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Keiretsu Divergence in the Japanese Automotive Industry: Why Have Some, But Not All, Gone?

Akira Takeishi

Graduate School of Economics, Kyoto University
CEAFJP Visiting Researcher

Yoshihisa Noro

Mitsubishi Research Institute, Inc.

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Akira Takeishi

Graduate School of Economics, Kyoto University;
Visiting Researcher (October 2015- July 2016),
Fondation France-Japon de l'École des Hautes Études en Sciences Sociales
e-mail address: takeishi@econ.kyoto-u.ac.jp

Yoshihisa Noro

Mitsubishi Research Institute, Inc.

ABSTRACT

The keiretsu relationship in the Japanese automotive industry was once admired as a source of competitive advantage. Yet, after the collapse of the bubble economy, arguments emerged that keiretsu was instead a source of weakness and its role had ended; in fact, some automakers dismantled their keiretsu relationships. Meanwhile, however, other automakers have maintained these relationships, and as such, discussions continue regarding whether or not keiretsu contributes to competitive advantage. In this study, we analyze some empirical data in order to explore the changes to keiretsu relationships in the Japanese automotive industry, and the reasons behind these changes. We propose that there are two types of keiretsu relationships, inward and outward keiretsu, where the former type is likely to be dismantled and the latter to be maintained. Future research agenda are also presented.

KEYWORDS

Keiretsu; Inter-firm Relation; Competitive Advantage;
Divergence; Automotive Industry
JEL Classification: D23; L14; L62; M11

1. Introduction

When the bubble economy burst in the early 1990s, evaluation of the Japanese economy, industries, and corporations swung drastically from praise to criticism. Although such a drastic change in evaluation is not unusual, it was rare, particularly because the key factors that had attracted praise were identical to those attracting criticism. According to Westney and Cusumano (2010), who examined how Western experts viewed and discussed the Japanese economy, industries and corporations, in a wide range of issues, including employment and compensation systems, strategy, corporate governance, inter-firm relations, and government-industry relations, the same factors were regarded as a source of success during praise and as a source of failure during criticism.

“Vertical keiretsu” was among the factors listed as contributing to both, success and failure. Vertical keiretsu refers to the close relationship established by a firm with other upstream and/or downstream firms in the value chain. Vertical keiretsu in Japanese manufacturing industries gained attention with the observance of structural differences between Japan and the United States of America (the United States), and effective cooperation between firms was regarded as a source of Japanese advantage. However, the critical view that emerged during the 1990s argued that firms in vertical keiretsu lacked flexibility and was slow to implement necessary restructuring. It was also noted that vertical keiretsu served as a barrier to entry into Japan and a means to obscure poor financial performance.

The Japanese automotive industry has often been regarded as a representative example in both, positive and negative evaluations. The positive view observed that major Japanese automakers built close relationships with their keiretsu suppliers, which was not common in Europe or the United States, and utilized their suppliers effectively to gain a competitive advantage. On the other hand, the negative view paid attention to Nissan’s case, where the automaker dismantled keiretsu in the late 1990s and the early 2000s, in order to overcome the financial crisis it endured after the bubble economy collapsed. Regardless of the praise or criticism, the keiretsu relationships between automakers and suppliers in the Japanese automotive industry have attracted significant attention in the discussion of vertical keiretsu in Japan.

In this study, we review the existing arguments from both types of evaluations, and analyze and explore the actual changes to the keiretsu relationship in the Japanese automotive industry and the reasons behind such changes. Considering that this industry has served as an important empirical subject in theories of firm and inter-firm relationships, this study is expected to provide valuable insights and implications beyond the analysis of a specific industry in a specific country.

The empirical data used for this study continues to be in the process of

extension and expansion in our current research project, and thus, is not yet complete for a full-fledged analysis. The analysis and discussions below are therefore preliminary, and our emphasis is on presenting our future research agenda¹.

2. The Existing Arguments

In order to begin, we briefly observe how vertical keiretsu² in the Japanese automotive industry has been discussed in existing arguments.

In reviewing previous discussions, it is important to note that researchers have used the construct of vertical keiretsu differently over the years. While keiretsu in general is a construct depicting certain types of relationships among Japanese companies and was disseminated overseas as “keiretsu,” there are multiple ways of defining and operationalizing the construct. In a narrow sense, keiretsu refers to a relationship between companies in a value chain that have extensive connections, such as partial equity ownership, dispatching directors, and providing financial assistance. In a broader sense, a long-term, cooperative relationship in contrast to the one that is short-term and at an arm's length, can also be referred to as keiretsu. While ranging from the narrow sense to the broad sense, the meaning of vertical keiretsu has never been unified, and there have even been some cases where the term was used ambiguously in individual studies and articles, which is sometimes confusing.

This issue of multiple meanings alone contributes to our research agenda, as discussed later. Below, we examine how vertical keiretsu in both, the broader and the narrower senses, has been discussed in existing literature. Note that, henceforward, vertical keiretsu is referred to as “keiretsu.”

Keiretsu as a Strength

As the Japanese automotive industry gradually improved its competitive performance in the United States and European markets, a stream of research was conducted on the successful factors. An earlier view was that the success relied on low wages and the protected domestic market. However, such assertions gradually faded,

¹ This research is part of a joint research project with Tatsuya Kikutani (Kyoto University) and Ryuichi Nakamoto (Sugiyama Jogakuen University) and financially supported by the Grants-in-Aid for Scientific Research (C), Japan Society for the Promotion of Science (grant number: 15K03655). Part of this research was carried out when one of the authors (Takeishi) was a visiting researcher at the Fondation France-Japon (FFJ) de l'École des Hautes Études en Sciences Sociales (EHESS), France. We appreciate the support of the JSPS and FFJ.

² The keiretsu relationship also includes horizontal keiretsu (e.g., corporate group etc.), as well as a combination of horizontal and vertical keiretsu. In addition, vertical keiretsu relates to both, production and distribution activities in the value chain; however, hereafter, we focus on the former, that is, vertical keiretsu for production activities, which is sometimes referred to as production keiretsu.

and subsequently the arguments that success was made possible by the capabilities of the Japanese automakers were accumulated through comparative analyses of the automotive industry in Japan, the United States, and Europe. The close, long-term relationship established with suppliers was designated as one of the critical elements that supported and constituted the capabilities of Japanese automakers.

For example, an international comparative study conducted by the Massachusetts Institute of Technology (MIT) clarified the strengths of the Japanese automotive industry and argued that the close collaboration with suppliers enabled excellent outcomes in the automakers' production and development (Womack et al. 1990). In addition, Harvard University's international research comparing product development management and performance of major automakers worldwide revealed that Japanese automakers could quickly, efficiently, and effectively develop new cars by involving suppliers as part of their team from the earliest stage (Clark and Fujimoto 1991). Such discussions further led to the argument that the automakers in the United States (or even companies in other industries) should build a "keiretsu" relationship with suppliers similar to that of Japan, as such efforts could deliver promising outcomes in the United States (Dyer 1996).

The analyses and discussions on inter-firm relationships and transactions in the Japanese automotive industry expanded beyond the issue of the particular industry, having reached more general research and theories. In economics, inter-firm relationships between Japanese automakers and suppliers, as analyzed by Asanuma (1989), were referred to as a notable example with economic rationality in the theory of the firm (contracts) by Aoki (1988) and Williamson (1979). Williamson (1979), who later won the Nobel Prize in economics for his research on transaction cost economics, initially discussed only two modes of transactions: (1) in-house production or vertical integration; and (2) market transactions. However, he later introduced and theorized the hybrid form as a third mode of transaction (Williamson 1991), referring to Aoki (1988).

In addition, in sociology and management research, keiretsu relationships in the Japanese automotive industry, and some effort on the part of the United States to learn from Japanese keiretsu, were mentioned as evidence to discuss inter-firm relationships and corporate strategy. For example, in sociology, Powell (1990) referred to the United States' automakers' efforts to learn from Japanese automakers and develop new relationships with suppliers in his argument that there exists a network form of economic organization that is neither hierarchy nor market. Further, in management research, Dyer (1998) discussed the importance of collaborating relationships between companies to gain competitive advantage, and cited keiretsu relationships in the Japanese automotive industry, as well as cases where the United States' automakers learned from Japanese keiretsu. The effectiveness and rationality of long-term,

inter-firm relationships became a central issue of theories on firm and economic organizations, and the keiretsu relationship in the Japanese automotive industry was frequently mentioned as its primary example.

Keiretsu as a Weakness

As the Japanese economy continued to decline after the bubble economy collapsed, the problems and limitations of keiretsu emerged as a new argument. In a study that investigated changes in keiretsu relationships in the Japanese automotive industry, Ahmadjian and Lincoln (2001) indicated that the role of keiretsu was declining. Lincoln and Shimotani (2010) discussed the comprehensive history of Japanese keiretsu, including horizontal keiretsu (e.g., corporate group), and concluded that keiretsu's role had ended, although historically it played an important role in the reconstruction and development of the postwar Japanese economy. The authors also argued that inter-firm relationships in Japan would be moving toward either market or in-house production, thus getting closer to the Anglo-American economic institutions. Lincoln (2012) further pointed out that Japan's close inter-firm relationship (i.e., a strong tie) is no longer a strength but a weakness, and it is a challenge for Japanese firms to build a more flexible relationship (i.e., a weak tie) with others.

As Westney and Cusumano (2010) discovered, what eventually emerged as a more prevailing argument in the United States was that, "extended enterprise," rather than keiretsu, would be more successful in gaining competitive advantage. According to this view, the Japanese keiretsu, based on long-term stable relationships and mutual trust, was too rigid and lacked flexibility, whereas "extended enterprise," based on open and flexible relationships, which the companies in the United States were developing, would lead to competitive advantage.

The restructuring of keiretsu by Nissan became a strong supporting evidence and provided momentum to the claim surrounding the problems and limitations of the Japanese keiretsu. Nissan, a leading Japanese automaker, extensively utilized keiretsu suppliers for many years. However, in order to overcome the financial crisis after the collapse of the bubble economy, Nissan established a strategic alliance with Renault in 1999. Under the leadership of Carlos Ghosn, who joined Nissan from Renault as the president, Nissan thoroughly reviewed and dismantled the keiretsu, including selling stocks of many keiretsu suppliers, which aided in the company's quick recovery. This case became a remarkable example of the limitations of Japanese keiretsu, which had been conventionally regarded as a source of competitive advantage. In addition, the case was particularly favored by the critical view of Japanese keiretsu as an individual from a foreign country at the top of a large Japanese company made decisions that internal managers could rarely make. Ahmadjian and Lincoln (2001) wrote that Nissan's case

provided “legitimacy” to the critical view of keiretsu. Similar behavior was also observed in Mazda, where the keiretsu was dismantled in the late 1990s and the early 2000s under the president who had been dispatched from Ford, Mazda’s alliance partner.

Keiretsu in the Japanese automotive industry had once gained much attention as a source of competitive advantage and success. It also greatly influenced theories on firm and economic organizations, and provided promising advice to foreign companies. However, after the collapse of the bubble economy, it was argued that keiretsu had become a weakness and a source of decline, and lost its role in the Japanese automotive industry, as was evidenced in the above cases of keiretsu dismantling.

Polytonal Facts and Arguments

As reviewed, the facts and discussions over keiretsu in the Japanese automotive industry have changed from positive to negative, if we observe those drawing significant attention. However, if we examine more widely and carefully, it remains that competing facts and arguments co-existed even after the collapse of the bubble economy. In other words, the overall tone was “polytonal,” rather than “mono-tonal.”

First, despite Nissan and Mazda restructuring their keiretsu, Toyota and Honda have maintained theirs³; however, all four of these large automakers regained and secured their competitive positions in the international automotive market, after enduring the same adjustment period in the 1990s and early 2000s.

Also, there remain some arguments asserting that keiretsu continued to contribute to the competitiveness of the Japanese automotive industry. For example, Fujimoto (2004), who studied the international automotive industry for many years, argued that the Japanese automotive industry maintained excellent competitiveness in the field of manufacturing and its supplier system, which is highlighted by “long-term relational transactions,” “dynamic small number competition,” and “bundled outsourcing,” continued to be a source of strength. According to him, Nissan’s keiretsu dismantling was a move toward returning to the original “principle of long-term capability,” or building up mutual capabilities over long-term transactions, from the “principle of long-term relations” or relying on long-term ties (Fujimoto 2004).

Similarly, Sei (2005), who studied the automotive parts industry for many years, concluded that the Japanese “keiretsu and subcontracting” system remained at the core of competitiveness in the Japanese automotive industry, and that Nissan’s keiretsu restructuring was merely one of discontinuing equity relationships, and the essence of

³ However, Toyota and Honda introduced new purchasing policies and restructured or merged some of their respective keiretsu suppliers.

its supplier relationships was maintained and reinforced.

Furthermore, even Carlos Ghosn, Nissan's president who decided on dismantling its keiretsu, said that "... Nissan's keiretsu was not functioning, because the keiretsu management of Nissan was premature, and the performance of keiretsu suppliers was poor. So we had to change the system. But we do not deny all of the keiretsu system. There are also cases in which keiretsu was used to produce significant profits. What I would like to say is that Nissan's management of keiretsu was not effective."⁴ This statement suggests that the problem was not keiretsu itself, but the substance and management of the keiretsu relationship, which together would determine the destiny of keiretsu⁵.

Over all, both facts and arguments provide competing views on keiretsu: one indicates keiretsu has lost its value and the other indicates it has maintained its value. If these two views continue to co-exist, the following questions should be analyzed for further discovery: (1) what actually happened to keiretsu in the Japanese automotive industry; and (2) why some keiretsu were dismantled and the others survived.

In addressing the questions, our research focuses on keiretsu in the narrow sense, namely, keiretsu relationships based on equity and personnel ties, rather than in the broad sense, such as in long-term relationships. This is because, first, keiretsu in the narrow sense is a distinguished feature of the Japanese automotive industry, and second, the divergent facts observed with regard to keiretsu in the narrow sense stimulated competing debates on the value of keiretsu relationships.

3. Analytical Framework and Empirical Data

Analytical Framework: Asanuma's Perspective

In order to explore the answers to the above research questions, this study draws on Asanuma's (1989, 1994) arguments as a primary perspective.

Asanuma (1989) investigated supplier relationships in the Japanese automotive industry, as well as in the electric machinery industry. He proposed "relational skill" (Asanuma 1994), which was initially termed as "relation-specific skill" (Asanuma 1989) and later revised as "relational skill," as a key construct to understanding the rationality of long-standing relationships between automakers and suppliers. The relational skill is the ability on the part of the supplier to respond

⁴ Quoted in *Nikkei Bijinesu* [Nikkei Business], November 13, 2000, page 30.

⁵ Lincoln also noted that keiretsu relationships in the Japanese automotive industry possibly still maintained an economic rationality of vertical keiretsu (Ahmadjian and Lincoln 2001). However, the author, in a later paper, concluded that the role of keiretsu, including that in the automotive industry, was over, without much reference to his previous arguments (Lincoln and Shimotani 2010).

efficiently to the specific needs of the automaker, and this skill serves as the main factor leading to long-term and continuous transactions between the two firms. By presenting this concept, Asanuma (1989) linked the practices of supplier relationships observed in the Japanese automotive industry to Williamson's (1979) theory of the firm, which was developed based on the transaction cost theory and made contributions to the subsequent development of theories of the firm, as described previously (Aoki 1988, Williamson 1991, Milgrom and Roberts 1992).

While this construct is applied to the current research, our focus is more on Asanuma's (1989, 1994) proposal of the two-layer structure of relational skill. He stated that relational skill has two layers: (1) "the surface layer," which refers to accumulated learning through transactions with the automaker; and (2) "the basic layer," which refers to general technological capabilities that support the surface layer and also serve to respond to the customization demands of multiple automakers.

The skill of the surface layer not only forms capabilities that are useful for future transactions with the particular automaker, but it also makes it possible for the supplier, if managed effectively, to accumulate technological capabilities that will penetrate into the basic layer, ensuring additional transactions with other automakers. In particular, if an automaker is superior to other automakers, through repeated transactions with the superior automaker, the supplier would probably acquire high-level capabilities that would have a spillover effect from the surface layer to the basic layer, consequently leading to additional transactions with other automakers. Investment in relational skill is not necessarily confined to the specific automaker relationship, as it can strengthen the basic layer skill that possibly leads to transactions with other automakers. Asanuma (1989, 1994) argued that relational skill would not necessarily be worthless outside the specific relationship.

Although Asanuma's (1989, 1994) construct of "relational skill" has been applied in many subsequent studies, his view on "the surface and basic layers" has not been considerably explored in subsequent research. However, this viewpoint provides an important clue in dealing with the research question of whether or not a special relationship of keiretsu could survive in terms of gaining economic rationality. This viewpoint urges further investigation into whether keiretsu relationships will result in transactions with other non-keiretsu automakers through the strengthening of the basic layer of relational skill, and if so, how such a mechanism would be employed and properly function.

It should be noted that Asanuma (1989, 1994) developed his arguments with the intention of providing a framework that would analyze what Williamson's theory lacked. While Asanuma drew on Williamson's (1979) theory of the firm, he noted that Williamson's argument focused on "special assets in transactions," without explicitly

considering continued transactions and relationships over different goods that would require different assets. Asanuma (1989, 1994) argued that it is necessary to develop a framework that explores the economic rationality for continued relationships over different generations of specific goods, which he believes would be key to understanding the continuing transactions over a long period of time. Asanuma (1989, 1994) presented the construct of the two-layered relational skill to address this concern.⁶

More generally, Asanuma's (1989, 1994) perspective attempts to explore the rationality of specific inter-firm relationships by extending the scope of analysis in time and space. It not only examines the transactions between an automaker and its keiretsu supplier at a moment in time, but also the transactions between the keiretsu supplier and other non-keiretsu automakers in a later period in time. This perspective could add significant value to theories of the firm and inter-firm relationships.

Empirical Data

Our empirical analysis is primarily based on a set of panel data on procurement of automotive parts by Japanese automakers from 1984 to 2008. The data set is compiled from reports published by the Industry Research and Consulting Co., Ltd. (IRC), a Japanese market research company. It provides the quantity of 200 types of parts that each Japanese automaker procured from their respective suppliers in Japan in three-year intervals for the time period mentioned above⁷.

It should be noted that the authors are currently in the process of extending the data to include those from 2010 to 2016, and adding another set of data from other sources, such as financial ties between automakers and suppliers. Therefore, the following analysis remains preliminary.

4. Keiretsu Divergence

Changes in Keiretsu Procurement

The empirical analysis begins by observing how the keiretsu procurement in the Japanese automotive industry changed over time. Figure 1 shows how the sources of part procurement by Japanese automakers changed from 1984 to 2008 for the three modes of procurement: (1) in-house production; (2) keiretsu suppliers; and (3)

⁶ Asanuma (1989, 1994) did not select keiretsu relationship in the narrow sense as the subject of research. He avoided using "keiretsu" as a keyword, which he argued may confuse inter-firm relationships established through equity and personnel ties with long-term continuing business relationships. However, Asanuma (1994) added that this does not imply a claim to ignore the "shareholding" relationship. He suggested that it could be possible to develop a considerably more fine-grained analysis by distinguishing between "inter-firm relationship with shareholding" and "inter-firm relationship without shareholding."

⁷ Local procurement in overseas productions is not covered in the data.

independent suppliers⁸. The sample automakers are seven Japanese passenger car manufacturers⁹ and there are 54 types of parts included in the sample, all of which were consistently listed in the IRC reports during this time period¹⁰. The ratio is calculated on a quantitative basis as the unweighted average of the ratios for the sample parts and automakers.

The classification of keiretsu suppliers relies on IRC's definition and is based primarily on: (1) equity ownership; (2) dispatching directors; and (3) history of business relations, reflecting "a shared recognition in the industry"¹¹.

According to Figure 1, from 1984 to 1999, the distribution among the three modes of procurement was stable; the procurement ratio from in-house production declined marginally from 9% in 1984 to 7% in 1999, while that from keiretsu suppliers remained in the range of 34% to 37%, and that from independent suppliers was in the range of 55% to 57% during the period. However, after 1999, the procurement ratio from keiretsu suppliers fell substantially to reach 27% in 2008 and the ratio from independent suppliers increased to reach 68% in 2008. In-house production continued to gradually decline to approximately 5% in 2008. These observations confirm that keiretsu was steadily losing ground, beginning in the late 1990s and continuing into the late 2000s.

However, a different picture emerges when we analyze the data by automakers. Figure 2 shows how the procurement ratio from keiretsu suppliers changed from 1984 to 2008 for each of the seven automakers. Most notable is that the procurement ratios from keiretsu suppliers for Nissan and Mazda decreased rapidly beginning in 1999. With regard to Nissan, the ratio remained marginally under 60% until 1999 and then declined to 19% in 2005. Similarly, for Mazda, the ratio declined from 35% in 1999 to 15% in 2008. One observation is that both the automakers suddenly and significantly changed the relationships with their respective keiretsu suppliers.

On the other hand, Figure 2 shows that the procurement ratio from keiretsu suppliers for other automakers changed very little. In particular, Toyota maintained its

⁸ Independent suppliers in this figure include other automakers' keiretsu suppliers and overseas suppliers. These two groups could be separated in this analysis, but in order to simplify the discussion, they are summarized as independent suppliers. Procurement from other automakers' keiretsu suppliers and overseas suppliers are analyzed and discussed later in this paper.

⁹ These include Toyota, Nissan, Honda, Mazda, Suzuki, Daihatsu, and Fuji Heavy Industries (FHI), which manufactured and sold passenger cars. Mitsubishi Motors Corporation and Isuzu Motors, which manufactured and sold heavy trucks, in addition to passenger cars, are excluded from this analysis.

¹⁰ Although IRC provided data on 200 types of parts for each report, constituent parts listed on each report changed over time.

¹¹ According to a phone interview with a staff of IRC (June 13, 2017).

ratio marginally above 60% from 1984 to 1999, and thereafter, it increased to nearly 70% in 2008. Honda's ratios ranged between 40% and 50% over the same time period, having marginally less than 40% in 1984, rising to nearly 50% in 1999, and decreasing again to its 1984 level of marginally less than 40% in 2008. Considering the remaining three automakers, Suzuki, Daihatsu, and FHI, the procurement ratio from keiretsu suppliers was low in 1984 and remained stable without any significant change until 2008.

A full picture shows that the role of keiretsu suppliers declined substantially at Nissan and Mazda, and these changes led to an overall decline of keiretsu suppliers in the Japanese automotive industry toward the late 2000s. However, the role of keiretsu suppliers only changed marginally for other automakers, particularly Toyota and Honda, whose keiretsu suppliers' role remained significant and stable from the mid-1980s to the late 2000s. Essentially, the role of keiretsu did not change for every automaker; it declined for some, but not for the others. After the late 1990s, the same keiretsu diverged into two: one dismantled and the other survived.

Further analysis is required to understand what changed for each individual automaker and for the Japanese automotive industry as a whole. However, it is first necessary to examine in more detail what happened to the keiretsu relationship at Nissan and Mazda.

Keiretsu Dismantling at Nissan and Mazda

In restructuring keiretsu relationships, Nissan and Mazda sold the stocks of their respective keiretsu suppliers and in some cases, forged a merger, acquisition, or an alliance with other suppliers. As a result, several former keiretsu suppliers turned to non-keiretsu suppliers, leading to a sudden decline in the procurement ratio of keiretsu suppliers in the 2000s as shown in Figure 2.

However, questions remain regarding what happened to the transactions with suppliers who lost keiretsu relationships with Nissan and Mazda; whether Nissan and Mazda stopped procuring from their former keiretsu suppliers after the dissolution and instead turned to new suppliers, or if they continued to procure from former keiretsu suppliers even though the keiretsu relationship had been discontinued.

Table 1 traces the changes in Nissan's procurement surrounding the keiretsu dissolution from 1996, before the keiretsu dissolution, to 2008, after the keiretsu dissolution. The suppliers with keiretsu relationships as of 1996 were divided into two groups: (1) "continued keiretsu suppliers," those that survived the dissolution and maintained keiretsu relationships until 2008; and (2) "discontinued keiretsu suppliers," those that lost keiretsu relationship by 2008. An examination was undertaken as to how the procurement ratio from each supplier group changed from 1996 to 2008. Table 1

also shows the changes in the procurement ratios from those suppliers who did not supply to Nissan as of 1996. There are 169 types of parts included in the sample, all of which were consistently listed in the IRC reports from 1996 to 2008.

Based on the data in Table 1, the following observations can be made. First, the procurement ratio from the continued keiretsu suppliers was 14% in 1996, and increased marginally afterwards to 17% in 2008. In other words, the shares of the continued keiretsu suppliers remained stable during this period. Second, the procurement ratio from discontinued keiretsu suppliers was 38% in 1996 and gradually declined thereafter, reaching 23% in 2008. Among the discontinued keiretsu suppliers, some completely discontinued business operations with Nissan, some were merged or acquired by other suppliers, and some maintained or even increased supply to Nissan during this period. When looking at the combined procurement ratio from continued and discontinued keiretsu suppliers, the result is an overall decrease from 53% in 1996 to 39% in 2008¹².

This leads to another question regarding which suppliers replaced the discontinued keiretsu suppliers whose shares had declined. Table 1 shows that Nissan's procurement mainly increased from independent suppliers¹³, overseas suppliers, and Toyota's keiretsu suppliers. From 1996 to 2008, the procurement ratio from independent suppliers increased from 35% to 39%, overseas suppliers from 1% to 8%, Toyota's keiretsu suppliers from 1% to 5%, and Honda's keiretsu suppliers from 0.3% to 3%. In addition, the procurement ratio from new suppliers who did not supply parts to Nissan in 1996 increased steadily from 0% to 6% in 2002, 8% in 2005, and 14% in 2008. Those new suppliers include independent, overseas, and Toyota's keiretsu suppliers, as noted above.

Overall, the results show that Nissan's procurement from keiretsu suppliers decreased after the keiretsu dissolution, while it increased from non-keiretsu suppliers, including new ones, in order to replace procurement from the discontinued keiretsu suppliers. On the other hand, procurement from continued keiretsu suppliers remained stable. Table 2 reveals similar observations for Mazda.

5. Supply of Parts from Keiretsu Suppliers to Non-Keiretsu Automakers

The above observations confirm that keiretsu relationships were certainly dismantled in actual transactions for some keiretsu suppliers at Nissan and Mazda, and imply that it is worth exploring further what determined the diverged destiny of keiretsu

¹² Nissan's procurement ratio in Table 1 does not match with that in Figure 2, as the sample parts are different (54 types of parts in Figure 2, 169 types in Table 1).

¹³ In Table 1, unlike the previous Figure 1, independent suppliers do not include other automakers' keiretsu suppliers and overseas suppliers.

relationships between those that were dismantled and those that survived. As mentioned above, in order to answer this question, we pay attention to the issue of whether keiretsu relationships could contribute to the supplier's basic layer skill. The primary focus of our following empirical analysis is on whether or not keiretsu suppliers supplied parts to non-keiretsu automakers, and if so, in what quantities.

First, Figure 3 shows on an average, how each automaker's keiretsu suppliers supplied parts to non-keiretsu automakers during the period from 1984 to 2008 using the same sample parts from Figures 1 and 2. The vertical axis measures the ratio of the volume supplied by each automaker's keiretsu suppliers to non-keiretsu automakers divided by the volume supplied by each automaker's keiretsu suppliers to the keiretsu automaker. Larger the ratio, greater is the volume supplied to non-keiretsu automakers relative to the volume supplied to the keiretsu automaker. The results show that Toyota's keiretsu suppliers had the highest ratio (29%), followed by Honda's keiretsu suppliers (20%), and Nissan's keiretsu suppliers (17%), while the ratio was very low (nearly 0%) for keiretsu suppliers of the other automakers¹⁴.

Next, Figure 4 shows how the volume supplied by each automaker's keiretsu suppliers to non-keiretsu automakers changed from 1984 to 2008. This figure plots the relations between the procurement share of each automaker and the supply share of each automaker's keiretsu supplier(s) for each of the 54 types of parts during the three periods: (1) the 1980s (1984-1987-1990); (2) the 1990s (1993-1996-1999); and (3) the 2000s (2002-2005-2008).

The vertical axis shows the procurement share of each automaker, or the ratio of the procurement volume of the automaker to the total procurement volume of the seven automakers, for each part and each year. The horizontal axis shows the supply share of each automaker's keiretsu supplier(s), or the ratio of the supply volume of each automaker's keiretsu supplier(s) to the seven automakers to the total supply volume by all suppliers to the seven automakers, for each part and each year. In this figure, the points on the diagonal line imply that the automaker procured all the part from its keiretsu supplier(s); the points on the left of the diagonal line imply that the automaker procured some of the part from non-keiretsu suppliers; the points on the vertical axis imply that the automaker did not procure the part from its keiretsu supplier (i.e., the automaker did not have a keiretsu supplier for the part and procured it only from non-keiretsu suppliers); and the points on the right of the diagonal line imply that each automaker's keiretsu supplier(s) supplied the part not only to the keiretsu automaker,

¹⁴ In this analysis, Daihatsu is included in non-keiretsu automakers for Toyota's keiretsu suppliers. However, Daihatsu, whose stocks were partially owned by Toyota, belonged to the Toyota group. If the keiretsu relationship is defined to include indirect equity ties, the supply to Daihatsu from Toyota's keiretsu suppliers should be excluded from keiretsu suppliers' supply to non-keiretsu automakers.

but also to other non-keiretsu automaker(s).

According to Figure 4, while Toyota's procurement shares (as shown along the vertical axis) were approximately 30% to 40% for most of the parts, reflecting its largest share of domestic vehicle production, many of the supply shares of Toyota's keiretsu suppliers were on the right of the diagonal line, and many points were moving gradually toward the right from the 1980s to the 2000s. Similar characteristics are observed for Honda's keiretsu suppliers. Meanwhile, although Nissan had the second highest procurement shares among the seven automakers in the 1980s, fewer points were located on the right of the diagonal line, and in the 1990s and the 2000s many points moved down and to the left of the diagonal line. A similar pattern is observed for Mazda.

Based on the same data, Table 3 reports the average value for the procurement shares of each automaker and supply shares of each automaker's keiretsu suppliers for the 54 types of parts in each of the three periods.

Figures 3 and 4, along with Table 3, reveal that in a large number of cases, Toyota's keiretsu suppliers supplied parts not only to Toyota but also to non-keiretsu automakers, and their supply shares were larger than Toyota's procurement shares. Furthermore, this trend was becoming more prominent over time. There were many cases in which the supply share of Toyota's keiretsu suppliers was located on the left of the diagonal line, which is common for other keiretsu suppliers. However, in the case of Toyota's keiretsu suppliers, the number of points on the left of the diagonal line was smaller and many points were moving toward the right over time, indicating an increase in their supply shares with other non-keiretsu automakers. A similar pattern can be confirmed for Honda.

A set of related data in table 4 reveals that Toyota's keiretsu suppliers gained shares in the procurement of parts for Nissan (increased from 1.4% to 5.3%), Honda (increased from 7.6% to 10%), and Mazda (increased from 8.7% to 12.5%) from 1996 to 2008. While Nissan and Mazda reduced their procurement from former keiretsu suppliers after the keiretsu dissolution, and increased the procurement from independent suppliers, overseas suppliers, and other automakers' keiretsu suppliers, as we saw in Tables 1 and 2, Toyota's keiretsu suppliers steadily expanded their market share for these two automakers. Toyota's keiretsu suppliers were even increasing their shares for Honda, which had maintained the procurement ratio from keiretsu suppliers during the period. In addition, Table 4 also shows that Toyota procured a very limited volume of parts from other automakers' keiretsu suppliers. As such, the degree of sharing keiretsu suppliers with each other is asymmetric between Toyota and the other automakers.

6. Discussion

Outward versus Inward Keiretsu

The above findings enable the presentation of the following argument as a proposition: *there are two types of keiretsu relationships and the difference would determine whether the keiretsu would be maintained or not.* Figure 5 illustrates the proposed view on these two types of keiretsu relationships. The upper-half depicts the existing view on keiretsu, along with hierarchy (in-house) and market (independent suppliers). The difference among the three modes of procurement is in the nature of the relationship. Keiretsu is neither an employment relation (in-house) nor an arm's-length spot market transaction (independent suppliers), but a market transaction based on long-term and stable relationships often with financial and personnel ties, and trust.

This existing view captures the essentials of the keiretsu relationship and is difficult to argue. However, within this keiretsu mode, it can be argued that there are two types, as shown in the bottom-half of Figure 5: (1) "inward keiretsu" or closed, the keiretsu relationship in which the supplier supplied its parts only to its keiretsu automaker; and (2) "outward keiretsu," the keiretsu relationship in which the supplier supplied its parts not only to its keiretsu automaker, but also to other automakers.

The data presented above indicate that the two types of keiretsu certainly existed in the Japanese automotive industry, namely inward keiretsu at Nissan and Mazda, and outward keiretsu at Toyota and Honda. It should be noted that some of the keiretsu suppliers at Toyota and Honda were "inward," that is, having limited or no transactions with other automakers, and some of the keiretsu suppliers at Nissan and Mazda were outward, having some transactions with other automakers. However, relatively, keiretsu suppliers at Nissan and Mazda were more inward while those at Toyota and Honda were more outward.

Drawing on Asanuma (1990, 1994), it can be argued that outward keiretsu relationships, in which the supplier could strengthen the relational skill at the basic layer and could thus expand business with other automakers, are more likely to be maintained; whereas inward keiretsu relationships, in which the supplier could develop the relational skill only at the surface layer, and therefore its business is only limited to the transactions with the keiretsu automaker, are less likely to be maintained. Simply stated, outward keiretsu would survive and inward keiretsu would disappear. The observations of Toyota, Nissan, Honda, and Mazda from 1984 to 2008 are consistent with this proposed explanation.

Mechanism of Outward Keiretsu

Keiretsu relationships generally tend to be exclusive, as an automaker's keiretsu supplier would supply parts only to the automaker itself and not to other competing automakers. If other automakers have their own keiretsu suppliers, their

priority is to procure the parts from their own keiretsu suppliers, rather than other automakers' keiretsu suppliers. In addition, automakers do not want their keiretsu suppliers to supply parts to other automakers as technologies and know-how could be leaked through multiple transactions. Indeed, it was widely known that for a long period of time, Toyota did not procure from Nissan's keiretsu suppliers and Nissan did not procure from Toyota's keiretsu suppliers.

However, if a keiretsu supplier has superior capability in both, the surface layer and the basic layer, and could develop and manufacture a better part, other automakers would be inclined toward procuring from that supplier. If the automaker does not have its own keiretsu supplier for a specific part, the possibilities are further enhanced. From the keiretsu supplier's viewpoint, to gain transactions with other non-keiretsu automakers and increase the number of customers would be highly beneficial in terms of economies of scale, economies of scope, sales growth, return on investment, diversified experiences, and learning opportunities. In fact, Nobeoka's (1998) empirical analysis demonstrated that suppliers with more customers had better management performance¹⁵.

In the absence of field investigation, it is yet to be determined on how Toyota and Honda, and their respective keiretsu suppliers, dealt with the issue of technology leakage and know-how. However, it is possible to logically infer that if the automaker could maintain leadership in knowledge, capability, and competitiveness through close and continued collaborations with the keiretsu supplier, the loss is limited even though technologies and know-how would eventually leak to competitors. If the benefits to the keiretsu supplier of expanding supply to non-keiretsu automakers are substantial, contributing to the improvement of its knowledge, capability, and competitiveness that in turn would lead to a better outcome of subsequent collaborations between the automaker and the keiretsu supplier, the possibility of remaining as the leader further increases, and the damage from any such leakage would be limited.

It is also yet to be determined whether such a dynamic relationship was functioning between the automaker and keiretsu suppliers in the cases of Toyota and Honda¹⁶. However, this mechanism could be constructed as an "ideal type" (Weber 1949) by which outward keiretsu relationships could maintain economic rationality.

In general, the outcome of collaborations between an automaker and a supplier is largely determined by four factors: (1) the automaker's capability; (2) the

¹⁵ It is also reported that Toyota's keiretsu suppliers had higher profit margins when compared to the other keiretsu suppliers (Sei 2005). If some keiretsu suppliers sell more to other non-keiretsu automakers than other keiretsu suppliers, the profit of the former should include some profits from transactions with non-keiretsu automakers.

¹⁶ It could be stated that this mechanism is based on "philosophy based on long-term capability-building" as described by Fujimoto (2004).

supplier's capability; (3) the relationship between the two companies; and (4) the manner in which they collaborate. The mechanism of outward keiretsu relationship is established by mobilizing all the four factors. By supplying its parts to multiple automakers, including both keiretsu and non-keiretsu, the keiretsu supplier gains the opportunity to cultivate relational skill at the basic layer, similar to other independent suppliers. With its high capability, an automaker can gain superior outcomes from collaborations with any supplier. However, from close collaboration based on keiretsu relationships with capable keiretsu suppliers, the automaker is able to obtain even better results than it could from collaboration with a capable independent supplier. In turn, this could lead to the automaker's opportunity to further enhance its own capability through learning from keiretsu-based collaboration. Through close collaboration with the keiretsu automaker, the keiretsu supplier also gains the opportunity to further raise their capability at the basic layer and gain more transactions with other automakers.

If the four factors are combined and continue to function together in this mechanism, which would require outstanding efforts on the part of the automaker and the supplier, even though the technologies and know-how gained through such collaboration are leaked to other automakers afterwards, the loss is limited, and the value and benefits of enhanced capability and performance are more significant.

In this mechanism, the supplier's high share of non-keiretsu automakers is the result and source of the keiretsu supplier's competitive advantage, and both the automaker's capability of supplier management and a close relationship with the keiretsu supplier are indispensable to maintain functioning of the mechanism.

It should be further noted that automakers who could sustain outward keiretsu with such a mechanism are limited in number within the industry. This is because it is impossible for all keiretsu suppliers to meet the survival conditions of supplying parts to non-keiretsu automakers; only a limited number of keiretsu suppliers can sell their parts to other non-keiretsu automakers. As we have previously observed, inward keiretsu suppliers are eventually dismantled, and the remaining competition is between outward keiretsu suppliers and independent suppliers, both seeking and competing for multiple customers. The result would depend on whether special collaboration between an automaker and their keiretsu supplier could contribute to superior improvement of the basic layer skill, when compared to the collaboration between an automaker and an independent supplier.

Regardless of the above, how and why some keiretsu suppliers supply to non-keiretsu automakers is critical to understanding why some were dismantled and others were successfully maintained¹⁷. Whether the proposed ideal type of outward

¹⁷ It should be noted that some of Toyota's keiretsu suppliers have low market share, having no or little transactions with non-keiretsu automakers. An analysis is required to understand why

keiretsu could explain the actual reality is expected to be answered through future research.

7. Future Research

The evaluation of keiretsu relationships in the Japanese automotive industry was greatly disturbed, moving from praise to criticism within a short period of time. In reality, some automakers eliminated their keiretsu relationships, which provided supporting evidence for the criticism. However, other automakers maintained keiretsu relationships that were still valuable and competitive, and therefore, arguments for praise remain.

Some argue that Nissan and Mazda did not change the essential nature of their supplier relationship; however, these two companies discontinued financial ties with most of their former keiretsu suppliers and indeed significantly changed procurement sources, as our analysis confirmed. On the other hand, while Toyota and Honda maintained their relationships with keiretsu suppliers, they also restructured some of them. As such, even though the argument that the role of keiretsu was completed is too simple, it is certain that the role of keiretsu was reconsidered and changed to a considerable degree, one way or another.

As both reality and discussions diverge, further research based on detailed empirical studies is required to determine what actually happened to keiretsu and the reason for the change. This research, although still in the preliminary stage, is one such attempt, and indicates that a key question to better understand keiretsu relationships and its economic rationality is whether or not keiretsu relationships would contribute to keiretsu suppliers' expanding transactions with non-keiretsu automakers.

This perspective assumes that inter-firm relationships are formed, evolved, and managed as a whole in the space and time of relationships and transactions within the industry, including with other automakers and for various parts. In other words, inter-firm relationships, the governance of transactions, and the boundary of the firm must be understood as a whole; only observing a part in space and time would not allow a thorough examination of the economic rationality.

In order to examine the validity of this argument, further empirical analysis must be undertaken. In particular, studying the following questions will be important: (1) what kind of interactions work between the surface layer and the basic layer of relational skill, and what kind of effect could the collaboration based on keiretsu relationships have on these interactions; (2) what challenges exist for suppliers to expand the scope of their customers, particularly other non-keiretsu automakers, what are the mechanisms to overcome these challenges (Nobeoka 1998; Konno 2003), and

keiretsu relationships with such suppliers continued.

how do independent suppliers and keiretsu suppliers compete over the supply to non-keiretsu automakers; and (3) what is the value of outward keiretsu in advanced research and development (Konno 2006) and technological innovation.

Empirical analysis of these issues, both quantitatively and qualitatively, with the extended and expanded data mentioned previously, will further advance this study and prove valuable not only in understanding keiretsu relationships in the Japanese automotive industry, but also to deepen and enrich theories of the firm and inter-firm relationships.

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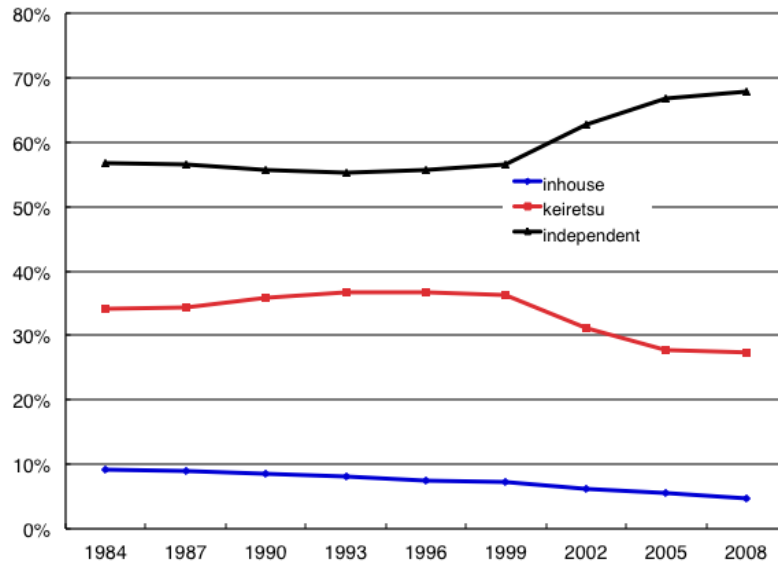
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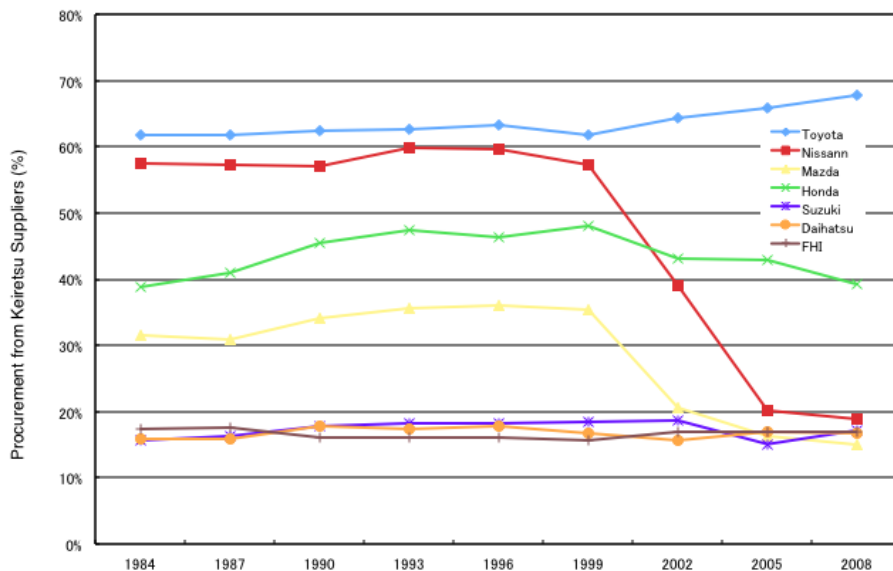
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Figure 1: Parts Procurement Sources for Seven Japanese Automakers from 1984 to 2008



Note: There are 54 types of parts included in the sample; the sample automakers are Toyota, Nissan, Honda, Mazda, Suzuki, Daihatsu, and Fuji Heavy Industries. The vertical axis shows each of the seven automakers' procurement ratios from each source for each year on unweighted average. Independent suppliers in this figure include other automakers' keiretsu suppliers and overseas suppliers.
Source: Compiled from IRC data.

Figure 2: Parts Procurement from Keiretsu Suppliers by Each Automaker from 1984 to 2008



Note: There are 54 types of parts included in the sample. The vertical axis shows each automaker's procurement ratio from keiretsu suppliers for each year on unweighted average.
Source: Compiled from IRC data.

Table 1: Nissan's Procurement Sources from 1996 to 2008

	1996	1999	2002	2005	2008
Inhouse	9.3%	9.1%	5.3%	4.7%	5.0%
Continued Keiretsu	14.3%	15.0%	16.1%	17.8%	16.7%
Discontinued Keiretsu	38.2%	37.3%	35.6%	27.8%	22.5%
Keiretsu as of 1996	52.6%	52.4%	51.6%	45.6%	39.2%
Toyota's Keiretsu	1.4%	1.7%	2.2%	5.3%	5.3%
Honda's Keiretsu	0.3%	0.4%	0.5%	1.0%	3.0%
Other Keiretsu	0.1%	0.1%	0.1%	0.4%	0.6%
Other Automekrs' Keiretsu	1.8%	2.2%	2.8%	6.7%	8.9%
Independent	35.4%	34.8%	35.8%	36.5%	39.2%
Overseas	1.0%	1.6%	4.5%	6.6%	7.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Existing Suppliers	100.0%	99.3%	94.1%	91.6%	85.8%
New Suppliers	0.0%	0.7%	5.9%	8.4%	14.2%

Note: There are 169 types of parts included in the sample. The “continued Nissan’s keiretsu suppliers” refer to the suppliers that had keiretsu relationships with Nissan as of 1996 and maintained these relationships as of 2008; the “discontinued Nissan’s keiretsu suppliers” refer to the suppliers that had keiretsu relationships with Nissan as of 1996, but lost the relationships by 2008. The “new suppliers” refer to the suppliers that did not supply parts to Nissan as of 1996, but did so afterwards.

Source: Compiled from IRC data.

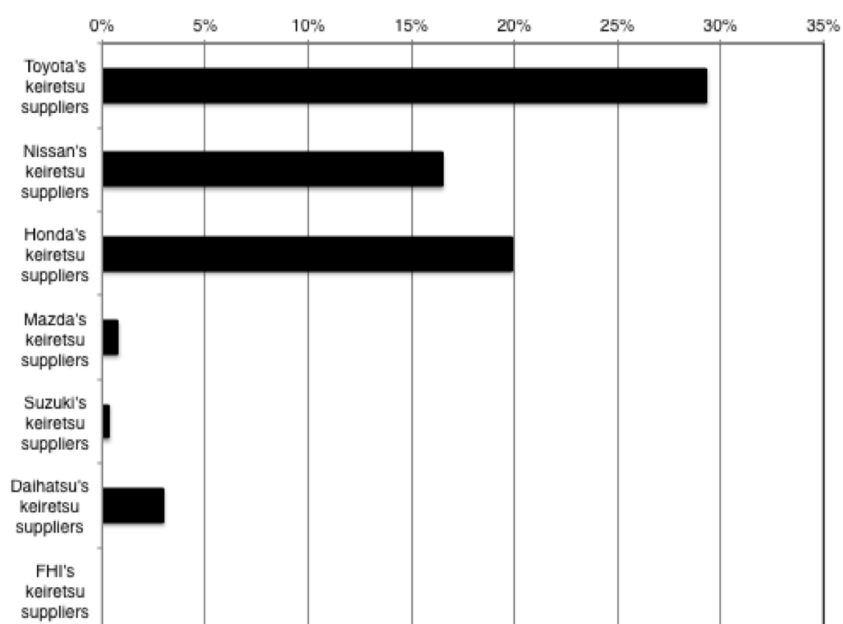
Table 2: Mazda's Procurement Sources from 1996 to 2008

	1996	1999	2002	2005	2008
Inhouse	6.7%	6.5%	6.3%	7.1%	7.4%
Continued Keiretsu	18.2%	18.5%	18.6%	20.5%	18.2%
Discontinued Keiretsu	15.6%	14.6%	14.8%	10.1%	6.3%
Keiretsu as of 1996	33.8%	33.1%	33.4%	30.6%	24.5%
Toyota's Keiretsu	8.7%	9.4%	11.7%	12.8%	12.5%
Honda's Keiretsu	1.3%	1.4%	1.4%	1.7%	2.0%
Other Keiretsu	1.7%	1.3%	1.1%	1.0%	0.6%
Other Automekrs' Keiretsu	11.7%	12.2%	14.2%	15.5%	15.1%
Independent	45.7%	44.9%	42.3%	36.8%	41.9%
Overseas	2.1%	3.2%	3.8%	10.0%	11.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Existing Suppliers	100.0%	97.3%	95.3%	86.8%	83.0%
New Suppliers	0.0%	2.7%	4.7%	13.2%	17.0%

Note: There are 169 types of parts included in the sample. The “continued Mazda’s keiretsu suppliers” refer to the suppliers that had keiretsu relationship with Mazda as of 1996 and maintained these relationships as of 2008; the “discontinued Mazda’s keiretsu suppliers” refer to the suppliers that had keiretsu relationships with Mazda as of 1996, but lost the relationships by 2008. The “new suppliers” refer to the suppliers that did not supply parts to Mazda as of 1996, but did so afterwards.

Source: Compiled from IRC data.

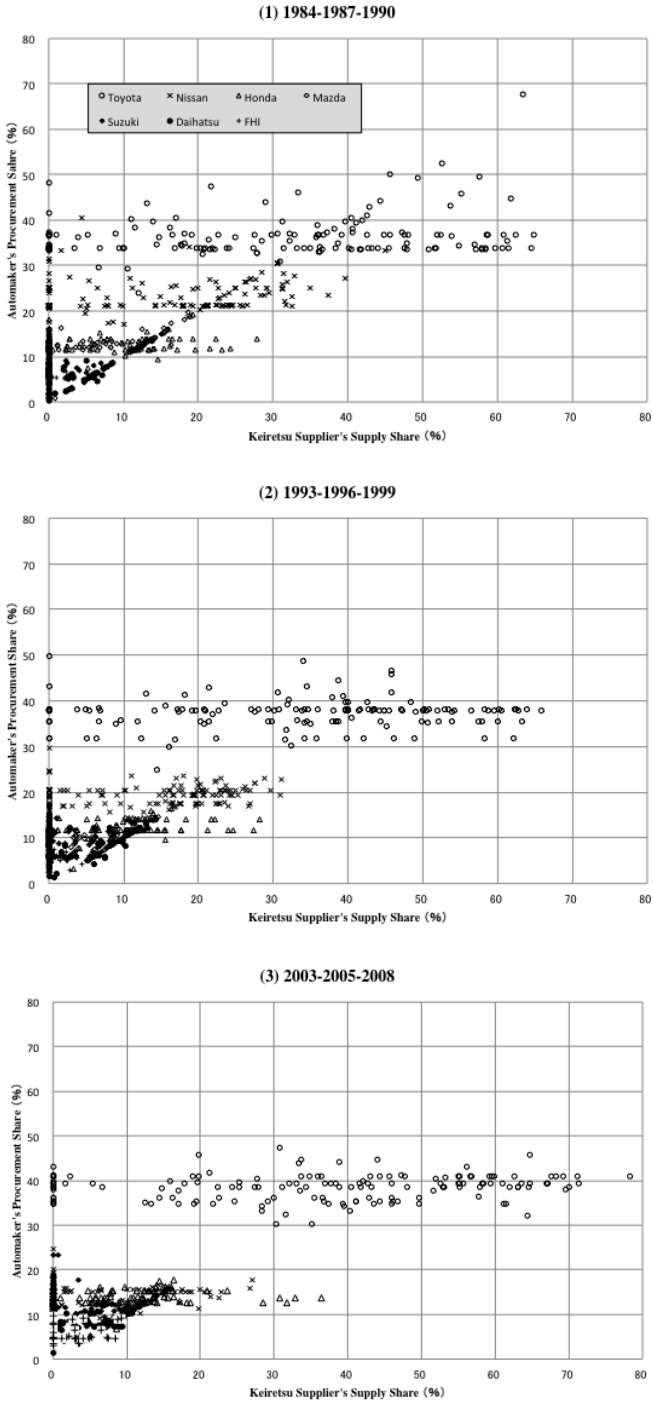
Figure 3: Keiretsu Suppliers' Supply to Non-keiretsu Automakers from 1984 to 2008



Note: There are 54 types of parts included in the sample. The horizontal axis shows the ratio of the volume of the supply to non-keiretsu automakers by the automaker's keiretsu suppliers, divided by the volume of the supply to the keiretsu automaker by the automaker's keiretsu suppliers, on unweighted average during the period from 1984 to 2008.

Source: Compiled from IRC data.

Figure 4: Automakers' Procurement Share and Keiretsu Suppliers' Supply Share from 1984 to 2008



Note: There are 54 types of parts included in the sample. The vertical axis shows the share of the automaker's procurement (the volume of the automaker's procurement / total volume of all seven automakers' procurement) for each year and each part. The horizontal axis shows the share of supply of the automaker's keiretsu supplier (the volume of supply by the automaker's keiretsu supplier to all seven automakers / the volume of supply by all suppliers to all seven automakers) for each year and each part. Source: Compiled from IRC data.

Table 3: Automakers' Procurement Share and Keiretsu Suppliers' Supply Share from 1984 to 2008

		Keiretsu Supplier's Supply Share (%)	Automaker's Procurement Share (%)	Ratio of Parts Procured from Keiretsu Suppliers (%)
Toyota	1984-1990	35.4	36.5	85.0
	1993-1999	36.4	37.1	85.6
	2002-2008	41.8	38.6	85.6
Nissan	1984-1990	20.8	23.4	74.1
	1993-1999	17.7	19.3	75.8
	2002-2008	12.5	14.5	39.2
Honda	1984-1990	11.4	12.5	54.5
	1993-1999	11.5	12.3	59.5
	2002-2008	12.4	13.6	55.6
Mazda	1984-1990	10.0	12.3	39.2
	1993-1999	7.6	9.8	42.1
	2002-2008	5.8	9.2	22.9
Suzuki	1984-1990	5.7	7.5	19.6
	1993-1999	7.0	9.3	24.2
	2002-2008	7.6	11.0	27.5
Daihatsu	1984-1990	4.2	5.4	25.3
	1993-1999	4.9	6.9	28.1
	2002-2008	5.7	8.2	27.5
FHI	1984-1990	4.4	5.3	20.8
	1993-1999	3.9	5.3	22.2
	2002-2008	4.1	5.0	23.5

Note: There are 54 types of parts included in the sample. The “keiretsu supplier’s share” is the share of supply of the automaker’s keiretsu supplier (the volume of supply by the automaker’s keiretsu supplier to all seven automakers / the volume of supply by all suppliers to all seven automakers) on unweighted average for each period. The “automaker’s procurement share” is the share of the automaker’s procurement (the volume of the automaker’s procurement / total volume of all seven automakers’ procurement) on unweighted average for each period. The “ratio of parts procured from keiretsu suppliers” is the ratio of the number of part types in which the automaker procured from its keiretsu supplier(s) among the 54 parts for each period.

Source: Compiled from IRC data

**Table 4: Each Automaker's Procurement Ratio
from Other Automakers' Keiretsu Suppliers**

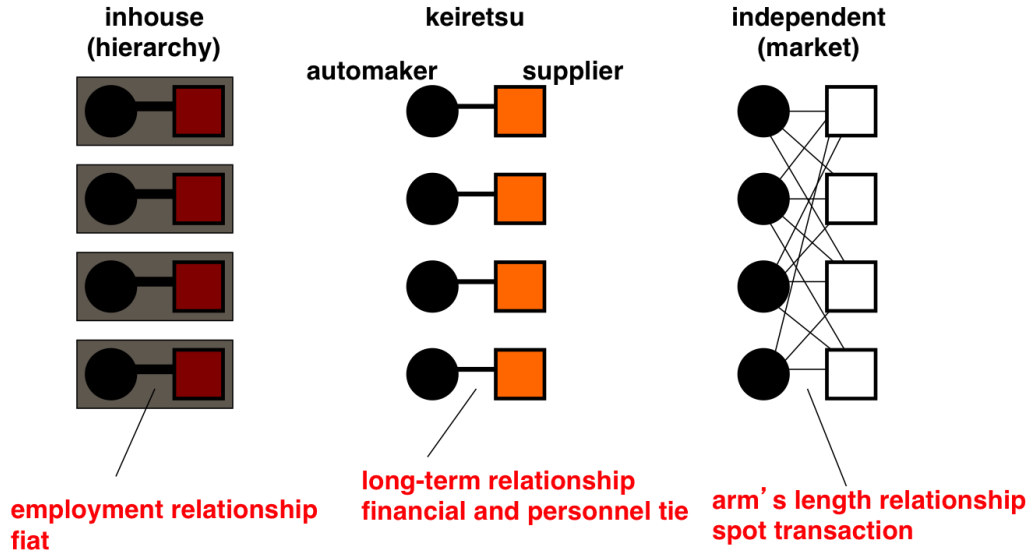
		1996	1999	2002	2005	2008
Toyota	Nissan's Keiretsu Suppliers	0.0%	0.0%	0.0%	0.0%	0.0%
	Honda's Keiretsu Suppliers	0.3%	0.2%	0.3%	0.3%	0.3%
	Mazda's Keiretsu Suppliers	0.0%	0.0%	0.0%	0.0%	0.0%
	Independent Suppliers	23.3%	23.1%	23.9%	24.2%	25.3%
Nissan	Toyota's Keiretsu Suppliers	1.4%	1.7%	2.2%	5.3%	5.3%
	Honda's Keiretsu Suppliers	0.3%	0.4%	0.5%	1.0%	3.0%
	Mazda's Keiretsu Suppliers	0.0%	0.0%	0.0%	0.0%	0.0%
	Independent Suppliers	36.4%	36.4%	40.3%	43.1%	46.9%
Honda	Toyota's Keiretsu Suppliers	7.6%	7.2%	8.0%	10.0%	10.0%
	Nissan's Keiretsu Suppliers	0.0%	0.1%	0.1%	0.3%	0.2%
	Mazda's Keiretsu Suppliers	0.0%	0.1%	0.3%	0.1%	0.3%
	Independent Suppliers	33.7%	36.3%	36.4%	35.2%	34.0%
Mazda	Toyota's Keiretsu Suppliers	8.7%	9.4%	11.7%	12.8%	12.5%
	Nissan's Keiretsu Suppliers	0.8%	0.7%	0.6%	0.5%	0.3%
	Honda's Keiretsu Suppliers	1.3%	1.4%	1.4%	1.7%	2.0%
	Independent Suppliers	47.9%	48.1%	46.1%	46.8%	53.0%

Note: There are 169 types of parts included in the sample. Independent suppliers in this table do not include other automakers' keiretsu suppliers or overseas suppliers.

Source: Compiled from IRC data.

Figure 5: A Revised View on Keiretsu Relationship

(1) Existing View



(2) Revised View

