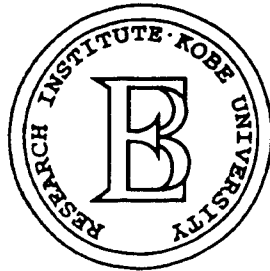


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2001

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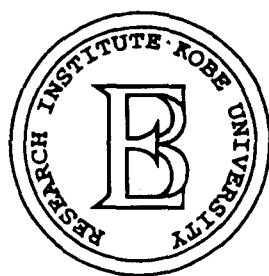
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Economic Theory: Past and Future

Murray C. Kemp* University of New South Wales

For twenty years I have enjoyed a close and harmonious relationship with Kobe University and, in particular, with the Research Institute for Economics and Business Administration. It therefore gives me great pleasure to receive from the University its highest award and to receive it in the presence of many close friends, including several former students.

This is an occasion for reflection—on the path travelled and on the path to be taken—and this evening I offer you some quite personal thoughts on the present state of economic theory. They are, for the most part, grey thoughts but you will detect in them a strong undercurrent of hope for the future.

During the last half-century, that is, during my own professional lifetime, economic theorists have worked in an intellectual environment dominated by two bodies of thought. The first body of thought is based on the pioneering work of Leon Walras, Kenneth Arrow, Gerard Debreu and Lionel McKenzie. The second has grown out of the work of Eli Heckscher, Bertil Ohlin, Abba Lerner and Paul Samuelson. For brevity (but unhistorically, unfairly, and ungrammatically) I will refer to these two bodies of thought as “Walrasian” and “Heckscher-Ohlin.” Within this environment, the work of theorists has for the most part been of the comparative static kind, with their normative calculations rooted in the Walrasian paradigm and their descriptive calculations rooted in the Heckscher-Ohlin paradigm.

This neat division of labour is, at first sight, puzzling. For, after all, the Heckscher-Ohlin model is merely a special case of the Walrasian. Why then do we persist with Heckscher-Ohlin? The answer is painfully obvious: the Walrasian model yields no descriptive comparative statics; more

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precisely, it yields no descriptive comparative statics that are easy to interpret and also profound, that is, answer questions that are interesting and non-trivial. To obtain descriptive results of that kind we have taken on board the family of special Heckscher-Ohlin assumptions, and we have been rewarded with the Stolper-Samuelson, Rybczynski, Heckscher-Ohlin, Factor Price Equalization and Hicks-Ikema propositions.

Most of those assumptions are well known; one easily remembers constant returns to scale, non-joint production and small numbers of just about everything. But there are other assumptions, assumptions that are rarely mentioned, even in formal expositions of Heckscher-Ohlin theory. Here I think specially of zero costs of factor re-allocation, representative agents and the existence of autarchic equilibria for all trading countries.

We have long known that each of the Heckscher-Ohlin propositions must be qualified if the assumptions of constant returns, non-jointness and small dimensions are relaxed. What we are now beginning to understand is that those propositions crumble and entirely disappear if the hitherto hidden assumptions are relaxed.

Let me briefly explain, beginning with the assumption that all trading countries have autarchic equilibria. Casual observation suggests that even wealthy trading nations may lack autarchic equilibria. In particular, they may lack the climate and fertile land needed for subsistence food production; one thinks of Holland, Belgium, Ireland, Singapore and even the United Kingdom and Japan. Such countries were once able to survive in autarchy; indeed there may once have been no alternative to autarchy. Over the years, however, natural resources may have been degraded and trade-based wealth may have induced a substantial increase in population, to the point where it cannot be supported in autarchy. If a country has no autarchic equilibrium, and if there are just two traded goods, the offer curve of that country consists of two disjoint segments; and this in turn suggests that, if there are just two countries, the offer curves of those countries may fail to intersect. Thus the absence of an autarchic equilibrium, even for one country may ensure the absence of a world trading equilibrium. Clearly the Heckscher-Ohlin depiction of world equilibrium in terms of an intersection of continuous offer curves must be revised. Similarly the common belief that any distortion-free Walrasian economy must benefit from the opening of its frontiers, whatever the characteristics of other economies, must be reconsidered.

Let me now change tack and briefly consider another of the hidden Heckscher-Ohlin assumptions, that the reallocation of factors is costless. If that assumption is dropped, so that a factor of production may earn different rewards in different industries, even in stationary equilibrium, then, quite simply, all five Heckscher-Ohlin propositions should be abandoned.

Finally, changing direction again, let us consider, even more briefly, the hidden Heckscher-Ohlin assumption of the representative agent. We now know that if that assumption is seriously relaxed, so that the Sonnenschein-Debreu-Mantel “anything goes” proposition comes into play, then even normative Heckscher-Ohlin results must be foregone.

That completes the act of demolition. Where do we go from here? Some of you will recall that, thirty years ago, Ivor Pearce suggested that we should abandon the Heckscher-Ohlin model. He thought that *any* tailoring of theory to achieve easily interpreted comparative statics is indefensible. According to Pearce, the task of the theorist is to ask comparative static questions on the basis of very general theory and then leave it to the econometrician to find approximate answers. I could not agree with Pearce when he issued his manifesto; and I still cannot join him. We cannot get along without restricted theoretical models. At the very least, they help us to sharpen the questions asked of econometricians—including Ivor Pearce’s own questions.

But we should not place our faith in a single body of theory. By all means, let us keep Heckscher-Ohlin. It has much to teach us about the role of factor endowments in determining the shape of the world equilibrium. But we need competing theories, each highlighting a particular subset of processes and collectively providing a set of hypotheses from which econometricians can choose. Perhaps some of them will do without the three hidden assumptions of Heckscher-Ohlin. I hope so.

LONG-TERM COOPERATION IN JAPANESE VERTICAL RELATIONSHIPS*

KENJI KOJIMA Kobe University

Abstract

The primary purpose of the study is to identify significant features of Japanese vertical relationships and to provide economic rationale. Japanese vertical relationships, particularly automobile industry, are examined in comparison with those in the U.S. Both buyers and suppliers can be identified to be mutually dependent and have developed long-term cooperative relationships with relationship-specific investments. They have developed facilitating practices to build and maintain trust between them. It could reduce transaction costs and eliminate inefficiencies in trading relationships with cooperation and reputation in long-term relationships.

JEL Classification: L14; L62

Keywords: Commitment; Cooperation; Japanese firms; Long-term relationships; Relationship-specific investment; Reputation; Vertical relationships

1 Introduction

Various systems have evolved in different countries to attain efficient trading relationships. Particularly, there are significant differences in vertical relationships between Japan and the United States. It is commonly observed that U.S. automobile manufacturers are more vertically

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integrated than their Japanese counterparts. Product development process in the U.S. is heavily influenced by the traditional system in which suppliers produce parts under short-term, arm's-length contracts and have little role in design and engineering. In Japanese vertical relationships, in contrast, suppliers are an integral part of the product development and manufacturing processes: they are heavily involved, assume significant responsibility, and communicate extensively and directly with product and process engineers. Japanese suppliers frequently play a significant role in development. Japanese vertical relationships can be identified that both buyers and suppliers have recognized the need to be interdependent and have responded by developing mechanisms that build reputation for trustworthiness between them in the long run. Japanese firms do not rely on legal contracts to protect their interests in trading relationships. What factors determine the differences in institutional arrangements that govern vertical relationships between Japan and the U.S.? Why are many trading relationships governed by flexible and long-term relationships in Japan?

In what circumstances should a firm procure its needs in the market and should it internalize the market by integrating operations so as to be self-sufficient in its own capacities? Extensive reliance on market procurement permits firms to exploit the efficiencies associated with specialization in production and the exposure of independent assets owners to high-powered market incentives. But it also exposes firms to the risks of self-interested opportunism. Upon realization that opportunistic behavior may occur, the governance structure and the terms and conditions of any arrangement may be chosen to adjust contracts that pose more serious hazards with greater safeguards.

Various institutional arrangements emerge to minimize the costs of making transactions. There exists a continuum of potential governance structures for vertical relationships. Between vertical integration and arm's length market transaction, we have a wide array of potential contracting arrangements that mediate transactions through the market but involve the use of a variety of specialized contractual provisions that arise as a consequence of efforts by firm to minimize the total cost of transaction over time. Governance of contractual relationships span a continuum bounded at one end by the writing of explicit, detailed contracts, which may then be enforced by court in the event of breach by one of the parties. At the other end is reliance on implicit, relational governance founded on enduring trust relationships and reinforced by largely non-legalistic mechanisms structured to encourage voluntary compliance with informal agreements. The central problem of governance in trading relationships is to devise specialized systems of incentives and safeguards that will promote the continuity of trading relationships that are efficient in the absence of self-interested opportunism, but which might otherwise break under forces of unassisted market contracting.

If vertical integration is not economical because of diseconomies associated with internal production, contractual arrangements to govern exchange between independent agents will emerge to economize on these transaction costs. The structure of these market contracts will

reflect efforts to create incentives and restrictions that reflect anticipated performance problems so that agent will perform as initially promised when different contingencies arise. Given contractual incompleteness due to uncertainty and complexity, as durable relationship-specific investments become more important, the transaction costs associated with mediating vertical relationships using arm's length market increase. Relationship-specific investments generate a stream of potentially appropriable quasi-rent equal to the difference between the anticipated value in the use to which the investments were committed and the next best use. The presence of relationship-specific investments creates incentives for one party to hold up the other *ex post* and can lead to costly bargaining. When relationship-specific investments are important, governance structure will emerge *ex ante* to reduce the incentives either party has to exploit them *ex post*.

Numerous researches focus on how trading partners protect themselves from the hazards associated with exchange relationships. One can try to understand how trading partners choose, from the set of feasible institutional alternatives, the arrangement that offers protection for their relationship-specific investment at minimizing costs. Relational governance systems can facilitate the building and maintenance of stable, long-term trading relationships. These, in turn, foster investment in relationship-specific assets, and enable firm operating within a relationship to exploit transaction rent not generally available to arm's length transactions. What governance mechanisms will emerge as the parties negotiate a mutually acceptable trading arrangement in response to anticipated transaction costs and contractual execution difficulties? One should understand the conditions under which close, long-term trading relationships in Japanese vertical relationships can devise mechanisms to promote the continuity of trading relationships that are efficient in the absence of self-interested opportunism. What mechanisms support the long-term cooperation in Japanese trading relationships? How can long-term relationships with flexible arrangements lead to efficient performance? It is important to understand the economic rationale of vertical relationships in Japan.

This paper discusses various mechanisms to support long-term, cooperative nature of Japanese vertical relationships. The vertical relationships in Japan, particularly automobile industry, are examined in comparison with those in the U.S. The primary purpose of the study is to characterize significant features of mechanisms to support long-term cooperation in Japanese vertical relationships and to provide economic rationale in a transaction cost perspective.

In this paper, significant features of mechanisms in Japanese vertical relationships are characterized. Mutual commitment with significant relationship-specific investments and cross-share holdings, reputation for trustworthiness, and facilitating practices like extensive information sharing and enduring personal ties can reduce transaction costs and eliminate inefficiencies between buyers and suppliers.

This paper is organized as follows. The next section describes long-term relationships in Japanese vertical relationships. Section 3 discusses commitment of buyers and suppliers in trading relationships. Section 4 discusses the role of reputation for trustworthiness in Japanese

vertical relationships. Section 5 describes facilitating practices for long-term relationships in Japan. Finally, concluding remarks are presented.

2 Long-term Relationships

2.1 Long-term Relationships

One of the most salient and enduring characteristics of the Japanese firms is their tendency to engage in close, long-term business relationships with other firms. The Fair Trade Commission (FTC) surveyed the buyer-supplier relationships at 200 large non-financial firms, of which 94 firms responded in 1986 (Fair Trade Commission, 1987). In regard to intermediate goods as well as capital goods, the overwhelming response was that they had long-term relationships over more than five years with all or the majority of their suppliers. 63% of respondents had the trade relationships with their 30 largest suppliers over more than ten years. The prevalence of those long-term relationships is explained in the FTC report as follows: a close, long-term relationship with a few suppliers affords substantial reductions in purchasing management costs as suppliers can be increasingly relied on to perform product inspections and inventory control, to protect technical secrets, and to settle transactions smoothly; in a long-term relationship, communication becomes simpler and mutual understanding develops; this is seen as a major advantage in maintaining existing purchasing relationships with trading off raising switching cost.¹

In comparing Japanese vertical relationships in automobile industry, the duration of suppliers' trading with the same automaker is significantly longer in Japan than in the U.S. Helper and Sako (1995) shows that 87 percent of Japanese suppliers, compared with 68 percent of U.S. firms, thought that their customer's commitment would last more than four years, the typical duration of a model cycle. Liker, *et al.* (1996) also suggest closer, more long-term relationships in Japan, though these differences are not as large as expected. Japanese suppliers are considerably more dependent on their largest customer.

2.2 Cooperation in Long-term Relationships

In Japanese vertical relationships that are characterized to be long-term ones, common character-

¹ Economic Planning Agency in Japan conducted the mail-survey on the trade practices in 1990 (Economic Planning Agency, 1991). It shows that long-term relationships seem to both foreigners and the Japanese peculiar to Japan. Moreover, it shows it works against newly entering foreign firms. Respondents are foreign businessmen in Japan and the Japanese in that survey. 82% of respondents among foreign businessmen agree that long-term relationships are peculiar to Japan; 72% of Japanese respondents agree with that. 70% of foreign respondents agree that long-term relationships are working as an entry barrier. On the other hand, 35% of the Japanese agree with that. That survey supports the claim of foreign manufacturers trying to enter the Japanese market. It is claimed that they are unfairly excluded because Japanese distributors purchase only from their accustomed manufacturers.

istics can contribute to controlling and coordinating the exchange relationships. One of them is heavy reliance on implicit, relational contracting founded on trust. Supply contracts are established by a basic agreement which is short, written document that is little more than legal ones stipulating that the supplier and buyer are entering into a trading relationship so as not to restrict the flexibility considered necessary to modify the supply agreement over time. They can operate on a basis of mutual respect for each other's autonomy, and will endeavor in good faith to maintain an atmosphere of mutual trust in their business dealings. The virtue of implicit contracting as a mechanism for sustaining long-term trading relationships lies in its intrinsic flexibility. Assuming a foundation of mutual trust and shared expectations, implicit contracting among parties better enables firms to make fast, informal, and highly refined adjustments in the terms of trade to preserve the substance of trade agreements rather than merely the letter of written contracts. What mechanisms can support flexible and long-term trading relationships in Japan? How does implicit, relational contracting enforce cooperative relationships?

Game theory can help us to explain what mechanism works to govern Japanese vertical relationships. Repeated trading relationships can serve in place of formal contracts in developing incentives for cooperative behavior in the long run. Game theory suggests that infinitely repeated interactions permit cooperation to occur if the players are sufficiently patient (Fudenberg and Tirole, 1991). Repetition of a game allows the players to escape the prisoner's dilemma; each player's pursuing immediate gain leads to an outcome that can be improved for all of them. The vertical relationships can have the character of a prisoner's dilemma. One way of overcoming this is to write contracts, with each party promising to refrain from the mutually damaging activity and making himself subject to legal sanction if he breaks his promise. However, cooperative outcomes are enforced by the threat that any deviation will trigger switch to an outcome of a prisoner's dilemma in a repeated game. In consequence, patient parties can implicitly cooperate with any deviation triggering punishment. A contract is implicit in that the parties would not need to enter into binding contracts to enforce their cooperation. Instead, each party is deterred from breaking the agreement by credible fear of provoking a prisoner's dilemma. If the equilibrium outcomes are suitably focal points among the parties, then cooperation might be sustainable without even communication.

In a continuing situation, people cooperate because it is in their interests to do so. The point of the repeated game argument is that players cooperate now for fear of being cut off from profits in the future. Suppliers make efforts to produce products on behalf of the buyers. The resulting consequences depend on an environment as well as on the suppliers' efforts. The buyers cannot directly observe the suppliers' efforts. In this situation, the repetition of the game would give the buyer an opportunity to observe the results of the suppliers' effort over a number of periods, and use the idea like some statistical test to infer whether or not the supplier was making appropriate level of efforts (Radner, 1985). The cooperative outcomes can be attained by a review that manufacturer periodically evaluates the cumulative performance of the distributors.

If a review results in a satisfactory evaluation, a new phase is begun in which the outcome is efficient to all of them; otherwise, the players enter a penalty phase in which the outcome is a prisoner's dilemma. The equilibrium cooperative outcomes are self-enforcing, and thus do not need to rely on any binding contracts or other precommitments.

Particular buyers in Japanese vertical relationships give suppliers ratings according to their performances and cooperation in both short-term and long-term trading periods. Suppliers that perform well are given high ratings. Then, they are promoted to be higher status in which they are provided with the various treatments being rewarded for target achievements and cooperation in prices, quality and delivery schedule (Economic Planning Agency, 1991). The buyers' policies of maintaining long-term relationship with suppliers can be designed to encourage them in achieving good supplying performances and high cooperation.

Although repetition can induce the incentive for players to cooperate, a repeated game has plethora of equilibria involving cooperation outcomes as well as non-cooperative ones; each player rationally pursues either long-term or short-term gains (Fudenberg and Maskin, 1986). Hence, repetition offers no guarantee that it will occur. None of the players can be ensured that cooperation occurs as an equilibrium outcome. The cooperation resulting from repeated relationships is not robust, so that it is necessary to have devices to support cooperative relations among players. Long-term, cooperative outcomes in Japanese vertical relationships are secured by mutual trust founded upon commitments and facilitating practices. Commitments with mutual dependence between buyers and suppliers, relationship-specific investments and cross-shareholdings can be essential mechanisms for sustaining long-term, cooperative relationships. Commitment implies an implicit or explicit pledge of cooperative continuity between trading partners and a willingness to make sacrifices of short-term gains to realize longer-term ones. It provides a foundation for the development of relational governance, which is considered important mechanisms for regulating long-term relational exchanges and reducing opportunism. Facilitating practices work to encourage partners to exchange and disseminate information and to establish personal ties among themselves. Information sharing and enduring personal ties may ensure every member of the trading relationship to establish and maintain trust among them. These commitments and facilitating practices encourage members of the trading relationships to choose cooperation as one of the focal point equilibria (Schelling, 1960).

3 Commitment

3.1 Mutual Dependence between buyers and suppliers

Significant involvement of suppliers in product development is one of the major commitments in Japanese vertical relationships. Japanese supplier management suggests that particular suppliers are trusted enough to be expected to participate in the early stage of product

development in Japanese automobile industry. One of the major benefits of the Japanese supplier involvement in design is access to highly customized design with unique features for particular buyers' needs. Japanese automobile suppliers develop more unique parts for their customers and make greater investments in specialized assets than do U.S. suppliers (Dyer, 1996a). Japanese suppliers typically have contracts with automakers both for a variety of components in a single model and for similar components in different models. There are usually several companies within the automaker's supplier group qualified to manufacture a component. The other qualified suppliers may be currently producing similar components for other models. Within an automaker's hierarchical structure of suppliers, there are two basic types - design approved (DA) and design supplied (DS) (Asanuma, 1985). DA suppliers provide both design and production services to the automaker's specifications, while DS suppliers produce a component from drawings provided by the automaker. The DA suppliers are usually those with the close, long-term relationships with the automaker. First-tier and the DA suppliers have a greater number and more profitable contracts with the automaker. The automaker usually has less detailed knowledge of the DA supplier's production costs, which give the supplier an advantage in price negotiation. There are many thousands of suppliers in the automaker's supplier hierarchy and only a few hundred at the first-tier.

The typical production cycle for a car model generally begins with a lengthy design and development stage followed by a 4-year production stage. The automaker usually invites several qualified firms in the supplier group to compete for a contract to design and produce a component for a new model cycle. A DA supplier will undertake the design and development as well as tooling for production with no guarantee of reimbursement by the automaker. For DS supplier, the automaker will guarantee reimbursement for specific investments such as tolling. The automaker makes a firm commitment to use the supplier for the 4-years production life of the model. A first-tier suppliers does not usually receive a separate payment for the investment in tools, dies, molds, and jigs that are highly customized and would need to be scrapped if the automaker cut off orders to the supplier. The suppliers' specialized capital investments make them highly dependent on the automakers, with the real possibility of a hold-up problem. However, automakers are also significantly dependent on the suppliers. Most DA suppliers' parts are "black box," meaning that the automaker provides only very general specifications while the supplier does all of the detailed functional specifications and blueprints. Consequently, suppliers have significantly more knowledge about the design and manufacture of the part than does the automaker. Because black-box parts are customized to a specific model, the automaker is highly dependent on the supplier. If the supplier did not perform as desired, the automaker would have difficulty simply switching trading to another suppliers, given the product's customized nature. Some DA suppliers claim that they do not provide the automakers with all of the specific functional details when they submit their design drawings for approval, but intentionally leave out certain important details such as tolerances. Because the automaker does not know the part's

exact design specifications, it is difficult to change suppliers, resulting in the automaker's dependence on the supplier.²

3.2 Commitment with Relationship-specific Investments

Under mutually dependent conditions, both automakers and suppliers make commitment with substantial relationship-specific investments in Japanese vertical relationships. Consider a firm that invests in specialized assets used to support a particular trading relationship. By virtue of their specialization and definition to one or a few specific customers, these assets may be highly efficient and yield lower production costs than alternative general-purpose assets. But their specialized nature also means that they have much lower value in alternative use. This creates the danger that investing firm's counterpart in the trading relationship might attempt to improve the terms of trade it receives by threatening to defect from the trading relationship. Alternatively, there is the possibility that the counterpart will simply cease to remain in business for any of several reasons, thus saddling the investing firm with underutilized or even idle assets. According to transaction cost economics, it may be difficult to specify *ex ante* precisely how the assets will be employed in production even if relationship-specific investments are entirely contractible. Once relationship-specific assets are sunk, the characteristics of the transaction and the gain from trade will be determined by *ex post* bargaining between the buyer and the supplier. Highly relationship-specific investment should be avoided by buying commodities in the market and making customized products in-house where the hierarchy can be used to reduce transaction costs (Williamson, 1979).³

By contrast, Japanese automakers increasingly pushed responsibility for design and manufacturing of more complex subsystems to a close-tied group of suppliers who are willing to make significant relationship-specific investments in developing customized parts for the buyers. Moreover, Japanese automakers seem willing to allow suppliers with development capabilities to

2 Most automakers in Japan restrict suppliers to sale design specification to other companies (Fair Trade Commission in Japan, 1993).

3 Monteverde and Teece (1982) examine the role of asset specificity in determining the structure of vertical relationships. They focus on the choice between vertical integration and market procurement of automobile components by Ford and General Motors. They use application-engineering effort as a measure of the degree of asset specificity. They find that specific components will have a higher probability of being vertically integrated. The empirical result provides support for the view that variations in asset specificity affect the choice between vertical integration and market procurements as hypothesized. Masten, Meehan, and Snyder (1989) attempt to distinguish among type of specific assets, comparing the relative importance of relationship-specific human and physical capital. They also study automobile component production finding that engineering effort as a proxy for human asset specificity appears to affect the integration decision more than physical or site specificity. Klein (1988) suggests that specific human capital in the form of technical knowledge is a major determinant of General Motor's decision to buy out Fisher Body. To sum up, asset specificity and uncertainty appear to have significant effects on the vertical relationships in the U.S.

receive the long-term advantages of cooperation. In fact, relationship-specific investments increase mutual dependence if both parties make them equally. Since these relationship-specific investments increase the exit costs for a party and reduce the potential for opportunistic behavior, parties are likely to be comforted and thus may increase their commitment to each other. This, in turn, creates incentives to cooperate, and the reduction in cost and improvements in quality that are gained through the cooperation outweigh the risks of opportunistic behavior from the parties involved. Japanese suppliers dedicated some of capital investments to their primary customer that these customized physical assets that could not be re-deployed if the customer terminates to purchase from them. It generally requires various types of investments in customized assets by one or both firms in order to make the production and physical distribution more efficient.

Dyer and Ouchi (1993) identify three types of customized investments employed in supplier relationship: (1) site-specific investment; (2) physical investments; (3) human capital investments.⁴

(1) Site-specific investments: Site specificity refers to the situation whereby successive production stages that are immobile in nature are located in close proximity to one another to improve coordination and economize on inventory and transportation costs. Plants are located so that they are dedicated largely to a particular customer in order to improve coordination and economize on inventory and transportation costs. Vertical relationships in Japan involves building a supplier plant within fifteen miles of the customer plant to reduce transportation costs, improve delivery, and generally improve coordination. It allows supplier engineers to work daily at customer technical centers with customer engineers in designing new products.

(2) Physical investments: Manufacturing equipment such as tools, dies, molds, jigs, machinery, information system and so on is customized. Physical specificity refers to relationship-specific capital investments. Physical asset specialization allows for developing unique feature of product and may improve quality by increasing product integrity.

(3) Human capital investments: Dedicated design to manufacturing requires engineers to develop significant customer-specific knowledge. Human capital specificity refers to relationship-specific know-how accumulated by trade partners through long-term trading relationship.

Mutual human-capital increases as trade partners develop experiences working together and accumulates specialized information, language, and know-how that allow them to communicate efficiently and effectively. It involves transferring the buyer's executives or employees to the supplier to work on a temporary or permanent basis, and sending consultants to work with the supplier to improve production methods, implement just-in-time delivery systems, or assist in solving other problems. For example, Toyota and Nissan have large supplier-assistance management consulting groups that work full time with suppliers to help them improve their

⁴ Williamson (1983) identifies four different types of relationship-specific investments: Site specificity; physical asset specificity; human capital specificity; dedicated assets. Asanuma (1989) identified that transaction-specific investments are prevalent in supplier relations in Japan, and developed the notion of "relation-specific skill."

production techniques and solve the problems on quality, cost, and delivery. Providing assistance to suppliers is a highly effective method for both helping and forcing suppliers to continuously innovate and improve their technology.

Dyer (1996b) shows that the more relationship-specific investments are involved in the Japanese vertical relationships than the U.S. based on the survey consisting of two Japanese automakers and all three U.S. automakers and a sample of their suppliers. Toyota and Nissan's supplier indicated that approximately 21 percent of their capital equipment investments were not re-deployable, compared with 20 percent for Ford suppliers, 14 percent for GM suppliers. On virtually every asset specificity measure, Japanese automakers and their suppliers were more specialized than their U.S. counterparts. The optimal level of relationship-specific assets will depend on the costs of safeguarding specific investments. If the safeguard costs are particularly high then the gains from specialization may be outweighed by the costs. In fact, *kankei gaisha* (affiliated suppliers) exhibit greater asset specificity than U.S. in-house division (Dyer, 1996a).

A firm may choose to seek efficiency advantages by creating assets, which are specialized in conjunction with the assets of a trading partner. These relationship-specific assets are the vehicles through which trading partners are able to generate relational quasi-rent. Although investments in specific assets boost productivity, the incentive to make relationship-specific investments is tempered. The contingent value of a specific resource exposes its owner to a greater risk of opportunism than the owner of generalized resources. According to the transaction cost economics perspective, if trading partners make relationship-specific investments, then they must safeguard against the hazards of opportunism. Source of advantage is contingent on the costs associated with safeguarding those investments. Relationship-specific investments are more likely to result in high performance when trade partners have developed safeguards which can control opportunism at relatively low cost and task activities are characterized by a highly degree of interdependence.

The efficient level of specificity between trade partners is likely to be contingent on the task activities and degree of interdependence. Generally speaking, the greater the interdependence, the more both parties will benefit from investments in specialized assets. Toyota's Just-in-time (JIT) system is a good example of how customized investments can create value. Just-in-time system is designed to reduce complexity and costs by eliminating inventories and work in process and to ensure that there are no redundant buffer-stocks, distribution facilities, or quality inspections. However, to implement JIT efficiently, Toyota and its suppliers had to make customized investments in information systems, plants, and flexible manufacturing systems that created mutual dependency.

3.3 Commitment with Cross-shareholding

Another mechanism to maintain long-term, cooperative trading relationships in Japan can be

commitment with cross-shareholding. An exchange of equity between two trading parties connects their economic interests, which help mitigate incentives to act opportunistically. The more equity the trading partner owns in the firm, the less sense it makes to try to exploit other shareholders' interests. Reciprocal equity ownership between any two Japanese firms, so called *mochiai*, is typically small - generally in the range of 1-3% of outstanding shares. The recent surveys suggests that average ratio of cross-shareholding over total outstanding share is about 23% of public corporations (Fuji Research Institute Corporation, 1993). The firms in the six major keiretsu hold 14% to 38% of the total shares in the group (Fair Trade Commission, 1994). Such a bilateral exchange of shares, by itself, constitutes a safeguard against abuse of trading relationships.

Japanese automakers are much more likely to use share ownership to make a credible commitment. Nissan and Toyota own an average of 23 percent of the shares of their suppliers in the long-term relationships, whereas U.S. automakers do not own shares in their supplier (Dyer, 1996a). Firms need credible commitments if they are going to be willing to make relationship-specific investments. Cross-shareholding in Japanese automobile trading relationships represents commitments that firms have made to each other, and in many ways, it is an arrangement that is to deter opportunism. Automakers and their suppliers own significant portions of shares each other. This ownership stake builds trust and represents a commitment among trading partners that need an incentive to make the relationship-specific investment they require. The incentive to breach contracts with suppliers and buyers in the interest of transferring value to shareholders are reduced when the other stakeholders are themselves among the firm's principal owners. Many enduring supplying and distribution relationships throughout the Japanese industry exhibit multiple-claim ownership. A benefit derived from this tendency to hold a blend of different financial and other claims against a firm is an attenuation of friction that might normally arise among various stakeholders that each owned a separate and distinct claim. The incentives to breach contracts with suppliers and buyers in interests of transferring value to shareholders are reduced when the injured trading partners are the firm's principal shareholders.

Commitment by trading partners is mutually reinforcing and increases over time. Each party's perception of the other's commitments will reinforce individual commitments and therefore future commitment intentions. Commitment is an essential ingredient for successful long-term relationships. It can imply an implicit or explicit pledge of relational continuity between trading partners who are willing to make short-term sacrifices to realize longer-term benefits. Where credible commitments are jointly pledged, their presence develops shared trust, which in turn work to maintain the relationship and constrain opportunistic inclination. It is the presence and function of trust that are vital to further commitment and longer-term exchange.

4 Reputation

Reputation for trustworthiness is an expectation held by an agent that its trading partner would behave in a mutually acceptable manner including an expectation that neither party will exploit the other's vulnerabilities. This expectation calibrates the set of possible actions, thus reducing the uncertainty surrounding the partner's actions. Japanese firms have recognized the need to be interdependent and have responded by developing facilitating mechanisms to build mutual trust. The Japanese do not rely on legal contracts heavily to protect their interests in trading relationships. Sako (1992) and Smitka (1991) argue that developing mechanisms to build reputation for trustworthiness between suppliers and buyers have been critical in attenuating the hazards of opportunism in Japan.

Dyer (1996a) shows that Japanese suppliers are more likely to trust Japanese automakers to treat them fairly and more willing to make dedicated investments based on oral agreements. Sako and Helper (1998) define trust as goodwill trust, that is, suppliers can rely on their automakers to help them in ways not required by their agreement with customers. Then, they find that Japanese suppliers are more trusted by their customers than U.S. suppliers.⁵ Japanese suppliers tend to entertain a higher level of trust and a lower level of opportunism than U.S. suppliers do. They also suggest that helps and technical assistance of automakers are significant in enhancing trust in Japan but not by in the U.S. Major Japanese automakers help their suppliers match competitors' efforts if one of competitive suppliers offered a lower price for a product of same quality. Furthermore, the automakers provide significant helps for suppliers to reduce costs if their material costs raised and develop technological capability.

Trust in trading relationships means that one's counterpart in an ongoing relationship can be expected to pursue those actions that would be to one's benefit and to refrain from those that would be detrimental. This does not necessarily mean that one's counterpart will always act in one's own benefit. Rather, it implies merely a sufficiently high likelihood of responsible behavior over a range of normal circumstances to warrant cooperation on an informal basis. Although none of the agreements were legally enforceable, they were not easily broken. The reputation effects and commitments embodied in these arrangements evidently work well and provide strong safeguard for the parties involved; the short-term gains from opportunism are largely offset by long-term losses from a damaged reputation in the particular industrial community.

Since many of these contracts are implicit, the party must be trusted to deliver on the implicit contracts even without enforcement by courts in Japanese vertical relationships. To the extent

5 Sako and Helper (1998) collected data by questionnaire survey during 1993 from 675 first-tier automobile component suppliers in the U.S. and 472 first-tier suppliers in Japan. Respondents were asked to answer the questionnaire for their most important customer regarding one product, which was typically of their company's output, and with they were familiar.

that long-term contracts reduce costs, such trustworthiness is a valuable asset of the party. The principal reason why long-term contracts between parties are needed is to promote relationship-specific investments by parties. The necessary arrangement to ensure appropriate investment by parties is a long-term relationship, which allows them to collect some of the rewards of doing honestly. The expense of writing a complete contingent contract ensures that these long-term relationships are implicit in nature. The relationships are beneficial to both parties, as they split the *ex ante* gains from trade.

Although both parties benefit *ex ante* from implicit long-term contracts, it might pay one party to renege *ex post*. For example, a buyer might gain from refusing to compensate a supplier for investing in the relationship-specific investment, after investment is done. Breach of implicit contracts can therefore raise one party's gains and the more so the greater is the burden of fulfilling past implicit contract. Conversely, the value of supplier's relationship-specific assets suffers a loss. To take advantage of implicit contracts, potential sellers must trust buyers. Otherwise, sellers would expect breach whenever it raises the buyer's value and would never enter into implicit contracts. To convince sellers that implicit contracts are good, buyers must be trusted not to breach contracts even when it is value maximizing to do so. A solution to the problem of how implicit contracts are maintained is reputation formation. Suppliers adhere to implicit contract because their adherence enables them to develop a reputation for trustworthiness, and thus to benefit from future implicit contracts. If violating an implicit contract today would make the suppliers untrustworthy in the future, they will uphold the contract as long as the option of entering into future contracts is valuable enough. Conversely, if it is not important for the supplier to be trusted in the future, they will violate the implicit contract. The long-term relationships provide incentives for trade partners to build reputation for trustworthiness that yields favorable long-term gains. The commitments and facilitating practices to maintain group goodwill and trust can reinforce the mechanism of reputation building by trading partners.⁶

Trade partners do not rely solely on reputation available from outside parties to judge the trustworthiness of other partner in the Japanese vertical relationship. To ascertain whether other partner is trustworthy they rely additionally on their own experiences. A certain periods of time and a number of personal contacts are required to update the reputation about other partners. During that period they operate in a testing process. Initially small and short-term trades are given and further trade depends upon performances and trade behaviors. Once they are satisfied

6 In Japan, firms may choose a trade partner within a circumscribed group in which reputation about the other contracting party is readily available and in which public sanctions against opportunistic behavior exist. The Japanese are inclined to introduction. Many Japanese will deal only with parties that can submit introductions from respected third parties. The introduction verifies both that the party has acted in ways considered 'honorable' within the world of 'reputable' firms and that it will be subject to the sanctions of the third party if it tries to act 'dishonorably' in the future (Ramseyer, 1986). The trading groups, which are mentioned beforehand, work in a similar way. When members of a group share the trading information and hold a common code of honorable behavior and subject to the sanctions of others in the group, monitoring cost can be substantially mitigated.

with the trade, on-going trade relationship is ensured. The combination of certain types of behavior and personal contracts involving the exchange of information and giving mutual assurances, and a considerable time for the consistency of one's behavior to be observed and tested can enhance and maintain a reputation for trustworthiness. Japanese firms have recognized the need to be interdependent and have responded by developing bonding mechanisms that build trust among them. The Japanese do not rely on legal contracts to protect their interests in trading relationships.⁷ Since the new entrants are required to spend time and effort to establish reputation to set up new trade relationship, it may burden the newly entering firms as a trade barrier. Once the trade relationship starts, the trading cost of each party reduces substantially due to simplified procedures. But each party must make efforts to maintain trustworthy relationship (Economic Planning Agency 1986).

5 Facilitating Practices

5.1 Extensive Information Sharing

Although they may be substantial, the mechanisms to maintain long-term trading relationships in Japan are not perfect. What practices facilitate maintaining stable, long-term relationships in Japanese vertical relationships? One of the practices to help Japanese firms forestall opportunistic problems in the long-term relationships is extensive information sharing. The quality of information that trading partners have at their disposal is clearly different from that available to outside parties. Trading partners can learn about each other through ongoing trading relationships and through various collaborative projects. Monitoring with the relationships takes place in several ways involving formal and informal information sharing mechanisms.

Japanese suppliers are trusted enough to be given model information relatively early in the design process and suppliers are expected to participate in the development, beginning at the concept stage. In the process, Japanese suppliers wield significant influence over the process of defining customers' requirements so that the product designs exploit the suppliers' unique manufacturing capabilities. Liker *et al.* (1996) indicate that almost all of the subsystem supplier in Japan receive early vehicle concept information from their customers although they do not necessarily have a great deal of influences over the setting of specifications for their subsystems.

⁷ Wilson (1980) conducts an intensive study of the New England fresh fish market. He finds that underlying the smooth functioning of the market was a system of mutual dependence created by the particular trade arrangements there; reputation effects provided an enforcement mechanism. Acheson(1985) studies the Maine lobster market and find the lobster market to be characterized by long-term, informal relationships between fishermen and lobster-pound operators. They typically crafted agreements designed to reduce the costs of information and the possibility of opportunistic use of informational asymmetry. Reputation considerations and interdependencies arising from the sharing of scarce resources reinforced the arrangements. Informal agreements and norms in eighteenth- and nineteenth-century whaling have been studied by Ellickson (1989) and Gifford (1993).

Japanese automakers provide early new model information to first-tier suppliers as the product concept is forming and issue only the minimum critical product requirements. U.S. firms are thought to provide much more detailed specifications to their suppliers, allowing suppliers little latitude on specifying the design. Japanese vertical relationships involve intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve performance and reduce cost. Because these are long-term buyer-supplier relationships, the quality and efficiency of information exchange is significantly higher than it would be in new relationships. Thus mutual human-capital investment enhances information sharing and communication between buyers and suppliers.

There was considerably more frequent exchange of design information reported in the U.S. compared to Japan at all tier levels and all stages of the development process. The frequency of communication does not necessarily reflect the quality of communication. Japanese have a long and continuous history of working together with their suppliers on design that they can communicate quickly and easily between them. Direct communication and relationships developed over a long period of time made detailed and explicit written communications largely unnecessary. The result of this emphasis on communication is greater efficiency, faster product-development cycles. Japanese vertical relationships in automobiles can be thought to involve intense and frequent communication during the product development cycle, particularly in the early stages when the product is being defined. This includes the intense and regular sharing of technical information to improve performance and reduce cost. When a supplier gets a notice that the concept session for a specific vehicle model is being scheduled, there is no ambiguity about what the supplier must bring to the session; approximately when the first, second, and third prototypes will be due; and what the buyer's expectations at each of those milestone events will be. One can find clear and consistent communication between suppliers and buyers in the Japanese relationships (Licker, *et al.*, 1996).

The suppliers' associations continue to serve a useful function in delivering benefits to both the automaker and member suppliers (Sako, 1996). Contrary to the bilateral contracting view, suppliers value mutual learning from other suppliers just as much as learning from their buyers, and that the majority of first-tier suppliers do consider suppliers' associations to be useful. Although there is a considerable variation among those associations, as a common characteristic, association membership is much broader than the boundary of *keiretsu* groupings, particularly in recent decades when independent suppliers that stand outside the *keiretsu* have been taking up membership in multiple associations. *Tokai Kyohokai*, which is affiliated with Toyota, has three sectors grouped according to the type of parts that members produce. Each group meets once a month, typically to visit a member supplier's factory, and to learn from the member's presentation about problems and achievements at his company in the following month. The automakers except Honda, which have an association, continue to retain much control over the

activities of the association. Although less common today, many of the associations required the automaker's recommendation as well as the approval of the association's administrative board to become members. Whether leading or advisory, providing support for the suppliers' association is expensive in managerial time, judging from the frequency of meetings. Weighed against this cost are the frequently cited benefits of being able to communicate about production plans, and of soliciting good suggestions for common problems, such as parts standardization and pollution control. The most popular benefits of belonging to an association are better informational access to the buyer. Next, learning from other members through exchange of technical information is considered the second most important benefit, and more important than the receipt of technical assistance from the buyer. Many members apparently regard fellow member suppliers as a more important source of technical know-how than their buyer. The type of buyer information, which is valued by members, appears to be about design and development for the next model, rather than, for instance, about the certainty of production scheduling.⁸

The extents to which suppliers share confidential information with buyers also provide signals of good faith between buyers and suppliers. Sharing confidential information signals to buyers that the suppliers' motives and intentions are benevolent. Since it appears that trading relationships are indeed governed as much by implicit understandings and practices as by legal obligations, the mutual trust in relationships is in turn strongly influenced by the level of information sharing among partners. Trusting relationships involve intensive information sharing, even to the point of becoming involved in each other's business planning. Thus, information sharing, while it does not appear to have a direct impact on the continuity of the relationship, is critical to build the trusting relationships that in turn create stability. Intensive two-way communication concerning plans, programs, expectations, goal settings, and performance evaluation is critical for resolving disputes and coordinating actions.

5.2 Enduring Personal Ties

Long-term duration of implicit contracts founded upon commitment arrangements depends critically on preserve continuity in the identity of specific employees interacting at the trading interface. The rotations and transfers result in the extensive network of enduring personal ties among individual employees inside and outside the firm. These are crucial to the efficacy of implicit contracting, for the terms of such agreements are held more between individual employee interacting at the trading interface than between the firms as legal entities. It is in this individual employee that mutual obligations are formed and bonds of trust are forged. It is individual employees who ultimately adapt contracts to changed circumstances and, out of consideration for their reputations, can act against any ill-advised tendencies towards opportunism

⁸ These evidences can be supported by the survey conducted by Fair Trade Commission in Japan (1993).

elsewhere in their organizations. Once established, the Japanese practice of long-term employment serves to preserve these personal ties for many years. It also raises the cost to individual managers of untrustworthy, opportunistic behavior.

The practice of long-term employment within one firm is important in developing trust among individuals both within the firm as well as across firms. There is real personal contact between the purchasing managers of manufactures and the managers or owner of a supplier firm. Because employees can develop long-term relationships with their counterparts at the supplier or buyer, it is not surprising that the Japanese have developed significantly greater trust across firms. Furthermore, management transfers develop effective communication that ongoing relationships require. Various levels of managers or engineers may be temporarily transferred to related firms to help solve specific problems or to work on joint projects. Such transfers provide extensive networks of personal relationships between individual managers in related firms by enhancing trust between the firm's managers. Reinforcing monitoring and information sharing at various levels of managers are ties at the level of the board of directors. Employee transfers are common among trading partners in Japan, particularly among bank and their client firms and large manufacturers and their suppliers.

The way that Japanese firms build trust is by requiring career paths in which employees transfer from firm to firm. Employee transfers, both temporary and permanent, are common among business partners, particularly between large manufacturers and their suppliers. In addition to permanent and temporary employee exchanges, suppliers often send guest engineers to work at their customer technical centers on an ongoing basis. Supplier and automaker engineers work jointly designing the components for a new car model. Not only do these career-path help build trust between firms, but also transferred and guest employees are better able to understand how to enhance the efficiency of the development and production processes because they know both buyer and supplier operations. Direct contact is much more important than other forms of contact in developing ways for employees to know and trust each other. Both of automakers and suppliers encourage a considerable amount of face-to-face contact between supplier salespeople and engineers and between automaker purchasing agents and supplier engineers. Japanese suppliers engage in more face-to-face contact and utilize more guest engineers than do U.S. automaker parts divisions and assembly divisions (Dyer, 1996a).

When supplier salespeople and engineers have frequent contact with buyers for business or social purposes, trust can be engendered because buyers can observe the salesperson's behavior across a variety of situations. Frequent interaction fosters trust by giving buyers information that helps them predict the salesperson's future behavior with confidence. Information sharing improves trust by resolving disputes and misunderstandings and by aligning perceptions and expectations among them. Much of communication is informal, which greatly enhances trust and coordinated behavior. Communications play an important role in realizing the mutual benefits in a relationship. Buyers and suppliers can achieve coordination by sharing information through

frequent and intensive two-way interchanges. Communication also fosters confidence in the continuity of the relationship and reduces opportunistic behavior.

6 Conclusions

Extensive reliance on market procurement permits firms to exploit the efficiencies associated with specialization in production and the exposure of independent assets owners to high-powered market incentives. But it also exposes firms to the risks of self-interested opportunism. As a fundamentally self-interested party in its own right, and one often capable of undertaking actions or exploiting information hidden from other party, one party cannot always be counted upon to act in the best interests of the other. Recognizing this possibility, rational parties are induced to develop appropriate incentives and safeguards to mitigate self-interested opportunism by other parties. The costs of designing and running these relationships, and value lost due to opportunistic behavior in the trading relationships by one party that ultimately cannot be eliminated, are the transaction costs borne by one party.

The major characteristics of vertical relationships in Japan making differences from the U.S. can be identified that both buyers and suppliers have recognized the need to be interdependent and have responded by developing mechanisms that secure cooperation between them in the long run. Japanese firms do not rely on legal contracts to protect their interests in trading relationships. Long-term relationships and commitments based flexible legal contracts in Japanese vertical relationships reduce transaction cost and eliminate inefficiencies between buyers and suppliers. Trust founded on facilitating mechanisms among trading partners allows them to adapt terms of trade as needed in response to changing circumstances based on high degree of implicit, long-term, relational contracts. Opportunistic behavior in such relationships can be mitigated, and their longevity fostered, by the multiple claims ownership of parties doing business with each other, and by extensive information sharing. The relational governance to facilitate building and sustaining stable vertical trading relationships may lead to investment in relationship-specific assets to bring appropriable rents. For most Japanese firms, the long-term trading relationships with firms in which they invest constitute the chief value of their overall dealings with those firms. Value comes from the transaction efficiencies generated by building and maintaining long-term trading relationships, mutually beneficial trust between managers in the trading firms can be nourished and cooperation be fostered. Contracting can take place on a much less formal, more implicit basis, often an advantage when it becomes necessary to adjust rapidly to a changing environment.

As uncertainty and complexity become more important in a vertical relationship, the expected costs of writing, administering, and enforcing full contingent contracts increases. A contract is incomplete in the sense that it does not specify unambiguously the obligations of each party in every possible state of nature. Contractual incompleteness sets the stage for *ex post* performance

problems. When contingencies arise that are not fully and unambiguously covered by formal contractual provisions, one or both parties to the transaction may have incentives to take opportunistic behaviors that increase the costs or reduce gains that will be obtained by the other party. The anticipation at the contract formation stage that the possibility of opportunistic behavior when certain contingencies arise affects the structure of initial vertical relationships. The central problem of governance in trading relationships is to devise specialized systems of incentives, safeguards, and dispute-resolution processes that will promote the continuity of trading.

One of the most important practices supporting the preservation of long-term trading relationships in Japan is tendency of trading parties to engage extensively in highly informal, implicit contracting. The virtue of implicit contracting as a mechanism for sustaining long-term trading relationships lies in its intrinsic flexibility. Assuming a foundation of mutual trust and shared expectations, implicit contracting among parties better enables Japanese firms to make informal and highly refined adjustments in the terms of trade to preserve the spirit and substance of a trade agreement rather than merely the letter of a written contract. Where implicit contracting is widely prevalent, the reference point in any discussion regarding a trading agreement tends to be the ongoing business relationship itself rather than the agreements *per se*.

The market may provide a natural deterrent to agents behaving opportunistically and eliminate the need to rely on either vertical integration or complex contracts. There is a potential cost to breaches of writing or implied contractual promises: the loss of future business from either this buyer or other buyers. In market where buyers and sellers frequently engage in similar types of transactions, and where it is possible at low cost to distinguish behaviors, reputation constraints will mitigate incentives of opportunistic behavior and allow agents to more comfortably use market transaction, recognizing that the market provides penalties for inefficient behavior. Developing mechanisms to build reputation for trustworthiness between buyers and sellers can be essential in attenuating self-interested opportunism in Japanese market.

The execution and adaptation of trading agreements are made primarily by reference to norms and expectations built over long-term trading relationships in Japan. Thus, relational governance within partners is of a more continuous administrative nature and relies less extensively on legal rules, third-party assistance to effect change, or litigation as a means of resolving disputes. Employees in Japanese firms are those who understand the interests and priorities of the relationships, are alert to the network of implicit contracts binding the firm to the relationships, and can be trusted to uphold these contracts over time through changing circumstances.

One can understand how Japanese firms have developed unique mechanisms of relational contracting to facilitate long-term, cooperative relationships with flexible agreements. It is important to understand why and how flexible trading arrangements sustain in the market transaction. Relational contracting in Japanese vertical relationships facilitates building and maintaining of stable, long-term, and cooperative relationships. These, in turn, foster investment in relationship-specific assets, and enable firm operating within the relationships to exploit

transaction rent not generally available to arm's length transactions.

What governance mechanisms will emerge as the parties negotiate a mutually acceptable trading arrangement in response to anticipated transaction costs under a particular institutional environment? Arrighetti, Bachmann, and Deakin (1997) suggest that trading arrangement can be affected by the institutional framework for exchange, as constituted by the legal system and by less formal, social norms. The institutional framework may play an important role in underpinning long-term, cooperative relationships. It is important to examine the effects of institutional environment on governance mechanisms in trading relationships.

Under what conditions a particular vertical arrangement can lead to efficient performance? What conditions under which close, long-term trading relationships among few firms can lead to efficient performance? Yet many interesting issues still remain unknown about trading relationships between buyers and suppliers.

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**EXPERIENCES OF TECHNOLOGICAL PARTNERSHIP
OF JAPAN WITH OVERSEAS:
THE CASE OF STEEL INDUSTRY**

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Abstract

Three cases of Japanese experience of transfer of technology to newly industrialized countries in the steel industry during the 1960s and 70s are analyzed comparatively. The most successful case in the Korean POSCO project is compared with the apparently failed case in Mexican SICARTSA project and a sort of intermediate case in the Brazilian USIMINAS projects. Both factors of success and failure are analyzed. Observations from this comparative analysis led us to conclude that the success of technology transfer depends very much on the quality of the system of learning of a recipient. The system incorporates efforts in education, finance strategy, coordination of the market, clear targeting of quality, and stimulus for technology absorption.

JEL Classification: D24, L61, O14, O33, O53, O54

Keywords: technological partnership, steel industry, technical cooperation

“The great questions of the day will not be settled by speeches and majority decisions ... but by blood and iron.” (Otto von Bismarck, speech to the budget commission of the Prussian Lower House in 1862)

1. Introduction

In the 19th century, iron was considered as the most strategic material of the military power

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and therefore it became a symbol of the power of a country. In the post-war modernization era, a steel turned to be one of the most important input for wide range of industries such as machinery (especially automobile and ship-building industries), civil construction and infrastructure building.

Development economists like Hirschman (1958) and Rosenstein-Rodan (1943) emphasized the importance of backward- and forward-linkages and the need of initial “big-push” to put the self-reinforcing forces in place. In this interpretation, the better quality of steel products are available, the great the chance will be to achieve higher level of industrialization. Then, owing to scale economy in steel production, the larger the demand, the lower the production cost becomes and the greater the variety of steel production can be sustained. Because of the circular causality between the scale economy and forward linkage effect toward the down stream industries, development of a steel industry was envisaged by newly industrializing countries for the past 50 years.

Steel production does not necessarily depend on availability of primary material such as iron ore and coal because a steel mill can be constructed at a coastal location which is advantageous in unloading of imported material and shipping of finished products. Rather, it highly depends on availability of capital. It also requires very complex and comprehensive combination of technologies. Experiences of late industrialization suggest that, because the technology is already embodied in the capital goods, if a country can introduce highly efficient equipment it can compete with industrialized countries. Hence, successful establishment of a steel would require that the government play important role in mobilization of capital and acquisition of advanced technologies.

The experience of Japan in rapid industrialization supported by spectacular development in steel industry called strong attention, especially from those countries envisaging industrial development. Japanese steel industry frequently received requests from them for financial and technological cooperation and cumulated a wide range of experiences in this regard. In this paper, we will trace some examples of success and failure from them and attempt to draw some lessons how we could implement an international technological partnership more successfully.

The case in point here is when a late industrializing country attempts to ride onto the successful trajectory how the project executing capability would matter. Issues are mainly concerned to capital and technology.

There are three main source of capital mobilization and three ways to acquire new technologies. Investment can be financed by domestic savings, foreign borrowings, and foreign direct investments. Acquisition of technology is possible through technology transfer (which comes with foreign direct investment), licensing, and imports of capital goods. So, experiences of late industrialization may vary depending on which strategy a country would choose.

Japan reactivated its economy in the post-WWII period by concentrating the use of limited domestic savings and hard currency into steel, carbon mining, and electricity generation.

Although borrowings from international financial institution contributed to some important infrastructure buildings, Japan was a rare case of being capable of financing late industrialization basically through domestic savings. Japan rejected foreign direct investment. It was an expression of a nationalism putting emphasis on “technological independence” not allowing foreign ownership of productive asset. Instead, the Japanese industrial policy prioritized, through foreign exchange control, acquisition of technology through imports of capital goods and licensing foreign technology. It also emphasized investment in education, especially in engineering in order to stimulate learning and developing application.¹

Korea, as the case of steel industry in this paper clearly shows, followed the Japanese example. Although its dependence on foreign borrowing was much higher, Korea did not allow foreign direct investment and concentrated to acquisition of technology through purchasing of the most advanced machinery and quick learning of highly educated human resource.²

On the other hand, Latin American countries, like Brazil and Mexico in our case study, foreign direct investment had much heavier weight. As many study showed³, Latin American industrialization progressed by constituting a triangular alliance of the government, national private, and foreign capital. Multinational firms bringing both capital and technology were generally welcomed, yet when it comes to activities related to natural resource and basic materials, nationalistic views were always invoked and only a minor share participation was allowed. At that point limitation of capital mobilization capability of the government appeared as a bottleneck. When a nationalistic point of view was translated into high degree of import-substitution policy, imports of advanced capital goods became difficult and the ability of developing compatible domestic technology became questionable.

In what follows we explore three cases of Japanese experience of technology transfer to newly industrialized countries during the 1960s and 70s. By doing so, we are able to demonstrate how differences in strategy might result different performance. The next section will depict the first case of this kind in Brazil with the Usiminas Steel project. Then, in the following sections, we will visit both the most successful case in the Korean POSCO project and apparently failed case in Mexico-SICARTSA project.

2. The Case of USIMINAS, Brazil

(1) Initial period of USIMINAS

When Mr. Juscelino Kubitschek became the president of Brazil in 1956, his administration announced an ambitious Five Year National Development Plan. It included the construction of four new steel mills with several blast furnace steel mills (Belgo-Mineira, Acesita, and CSN). At

1 See Kim and Dahlman (1992).

2 See, in particular, Evans (1979).

3 See, in particular, Evans (1979).

that time steel production capacity of Brazil was around 1.28 million. The Brazilian government requested cooperation of Japan. Although Japanese steel production was still much smaller in scale than in the US and Europe at that time, it already showed remarkable catching up by introducing the newest technology of the moment, which is the example that Brazil wanted to follow. The negotiation gave birth to the USIMINAS project.

The USIMINAS project was the first case of the Japanese cooperation for steel production in overseas. The Japanese business community welcomed the request because the iron ore rich Brazil was seen as an ideal showcase to prove to the world that the technological capability of the Japanese industry was already comparable to that of the industrialized countries. Therefore a national project team was called involving high-profile government officials, business leaders of steel industry, industrial equipment industry, and construction and engineering industry. After exchange of visits of several highly qualified business executives and government officials, the both countries swiftly reached an agreement to jointly establish USIMINAS in 1957.⁴

Short-term benefit came from considerable volume of plant equipment demand related to USIMINAS. The plant equipment exports to USIMINAS during the construction period (1960-65) represented about 10% of the whole industrial machinery exports of Japan during the same period. This demand was very significant for the Japanese industry which entered a downward cycle in the mid-1957.

In the long-term, the project was expected to contribute to enhance economic relationship with Brazil to secure access to primary materials. Brazil is special to Japan also because the Japanese community there is the largest outside Japan.

USIMINAS was formally established in 1958. As a counterpart organization a special purpose investment company Nippon USIMINAS had been already established in the previous year which also carried out organizing provision of equipment and technical support to USIMINAS. Nippon USIMINAS is a consortium of the government fund (corresponding to two thirds) and investment of private companies consisting of steel companies and plant equipment companies.

The founding agreement of USIMINAS included the following contents:

- (a) Construction of an integrated steel mill;
- (b) Initial production capacity is 500 thousand tons;
- (c) Capital: 3.2 million cruzeiros where the Brazilians and the Japanese hold 60% and 40%, respectively;
- (d) Executive management board consisting of five executive managers, including three Brazilians and two Japanese. One Brazilian chaired the company as a president and the other two took responsibility for sales and finance. One of the Japanese held the position of a general manager who controls accounting and budgeting. Another Japanese initially

⁴ The negotiation process is described in great detail in Nippon Usiminas (1969) and Usiminas Kaiso Roku Henshu Group (1997). Several persons involved in the initial phase of the Usiminas wrote books. See Nakamura (1999) and Kobayashi (1997).

supervised the plant construction and then in the operation phase directed planning of expansion, technological research, production planning and improvement of productivity.

(2) Financial problems

Plant construction was started in 1959 and the first blast furnace was installed in 1962. USIMINAS gradually became an integrated structure by finishing casting plant and steel plate making plant in 1963. In 1965 construction of hot strip mill and cold mill was completed. It took more than eight years since the master plan was defined until to achieve the planned production level of 500 thousand tons per year.

Construction of the production plant was delayed more than one and half years than the original plan for various reasons. Firstly, the government provoked significant fiscal imbalance by implementing the development program in addition to the construction of Brasilia. This problem caused inflation which increased USIMINAS' plant construction cost substantially. Inflation also raised financial cost of the loan from the national development bank, BNDE, because BNDE charged the monetary correction to compensate the real value loss of the outstanding loan. Secondly, because the plant was constructed in deep inland, investment was needed in construction of urban infrastructure for employees' living and transportation in addition to the plant itself. Thirdly, serious political uncertainty surrounded the post-Kubitschek period with several anti-communism military intervention, which led to the military coup in 1964.

Faced by the lack of finance for construction, USIMINAS proposed to increase the capital to 18 billion cruzeiros in 1961. Intense negotiation was held during 1961-62 and the Japanese side agreed to increase their investment up to 9.7 billion yen corresponding 40% of the capital. However, the Brazilian government was not able to finance the rest of capital increase because by 1961 Brazil went into balance of payment crisis and had already requested debt payment rescheduling to creditor countries. In order to save the nascent project Japan agreed to reschedule the repayment of the outstanding commercial lending and further extended Export-Import Bank loans to BNDE to cover the finance of BNDE's capital increase to USIMINAS.

The financial problem persisted, however. In 1963 the Brazilian side requested further capital increase to cover the soared construction cost and financial cost due to the inflation. For the Brazilian side, financing through capital increase is by far more preferable to the borrowing under the inflationary economy because the financial cost is much higher due to the monetary correction. Although Nippon USIMINAS conceded additional five billion yen for construction, the Japanese side became reluctant to further investment contending that, by the original agreement, infrastructure building in the plant area and operational cost including financial ones for inflationary monetary correction are sole responsibility of the Brazilian government. Thus USIMINAS relied on the BNDE lending and when the construction was concluded the loan

outstanding was converted into capital stock. This measure created intense discontent of the Japanese investors because although the Japanese invested 65% more than what was committed originally, their equity share decreased from 40% to 21.46%. The Japanese consortium's share decreased further to 18.8% until 1967 by more capitalization of BNDE loans.

(3) Technical transfer

Despite of the conflict surrounding the financial problem, the construction of the plant was carried out in harmonious cooperation between Japan and Brazil. The technical assistance of 1,508 men-months of 137 engineers from 34 plant equipment makers was devoted for the installation. Plant construction was carried out by a Japanese general constructor Kajima involving whose civil engineering service of 460 men/months of works of 11 engineers was devoted.

As the production partly started in 1961, Yahata Steel, Fuji Steel and NKK jointly dispatched nearly 500 persons to USIMINAS in five years until 1965. These persons were stationed 3-4 years serving as leaders of production lines and also provided the following technical assistance:

- Suggestion to completion of the plant construction;
- Elaboration of an operation manual;
- Production planning;
- Preparation of production materials;
- Training of local staff.

The technical cooperation was granted basically free of charge of technical fee. The line operation was transferred to Brazilians one year after each plant started operation. The process was actually carried out overcoming huge obstacles. Since the plant was constructed in the isolated area, Japanese engineers who came all the way from the other side of the earth suffered from large difference in living standard and climate. It was also difficult to gather local engineers and operators with reasonable qualification in such area. Cultural gap and difficulty in communication were tremendous. In those circumstances, the role played by the *nikkey* (Japanese immigrants and their descendents) employees in mediating communications and facilitating assimilation of the Japanese staff should be highly credited. Especially, they played vital role in translation of operation manual into Portuguese and interpretation in training seminars. By 1967 all the responsibility of plant operation was transferred to Brazilians and the Japanese engineers left USIMINAS.

The changeover of operational responsibility occurred in the midst of steel market crisis and the company was in the continuous financial difficulty. According to Dahlman and Fonseca (1987, p. 163), USIMINAS broke the "recipe" left by the Japanese into basic elements and carefully studied what was behind them and how they fitted together⁵. Each elements were

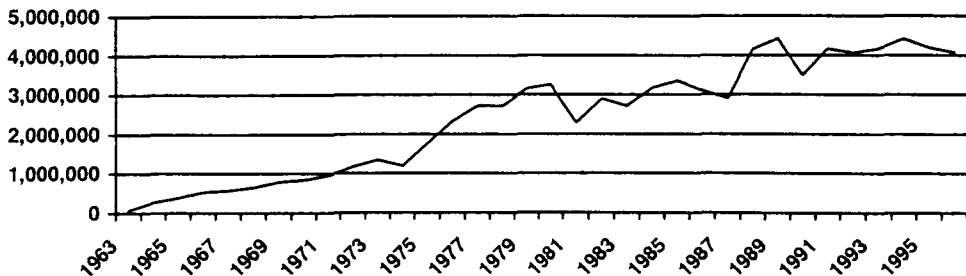
5 The same authors points out that USIMINAS passed from know-how stage to know-why stage (p. 171)

compared with those used elsewhere in the world to learn weakness of USIMINAS. This required creation of the departments of industrial engineering, metallurgy and plant inspection, as well as an research/information center. The whole process of acquisition of technology was beyond the simple learning. It was worked closely with the technical assistance of Nippon Steel.

The success of technology transfer showed immediate result. In mid-1970s, USIMINAS had the highest productivity in sinterization, and comparable to average productivity of blast furnace (in terms of daily production volume and energy efficiency in coke/fuel rate) of steel mills in Japan, which was the world leader at that period (Dahlman & Fonseca, 1997, Table 6.9).

Production showed steady growth attending strong domestic demand during the high growth period of the Brazilian economy in the decade of 1970s, as shown by Figure 1. Production capacity was expanded to 1.4 million tons in 1973, 2.4 million in 1976, 3.5 million in 1981. Accordingly, USIMINAS' share in total Brazilian production increased progressively from 15% in 1967 to 19% in 1973, and 25% in 1976. Especially, USIMINAS had maintained high share in flat sheet products which contributed substantially development of shipbuilding and automobile industry (Dahlman & Fonseca, 1997, Table 6.7). Technologically, USIMINAS was in a position to provide technical assistance to downstream activities such as capital good industries and other steel mills. Dahlman and Fonseca (1987) reports that USIMINAS was doing for the new steel plant of AÇOMINAS *basically the same thing which the Japanese did* for it when it was getting started (p. 164).

Figure 1. USIMINAS: Evolution of the production (tones)

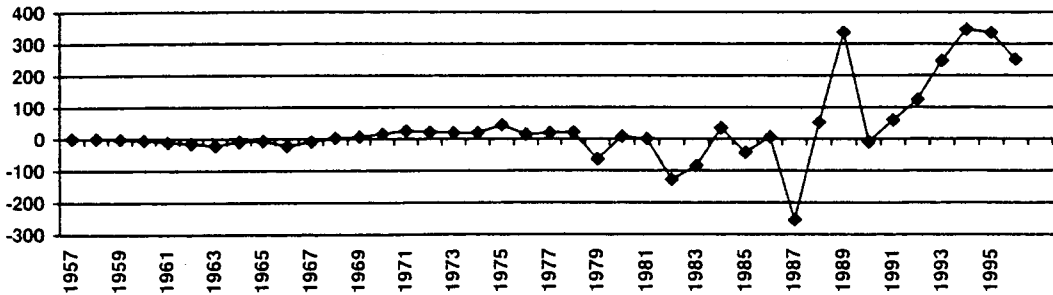


(Source) Usiminas Kaisu Roku Henshu Group, 1997

(4) Regime changes: Nationalization and desnationalization

Brazilian government established Siderbras in 1973 as the holding company of the state-owned steel companies. The majority equity share of USIMINAS (51.68%) was transferred from BNDE to Siderbras. With other state-owned steel mills such as COSIPA and CSN, USIMINAS was put under the direct control of the government. The government's idea was to take responsibility of financing steel production and command industrialization by distributing basic materials at low cost. However, such non-profit maximizing control of price and production and nomination

Figure 2. Net profit after tax (in million US dollars)

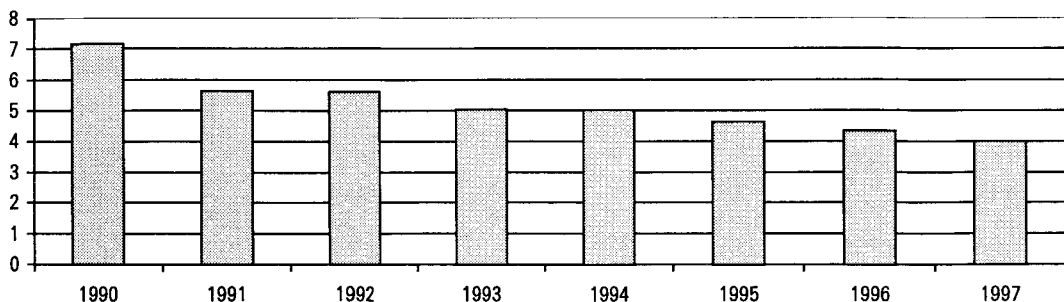


(Source) Usiminas Kairo Roku Henshu Group, 1997

of politically appointed managers without any experience in the steel business gave devastating effect on profitability of USIMINAS as shown by Figure 2. On the other hand, although availability of financial resource expanded initially, the government's ability was restrained substantially as the budget deficit accumulated and inflation soared in the 1980s.

The decade of 1990s witnessed the government's strong determination on the privatization program. USIMINAS was the first case to be brought to the market auction in 1991. At the eve of the privatization, the position of shareholding of Nippon USIMINAS had dropped to 4.99% from 18.58% prevailed at the time when Siderbras was established because of the unilateral capital increase by the Brazilian part. At the time of privatization, Nippon USIMINAS acquired equities held by BNDES through swap of (non-voting) preferential share with ordinary voting shares and with withdrawal of deposited dividend for the preferential share. As a consequence of this operation, the share of Nippon USIMINAS increased to 13.84%. USIMINAS was reborn as a private company and achieved one of most remarkable successes of privatization in Brazil. Its profit improved constantly (see the Figure 2) while the productivity increases as shown by the Figure 3.

Figure 3. Productivity: Man-hour per ton of production



(Source) USIMINAS Web page (<http://www.usiminas.com.br>).

3. The case of POSCO, South Korea

(1) Elements of the success of POSCO

Pohang Iron and Steel Co. Ltd., POSCO is considered not only the most important steel company in Korea but also one of the most successful cases of development of steel industry in newly industrializing countries. This company has attained almost the lowest cost of production of common ("large-scale production") steel in the world, challenging traditional exporters. It is furthermore catching-up to them in the field of high-grade types of steel. The amount of production of POSCO increased in more than eight times in ten years from 2 114 thousand tons (M.T.) in 1976 to 9 530 thousand tons in 1986, when the company attained the status of one of the top steel mills in the world.

Table 1. Steel Production in Korea

(thousand M.T.)

		1973	1976	1978	1980	1984	1985	1986
Production	Total	1.240	3.511	4.959	8.558	13.034	13.539	14.555
	POSCO	458	2.114	2.923	6.228	9.195	9.284	9.530
	Share (%)	36,9	60,2	58,8	72,8	70,5	68,6	65,5
Domestic market supply	Total	2.431	3.466	6.517	5.636	9.744	10.459	11.262
	POSCO	501	1.403	2.338	2.747	5.542	5.747	6.354
	Share (%)	20,6	4,3	35,9	48,7	56,9	54,9	56,4
Export	Total	917	1.564	1.871	3.875	6.013	5.788	6.369
	POSCO	118	41	525	2.365	2.527	2.573	2.463
	Share (%)	12,9	26,4	28,1	61,0	42,0	44,5	38,7

(Source) Toda (1990).

Few people thought that this fast development of steel industry was possible in Korea when POSCO started in 1968. For example, the World Bank's report on evaluation of Korean economy concluded in the same year: "the construction of the steel plant should be postponed and, in stead, labor or technology intensive machinery industries should be developed." Behind this conclusion, there was the opinion that Korea's technological capability was not yet sufficient for the proposed steel plant.

Furthermore, the United States Operations Mission (USOM) sent the official document to the Korean Economic Development Institute indicating that instead of integrated steel mill with blast

furnaces, it was recommendable to construct only continuous hot strip mill with the system of electric furnace.

Unlike the case of Brazil which was naturally endowed with rich iron ore resource, the challenge of Korea was much harder one of creating the comparative advantage overcoming obstacles all unfavorable factors such as lack of natural resources and capital and proximity to the most efficient competitor of the world, Japan. It was also a challenge of the conventional wisdom saying that a state enterprise is inefficient.

According to Hiromoto Toda (1986) who studied in details the case of POSCO, there have been the following factors, which enabled the successful development of this Korean steel company:

- 1) Very active support from the government, especially from the President, was crucial. Through this support, POSCO was able to get external finance, favorable conditions of technological transfer, construction of related infrastructure, etc.
- 2) High rate of increase of demand of steel in the domestic market was one of the very favorable factors for POSCO.
- 3) The reduction of construction costs of the steel plant by diminishing the period of construction. The construction period was reduced by 14 months through 4 phases of Pohang steel mill and by 6 months in case of Kouyou steel mill.
- 4) The purchase contracts of every components of the steel plants was made very timely and with the best conditions in terms of price and quality through the system of open bidding. The purchase of POSCO could be considered the most favorable among many cases of construction of integrated steel mills.
- 5) Efforts were made to develop the own capacity of engineering through the four phases of construction of POSCO, reducing substantially the cost of engineering.
- 6) The period of transition from initial production step to full production step was shortened considerably, on average to only three months in stead of six months of other countries.
- 7) Stabilization of the supply of raw materials as coal was considered as the essential element for successful steel production. POSCO made investment in Tanoma Coal Co. (United States) and participated in joint ventures of coal mining development (Mt. Thorley and Greenhills, both in Australia).
- 8) It should be emphasized that the planning of construction of plants were made on the basis of the very careful estimation of supply and demand of steel made by its own staff.
- 9) The availability of very high quality of labor and its very low level of turnover was one of the most important factors of the success of POSCO.

It should be emphasized that above mentioned merits have much to do with the Korean national system of innovation. According to Kim (1993), the general framework of the Korean

technology policy can be characterized by the following elements:

- 1) Investment in basic education, which eradicated illiteracy and universalized middle-school level education in 30 years;
- 2) Hard working habits encouraged by “beat-Japan” spirit and tension with North Korea;
- 3) Promotion of technology transfer through the procurement of turnkey plants. Foreign direct investment and technology licensing were restricted to maintain Korea’s independence from foreign multinationals;
- 4) Continued military relations with the U.S. also contributed to transfer of technology in number of sectors;
- 5) Korea’s own military technology investment brought significant impact on precision of machinery and electronics industry;
- 6) Strategic industrial policy to promote import-substitution of key industries such as textile, consumer electronics, automobile, steel, and shipbuilding;
- 7) Instead of multinationals, large national business groups, Chaebols, were promoted. They were responsible for import-substituting industrialization and leading exports.
- 8) Export promotion to earn foreign currency to enable acquisition of foreign technology and import-substitution;
- 9) Domestic science and technology infrastructure played little role.

Despite the negative perspectives shown by the World Bank and the United States, in the particular political context of Korea at that time allowed all the necessary conditions for the POSCO development including finance, investment in learning, market creation concerted with big business groups (*chaebol*) and technology transfer. Thus, the risk of investment was rather safely taken by the government. It should be noted that the Korean government was in favorable position to negotiate the package of financing and technology transfer from Japan because it was given as the reparations for hardships under the colonial rule. However, these conditions are not sufficient without Korea’s extraordinary learning capability which was so much praised by Amsden (1989)⁶. In this regard, we can observe very aggressive and organized efforts of acquiring technology in the early stage of the POSCO project.

(2) Japan-Korea Technological Partnership

Until 1973, Korea had no capacity of production of iron for steel production. Consequently, scrap or crude iron was imported to produce steel by small electric furnaces. According to Uhi Pak (1989), as there were no integrated steel mill in Korea at the beginning of 70s, the government of the Republic of Korea had to depend on foreign technology as well as foreign finance when it planned to construct a large size integrated steel plant.

⁶ See Amsden (1989), especially Chapter 12. The idea was further developed by Amsden and Hikino (1994).

The government tried twice to start plans of construction of the steel plant, but failed to realize them due to several reasons. The first plan was envisaged by the contract between the government of the Republic of Korea and KISA (Korea International Steel Associates, established as an international consortium with participation of companies of the United States, West Germany, Italy and United Kingdom. France participated later.).

KISA promised on October 1967 to get necessary capital abroad before the end of 1969 and to finalize the construction of the steel plant before the end of 1972. Nevertheless, as it was mentioned, both the World Bank and the US Mission were against the plan of construction of an integrated steel plant. In this context, Koppers, the leading company of KISA were not able to obtain the required capital of 100 million dollars. Furthermore, the complex organization of KISA made difficult to make its timely decisions. Therefore, KISA was dissolved in 1969.

The government, after this failure, decided to get external finance for the construction of the steel plant. In August 1969, Japanese Minister of Foreign Affairs expressed that its government would support the Korean government's new approach to the construction of the steel plant. According to the signed agreement, Japanese government would extend a loan of 123 million dollars for a turnkey contract of up-to-date equipment. As a part of that contract POSCO and Japan Group (JG) consisting of steel companies agreed on the contract regarding the technical cooperation: (a) cooperation for the project of consulting on planning of the construction of the plant; (b) cooperation for the project of purchase of equipment and construction; (c) support and advice for purchase and installation of equipment as well as related construction works; (d) planning and implementation of construction and integrated system of control of construction; (e) support of initiation and operation of the plant.

Japanese technological cooperation have been gradually reduced from the construction of the original plant to the first expansion plan (1974-76), the second expansion plan (1976-85) and the third expansion plan (1979-). Based on the experience in the first phase which entailed over 119 thousand foreign engineer hours (D'Costa, 1999, p. 8), POSCO already acquired capabilities to undertake the following engineering tasks: preliminary engineering planning, preparation of procurement specifications for auxiliary facilities (power transmission and distribution systems), preparation of common specifications for general technology, review and evaluation of manufacturers' specifications, preparation of civil engineering and building construction design, preparation of testing and start-up plans. In the second expansion plan (1976-85) the responsibilities of POSCO became even greater, although JG reviewed all the engineering works of POSCO and the master engineering plan continued to be the responsibility of JG. As the Korean engineers and workers were able to absorb very successfully the technology, at the third expansion plan phase (1979-), JG's only function was to evaluate POSCO's own master engineering plan (Amsden, 1989, pp.308-309), entailing only 491 foreign engineer hours (D'Costa, op.cit.). The declining reliance on engineering service of JG is indicated by reduction of the ratio of engineering service fee per ton of steel production from \$6.13 in the first phase to

Table 2. Comparison of steel product quality and process technology

	Korea	Japan	Others*
<u>Product quality</u>			
Steel plate for automobil (t.s. kg/mm ²)	80	120	50
Steel plate for ship-building (t.s. kg/mm ²)	50	50	40
<u>Process technology</u>			
Labor productivity (T/man)	866	1,102	603
Energy efficiency (1,000 kcal/t)	529	589	680

*Others: estimates of the steel plants in developing countries.

(Source) Park (1997).

Table 3. Selected indicators of technology and competitiveness (%)

	1986		1988		1989		1992		1993		1994	
	Korea	Japan	Korea	Japan	Korea	Japan	Korea	Japan	Korea	Japan	Korea	Japan
C.C. ratio	75,1	92,7	88,3	93,1	94,1	93,5	96,8	95,4	97,8	95,7	97,8	-
Yield (Steel)	89,7	92,6	91,7	92,6	92,6	92,8	-	-	94,6	93,1	95,2	-
Specialty Steel	-	18,0	6,5	18,7	6,5	17,9	8,2	17,8	8,9	17,6	10,7	-

C.C. ratio: Continuous Casting Ratio

(Source) Park (1997)

\$0.11 in the third expansion phase (Amsden & Hikino, 1994, p. 134).

Particularly high attention was paid to shorten the plant construction period and start its regular operation as soon as possible. For this purpose POSCO sent engineers to Japanese companies for training where they participated in the set up process of steel plants in Japan and obtained a wide range of experiences of construction and operation of steel mills. As a result of this effort, the first blast furnace of POSCO was brought to normal operation in only four months while it normally takes 12 months after the initiation of the plant construction. In later stage the period for POSCO to get normal operation of LD converter was also so short. Such a performance was really surprising because LD converter needs very well coordinated combination of chemical and mechanical systems. Thus, the period of construction of the integrated steel plants in POSCO was shortened substantially from the original plant to the fourth expansion plan, in spite that the scales of plants were increased.

Thanks to the aggressiveness in technology acquisition, it did not take long time for POSCO to become technologically self-dependent. POSCO started its own R&D efforts. First, it implemented a lot of improvements and adaptation of absorbed technology at Quality Control

Table 4. Period of construction of integrated steel plants

	Capacity of production (100 M.T /y)	Construction period
POSCO		
Original plant	1,030	38 month
First expansion	1,570	30
Second expansion	2,920	29
Third expansion	2,920	24
Toronto (Italy)	2,600	49
FOS (France)	3,500	50
Bokaro (India)	1,700	100
Usiminas (Brazil)	1,400	74

(Source) Toda (1990).

Table 5. Comparison of steel industries of selected countries

		Production capacity (1000t)	Cost of construction (US\$/t)
Korea	POSCO	Blast furnance	500
			860
Taiwan	CSC		213
			(860)
Brazil	Usiminas		762
	CST		760
Egypt	Alexandria National Steel	DR	952
India	SAIL	Blast furnance	430
Qatar	Qatar Steel Co. (QASCO)	DR	700

(Source) Toda (1990).

Department and production sites. They began to develop new products and finally decided to centralize R&D activities establishing the R&D Center in 1977.⁷ POSCO then started to

⁷ POSCO invested in R&D 7.3% of profit in 1977, increasing further to 12.5% in 1983. POSCO also established Pohang Institute of Technology (POSTECH) and Research Institute of Industrial Science and Technology in the 1980s to train technical graduates and act as a source of innovation for Korean industry as a whole.

(D'costa, 1999, p.14)

organize its own steel related business complex, especially heavy machinery industry. By this process the percentage of equipment produced locally, instead of imported components, increased substantially from the initial plants to the third expansion plan: from 12.5%, 15.5%, 22.6% to 35%. Furthermore, POSCO already became an exporter of its own technology at the end of 1970s, such as training of personnel of Chinese Steel Corporation of Taiwan, installing computerized system for Krukutou Steel of Indonesia, and setting up a joint-venture with US Steel in California.

4. The case of SICARTSA, Lazaro Cardenaz, Mexico

(1) Elements of the failure of SICARTSA

The case of SICARTSA (*Siderúrgica Lázaro Cardenas-Las Truchas, S.A.*), located at the city of Lázaro Cardenas, on the Pacific coast of Mexico could be considered as a very contrasting case of POSCO.

We must admit that the most of positive factors of POSCO was lacking in the case of the second phase of SICARTSA.

The original plan proposed by the President Echeverria of Mexico was to construct a steel plant almost as large as the Pohang Steel Mill of Korea through its four phases of construction. He planned to construct a steel plant of 1,300,000 tons before 1976, and its capacity of production was to be expanded to 10,000,000 tons before 1994.

One of the most important shortcomings of SICARTSA is the fact that it had only one blast furnace. It made impossible for the plant to maintain the continuous production of steel because the plant had to be stopped when the blast furnace had to be repaired periodically. SICARTSA has the rare combination of blast furnace system and Direct Reduction system.

Secondly, demand of steel product in Mexico decreased drastically because of debt crisis of 1982 and subsequent lost decade of 80s. This unfortunate process of Mexican economy made extremely difficult the accomplishment of original plan of production and expansion of the plant. The coefficient of actual production to the capacity of SICARTSA II was only 24.5 per cent even excluding the effects of two months strike of this plant in 1989.

Thirdly, period of construction was terribly prolonged. This caused the substantial increase of cost of construction. On the one hand, the Mexican government (SEPAFIN) urged SICARTSA, NKS and PMT to purchase local components and equipment because of the constraints of international balance of payments. These products had not only problems of quality, but also of delivery period. This produced delay in the construction period. Furthermore, the government ordered suspension of construction of plants, due to fiscal constraints. For example nine months of suspension from July 1983 in the case of PMT and one year and six months from June 1985 in the case of plant of continuous forging of SICARTSA II.

Fourth, lack of coordination among steel projects located at Lazaro Cardenas affected negatively their performance. For example, PMT was not able to use steel products of SICARTSA II for its production of large-scale steel pipe, because of prolonged delay of the construction of SICARTSA's mill planed to produce intermediate steel products for PMT. PMT had to buy this type product from AHMSA, which is located at more than 1000 kilometers from Lázaro Cardenas. More over the quality of the products of AHMSA was not satisfactory for PMT's production of large-scale steel pipe.

Fifth, SICARTSA II faced unexpected troubles and problems that seriously affected its performance. The delay in the construction of the plant of electric generation (one of the most important infrastructure for steel production) caused constraints in supply of electricity for the electric furnace of SICARTSA II. This problem of scarcity of electricity reduced the coefficient of actual production of steel to the capacity of the plant.

Sixth, iron scrap, one of the most important input for the electric furnace, provided by local companies, contained very high level of impurities. This obviously increased the cost of production.

Seventh, in certain cases, technology and know-how are not well shared with co-workers and accumulated in the steel plant, according to observations of some specialist, although it is necessary to qualify more precisely this aspect.

(2) Japan-Mexico Technological Partnership

Japanese steel companies' cooperation for SICARTS II, NKS and PMT located in the industrial port of Lazaro Cardenas was considered as one of the most outstanding large scale cooperation of Japanese steel industries for the modernization of steel industry of a foreign country, according to Tetsuo Nakaoka. (1991)

This cooperation constituted a part of the comprehensive Japan- Mexico economic cooperation programa in the period of President Lopez Portillo. This program included other projects like cooperation for the construction of the industrial ports and imports of Mexican oil to Japan.

In contrast to the case of Korea, Mexico had already a considerable capacity of production of iron and steel in 70s. The state owned company AHMSA (Altos hornos de México S.A.) started its production as early as 1943.

In 1981, AHMSA produced one third of steel produced in Mexico. But the plant was too old and obsolete and efficiency was very low (0.86 t/m³/d of crude iron production and 1000kg/t of cokes coefficient) Even the fifth blast furnace, the newest one had much lower level of efficiency of operation compared with other countries like Korea and Brazil towards the end of 70s.

On the other hand, HYLSA, Hojalatas y Laminas S.A., a private company innovated the technology of Direct Reduction and were producing 1 771 000 tons of steel with this process in

Table 6. Steel production in Mexico

	1981	1986	Production capacity
Public			
AHMSA	2,424	2,869	3,950
FMSA	691	254	(Closed 1986)
SICARTSA	804	1,192	1,300
Private			
HYLSA	1,771	1,582	1,700
TAMSA	395	232	465
Mini mills	1,099	1,046	1,633
Total	7,554	7,175	9,048

AHMA: Altos Hornos de México S.A., FMSA: Fundidora Monterrey S.A., SICARTSA: Siderúrgica Lázaro Cardenas Las Truchas S.A., HYLSA: HYLSA S.A., TAMSA: Tubos de Acero de México S.A.
(Source) Nakaoka (1991)

1981.

After the visit of President Lopez Portillo to Japan, a mission of KEIDANREN (The federation of Japanese economic organizations) was sent to Mexico in 1979 and agreed to carry out the cooperation projects for Mexico's industrial development, especially of steel industry. Another mission headed by Mr. Harada, Vice President of New Nippon Steel was sent to Mexico to study on the possibilities of Japanese cooperation for Mexican steel industry and to get information regarding regional development of the country.

5. Some Lessons and closing remarks

The three experiences of international technological partnerships of the Japanese steel industries depicted above have shown us some common characteristics. First, they were all initiated by the government-government based dialogues and not from private initiatives. They were recognized as national projects and accompanied by the official loans provided by the Japanese government to the recipient governments. The implementation of projects were carried out by the state-owned enterprises in the recipient countries and cooperation was provided by the group of Japanese steel companies. The main interest of the Japanese side was not directly related to the steel industry perse, but it had more to do with diplomatic concern and enhancement of general economic interests such as export of plant and engineering services and in the case of Mexico especially related to access to Mexican petroleum in the middle of the Second Oil Crisis.

Having these elements as background, observation of the three experiences clearly tells us

how important was the consistency and continuity of the support of the recipient government. In the most successful case of POSCO, the Korean government showed vigorous leadership, being headed by the President, maintained the marketing perspectives high by aiming at the exports and linkages to domestic industries within relatively stable macroeconomic environment. The government had clearly in mind that Korea should be able to get self-sustained technologically as soon as possible and therefore aggressively absorbed technological capability of the Japanese companies. Korean government was clearly aimed at international competition of the steel products and related products such as ships and automobiles, which increased awareness of quality.

On the contrary, the Mexican SICARTSA case tells us that fragility of the government support was the fundamental cause of the failure. It included inability of financing until the completion of the project, imposition of the use of the local machinery instead of introducing the state-of-art equipment, failure of power supply by delaying the construction of gas pipeline to the steel mill and lack of coordination with the downstream industries which obscured prospects of the market.

The case of Brazilian USIMINAS was a sort of middle-way. As Koreans did and unlikely the Mexican did, the Brazilian government had introduced the newest technology at the moment and the USIMINAS local staff was quick enough to absorb technological transfer in five years. It continuously expanded production and also upgraded technology relying on technological cooperation from Japan and at the same time expanding local engineering capability. On the other hand, likewise the Mexican case, while the government attracted foreign investment, it insisted in majority control although it was not able to perform corresponding role of financier. This inhibited sound growth of the company. The Brazilian government was in a way more flexible to utilize BNDE financing (although it was actually financed by the Japanese official fund) to muddle through the financial problem. Yet, it also had limitation. Finally, as the result of privatization in the 1990s, USIMINAS is now entering a new phase of modernization and development.

These observations led us to conclude that the success of technology transfers depend very much on the quality of the system of learning of a recipient. The system incorporates efforts in education, finance strategy, coordination of the market, clear targeting of quality, and stimulus for technology absorption.

Finally, it is worth recalling that the recent international business alliances of the Japanese steel industry have stemmed from different motives. For example, Nippon Steel and Usinor announced comprehensive alliance in the European market. In the similar vein, Kawasaki Steel and NKK are virtually merged and together signed an alliance with Thyssen. These are motivated by intensified global competition aiming at cost reduction through asset consolidation at a global scale and synergy effect.

The alliance between NKK and Argentine steel group Techint in the field of seamless steel

pipe also should be understood in this context. NKK and Techint have complementary relationship where the latter has the largest share in the world about a standard type of seamless steel pipe while the latter has stronger technological capability to produce more sophisticated types of product but increasingly lost price competitiveness in the standardized products. The alliance enables the both company to attend the customers' needs. The NKK-Techint example suggests new type of business alliance between Latin America and Japan.

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ANALYSIS OF ADOPTION OF FOREST CERTIFICATION IN JAPAN FROM PERSPECTIVE OF ORGANIZATIONAL THEORY

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Abstract

This paper investigates the adoption of wood products certification for the promotion of sustainable forest management in Japan and the USA. Bolman and Deal's four frames for analysis of organizations are used as the basis for the investigation. The analysis shows that the cultural differences between the two countries revealed through the perspectives of social structure, political environment, human resource relationships, and control of symbols to influence public opinion and decision making lend support for North's observation that social instruments adopted by a society where they did not originate will not have the same results in the adoptive society.

JEL Classification: L73, P51, Z10

Keywords: forest certification, organizational theory

BACKGROUND

In the last several years the world-wide attention to conserving forest health in places where the timber base has been threatened by over cutting has become an international issue promoted by many NGOs. The concept of sustainability of forest resources on forest lands has become a topic of international concern along with many other environmental conservation movements. International agreement about how sustainability should be achieved has not been established and there is much debate between NGOs, academics, governments, and industry on this topic. However, there seems to be agreement that sustainability means management of forest lands so that the forests remain viable and healthy while producing wood products for consumption.

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Japan has been a player in the world concern over the protection of the environment and the Japanese government is conscious of Japan's international image as a protector of the environment. NGOs in Japan along with forest academics have brought the issues of sustainability of forest lands to the Japanese timber sector from their association with their colleagues in other countries and because of Japan's role in the removal of timber from forests in developing countries. These issues concerning sustainability of forest lands have found something of a misfit when introduced to the Japanese domestic timber industry because Japan's forests are currently not being harvested at or near possible production levels.

The forest industry in Japan has suffered many changes since the Japanese government instituted the process of deregulation of timber trade. The opening of the Japanese market to foreign timber virtually reduced the domestic production of timber to a fraction of what it had been. This deregulation coupled with changes in monetary policies and governmental reductions in support for the timber growers have created a very economically depressed forest sector in Japan. The cost of cutting is higher than the price of imported timber. In this situation, the NGOs and university academics have looked hopefully to the western ideas of sustainability as possible ways to reinvigorate the Japanese domestic timber production industry making it more competitive with world market trade. However, it is being discovered that actual implementation of sustainability as they are being discussed in other countries are finding a misfit in the depressed forest sector of Japan because Japan's forests are being sustained through non-harvest rather than active management. Furthermore, Japan's forests were managed with sustainability for generations due to the relatively small land base proportional to forest production need. However, the Japanese practices of sustainability do not necessarily fit the western models which are developing out of the western demands for timber on western land bases.

In Europe, the Americas, and many Asian countries, the recognition of the increasing demands on the forest land base as the source of timber supply, recreation, and environmental quality has produced conflicts between the forest industry and NGOs representing public interests. Many NGOs have attempted to find solutions which would protect the world's forest land bases for posterity and for uses other than only timber supply. The western institution of certification has gained popularity as a viable way to influence the timber industry to implement sustainable forest management practices on forest lands. This social tool has met with varied success in different locations but has continued in spite of serious criticism to gain support world wide. NGOs and academics in Japan have taken notice and have introduced the concept of forest certification to Japan. One of the major players has been World Wildlife Fund Japan (WWF) which has promoted the Forest Stewardship Certification (FSC) plan in Japan.

Certification of forest lands means that a non-governmental third party evaluator investigates the

management practices of a timber company based on a set of standards and practices and determines if that company is managing its lands responsibly as a sustainable forest land base. If the company meets the requirements, the company is granted certification and can use the logo of the certifying organization on its products. If all of the forest industry players in the chain of custody leading from timber production to wood product on the market are certified as compliant with practices which promote sustainable forest management, the final product can reach the consumer as a certified product. The consumer can then choose to support companies who practice sustainable forest management by purchasing their products instead of products of companies who do not. As mentioned before this attempt at voluntary compliance with sustainable forest management has met with varying degrees of success in the countries where it originated.

If we combine the introduction of the western concepts concerning the implementation of sustainability which do not necessarily fit the Japanese traditional ideas of sustainability with the implementation of the western social tool of certification, we have a situation which is open to speculation as to how it will proceed. Sustainable forest practices from the west are not necessarily applicable in Japan's forest sector and the western concept of certification as a social tool which is meaningful to the public is not familiar to the Japanese population. North says that the same set of regulations imposed on societies with different institutional arrangements will lead to very different outcomes (North 1990, p.101). His proposition comes from the observation that fundamental changes happen at the margins of society where the issues require more immediate attention. Margins are the locations in social and organizational structures which are close to the actual implementation of policy and creation of product. This is applicable to the phenomena under analysis in this paper because introduction of certification in Japan is happening at the margins rather than at the top of organizations. It is not coming from governmental decree nor from top executive levels of businesses. It is following the bottom-up rather than top-down model of social change.

Due to the relative difference in the bargaining power of actors at the margins of different societies and the differences in their historical development as well as incomplete feedback on the results, these margin changes have the potential to cause very different results from one society to the other. Since forest certification mainly focuses on promoting the western concept of sustainability, and since Japanese social and organizational structures are largely different from Western ones, North's observations suggest that an analysis and comparison of the introduction of certification as method of promoting sustainable forest practices in the west where these concepts originated and in Japan where they are new and have no cultural foundation, can provide us with insights into the possible outcomes which can be expected by the forest sector in Japan. Analyzing the adoption of certification in the USA as a representative

western country and comparing it to the adoption in process in Japan can provide us with useful information to guide the Japanese actors in their undertakings. Comparison between the process in the USA and Japan will provide insights into the social attitudes, business relationships, and cultural biases of people and organizations which will influence the future of Japan's forest sector as it searches for ways to improve its current situation.

In order to investigate this social phenomena in Japan, I have chosen to use the frameworks for organizational analysis which were developed by Bolman and Deal (Bolman and Deal 1991). They developed their four frames by organizing the work of theorists of organizational behavior into structural, human resources, political, and symbolic frames. Each of these frames provides a different perspective for looking at organizational behavior. Theorists from each of these areas propose that an organization's problems can be identified and most efficiently solved by approaching those problems from the premises their perspective emphasizes. Bolman and Deal's use of all four frames is helpful because in using all four, the analyst is forced to see the phenomena in ways which might not be considered under only one approach. In the following paper I will use the major premises of all four of Bolman and Deal's frames to investigate the introduction of wood products certification into Japan.

THE STRUCTURAL FRAME

The structural frame was developed primarily from research in the field of sociology. It is based on the assumption that organizations exist first and foremost to accomplish established goals and that well organized and clearly established technology is the key to accomplishing those goals. It describes a reliance on the rational approach to organizational behavior and stresses the significance of formal roles and relationships, postulating that problems can be minimized and quality and performance can be improved if the right formal arrangements are implemented. Therefore, from the structural perspective, finding the right arrangement or pattern of roles and relationships is essential to achieving goals.

In order to rationally organize structure to implement technology for goal achievement, work must be divided and then systems put in place to effectively coordinate operations. Choosing the best structural arrangement depends on a rational and comprehensive appraisal of existing conditions including size of an organization, nature of its core technology, how it fits into its environment, what its goals and strategies are, use of information technology, and characteristics of its people.

From the structuralists point of view, achievement of goals depends largely on reducing ambiguity by effective communication of factual information and reducing uncertainty by

buffering itself from the turbulence of its environment. This view emphasizes the importance of understanding the environment by mapping external relationships in order to protect internal operations. It is essential that all concerned at any level of an organization must agree on the nature of tasks to be accomplished and what the standards for completion of each task will be. Therefore, from this point of view creation of the most suitable organizational structure, development of appropriate technology, and thorough understanding of environmental context are crucially important to decision making and the success of an organization.

If we look at what is known about organization for sustainability in Japan from the perspective of the structural frame, we can first say that goals of certification are not necessarily clearly established. Certification is newly adopted from Western countries. Consensus about the goals of forest certification in Japan, which seems to be evident now, probably exists only because certification has not yet been extensively applied and tested. There has not yet been time for it to clash with the society or cause conflict between the actors. Actors who apparently would be adversaries in the USA seem to be very cooperative about certification in this initial stage in Japan. However, it is already evident that the goals of the Western system are not compatible with application of sustainability as it is practiced in Japan, and that may be why only two forests in Japan are now certified.

Japan has maintained sustainably her forestry for a long time by implementing regionally developed ideas and techniques in forest management. There are several very strong nationwide timber product brands such as Kiso, Yoshino, and Kitayama, which have been mainly created based on regional reputation through their long history dating from before the Meiji restoration. These brands have functioned in a Japanese sense as a kind of certification which have shown, but not certified in the Western sense of certification, that timber products from these companies are from sustainably well managed forests in those regions.

The evidence produced by these companies indicates that the concept of sustainability is not at all new to Japan. However, certification is a new and odd practice in Japan and not yet understood or trusted by the general population nor leaders in business and government. If certification standards were adjusted to reflect the sustainable management practices developed over hundreds of years in those regions, forest certification could be presented as a parallel to the reputations of these kinds of brands.

This might provide an inroad for people to begin to recognize and accept certification in Japanese society. In the current situation goals diverge because traditional Japanese sustainability and western certification standards are not compatible. When we consider this lack of clarity about goals, we see why certification is actualizing slowly in Japan and why actors are hesitant to commit to certification even though they all seem to be collaborating cooperatively to promote its adoption.

In the USA the primary goal of certification is clearly sustainability. The problem is the fact that there are critical differences between the actors as to what sustainability means. Some actors such as timber companies may consider sustainability as primarily sustainable timber production while some NGOs consider it to be primarily a tool to protect and re-establish bio-diversity. Certification is an established and understood practice in the USA and implementing it for forest products is not looked at as an odd practice. The issue in the USA is the divergence of goals between the actors due primarily to their different definitions of sustainability for certification not in the implementation of certification for sustainability as a tool to achieve it.

From the structural frame we should next look at technology. Since Japan has no experience in forest certification and in certification processes in general, there is very little forest certification technology. There are no dominate certification schemas which have local origin; there are only the imported ones of FSC and International Standard Organization (ISO). As new imports, the technology they bring is not understood and only appreciated as a western phenomena that by adoption could strengthen Japan's voice in the international community. Since Japan participated in the Montreal Process and is working to create some guidelines for sustainable forest management, this effort might result in a more developed technology for certification in the near future. Also, as mentioned above under goals, Japan has a very long history in forestry and has accumulated her own philosophies and techniques in forest management. Some timber communities which have kept their high reputation through maintaining Japanese style traditional forestry management are being studied by forestry researchers attempting to codify and make their traditions useful as criteria and indicators for forest certification. This well developed but undocumented technology might help to create very strong techniques which can be used for certification in the future. At that point Japan may have to petition for acceptance of regionalized standards at the international level.

In the USA there are very strong technologies for forest certification. There are well established certifying bodies with highly developed certification schemes of guidelines, principles, and criteria. These have been developed in the USA with the experience and knowledge of USA forestry academics, land managers, and industry professionals. ISO, FSC, and American Forest and Paper Association (AFPA) schemes have detailed tested systems and auditors who are trained to use them. The technology as well as the concept is familiar to most of the actors in the forestry community.

The third aspect of the structural frame to consider is the establishment of formal roles and relationships. In Japan there are no formal roles and relationships currently existing in the arena of forest certification with one exception. This exception is further evidence of the uniqueness of Japan regarding certification. In most of the rest of the world the original parent body of FSC,

WWF, has hidden its formal relationship with FSC since due to initial criticism it was decided that FSC needed to appear neutral instead of associated with an environmental group. In Japan the relationship between WWF and FSC is not hidden and is in fact the only functioning formal relationship operating to establish forest certification. WWF is promoting FSC certification and has offered more than 20 workshops in two years all over Japan. WWF is playing the major role in coordinating efforts to bring forest certification to Japan. Other than this, all the actors so far involved have been loosely connected through informal meetings and correspondences. No specific outstanding patterns and arrangements such as formal alliances can be observed so far. It is also interesting to note that no public antagonism can be observed either.

Japan is a very centralization-of-power country. Every governmental organization and agency is generally tightly connected between central government and local as well as among central government. However, since the Japanese Forest Agency has lost its legitimacy due to its mismanagement and huge debts, the tightly uniformly controlled formal system does not function in terms of forest policy including implementation of forest certification. If the Forest Agency and the Ministry of Agriculture were more powerful and vigorous, the Forest Agency would take the lead more actively in the whole process of forest certification. This would be a normal and accepted role of a government agency in Japanese society for implementation of a program that would regulate forest products. Traditionally, government is trusted and not looked at with as much suspicion in Japan as it is in the USA.

In the USA we can observe more vivid formal patterns of roles and relationships among actors who are involved in forest certification. There are several alliances which consist of supportive actors to specific schemes. In the alliances, very strong formal roles and relationships can be observed. However, with internal and external turbulence, these alliances are vulnerable to rather rapid realignment.

Since the structural frame emphasizes that the arrangement and management of internal systems are critical to success, an organization must develop ways to protect these internal systems from changes in the outside environment. Structuralists refer to this kind of protection as buffering from turbulence in the environment. For certification, buffering agents are activities associated with but not the direct influence of governmental regulations and activities of ENGOs. These activities help protect the certification process keeping it from becoming irrelevant to current issues.

In Japan, forest certification is a "baby" in society which is very fragile due to its recent introduction. It is very vulnerable to outside turbulence and there exist at present no well organized and implemented regulations and laws related to eco-protection which would buffer

certification and insure its survival. There is also very little well organized and supported activity of ENGOs in Japan. These kinds of organizations are looked at with suspicion in Japan. This is changing slowly, however, at this time, their activities are not widely enough supported nor respected enough to act as buffers for certification.

Typical buffers such as coding, forecasting, and growth are not developed since technology is not developed for coding and forecasting, and the general lack of acceptance of the concept of certification and lack of commitment to certification eliminate growth as a possible buffer. If certification moves forward from its current conceptual only stage to actual implementation, turbulence encountered could cause the whole initiative to fall apart. However, in Japan, if a concept and scheme such as certification is formally adopted and established in society by the authority of a strong arm of government, that policy could become very stable very quickly. The Japanese government is now trying to create more and stronger pro-environment acts. If it does, then buffers to turbulence will also develop quickly.

In the USA there are strong pro-environment regulations compared to Japan which act as buffers protecting certification. There are also strong ENGOs such as Friends of the Earth which act as buffers for certification by gathering data which supports certification by predicting such things as losses of resources if there is no intervention. Coding is evident and growth in certification implementation, even though it is slower than many desire, is increasing. Buffers against turbulence are in place and functioning in the USA from the structuralist point of view which will help protect certification as it is tested and tried and promoted.

The next important feature to consider from the structural frame is the establishment of agreement on task and standards to evaluate task accomplishment. In Japan no agreement exists on the nature of the task much less on specific tasks to be performed, and standards are not established for evaluating task performance. There is much work to be done to codify Japan's traditional sustainability practices. This must precede establishing standards and practices for Japan. Otherwise, adoption of western practices and standards would be unrealistic and merely serve to appease the international community in support of Japan's need to be seen as internationally cooperative.

In the USA forest certification has evolved rather quickly by comparison to Japan into an arena of specialized actors aligned with particular schemes each with their own task and highly developed and critically appraised standards for evaluation. There is much turbulence in this environment but the buffers discussed above are functioning and the actors are negotiating and finding new and creative ways to agree without completely threatening the existence of certification in the USA. Standards are being reviewed and criticized. For example, discussion is developing around the issue that some standards prevent certain owners from considering

certification even if their practices are certifiable due to the high cost for extensive documentation which can include dependence on others in a chain of custody. The problems are being addressed and creative ways such as cooperatives which bring together individual land owners to be able to pay for certification jointly have successfully been formed. Tasks and standards might not be universally agreed upon in the USA, but they exist and they are functioning and the actors are working on perfecting them and making them accessible and relevant to wider participation.

From the structuralist perspective, certification in Japan is very fragile at this time. Goals are not clearly defined, there are very few functioning formal roles and relationships, technology has not been developed which is workable in Japan, buffers are not in place to protect certification from turbulence in the environment, and tasks and standards have not been developed. However, the unique thing about this in Japan due to Japanese organizational patterns is that this could all change relatively quickly depending on what government does in relationship to sanctioning certification. The centralized government of Japan has influence over regulations but also has the cooperation of most of the Japanese people most of the time. From the structuralist view, the critical factor in the success of a certification initiative in Japan will be whether or not the Japanese government is able to set up the necessary formal structures, establish formal roles and relationships, and encourage the rapid and realistic development of certification technology for the implementation of clearly defined goals.

All the actors are still ad hoc collaborating to install the concept of forest certification. They have not been differentiated so much in the arena of forest certification. I anticipate that this collaboration might end very soon and some kinds of agreements and formal frameworks might be established

An analysis of certification in the USA from the structuralist view would conclude that certification is proceeding well due to highly developed technology, establishment of formal roles and relationships, and the establishment of clear tasks and standards. North's conditions for adaptive efficiency seem to be working and society is investing in skills and knowledge that indirectly contribute to certifications success (North 1990, p. 81). The structuralist would probably point to the lack of consensus on a clear working definition of sustainability as the major threat to the effectiveness of certification in the USA since this undermines the clear goal of certification which is intended to be sustainable management practices in place on the land. The structuralist might also warn that turbulence in the environment caused by this lack of agreement on definition could escalate to the point where the buffers would not be strong enough to continue to protect certification as an initiative. I feel certain the structuralist would advise all of the actors to attend to the modification of standards making certification applicable and accessible to as many

owners as possible. This would have the effect of producing one of the most effective avenues to protecting certification, buffering through growth.

The Human Resource Frame

The human resource frame has a very different approach to analysis of organizational behavior than the structural frame. The human resource frame was developed primarily from research in the field of social psychology and studies phenomena in organizations such as bias, prejudice, human needs and desires, feelings, and motivation. It focuses on the interdependence between people and organizations and is based on the assumptions that organizations exist to serve human needs, that organizations and people need each other, and that if the fit between an organization and its people is poor, both will suffer. Instead of formal roles and norms established by authority as in the structural frame, human resource theorists emphasize the importance of informal roles and norms and a democratic approach to decision making as most critical to the functioning of an organization.

Maslow's categories of human needs (physiological, safety, sense of belonging, esteem, and self-actualization) are basic to much of the work definitive to this perspective (Bolman and Deal 1991, pp. 124-125). Maslow's model states that as lower needs such as physiological needs are met people need to satisfy higher level needs such as self-actualization. The human resource theorist believes that organizations should be arranged to provide opportunities for Maslow's higher level needs satisfaction. McGregor postulates that conditions in organizations should be arranged so that personal goals of individuals in organizations will be met while achieving the goals of the organization (Bolman and Deal 1991, pp. 125-126). Argyris suggests that these kinds of situations can evolve if organizations change from treating people like children to treating them like adults through systems such as participative management (Bolman and Deal 1991, pp. 127-128). In his model, organizations should facilitate interactions which emphasize common goals and mutual influence, open communication, public testing of assumptions and beliefs, and combine advocacy with inquiry. He goes further to say that individual's behavior is controlled by personal "theories of action" which are like two categories of cognitive maps, one which is what we say we do and the other is what we really do.

For the human resource theorist, conflicts should be resolved by seeking to agree on tasks and processes, searching for interests in common, establishing tests of opposing views, doubting ones own infallibility, and treating differences as the responsibility of the group. Ouchi incorporated many of the human resource precepts in his development of Theory Z (Bolman and Deal 1991, pp. 172-174). His theory is a blend of Japanese and American approaches to organizational management. The main premise is that humanizing working conditions improves productivity

and profit as it raises self-esteem. This frame focuses on the fact that humans are complex and they bring that complexity with them to participation in organizations. Organizations must deal with all aspects of human complexity if they wish to function well, and from this frame we sense a moral imperative that puts the human above task. The development of the organization should serve the development of its people and vice versa.

An analysis of organization for sustainability in Japan from the perspective of the human resource frame leads us to look at the interdependence between people and organizations as it relates to the adoption of certification in Japan. It helps us identify what can be considered as unusual and unpredicted behaviors that are manifesting in the relationships between the people involved in promoting certification in Japan. Since forest certification is a very new topic in Japan, and since organizations have not established their normative and formal ideas and goals on certification, individual people are the main actors and their informal actions are carrying the total responsibility for this initiative. In my personal interactions with timber company representatives, university professors, Forestry Agency personnel, ENGO representatives, and land owners who are giving their attention to certification, I have observed that these people are cooperating with each other regardless of their organizational backgrounds.

In this very introductory stage, people are generally acting from their own personal views and attitudes rather than as representatives speaking for the interests of their respective organizations. They are functioning autonomously about issues, independent of the organizations they belong to, but they seem to be using their positions in their organizations as tools to promote their own rationalized behaviors and opinions regarding forest certification. Looking at these individuals, we also see a pattern in their relationships to their organizations consistent with North's observations that in the margins away from centralized decision making is where alternative ideas and approaches are most often explored (North 1990, p. 81). It seems from my observation that the actors in certification are not the typical mainstream people in their organizations. The mainstream people seem to be paying attention to other things with the attitude that forest certification is not very important. Since the actors paying attention to certification have little pressure from their organizations and therefore much individual freedom, it appears that they are developing similar goals and have found much common ground to stand on together even though they represent organizations with potentially divergent interests. This is very unusual in Japanese society.

It will be interesting to watch the developments as the initiative for forest certification matures. If it does develop more importance and wins the more serious attention of more typical mainstream representatives in organizations, will the common goals being established now survive, or will the goals of the organizations create conflict which will destroy the

establishment of the current cooperation which has been based on informal relations and norms rather than formal ones? I anticipate that the positive informal relationships will dissolve with the establishment of formal roles and relationships between representatives of organizations and within organizations.

In the USA forest certification has been established in forestry society for long enough that formal roles and relationships have been established. Since the issues of certification and sustainability are fundamentally associated with people's values, people have tended to gravitate to organizations whose values are compatible with theirs. However, there have also been trends to establish informal relationships across organizations encouraged by the creation of task forces and conferences where representatives from diverse interests meet to discuss issues informally as well as work on tasks together in workshops designed to promote understanding and good will. These kinds of conferences have brought together very diverse interests and had a very positive effect on opening dialog about issues surrounding sustainability as well as certification. The Olympic Natural Resource Center (ONRC) near Forks, Washington is a good example of a formal organization whose purpose includes providing forums for the exchange of ideas through conferences created to enhance both formal and informal communication and encourage formal and informal relationship building.

Human resource theorists would find very little happening so far in Japan concerning support for development of new skills, encouragement of involvement in issues, and provision of psychological support for those effected by current situations related to forest certification and sustainability. In fact they would probably find problems that are not being attended to from a human resource perspective. Many timber communities are suffering because of imported low cost timber products. They can not harvest their timber profitably for market value and in the last few years the Forest Agency has eliminated subsidies to land owners for maintaining timber lands. Many of these communities are being hard hit by these conditions, and there have been so far very few attempts to assist the people affected with retraining programs or psychological support.

The citizens of these communities have very weak recourses for involvement in decision making and lobbying for support. The character of these people will probably prevent them from organizing to protest or try to influence using rallies or marches to gain attention for their situation. Due to lack of traditional involvement in matters such as influencing policy making, the people in these communities will probably not participate in the certification initiative and will probably be unaware of the potential influence it could have on their lives. A human resource theorist familiar with Japan would probably recommend that a government agency more influential than the now powerless Forest Agency should take responsibility for human

development in the forest communities of Japan.

If a human resource theorist looks at the actors promoting the adoption of forest certification in Japan, he or she would find that due to the informal nature of their relationships, these actors are collaborating with each other across disciplines and professional interests in very productive ways exchanging their information and sharing their resources, e.g. forest professors with industry, industry with ENGOs, and Forest Agency personnel with professors. They are supporting each other psychologically and emotionally almost like the behavior often associated with minority political movements. There are also a few training sessions now being offered by WWF covering forest certification.

In the USA a human resource specialist would note that things have changed significantly over the last 10 years in forest communities. The problems have not been solved but they have been identified and have gained attention. Programs have been put in place in many communities which have begun to offer retraining programs for displaced timber industry people. Also, public meetings in which timber people have been involved have allowed them to participate in the changes that the timber industry is dealing with. Psychological support has not been common in a formal sense but informally timber communities have supported each other emotionally and psychologically through meetings and activities to gain attention for the displacements they have experienced.

With regards to actors directly involved with certification, there are many formal and informal training programs offered for those wishing to become auditors or certifiers, for timber employees to become trained in new more sustainably sensitive timber harvesting practices, for landowners to become knowledgeable about certification issues, for exploring cooperation between buyers groups, industry, land owners, and retailers, and for creating cooperatives of landowners as groups for multiple unit joint certification. Though not pervasive in the timber community these kinds of training are becoming well known and achieving success.

Regarding conflict resolution and open communication in the area of certification, in Japan there is no noticeable conflict and a lot of open communication. As the situation is described above there have not yet been any conflicts to resolve. The actors who are promoting certification are apparently getting along very cooperatively establishing common goals from their common opinions and interests. Their communication is very open and informal. Things seem to be very positive from these human resource perspectives even though not much actual certification is happening yet.

In the USA certification and sustainability have been associated with the intense conflict

between the environmental movement and the timber industry. Conflict escalated in some locations to destruction of property and violence against people. In the last ten years much has been done from a human resource perspective to promote conflict resolution. In the opinion of many it came too late and too little, but it did come and has improved cooperation between divergent elements. At one time it was almost impossible for different sides to be physically in the same location. Today, it is not uncommon for a representative of industry and representative from an ENGO to be collaboratively working on a project or task force together. The conflicts and the seriousness of the problems related to changes in the forest community have changed the field of forestry. The need for conflict resolution and better communication and understanding across organizations and between actors has shown that forestry is now a social science as well as a natural science.

The human resource theorist would probably conclude that most of the promoters of certification in Japan are non-mainstream representatives of their organizations and that they are enjoying more personal freedom in their relationships than is normal in Japan. If this kind of open communication seeking common goals and interests can be maintained as certification proceeds toward wider implementation, certification for sustainable forestry has the potential to be very effective in Japan because it will attend to the interdependence between people and organizations.

In the USA, improvements have been made in relationships between people and organizations, but the human resource theorist would probably advise that much more needs to be done with activities related to participatory management and the seeking of common interests. They would recommend more interfacing of larger industrial owners and small owners with third party certifiers such as FSC to search for ways to make certification more accessible and affordable as well as relevant.

The Political Frame

The political frame was developed primarily from research in the field of political science. It is based in the attitude that organizations and the people in them are primarily concerned with competition for power and scarce resources. The major assumptions of this frame are that organizations are coalitions of interests, that there are pervasive differences in values, preferences, beliefs, information, and perceptions of reality among these coalitions, that most decisions concern the allocation of scarce resources available to coalitions and organizations, that conflict within and between coalitions are the natural result of these conditions making power the most important resource, and that goals and decisions are made through political processes between coalitions. Theorists of this approach focus on skills such as bargaining, negotiation, coercion, and compromise as needed for success in the political processes operating between and in

organizations.

In this frame authority is seen as only one of several forms of power. Expertise or possession of information, control of rewards, ability to coerce, alliance through networks, control of agendas, control of meaning and symbols, and personal power of individuals such as charisma, political skills and verbal ability are all equally important. Conflict is not seen as a problem, rather it is an opportunity for new ideas and stimulating innovations. Taking advantage of conflict opportunities relies on ones skills in political processes. From this perspective politics can not be eliminated from organizations, instead it is important to learn how to be effective in recognizing, understanding, and managing political processes in all organizational endeavors.

The theorist of this frame acknowledges that there are two faces of power. The first face exploits and seeks personal dominance. The second face creates vision and establishes collective goals. The second is consistent with what Burns terms as positive politics. Positive politics seeks truth, mutual actualization, definition of values, productive debate, moral reasoning, and higher levels of principled judgement (Bolman and Deal 1991, p. 221). Lax and Sebenius add to positive politics their principles of moral judgement: rules must apply the same to all concerned, specific actions should follow moral conduct applicable to all situations, and all actions should show concern for the legitimate interests of others (Bolman and Deal 1991, p. 221). It is evident then that positive politics should have moral dialogue and moral frameworks.

Descriptively rather than prescriptively as with positive politics, advocates of this frame acknowledge that the basic process within and between organizations is the pursuit of self-interest in imposing one organization's agenda on the system. These agenda are often clothed in a variety of disguises to conceal real purposes. Therefore, it is understood that politics corrupt decision making and that what seems like an excellent and perhaps even benevolent initiative by one group may be viewed very differently by another.

From this frame organizations and their environments are seen as complex relationships which can only be successfully dealt with through political action. Shifts of influence in the environment are constant and the only way to effectively deal with them is through politics. The ever present question is how much power can any one organization mobilize to influence such entities as governments, unions, large corporations, and consumers at any one time and in any one situation. The main limitations of this frame are that it underestimates the potential for rational and collaborative process.

If we look at what is known about organization for sustainability in Japan from the perspective of the political frame, it is evident that politics has not yet become an obviously observable

activity in the adoption of certification in Japan. As described in the previous two frame discussions, the initiative is young in Japan and so far competition and a struggle for power has not evolved within or across the loosely formed coalitions. The two certification schemes (FSC and ISO) introduced to Japan developed outside Japan from the interests of two divergent coalitions, ENGOs and industry. These coalitions exist with much less divergence in Japan than in the USA; therefore, in Japan these two schemes don't necessarily cause conflict. Since the two schemes have very different concepts and approaches, competition between the two schemes may not occur in Japan at all. The two schemes may in fact be used together with no conflict. This would in fact be consistent with the Japanese societal comfort with syncretism or the ease of accepting more than one scheme which in some other cultures are viewed as contradiction.

If certification moves to implementation, and if it creates markets increasing profit, much more interest will evolve and power struggles could develop within and across organizations. For example representatives from Sanwa Bank, one of the largest banks in Japan, is participating in workshops and conferences to investigate the potential value of auditors, accreditors, and most importantly consultants for certification. If certification becomes firmly established, this bank might easily take the most prominent power position in certification because of its established ranking in society. Since Japan is very much a hierarchical and ranking-based society, this kind of struggle is normally settled by exogenous factors of social ranking such as this. It will be interesting to see if this traditional political pattern of social ranking will be followed as this new and very western concept is adopted in Japan. Its initial introduction has already broken traditional patterns, but as it gains prominence, it will be more and more noticed by those who have established political power in organizations related to forest certification.

Japan is experiencing drastic changes in society with the alternation of generations and social paradigm shifts. There still remains old-fashioned, closed, traditional, collectivism-oriented ideas on politics which have occupied these fifty years. In these traditional ideas of politics, conflict is always considered something evil. However, because actors' attitudes are also new and constructive, there is a very open atmosphere to any conflict: conflict and settling conflict by discussing openly seems to be very welcomed in this area. This is very unusual in Japan.

The reason the highly participatory actors in forest certification are positive, innovative and constructive is because the issue, forest certification, is too new and innovative for "old-fashioned" actors to participate in. There is a self-selection factor operating which has produced a group of actors who are not in the mainstream of normal Japanese methods of political activity in all the organizations involved from banks to universities. Active actors have created arenas to meet each other and exchange their information about forest certification in many ways such as informal workshops, informal business meetings, and informal academic conferences. Even less-active

actors such as Forest Agency representatives and major large-scale timber companies have joined these opportunities and given their feed back and their opinions to promote forest certification. There are no formal arenas for actors to negotiate.

As certification moves toward wider implementation, there could be a large struggle between traditionalist and the non-mainstream proponents of certification adoption within and across organizations. Struggles across organizations are not usually carried on in an open forum. Courting favor of and influencing those holding the most powerful ranks is the most rewarded political skill. There is evidence of change in this kind of political activity in Japan today. There are examples of activities which show these kinds of struggles currently in spontaneous and open activities such as the attempted hostile take over of Shoei Electric Company which if successful would have pushed aside the traditional *keiretsu* allocation of political power. It would have been another force ushering in a less defined and predictable arena of political activities. This more public less networked kind of open to all activity is new in Japan. It did not succeed but the simple fact that it was even tried indicates changes in the traditional methods of political behavior.

In Japan, traditionally, the struggle for power is not often carried on in the public forum. This kind of public struggle is viewed as inefficient and demeaning. The issues that cause political struggle are confined to those responsible for decision making in the specific arena and there is usually no appeal to the public for support by any of the sides in the struggle. As mentioned much of this struggle takes place in very low profile since ranking systems are methodically followed. Courting the favor of those in higher positions is, therefore, one of the main political skills rewarded in Japanese society. Open political struggles with attempt to mobilize public support is not expected in Japan, and there is very little context for this kind of political activity. Japanese people would look at any attempts to proceed in this fashion as odd and be reluctant to participate.

The old-type ideas are being challenged by new, less collectivist, less Japanese-traditional styled ideas. Especially in newly emerging areas such as “sustainability” and certification, the old-style political activity may loose dominance. Currently, the more open style is being enjoyed by the promoters of certification, but as certification moves into implementation, it will be interesting to see if there is truly a paradigm shift in their favor. I expect this will be a slow process, and that we will see much influence from the old-style politics still operating as certification moves to implementation.

In the USA there is a long history of open political activity related to use of natural resources dating back to the first movements to preserve natural areas from development as national parks

and wilderness areas. Since that time there has been an almost continuous political struggle between those who want to preserve areas of natural resources and those who wish to develop and use them. At times these conflicts have become very polarized and the conflict has escalated into very volatile situations. All of the political skills mentioned by political theorists have been employed and developed from compromise to coercion. In this long history some of the most well known ENGOs developed their power bases and their abilities to influence governing bodies and mobilize public support. They have refined their tactics over time and have become adept at lobbying the USA congress and world bodies such as the UN and WTO. They have extensive fund raising systems and have created many successful techniques for mobilizing public support.

One of the most recent examples of this kind of activity related to sustainability and one that has been influential on certification is the well known spotted owl controversy. ENGOs used the threat of habitat destruction for the spotted owl in the logging of old growth forests to mobilize public support for the closure of many old growth forests to logging. With the threat of forests being closed, factions in the timber industry reacted through political activity of their own lobbying for open access and mobilizing public support to gain sympathy for their economic plight. All the political processes identified in the political frame were used in this controversy, and as this frame predicts a lot of new information about forest ecology, timber communities, and ways to effectively deal with controversies such as this have developed out of the open conflict.

In the USA public open political struggles have a long history. This type of behavior is expected, and, therefore, with the issues of sustainable forest management and certification of forest lands, no one is surprised to find politics operating in a public forum. Due to the long experience with public political activity as a society, Americans expect this kind of activity and expect to have the opportunity to participate in it if they choose. There is respect for those who participate and an underlying faith that this process has the potential to produce positive results. This kind of attitude and experience does not exist in Japan.

So the difference in Japan and the USA is dramatic. In Japan certification has not become a high profile political issue, but in the USA it has long been political and appears to have a future of more political activity. In Japan the political struggle will probably be quietly carried on by experts and executives within and across participating organizations. Much of the behavior will be dictated by the ranking system prevalent in Japanese society unless a paradigm shift to more open activity takes place soon. Therefore, we can expect very different political activity in the struggle for power in Japan compared to the USA in the arena of forest sustainability and certification.

Political frame theorists focus attention on competition for resources as critical to successful achievement of an organization's goals. In the arena of organization for sustainability and certification, some of the resources for which there could be competition can be identified as support by the scientific community, forest management information, economic control of timber products, and participation of landowners. In Japan currently there is no observable competition for these resources. They are being shared by the experts and executives across and within organizations in conferences and informal communications. Banking executives and university professors are meeting and discussing how the ecology and management information available from the scientific community can be used by auditors and consultants. ENGO representatives are talking with industry leaders about how both of the certification schemes introduced to Japan can be most efficiently used. I have observed no competition for resources. The resources mentioned above are openly being shared at this point in the adoption of certification in Japan.

Economic control of timber products could become competitive if forest certification moves to extensive implementation. Currently, there are abundant forest resources which are untapped due to lack of economic incentive to harvest. If certification produces a new market share situation in Japan which creates market incentive for harvesting Japan's overstocked forests, then competition for these resources could develop. Also, If some timber mills, wholesalers, and retailers become certified as chain-of-custody, and if they import relatively cheap certified timber and wood products from outside of Japan, there might occur some serious conflicts between imported certified products and domestic certified products even within the same scheme. These changes and the changing formal and informal business structures of Japan happening at the same time create an unpredictable future for how competition for control of timber products will evolve in Japan in the next few years.

In the USA we have a very different picture. Competition for all of the resources we can identify using the political frame is intense. Public support viewed as a resource is evident in the competition between ENGOs and timber industry interests as discussed in the previous section on power struggles. Competition for support of the scientific community is observable in the requests for and funding of research by all related factions and has escalated divisions in the structures and relationships of the forest science community, ecology and production. Support for various schemes of standards, criteria, and indicators which is compatible with special interests is sought after from the academic community. Information is manipulated and debated regarding all aspects of sustainability and application of certification issues ranging from how many acres are really necessary to support one mating pair of spotted owls to the landscape management needs for bio-diversity and wildlife habitat. Control of information used to forecast supply and demand of timber products is competitive and its application is heavily debated. The participation of timber land owners is also competitively sought after from large industrial

owners to the small family timber land owners. In the USA we see a very complex competition for resources in all areas.

If we then view the competition for timber products as the underlying stimuli for the political frame resources identified above, the picture becomes even more complex. In the USA the competition for the resources on public lands has been, and indications are that it will continue to be, intense. Since the USA congress, the president, and the agencies who are responsible for these lands can all make decisions about the use of these resources, there is much competition for their sympathy and their support. Furthermore, competition for private timber resources and the competition from imported products also influence attitudes about, development of, and application of standards related to certification practices. Regarding competition between certification agencies, since forest certification schemes have been grouped based on their goals, processes, and techniques, competition from the technical standpoint may de-escalate. For example, FSC is more geared to the small-scale non-industry timber producer, and ISO and AFPA have been developed for the large-scale industry timber producers. Therefore, we may see more specialization of certifiers. We must also recognize that for each scheme to survive, it will be important for each to obtain as many as possible. In general, we can expect that in the USA, competition for resources identified using the political frame will continue to be a major influence on how sustainability of forest resources and certification as a tool to achieve those ends develops.

Due to the less open public forum in Japan for political activity, we can expect that the struggle for power and competition for resources will be carried out with less obvious observable political activity. However, due to the fact that certification is a western concept unfamiliar to Japanese society, that its current promoters can be categorized as non-traditional Japanese representatives of their organizations, and that it is being introduced to Japan in a time when there are other attempts to force a paradigm shift in Japanese organizational behavior from reliance on the ranking system and cross-organizational tightly controlled arrangements such as keiretsu, we may see certification adoption in Japan happen in a way that will be unique for Japan and in the world.

In the USA, from the perspective of the political frame we can expect more of the same intense political behavior in struggles for power as well as competition for resources. It has, as predicted by the premises of this frame, brought about positive effects since there is a long history of handling conflict of interests in the open public arena by mobilizing support to impose ones agenda on the system.

The Symbolic Frame

The symbolic frame was developed primarily from research in the fields of social and cultural anthropology. It is distinct from the other three frames in that it abandons rationality and views organizations through the lenses of tribe, theater, or carnival. It seeks to explain organizational behavior as primarily characterized by images and drama and analyzes it for metaphor, symbol, stories, ritual, myth, and script. Theorists of this frame base their ideas on the assumptions that what happens is less important than what it means, that schema determines meaning, that processes and events are ambiguous and uncertain, and that humans create symbols to resolve confusion, increase predictability, and provide direction.

Activity described by this frame is more evident when unclear goals and technology are characteristic of a situation. In uncertainty, symbols serve to provide meaning, clarity, and predictability. Myths and stories as symbols, when well established, legitimize, promote solidarity and cohesion, and provide narrative which anchors the present in the past. They function as morality tales that tell us what is valuable and give us heroes to emulate. They convey to us what is right and consequently tell us when things should change. However, on the negative side they can blind us to new information and misdirect our attention.

Ritual and ceremony as symbols bring order and predictability to organizational life. They socialize members of an organization, stabilize the system, reduce anxiety and ambiguity, and tell the outside world who an organization is and what it stands for. Many behaviors in organizations are not readily recognizable as rituals such as performance appraisals, training programs, certifications, and surveys. Often the information provided by these behaviors is not used, but the activity itself establishes legitimacy. March and Olsen state that decisions often decide nothing and suggest that the process is ritual which legitimizes the organization's behavior (Bolman and Deal 1991, p. 273). Their garbage can theory is compatible with the symbolic frame since they state that decision making is more a function of the mix of people and ideas and timing than a rational appraisal of relevant information. Meyer and Scott state that structures are often decoupled from activities (Bolman and Deal 1991, p. 273). The symbolic theorist would add that it is symbolism that maintains function. When rituals become out of touch with real needs they become useless and resented.

When organizational behavior is viewed as theater, it is evident that getting the drama and the script right is particularly important in sectors where product is ambiguous and hard to measure. Viewed as theater as opposed to instrumental activity, we see that it is important to conform to the appearance that society expects and trusts. Sometimes a modern look is also required to gain legitimacy by symbolically representing that the organization is state of the art and is responding

with current innovation in the public's interest. In this view, it is the theater of motion and process that establishes legitimacy, not rationality. Planning as a symbol for legitimacy has the functions of replacing measurements, tests commitment of planners, creates benefits from the interactions of the planners incidental to the plan, and advertises an organization's strength. Power is ambiguous and can function only when people agree that it exists

Viewing organizations as tribes with cultures of their own, we can interpret behaviors as expressions of that culture serving to promote its survival such as rites of passage which allow new comers to enter only after having passed the tests which mold one to the minimum expectations of the group.

If we look at what is known about organization for sustainability in Japan from the perspective of the symbolic frame, we see that without clearly defined goals, with weak technologies, and much ambiguity due to lack of experience with the concept of certification, symbolism may be playing a very important role in the adoption of certification in Japan. Analysis from this frame can offer an explanation of why WWF is playing the major role so far in promoting certification and enjoying support from diverse factions in the process. WWF is known in Japan as a well respected international organization. The symbol of the panda is widely seen in Japan and has captured the sympathy of many Japanese who are beginning to develop interest in pro-ecology and green movements. It is a little faddish now to support this kind of organization, and since it has an international reputation, it speaks to the Japanese rising interest in being considered individual as well as organizational participants in the international community.

Currently, since the promoters have no specific rational goals and technologies, all they really have to work with are their passions and anxieties. This makes their situation ripe for analysis under the frame of symbolism. The pro-ecology and green movements in Japan have targeted timber companies asking them to consider how they can compromise in order to survive due to the international changing values in the arena of forest production. Subsidy cutting due to financial restructuring of Forest Agency budgetary systems has urged timber industry, especially small-scale timber companies and local timber communities to consider how they can manage their business without public financial support. One university with a prominent forestry department which strongly supports implementation of forest certification is located in one of the timber communities suffering from the subsidy elimination. This forestry department is hoping that certification can save this community by increasing market share creating markets for their timber and premiums in market pricing. They have very little rational evidence that certification will work for this community, but the symbolism of their efforts could be helping to maintain their legitimacy as a forestry department created to serve the timber interests in this region. Their efforts are also helping to hold the community together, not with jobs and active plans but

with hope generated from the symbolism of their efforts.

University professors and students attempting to codify the traditional Japanese practices of sustainable forest management by regions are functioning symbolically to anchor the present situation of ambiguity and uncertainty in the more secure vision timber people have of the past. This gives everyone the hope that the future will include them. However, if we analyze the codification, we must ask if it is really rational in application or if it is more of a myth with its origin in a time that is too different from today and, therefore, will not succeed upon implementation. The main value of the codification may be the cultural anthropological documentation of a past era and its symbolic function for the present.

Further analysis from this frame could suggest that perhaps the ritual use of this codification may be exactly what is needed for solidarity and legitimacy. As criteria and indicators, maybe their foundation in the past offers more legitimacy than ones created to be more rationally applicable to the present situation. Perhaps symbolism that provides legitimacy and solidarity is more needed than rationality to bring the timber communities out of their economic crises. If the symbols and myths are skillfully presented by convincing theater, the market might shift in their favor and the world be convinced that these regional standards are internationally acceptable. From the perspective of this frame, Japan would accomplish its desire to be a significant voice in the international community by affecting the international community's views on the use of regional standards.

It seems like science fiction or advertising schemes which would be devised to market something that has no real substantial value. According to the symbolic frame, rationality maintains existence and finds application only as it can be symbolized and dramatized. Therefore, in the above scenario, if we are looking for effectiveness, the use of the traditional sustainable practices might have more benefit to the community in the long run as well as the short run, than modern western sustainability practices which may be more rationally based in current technologies.

In the USA analysis from the symbolic frame could run to a detailed description of every behavior relevant to certification and sustainability. One of the most revealing examples would be a look at the standards and practices of FSC. The detailed documentation required to complete certification, the third party certification presented as unbiased, and the chain of custody requirements are all rationally thought out attempts to establish legitimacy. Investigations into the actual rational functioning of these implementation strategies have created criticism which indicates that these strategies may not be functioning as rationally as intended. If not, perhaps their function has an element of establishment of legitimacy symbolically. Here we see

how symbol, myth, and ritual can bring about solidarity but also how it causes division. The symbol of Weyerhaeuser may inspire certain factions in the sustainability and certification controversy, but it has and will continue to alienate other factions. The CEO of Weyerhaeuser has said, "sustainability does not need to be defined the same for everyone (Jenkins and Smith 1999, p. 286)." Can diversity in the definition of sustainability be accepted as workable by the majority of the coalitions in the arena of forest management? Analysis from the perspectives of the other three frames would more than likely predict that acceptance of diverse definitions of sustainability would not be able to be accomplished. The symbolic frame theorist, however, would say that if it is mythologized and symbolized, and if rituals are created to legitimize it, it might have a chance of success. In fact, it might be the most rational of all the alternatives but unacceptable to many factions unless it is dramatized in a way that gives it legitimacy.

Another critical factor from the symbolic frame directly related to the acceptance of certification by the general public in the USA is that the label provided by FSC for certified products is unknown by the general public. The symbol is there, but the theater has not been provided to activate the symbol. Rituals and promotion of myth to make the symbol function are needed if the consumer is expected to preference certified products. The symbolic frame theorist would say that rational appeal is not enough. Certification needs the stamp of approval of admired persons and association with high moral values as well as quality incentives such as market share and premiums.

CONCLUSION

Compared to the USA where formal roles and relationships have been established, technology has been developed for forest land certification, and tasks and standards have been codified, the structuralists would say that Japan is not prepared for the adoption of timber land certification for the purpose of promoting sustainable forest management based on the western concept of sustainability. However, this could change very quickly in Japan if government follows its usual role of controlling social policy initiatives. Cooperation between diverse interests could be maintained as certification proceeds, whereas, in the USA, we can expect continued conflict and hard won cooperation.

Analysis from the human resource frame shows us that Japan has done little in the way of formally addressing the needs of the people in communities which depend on domestic timber production and that those people have not and probably will not mobilize to demand attention to their problems. However, it is also observable that those who are highly participatory in the introduction of certification are trying to address these problems and are cooperating without conflict. They are, thereby, forming a good base for productive alliances across their diverse

interests. In the USA, the opposite has evolved. Local communities have demanded and received attention from government and industry to help with their declining local economies. However, this assistance has come out of intense public conflict. Even though roles and relationships are defined in the USA, this does not mean that there is cooperation. In fact, the future of certification and sustainable forestry will continue to be influenced by the divergent interests of the actors as they protect their own interests. Each step will be hard won due to the lack of an overall foundation of interdependency in the roles and relationships between people and organizations in the forest sector.

The control of power in the competition for limited resources is the central premise of the political frame. The political environment in Japan indicates that we can expect any struggle to take place behind the scenes and that government may be accepted as mediator and standard setter and that this will be accepted by the players. In the USA, we expect continued distrust of government as the arbitrator and continued political conflict in the open forum of political debate. Lobbyists hired by industry and by NGOs will continue to try to influence government policy makers. The media will be used by all special interests to promote their views. These activities make outcomes somewhat dependent on the availability of financial support for each special interest. In this public forum debate in the USA, public policy can be heavily influenced by special interests with large funding bases.

Analysis of the situation from the frame of symbolism shows us that in both countries how certification is dramatized could have significant influence on its acceptance and the outcomes of that acceptance. We can expect a more cohesive and well orchestrated dramatization in Japan due to the structural and political environment of more behind the scenes collaboration and the long history of cooperation between divergent interests in the keiretsu system. In the USA we can expect the drama to be more public with more open conflict and less well orchestrated. Both will find their symbols and myths which will support the outcomes but these will evolve in very different ways due to the structural and political differences in these two societies.

In conclusion, government in both countries will play significant roles in the realization of certification and sustainability. However, in Japan we can predict that the government will act with more control and more effectively direct the outcomes of certification. From the analysis using the Bolman and Deal frames there is support for North's observations that outcomes will be different when social instruments are adopted into a culture where they did not originate.

If certification of wood products finds success in Japan, analysis using the four Bolman and Deal frames predicts that it will take place in very different ways than it is evolving in the USA. If the players in the adoption of certification in Japan are not fully aware of the differences

between Japan and the USA brought to light in the comparison of the social structures, political environments, human resource relationships, and control of symbols to influence public opinion, they may be harboring unrealistic expectations of what certification can accomplish in Japan.

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**SENSITIVITY OF DOMESTIC PRODUCTION TO IMPORT
COMPETITION:
EVALUATION AT DIFFERENT LEVELS OF AGGREGATION ***

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Abstract

This paper examines the impact of import competition on domestic production by exploiting the newly constructed longitudinal firm-level monthly data of Japanese products. The firm-level estimates are compared with those based on data at different levels of aggregation (2-digit industry and 7-digit product). The results show that the aggregation effect, both through product coverage and through inter-firm heterogeneity, affects the estimates. The sensitivity of production varies substantially from firm to firm even within the same industry. By linking this intra-industry variability with domestic price differentials, this paper finds that highly sensitive to import competition is production of relatively low-priced products.

JEL Classification: C81, D24, F14, L11, L64.

Keywords: import competition, longitudinal firm-level data, aggregation, vertical differentiation

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1. Introduction

It is widely believed that the import penetration intensifies competition and affects domestic manufacturers. Although some industry groups emphasize the negative side of import competition, their claim is yet to be under square scrutiny. The quantification of impact of imports on domestic industries is strongly required.

Among the issues which researchers face in estimating the impact of import competition on domestic industries, this paper focuses on the aggregation effect.¹ The motivation to investigate this issue is two-fold. First, as production and trade of differentiated products are more prevalent in industrialized countries, more serious attention must be paid to the heterogeneity among firms within the same industry when we evaluate the sensitivity of domestic production to import competition. Since domestic productions of products with distinctly different quality tend to respond differently to the same import price changes, we must carefully control for inter-firm heterogeneity even if firms are classified into the same industry. Second, since many of the previous estimates of the impact of import competition on domestic industries rely on aggregate data, high sensitivity of some firms might have been obscured by aggregation with other relatively insensitive firms. This suggests that estimates previously obtained from industry-level data might critically differ from firm-level estimates.

To investigate the aggregation effect, the estimates at the broadly defined 2-digit industry-level, at the finely defined 7-digit product-level, and at the individual firm-level will be compared, by exploiting the longitudinal firm-level data newly constructed from the original confidential government data files of the *Current Survey of Production* (Seisan Doutai Tokei, in Japanese). The aggregation effect will be examined both in terms of the product category definition and of the inter-firm heterogeneity. Depending on the definition of the product, we may incorporate not only substitutes but also complements for imported products, thus obtain downward-biased estimates of production sensitivity. This possibility is beyond mere curiosity because trade statistics in many countries classify intermediate components and parts and final products into the same category if we depend on aggregate data. The comparison of results from industry-level and from product-level will reveal this side of aggregation effect, while the firm-level estimates will make clear inter-firm, or intra-industry heterogeneity obscured by aggregation.

The rest of the paper is structured as follows; Section 2 briefly surveys the previous related research. Section 3 formalizes theoretical models and introduces its empirical counterpart. Section 4 describes the data of which the detailed explanations are provided in Appendix. Section 5 reports the estimation results. Section 6 concludes.

¹ Another critical issue in estimation is the simultaneity of variables. This issue will be discussed again in the later sections of this paper.

2. Related literature

The impact of import competition on domestic industries has been intensively investigated especially in the U.S. Among many variables which could be affected by foreign trade, the main focus of studies in the U.S. has been on labor, particularly on unemployment in the 1980s and on wage inequality in recent years (Branson and Love (1988) and Feenstra (2000), for example). For the impact on employment volume, researchers have recently begun to distinguish net changes from gross job creation/destruction by exploiting plant-level micro data.²

Related with estimation methodology, Grossman (1986) pointed out a critical issue; the employment sensitivity estimated by OLS regressions on the import quantity variable, which is often casually considered as a measure of import competition intensity, should be biased because employment and import volume are simultaneously determined. An alternative strategy proposed was using the import price as an explanatory variable since the import price is assumed given in the standard trade models.³

Previous studies have also examined the impact of import competition on many variables, such as mark-ups (Levinsohn (1993)), productivity (Harrison (1994)) and R&D spending (Bertschek (1995)). Many of these studies excavate micro-data sets, including those of developing countries during a period of drastic trade liberalization, to control for various plant-specific factors.

3. Model

3-1. Conceptual framework

Before discussing the econometric models, let me start with the following standard system of demand and supply for a domestic product to overview the basic ideas behind empirical specifications;

$$\begin{aligned} q &= D(p, p^m, y) \\ q &= S(p, w) \end{aligned} \quad (1)$$

,where q , p , p^m , y and w denote production quantity, price of the domestic product, import price, domestic income and factor price, respectively. The domestic product is assumed to be an

2 Levinsohn (1999) examines the impact of foreign trade on gross job flows using plant-level data in Chile during the period of drastic trade liberalization.

3 We cannot deny the possible simultaneity even if we use the import price because the traditional assumption of "small county" may not be a realistic description of economies with large domestic markets, such as Japan and the U.S. In those economies, import prices are likely to be influenced by their own domestic demand and no longer given. The endogeneity problem will be discussed again in the next section.

imperfect substitute for the imported product, which has an exogenous price and whose supply is assumed to be perfectly elastic. All the price variables, including import price, are expressed in terms of home currency. As Grossman (1986) pointed out, we need a “reduced-form” to circumvent the simultaneity problem in estimating the domestic impact of imports. For the quantity, (1) reduces to,

$$q = \alpha + \beta p^m + \gamma y + \delta w \quad (2)$$

if we assume linearity. We expect $\beta > 0$, $\gamma > 0$, and $\delta < 0$, from the standard setup of downward-sloping demand curve and upward-sloping supply curve.⁴ The specification of (2) is basically the same as previous works of Grossman (1986) and Revenga (1992), as it includes the import price, not the import quantity, as a right-hand side variable for a measure of import competition. The estimate of β from (2) can be interpreted as the sensitivity of domestic production to import competition. If variables are in the logarithm form, it represents the import price elasticity of domestic production.

The main purpose of this paper is to examine how aggregation affects the estimates for this sensitivity of domestic production. Before discussing econometric models and estimation results, the clarification of concepts will be useful. The aggregation brings about a bias in the coefficient estimate mainly through the following three routes: heterogeneity among firms, definition of product coverage, and endogeneity of variables.

First, firms even in the same industry are inevitably heterogeneous in many respects. This implies that estimates based on aggregate industry-level data often non-negligibly differ from estimates based on micro firm-level data.

Second, subset of domestic products aggregated may be complements rather than substitutes for the imported product. The foreign trade statistics in many countries actually classify intermediate components and parts in the same category with the final products. This second problem is especially serious when the definition of the industry is broad, such as 2-digit industry-level. On the other hand, if we restrict our focus on firms producing only the final products based on 7-digit product-based data, we can be more confident in examining the first effect of aggregation without the contamination of this second route.

Finally, the right-hand side variables are more likely to be endogenous in the regression explaining the aggregate output compared with individual firm's output. The use of firm-level data will not only reveal rich information of intra-industry variability but also alleviate the possible endogeneity of explanatory variables in the regression, since we can naturally assume that variables including the import price are regarded as exogenous for individual firms.⁵

We suspect that previous estimates based on industry-level data might be affected partly by

4 Although we have thus far assumed the perfect competition to derive (2) from (1), the specification (2) as the “reduced-form” is robust for a wide range of other typical modes of firm behaviors.

5 To resolve the simultaneity problem, Grossman (1986) and Revenga (1992) assign instrumental variables to import price.

these aggregation problems. Therefore, this paper chooses a different strategy: exploiting newly constructed longitudinal data of individual firms belonging to the same 7-digit product category.

3-2. Econometric specifications

The empirical counterpart for the equation (2) estimated in this paper takes the following log-linear form;

$$\ln q_{ijt} = \alpha_{ij} + \beta_i \ln p_{it}^m + \gamma_i \ln y_t + \delta_i \ln w_{it} + u_{ijt} \quad (3)$$

where u is the error term with standard properties. Besides the time subscript t , the subscript j denotes the firm supplying the product i ($t=1, 2, \dots, T$; $j=1, 2, \dots, J$). Due to the limit of data availability, inter-firm cost heterogeneity has been assumed away in the empirical implementation.⁶

While the specification (3) estimated with firm-level longitudinal data is served as the baseline case in this paper, several other specifications using various data will also be estimated for comparison as follows. First, the production sensitivity is estimated with the aggregate time-series data of the particular product. For the product i ,

$$\ln Q_{it} = \alpha_i + \beta_i \ln p_{it}^m + \gamma_i \ln y_t + \delta_i \ln w_{it} + u_{it} \quad (4)$$

,where the dependent variable Q is the total output of the product aggregated over all firms producing the same product ($Q_t = \sum_{j=1}^J q_{jt}$). The comparison of this aggregate estimate with the former micro estimate will enable us to examine how the aggregation effect, especially through firm heterogeneity, affects the import sensitivity of domestic production. Since both (3) and (4) are based on the same finely defined 7-digit product category, the aggregation through product coverage is not supposed to appear in this comparison.

Second, the following will be estimated with industry-level data;

$$\ln Q_{ht} = \alpha_h + \beta \ln p_{ht}^m + \gamma \ln y_t + \delta \ln w_{ht} + U_{ht} \quad (5)$$

,where Q is the output of industries defined broadly at the 2-digit level. The industries are numbered by h ($h=1, 2, \dots, H$). The industries are supposed to cover the whole tradable industries. The comparison of (5) with (4) will reveal the aggregation effect through the product coverage because both intermediate components and final products should be classified in the same industry if we depend on 2-digit data.

Although they differ in data and in specifications, all of the above three cases assume that the sensitivity of production to import competition is the same across all firms in (3) and (4), or across all industries in (5). Consequently, this paper next examines the effect of this pooling

6 The regression of a micro variable on aggregate variables results in biased estimates for standard errors, although the coefficient estimates themselves are not biased. In this sense, most of the results reported in this paper should be interpreted with some cautious margins.

constraint. We will be able to study the plausibility of assuming monolithic structure in the industry, or of assuming the representative firm model by sequentially relaxing the pooling constraint as follows. While keeping longitudinal structure of the data set, this paper allows variability across firms in only one coefficient which attracts our attention; i.e. the import price elasticity, by the following formulation:

$$\ln q_{ijt} = \alpha_{ij} + \sum_{j=1}^J \beta_{ij} DUM_j \ln p_{it}^m + \gamma_i \ln y_t + \delta_i \ln w_{it} + u_{ijt} \quad (6)$$

,where DUM_j denotes the dummy which takes the value of one for firm j only and zero otherwise. Similarly, for the industry-level counterpart derived in (5), we can estimate the industry-specific production sensitivity as follows;

$$\ln Q_{ht} = \alpha_h + \sum_{h=1}^H \beta_h DUM_h \ln p_{ht}^m + \gamma \ln y_t + \delta \ln w_{ht} + U_{ht} \quad (7)$$

Further, to allow variable coefficients for all explanatory variables, we will estimate the same model for individual firm by splitting the longitudinal data set into separate time-series data sets of individual firms.

$$\ln q_{ijt} = \beta_{ij} \ln p_{it}^m + \gamma_{ij} \ln y_t + \delta_{ij} \ln w_{it} + \sum_k \alpha_{ijk} Z_{ijk} + u_{ijt} \quad (8)$$

As is obvious, however, nobody can fully control for various individual effects, which is signified as Z in (8). Since firm-specific effects are not supposed to change monthly, however, we can bypass this problem by taking time-difference as follows:⁷

$$d \ln q_{ijt} = \beta_{ij} d \ln p_{it}^m + \gamma_{ij} d \ln y_t + \delta_{ij} d \ln w_{it} + v_{ijt} \quad (9)$$

The error term is denoted by v . We will compare these various estimates for the sensitivity of domestic production in Section 5, after describing the data we use for estimation.

As explained above, our estimation will result in various estimates for the sensitivity of domestic production to import price changes (β) with different degrees of pooling restrictions and with different data as follows:

- a) Based on longitudinal broadly defined (2-digit) industry-level data, with β constrained equal for all industries (5).
- b) Based on longitudinal broadly defined (2-digit) industry-level data, with β allowed to vary across industries (7).
- c) Based on time-series aggregate (7-digit) product-level data for a particular product (4).
- d) Based on longitudinal firm-level data, with β constrained equal for all firms (3).
- e) Based on longitudinal firm-level data, with β allowed to vary across firms (6).
- f) Based on time-series data of individual firms, with all coefficients to vary across firms (9).

⁷ Since firms in the same industry tend to face same shocks, the disturbance terms are often correlated. Although this prompts us to estimate (9) by SUR (Seemingly Unrelated Regression), SUR in this case degenerates to OLS since all the explanatory variables are identical for all firms.

The comparison of estimates from a) or b) with c) will reveal the aggregation effect through product/industry coverage, while that of c) with d), e), and f) will show the aggregation effect through firm heterogeneity or simultaneity.

4. Description of data

This paper exploits the micro data from *Current Survey of Production* (Seisan-Doutai Tokei, in Japanese). Among many statistics, this survey collects data on production quantity and price for a wide range of finely classified products on monthly basis in Japan.⁸ By defining the product at the disaggregated seven-digit level, we can exclude intermediate components, which tend to be complements rather than substitute for final products, from our analysis. Since individual plant-level data before that month are generally no longer maintained even in the original data files of the government, our sample period starts from January 1988. Due to the data availability at the time of this research, the sample ends at December 1995. The aggregate data used for estimating (4) is not drawn from publicly available statistics, but constructed by summing over all firms in our sample.⁹

Although plant/establishment-level data are available in the original government data files, this paper concentrates on firm-level data from the following two reasons. First, the strategic decisions such as response to imports are likely to be made at the corporate level, not at the individual plant/establishment levels. Second, compared with that at the firm level, the production at the plant level tends to be volatile and unstable. Third, since openings and shutdowns, which are discontinuous with sunk costs, are relatively frequent at the plant/establishment level, the linear regression framework is not a suitable tool. Therefore, this paper aggregates production quantities of all establishments which belong to the same firm and compiles them into the longitudinal form. Firms which experienced entry or exit are excluded from the sample due to the above mentioned problem. As a result, the sample is a balanced-panel form.

To estimate the impact of imports, we need foreign trade data. The classification system of trade data, however, does not coincide with that of domestic production data. There exists no official data concordance table between these two statistics for the Japanese case.¹⁰ Consequently,

8 Exactly speaking, the Survey collects data on quantity and value of production, not directly the price level. As a result, this paper defines the "price" as the unit-value. Although the unit-value index is inevitably affected by compositional shifts, this problem is less serious at the individual plant/establishment level compared with the industry level because product composition is unlikely to change monthly within individual plant. Even if this bias exists, our interpretation of the results is not qualitatively affected.

9 The legal restriction prevents us from revealing any information which could result in identifying any individual plant. Hence, the data set used for our study cannot be revealed, although some summary statistics will be available upon request.

10 Feenstra (1996) is a very informative source for the concordance connecting data in different statistics in the U.S. case.

this paper exploits the concordance table annexed to the Input-Output Table, which links trade data with manufacturing census data at the seven to nine digit levels. The procedure of data concordance and concordance tables are shown in Tomiura and Uchida (1998).¹¹

Other data employed in the regression include the total industrial production index for y , as national income statistics are not available on monthly basis, and the input price index for w .¹² All data on prices, including import prices, are deflated by the aggregate wholesale price index.¹³

On the other hand, the 2-digit industry-level data are derived from *Annual Survey of Manufacturers* (Kogyo Tokei, in Japanese). The sample period is from 1988 to 1995 to facilitate comparison with the results from micro data.¹⁴

5. Empirical results

5-1. Estimates based on industry-level data

First, the result from broadly defined 2-digit industries is reported in Table 1.

As the F value in Table 1 suggests, the restriction constraining the constant term equal for all industries is rejected. The responses to imports must vary across industries, as daily experiences indicate. Based on the result from the Hausman test, the random-effect model is chosen in this case. The import-price elasticity of domestic production is estimated to be around 0.18. This estimate means that the Japanese industry reduces production by less than two percent even if the import price falls by ten percent. According to Revenga (1992), the import price elasticity of employment in 38 U.S. industries pooled for the period of 1977-87 is around 0.24 to 0.39. Although direct comparison should be viewed with caution, production in Japan during 1988-95

11 The import price is defined as the unit-value. The interpretation of the results is not qualitatively affected even if import price changes are driven by product compositional changes. I also tried WPI-based import price index to check robustness in some cases, but although classification mismatches limit the cases, no direct contradictory evidence was found.

12 The input price indices are those at the industry-level. To check robustness, I also tried the wage index of each industry, but the results are basically the same.

13 Monthly dummies are introduced to adjust seasonality. The other variable included in the regression is the export price. Due to the limit of data availability, we cannot exclude the production for export sales from total production. Hence, the production quantity as the dependent variable in the regressions must be affected by the export price. As long as the assumption of perfect competition in foreign markets is plausible, the export price index must sufficiently control for foreign market conditions relevant to domestic firms. Other factors, such as foreign rivals' costs, however, may affect domestic production decisions if oligopoly is prevalent in the industry. Studies including these factors will be left to future research. The export price index, derived from trade statistics, is expressed in terms of yen.

14 Since the quantity data are not available in *Annual Survey of Manufacturers*, I define it by the shipment value deflated by WPI of respective industry. For the factor price w , we use the "expenditure on materials" divided by the output 'quantity' derived both from *Annual Survey of Manufacturers*, as it closely corresponds to the average variable cost. The price indices are drawn from WPI.

Table 1 Estimates based on 2-digit Industry-level Data

$\hat{\beta}$	POOL	PANEL (RE)
ALL INDUSTRIES COMBINED	1.78867 (2.10167)	0.176552 [0.095437]
STATISTICS	$\bar{R}^2 = 0.035183$	F=1408.1 $\chi^2 = 3.3021$

Note: The regression is based on the two-digit level industry data from *Annual Survey of Manufacturers*. The dependent variable is the logarithm of industry production. PANEL reports result from the random-effect model. The figures in parentheses are t-value in the pooled regression and the standard error in the random-effect model for panel data. Estimates of other coefficients are not shown. F is the test statistics for the constraint on the constant term α equal for all industries. χ^2 is the test statistics for the Hausman test on the orthogonality of α and the error term.

is less responsive to imports than U.S. employment during 1977-87. This small estimate of production elasticity, however, does not necessarily imply small impacts on employment because import could reduce demand for labor further by substitution between labor and capital. Since import penetration into relatively capital-rich countries, such as Japan, decreases demand to relatively labor-intensive products or labor-intensive production processes. Therefore, we must be careful in interpreting the result in employment context.

Next, let me turn to the case where import price elasticity is allowed to vary depending on the industry. The result is demonstrated in Table 2. In the classification introduced above, Table 2 corresponds to the model (7)/the case b), while Table 1 corresponds to the model (5)/the case a). The Hausman test statistics show that the fixed-effect model is preferred. The important thing to note here is the vast diversity of responses to imports across industries. Although the sensitivity to import price changes has been estimated to be small in the case of all industries combined, there exist industries seriously sensitive to imports. The high elasticity of the textile industry is quite reasonable if we consider the high import penetration in that industry.¹⁵ On the other hand, the electric machinery industry is the only industry with the coefficient estimate significantly negative. The reasons for this wrong sign in the case of electric machinery might be due to the industrial composition or to the endogeneity of import price. By the former, I mean the broad

15 Grossman (1986) also reports high import elasticity of labor, 1.03-1.07, for the U.S. steel industry for which import restriction actions had been discussed. Although it has the second largest estimate in Table 2, it is rather difficult to interpret the case of "general machinery" since this industry is a composite of various different machines.

Table 2 Industry-specific Estimates based on 2-digit Industry-level Data

$\hat{\beta}$	POOL	PANEL (FE)
Textiles	0.168361 (1.55555)	1.67864 [0.347244]
Paper	0.106924 (0.958782)	0.170034 [0.126606]
Chemicals	0.304501 (2.94051)	-0.123481 [0.198382]
Petroleum & coal	0.106107 (0.956087)	-0.141883 [0.163621]
Pottery & Clay	0.136224 (1.24788)	0.050973 [0.108364]
Steel	0.253179 (2.31971)	0.532246 [0.129152]
Non-ferrous metals	0.087823 (0.781983)	-0.075824 [0.128836]
General machinery	0.391160 (3.52900)	0.940658 [0.269292]
Electric machinery	0.529635 (4.76930)	-0.433341 [0.123251]
Transport machinery	0.490568 (4.29667)	0.500188 [0.205962]
Precision machinery	-0.024013 (0.214350)	0.584778 [0.145534]
STATISTICS	$\bar{R}^2=0.992345$	F=1408.1 $\chi^2=3.3021$

Note: The industry-specific dummies are interacted with the import price. PANEL reports results from fixed-effect model. Other notes to Table 1 also apply to this table.

definition of industry which may include many complements rather than substitutes, such as parts and components. The latter implies that Japan's demand for electric machinery may influence the import price and this simultaneity biases the estimate. In any case, we must further excavate the electric machinery case.

Based on these industry-level estimates, this paper concentrates on the electric machinery in the following section because its elasticity estimate has the significant wrong sign. To facilitate discussions and interpretation of results, this paper picks up a couple of final consumer goods which anybody can understand their product characteristics: color television and air conditioner.¹⁶ Needless to say, this paper does not intend to cover all product categories. I neither mean to claim that the results from the following should be universally observed in all industries. What this paper establishes is providing “examples” which we can relatively easily interpret and will be able to check with other data sources.

5-2. Estimates based on firm-level data

Table 3 compares the result from firm-level longitudinal data with that from aggregate data. The rows titled as “AGR” correspond to regressions where the dependent variable is the total production quantity aggregated over all firms producing the same 7-digit product (the model (4)/the case c), while the rows titled as “PANEL” corresponds to regressions based on firm-level longitudinal data with the fixed-effect model (the model (3)/the case d).¹⁷

Table 3 Estimates based on Firm-level Panel Data and on Aggregate Product Data

Product	Estimation	$\hat{\beta}$	t	\bar{R}^2
TV	PANEL	0.863232	6.7623	0.8352
	AGR	0.190377	2.1393	0.8687
Air Conditioner	PANEL	0.271996	4.1086	0.7244
	AGR	0.116105	1.7082	0.8107

Note: The dependent variable is the industry aggregated production quantity in the AGR rows, the production quantity of individual firm in the PANEL rows. The fixed-effect model is used in estimating panel data. $\hat{\beta}$ is the coefficient of import price with one lag in the AGR rows. Estimates of other coefficients are omitted from the table. “t” denotes t-value for $\hat{\beta}$.

The figures in Table 3 demonstrate that elasticity estimates obtained from longitudinal data are substantially larger than those from aggregate data in the case of television. This implies that

16 Although more disaggregated classifications are available in production data and in trade data, the limitation of classification matching between these statistics compels us to contend ourselves with this level of product aggregation.

17 To make comparison easier, “AGR” is the result from the aggregation of only firms which constitute the balanced-panel. The results from all the firms, however, are only negligibly different. Hence, we can safely concentrate on the balanced-panel firms. Since the Hausman test of misspecification supports it, “PANEL” is the result from the fixed-effect model.

the level of aggregation must seriously affect the assessment of impact of imports. Different from the industry-level estimates reported in Table 2, the aggregation problem here is aggregating heterogeneous firms, rather than mixing intermediate components with final products because the product is quite finely defined at the disaggregated 7-digit level. Hence, even if we concentrate on substitutes, the aggregation bias in import response estimation is enormous in some products such as televisions probably due to inter-firm heterogeneity. On the other hand, the aggregation problem seems less serious in the case of air conditioner. The reasons for this difference, however, will be revealed only with sufficient knowledge of production technologies and/or of industrial organization. I will leave it for future work.

Compared with the 2-digit industry level estimate of electric machinery in Table 2, both for television and for air conditioner, the estimate for import price elasticity has now been fixed to have the correct positive sign. Since inter-firm heterogeneity seems less prevalent, the simultaneity and/or contamination by intermediate components might be the main cause of the wrong estimate at the aggregate level especially in the air conditioner case.

Table 4 Summary Statistics of Firm-specific Estimates

Product	Estimation/Stat.	Mean	St. Dev
TV	PANEL $\hat{\beta}$	0.979670	0.789577
	t	2.6308	2.1204
	\bar{R}^2	0.8434	-----
	IND $\hat{\beta}$	0.537213	0.373664
	t	1.5134	0.6883
	\bar{R}^2	0.4307	0.2170
Air Conditioner	PANEL $\hat{\beta}$	0.271996	0.214630
	t	2.2045	1.7395
	\bar{R}^2	0.7374	-----
	IND $\hat{\beta}$	0.090338	0.098121
	t	0.7871	0.9406
	\bar{R}^2	0.5994	0.1460

Note: The dependent variable is the production quantity of individual firm. "Mean" and "St. Dev" are calculated for firms which have estimates with correct signs.

Next, Table 4 compares results in the case where import price elasticity is allowed to vary across firms. The "IND" rows in this table report the results from independent regressions of

individual firms in the time-series format, while the “PANEL” rows reports the results from regressions based on panel data with firm dummies interacted with the import price variable. In other words, all coefficients can be different across firms in “IND” cases (corresponding to the model (9)/the case f), while coefficients other than import price elasticity are constrained to be equal for all firms in “PANEL” cases (corresponding to the model (6)/the case e). Due to the confidentiality requirement imposed by the law, we are not allowed to show estimated coefficients for individual firms. Hence, reported in the table are the average value and standard deviation for estimates of import price elasticity, t-value of the estimate, and the adjusted R square of the regression. What is clearly shown from Table 4 is the limit of discussions based on average values. Estimates with micro data have large standard deviation. We should not satisfy with the representative firm model. Intra-industry variability, or variability across firms within the industry must be examined.

5-3. Production sensitivity and relative price level

What this paper tries next is to interpret observed vast inter-firm diversity of responses to imports. Among many factors, the price level must be one of the most important factors in the interpretation. In the extreme case of perfectly homogeneous products, the domestic price differentials across firms must diminish as the result of intensified competition by import penetration. On the other hand, in the cases such as the vertical product differentiation, each product can have different price depending on its quality. For Japan’s machinery industries, we can safely assume that the competition with imports is more intense among firms who supply lower-priced, lower-quality products compared with those who supply higher-priced, higher-quality products, since import prices tend to be distinctively lower than prices of domestic products. This suggests that previously observed vast diversity of production sensitivity among firms could reflect intra-industry price variability.

To test this conjecture, I split the whole sample into two sub-groups: firms whose price level is higher than industry average and firms whose price level is lower than industry average. Since the relative price of each firm compared with the industry average is generally stable over time in this case, dividing firms based on the average price during the sample period poses no serious problem.¹⁸ Besides, the price levels of domestic products and import price level differ substantially in our case. Those firms whose average price is lower than the industry average charge prices lower than higher-priced domestic products by forty to sixty percent. Thus, this grouping of domestic firms seems reasonable. Table 5 reports the result from the aggregated two sub-groups. For both television and air conditioner, the production sensitivity of lower-priced products is larger than that of higher-priced products.

¹⁸ We assume here that each firm produces prefixed one product variety. Although firms may produce simultaneously many product varieties and may drastically reshuffle product-mix over time, the monthly stability of each firm’s average price implies that these cases are not likely in our sample.

Table 5 Estimates for Sub-groups Aggregated by Price

Product	Group by price level	$\hat{\beta}$ (t)	\bar{R}^2
TV	Above average	0.182974 (1.89479)	0.852104
	Below	0.324800 (1.97135)	0.677959
Air Conditioner	Above average	0.060608 (0.959350)	0.853108
	Below	0.175441 (1.95849)	0.680882

Note: The dependent variable is the production quantity aggregated over firm which belong to the respective sub-groups. Figures in parentheses are t-value.

To check whether this result is a mere artifact of aggregation, I trace back to firm-level estimates. Table 6 reports the average and variance of firm-level estimates in Table 4 for these two sub-groups. While Table 5 reports the results from regressions based on aggregated sub-groups, Table 6 summarizes the individual firm-level regression results. Although some differences are observed in the absolute levels of estimates, the result that lower-priced products are more sensitive to imports is robust irrespective of products examined (television or air conditioner) and of estimation procedures employed.¹⁹

Table 6 Firm-specific Estimates Summarized by Price

$\hat{\beta}$	Firms Above Average Price	Firms Below Average Price
TV		
PANEL	0.419342 [0.428]	1.653531 [0.715]
IND	0.269528 [0.311]	0.562794 [0.426]
Air Conditioner		
PANEL	0.267674 [0.136]	0.283046 [0.279]
IND	0.042351 [0.023]	0.129967 [0.120]

Note: Weighted averages with weights equal to each firm's production quantity. Figures in square brackets are standard deviation among firms belonging to each cell.

¹⁹ We should interpret this result with caution because the import price index employed in the regressions is defined at the industry level. Since no more disaggregated data of imports which have same classifications as those in the production data are available, we must contend ourselves with this import data. Although the homogeneous treatment of the imports is theoretically inconsistent with the framework of differentiated competition, we anticipate no significant vertical differentiation among imports in this case because imports of television and air conditioner are predominantly from Asian countries.

The results from firm-level data demonstrate that impact of import competition varies significantly across firms depending on the position each firm occupies in the product space in differentiated industries such as home electronics, even if all the firms face the same exchange rate changes. Put it differently, the negative impact of import penetration on domestic production concentrates on low-priced products, rather than dispersing evenly over all products in the industry. Even if we notice negligible impact of imports at the aggregate levels such as the national economy or the manufacturing industry as a whole, groups of manufactures who charge low prices can be seriously damaged. On the other hand, the same result implies that a firm can substantially reduce competitive pressure from imports once the firm alters price/quality level of her own product. As was mentioned, however, the relative price level of each firm is stable over time in the cases examined here. This may indicate that changing product quality entails non-negligible adjustment costs for individual firms and thus means that firms facing intense pressure from import competition may feel difficult to alleviate the problem because they cannot easily reshuffle their product composition. Anyway, we need more evidence to test this interpretation.

What is at least clarified from this study is that product differentiation cannot be neglected even within the product, defined narrow at the 7-digit level. Each product variety, or at least each group of them, may constitute distinct sub-market within each product category.²⁰ In sum, we will not be completely free from the aggregation problem in differentiated products, even if we excavate data probably into more finely disaggregated levels.

6. Concluding remarks

The purpose of this paper has been to quantify the impact of import competition on domestic production by exploiting the newly available firm-level longitudinal data set. The remaining issues, however, still exist as follows.

First, we need to further investigate the robustness of the results from only a couple of products in Japan. Although this paper has conducted 2-digit industry-level estimation covering all industries, the representation by television and air conditioner must still be regarded as nothing more than examples. We need other cases to draw any general implications. What we need before estimation, however, is the comprehensive data concordance between production data and foreign trade data. On this front, we are still in the primitive first step.²¹

Second, the impact of import competition should be assessed in terms not only of quantity but also of price. The price data this paper employs is defined as the unit-value from *Current Survey*

20 See footnote 18 for the possibility of multi-product production and of the reshuffles of product-mix over time in this case.

21 In a different research project, I have constructed a data concordance connecting all the four-digit domestic industries in *Annual Surveys of Manufacturers* and the import statistics in Japan. The concorded data are available in Tomiura and Uchida (2001).

of Production, while *Annual Survey of Manufacturers* contains no price/quantity data. Although the data availability will severely limit it, it will be worth seeking this line of research because the market-discipline effect of import competition is more appropriately examined in the pricing context.

Third, just as in the U.S., the employment will obviously be the next target of study. At least in the past years which the sample in this paper covers, employment adjustment in Japan has been inactive across firms and industries in any international standards. The Japan's unemployment rate, however, has continued to rise over the recent years. Hence, the investigation of the impact of import competition on Japanese employment must deserve attention.²²

In spite of these remaining issues, the results from this paper will have deep policy implications for many industrialized countries where import competition from low wage countries has intensified. At the same time, this study has provided rich information which has been unavailable from aggregate data.

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22 Even if net employment loss in all industries combined is small, gross job destruction in import competing industries might be substantial and some industries might create jobs during the yen appreciation period. See Tomiura and Uchida (2001).

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Appendix: Description of data

1. Micro data of production

The Statistics Law in Japan limits the access to the original confidential data files of the government. Upon the individual permission by the government agency in advance, however, anyone can make access to the data files as long as the research program satisfies necessary conditions. This paper depends on the data access allowed under the No. 99 and posted under No. 84 by the Public Management Agency in 1996 and also partly on the published report by the Research Group on Statistical Analysis of Production and Industry in 1998. Due to the legal restriction, original micro data sets used for this paper are not available from the author, although some aggregated statistics will be provided upon request. The sample period is from January 1988 to December 1995. The series employed is seasonally unadjusted original series. The official classification codes, numbers and product names for the products examined in this paper are as following; "Air conditioners" (in "Refrigerating Machines" (2180)) is defined as the sum of 7-digit products from 2180116 to 2180123. "Color TV sets" (in "Television receivers" in "Home Electronics" (2340)) is defined as 2340101 plus 2340102.

Several notes are as follows;

First, the sample includes only the firms which have production data. All the firms including those with shipment data are excluded as long as they have no corresponding data of production.

Second, as *Current Survey of Production* is not a census statistics, the sample does not coincide with the whole sample of the corresponding industry. Although it is the only census, *Census of Manufacturers* conduct censuses only twice in every five years. Since we restrict our attention to the firms which constitute the balanced-panel data and since larger firms tend to dominate in industries such as Japanese electric machinery which we studied here, however, the sampling problem does not seem to be serious in this case.

Finally, the major classification change has taken place only once during the sample period. For the air conditioner, in 1993 and after, production data on "in-house unit" become available separately from "outside unit," as more and more air conditioners in Japan has one outside unit connected with multiple in-house units. To keep consistency with the data for the earlier period,

we count the production quantity in terms of “outside unit,” while we measure production price/value by the total series including in-house units.

2. Data concordance between import statistics and production statistics

The data concordance between foreign trade data and production data should have been found in “Exports and Imports of Machinery,” the Appendix to Current Survey of Production. The coverage of this Appendix is severely limited, however. No official concordance tables are available. Therefore, this paper exploits “Code Table between Input-Output Table and Trade Statistics” attached to the input-output table. This code table links input-output table at the seven-digit level with foreign trade data at the nine-digit HS level. Among publicly available tables for Japanese data, this is the most informative and reliable one. This paper employs the code table in 1990 issue of Input-Output Table. In the case of air conditioner, since the import data from 1988 to 1989 include air conditioners for automobiles, which are classified in Transport Machines in production statistics, we match trade and production data only after 1990. See Tomiura and Uchida (1998) for more detailed description of the data concordance.

Japan-Korea Free Trade Area and Structural Reforms

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Abstract

This paper analyzes 'formation of Japan - Korea free trade area' focusing on an economic structural reform and a mutual strategic complement aspect.

Japan and Korea have similar systems in economic organizations, political decision-makings, and social cultures. Those systems were effective for catching-up stages of economic developments, but have become inefficient, sometimes have become fetters, after catch-up stages. Japan-Korea Free Trade Area formation could be one of strong impacts for structural reforms in both countries for more efficient systems in a developed and competitive global economy. The similarities between Japan and Korea will become strong points or advantage in forming the FTA. Joint strategies against EU and US, and more importantly against China, will be beneficial for both Japan and Korea. Japan, Korea and China jointly could be a core of third pole in Asia, with US pole and EU pole. J-K FTA formation will be one of bases for this.

JEL Classification: F02, F14, F15

Keywords: Free Trade Area, Structure Reform, Global Competitiveness, Safety net

1. Introduction

There exist strong movements for forming FTA (Free Trade Area) in the world. This might

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reflect a historical change from Cold War era to Market Principle era, or from national policy oriented to economic efficiency oriented, or from role of national government activities to role of private sectors activities. Developed countries were concerned with national interests but are now more concerned with global markets or activities. Although an optimum market size for most of firms is not global, it is not within one national boundary. Seeking for an optimum size of market, strategic FTA formation is an important issue. For developing countries, which were interested in protecting their domestic markets or were taking nationalistic development dictatorship, it becomes important now to open their markets and invite foreign direct investments. To open or liberalize its domestic market accompanies large costs. A larger market can invite FDI more easily. To share the costs and to make larger markets, a strategic formation of FTA is important for developing countries. Those are additional factors for traditional arguments for FTA formation of trade creations and trade diversions.

Good results of forming EU and NAFTA have strong impact for forming regional FTA in many areas. However, there always exist conflicts or frictions between forming free global market and forming protective regional markets. Former globalism is beneficial for firms whose competitiveness depend on scale economies. A global standard or an international standard for transaction rules is one of factors to unify markets and extend size of markets. A large developed country, like USA, easily has those firms with high technologies and interested in using its domestic rules as global rules. Latter regionalism is beneficial for firms, which related to traditional or local products. Historically formed transaction rules, which reflect regional cultures, are developed for those traditional or local markets. Small developing countries have these markets and are interested in protecting markets and local rules. Each country has both types of firms, and struggles between globalism and regionalism exist also within one country.

In the East and South-East Asia, there were many diversified countries or areas of economic development stages, cultures and political systems. However, economic development sequences of flying geese pattern, starting from Japan, next to NIEs, then ASEAN, and to China, and new ASEAN members, have changed the area into more uniform. This brings about deeper economic integration of the area.

The early stage of ASEAN was a political group in the era of Cold War, but ASEAN gradually increased cooperation as an economic group, which was still a defensive assembly of small countries. In spite of Asian currency crisis, ASEAN now is more offensive in a sense that it increases members and puts into practice AFTA and is planning to extend FTA relation to China. China has absorbed foreign direct investments from EU and US and also from Asian neighboring countries. Cheap and efficient labor, combined with advanced foreign technologies gives a comparative advantage for labor-intensive manufacturing industries in China. Its potentially big domestic market is also an incentive factor of FDI into China. China and Taiwan become members of WTO and how to organize a structure of international division of labor between China is an urgent issue all over the world, especially for Asian neighboring countries.

Japan and Korea have similar development and growth experiences of government policy led and of manufacturing export led. Household sector's savings is large and big manufacturing firms' investments are financed through banking systems. A government distributes funds for producers, and benefits for consumers are not considered much. When investments of firms are not large, export and/or government expenditure should absorb savings-investment gaps. After explosion of the recent Japanese bubble, investment and export and also government expenditure have shrunk and Japanese economy is in lower equilibrium level of GDP. After Asian currency crisis, a zaibatsu system has dismantled and Korean firms have become good buy for foreigners and a small domestic market has become more disadvantageous for Korean firms in an international competition. Both Japan and Korea are seeking means of pulling back from a brink of disaster. Japan-Korea FTA is one of means.

2. Economic structures of Japan and Korea

Environments of manufacturing firms' activities have changed both for Japan and Korea. Profitable industrial sectors have changed from heavy-thick-long-big products sector to light-thin-short-small products sector, and this has made more efficient to use an outsourcing system than an integrated-production system. It becomes more important to find profitable investment opportunities than making large-scale investments in equipments. Managers of firms must change their organizations to have economic efficiencies by selecting profitable projects and investments. A R&D activity is one of key elements for future profits. A government cannot lead its economy for further developed stages and a big keiretsu-system is not efficient any more. A competition in free and large markets is one way to form an efficient economic organization. A FTA formation might help for this.

Both in Japan and in Korea, indirect financial systems through banking systems, contributed to government policies for economic development or growth. Regulations for banking activities were used for selectively financing to basic or key industries, mostly to big firms. Big firms had invested excessively to increase its market share, competing with other big firms. This produced the results of over-borrowing and over-capacity by firms. In situations of low profit rate in new investments, their debts become heavy burdens for firms. A direct finance system through stock market is another way to finance new investments in markets. Developing a stock market necessitates a breakdown of crony capitalism, which exists in Japanese and Korean markets. Japan-Korea FTA might have big waves to go away from the crony capitalism.

The government led banking system assisted low profit over-lending by banks (over-borrowing by firms). Banks had selected firms, which were supported by the government, in lending and thus could not effectively affect firms to select investments projects. The government also invested in social capitals or public goods for economic development, and social benefits were high in high growth rate eras in Japan and Korea. However bureaucratic

decision-makings and political struggles of pressure groups reduced efficiency of government investments and brought to misallocation of economic resources. Now it becomes better to use market mechanisms and to privatize public or government organizations. Japan-Korea FTA, again, might give good chances to push governments or pressure groups to accept principles of market mechanisms.

A more fundamental focus might be in a mechanism of over-savings (relative to investments) in Japan and Korea. Over-savings are sustained by current accounts surplus and/or government budget deficits. Japan and Korea have weak constitutions of over-savings, and export promotion policies or public investments were important government policies for increasing effective demand. Success of an export promotion brought hike in exchange rates and this, in turn, brought DFI out-flows. Foreign subsidiaries and foreign local firms, which got technology transfers, have become competitors in third markets and even for investors' domestic markets. With large decrease in trade surplus, government expenditure (investment) should be increased to keep a GDP level. It was easy for a government to find socially beneficial investment projects, when a social overhead capital was small. However, with accumulation of social overhead capitals, with bureaucratic decision-makings and with pressure groups' political activities, effectiveness of government's new investments was easily reduced. Government deficits and misallocation of resources become burdens both for the government and taxpayers.

The over-savings constitution should be changed through increase of private investments and consumptions. Deregulations might give chances to new businesses, and venture capitals of financial supporting system might give chances of germination. Consumption will be increased when firms' profits are distributed to share holders rather than kept for reserve funds. To increase a consumption rate, pension systems should work effectively to give belief as safety insurances for old ages. It is a role government to make a system with confidence.

Structural reforms of finance and manufacturing industries, and more importantly of bureaucratic and regulatory government systems, are necessary at this starting point of 21st century both for Japan and Korea. A coalition between a government and large firms cannot lead to competitive and efficient economic systems in global world. A liberalization of international transactions and a deregulation of home markets will accelerate reforms, but realization of the liberalization and deregulation may difficult without outside (foreign) pressures. Although both governments are not very active for forming Japan-Korea FTA, this is a necessary first step for global liberalization and deregulation.

3. Roles of Japan-Korea FTA

There are some reasons to form Japan-Korea FTA (J-K FTA). Firstly, costs of structural reform with global liberalization and deregulation by oneself will be mitigated by joint reform with FTA. A larger domestic market by FTA will be advantageous for global competitiveness in

the industries of increasing returns to scale. Secondly, domestic resisting or reluctant groups for reforms will be persuaded more easily with pressure of FTA and thus domestic inefficiencies will be reduced with joint action for FTA. Thirdly, related to these two reasons and more importantly, J-K FTA works as one of strategic power against USA and EU, and especially against China.

Structural reforms of financial sectors and manufacturing sectors in a global market will select few competitively surviving firms (banks and companies). The size of firms in Japan and Korea will be larger with J-K FTA than the case without J-K FTA. Without J-K FTA, a size of each domestic market is not large enough relative to EU and NAFTA, and to China markets, and thus surviving firms in Japan and Korea may not have enough competitiveness in a global market. With J-K FTA, the joint domestic market is relatively larger and mutual investments, firms' cooperation or M&A, and competitive economic environment will produce more competitive firms in a global market. From this point of view of J-K FTA, investment liberalization, deregulation of M&A, and competitive cooperation of firms will bring more benefits than mere trade liberalizations or tariff reductions have.

Both Japan and Korea have less-modernized industries and sectors, like agricultural sector or marine products and more generally small and medium size enterprises of local traditional sectors. Gradual liberalizations to global market, starting from FTA, will be a better procedure, than big shocks of globalization, for forming efficient and competitive firms in those sectors. Domestic political interest groups are very strong and traditional regulations for protection make it difficult to promote structural reforms in these sectors. It is possible and necessary to have competitive firms and enterprises in those sectors, and the possibility will be larger with larger joint domestic markets of Japan and Korea. J-K FTA is one way to persuade political interest groups in a big wave of a global liberalization.

It may be hard for firms based in Japan and in Korea to compete with large multinational enterprise based in US and in EU. However firms based in a joint Japan and Korea market will be more competitive and J-K FTA is important as a strategy for getting a strategic competitiveness. Joint strategies of Japanese and Korean firms against EU and US firms will be more effective than separated strategies are. Exporting to US and EU markets, Japanese firm and Korean firm are competing each other, and cooperative strategy between those firms produces more profitable chances. For import protections by EU and US, export coalitions of Japan and Korea make it easy to change protective policies or structures. Japan and Korea now worry about increasing import from China and coalition of Japan and Korea will have power for negotiation of import protections. A more important strategy might be in negotiation for DFI to China. Competitions of DFI into China between Japanese firms and Korean firms reduce benefits for both firms and give advantageous positions to China. The benefits will be increased with Japan and Korea cooperative negotiation against China. J-K FTA will be beneficial both for Japan and Korea, but governments were reluctant because of uncertainty of future benefits and

certain short ran adjustment costs of FTA, especially when their economic situations were not good. Past historical relation between Japan and Korea also impede the formation of FTA. FTA is rather confused with economic and political unification. However in a stagnating economic situations and effective policies are difficult to find, J-K FTA has become realistic issue of political negotiations between Japan and Korea.

4. Characteristics of Japan-Korea FTA

A special characteristic of J-K FTA will come from similarities of economic behavior, economic institution and economic performance in the two countries. Geographical location, size and climate are like and thus naturally both countries have similar potentials in forming economic structures. Historical relations also contributed the similarity. Before World War 2nd, Japan had unified Korea and had put Japanese system into Korea. After the war, Japan first succeeded in catching up developed countries and Korea followed the same way of Japan by taking similar development strategies. As already mentioned, over-savings relative to investment, export-led grow economy and government led economy are important characteristics of the two countries. We are now in the position to reform these characteristics to vitalize their economies, and thus both governments can write similar policy prescriptions. Safety nets for reducing risks for future are necessary to increase a private consumption, and deregulations of domestic market for DFI inflows and of other activities are necessary to increase private investments. However, government procedures for safety nets and for deregulations are difficult to take by one country alone, with competitive neighbors of similar economic structures. It might become easier to take such procedures with FTA formation.

Similarity of economic structures appears in dominance of export oriented manufacturing industry both in Japan and Korea. The manufacturing industries make use of scale economies and an imperfect competition prevails in the market. When each domestic market was growing and catch-up was a policy target of development, domestic firms were protected as infant-industries or strategic industries for future. Protective government policies and financial supports of banking system produced convoy Keiretsu system to share profits. Competition was about increasing market share but the share was rather kept constant through stable share of big Keiretsu banks' funds. When market growth rates become low and the catch-up stage has been passed, the convoy system becomes difficult to sustain and a monopoly or an oligopoly becomes a inefficient form of organization in the manufacturing industry. A competition for efficiency facilitates restructuring of organizations. A division and re-integration of firms is one dimension of reforms. A division of manufacturing processes and re-integration of processes is another dimension of reforms.

Re-organization for differentiated products is one way for sharing a limited market size and monopolistic competition might be one form of a market in a manufacturing industry. In this

case, a size of domestic market is one of important factors for global competitiveness. Each market size of Japan and Korea is not large enough for global competition but the market size becomes fairly large with J-K FTA. Restructuring within Japanese market or Korean market itself may not accompany large costs but will not provide enough competitiveness for a global market. Restructuring with J-K FTA might accompany large costs for restructuring but will provide more competitiveness.

Competition between Japanese firms and Korean firms within J-K FTA becomes severe and intense but this situation will provide competitiveness to them in third or global market. A cooperative division of labor between Japan and Korea for strategically increasing competitiveness is one of important incentives for FTA. If both Japan and Korea are interested in taking parts of international division of labor in high-tech manufacturing industry, cooperative strategy against US and EU, and also against China, will make it possible to specialize in the industry.

Similarities of organizational forms in firms, or of economic transaction forms, or of contract forms, exist in Asian countries, relative to forms in western (Europe or American) countries, and the similarities between Japan and Korea are stronger with historical and locational reasons. On the job and educational trainings are provided within firms, decisions are made in both bottom-up and top-down ways, and team-work and/or interchange of personnel within a firm works, with a long-term contracts system of employment. Similar relations could be found among Keiretsu firms. Information is exchanged for making decisions of firms, and technologies are exchanged for improving quality of intermediary inputs. Cooperation in finance and personal

Table 1. DFI Outflows (as % of total FDI outflows)

	Korea		Japan	
	to Japan	to China	to Korea	to China
1992	2.3	11.6	0.7	3.1
1993	0.5	20.9	0.7	4.7
1994	2.5	27.5	1.0	6.3
1995	3.4	26.8	0.9	8.7
1996	1.9	19.7	0.9	5.2
1997	1.9	19.2	0.8	3.7
1998	0.6	16.2	0.7	2.6
1999	1.9	12.1	1.5	1.1
2000.1-7	1.4	6.3	-	-

Source : UNCTAD, World Investment Report

Table 2. DFI inflows (as % of total FDI inflows)

	Japan		Korea		Chian	
	from Korea	from China	from Japan	from China	from Japan	from Korea
1992	0.3	0.1	21.6	0.3	16.6	0.6
1993	0.02	0.5	21.5	0.2	12.6	1.0
1994	1.6	0.2	34.2	0.2	6.1	2.1
1995	2.5	0.3	24.8	0.5	8.3	2.8
1996	1.0	0.1	12.1	0.1	8.8	3.3
1997	1.2	0.1	7.6	0.1	9.6	4.7
1998	0.1	0.02	8.1	0.1	7.5	4.0
1999	0.4	0.01	7.8	0.1	6.3	3.6
2000.1-6	-	-	9.7	0.8	-	-

Source : UNCTAD, World Investment Report

affairs within Keiretsu firms make it easy to use longer term's organizational transactions instead of arms length market transactions.

Unification or integration of the three (government, firm and household) is relatively stronger in Japan and Korea, and this has both merit and demerit for economic efficiencies and competitiveness. Merit will be large when Japan and Korea take cooperative strategies, with J-K FTA, against EU, US, and China. Without FTA, firms dominated by EU and/or US will control Japanese or Korean firms through M&A or DFI in Japan or Korea. In this situation, it will be difficult for Japanese and Korean firms to specialize into high-tech industries, where both Japan and Korea are interested in. China is a socialist country and firm's strategies are influenced by its government policies, and separate negotiations of Japanese or Korean firms with Chinese firms will be favorable for Chinese firms. As already mentioned above, a strategic cooperation among firms of Japan and Korea is beneficial both for Japan and Korea, and this will be intensified by the formation of J-K FTA.

5. Asian safety nets and Japan-Korea FTA

Asian currency crisis exhibited an importance of forming safety nets in Asia by Asian countries. Supports or assistances by EU and US, or by IMF and World Bank, were not prompt and not fully enough for helping Asian countries, compared with the case of Mexico currency crisis. Japan, which depends on US market, itself is not large enough to take role of leadership

in Asia. Korean economy also depends on US market but after the attack of currency speculation, it becomes aware of importance of Asian safety nets by Asian countries. China, taking for membership of WTO, has a political power and its potential economic power is large, and thus China might gain the hegemony in Asia. Japan, Korea and China alone cannot make Asian safety nets, but it will be possible to construct the core net with cooperation of the three countries. With three countries, it will be possible to have a position comparable to EU and US, in market size and in political power. Japan and China are rather competing each other to take a leadership in Asia and thus roles of Korea are important to mediate between the two countries. Starting with J-K FTA is one of the possible approaches of forming Japan-Korea-China cooperation.

China is increasing its economic and political power in the world, and will have decisive effects, in future, to international system of division of labor, because of its enormous potential capacities. A relation to China is very important both for Japan and Korea and will become more important in future. Potential market size is so big, cheap and good labors are unlimited and foreign capitals and advanced technologies are flowing into China. Firms in China will dominate labor-intensive manufacturing industry. And thus Japan and Korea should find out comparative advantage in high-tech industry and cooperative strategy of the two countries is important. Big EU and US firms get ahead of Japanese and Korean firms in China market. Competition between Japan and Korea firms in China market is not profitable and cooperative strategy against China, EU and US firms, will be beneficial for both firms. The cooperation will be tighter with J-K FTA. Competition for DFI in China market will reduce profit share of competitors and will increase share of the host country as mentioned above. Competing separately with big firms of EU or US will produce a situation that the big firms occupy most profitable position and will drive Japanese and Korean firms to find position in less profitable areas.

After Asian currency crisis, EU and US have extended political and economic powers to Asia and a view of three poles world, of EU, US and East Asia, might be revised to a view of two poles world, of EU and US, or US hegemony of one pole. A realized situation will depend on costs and benefits of accumulation or integration of economic activities, and information, telecommunication, and transportation technologies are important determinants for this. However Asia has many countries of different cultures, especially different from European or American cultures, and there is another large potential area of South Asia, and thus it might be necessary to form one pole in Asia. J-K FTA is a first step to form East Asian pole, including China.

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