Structural Changes in Japanese Supplier System

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Objectives

- Structural changes in Japanese supplier system - a focus on vertical integration
- Factors behind vertical integration (firm boundaries)
- How has “keiretsu” system, once praised, been changed over time since “growth era” in the 80s through “slump/restructuring” phase in the 90s
- Panel data analysis: cross-section (by OEMs and component types) and time-series (1984-2002)

Analytical Framework

- Factors behind VI
  - Monopoly, scale economy, transaction cost (Monteverde & Teece, Walker & Waber), architecture (Teece, Fujimoto & Katsu), innovation (Langlois & Robertson), knowledge (Fine&Whitney, Takeishi)
- Variations of VI
  - Complete VI, complete VI within Keiretsu (Quasi-VI), tapered integration, outsourcing within Keiretsu, tapered outsourcing within Keiretsu, complete outsourcing

Variations of VI

	VI	Outsourcing	
		Keiretsu	Non-K
Complete VI	○		
VI within K	○	○	
Tapered VI	○	(○)	○
O within K		○	
Tapered Outsourcing within K		○	○
Complete O			○

Data

- IRC data on component transactions for 200 types of components in 1984, 1987, 1990, 1993, 1996, 1999, 2002
- Questionnaire survey to measure the nature of components (with Nobeoka and Manabe)

Data Analysis (preliminary results)

- Procurement patters, purchasing volume
- Vertical integration
- Comparisons by OEMs

- Important notes:
- 1. Component types included in the data differ by year. Only 72 components that appeared every year are analyzed for time-series analysis.
- 2. OEMs manufacturing only cars and light trucks are analyzed. Those manufacturing heavy-duty trucks are excluded.
- 3. Keiretsu suppliers are defined by IRC, based on financial affiliation, sales dependency, and historical relations, reflecting a widely shared view in the industry.
- 4. Data are still preliminary and subject to changes. Some clarifications and refinement may be needed. Please do not cite, quote, or reproduce without permission.

Procurement Patterns, Volume

	1984	1987	1990	1993	1996	1999	2002
Procurement volume	114	121	127	103	87	97	101
# of suppliers	1.97	2.10	2.16	2.27	2.38	2.38	2.36
# of OEM customers	2.01	2.05	2.06	2.06	2.09	2.15	2.21

Note: Unweighted average of 72 components and 7 OEMs

Vertical Integration

	1984	1987	1990	1993	1996	1999	2002
Procuremt from in-house component diviions %	8	8	8	8	7	7	6
Procuremt from Keiretsu suppliers %	31	31	33	34	34	33	28
Total: Quasi-VI	40	40	41	41	41	40	35

Note: Unweighted average of 72 components and 7 OEMs

%=procurement volume from in-house component divisions (or Keiretsu suppliers) devided by total procurement volume by the OEM for the component for the year.

VI by OEMs in 2002

	Procurement volume	# of suppliers	In-house production %	Procurement from K-suppliers %	Quasi-VI
Toyota	302	2.75	12	64	76
Nissan	118	2.46	4	31	35
Honda	111	2.42	7	36	43
Mazda	52	2.50	6	23	29
Suzuki	72	2.43	8	13	21
Daihatsu	54	2.23	11	12	23
Fuji Heavy Industry	37	2.10	4	17	21

Note: Unweighted average for 200 components in 2002.

VI (in-house production) by OEMs

In-house%	1984	1987	1990	1993	1996	1999	2002
Toyota	12	13	11	11	10	12	10
Nissan	10	11	10	8	8	7	4
Honda	5	5	5	5	5	5	4
Mazda	7	7	6	6	6	6	6
Suzuki	8	9	9	10	7	7	7
Daihatsu	8	7	9	9	10	9	9
Fuji Heavy Industry	7	7	6	6	4	4	4

Note: Unweighted average of 72 components.

VI (outsourcing from Keiretsu suppliers) by OEMs

K-suppliers%	1984	1987	1990	1993	1996	1999	2002
Toyota	61	61	61	62	62	61	62
Nissan	54	53	53	56	56	56	36
Honda	38	40	45	47	44	44	38
Mazda	31	29	30	30	31	30	18
Suzuki	12	11	13	12	15	15	16
Daihatsu	12	15	17	16	16	15	15
Fuji Heavy Industry	11	11	10	11	11	12	13

Note: Unweighted average of 72 components.

Quasi-VI (in-house production + outsourcing from K-suppliers) by OEMs

Quasi-VI (in-house+k-suppliers)%	1984	1987	1990	1993	1996	1999	2002
Toyota	73	73	72	73	72	72	72
Nissan	64	64	63	64	64	63	40
Honda	44	45	50	52	49	48	42
Mazda	38	36	36	36	37	36	24
Suzuki	20	20	22	22	22	22	23
Daihatsu	20	22	26	26	25	24	24
Fuji Heavy Industry	18	18	17	17	16	16	17

Note: Unweighted average of 72 components.

Future research

- Measuring the nature of components by questionnaire survey: architecture (interdependency, standardization), uncertainty, technological changes, added-value, etc.
- Analysis of factors behind VI: scale, volume changes, component natures, competition, OEMs strategy
- Interviews: OEMs strategy on VI, Reasons and effects of recent changes in VI