) compare the Samsung and Sony in terms of the various indicators made up using the patent data including citations, and conclude that while Samsung caught up with Sony in the mid 2000s in terms of market capitalization and sales volume, technological catch-up, in terms of the patent count, quality and mutual citations, etc, happened as early as the mid 1990s. While the causes for catching up between Korea and Japan should involve many diverse factors, the existing studies tend to consider mostly tangible

aspects of the firms which are often reflected the standard financial statements or patent application data. This study will look into more intangible aspects including the management practices of the firms in the two countries. Aoki (2010) emphasized that organizational architecture within a firm is a major driver of corporation system in each country. Our comparative study on organizational management and human resource management in the two countries is significantly related to his hypothesis.

In the next section, we describe our interview survey. Although our interview survey basically follows Bloom and Van Reenen (2007), we incorporate some questions that were not included in Bloom and Van Reenen (2007) to capture some unique features of Japanese and Korean firms such as the role of informal meeting within a firm and on the job training. In the third section, we construct a management score by quantifying the interview results of Japanese and Korean firms, and compare the management practices in firms of the two countries. In the fourth section, using management scores and financial statements in Japanese and Korean firms, we estimate a production function and examine the effects of management practices on firm performance. In the last section, we summarize our studies.

## **2. The Interview Surveys in Japan and Korea**

### *Why did we conduct the interview survey?*

Recently, it has been recognized that qualitative factors in management practices not captured by official surveys are affecting firm performance. At first, many researchers conducted their own mailed surveys to examine these qualitative factors within firms. However, the response rates to the surveys were very low. For example, the response rate to the mailed survey conducted by Ichikowski (1990) -- who tried to examine the effect of human resource management on Tobin's Q or labor productivity-- was only 10%. In the US, researchers and statistical agencies have adopted interview surveys to improve the response rate. For example, the response rate of the interview survey in the National Employers Survey conducted by the



National Bureau of Census was 66% in the manufacturing sector and 61% in the non-manufacturing sector. Much of the recent research on human resource management has also incorporated interview surveys. Bloom and Van Reenen (2007) conducted interview surveys by telephone to examine management practices in firm and attained a 54% response rate. Following the above experiences, we also decided to conduct an interview survey.

*How did we design our interview survey?*

In our research, we followed the interview survey conducted by Bloom and Van Reenen (2007). However, we conducted the survey by meeting the managers of the planning departments of firms face-to-face, while Bloom and Van Reenen (2007) conducted their survey by telephone. The reason why we conducted face-to-face interviews is that we were concerned about low response rates. In Japan and Korea, when we want to ascertain qualitative features in firms, face-to-face communication is a more useful tool than telephone interviews.

Bloom and Van Reenen (2007) classified their eighteen interview questions into four categories: product management, monitoring, the firm's target, and incentives for workers. While their survey was extended to only manufacturing plants, our survey was also extended to firms in the service sector. Thus, we excluded questions about product management, as they would not apply to all firms. Instead, we asked questions about organizational change and on-the-job training. As a result, we can classify our questions into two categories: organizational management and human resource management.

The first category (organizational management) covers the first four questions (Questions 1 to 4). In this category, we wanted to examine the managerial vision of the firm, the organizational goals, communication within the firm, and organizational reform. In the second category about the human resource management (Questions 5 to 13), we added a question about on-the-job training (OJT) to the questions in Bloom and Van Reenen (2007), because the effects of OJT in Japanese and Korean firms are considered significant to firm performance. The detailed interview questions are shown in Appendix 1.

In each question, we have three sub questions. The structure of the pointing system is that the more you answer positively to each sub question, the more point you get, for instance, in human resource management. In each question with 3 sub-questions, you get a point of 4 if you answer positively to all of the 3 sub-questions. Similarly, positive answers to the first 2 sub-questions only, you get a point of 2. In other words, we quantify the responses to the above questions as follows: If the firm manager responds negatively to the first sub-question, we give the response a point 1 out of a possible total of 4 points in the question and move to the next question. If he responds positively to the first sub-question, we keep continuing to move to the second sub-question. If the manager responds negatively to the second sub-question, we mark a 2 and move to the next question. If he responds positively to the second sub-question, we move to the last and third sub-question. In the last sub-question, the manager respond with a positive answer, he is given a point of 4 for the all three sub-questions together he answered positively, while a negative response is given a point of 3 for the two previous sub-questions he answered positively.

Our survey focused on four industries in the manufacturing sector (Electric machinery, Information and communication equipment, Motor vehicle, and Precision machinery) and three industries in the service sector (Internet-based services and information services, Media activities, and Retail service). In Japan, we obtained our data from 573 firms. As the total sample was 1086 firms, the response rate in Japan was 52.8%. In Korea, we obtained the data of 350 of the sample 591 firms, thus the response rate was 59.2%<sup>4</sup>.

### **3. Management Scores in Japan and Korea**

In this section, we compare the management practices between Japanese and Korean firms based on interview surveys.<sup>5</sup> Table 1 shows the distribution of firms in Japan and Korea

---

<sup>4</sup> The Japanese survey was conducted from February, 2008 to September, 2008. The Korean survey was conducted from May, 2008 to July, 2008.

<sup>5</sup> The results in the Korean interview surveys are based on Lee et al. (2009).

by industry. While the share of manufacturing firms in the total number of firms in Japan is 33.9%, the share of manufacturers in Korea is 84.9%. In particular, the firms in the motor vehicles industry in Korea account for 40.0% of the total number of firms. In Japan, the share of firms in the retail services is also 40.1%.

(Place Table 1 here)

Table 2 shows the distribution of firms in Japan and Korea by size as measured by the number of employees. In Japan, the number of small and medium sized firms with fewer than 300 employees in the survey is 313 of the total 573. In Korea, the number of firms with fewer than 300 is 260 out of the 350. The share of small and medium sized firms in Korea is larger than that in Japan.

(Place Table 2 here)

#### *Management scores in all samples*

As explained in the previous section, we assigned scores to the management practices based on the interview surveys. Figure 1-1 shows the distribution of scores in all firms and all interview questions in Japan and Korea by using Kernel density. Table 3 summarizes statistics of management scores. In Japan, the mean value of the distribution in average score for all firms is 2.73 and the variance is 0.23. The average scores in many firms fall between 2.5 and 3.5. In Korea, the mean value of the distribution is 2.33 and the variance is 0.32. The mean and the median values in Korea are lower than those in Japan and the variance of scores in Korea is higher. The average scores in most of the Korean firms range from 1.5 to 2.5. However, the differences of mean and median values and the variance of scores between two countries are not significant.

(Place Figure 1-1 and Table 3 here)

As we did not find that the several statistics of two distributions are not significantly different, we compare the two distributions as a whole using the Kolmogorov-Smirnov test. Suppose the two cumulative distribution functions ( $F(x)$  and  $G(x)$ ) and take maximum differences between two

distributions ( $D_{mn}$ ) defined from the sample distribution functions of  $F(x)$  and  $G(x)$ .

$$D_{mn} = \sup_{-\infty < x < \infty} |F_m(x) - G_n(x)|$$

In the Kolmogorov=Smirnov test, the null hypothesis is the two distributions are the same

( $F(x)=G(x)$ ). If the test statistics  $(\frac{mn}{m+n})^{1/2} D_{mn} > c$  and  $c$  is appropriate constant, the null

hypothesis is rejected.

We apply the Kolmogorov=Smirnov test to the distributions in the average management score in Japan and Korea. The test results are shown in Table 4. In the first row of the table, we test the hypothesis whether the sample values in Japan are significantly smaller than those in Korea.

‘Distance’ in the second column shows maximum distance in the case where the sample value in Japan is less than that in Korea. P value shows that the sample values in Japan are not significantly smaller than those in Korea. The second row of the table tests the opposite case. The

Kolmogorov=Smirnov test, shows that sample values in Japan are significantly larger than those in Korea. The last row show the combined results of the previous two tests. The combined result shows that the difference in two distributions is significant.

(Place Table 4 here)

#### *Management scores by industry and by size*

The difference in the distribution of scores in Japan and Korea shown in Figure 1-1 may reflect the difference in the industry composition in the samples. Thus, we examined the distribution of scores by industry. Figures 1-2, 1-3, and 1-4 show the distribution of scores in the manufacturing sector, the information-related services sector, and the retail sector respectively, which are more or less similar in that the scores for Japanese firms tend to be distributed in higher point areas than those of the Korean firms.<sup>6</sup>

(Place Figure 1-2 to Figure 1-4 here)

We classify our interview questions into two categories: one category consists of

---

<sup>6</sup> The information-related services sector consists of internet-based services and information services, and media activities.

questions about organizational management and the other questions about human resource management. We show the distribution of scores in organizational capital from Figure 2-1 to Figure 2-4. In both countries, the mean value of the distribution in organizational management is higher than that of all questions together. The scores in Japan are higher than in Korea. These results imply that the organizational targets are clear to all employees in Japan in more cases than in Korea, or Japanese firms improve their organizational structures more aggressively than Korean firms, because high scores in organizational management indicate a greater degree of transparency of organizational goals or aggressive organizational reform.

(Place Figure 2-1 to Figure 2-4 here)

We also show the distribution of scores in human resource management in Figures 3-1 to 3-4. The average scores in human resource management are lower than those in organizational management in both countries. The average scores in Japanese firms are higher than those in Korean firms in all sectors. In Korea, the low score in the manufacturing sector pulls down the score in all firms. As a score in this category indicates flexibility in human resource management, the results imply that Japanese firms are more flexible in their human capital management than Korean firms. As shown in Table 3, Kolmogorov-Smirnov test also shows that two distributions in the cases of organizational management and human resource management are significantly different.

(Place Figure 3-1 to Figure 3-4 here)

As seen in Table 2, the Korean sample consists of more small and medium sized firms than the Japanese sample. Thus, we examine the distribution of average score in both countries by size in Figures 4-1 and 4-2. In Figure 4-1, where the distributions of average scores in firms with more than 300 employees are shown, we find a gap in the mean value of the two distributions in Japan (2.81) and Korea (2.57). The median value (2.87) in Japanese firms is also higher than that (2.57) in Korean firms.

(Place Figure 4-1 & 4-2 here)

As for firms with fewer than 300 employees, the peak of the distribution for Japanese firms was at a point higher than the 2.5 mark, while for Korean firms, it was around 2. The difference in the distribution leads to a wider gap in the average score in firms in medium and small sized firms in both countries than that in large firms. In contrast to the relatively high mean in the distribution of Japanese firms (2.64), the mean in Korean firms is 2.25. This gap in the mean can be explained by the difference in the distribution in the average score in human resource management. The mean in the average score in human resource management in Korean firms is very low (2.00), while the corresponding mean in Japanese firms is 2.45. These results imply that human resource management practices in Korean small and medium sized firms are more conservative than those in Japan.<sup>7</sup>

Overall, we can conclude that the management scores in Japan tend to be higher than in Korean firms, which is consistent with the common perception that the Japanese firms are more advanced and the Korean firms are catching up. Then, the next question is how well this scores are reflected in firm performance or productivity.

#### 4. Are Management Practices Related to Firm Performance?

Using the scores indicating management practices explained in the previous section, we examine whether the improvement in firm performance is associated with better management practices. Modifying Bloom and Van Reenen (2007) we estimate the following production functions:

$$(1) \ln Y_i = \text{const.} + \alpha_1 MS_i + \alpha_2 ORG_i + \alpha_3 \ln K_i + \alpha_4 \ln L_i + \alpha_5 X_i + \varepsilon_i$$

$$(2) \ln Y_i = \text{const.} + \alpha_1 MS_i + \beta_1 MS_i * KD + \alpha_2 ORG_i + \beta_2 ORG_i * KD + \alpha_3 K_i + \beta_3 \ln K_i * KD + \alpha_4 \ln L_i + \beta_4 \ln L_i * KD + \beta_5 KD + \beta_6 X_i + \mu_i$$

Equation (1) and (2) are a standard production function including the management score ( $MS$ ). As for  $MS$ , we take not only average score in all interview questions, but also

---

<sup>7</sup> However, all differences in means between Japanese firms and Korean firms are not significant.

management scores in organizational management and human resource management. To examine the effects of organizational reform on firm performance, we make a dummy variable (*ORG*) that indicates that organizational reform was conducted in the past 10 years.

$Y$  is value added,  $L$  is labor input,  $K$  is capital input. As a control variable ( $X$ ), we take the ratio of college graduates to the total worker. Bloom and Van Reenen (2007) constructed pseudo-panel data by corresponding their management scores to other variables in production function in the past ten years to examine the long-term relationship between management practices and firm performance. Following them, we take variables in Equation (1) and (2) except the management score from firm-level data from 2006 to 2008. We convert value added and capital data in Korean firms to those in terms of Japanese Yen by using current exchange rates. We also include industry dummies in both estimations. In addition to the variables in Equation (1), we include cross terms with Korean dummy with respect to all explanatory variables in Equation (2). Statistics of all variables except management scores used in the estimation are summarized in Table 5.

(Place Table 5 here)

#### **4.1 Estimation Results without Management Scores**

Before examining the relationship management practices and firm performance, we estimate a simple production function without management scores and control variables but with a Korea dummy. The results of OLS estimations are shown in Table 6. They first show that production functions are close to be of the constant returns to scale with the sum of the coefficients of labor and capital close to one. Although coefficients of a separate Korea dummy are unstable, the cross term of capital and Korea in all industries and the service sector are positive and significant. The results imply that capital in the Korean firms is more productive than the Japanese firms. However, the cross term of labor and Korea is negative and

insignificant. . In what follows, we will add the variables of management practices to see whether to what extent they can explain this productivity differences between the Korean and Japanese firms, and thus whether the Korea dummies would lose its significance.

(Place Table 6 here)

#### **4.2 Estimation Results Using Management Practices**

Then, we estimate Equations (1) and (2) using the average score in all questions in the interview surveys. The results with all samples in Japan and Korea are reported in Table 7. The results divided into manufacturing and services are reported in table 8, and the results with divided into sizes are reported in table 9. The estimation method utilized is OLS..

First, the results in Table 7 show that the average management score has the positive and significant relationship with firm performance (column 1), and its significance is maintained when we add the ratio of college graduates into the model as a control variable (column 2), When we add the cross terms of Korean dummy with the capital and labor variables, the significance of average management score disappear (column 3 and 4). But, the estimation results by sector are different from Table 7. The significance of average management score disappears in the estimations in the manufacturing sector (Table 8-1). Especially, higher firm performance is significantly associated with better management practices in Korean service firms.

The estimation results in Table 9 are similar to Table 8. In Korea large sized firms, better management score corresponds to high firm performance, while we do not find such relationship in SMEs.

Second, when we divide the interview scores into two categories: those indicating organizational management and those in human capital indicating human resource management,



only the latter scores have positive and significant relationship with firm performance in almost all models with a Korea shift dummies. When we interact this variable of human resource management with Korean dummies, the interaction terms are significant only in the service sector, implying no difference in its effect between the Japanese and Korean firms in most cases. As for organizational reform, we are mostly unable to find positive effects on firm performance. In contrast, the share of college graduates in the total workers contributes to the improvement in firm performance.

Third, an interesting pattern of the higher capital productivity in Korean firms and higher labor productivity in Japanese firms has been confirmed in all regressions models using different samples divided by sizes and sectors. This interesting pattern is consistent with other studies (Lee and Jung 2009), and may be subject to diverse interpretations. The one is that given much higher labor costs in Japan, the Japanese firms have been more economizing the use of labor and thus they tend to show higher marginal productivity of labor, which also means that labor is more binding in Japan. The other is that

(Place Table 7, 8, 9 here).

## **5. Conclusions**

In the last twenty years, Korean firms have caught up with the Japanese firms and some firms have already overcome the performance of the competing Japanese firms. According to the growth accounting in Japan and Korea, accumulation in intangible assets have played a key role in explaining difference in economic performance in the two countries. Among several kinds of intangibles, management skills and human capital are crucial to the improvement in a firm's performance. Bloom and Van Reenen (2007) examined the effects of organizational and human resource management on firm performance using interview surveys conducted in France, Germany, the UK, and the US. Following their study, we conducted the interview survey on

organizational and human resource management in Japan and Korea.

Based on Bloom and Van Reenen (2007), we constructed scores on management practices in each firm based on the interview surveys. For the scores in organizational management, firms that have clear organizational targets, better communication amongst employees, and conduct organizational reforms would have a higher score. For the scores in human resource management, firms that evaluate human resources flexibly and strive to keep employees motivated would mark high scores.

When we compared the distributions in average management scores between Japanese and Korean firms, the mean value in Japan was higher than that in Korea. Kolmogorov-Smirnov statistics show that the distributions in average score in Japan is significantly different from that in Korea. Even when we study the distribution in the average score in the manufacturing firms only (which dominate the sample in the Korean survey) the results are similar to that in all firms.

Using these scores, we examined whether the improvement in firm performance is associated with better management practices. Estimation results using the whole sample showed that the measure indicating management practices has a positive and significant relationship to the improvement in firm performance, when we divide the management practices into the organizational and human resource management, we find in general the latter have more significant impacts, together with the share of college graduate in labor force.

Our next task is to examine the Japan and Korea difference. The differential impacts of the management practices across firms in two countries are mostly shown only in the service sector and the large firm sectors, such that in Korean firms in these categories, the size of the positive impacts are greater than in the Japanese firms. This indicates in which area and which types of the Korean firms should try to improve their productivity.

However, the overall estimation results, the positive and significant cross term of Korean dummy with capital imply the higher capital productivity in Korean firms. This suggests that

distribution system within a firm which Aoki (1980) developed is likely to be a key factor for the diversity of performance between Japanese and Korean firms. The research on the effect of the distribution system on the firm performance should be also the future research.

## References

- Aoki, M. (1980), "A Model of the Firm as a Shareholder-Employee Co-operative Game," *American Economic Review*, 70.
- Aoki, M. (2010), *Corporations in Evolving Diversity, Cognition, Governance, and Institutions*, Oxford University Press.
- Bloom, N. and J. Van Reenen (2007), "Measuring and Explaining Management Practices across Firms and Countries," *Quarterly Journal of Economics* 122, pp.1351-1408.
- Corrado, C., C. Hulten, and D. Sichel (2005), "Measuring Capital and Technology: An Extended Framework," in C. Corrado, J. Haltiwanger, and D. Sichel (eds.), *Measuring Capital in the New Economy*, The University of Chicago Press, Chicago.
- Corrado, C., C. Hulten, and D. Sichel (2009), "Intangible Capital and U.S. Economic Growth," *The Review of Income and Wealth* 55, pp. 661-685.
- Fukao, K., T. Miyagawa, K. Mukai, Y. Shinoda, and K. Tonogi (2009), "Intangible Investment in Japan: Measurement and Contribution to Economic Growth," *The Review of Income and Wealth* 55, pp. 717-736.
- Fukao, K. T. Inui, S. Kabe, and D. Liu (2008), "An International Komparison of the TFP Levels of Japanese, South Korean, and Chinese Listed Firms," *Seoul Journal of Economics*, pp. 5-33
- Hao, J., V. Manole, and B. van Ark (2008), *Intangible Assets in Europe: Measurement and International Comparability*, paper presented at the final conference of EUKLEMS Project held at Groningen.
- Ichikowski, C. (1990), "Human Resources Management System and the Performance of U.S. Manufacturing Businesses," *NBER Working Paper* No. 3449.
- Joo, SH., and Keun. Lee (2010), "Samsung's Catch-up with Sony: An Analysis Using U.S. Patent Data," (with Si Hyung Joo), *Journal of the Asia-Pacific Economy*. vol. 15 (3): 271-287.

- Jung, Mooseop, and Keun Lee, (2010), “Sectoral Systems of Innovations and Productivity Catch-up by the Korean firms with the Japanese firms,” *Industrial and Corporate Change*.
- Jung, Moosup, Keun Lee, and Kyoji Fukao, (2008), “Total Factor Productivity of Korean Firms and Catching up with the Japanese firms,” *Seoul Journal of Economics*, vol 21, no. 1.
- Kanamori, T. and K. Motohashi (2006), ‘Centralization or Decentralization of Decision Rights? Impact on IT Performance of Firms,’ *RIETI Discussion Paper Series* 06-E-032.
- Kurokawa, F. and K. Minetaki (2006), “How Can IT Raise Productivity Linked with Workplace Re-organization and Human Capital in Japan?,” (in Japanese), *The Economic Analysis* No. 178, pp. 54-95.
- Lee, K., T. Miyagawa, S. Kabe, J. Lee, H.Kim., and Y. Kim (2009), “Management Practices and Firm Performance in Japanese and Korean Firms,” *JCER Discussion Paper* No. 120.
- Marrano, M. G., J. Haskel, and G. Wallis (2009), “What Happened to the Knowledge Economy? ICT, Intangible Investment and Britain’s Productivity Record Revisited,” *The Review of Income and Wealth* 55, pp. 686-716.
- McGrattan, E., and E. Prescott (2005), “ Expensed and Sweat Equity”, *Federal Reserve Bank of Minneapolis, Working Paper* no. 636.
- McGrattan, E., and E. Prescott (2010), “Unmeasured Investment and the Puzzling U.S. Boom in the 1990s”, *American Economic Journal: Macroeconomics*, 2, pp.88–123
- Miyagawa, T., M. Ozaki, A. Kawakami, and K. Edamura (2008), “Organizational Reform and Firm Performance in Japan,” (in Japanese), *RIETI Discussion Paper Series* 08-J-062.
- Miyagawa, T. and M. Takizawa (2011), “Productivity Differences between Japan and Korea and the Role of Intangible Assets,” (in Japanese), K. Asako, N. Iiduka and T. Miyagawa, eds., *Great Recessions in the Global Economy and Business Cycle Analysis*, The University of Tokyo Press.
- Pyo, H. K., H. Chun, and K. H. Rhee (2011), “Productivity Growth in the Republic of Korea,” Presented at the first Asia KLEMS Conference held on July 27, 2011.

Shinozaki, A. (2007), “Effective Reforms with Information Technology: Logit Model Analysis on Business Process Reengineering, Business Unit Restructuring, and Human Resource Management,” (in Japanese), *The Economic Analysis* No. 179, pp. 36-54.

**Table 1. The Distribution of Firms in Japan and Korea by Industry**

	Japan	Korea
Industry	Number of Firms	Number of Firms
Electric machinery	44 ( 7.7% )	51 ( 14.6% )
Information and communication machinery	73 ( 12.7% )	96 ( 27.4% )
Motor vehicles	52 ( 9.1% )	140 ( 40.0% )
Precision machinery	25 ( 4.4% )	10 ( 2.9% )
Internet-based services	135 ( 23.6% )	15 ( 4.3% )
Information service		11 ( 3.1% )
Media activities	14 ( 2.4% )	9 ( 2.6% )
Retail	230 ( 40.1% )	18 ( 5.1% )
Total	573	350

**Table 2. The Distribution of Firms in Japan and Korea by Numbaaer of Employee**

Industry	Japan						Korea					
	Number od Employee					Total	Number of Employee					Total
	50-99	100-299	300-499	500-999	1000-		50-99	100-299	300-499	500-999	1000-	
Manufacturing	25	63	31	32	43	194	42	180	31	30	14	297
Information related services	43	59	13	17	17	149	5	22	3	0	5	35
Retail	43	80	42	40	25	230	0	11	1	0	6	18
Total	111	202	86	89	85	573	47	213	35	30	25	350

**Table 3 Summary of Management Scores**

		Total		Japan		Korea	
		mean	variance	mean	variance	mean	variance
<b>MS (all questions)</b>							
	All samples	2.581	0.303	2.735	0.229	2.328	0.321
	Manufacturing firms	2.481	0.315	2.766	0.215	2.294	0.294
	Service firms	2.694	0.264	2.719	0.236	2.515	0.438
	Large firms	2.723	0.275	2.788	0.224	2.508	0.387
	Small and Medium sized firms	2.454	0.294	2.661	0.228	2.255	0.277
<b>MS (Organizational management)</b>							
	All samples	2.703	0.360	2.845	0.306	2.471	0.363
	Manufacturing firms	2.633	0.355	2.911	0.257	2.450	0.336
	Service firms	2.784	0.355	2.811	0.329	2.586	0.503
	Large firms	2.818	0.355	2.885	0.318	2.595	0.417
	Small and Medium sized firms	2.601	0.343	2.789	0.285	2.421	0.333
<b>MS (Human resource Management)</b>							
	All samples	2.390	0.410	2.564	0.299	2.105	0.461
	Manufacturing firms	2.244	0.443	2.540	0.324	2.052	0.428
	Service firms	2.555	0.322	2.576	0.287	2.405	0.549
	Large firms	2.575	0.344	2.636	0.276	2.374	0.521
	Small and Medium sized firms	2.224	0.411	2.463	0.316	1.996	0.397



Table 4 Kolmogorov-Smirnov test

	All items		Organizational management		Human resource management	
	Distance	P-value	Distance	P-value	Distance	P-value
Japan<Korea 1)	0.007	0.977	0.000	1	0.006	0.983
Japan>Korea 2)	-0.3277***	0	-0.2976***	0	-0.3417***	0
Combined test	0.3277***	0	0.2976***	0	0.3417***	0

1) 'Japan <Korea' means that sample values in Japan are smaller than those in Korea.

2) 'Japan >Korea' means that sample values in Japan are smaller than those in Korea.

Table 5 Summary of Statistics

	Total		Japan		Korea	
	mean	S.E.	mean	S.E.	mean	S.E.
<b>2006~2008</b>						
Y	25,591	194,758	9,997	42,497	58,134	334,453
K	49,423	401,921	11,208	48,634	126,623	688,902
L	1,067	3,258	1,305	3,773	572	1,647
Colldge graduate	39%	26%	41%	26%	38%	25%
<b>2006</b>						
Y	28,035	214,766	10,557	45,810	64,214	368,341
K	46,781	365,233	11,090	46,222	118,165	623,878
L	1,039	3,189	1,277	3,712	557	1,583
Colldge graduate	39%	26%	41%	26%	38%	25%

※Y and K in million Yen (Won) for Japanese (Korean) firms.

Table 6. Estimation Results (2006-2008, OLS)

lnVA	Whole sector		Manufacturing sector		Service & Trade sector	
	(1)	(2)	(3)	(4)	(5)	(6)
1(Korea)	-0.217 *** [-5.711]	-0.259 [-0.560]	-0.326 *** [-7.372]	0.394 [0.518]	0.156 ** [2.191]	0.123 [0.187]
lnK	0.228 *** [14.878]	0.193 *** [12.708]	0.318 *** [9.043]	0.322 *** [7.154]	0.161 *** [9.998]	0.145 *** [8.580]
lnK × 1(Korea)		0.125 *** [3.629]		-0.005 [-0.086]		0.157 *** [4.594]
lnL	0.77 *** [36.309]	0.789 *** [34.613]	0.741 *** [16.344]	0.77 *** [12.295]	0.781 *** [34.857]	0.796 *** [33.388]
lnL × 1(Korea)		-0.068 [-1.429]		-0.051 [-0.591]		-0.088 [-1.532]
Observation	1644	1644	918	918	726	726
Adj. R-Squared	0.801	0.805	0.774	0.774	0.853	0.857
F-value	737	627	495	442	857	646

Note 1. L = # employee × hour worked.

2. Dummy variables for Industry are included in the estimations but not reported.

3. Robust *t* statistics in brackets.

4. ✕p<0.10, \*\* p<0.05, and \*\*\* p<0.01.

Table 7. Estimation Results Using All Samples (2006-2008)

lnVA	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average score	0.082 ** [2.549]	0.068 ** [2.116]	0.003 [0.064]	0.004 [0.082]				
Average score ×1(Korea)			0.126 ** [2.003]	0.086 [1.362]				
Org. score					-0.055 [-1.598]	-0.063 * [-1.872]	-0.073 [-1.642]	-0.081 * [-1.852]
Org. score ×1(Korea)							0.015 [0.218]	0.029 [0.438]
Human R.M score					0.127 *** [4.381]	0.121 *** [4.241]	0.071 * [1.874]	0.08 *** [2.115]
Human R.M score ×1(Korea)							0.099 * [1.739]	0.05 [0.889]
Organization reform	-0.072 * [-1.961]	-0.071 * [-1.951]	-0.031 [-0.595]	-0.058 [-1.081]	-0.021 [-0.547]	-0.02 [-0.531]	0.011 [0.222]	-0.009 [-0.164]
Organization reform ×1(Korea)			-0.093 [-1.259]	-0.031 [-0.424]			-0.078 [-1.027]	-0.037 [-0.489]
ln(Korea)	-0.201 *** [-4.933]	-0.246 *** [-6.054]	-0.34 [-0.732]	-0.649 [-1.353]	-0.197 *** [-4.874]	-0.242 *** [-5.981]	-0.158 [-0.343]	-0.522 [-1.094]
lnK	0.228 *** [14.869]	0.231 *** [15.474]	0.192 *** [12.739]	0.191 *** [12.101]	0.228 *** [15.042]	0.231 *** [15.690]	0.191 *** [12.756]	0.191 *** [12.228]
lnK × 1(Korea)			0.127 *** [3.661]	0.122 *** [3.709]			0.129 *** [3.826]	0.123 *** [3.792]
lnL	0.764 *** [35.831]	0.742 *** [33.897]	0.791 *** [34.922]	0.774 *** [30.231]	0.759 *** [36.043]	0.736 *** [33.836]	0.789 *** [34.871]	0.769 *** [29.787]
lnL × 1(Korea)			-0.082 * [-1.723]	-0.063 [-1.282]			-0.094 ** [-2.035]	-0.07 [-1.438]
Collage graduate		0.499 *** [6.436]		0.361 *** [4.048]		0.501 *** [6.473]		0.375 *** [4.155]
Collage graduate ×1(Korea)				0.288 ** [2.058]				0.248 * [1.788]
Observation	1644	1611	1644	1611	1644	1611	1644	1611
Adj. R-Squared	0.802	0.807	0.806	0.811	0.804	0.809	0.807	0.812
F-value	606	572	470	429	560	531	419	383

Note 1. L = # employee × hour worked.

2. Dummy variables for Industry are included in the estimations but not reported.

3. Robust *t* statistics in brackets.

4. ✕p&lt;0.10, \*\* p&lt;0.05, and \*\*\* p&lt;0.01.

Table 8-1. Estimation Results in the Manufacturing Sector (2006-2008)

lnVA	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average score	0.052 [1.267]	0.026 [0.645]	0.004 [0.067]	-0.013 [-0.188]				
Average score ×1(Korea)			0.065 [0.787]	0.052 [0.624]				
Org. score					-0.083 * [-1.738]	-0.081 * [-1.744]	-0.152 ** [-2.066]	-0.194 *** [-2.694]
Org. score ×1(Korea)							0.082 [0.874]	0.14 [1.531]
Human R.M score					0.118 *** [3.119]	0.094 *** [2.595]	0.134 ** [2.247]	0.157 *** [2.596]
Human R.M score ×1(Korea)							-0.009 [-0.120]	-0.073 [-0.969]
Organization reform	-0.081 * [-1.654]	-0.059 [-1.224]	0.038 [0.333]	0.015 [0.128]	-0.026 [-0.515]	-0.012 [-0.243]	0.157 [1.439]	0.173 [1.470]
Organization reform ×1(Korea)			-0.148 [-1.171]	-0.093 [-0.723]			-0.22 * [-1.784]	-0.219 * [-1.694]
l(Korea)	-0.322 *** [-6.562]	-0.37 *** [-7.813]	0.344 [0.446]	0.142 [0.189]	-0.324 *** [-6.646]	-0.369 *** [-7.839]	0.365 [0.475]	0.061 [0.082]
lnK	0.318 *** [8.948]	0.29 *** [8.344]	0.325 *** [7.373]	0.282 *** [6.406]	0.319 *** [9.203]	0.291 *** [8.614]	0.326 *** [7.467]	0.286 *** [6.636]
lnK × l(Korea)			-0.008 [-0.124]	0.015 [0.237]			-0.007 [-0.116]	0.012 [0.205]
lnL	0.739 *** [16.341]	0.735 *** [16.977]	0.765 *** [12.304]	0.767 *** [13.022]	0.727 *** [16.670]	0.726 *** [17.182]	0.751 *** [11.998]	0.746 *** [12.604]
lnL × l(Korea)			-0.05 [-0.575]	-0.053 [-0.637]			-0.05 [-0.587]	-0.042 [-0.513]
Collage graduate		0.721 *** [5.671]		0.674 *** [4.178]		0.706 *** [5.658]		0.704 *** [4.202]
Collage graduate ×1(Korea)				0.051 [0.225]				-0.007 [-0.033]
Observation	918	899	918	899	918	899	918	899
Adj. R-Squared	0.774	0.786	0.774	0.785	0.776	0.787	0.776	0.787
F-value	382	384	308	286	342	341	272	252

Note 1. L = # employee × hour worked.

2. Dummy variables for Industry are included in the estimations but not reported.

3. Robust *t* statistics in brackets.

4. ✕p&lt;0.10, \*\* p&lt;0.05, and \*\*\* p&lt;0.01.

Table 8-2. Estimation Results in the Service Sector (2006-2008)

lnVA	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average score	0.079 [1.587]	0.077 [1.548]	0.011 [0.207]	0.009 [0.166]				
Average score ×1(Korea)			0.348 *** [3.493]	0.336 *** [3.355]				
Org. score					-0.028 [-0.593]	-0.031 [-0.662]	-0.048 [-0.912]	-0.05 [-0.972]
Org. score ×1(Korea)							0.016 [0.136]	0.007 [0.065]
Human R.M score					0.105 ** [2.336]	0.108 ** [2.368]	0.058 [1.230]	0.06 [1.250]
Human R.M score ×1(Korea)							0.324 *** [2.822]	0.318 *** [2.810]
Organization reform	-0.048 [-0.904]	-0.056 [-1.024]	-0.047 [-0.807]	-0.06 [-1.000]	-0.011 [-0.207]	-0.019 [-0.345]	-0.024 [-0.416]	-0.037 [-0.627]
Organization reform ×1(Korea)			-0.171 [-1.203]	-0.163 [-1.144]			-0.098 [-0.691]	-0.089 [-0.634]
l(Korea)	0.165 ** [2.321]	0.134 * [1.828]	0.07 [0.112]	0.148 [0.241]	0.17 ** [2.425]	0.137 * [1.903]	0.208 [0.364]	0.285 [0.493]
lnK	0.163 *** [10.041]	0.168 *** [10.076]	0.147 *** [8.814]	0.156 *** [8.898]	0.163 *** [10.081]	0.169 *** [10.173]	0.148 *** [8.852]	0.157 *** [8.966]
lnK × l(Korea)			0.166 *** [5.129]	0.145 *** [3.958]			0.172 *** [5.235]	0.151 *** [4.117]
lnL	0.774 *** [33.121]	0.767 *** [29.630]	0.796 *** [33.405]	0.782 *** [28.113]	0.772 *** [33.141]	0.763 *** [29.509]	0.794 *** [33.280]	0.778 *** [27.740]
lnL×1(Korea)			-0.148 ** [-2.561]	-0.129 ** [-2.099]			-0.16 *** [-2.964]	-0.14 ** [-2.389]
Collage graduate		0.167 * [1.747]		0.223 ** [2.089]		0.181 * [1.890]		0.233 ** [2.140]
Collage graduate ×1(Korea)				-0.312 [-1.417]				-0.327 [-1.548]
Observation	726	708	726	708	726	708	726	708
Adj. R-Squared	0.853	0.852	0.859	0.858	0.854	0.852	0.86	0.86
F-value	617	529	435	372	542	472	379	327

Note 1. L = # employee × hour worked.

2. Dummy variables for Industry are included in the estimations but not reported.

3. Robust *t* statistics in brackets.

4. \*\*p&lt;0.10, \*\* p&lt;0.05, and \*\*\* p&lt;0.01.

4. \*\*p&lt;0.10, \*\* p&lt;0.05, and \*\*\* p&lt;0.01.

Table 9-1. Estimation Results in Large Firms (2006-2008)

lnVA	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average score	0.061 [1.398]	0.064 [1.479]	-0.013 [-0.256]	-0.013 [-0.259]				
Average score ×1(Korea)			0.173 * [1.926]	0.17 * [1.920]				
Org. score					-0.038 [-0.802]	-0.032 [-0.682]	-0.091 * [-1.863]	-0.087 * [-1.787]
Org. score ×1(Korea)							0.186 [1.310]	0.19 [1.433]
Human R.M score					0.093 ** [2.147]	0.09 ** [2.115]	0.076 * [1.676]	0.073 [1.579]
Human R.M score ×1(Korea)							-0.011 [-0.094]	-0.018 [-0.160]
Organization reform	-0.047 [-0.764]	-0.038 [-0.602]	0.01 [0.140]	0.006 [0.077]	0.003 [0.047]	0.008 [0.130]	0.072 [0.929]	0.064 [0.805]
Organization reform ×1(Korea)			-0.173 [-1.364]	-0.11 [-0.858]			-0.232 [-1.636]	-0.171 [-1.213]
l(Korea)	-0.245 *** [-4.045]	-0.24 *** [-3.978]	0.827 [0.989]	0.158 [0.174]	-0.24 *** [-3.975]	-0.236 *** [-3.931]	0.806 [0.970]	0.122 [0.135]
lnK	0.313 *** [13.266]	0.315 *** [13.523]	0.274 *** [13.151]	0.273 *** [12.898]	0.31 *** [13.169]	0.312 *** [13.443]	0.272 *** [13.343]	0.271 *** [13.083]
lnK × l(Korea)			0.177 ** [2.560]	0.156 ** [2.378]			0.178 ** [2.373]	0.158 ** [2.251]
lnL	0.631 *** [19.966]	0.614 *** [18.981]	0.677 *** [21.849]	0.669 *** [20.236]	0.631 *** [20.189]	0.614 *** [19.131]	0.676 *** [21.914]	0.667 *** [20.190]
lnL×l(Korea)			-0.208 ** [-2.392]	-0.162 * [-1.820]			-0.206 ** [-2.290]	-0.159 * [-1.742]
Collage graduate		0.443 *** [4.490]		0.282 *** [2.662]		0.441 *** [4.499]		0.283 *** [2.681]
Collage graduate ×1(Korea)				0.417 [1.491]				0.416 [1.494]
Observation	706	687	706	687	706	687	706	687
Adj. R-Squared	0.784	0.786	0.789	0.791	0.784	0.787	0.789	0.792
F-value	232	223	189	170	217	215	169	153

Note 1. L = # employee × hour worked.

2. Dummy variables for Industry are included in the estimations but not reported.

3. Robust *t* statistics in brackets.

4. \*p&lt;0.10, \*\* p&lt;0.05, and \*\*\* p&lt;0.01.

Table 9-2. Estimation Results in Small and Medium Sized Firms (2006-2008)

lnVA	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average score	0.066 [1.550]	0.031 [0.715]	-0.003 [-0.040]	0.013 [0.185]				
Average score ×1(Korea)			0.085 [0.979]	0.009 [0.109]				
Org. score					-0.053 [-1.175]	-0.082 * [-1.871]	-0.053 [-0.716]	-0.084 [-1.162]
Org. score ×1(Korea)							-0.042 [-0.463]	-0.025 [-0.278]
Human R.M score					0.109 *** [3.061]	0.102 *** [2.887]	0.045 [0.773]	0.089 [1.567]
Human R.M score ×1(Korea)							0.115 [1.593]	0.029 [0.408]
Organization reform	-0.078 * [-1.783]	-0.075 * [-1.766]	0.003 [0.038]	-0.045 [-0.627]	-0.04 [-0.896]	-0.033 [-0.761]	0.023 [0.325]	-0.003 [-0.044]
Organization reform ×1(Korea)			-0.134 [-1.464]	-0.052 [-0.574]			-0.1 [-1.071]	-0.048 [-0.518]
l(Korea)	-0.068 [-1.259]	-0.176 *** [-3.170]	1.058 [1.041]	1.82 * [1.827]	-0.067 [-1.241]	-0.174 *** [-3.137]	1.548 [1.458]	2.099 ** [2.014]
lnK	0.167 *** [9.094]	0.172 *** [9.768]	0.111 *** [5.668]	0.116 *** [5.485]	0.169 *** [9.204]	0.173 *** [9.916]	0.11 *** [5.617]	0.118 *** [5.559]
lnK × l(Korea)			0.17 *** [4.860]	0.162 *** [4.576]			0.177 *** [5.143]	0.165 *** [4.719]
lnL	0.777 *** [17.555]	0.757 *** [17.400]	0.841 *** [15.961]	0.848 *** [16.766]	0.754 *** [16.691]	0.731 *** [16.467]	0.832 *** [15.575]	0.829 *** [16.001]
lnL×l(Korea)			-0.19 ** [-2.205]	-0.249 *** [-2.907]			-0.23 *** [-2.605]	-0.27 *** [-3.069]
Collage graduate		0.687 *** [6.169]		0.557 *** [3.707]		0.691 *** [6.215]		0.587 *** [3.892]
Collage graduate ×1(Korea)				0.171 [0.963]				0.12 [0.680]
Observation	939	920	939	920	939	920	939	920
Adj. R-Squared	0.427	0.454	0.445	0.469	0.431	0.459	0.45	0.474
F-value	66	65	55	53	64	62	53	52

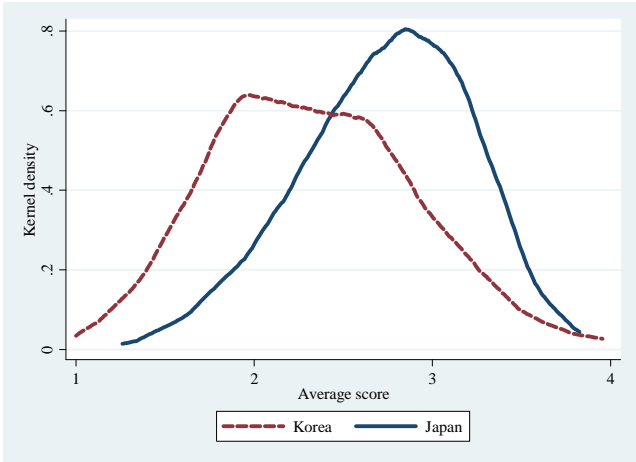
Note 1. L = # employee × hour worked.

2. Dummy variables for Industry are included in the estimations but not reported.

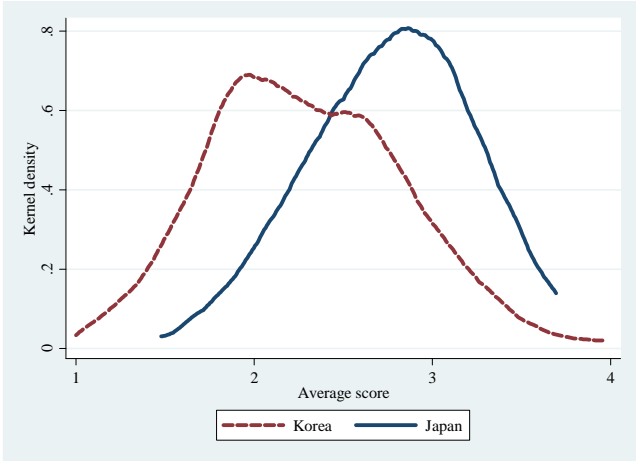
3. Robust *t* statistics in brackets.

4. \*p&lt;0.10, \*\* p&lt;0.05, and \*\*\* p&lt;0.01.

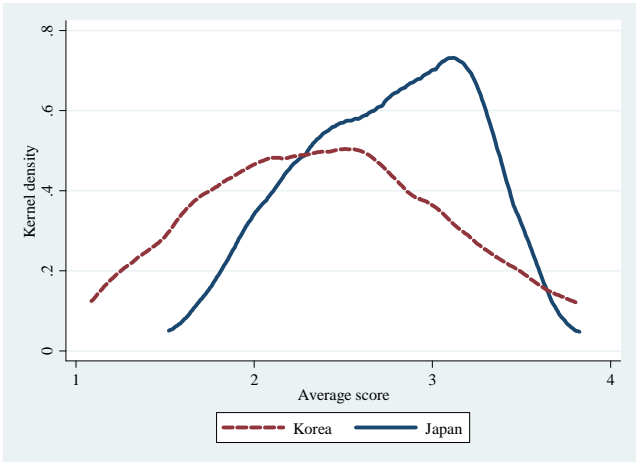
**Figure 1 – 1 Distribution of Management Scores (All firms)**



**Figure 1 – 2 Distribution of Management Scores (Manufacturing firms)**

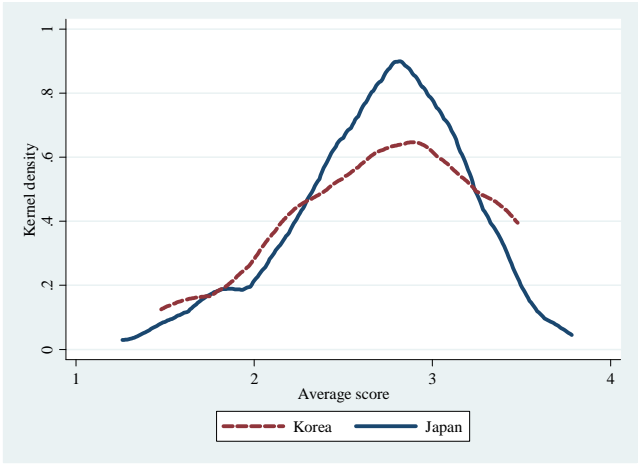


**Figure 1 – 3 Distribution of Management Scores (Information-related firms)**

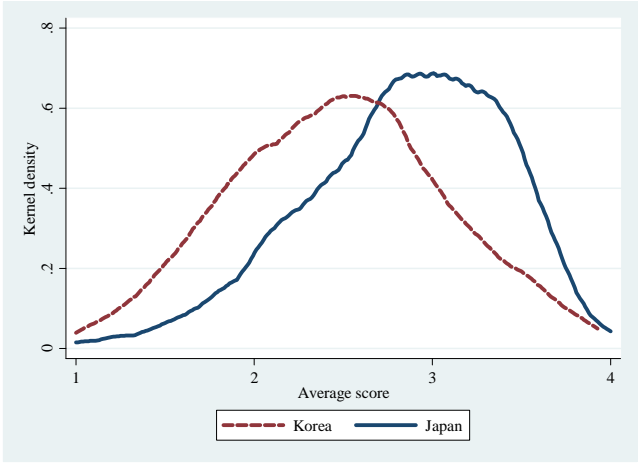




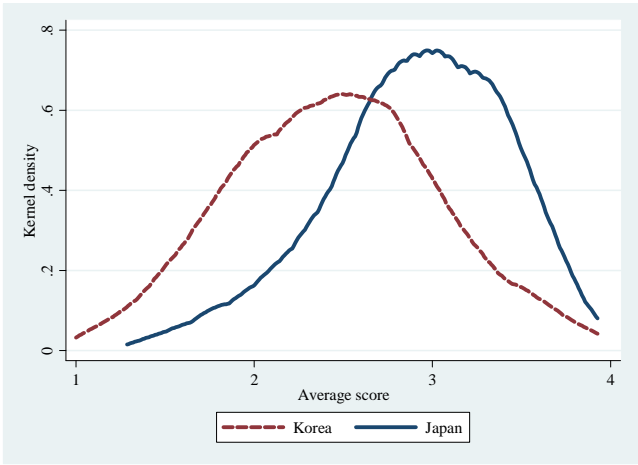
**Figure 1 – 4 Distribution of Management Scores (Retail firms)**



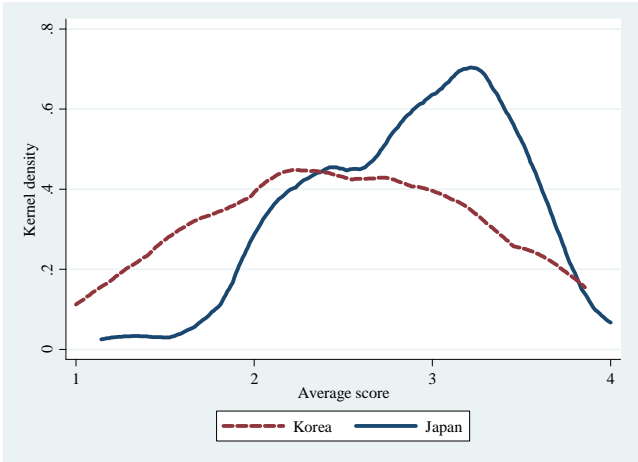
**Figure 2 – 1 Distribution of Management Scores in Organizational Capital (All firms)**



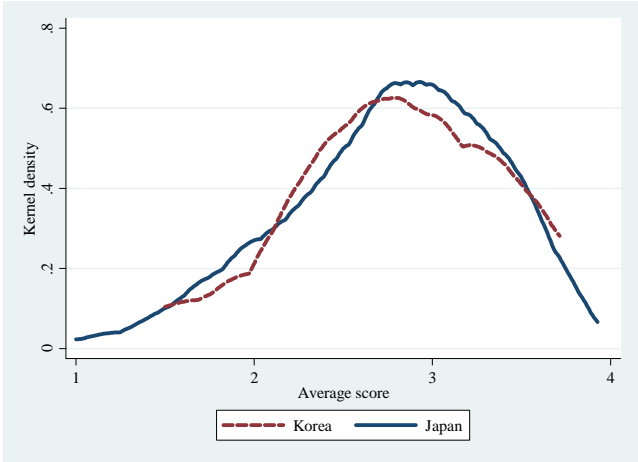
**Figure 2 – 2 Distribution of Management Scores in Organizational Capital (Manufacturing firms)**



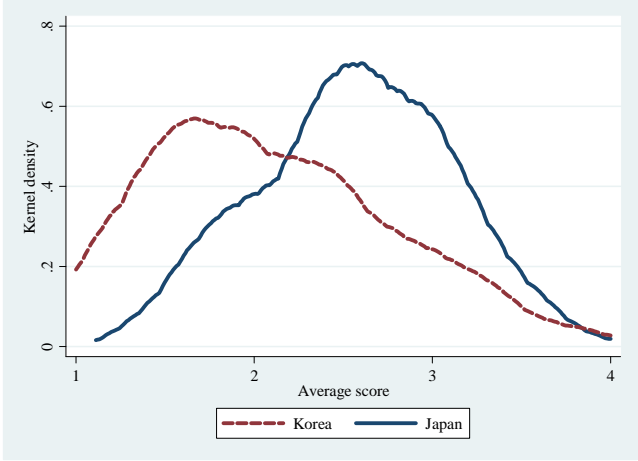
**Figure 2 – 3 Distribution of Management Scores in Organizational Capital  
(Information-related firms)**



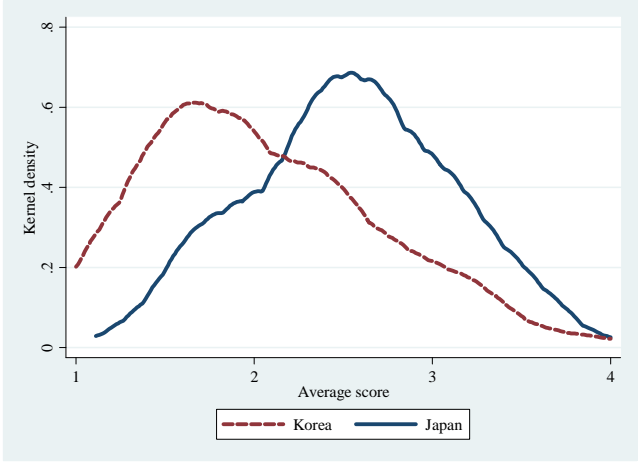
**Figure 2 – 4 Distribution of Management Scores in Organizational Capital (Retail firms)**



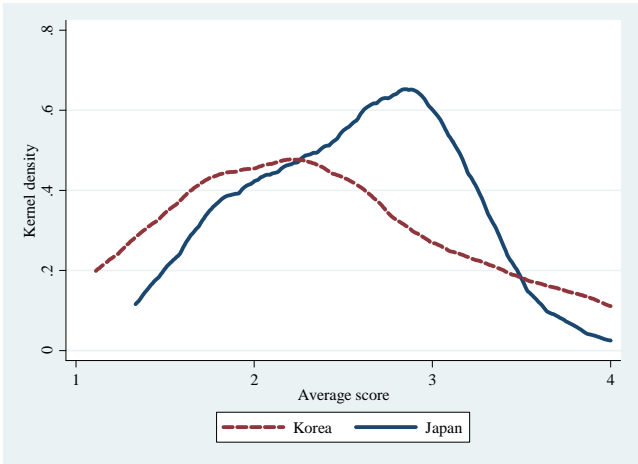
**Figure 3 – 1 Distribution of Management Scores in Human Capital (All firms)**



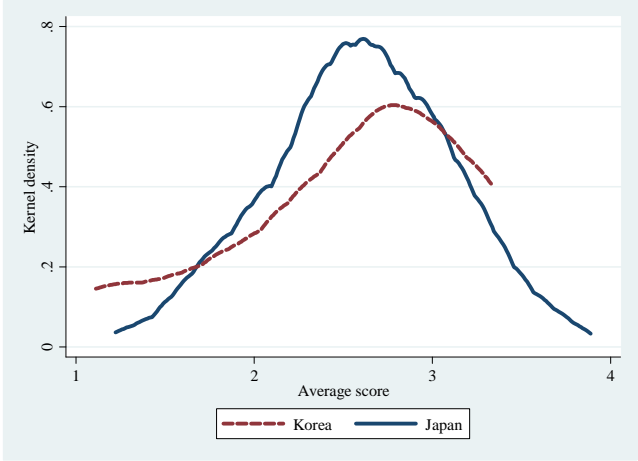
**Figure 3 – 2 Distribution of Management Scores in Human Capital (Manufacturing firms)**



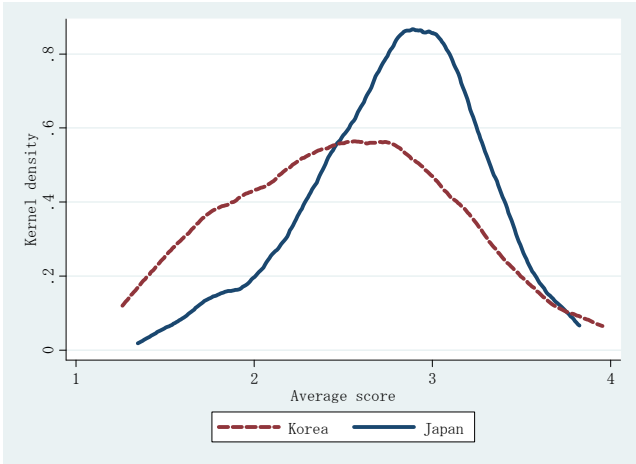
**Figure 3 – 3 Distribution of Management Scores in Human Capital (Information-related firms)**



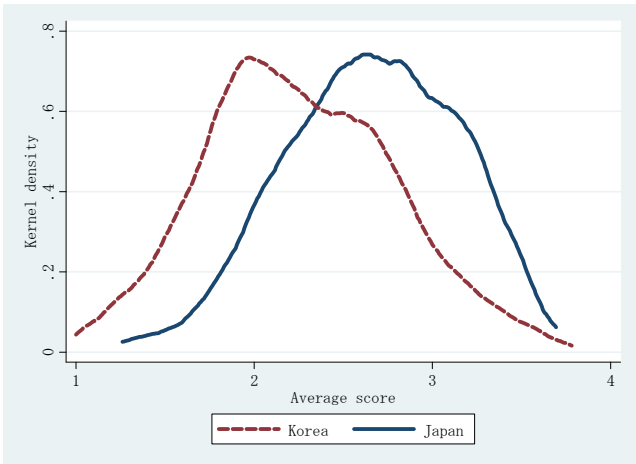
**Figure 3 – 4 Distribution of Management Scores in Human Capital (Retail firms)**



**Figure 4 – 1 Distribution of Total Scores of Firms with 300 or More Employees (All firms)**



**Figure 4 – 2 Distribution of Total Scores of Firms with Fewer than 300 Employees (All firms)**



## Appendix . Questionnaire

### About the scoring

### Quantitative accompanying information

1. Permeation of management principles (vision)
  - 2 Does your company have management principles that it has upheld for many years ?  
( )
  - 3 What kind of schemes are in place to have those management principles shared by all employees ?  
(For example, announcing them at the morning assembly, or making them portable by writing them on cards or such like.)  
( )
  - 4 Are the management principles also supported by parties such as external partners or the shareholders ?  
( )
2. Implementation of organizational goals
  - 2 Are there specific numerical goals on multiple levels that go beyond being just a vision or a slogan, regardless of the level of the goals  
(such as company-wide or divisional or sectional goals)?  
( )
  - 3 Are the goals of each division adjusted in each division to ensure consistency between divisions ?  
( )
  - 4 Is consistency maintained between these goals and the goals of the management principles or of the long-term company-wide goals ?
    - 2-1. Implementation of organizational goals (setting target levels)
      - 2 For example, are the settings for the divisional or sectional target levels simply given to you from the division or section above you?  
( )
      - Or are they given to you while considering the opinions of your division or section?  
( )
    - 3 Are the target levels appropriately set as non-binding challenges?  
( )
    - 4 Are target levels checked to ensure there is fairness between divisions or sections? Please give an example of how they are checked.  
( )
  - 2-2. Implementation of organizational goals (permeation of goals)
    - 2 Do all employees know about the goals?  
( )
    - 3 If goals exist on various levels (such as company-wide, divisional and sectional goals), do all employees understand the level of priority of the goals?  
( )
    - 4 Do all employees accept the target levels? Please give an example if possible.  
( )
  - 2-3. Implementation of organizational goals (degree to which goals are achieved, checks on performance)
    - 2 Are checks made to see how far goals have been achieved? Please give an example of how such checks are made.  
( )
    - 3 Are such checks made on a periodic basis rather than being made as necessary? And how frequently are such checks made?  
( )
    - 4 Are additional checks made that are decided by the section or department involved itself, rather than just being fixed checks?  
( )

2-3-1. Implementation of organizational goals (permeation of degree to which goals are achieved, and results of checks on performance)

2 Are the results of such checks made openly available within your division?

3 Are the results of such checks made openly available within not only your division but also between relevant divisions?

4 Are adjustments made to ensure that the degree to which goals have been achieved at different divisions is fairly compared?

(for example, utilizing common scales such as overtime hours?)

2-3-2. Implementation of organizational goals (results of checks - handling when goals have not been achieved)

2 Is a meeting consisting of managerial staff and employees promptly held as soon as it is known that the goals were not achieved?

3 After investigations, are points to revise spread throughout the division, and are measures for handling the failure to achieve the goals promptly implemented?  
(In this case, exclude personnel matters.)

4 Are problematic issues and countermeasures made thoroughly known throughout the relevant division, and if necessary, other divisions?

Please give an example if possible.

2-3-3. Implementation of organizational goals (results of checks - handling when goals have been achieved)

2 When goals are achieved are investigations made so that those goals renewed on a continuous basis or so that higher goals are set?

3 How long is it between the setting of higher goals and the operation / implementation of those goals?

4 Are these measures institutionalized on a company-wide level?

### 3. Non-stylized communication within the organization

2 Are measures and activities other than stylized meetings used to increase informal communication?

(for example, informal meetings consisting only of key personnel)? Please give an example.

3 Are informal meetings held between divisions?

4 Are informal meetings held with persons of various ranks?

( )

4. Implementation of organizational reform		
2	Has your company undergone any organizational reforms in the last ten years? When did it occur?	
3	Did your company use a consulting company at that time? How much did it cost?	
4	Did you determine the results of the reform in a quantified manner? By what percentage did profits increase or by what percentage were costs reduced?	
4-1.	Period of organizational reform or strategic change	
2	Did it take time to implement the organizational reform over one year? How many years were spent including preparation period?	
3	Why was the organizational reform necessary? Was it to do with the leadership of the top management?	
4	During the organizational reform, did the mid-level management also strive to achieve the reform, thereby giving a sense of unity in the company?	
4-2.	Scope of the effects of organizational reform	
2	Were the effects of the reform shown in the divisions or sections? If they were, please give an example of the effects.	(Write the example here)
3	Were the effects of the reform shown between divisions, and not just within one division? If they were shown between divisions, please give an example of the effects.	( )
4	Were the effects of the reform shown between the company and the business partners, and not just within the company? If they were, please give an example of the effects.	( )
4-3.	Details of the organizational reform (delegation of authority) When a company undergoes organizational reform, sometimes the employees' decision-making authority is also revised. In the case of your company,	
2	Was decision-making authority given to those in a lower position as a result of the organizational reform?	
3	Were posts simplified in conjunction with decision-making authority being given to those in a lower position?	
4	As a result, was there a change in the details of the job or the way of doing the job? Please give an example.	( )
4-4.	Details of the organizational reform (IT activities)	
2	Did the IT system make your company more streamlined, for example by reducing the amount of paper-based documentation?	
3	In the last decade, did your company launch organizational reform, rather than raise business efficiency, by utilizing the IT system?	
4	Did an opportunity to earn new profits arise as a result of the organizational reform by the organizational reform based on the IT system? Please give an example.	( )

5. Promotion system
  - 2 Does your company mainly have a performance-based promotion system?
  - 3 If the promotion system is mainly a performance-based one, does your company have a management-by-objectives system? If it does, when did that system start?
  - 4 Did the performance of the employees improve as a result of using the management-by-objectives system and introducing a performance-based promotion system?
6. Schemes to improve motivation
  - 2 Are there any schemes other than promotion-related or pay-related systems to increase the motivation of the employees? Please give an example.
  - 3 Is that scheme used on an institutional basis throughout the company?
  - 4 Do you monitor when the employees' motivation, retention rate or job performance increases as a result of such a scheme?
7. Handling employees that perform poorly
  - 2 Are they handled in some specific way other than by giving them oral warnings?
  - 3 Does that handling include measures that are implemented faster than the average term of office?
  - 4 Are the measures implemented as soon as a problem is confirmed (before a routine rotation)?
8. Handling employees that perform well
  - 2 Is it made clear within the division that the employee's performance is good, for example by management praising employees at meetings?
  - 3 Is there a system to connect good performance to things such as financial reward or promotion?
  - 4 Was the motivation of the employees raised through introducing such a system?
9. Securing good manpower
  - 2 Can you identify the high performance and core employees, mentioned in the question 9, in your company? Please give an example.
  - 3 Such excellent employees are treated well compared with ordinary employees? If so, how are they treated?
  - 4 Could you prevent the loss of such excellent employees?



10. Evaluating the interpersonal skills of the managers

2 Do the managers give clear criteria such as the degree to which persons of a lower position should be nurtured?

3 Is there an incentive system, such as a pay-related or promotion-related system, to reward managers that have nurtured excellent staff of a lower position?

4 Did the motivation of the managers increase as a result of introducing such a system?

11. Nurturing human resources through training

Is there training on an occupational ability basis or an assignment basis, aiming to improve the work skills of the employees?

2 Over the course of one year, on average how long is spent on training?

(Training on an occupational ability basis means training in specialist capabilities that are required in each field, such as management, business, research and development, and manufacturing. Assignment-based training means training in areas such as languages, OA, computing, and acquisition of official certifications.)

3 Do those training activities help to improve business results? Please give an example.

( )

4 Are the effects of those training activities adaptable to other companies?

12. Nurturing human resources through OJT

2 Is OJT performed on a daily basis?

What percentage of the supervisor's working time is spent on giving instructions to those in a lower position?

3 Does OJT contribute to business results? Please give an example.

( )

4 Are the effects of OJT monitored? Please give an example of the methods used.

( )

13. Employees' expertise

2 Are employees rotated in a fixed schedule, such as once every two or three years?

3 To improve the expertise of the employees, are they assigned to a set position for a long time?

4 Is there a systematic program in place to ensure the employees acquire some expertise?



**“Comparing the Catching-up Firms with the Advanced  
Firms: Korea vs. U.S.A.”**

*Buru Im*

(BK21, Department of Economics, Seoul National University)

*(Co-authored with Keun Lee)*



*The 19th SJE-WCU-BK21 International Symposium*

**Comparing the Catching-up Firms with the Advanced Firms: Korea vs. U.S.A.**

**Buru Im  
Keun Lee**

Department of Economics  
Seoul National University

2011. 11. 3.

**Contents**

---

- 1. Introduction**
- 2. Data**
- 3. Simple Comparison of Firm's Performance**
- 4. Variables used in the Analyses and Regression Model**
- 5. Results**
- 6. Concluding Remarks**

## **1. Introduction**

---

### **1) What is this paper about?**

- Performance behavior comparison between U.S. and Korean firms based on growth, profitability and firm value
  - show the performance change of Korean and the United States' firms
- Analyzing the determinants of firm performances and investigating their different effects to the different country's firms
  - There are many studies about determinants of firm performances. However, different effects of them in different country have not been well investigated

## **1. Introduction**

---

### **2) Motivations – Some hints from previous literature**

- Lee & Temesgen(2009)
  - determinants of firm's growth of 8 developing countries
  - some basic results: different effect with different capabilities or countries
    1. low growth firms vs high growth firms
    2. in low and middle-income countries - physical capital and human capital contrasting to that of advanced countries
- Lee & Kim(2009)
  - different determinants of long run macroeconomic growth at different income level
    - ; in lower-income countries, secondary education and institution are important;
    - in upper-middle and high-income countries, technology policy and tertiary education are effective
- D'Souza et al.(2005) , Boubakri et al.(2005)
  - ; post-privatization performance and its determinants(different in OECD country and developing country)

## **1. Introduction**

---

### **2) Motivations – Directions in the paper**

- Extend the definition of performance
  - Deal with profitability and firm value as well as growth rate
- Compare Korean firms and U.S. firms directly in one regression
  - Special characteristics of Korea : Korea was low-income country in the past, but after the rapid economic growth, Korea economy became more advanced. However, Korea still has the need to catch-up more advanced economies
  - Take U.S. firms as representative of advanced countries

## **2. Data**

---

- U.S. : COMPUSTAT North America database
  - use financial data from firms listed on the New York Stock Exchange
  - year : 1981~2007, based on the active firms in each year
  - manufacturing industry by NAICS
- Korea : KIS(Korea Information Service)Value Library database
  - use financial data from firms listed on the Korea Stock Exchange
  - year : 1981~2007, based on the active firms in each year
  - manufacturing industry by 9<sup>th</sup> KSIC

### 3. Simple Comparison of Firm's Performance

#### 1) Performance Indicators

- Growth(GRSALE) : Annual sales growth rate  

$$\log(\text{Gross sales})_t - \log(\text{Gross sales})_{t-1}$$
- Profitability(ROS, ROA) : Return on sales(ROS), Return on assets(ROA)  

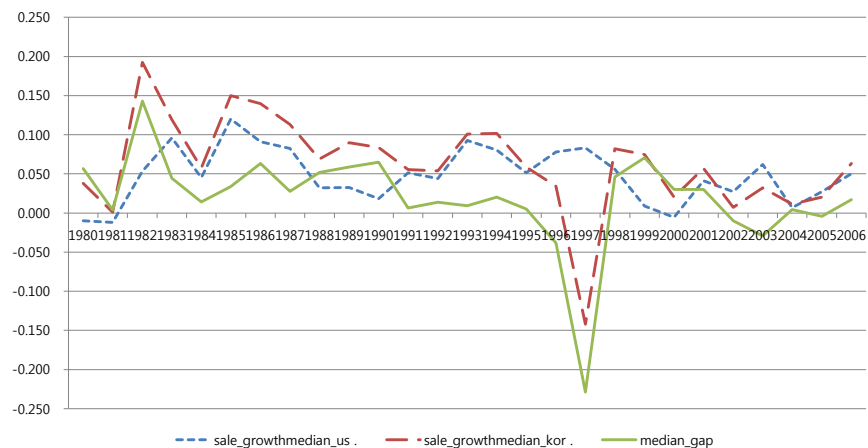
$$\text{ROS} = \text{Operating income}_t / \text{Gross sales}_t$$

$$\text{ROA} = \text{Operating income}_t / \text{Total assets}_t$$
- Firm value(Q) : Tobin's Q (Market to book ratio)  

$$(\text{Aggregate market value}_t + \text{Total liabilities}_t) / \text{Total assets}_t$$

### 3. Simple Comparison of Firm's Performance

#### 2) Sales Growth Rate in each Year

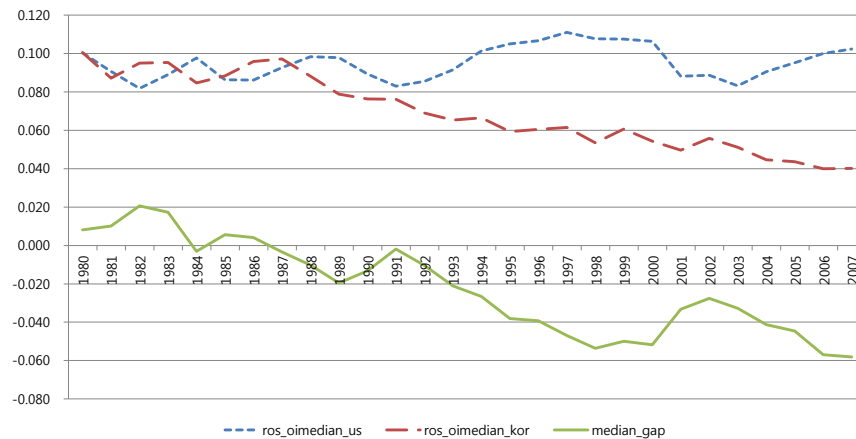


- Korean firm's growth rate was higher than that of US firms' in 1980s and 1990s but it became slow down in 2000s : tendency of growth-oriented strategy of Korean firms in 1980s and 1990s changed in 2000s



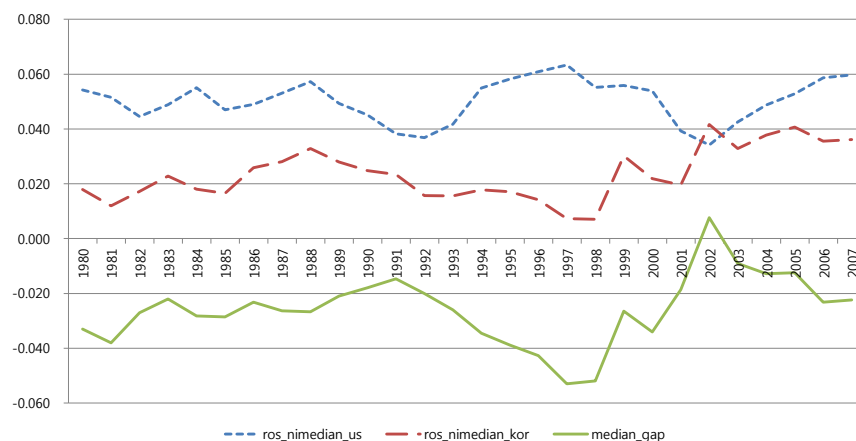
### 3. Simple Comparison of Firm's Performance

#### 3) ROS in each Year(numerator is operating income)



### 3. Simple Comparison of Firm's Performance

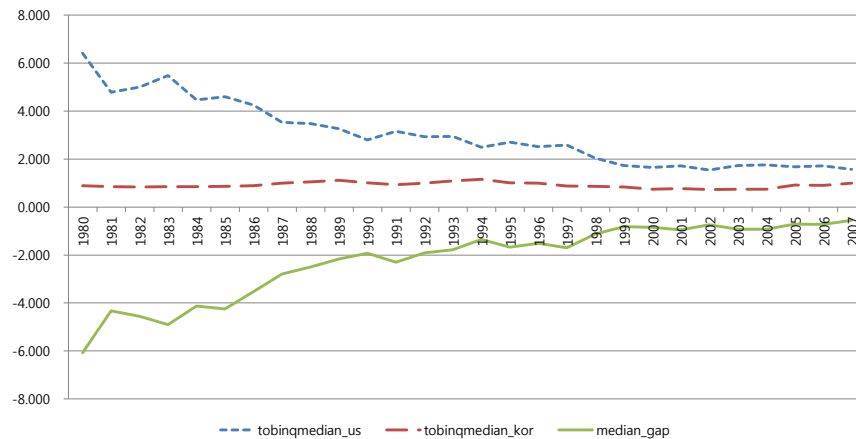
#### 3) ROS in each Year(numerator is net income)



- Profitability of U.S firms still higher than that of Korean firms; but in the aspect of net income, the gap becomes smaller in 2000s → net income profitability of Korean firms is not as bad as the operating income profitability

### 3. Simple Comparison of Firm's Performance

#### 4) TOBIN-Q in each Year



- Gap of Tobin's q has decreased

### 4. Variables used in the analyses and regression model

#### 1) Variables used in the analyses

- Size(SIZE) :  $\log(\text{Number of employees})_t$   
; economy of scale, easy to utilize the result of innovation, less flexible when market environment change, possibility of ownership dispersion
- Debt ratio(DEBT\_RATIO) :  $\text{Total liabilities}_t / \text{Total assets}_t$   
; restriction in using additional capital for a new chance of growth and aggressive price policy to expand market share, increasing the volatility of profit, pecking order theory, decreasing agency cost, reducing corporate tax
- R&D intensity(RND\_INT) :  $\text{R\&D expenditures}_t / \text{Gross sales}_t$   
; making entry barrier, creating new market, forming intangible assets
- Advertising intensity(AD\_INT) :  $\text{Advertising expenditures}_t / \text{Gross sales}_t$   
; increasing consumer recognition, improving the image of the company, enhancing market share, forming intangible assets

#### 4. Variables used in the analyses and regression model

##### 2) Independent Variables

- Capital intensity(CAP\_INT) : Tangible fixed assets<sub>t</sub> / Number of employees<sub>t</sub>  
; leading to high productivity, decreasing liquidity and flexibility of resources
- Current ratio(CURRENT\_R) : Current assets<sub>t</sub> / Current Liabilities<sub>t</sub>  
; proxy for resource slack, how it is utilized to productive activity determines its effects to performances
- Investment(INVEST) : (Tangible fixed assets<sub>t</sub> – Tangible assets<sub>t-1</sub>) / Gross sales<sub>t-1</sub>  
; being recognized as a firm's growth opportunity, strategic aggressiveness

#### 4. Variables used in the analyses and regression model

##### 2) Regression Model

$$Y_{i,t} = \alpha + \sum_j \beta_j X_{ij,t-1} + \sum_j \gamma_j X_{ij,t-1} \times KOR_i + \sum_l \delta_l^1 Industry_{i,l} + \sum_m \delta_m^2 Year_{t,m} + \delta^3 Country_i + u_i + \varepsilon_{i,t}$$

- $Y_{i,t}$  : performance indicator of a firm i in year t
- $X_{ij,t-1}$  : control and explanatory variables j of a firm i in year t
- $KOR_i$  : 1 if a firm i belongs to Korea, 0 if a firm i belongs to U.S
- $Industry_{i,l}$  : 1 if a firm i belongs to Industry l, 0 otherwise
- $Year_{t,m}$  : 1 if t=m, 0 otherwise
- $Country_i$  : 1 if a firm i belongs to Korea, 0 if a firm i belongs to U.S
- $u_i$  : time invariant individual firm effect
- $\varepsilon_{i,t}$  : random disturbances with normal distribution
- $\gamma_j$  captures the difference of a variable j's effect to Korean firms compared to U.S firms
- $\beta_j$  captures the effects of a variable j to U.S firms
- $\beta_j + \gamma_j$  means the effects of a variable j to Korean firms

## 5. Results

VARIABLES	1981~1989	$\beta+\gamma$	1990~1998	$\beta+\gamma$	1999~2007	$\beta+\gamma$
SIZEt-1	-0.109** (-6.634)	-0.144*** (-4.498)	-0.065** (-5.982)	-0.032** (-2.382)	-0.077** (-7.002)	-0.07*** (-4.891)
SIZE*KOR	-0.035 (-0.991)		0.033+ (1.910)		0.007 (0.406)	
RND_INTt-1	-0.074 (-0.376)	0.254 (0.172)	0.473** (2.588)	1.434*** (3.468)	0.264+ (1.741)	1.733*** (7.091)
RND_INT*KOR	0.328 (0.220)		0.961* (2.127)		1.469** (5.107)	
AD_INTt-1	-1.130* (-2.181)	1.997** (2.553)	-0.070 (-0.305)	1.319*** (3.371)	-0.449 (-1.445)	0.271 (0.51)
AD_INT*KOR	3.127** (3.354)		1.389** (3.069)		0.720 (1.170)	
CURRENT_Rt-1	-0.013* (-2.104)	0.003 (0.157)	-0.000 (-0.0388)	0.002 (0.314)	-0.008* (-2.040)	-0.003 (-0.738)
CURRENT_R*KOR	0.016 (0.832)		0.002 (0.275)		0.005 (0.997)	
INVESTt	0.105** (4.143)	0.137*** (2.662)	0.186** (4.444)	0.147*** (8.227)	0.053* (2.382)	0.062*** (4.477)
INVEST*KOR	0.032 (0.552)		-0.039 (-0.865)		0.008 (0.308)	
CAP_INTt-1	0.013 (1.125)	-0.011 (-0.53)	-0.020* (-2.096)	-0.026*** (-3.437)	-0.044** (-5.063)	-0.001 (-0.051)
CAP_INT*KOR	-0.024 (-1.009)		-0.006 (-0.496)		0.043** (3.706)	
GDPGROWTH	-0.004 (-1.336)		0.019** (23.28)		0.015** (5.366)	
Observations	3532		6268		7308	
R-squared	0.122		0.170		0.050	
LM-test statistics( $\chi^2$ )	1.39		31.7***		7.90***	
Hausman test statistics	104.30***		78.73***		161.34***	
Number of firms	540		877		992	

t-statistics in parentheses  
 \*\* p<0.01, \* p<0.05, + p<0.1

REGRESSION RESULT of ROS <sub>1</sub>						
VARIABLES	8189	$\beta+\gamma$	9098	$\beta+\gamma$	9907	$\beta+\gamma$
SIZEt-1	0.003 (0.946)	-0.025*** (-4.183)	-0.003 (-0.715)	0.032*** (5.637)	-0.009* (-2.165)	0.029*** (5.486)
SIZE*KOR	-0.028** (-4.188)		0.035** (4.801)		0.038** (5.633)	
RND_INTt-1	-0.384** (-9.121)	-0.522+ (-1.889)	-0.612** (-7.605)	-0.219 (-1.243)	-0.401** (-7.094)	0.4*** (6.284)
RND_INT*KOR	-0.138 (-0.494)		0.392* (2.022)		0.801** (9.410)	
AD_INTt-1	-0.347** (-3.337)	0.027 (0.182)	-0.145 (-1.444)	0.604*** (3.584)	-0.448** (-3.907)	-0.185 (-0.976)
AD_INT*KOR	0.375* (2.070)		0.749** (3.823)		0.262 (1.184)	
CAP_INTt-1	0.006* (2.393)	0 (-0.054)	-0.013** (-3.249)	-0.012*** (-3.736)	0.000 (0.0365)	-0.007** (-2.306)
CAP_INT*KOR	-0.006 (-1.415)		0.002 (0.310)		-0.007 (-1.596)	
INVESTt	0.053** (8.224)	-0.009 (-0.883)	0.088** (5.653)	0.006 (0.925)	0.034** (2.623)	-0.009+ (-1.785)
INVEST*KOR	-0.062** (-5.137)		-0.082** (-4.850)		-0.043** (-3.101)	
DEBT_RATIOt-1	0.009 (0.948)	-0.001 (-0.126)	0.010 (0.959)	-0.04*** (-4.03)	-0.014 (-1.312)	0.025*** (3.865)
DEBT_RATIO*KOR	-0.010 (-0.790)		-0.050** (-3.428)		0.039** (3.177)	
GDPGROWTH	0.003** (4.395)		0.004** (11.72)		0.001 (1.127)	
Observations	4143		6693		7495	
R-squared	0.058		0.092		0.044	
LM-test statistics( $\chi^2$ )	2557.17***		1308.29***		2355.58***	
Hausman test statistics	156.13***		180.53***		245.29***	
Number of firms	610		903		1016	

t-statistics in parentheses  
 \*\* p<0.01, \* p<0.05, + p<0.1

REGRESSION RESULT of FIRM VALUE						
VARIABLES	8189	$\beta+\gamma$	9098	$\beta+\gamma$	9907	$\beta+\gamma$
SIZEt-1	-0.420** (-20.50)	0.109*** (3.07)	-0.366** (-23.06)	-0.088*** (-3.581)	-0.329** (-23.34)	-0.133*** (-6.071)
SIZE*KOR	0.529** (13.04)		0.277** (9.141)		0.195** (7.434)	
RND_INTt-1	0.002 (0.460)	8.127*** (3.372)	-0.001 (-1.381)	0.026 (0.037)	-1.928** (-9.278)	-0.599 (-1.261)
RND_INT*KOR	8.125** (3.371)		0.027 (0.0380)		1.329* (2.562)	
AD_INTt-1	-2.513** (-3.439)	3.329*** (3.033)	-0.090 (-0.256)	-0.993 (-1.534)	-1.809** (-4.376)	-1.439** (-1.977)
AD_INT*KOR	5.842** (4.466)		-0.903 (-1.229)		0.370 (0.442)	
CAP_INTt-1	-0.042* (-2.458)	0.013 (0.546)	-0.087** (-6.056)	-0.033*** (-2.6)	-0.070** (-6.203)	0.007 (0.633)
CAP_INT*KOR	0.055+ (1.853)		0.053** (2.749)		0.077** (4.837)	
DEBT_RATIOt-1	0.042 (0.671)	-0.602*** (-4.824)	0.086* (2.267)	0.31*** (5.219)	0.292** (7.725)	0.106*** (3.395)
DEBT_RATIO*KOR	-0.644** (-4.565)		0.223** (3.167)		-0.186** (-3.807)	
Observations	3730		5646		6996	
R-squared	0.232		0.199		0.155	
LM-test statistics( $\chi^2$ )	8058.78***		11013.91***		8785.08***	
Hausman test statistics	1172.93***		287.19***		1266.24***	
Number of firms	534		760		908	

t-statistics in parentheses  
 \*\* p<0.01, \* p<0.05, + p<0.1

## **6. Concluding Remarks**

---

### **1) Different effect in different country**

### **2) Common pattern**

- positive differences of R&D intensity effect to growth and profitability  
; in the environment with relatively lower R&D level, marginal contribution of additional R&D expenditure can be bigger / relative characteristics of R&D
- positive differences of advertising intensity effect to growth and profitability  
; the effects of advertising are bigger in more monopolistic market structure such as Korean market
- positive differences of capital intensity effect to firm value  
; fixed asset size is more appreciated in Korean market

**Thank you**