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Changing Job Design and Its Influence on Labor Mobility

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Introduction

Changing Job Design and Its Influence on Labor Mobility

Recently in Japan, there has been a perception that human capital accumulated in some jobs may be becoming less specific to the firm, the industry, or the occupation which the workers belong to. One plausible argument is that some jobs have been more standardized or specialized than in the past due to the increasing usage of information technology (IT), adaptation to globalization, and the weakening commitment of Japanese firms to "lifetime employment." For example, Higuchi (2001) reports that firms' increasing use of IT has raised their ratios of contingent workers and their degree of outsourcing, which implies that the work process has been standardized.[1,2] There have also been a number of recent studies on the relationship between globalization and reliance on irregular workers and some anecdotal observations that exposure to global competition facilitates the standardization of jobs.[3]

The declining specificity of human capital should indicate higher labor mobility. According to the Employment Status Survey by Japan's Ministry of Internal Affairs and Communications, the ratio of job changers among all employees increased from 2.6% in 1982 to 5.6% in 2007. The survey also shows that the percentage of workers wanting to change their present jobs increased from 8.6% to 11.7% of all employees during the same period. The increase in the ratio of would-be job changers is especially notable among specialists and technical workers—from 4.4% in 1982 to 8.8% in 2007. However, it is hard to prove that changes in job design contributed to this increase in turnover because the Japanese economy scarcely grew and its unemployment rate continued to rise over most of the past two decades. In a prolonged recession, the voluntary quit rate may rise among people who were forced to accept less preferable jobs.

The government's data do not offer any clear indication that changing job design might be facilitating labor mobility. For example, Bognanno and Kanbayashi (2007) report that the wage penalties associated with job changes across different industries or different occupations

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[1] Yoshio Higuchi, *Koyo to Shitsugyo no Keizaigaku* [Economics of employment and unemployment], (Tokyo: Nihon Keizai Shinbunsha, 2001), chap. 7.

[2] Clearly, one indication of changing job design is the increased percentage of irregular workers (part-time, temporary workers, contract workers, etc.) who now account for 34% of the work force in Japan according to the Labour Force Survey by the Ministry of Internal Affairs and Communications. Outsourcing of work to people dispatched from temporary staffing agencies should require work processes to be standardized and specialized so that temporary workers do not need to have a broad skill set or coordinate with other workers.

[3] See, for example, Tomohiro Machikita and Hiroshi Sato, "Temporary Jobs and Globalization: Evidence from Japan," (RIETI Discussion Paper Series 11-E-029, 2011), for a study that measures the influence of globalization on the increase of temporary employment. One interesting case study that looks at how foreign ownership changed the job design and human resource policies of a traditional Japanese firm is Thomas DeLong and Masako Egawa, "Shinsei Bank: Developing an Integrated Firm," (Harvard Business School Case, 2007).

fell significantly in the 1990s and early 2000s, a finding that may be consistent with the view that human capital is now less specific to an industry or occupation. But, at the same time, they find that the extent to which job change penalties rise with age also increased during the same period, which might be more consistent with the opposing argument that human capital is increasingly firm-specific.[4]

In light of the lack of any systematic evidence linking recent labor mobility trends with any economy-wide changes in job design, it may be quite instructive to compile disparate findings for specific industries, occupations and labor market issues in order to provide a better evidentiary basis for this debate. This issue of *Japan Labor Review* presents a set of such studies that contribute to the following research questions: where and to what extent is evidence for the standardization of jobs observed and in what ways are changes in job design affecting labor mobility?

The first paper by Naoki Senda, Hongmoon Park, and Mitsutoshi Hirano presents case studies of two IT companies which test the hypothesis that job structures and skill evaluation criteria have become homogenized given the observed standardization of software development processes. Borrowing concepts from the product architecture literature, they argue that IT jobs shifted to an "open" and "modular" architecture to facilitate worker mobility and outsourcing. The authors find that skills evaluations have become standardized to a significant extent, but that the "modularization" of work is proving difficult in some areas. Depending on the nature of their businesses, some companies are clearly choosing to custom design their job skills. The study reveals that the degree of job standardization and the switching cost for job changers may vary across firms even in the same industry depending on the employer's product market strategy and its resultant human resource management policy.

The second paper by Yuji Genda looks at labor mobility across the status border between regular and irregular employment to determine whether irregular workers are really outside the internal labor market. If irregular workers do not accumulate much human capital, especially human capital specific to the firm that employs them, they will continue to find it difficult to step up to a permanent position and remain vulnerable to negative external shocks to the employers. In his earlier work, Genda (2008) finds that the length of employment with the same employer has a significant impact on the probability of transitioning from irregular to regular employment, implying that either accumulation of human capital or revealed commitment to a job matters for employers.[5] In this issue, Genda uses a unique survey that allows him to distinguish the paths workers follow to reach regular employment, namely, moving up in the same firm versus changing employers to become "permanent." To the extent to which the former path is prevalent, irregular workers are not excluded from the internal labor market. Irregular workers could be an important

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[4] Michael Bognanno and Ryo Kanbayashi, "Trends in Worker Displacement Penalties in Japan: 1991-2005" (IZA Discussion Paper no. 2954, 2007).

[5] Yuji Genda, "Transition into Regular Employment among Separating Non-Regular Employee," *The Japanese Journal of Labour Studies* 50, no. 11 (2008): 61-77.

pool of applicants for permanent positions because their employers asymmetrically observe the workers' qualities. Moreover, irregular workers could accumulate substantial firm-specific or job-specific human capital if they are assigned tasks matching their abilities. This paper reveals the importance of job-specific human capital among those who move up in the same firm but also reports a puzzling result in that it did not find any wage premium for those intra-firm transfers.

In the third paper, Akihito Toda attempts to find evidence for the hypothesis that market friction is diminishing for job changers who move within the same occupation. Standardization of a job will make experience within an occupation more valuable than before if the required job skills become similar across firms and human capital accumulated on the job will suffer less depreciation due to standardization. Toda finds evidence supporting the above hypothesis for the job category of specialist and technical workers. More precisely, he demonstrates that the rate of job change within these occupations has increased and the proportion of within-occupation job changers is larger among workers with more education. Although Toda does not find that wage premiums also increased for job changes within occupations, contrary to his hypothesis, he shows that wage premiums have risen for female specialist and technical workers. This last finding implies that standardization of jobs may have a greater impact on the wages of female workers for whom labor market friction is presumably greater (perhaps, for example, if asymmetric information is more significant for female workers).

The fourth paper by Masaru Sasaki offers a completely different perspective focusing on the intermediary role of public employment service agencies and the question of whether an improvement in matching efficiency can be observed in the initial referral process of the agencies (due to a combination of applicants' search efforts and the agencies' referral efficiency) or in the subsequent hiring process of firms (presumably due to the quality of job leads provided by the agencies). Sasaki finds that overall matching efficiency improved from 1998 through 2007 but all the gains came from the referral process that offset a decline in job placement rates under firms' hiring processes. Sasaki suggests that the search support capability of the employment agencies improved, but it may also be the case that standardization of jobs has lowered the cost of screening posted jobs both for workers and employment service agents. And yet, for whatever reason, better search support by agencies did not improve the quality of induced employer-applicant matches. Since we cannot control for the quality of jobs and the data do not cover job matching not mediated by the public employment service agency, the evidence still falls short of answering whether labor market friction is declining as a result of better matching efficiency or not. Nonetheless, Sasaki's work sheds new light on how the public employment agency search process mediates the effect of the demand-supply balance in the labor market on the unemployment exit rate.

The last paper by Yoshifumi Nakata and Satoru Miyazaki carefully documents micro-level changes in the labor market for industry scientists and engineers. Their findings are consistent with Toda's work in this issue. First, labor mobility among industry scientists and engineers has been trending upward, especially among younger workers and information systems and software engineers. This finding for IT engineers is not surprising because development processes are becoming increasingly standardized in the IT field, as discussed in the paper by Senda, Park, and Hirano.

What is interesting is that this increase in labor mobility is taking place when the supply of scientists and engineers is shrinking. According to the NISTEP report cited in this study, the number of natural science and engineering-major students entering universities has declined more than 20% in the past decade. Nakata and Miyazaki also show that although the productivity of Japanese engineers is higher than that of their counterparts in other developed economies, their wages are lower. Given this compensation gap, increasing exposure to the external labor market should eventually lead to an increase in Japanese engineers' wages. The paper includes an analysis based on a survey of workers in the electronics industry which reveals that current salary systems in the industry depend more on individual performance than in the past. At the same time, engineers' job satisfaction and company loyalty is declining. All of the findings in this paper indicate that the influence of the external labor market is increasing among industry scientists and engineers.

Overall, the papers in this issue suggest that there are real changes in job design and the specificity of human capital at least in some occupations. However, there is significant heterogeneity across firms, industries, and occupations, and therefore the magnitude of the impact of these changes on labor mobility is unknown. Even in occupations where the external labor market plays an increasing role in allocating human resources (i.e., temporary workers and engineers), the internal labor market still has significant influence on how workers change jobs.

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Modularization of Work and Skills Evaluations: Two Cases of IT Companies

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In recent years, the IT industry is considered to be undergoing work standardization towards open and modular structures that are tailored for mobile workers and outsourcing. We conjecture that in this industry, companies may be transforming themselves to achieve industry standards with regard to required employee skills and evaluation criteria for these. Bearing this hypothesis in mind, we conducted case studies of two IT companies and looked in detail at the state of the modularization of work and skills evaluations. As a result of this research, we have found that the standardization of skills evaluation has progressed to a significant extent, but that the modularization of work is proving difficult in some areas, depending on the attributes of the job, and that some companies are clearly choosing not to restructure jobs towards a modular design in certain areas. We conclude that these companies are strategically custom-designing work processes and skills evaluation in order to differentiate themselves from others.

I. Introduction

In product architecture theory, "work" is a cluster of interdependent tasks which is also embedded in the system of interdependent "works." "Modularization" is one of the main principles defined (by Aoki [2002]) as "dividing a complex system or process[1] based on pre-specified connection rules into semi-autonomous subsystems that can be independently designed." Fujimoto (2001) defines "openization"[2]—another main principle—as the industry standardization of an interface between two subsystems across corporate boundaries.

[1] In a complex system, there is a high level of interdependence among the components that make up that system; system complexity is a state in which any changes to the parameters that define the system will necessitate a significant amount of changes in other parameters (Aoshima and Takeishi 2001, 34).

[2] More specifically, there are two sub-types of product modularization: *closed modular architecture*, in which the interface connecting the modules is firm-specific, or "closed" within a single company, and *open modular architecture*, in which, conversely, the interface among modules becomes an industry standard and is able to connect beyond the level of a single company. "Openization" is used in this paper to mean that the interface among components in a product is transitioning towards an open architecture.

The reasons behind modularization are as follows: among other things, (i) modularity increases the range of "manageable" complexity, (ii) modularity allows different parts of a large design to be worked on concurrently (iii) modularity accommodates uncertainty (Baldwin and Clark 2000, 90-92).

An important complementary principle within modularization is the fact that there should be interdependence within and independence across the module. In other words, a module is a unit whose structural elements are powerfully connected among themselves and relatively weakly connected to elements in other units. There are clear degrees of connection, thus there are gradations of modularity. To put it another way, modules are units in a large system that are structurally independent of one another, but work together. The system as a whole must therefore provide a framework—an architecture—that allows for both independence of structure and integration of function (Baldwin and Clark 2000, 63).

Architecture is defined as the basic concept behind the design of both modularizing and interfacing the subsystems that make up complex systems (Ulrich 1995; Baldwin and Clark 2000; Aoshima and Takeishi 2001). Henderson and Clark (1990) defined product architecture as "the method of integrating the individual structural elements of a product into a system," and indicated the importance of innovation in line with changes in product architecture in maintaining corporate competitiveness. In addition, research by Ulrich (1995), which played an important role in the creation of basic frameworks for the debate over product architecture, focused on the efficiency of product development according to the degrees in interface between functions and structures, and defined an opposing concept to modular type, in the form of integral type. Ulrich described the attributes of each type of product architecture, as well as frameworks for organizations and functions that applied to these.[3]

Fujimoto (2001, 2003, 2004, 2005) theorized that the categorization of system product architecture requires functional design (dividing overall system function into sub-functions, and establishing target criteria) and structural design (establishing interfaces related to the integration of functions or components, and designing the system as a whole), and developed product architecture theory from the perspectives of integrating function and structure, and integrating components. In other words, there is a distinction determined, firstly, by whether the functions and components exist in an overall relationship to one another (*integral type*) or whether they are individually connected (*modular type*), and secondly, by whether the interfaces of components are unique to a specific company (*closed type*), or standardized to the industry (*open type*). For example, automobiles and small household electronics tend to be *closed/integral* type, while multipurpose computers and industrial machinery are *closed/modular* type, and bicycles and internet products are

[3] According to Ulrich (1995, 420), "the architecture of the product is the scheme by which the function of the product is allocated to physical components, which is defined more precisely as : (i) the arrangement of *functional elements*; (ii) the mapping from *functional elements to physical components*; (iii) the specification of the *interfaces* among interacting physical components."

open/modular type.

Product architecture theory can be applied to organizational architecture design. Furthermore, there is a tendency to equate product architecture and organizational architecture (Baldwin and Clark 2000; Fujimoto, Takeishi, and Aoshima 2001). Organizational architecture determines corporate activities, the division of these activities into tasks for which responsibility is taken by individual members of staff, and the organizational structure that enables the implementation of coordination between such tasks (Taniguchi 2006), and an affinity between product architecture and organizational architecture will determine the competitive advantage of the company. As a result, the complementary between product and organizational architecture can be extrapolated into an explanatory principle of comparative industrial superiority. In other words, in comparison with the United States in the 1990s, where economic growth was based on digital goods, new financial instruments and other open/modular type goods, Japan maintained its competitiveness through integral-type products such as automobiles and precision instruments. The fact that individual countries have differing competitive industries can be explained by the fact that each country's organizational architecture is impacted by its initial conditions and history of development, which eventually makes a uneven distribution towards countries with specific types of organization (Aoki 2001; Fujimoto 2001).

In light of these previous studies, notably in consideration of the relationship between product architecture and organizational architecture, in this paper, we consider to what extent skills evaluation criteria have been elaborated and standardized by IT companies from the perspective of their relationship to the *openization* and *modularization* (referred to as O/M, below) of work. Furthermore, we consider the actual state and the logic behind whether the standardization of skills is taking place at the individual company level or at the industry level. Our study focused on two IT companies, one, a U.S. company's subsidiary in Japan, and the second, a Japanese company, as case studies.

If we rely on product architecture theory, the "modularization of work" could be defined as "partitioning" (von Hippel 1990) a set of related tasks to a specified member of the organization, out of the overall, complex system that makes up the organization. Excessive segmentation of work, however, results in additional costs at the point at which each part has to be coordinated to the whole once again. As a result, when modularizing work, the specification and interface (coordination) relating to the work (set of tasks) allocated (partitioned) to each member of the organization needs to be determined in advance of, not subsequent to, the partitioning, and the organization must aim for optimized design in order to achieve standardization and facilitate intensification wherever possible.

In short, product architecture theory indicates that if a product architecture shifts to open modular type, it is reasonable to shift to the modularization of work (highly standardized, allowing work to be completed independently without a significant need for coordination with other areas) and openization of work (industry standard) according to that. The IT industry is well suited to American companies, which have the superior ability to con-

ceive an entire system in advance, create rules, establish industry standards for interfaces, implement mergers and acquisitions freely, and expand business at high speed. The ability to do this is complementary to working in an open/modular style (Fujimoto, Takeishi, and Aoshima 2001). On the other hand, typical large Japanese companies, which have maintained high levels of competitiveness through operating in a closed/integral style of organizational architecture, are likely to face the need to implement O/M in their work in order to engage with the IT industry (where open/modular style is advantageous).

Despite this, we must not ignore the emphasis of the strategic theory of the "resource-based view," which states that a company's sustained competitiveness lies ultimately in its "rarity value," which is difficult to imitate and transfer for other companies (Barney 1991, 2001; Peteraf 1993). Put another way, differentiating oneself from other companies by creating firm-specific and unique resources is a way to obtain a sustainable competitive advantage. From this perspective, the industry standardization of a company's core competence (Prahalad and Hamel 1990) along with the substance of its human resources, who are responsible for realizing this competence, may in fact result in self-imposed damage to its organizational abilities. If so, what sort of adjustments are being made to internal organizational structures by IT companies in the face of these changes and issues? This paper is based mainly on this simple question, and on the detailed considerations of how the IT industry conceives its "work architecture," the essence of its work, and the evaluation of skills.

II. Work Architecture

Within the IT industry, where the product architecture type leans strongly towards being open and modular, it is thought that the work of the project teams follows a similar style. Whether an individual product is modular or integral, however, differs depending on what level of component it is,[4] and if we examine the various jobs that are undertaken within a corporate organization at a more detailed level, it becomes possible to categorize them according to their attributes in line with architecture theory. If we apply product architecture categorization to work within an organization, and conceive of a "work architecture" for IT companies, it is possible to create an image of four types of work, as shown in Figure 1, and the type of skills required for each (here, we refer to these as "knowledge types").

The horizontal axis of the diagram is designed to identify whether work is "highly independent" (modular) or "highly dependent on other processes" (integral). People working in the former type of job tend to be engaged in completing single, highly independent

[4] For example, the microprocessors contained in Intel computers cannot be divided into open modules, despite the fact that other components of the computers are all open type (Fujimoto 2001).

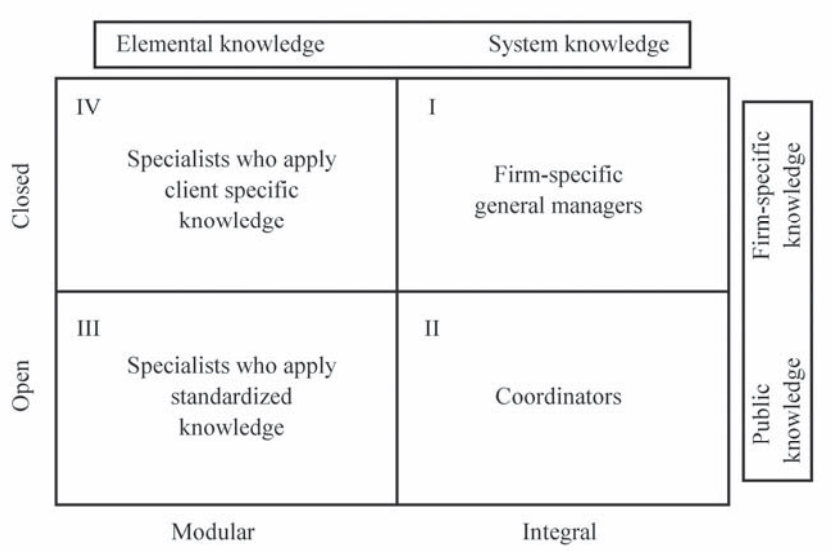


Figure 1. Work Architecture and Knowledge Types

components within the system design process, using a high level of "elemental knowledge."[5] People working in the latter type tend to be engaged in the design of systems, using carefully integrated specialist's elemental knowledge, and are required to have "system knowledge" (Aoshima and Nobeoka 1997) or "structural/architectural knowledge" (Matusik and Hill 1998).

The vertical axis identifies whether the project implementation process is "industry standard" (open) or "unique to the company" (closed). People in positions identified as the former are specialists who are masters of "public knowledge"[6] (Matusik and Hill 1988) within industry standardized best practices. People in positions identified as the latter are well versed in "firm-specific knowledge" (routines, work processes, human resources and organizational knowledge, and culture unique to the company) that is embedded in either their company or their client companies. Such people are most likely required to customize components through a close collaboration of processes with their client companies. Firm-specific knowledge is dependent on the history of the company, and is built up over

[5] Aoshima and Nobeoka (1997) described two types of knowledge that are required for product development. One is knowledge related to the development of the elemental and component technologies that constitute the product system, and this is necessary for developing high-level sub-systems. The other is knowledge related to the overall structure of the product system, and this is necessary for determining the relationships among the components and for compiling a system that has product integrity. The first of these types of knowledge is called "element knowledge" and the second is called "system knowledge."

[6] Public knowledge is not unique to any one company. It resides in the external environment and is, in essence, a public good. Public knowledge includes such items as industry and occupational best practices. (Mastusik and Hill 1988, 683)

time within the organization and individuals, through experience with various projects that take place. It therefore also possesses the attribute of being "process knowledge" (Aoshima and Nobeoka 1997).

Project Managers (referred to as "PMs" below) are categorized into the first quadrant (closed/integral type), as "firm-specific general managers." Firm-specific general managers here are as defined by Hirano (2006, 18), as people who have what are referred to as "firm-specific general skills," in addition to their own expert techniques for skillfully processing designated tasks. These comprise "contextual skills" (skills that have been learned and stored up in specific contexts applicable to the company in question), "integrative skills" (knowledge related to the operations peripheral to a specific job) and also "malleable skills" (general problem-solving, communications skills, and flexibility).

PMs, who are categorized in the first quadrant, are required to provide a significant amount of understanding of, and coordination with, the unique aspects of both the work of their project members and of their client companies, and need therefore to have both system knowledge and firm-specific knowledge.

The second quadrant (open/integral type) describes projects that are dependent on industry standards for their implementation processes, but which involve the integration of the sub-systems or components. Workers in this quadrant therefore need system knowledge and public knowledge in order to function. For now, we will refer to workers in this quadrant as "coordinators."

System engineers (referred to as "SE" below), who are often known as IT specialists, are required to have high levels of specialization, based on elemental knowledge that has been modularized and standardized within the work process. This type of work is open, and can therefore be categorized into the third quadrant (open/modular type). However, there is another type of SE who engaged in the design of systems highly customized to specific industries or clients by using firm-specific knowledge. This means the processes they use at work are closed. Work involving this type of staff can be classified into the fourth quadrant (closed/modular).

In this way, even in the IT industry, where product architecture is open/modular, there can be a variety of work within a project. For this reason, while it is common to refer to the IT industry as highly opened and modularized in its work, and if we look deeper inside the organization at how each piece of work is carried out, it is clear that while some work has implemented O/M, there is also some work where that is not the case. Specifically, work contained in quadrant 3 has undergone high levels of O/M, and in accordance with this, skills evaluation is sophisticated and standardized. On the other hand, there are some areas in which it is extremely difficult to implement O/M, where work is closed and integral. In light of these points, we established the following two specific research questions (RQ).

(RQ1) Within the IT industry, is there a difference in the extent of work O/M depending on the attributes of the job? Does the industry feature some areas in which work O/M is possible and some in which it is not?

(RQ2) Within the IT industry, what sort of the relationship exists between work O/M and the sophistication and standardization of skills evaluation?

III. Trends in Modularization of Work and Sophistication/Standardization of Skills Evaluation Criteria in IT Companies

1. Outline of Research

The answers to the RQs are clarified by describing trends in work O/M and skills evaluation in IT companies, through multiple descriptive case studies achieved via interviews with the people responsible for designing human resources systems and specialist technicians. The reason for using this method was that there had been, to date, little research that had focused in detail on work O/M from the perspective of work architecture, and as such it was considered that an initial observation of the state of work, without setting a fixed prior hypothesis, and subsequent detailed compilation of points arising from such observation, would be the most appropriate method of clarifying the RQs in relation to the IT industry, which was thought to be ahead of other industries in the implementation of work O/M.

The companies where research was carried out were Systems Company A, a U.S. company's subsidiary in Japan, and Software Company J, a Japanese company. Interviews were carried out with the two members of staff responsible for human resources (May 2008) and a PM in the Systems Development Service Division (April 2008) in Systems Company A, and with the director of the Training Center (April 2008) of Software Company J and the sales manager of Company J, which is the parent company of the group to which Software Company J belongs (March 2011). The reason that the two companies were selected was that the evaluation system used by Systems Company A has become the basis for ITSS (IT Skills Standard), which is now making its way throughout both public and private sectors as the standard for cross-sector corporate skills evaluation within the IT industry.

The Ministry of Economy, Trade and Industry (METI) heads up ITSS, which has clarified and systemized the skills required for the provision of various types of IT and related services. ITSS has been developed with the objective of creating skills standards that will equate to industry criteria over and above the framework of individual companies, in order to deliver a yardstick (set of common parameters) that is useful in the education and training of IT service professionals in both industry and academia. Version 1.1 was published in December 2002, and Version 3 (the most recent version) in March 2008.[7]

The ITSS skills criteria creation approach involves an elemental breakdown of the skills required to deliver each type of IT service, and the organization of these from the perspectives of whether they are objectively observable, and whether they can be utilized in

[7] From Ver. 3 onwards, an information processing technicians' examination has been used in regard to evaluation levels 1-3 within each specialization, in order to ensure increased objectivity and sophistication within evaluations.

education and training. More specifically, (i) IT services are classified according to type of occupation/area of specialization, (ii) for each type of occupation/area of specialization, "attainment level indicators" are defined, describing experience and results, as objectively observable indicators, (iii) the skills required for each type of occupation/area of specialization are organized into "skill categories," which are broken down into elements from the perspective of utilization in education and training, and "skill maturity levels," which indicate the level of maturity attained for each skill category, and the required "knowledge categories" are developed, and (iv) in addition to the above, a "skills framework" is created as a means of providing an overview of the whole.

Software Company J was one of the earliest to adopt the ITSS in its human resources evaluations and reward systems.

Both companies, in other words, are considered suitable as the subjects of research in relation to the state of their work O/M and the standardization of their skills evaluation. In addition, observing both Systems Company A, which has its headquarters in the U.S., and Software Company J, which is based in Japan, is thought to provide an opportunity to test the commonly held theory that American IT companies are further ahead in the implementation of work O/M and the sophistication and standardization of their skills evaluation criteria than their Japanese counterparts (although this case studies are not a pure comparison of the two countries).

In line with the RQs, members of the two companies were interviewed based on the following three points: (i) what types of work exist within the IT company, (ii) how the companies standardize and make the evaluation of skills among the staff who undertake such work more sophisticated, and (iii) whether, at the same time, there are areas in which the sophistication and standardization of skills evaluation is not possible.

2. Design and Operation of Skills Development/Evaluation at Systems Company A

Systems Company A is a U.S. company's subsidiary in Japan, and comprises a computer-related hardware, software and service business. In Japan, the company achieved operating profits of 154 billion yen in fiscal 2007, and has a staff of 16,000. Since 1991, the company, along with its global group, has been implementing a "Professional Specialist System," and has been in the process of changing over to training and evaluation systems that are appropriate for its employees' specialized types of work. Furthermore, the company applies a multi-track career path for its line staff (section manager and above) and specialist employees. The human resources system is constantly being updated in order to respond swiftly to changes in the market. At present, the points regarding professional specialist systems within the company are as follows.

(i) The basic flow of a career path for a specialist staff member (up to directorship level) involves training, including OJT, subsequent to entering the company, leading to accreditation as a specialist in some field, and then additionally passing professional accreditation according to the Systems Company A global common

Table 1. Specialist Staff Titles and Relationship to Bands within Systems Company A

Band	Consultant	IT Specialist	IT Architect	Project Management	Learning	Sales (Solution Sales)	Project Executive
Entry	Graduate	Graduate			Graduate		
6	Consultant	Entry IT Specialist		Project Leader	Learning Specialist	Business Solution Sales Rep.	
7	Senior Consultant	Advisory IT Specialist	Associate IT Architect	Associate Project Manager	Advisory Learning Specialist	Advisory Business Solution Sales Rep.	
8	Managing Consultant	Senior IT Specialist	Advisory IT Architect	Advisory Project Manager	Senior Learning Specialist	Senior Business Solution Professional	Advisory Services Program Manager
9	Senior Managing Consultant	Consulting IT Specialist	Senior IT Architect	Senior Project Manager	Consulting Learning Specialist	Consulting Business Solution Professional	Senior Services Program Manager
10	Associate Partner	Senior Consulting IT Specialist	Executive IT Architect	Executive Project Manager	Senior Consulting Learning Specialist	Senior Consulting Business Solution Professional	Executive Services Program Manager
Executive	Partner	Distin-guished Engineer	Distin-guished Engineer	Delivery Executive (Director)	Partner/ Delivery Executive (Director)	Sales Executive (Director)	Delivery Executive (Director)

Source: Systems Company A, company documents.

accreditation system.

(ii) Five bands (levels) are defined for each professional occupation, and employees can rise through the bands through self-assessment (requiring the approval of their superiors or other assessors) of their skills, based on the company's global, commonly defined skills assessment criteria ("skills dictionary"), along with attainment levels (results evaluation) for each project they are involved in. A combination of these two assessments results in approval for promotion (see Table 1).

(iii) In addition to this, since around 2003, in some departments, human resources training and assessment has been implemented using skills evaluation criteria known as Professional Development Frameworks (PDF). Categories assessed using PDFs include "Core Capabilities," which are required of all specialist staff, "Dimension Capabilities," which are required in order to produce excellent results

in specialized fields, and "Functional Skills," which include knowledge and specialized techniques related to solutions, industries and products, and which are required in order to solve individual issues posed by clients. A staff member's PDF Overall Level is determined through a combination of Core Capabilities and Dimension Capabilities.[8]

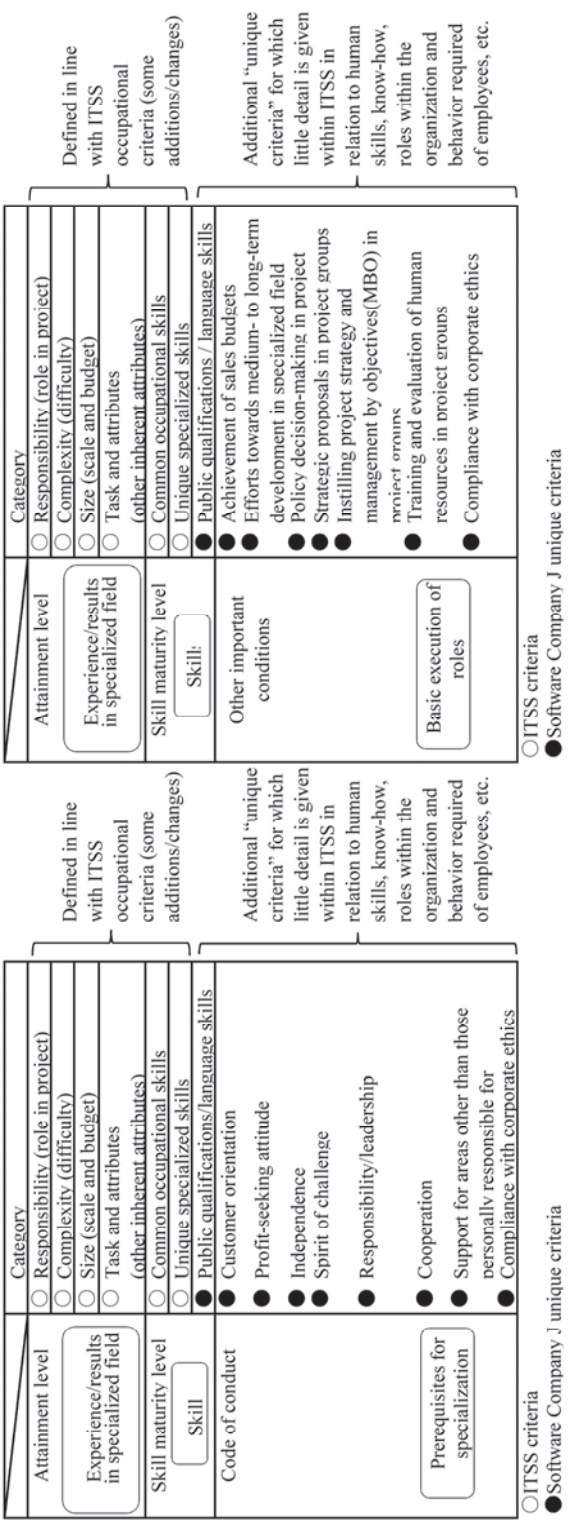
Skills evaluation criteria have been created for staff in sales, but compared with those for other occupations, their skills evaluations are less sophisticated and standardized since there are many skills that are more complicated and difficult to quantify.

The most unique aspect of the training and evaluation of specialists within this company is the PD (Personal Development) Tool, which allows staff to self-assess their own specialized knowledge and skills, and based on this, to create an IDP (Individual Development Plan). Information from this is recorded on the individual career information database within the company, known as the "Professional Marketplace," allowing staff to make regular updates along with developments in their own work experience. Put simply, the company encourages its staff to both manage their own careers and train themselves. What is particularly interesting about this is the fact that, as seen by the name "Professional Marketplace," this database functions as an internal procurement venue, in other words an "internal spot market" (Williamson 1985, chap. 10).

3. Design and Operation of Skills Development/Evaluation at Software Company J

Software Company J was incorporated after the software business was split off from the information processing department of a major Japanese computer manufacturer. It has operating profits of 7.41 billion yen (fiscal 2007), and approximately 6,000 employees. The company introduced its human resources system, which was based on a job grading system for each job description, but subsequently, in 2004, it introduced a human resources system based on the new job descriptions, in line with METI's ITSS. The main features of the company's system are (i) its level structure and occupational categories are the same as those in ITSS (11 occupations, 7 levels), and (ii) it features additional evaluation elements for specialist employees with regard to elements other than their IT skills (in contrast to ITSS, which only relates to IT skills). More specifically, in addition to the "attainment target index" and "skill maturity level," which are indexes used for evaluation within ITSS, rank-and-file employees (level 4 or below) are evaluated against "behavior criteria," while management employees (level 5 or above) are evaluated in "other important issues," giving some additional evaluation elements that are unique to the company (Figure 2). Furthermore, as with Systems Company A, the company uses a multi-track career path for both line and specialist staff (of Department Manager class and above).

[8] In order, for example, for a staff member to be assessed as PDF Overall Level 4, he or she is required to be "Experienced" in all three categories of Core Capabilities, and to have reached the highest level (Level 4) in at least one of the categories of Dimension Capabilities. Reaching PDF Overall Level 4 is a precondition for promotion to Band 8.



Source: Software Company J materials, interpretation by the authors.

Figure 2. Job Requirement Forms Used at Software Company J

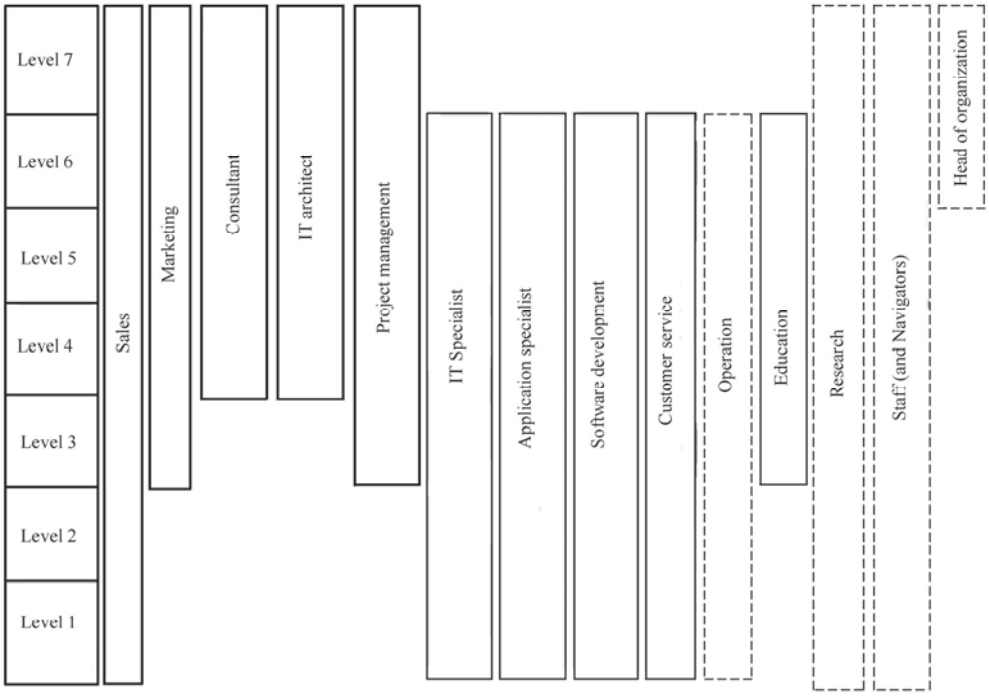
In addition to this, not only does the system feature additional categories not contained in ITSS, it also features some areas where changes or additions have been made to categories contained in ITSS, in line with the particular circumstances of the company. These, specifically, are as follows.

(i) Adjustments have been made to the ITSS category of "size" (scale of human resources, and budget) within each individual department. In other words, each project is not evaluated by an absolute value in regard to scale of human resources and budget. Within ITSS, "size" is taken as having a high degree of corroboration to "complexity" and "responsibility," and in principle, since the larger a project becomes, the greater its complexity and responsibility in terms of coordination of technical ability and project execution, it is considered that staff handling such projects will require extremely high-level skills. However, there is not necessarily a linear link between "size," "complexity" and "responsibility." Two projects that have the same budget, for example, may have differing degrees of complexity depending on whether a project is a new one or an ongoing one, while the issue of whether the project is supplying the public or private sector also has an impact. Based on reasons such as this, it is considered that regulating for skills levels based only on the scale of human resources involved and the budget may not allow for an accurate assessment of the project's value or complexity.

(ii) Evaluation categories have been added to the skills attainment category to assess skills that utilize process knowledge within "Skills in the specialized field" (for example, highly specialized knowledge related to the SCM (Supply Chain Management) of a certain convenience store company, or unique risk management skills for building large-scale IT systems for the financial industry. These are not included in ITSS.

(iii) ITSS does not contain evaluation categories for quality control, so a "navigator" is appointed to coordinate project quality control across each entire project (the "navigator" must have experience as a PM and be of level 4 or above) (see Figure 3).

To summarize the above, in addition to the evaluation of IT skills at Software Company J, elements relating to other aspects, such as attitude to clients, cooperation and profit management, which are not included in ITSS, are evaluated under the additional categories of "Code of conduct" and "Other important conditions." This indicates that Company J is aware of the value of skills required for the actual execution of work, despite the fact that these are not part of ITSS. Furthermore, categories relating to coordination skills—such as those required for a quality control navigator—are not part of ITSS, and as such evaluation criteria have not been defined for these areas.



Source: Software Company J materials, interpretation by the authors.
Notes: 1. Occupation titles shown within the dotted lines are not defined within ITSS.
2. The occupation listed as "Operation" is defined within ITSS as one specialist area within "IT Service Management."

Figure 3. Job Titles and Relationship to Level within Software Company J

IV. Discussion

1. Similarities between the Two Companies

When looking at trends in the modularization of work and the sophistication of skills evaluation, there is a similarity between these two companies. That is, there is a difference in the level of standardization applied to skills evaluation, depending on the type of occupation.

In Systems Company A, skills standards are applied to the entire corporate group and have been defined for each specialized occupation type based on the occupation structure. Furthermore, within the company, skills evaluations are done based on self-assessment, which requires a high level of skills evaluation standardization, as well as the compilation of a "skills dictionary" in order to make the system function. At the same time, however, it is acknowledged that applying sophisticated and highly standardized systems for evaluating

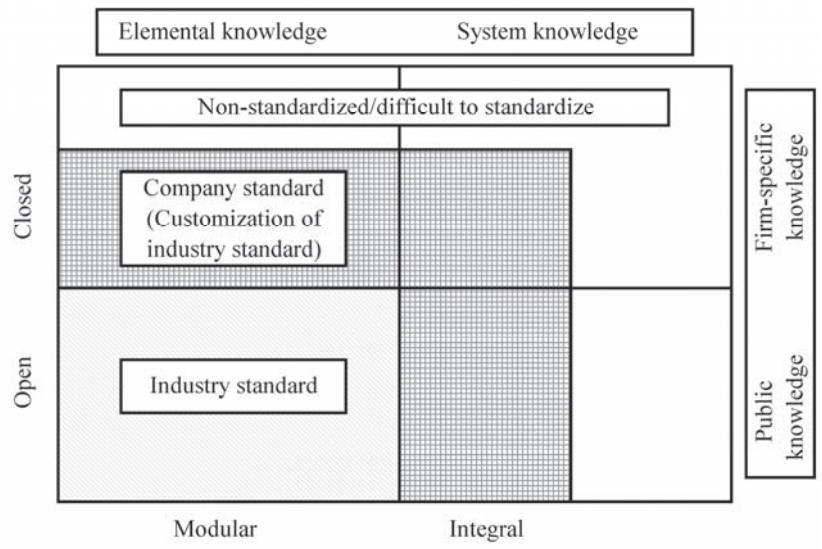


Figure 4. Image Showing the Extent of Standardization of Skills Evaluation

skills among specialist sales staff is more difficult than for other occupations, since they are required to interact with customers to a greater extent. In addition, IT architects, for example, who are in an IT technical occupation, are divided into general "IT Architects" and "Client IT Architects," who are required to be well-versed in the needs of one or more designated (particular) clients. This categorization hangs on the key term "degree of connection with the client," and it is thought that the degree of interface with the client is a factor that prescribes the extent to which skills evaluation can be standardized.

At Software Company J, the industry standard skills evaluation index ITSS has been applied as the basis for evaluation, but has been uniquely customized through the adoption of skills evaluation indexes that have been devised to fit the organization and work types engaged in by the company. In other words, the skills required at work are seen to be not only those to which industry standards can be applied (open), but also those that ought to be company standards (industry standards customized to the company), and so the level to which skills evaluations can be standardized differs.

In both of these two companies, issues related to client contact and the coordination and integration of work tend to be recognized as difficult targets for the standardization of skills evaluations. Stated in terms of the framework of this paper, in other words, the more the work is closed or integral in type, the more difficult it will be to modularize or standardize the evaluation of related skills (see Figure 4).

2. Differences between the Two Companies

On the other hand, some notable differences were observed between Systems Company A and Software Company J. Table 2 gives a simplified overview of these differences.

Table 2. Differences between the Two Companies in Terms of Work O/M and Standardization of Skills Evaluations

	Systems Company A	Software Company J
Skills evaluation standards	Company standards (PD tool)	Industry standard (ITSS) + Customization that fits the company
Method of evaluation	Self-assessment	Assessment by superiors based on self-written report
Settlement/Internal transfer of staff	Internal spot market	Placement/Rotation designed by Human Resources Department
Separation of career ladder for line and specialist staff	Section Manager and above	Department Manager and above

Both companies operate multi-track career ladders for both line and specialist staff, and while criteria have been established for specialized skills evaluations, significant differences are observed in their methods of evaluating their staff, as well as the handling of the placement and internal transfer of staff. At this point, we will consider these differences in more detail, and attempt to clarify a theory of why they may have occurred.

At Systems Company A, as seen earlier, a human resources database known as the "Professional Marketplace" is used as a venue for internal procurement of staff. This system means that in addition to the conventional vertical organizational structure of staffing, it is possible for any project to recruit or search for the most suitable staff members on a company-wide basis, without being restricted by the frameworks of the existing organizational unit. It therefore plays the role of an internal spot market. If, for example, there is a need to assign a project specialist with thorough knowledge of networks to the building of a financial system, but there is no appropriate staff member in the department concerned, the manager of the department responsible for financial systems can recruit a network specialist via the Professional Marketplace. The required skills, band level and experience, etc. are published as part of the recruitment information, allowing staff members to apply for the job. The manager can refer to the information on these applicants registered in the Professional Marketplace and procure the most appropriate staff member from among multiple candidates. According to the interviews, a certain proportion of project team members are currently procured using the Professional Marketplace, and the manager of Systems Company A's human resources department indicated an intention to develop the system so that this proportion can increase further in the future. Under this system, the human resources department does not, in principle, get involved in the process of staff procurement, acting only as an intermediary if a problem occurs (if, for example, a member of staff is subject to a dispute between two departments).

At Software Company J, on the other hand, there is no similar system in place, and

staff members are allocated to projects in more conventional organizational units. Of course, in some cases the need may arise for staff to be moved to another department, and in such cases the organizations involved coordinate between themselves.

These differences in the practice of placing and transferring staff within the two companies also give rise to differences in employees' careers, and in the role played by the human resources departments. We already mentioned the fact that both companies have multi-track career ladders in place for both line and specialist staff, but whereas Systems Company A implements a multi-track system for line and specialist staff at the section manager level and above, Software Company J only clearly categorizes staff as specialists once they are in charge of an area, from the department manager level. In other words, since Systems Company A has a clearer definition of the difference between line and specialist staff, staff members have fewer opportunities to broaden their careers, and they tend to have a higher incentive to improve their specialist skills in one occupational area compared to Software Company J. In addition, Systems Company A operates the Professional Marketplace. This means that specialist staff members are required to demonstrate employability in order to ensure that they are recruited within the internal spot market, and therefore the system makes the specialists develop their careers by self assessment and deepen their specialties in relatively narrow occupational fields. On the other hand, Software Company J implements more conventional internal human resources management, and as a result it is important for them to ensure that staff deployment is done in a way that is flexible with regard to the environment, in order to remain competitive. In other words, since there is a significant need for the company to take the lead in optimizing the organization overall, while it is of course important for staff members to improve their specialist skills, it is also important to promote the formation of broad career paths through rotations, which facilitate the flexible deployment of human resources. This means that the human resources department at Company J is involved in the placement and internal transfer of staff to a greater extent than it is in Systems Company A.

A particular sign of this is seen in the difference in PMs' career paths between the two companies. According to interviews, many staff that reached PM status in Software Company J had experienced a range of other specialist occupations beforehand. This shows the thinking that a certain amount of career breadth is a prerequisite for undertaking the role of PM in this company. This reflects an awareness that a PM requires, to a certain extent, a similar level of skills to the level demanded of a line manager. According to the framework of this paper, these are jobs categorized in quadrant 1. In Systems Company A, the work undertaken by a PM is standardized to a great degree, and the main requirement is to coordinate the project in line with these standards, to as efficient a degree as possible. According to the manager of System Company A's human resources department, "Considered from the perspectives of coordination and integration, this is indeed integral work, but the process is implemented on a highly openized basis." For this reason, PMs in Company A are categorized in quadrant 2. Furthermore, Company A's human resources manager stated that "PMs

are not, in principle, involved in interactions with customers in Systems Company A, so standardizing a PM's work is not the toughest issue. It is much harder to standardize the very specialized skills required of sales and consulting staff, who have high levels of interaction with customers." However, there was a slightly different perspective from an incumbent PM at this company, who stated, "It is true that PM work has been standardized to an extremely high level, but we often find that that type of standardized management methods do not in fact fit actual individual projects, or that things do not function exactly according to the standards. Furthermore, even if we work according to standardized methods, there are cases where these do not fulfill the preconditions of our clients for service provision, or where our clients cannot fulfill the roles the standards expect of them. PMs are often assigned to client sites, and we struggle to work out how to bridge those gaps" (Systems Company A Systems Development Service Division PM). This opinion, from a PM who actually does interact with the clients, further indicates the difficulties in implementing standardization in areas that involve interaction with clients, despite the progress of standardization that has been made in management techniques and other areas.

As can be seen from the points above, in Systems Company A, the efficient utilization of the Marketplace—in other words, the efficient procurement of staff—is a priority issue, and significant levels of sophistication in skills evaluation criteria will be required to achieve this. On the other hand, Software Company J implements conventional internal human resources activities that are common to typical Japanese companies, but at the same time, it is engaging in the further elaboration of its skills evaluation criteria as a way to efficiently train and evaluate its specialist staff.

The difference in the construction of skills evaluations systems in these two companies can be inferred as coming not only from their policies and practices of placement and internal transfer of employees as described above, but also from the differences in customer segmentation and policies for client relations. Software Company J often manages its projects as a subcontractor of the parent company (Company J) in SI (System Integration) work, and a high proportion of the company's business is with government departments or Japanese communications carrier group companies.[9] Furthermore, since only about 25% of Group J's sales are overseas (as of 2009), the entire Group, including Software Company J, is largely dependent on the Japanese domestic market. According to a sales manager from Company J, "With the exception of certain occupations, Japanese business practices have not been standardized to the degree that this has been done in the U.S. and Europe, and this trend holds true for SI business in the government and public infrastructure sectors. Software Company J, which is in just this situation, and also heavily dependent on the Japanese domestic market, must increase the levels of customer satisfaction by implementing its work in a way that gives its clients and the industry the highly specific customization that is required." Furthermore, the sales manager from Company J often sees smaller and me-

[9] From Company J's Accounting Report for the fourth quarter, March 2009.

dium-sized clients on limited budgets often introduce packaged software systems and align their needs to those (non-customized) systems for small projects. However, Software Company J, which usually deals with relatively large companies in the public sector, has a relatively high proportion of clients that require very firm-specific customization in building their systems.

Company A, on the other hand, was incorporated in the U.S., and a large proportion of its group companies conduct business overseas. The Japanese market is big, but it is only one sector within the global market, and as such, there is likely to be a basic difference in Company A's SI business operating policies compared with Software Company J. It is Company A's policy that competitive efficiency should be achieved by implementing SI based on globally standardized trade practices, expecting clients to align with such systems to some extent. The points outlined above, however, are merely conjectural considerations based on the results of these case studies, and it will be necessary to continue to study both companies, as well as to obtain detailed results from studies and analyses of other companies, in order to establish exactly why this difference in the extent of work O/M and skills standardization has occurred in two companies.

Next, in regard to the standardization of skills evaluations, questions must be asked regarding why all work within a company cannot be evaluated using only an industry-standardized tool such as ITSS, and why companies consider it necessary to customize the tool to their own situations, as well as why companies are making a large amount of effort towards work O/M and skills evaluation standardization regardless of the possibility that there are areas where standardization cannot be easily made or where standardization is impossible (very closed work, very integral work, or both). Seen from another perspective, these areas of work can be considered their own unique corporate know-how (the possible resource for a competitive advantage). Why do they act in a way that might prejudice their own competitive advantage? The following can be inferred from this situation. The process of either applying industry standards for work or required skills, or customizing such standards to fit a particular company, involves reconfirming the areas of work to which O/M cannot be applied (the areas that give the company its competitive advantage). Then, they apply industry standards to all other work and required skills except for the above. Areas standardized in this way will be imitated and learned from by other companies, but if the company has been at the front lines of implementing standardization, then it will be able to differentiate itself further while other companies are merely imitating it, and engage in unique measures to strengthen its business resources. The manager of the human resources department at Systems Company A comments in regard to this, "Since technology and skills in our industry become obsolete in much faster cycles than those of other industries, we are in a situation in which it is vital to either create new standards before any other company does so, or to build de facto standards. We are in a repeating cycle in regard to this. Systems Company A is engaged in constant efforts to be the first to create standards of this sort."

V. Conclusions

In this paper, we analyzed case studies regarding work O/M and the sophistication and standardization of skills evaluations taking place in the IT industry, which is considered to be typical of an openized and modularized industry. The main purpose of these case studies was a comparison between a U.S. company's subsidiary in Japan, where work O/M is considered to be progressive, and a Japanese company, which is conventionally known for its closed-integral style work, and where the introduction of work O/M is said to be delayed. Our conclusions, gained from the case studies and observations of examples, are as follows, organized in response to the original RQs.

Based on the results of interviews, it is clear that the attributes of work within the IT industry can be explained by the work architecture described in the framework of this paper. In other words, work in the IT industry is mostly divided into modular-type work. Despite being divided into modules, work in those two companies still requires highly firm-specific knowledge, and integral-type work, in which a high degree of coordination and integration is required between modules. Work processes in the industry can be categorized as openized (industry standard) or closed (firm-specific). Closed areas include the work that requires high levels of interaction with clients and work that requires knowledge that is specific to that company.

Standardization of work O/M and skills evaluation in the IT industry are considered, at least from the results of these case studies, to have progressed to a significant level, with both companies indicating that they intend to develop them even further in the future. Explained in terms of the framework of this study, this means that areas categorized as open/modular-style work (quadrant 3) are expanding, while the standardization of skills evaluation is progressing to a significant degree. Industry standardization is progressing, as seen in the example of Software Company J, where open/modular type work and its evaluation are carried out using skills evaluation criteria such as ITSS. At the same time, however, both Systems Company A and Software Company J find that the areas of their work that demonstrate more integral and closed attributes have not been standardized by the companies (and even less so by the industry), and may even be difficult to standardize. This is indicated by the fact that Systems Company A notes the difficulty of providing company standards for the evaluation of skills held by sales staff, and that Software Company J has introduced its own customized version of standards for evaluating skills required for customer interaction and coordination, but also finds that there is a significant area of work for which evaluation cannot be implemented without coordination between different departments.

To summarize the above, findings from the comparative study of the two companies indicate that the extent of implementation of work O/M and standardization of skills evaluation differs from company to company. In Systems Company A, both work O/M and standardization of skills evaluation have progressed to a high level, and there is a strong inten-

tion to implement industry standardization of their work execution processes and skills evaluation. In contrast, while Software Company J also indicates the intention to switch to industry standards, there is a stronger emphasis towards the appropriate customization of industry standards for work execution processes and skills evaluation criteria so as to achieve customized standardization, and towards achieving a balance between standardization and the building of firm-specific and client-specific skills for areas to which standardization cannot be applied. The major factor that determines this difference is the human resources management system, and more particularly the system for the placement and internal transfer of staff. At Systems Company A, the emphasis is placed on the "optimal placement of human resources," while at Software Company J it is on "efficient development of human resources."

In other words, at Systems Company A, they have been building a system that functions as a quasi-occupational labor market, and skills assessment criteria have been defined in order to promote individual skills assessment, the development of employability, and career management. It is necessary to exclude firm-specific aspects unique to individual organizations or clients, and implement standardization as far as possible, in order to successfully utilize the staff procurement and deployment facilitated by this quasi-occupational labor market. This is because non-standardized individual skills information and information related to work execution processes belong within the individual or workplace. It would cost inordinate amounts of time and money for an individual line manager to collect such specific human resources information from each department in order to implement staff procurement or placement across the company as a whole. It is virtually impossible. If this were to happen, this sort of system would no longer function as a "marketplace." On the other hand, using the marketplace in order to deploy human resources, rather than a staff transfer plan led by the human resources department, requires an even greater degree of industry standardization in regard to individual skills and work execution processes, since these are the basis for staff placement. Furthermore, if the separation of career path ladders between specialists and line managers starts at an early stage as in the case of Systems Company A, it becomes easier to specify the skills demanded of specialist employees more particularly, and to implement work O/M and standardize skills evaluation.

In comparison with this, Software Company J has maintained a conventional career development system (periodic rotation designed by the human resource department). When this happens, in the formulation of skills evaluation standards, it is no problem for a certain amount of firm-specific content to be included in the designation of work processes and skills. It is needless to clarify so many skills to individual employees, since the human resource department will collect the firm-specific skills and work process information embedded in the individual workplace or employee for rotation.

The separation of career path ladders between specialist and line staff at Software Company J takes place relatively late—at department manager level or above—and since the human resources department implements rotation as one aspect of its training program,

even specialist staff are required to experience and gain skills in closed/integral work as part of their career development process to a higher degree than is the case at Systems Company A. Furthermore, at Software Company J, it is felt that a high level of firm-specific and client-specific skills are required for the execution of work, in line with to the customer segment. As a result, work and skills evaluation is not done to thorough industry standards, but rather, the emphasis is on maintaining a balance between the training and evaluation of specialist and line staff, and on the creation of standards that are customized to the organization from industry-standard skills evaluation, in line with the human resources management policy and the characteristics of the client.

However, it is clear that the standardization of skills evaluations is required in areas of work where O/M has progressed, no matter what purpose the effort of skills standardization is being made for, since technical skills swiftly become obsolete in the IT industry. At the same time, it is also vital to consider how to ensure that skills and work, which eventually turn into commodities (that are easy to imitate for other companies), should be uniquely customized and updated in order to build and maintain a competitive advantage in such a rapidly changing industry.

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Non-Permanent Employees Who Have Become Permanent Employees: What Awaits Them after Crossing Status or Firm Borders to Become "Permanent"

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Based on a unique survey conducted amongst permanent employees with experience being employed as non-permanent employees after graduation, this paper compares transfers within companies and between companies in relation to the transition status from non-permanent to permanent employment, and analyzes the characteristics of each.

The transition from non-permanent to permanent employment within the same company, something that has not been assessed in official statistics in the past, showed a strong tendency of adherence to the same kinds of job type and workplace before and after the transition. On the other hand, in the case of inter-company transfers involving transition from non-permanent to permanent employee status, it is common to experience different job types and workplace environments before and after the transition.

In intra-company transfers, the content of the work was evaluated as the main criterion, and in the process of internalizing irregularities arising through ongoing employment, it was inferred that there was already a gradual trend towards improvements in working conditions. In contrast, in the case of inter-company transfers through changes of job, the main evaluation criterion was the worker him- or herself, and rapid improvements in working conditions were seen after the transfer, if the worker was deemed suitable to be a permanent employee.

Another new discovery was that it became clear that annual income after the transition to permanent employment did not depend on the route of transition from the non-permanent status. As a result of estimating the earned revenue function of permanent employment for a person with experience in non-permanent employment, after controlling for such factors as educational background, job type and length of service, no significant difference was seen between intra-company and inter-company transfers. In terms of the background behind income after the transition to permanent employment being independent of the route, the possibility was suggested that decision-making behavior came into play among non-permanent employees in relation to the choice of intra-company or inter-company transfers.

I. Introduction

This paper analyzes the situation concerning the transition from non-permanent to permanent employment of people currently working as permanent employees who have experienced being employed as non-permanent employees after graduation. In particular, it categorizes the transition from non-permanent to permanent employment into transfers within the same company and transfers between different companies, and clarifies the characteristics of each category.

When seeking to consider the ideal situation with regard to non-permanent employment, there are potentially two approaches. One is an approach that involves keenly pointing out the serious situation in which they are being placed, and to cut into the so-called "dark" side of non-permanent employment, with the aim of achieving a breakthrough in the situation. It is this dark side, which involves such problems as temporary worker layoffs and the termination of non-permanent employment contracts, that has frequently been raised as an issue during the deep recession that began in the autumn of 2008.

In contrast to this, another approach is to pay attention to the "light" side, linking wishes to the expansion of opportunities, without overlooking areas of non-permanent employment where improvements in the situation are being seen. This paper sheds some light on the latter "light" aspects of non-permanent employment.

It is generally considered to be difficult for a person to switch from being a non-permanent to permanent employee, but is not impossible. In fact, according to the reference table carried every year in the Labour Force Survey (Detailed Tabulation), the number of those who switched from non-permanent to permanent employment climbed from an annual average of 300,000 to 400,000 during the first decade of the 21st century. Genda (2008a) used the Employment Status Survey, which ensures the largest sample size concerning job changes in Japan, to analyze the factors regulating transitions to permanent employment, through job transfers of non-permanent employees, and verified that specialist skills, such as those in the field of medicine and welfare, gave non-permanent employees an advantage in switching to being a permanent employee. An important discovery in this was that continued work experience at the same company as a non-permanent employee for around two to five years before leaving a position gave people an advantage in switching to being a permanent employee. As a background to this, the paper pointed out consistency with the signaling hypothesis, in which continued work experience in one's previous position is an indicator of potential abilities and propensity to remain in a job.

In addition to the transition to permanent employment through job changes, Genda (2008b) indicated that internal promotions within the same company are important as a means of improving working conditions for non-permanent employees. For this paper, a unique survey was carried out of more than 3,000 non-permanent employees without spouses, and the internal labor market hypothesis concerning non-permanent labor was verified. According to the conventional dual labor market theory, non-permanent employment belongs to the external labor market, with poor work-related learning opportunities, and it has been uniformly understood that working conditions are unrelated to experience and individual abilities.

However, from positive analysis using a unique survey, proof has been obtained that even in non-permanent employment, there is a positive relationship between annual income and the number of years of continuous service, and past work experience is also assessed in some areas. These results signify the fact that seniority-based benefits, in which income is determined according to experience through in-house training, or selective benefits, where

income is determined according to individual abilities, are being implemented. This tells us that even among non-permanent employees there are people whose skills are being formed and who are receiving work benefits commensurate with the lower tier of the internal labor market.

These studies suggested that, as well as the accumulation of specialist skills, the development of a stable environment that permits a certain period of continued employment within the same company was a decisive factor in improving working conditions for those in non-permanent employment. However, on the other hand, there was still the unanswered issue of verifying one other important path towards improving working conditions for those in non-permanent employment. This was the clarification of the transition process from non-permanent to permanent employment within the same company.[1]

The Employment Status Survey only shows cases of transitions from non-permanent to permanent employment where the company at which the employee works has changed as a result of a job change. Trends related to people who have been promoted from non-permanent to permanent employment within the same company, without a job change, are not surveyed in conventional government statistics. Even in previous research, although there are studies that have touched upon the transition from non-permanent to permanent employment within a company, there are few relevant samples available, so the subject has not been taken up as a major research target.[2]

Accordingly, a new survey has been conducted of people who were working as permanent employees at the time of the survey, who had experience of employment as non-permanent employees after graduation, and this paper conducts a positive analysis of the status of transition from non-permanent to permanent employment through transfers within the same company, as well as transfers between companies as a result of job changes.

II. Data

1. Survey Method

In order to achieve the objectives of this paper, it is necessary to secure an adequate number of samples that can stand up to statistical validation, in relation to people who have experience working as non-permanent employees after graduating or dropping out of school, and who are currently (at the time of the survey) working as permanent employees. The option of conducting a web-based survey was selected as an effective means of doing this, with the survey being aimed at people who have already volunteered to participate in various consumer monitoring surveys, whose individual attributes have already been regis-

[1] There have not been many studies of opportunities to advance from non-permanent to permanent employment within a company, but one exception to this is Sato (2004).

[2] For example, Nishimura (2008) stated that the Survey of Working Persons conducted by Works Institute Recruit indicates a situation in which the forms of transition to permanent employment are becoming more diverse, irrespective of academic background or gender.

tered.[3]

The specific procedure was as follows. Ahead of the survey, a screening survey was conducted and people from across Japan between 20 and 44 years of age who were permanent employees with experience of having worked as non-permanent employees (part-time, casual employment, temporary workers, employees on fixed-term contracts, independent contractors, etc.) in the past, since graduating (or dropping out) of school, were selected from among those who registered to be monitors.[4] In doing so, those in managerial or executive positions were excluded. Then, after screening them for a certain period, 4,383 of those who had registered, who met the requisite conditions, were asked to cooperate in this survey.

This survey aimed to obtain around 3,000 valid responses from those who were requested to participate. In addition, consideration was given to ensuring that it was possible to secure a minimum of around 1,000 responses as samples where the company at which the respondent had most recently worked as a non-permanent employee (excluding students) was the same as the company at which he or she was currently working as a permanent employee, with a further 1,000 as samples where the two companies were different. Incidentally, in relation to the question above, following on from the survey choice of a "different" place of employment was the note, "includes cases in which you are currently working as a permanent employee at a company where you were previously employed as a temporary worker sent from a staffing agency," in order to draw attention to the fact that permanent employment at the place to which an employee had previously been dispatched as a temporary worker should be classed as the transition to permanent employment through transfer between companies.

2. Analysis Targets

Among the permanent employees with experience of working as non-permanent employees are those who made a direct transition from their most recent non-permanent employment to their current permanent employment, as well as those who ended up in their current permanent position after having experienced non-permanent employment in the past, followed by multiple experiences of permanent employment.

The main focus of this paper is a comparison of the characteristics of the process of transition from non-permanent to permanent employment in the case of transition within the

[3] In research using web-based consumer monitoring surveys, there are often concerns about the credibility of the content of responses, as well as bias in the attributes of the respondents. In fact, in order to obtain reliable responses with a high level of objectivity, it is necessary to eliminate those who make poor monitors, such as those who are "masquerading," those who have multiple registrations and those who provide multiple responses, and to reduce respondent bias to the greatest degree possible. Accordingly, the actual implementation of the survey was entrusted to a survey company that has the country's largest number of monitors whose identity has been confirmed (around 700,000), by means of checks with financial institutions.

[4] The analysis target range was set at between 20 and 44 years of age because it was thought that the survey would mainly target people who had begun working during the recession after the collapse of the bubble economy.

same company and also in the case of transition through job changes between different companies. When comparing the employment situation in the most recent episode of non-permanent employment and in the current permanent employment, if cases where respondents have experienced employment as permanent employees at other workplaces are included, the impact of the learning effect resulting from their having built up experience as permanent employees will end up being included in the comparison.

Consequently, in order to ascertain the transition from non-permanent to permanent employment as accurately as possible, it is preferable to limit the survey to samples where respondents were working as non-permanent employees immediately before commencing work in their current positions as permanent employees.

In cases where respondents replied that the companies where they are currently working as permanent employees are "the same" as the companies where they were employed most recently as non-permanent employees, the respondents were then asked about their circumstances immediately before they began working at their current workplaces. In the analysis below, of those who experienced internal transfers, the sample that responded that "I was working as a non-permanent employee at my current workplace" or "I was working as a non-permanent employee at a different workplace in my current company" is called the "intra-company transfer" group in the transition from non-permanent to permanent employment.[5] Of the valid responses, the sample that corresponded to intra-company transfers numbered 1,117.

On the other hand, in the event that the response was that the company where the respondent is currently working as a permanent employee is "different" from the company where he/she was working most recently as a non-permanent employee, the respondent was also asked what he/she was doing immediately before becoming employed as a permanent employee at the current company. By looking at the responses, we can see that, of the 1,950 cases where the respondent had become a permanent employee through a change of job, there are many who had accumulated multiple experiences as permanent employees, with the number of those responding that "I was working as a permanent employee at a different company" climbing the scale to 622.[6] Accordingly, among those who had undergone a change of job, the "inter-company transfer" group only refers to those who were employed

[5] With regard to "workplace," one of the following options was selected: "Administrative division of the company (headquarters/head office)," "Administrative division of the company (branch office/branch store/affiliate)," "Research and development division of the company (research institute, etc.)," "Factory/construction site/work site," "Sales office/service center/call center," "Distribution/wholesale/delivery center," "Retail store/catering establishment (supermarket, convenience store, restaurant, Japanese-style pub, etc.)," "Other premises (hotel, internet café, karaoke parlor, entertainment-related business, etc.)," "Individual office," "Civil service," "Working from home," "No set workplace," "Other."

[6] In addition, those who responded "I was not doing anything" (126) or "I was doing something I was interested in other than work, such as hobbies or study" (117) were defined as the midstream job change path.

and working as non-permanent employees at different companies immediately before becoming permanent employees at their current companies, and only these were included as the targets of the analysis. The inter-company transfer group numbered 915.

3. Base Attributes of the Intra-Company Transfer Group and the Inter-Company Transfer Group

Table 1 presents a number of the basic attributes of the intra-company transfer group and the inter-company transfer group. By gender, the proportion of men was higher than the proportion of women in both groups. By age structure, those in their 30s were more numerous than those in their 20s or their early 40s. By the educational establishment attended most recently, in the intra-company transfer group, the proportion of those who had attended a technical college, junior college or vocational college was slightly higher than those who had ended their education after high school, whereas in the inter-company transfer group, both categories were more or less equal.[7] However, what both groups have in common is the fact that the proportion of those who had attended universities or graduate schools was the highest of all categories.

Even when a chi-square test was conducted to compare these attributes, no statistically significant differences were seen in the composition of the two groups. In general, in the intra-company transfer and inter-company transfer groups, no clear differences can be seen in such individual attributes as gender, age and academic background.

The area where a pronounced disparity can be seen between intra-company transfers and inter-company transfers is in the form of employment during the most recent period of non-permanent employment. In the inter-company transfer group, where the respondents became permanent employees through changes of job, the most common form of employment immediately before the change of job was casual work. For students such as university and high school students, casual work carries strong connotations of being a temporary form of employment in order to earn the income that they require for living expenses or leisure. However, casual employment after graduation might perhaps be perceived by workers or companies as interim employment at the stage before beginning full-time employment as permanent employees.

In the inter-company transfer group, the next highest proportion after casual work was accounted for by job changes from registered temporary worker to permanent employee. This category could well include at least some cases where a worker is employed as a permanent employee at a company to which he or she has been dispatched as a “temporary-to-permanent” employee, at the end of the planned period of employment as a temporary worker sent by a staffing agency. In response to the impact of the global recession that began in the autumn of 2008, many difficulties related to the employment of temporary

[7] The educational establishment attended most recently that is indicated in the table includes school, college or university where the respondent dropped out part of the way through that educational stage.

Table 1. Individual Attributes as Seen in the Cases of Intra-Company Transfers and Inter-Company Transfers

(Component ratio in each category, %)

Permanent employees who were non-permanent employees immediately before taking up their current positions	Intra-company transfers (n=1,117)	Inter-company transfers (n=915)
(A) Gender		
Male	52.6	55.3
Female	47.4	44.7
(B) Age		
20-24 years	2.3	2.7
25-29 years	19.3	18.9
30-34 years	30.8	33.2
35-39 years	30.2	28.4
40-44 years	17.5	16.7
(C) Educational establishment attended most recently		
Junior high school	1.4	1.2
High school	26.9	29.7
Technical college, junior college, vocational college	29.5	29.3
University, graduate school	42.2	39.8
(D) Form of non-permanent employment (most recent)		
Part-time work (limited days and limited hours)	10.4	10.5
Casual work	23.6	41.0
Temporary work	3.1	3.2
Part-time work (limited days)	1.9	1.8
Day labor	0.8	2.5
Temporary (sent from a staffing agency: registered)	26.5	19.0
Temporary (sent from a staffing agency: standard)	7.7	5.8
Temporary (sent from a staffing agency: other)	1.0	0.2
Independent contractor	1.9	3.3
Fixed-term contract	20.1	10.7
Fixed-term contract (annual)	2.6	1.3
Other (other than permanent)	0.4	0.8

Note: Web-based survey entitled *Questionnaire on Ways of Working*, implemented for the specially promoted research project entitled Economic Analysis of Inter-Generational Issues. The same applies for all other tables.

workers were pointed out, such as the breaking of contracts and dismissal, and there were those who raised doubts about the temporary employment system itself. However, the results here suggest that registered temporary employment is the next most important form of employment after casual work as a route to becoming a permanent employee through a change of job.

In contrast, in relation to intra-company transfers, caution is required in the interpretation of the most recent form of non-permanent employment. Looking at Table 1, we can see that registered temporary employment is the form of non-permanent employment that accounts for the highest proportion among the intra-company transfer group. If we interpret these results literally, it means that registered temporary workers not only have the potential to become permanent employees at the "temporary place of employment" where they are actually working, but also that there are many cases in which they are employed as permanent employees at the "dispatching company" with which they concluded an employment contract. It suggests that there are few cases among non-permanent registered employees who change their form of employment at the "dispatching company" as a standard permanent employee.

In this survey, in relation to the transition from the most recent non-permanent employment to the current permanent employment, in cases where the respondents are currently working as permanent employees at places where they previously worked as temporary employees, they were prompted to select an option indicating the change of job (inter-company transfer). However, there may be some who were employed as permanent employees at the temporary place of employment and who responded that they were transferred within the same company, considering their actual places of employment as their workplace, irrespective of their employment contracts.

If we exclude registered temporary employment, the most common form of non-permanent employment prior to experiencing an intra-company transfer was casual work, as was the case with inter-company transfers. In fact, what is worthy of note in the intra-company transfer category is the large number of those making the transition from employees on fixed-term contracts. The results in the table suggest that some people are aware that being a contract employee is a trial form of employment, with a view to the possibility of making the transition to becoming a permanent employee at the company in the future.

III. Changes in Job Type and Workplace

1. Changes in Job Type

Table 2 presents a matrix representing the situation concerning changes between the job type at the time of most recent employment as a non-permanent employee before the transition and the job type when employed as a permanent employee after the transition, showing the situation for both intra-company and inter-company transfers.[8] The matrix values refer to the component ratio (percentage) of the permanent job type after the transition as seen by job type while in non-permanent employment; the upper row shows the

[8] In this survey, the number of non-permanent employees selecting the "managerial position" option was very low, at just 19, so this option has been excluded from the table.

Table 2. Changes in Job Type Resulting from the Transition from Non-Permanent to Permanent Employment

Upper row (intra-company transfers) Lower row (inter-company transfers)		Permanent employment job type after the transition								(I) Job type composition at the time of non-permanent employment
		Professional/ technical position	Clerical position	Sales/ marketing position	Service position	Production process/ manual labor position	Transport/ security position	Other	Total (%)	
Non-permanent employment job type immediately before the transition	Professional/ technical position	**89.6**	7.1	2.5	0.8	0.0	0.0	0.0	100.0	**21.5**
		73.5	14.3	4.8	2.7	4.1	0.7	0.0	100.0	**16.2**
	Clerical position	2.9	**94.2**	1.5	0.2	0.2	0.0	1.0	100.0	**36.9**
		10.8	**80.3**	4.0	2.2	0.9	1.4	0.5	100.0	**24.5**
	Sales/marketing position	7.1	6.0	**78.6**	3.6	2.4	2.4	0.0	100.0	**7.5**
		4.4	42.0	**39.1**	4.4	1.5	5.8	2.9	100.0	**7.6**
	Service position	12.5	12.5	7.5	**60.0**	2.5	0.8	4.2	100.0	**10.8**
		23.7	33.6	11.2	**16.6**	10.0	4.6	0.4	100.0	**26.5**
	Production process/manual labor position	4.6	11.2	3.3	0.7	**78.3**	1.3	0.7	100.0	**13.6**
		18.1	18.8	6.9	9.7	**31.9**	11.8	2.8	100.0	**15.8**
	Transport/security position	1.3	10.0	11.3	0.0	2.5	**75.0**	0.0	100.0	**7.2**
		13.0	18.8	11.6	10.1	14.5	**29.0**	2.9	100.0	**7.6**
	Other	11.1	18.5	3.7	0.0	0.0	0.0	**66.7**	100.0	**2.4**
		6.3	50.0	18.8	6.3	6.3	0.0	**12.5**	100.0	**1.8**
(II) Job type composition after entering permanent employment		**23.3**	**40.8**	**9.2**	**7.1**	**11.4**	**5.8**	**2.5**	**100.0**	
		25.1	**39.4**	**10.0**	**8.1**	**9.9**	**6.2**	**1.3**	**100.0**	

Note: Of the non-permanent employment types, managerial positions (pre-transition) have been omitted. Apart from the column at the far right (I) and the row at the bottom (II), the figures represent shares of non-permanent employment job types immediately before the transition. (I) shows the share of total non-permanent employment before the transition, while (II) shows the share of total permanent employment after the transition.

values for intra-company transfers, while the lower row shows the values for inter-company transfers.

As well as the job type change matrix, the table also presents the pre-transition job type component ratio for non-permanent employment as a whole in the column at the far right (I), while the bottommost row (II) shows the post-transition job type component ratio for permanent employment as a whole. The values in (I) and (II) promote an understanding of the main discoveries related to the changes that are demonstrated in the matrix.

From (I), we can see that most transitions from non-permanent employment as a result of intra-company transfers arise from clerical positions, professional positions and technical positions. More specifically, the proportion of those who were in clerical positions before their transition to permanent employment was 36.9%, while the proportion of those in professional and technical positions was 21.5%, so together they account for over half of the total. Thus, the majority of intra-company transfers arise from white-collar job types, while those from blue-collar job types such as production process jobs and manual labor did not exceed 13.6% of the total.

Furthermore, from the inter-company transfers section of (I), it is evident that there are points in common with intra-company transfers, as well as areas of difference. With regard to the points in common, transitions from clerical positions are high in inter-company transfers as well, at 24.5%. Moreover, transfers from non-permanent employment in production process jobs and manual labor were also limited in the category of inter-company transfers, at 15.8%. Irrespective of whether it resulted from an intra-company or an inter-company transfer, the transition from non-permanent to permanent employment occurs most easily in clerical positions.

However, there are also differences from intra-company transfers in the category of inter-company transfers. In the case of inter-company transfers, along with clerical positions, there was a high incidence of transition from non-permanent employment in the case of service positions. Inter-company transfers from professional and technical positions were about as low as those from production process jobs and manual labor, at 16.2%.

At the same time, another important fact is revealed by the job type composition after the transition to permanent employee status in (II); with regard to the job type composition at the time of hiring as a permanent employee, there was hardly any difference between intra-company and inter-company transfers. Irrespective of the transition process, what was common to both intra-company and inter-company transfers was that the proportion of those taking up permanent employment in clerical positions after the transition was the highest, at around 40%. Moreover, permanent employees in service positions after the transition accounted for only a small proportion of the total in the case of intra-company transfers, at 7.1%, and the level was similarly low in the case of inter-company transfers, at 8.1%. On the other hand, in the case of professional and technical positions, where the occurrence of inter-company transfers is not very common, whereas the proportion after the transition in the case of intra-company transfers is 23.3%, in the case of inter-company transfers it was

a comparable level, if slightly higher, at 25.1%. The job type composition after the transition to permanent employee status is surprisingly similar between intra-company and inter-company transfers.

Behind the changes in the job type composition between the pre- and post-transition situation are marked differences in the situation with regard to the changes in job type detailed in the matrix in the table.

Looking at the diagonal matrix, we can see that the share of those remaining in the same job type is markedly higher in the case of intra-company transfers than in the case of inter-company transfers. In cases where non-permanent employees in clerical positions transfer to positions within the same company, almost all (94.2%) become permanent employees in clerical positions. In the case of non-permanent employees in professional or technical positions, 89.6% of those experiencing intra-company transfers moved to permanent professional or technical positions. In the case of other positions, although the share of those remaining in the same job type was comparatively low, compared with the case of inter-company transfers, the disparity is large. The share of those in non-permanent employment in production process jobs and manual labor who remained in the same job type after the transition to permanent employment is 78.3% in the case of intra-company transfers, whereas in the case of inter-company transfers it was less than half, at 31.9%.

This fact means that, in the case of inter-company transfers, changes of job type occur frequently as a result of the transition. In the case of intra-company transfers, 60% of those in non-permanent employment in service positions transitioned to permanent employment in service positions. However, in the case of inter-company transfers, the percentage of those switching to permanent service positions after the transition from non-permanent service positions, which were the most common, was low at 16.6%. Rather, non-permanent employees in service positions mostly moved to being employed as permanent employees in clerical positions or professional/technical positions at other companies through job transfers.

In inter-company transfers, there were many cases of non-permanent employees in sales/marketing positions transferring to permanent clerical positions, rather than positions in the same job type. In the case of production process jobs and manual labor, although the share accounted for by those working in the same job types after changing jobs was the highest, the share of those changing jobs to take up professional, technical or clerical positions as permanent employees was also not that low, at 18-19%.

Changes of job type where there are frequent transitions from non-permanent employment arising from inter-company transfers give rise to results in which the job type composition after the transition to permanent employee status does not differ greatly between intra-company and inter-company transfers.

Overall, we can see from Table 2 that job type is the main criterion in intra-company transfers as the prerequisite that brings about the transition from non-permanent to permanent employment, and this continues even after the transition, while there appears to be only

a weak tendency to adhere to a particular job type in the case of inter-company transfers. In fact, a different criterion from job type while in non-permanent employment lies behind inter-company transfers.

2. Changes in Workplace

Table 3 presents a matrix of changes in the workplaces where the respondents worked as non-permanent employees immediately before their transitions and where they worked as permanent employees after their transitions. In addition, with regard to workplaces, in the case of temporary workers and independent contractors, rather than asking about the dispatching company or the company issuing the contract, the survey sought answers about the places to which the respondents were dispatched or contracted.[9] In the same way as Table 2, the column on the far right indicates the workplace composition at the time of non-permanent employment, while the bottom row shows the workplace composition at the time of permanent employment.

If one looks at the table, naturally, the proportion of those working in the same kind of workplace after the transition is high in the case of intra-company transfers. Of the non-permanent employees who had been working in the "administrative division of the company (headquarters/head office)," the proportion of those who became permanent employees working in the "administrative division of the company (headquarters/head office)" in the same way after the transition is 93.6%. In the case of intra-company transfers, excluding the "sales office/service center/call center" and "other premises (hotel, internet café, karaoke parlor, entertainment-related business, etc.)" options, in all of the other workplaces, at least 75% of respondents are working as permanent employees in the same kind of workplace.[10]

However, even in the case of transfers within the same company, a number of cases are evident in which the workplace changed as a result of the transition from non-permanent to permanent employee status.[11] For example, of the non-permanent employees working in

[9] In the event that there were multiple workplaces, the respondents were asked to answer about the workplace where they spent the greatest number of years working.

[10] Apart from transfers of workplace, the transfer situation related to the scale of employees (number of permanent employees) overall in the company where respondents are employed was also surveyed. According to this, naturally, in the case of intra-company transfers, the proportion of respondents working in a workplace with the same scale of employees before and after the transfer is high. On the other hand, there were also cases in which the current scale of employees, since the respondent became a permanent employee, has increased compared with the stage at which the respondent was a non-permanent employee. This result tells us that the transition from non-permanent to permanent employment has occurred as a consequence of an expansion in employment by the company, even if only indirectly.

[11] These are cases in which the company where the respondent was working most recently as a non-permanent employee and the company where he/she is currently working as a permanent employee are the same, and correspondents to the option "I was working as a non-permanent employee at a different workplace in my current company."

the "administrative division of the company (branch office/branch store/affiliate)," the proportion who transitioned to the headquarters or head office of the same company as a permanent employee was 16.4%.

More than this, though, the change in the type of workplace in the case of inter-company transfers was significant. Looking at the column on the far right (I), we can see that the workplaces of non-permanent employees where the greatest number of inter-company transfers takes place are in the "retail store/catering establishment (supermarket, convenience store, restaurant, Japanese-style pub, etc.)" category (20.8%). However, looking at the subsequent changes based on the matrix, we can see that the proportion of those working in retail stores or catering establishments after the transition was around one person in ten. The majority became permanent employees working at a "factory/construction site/work site" or in the administrative division of a company.

In the case of inter-company transfers, the highest proportion of transitions involving the same kind of workplace before and after the transition is accounted for by the "administrative division of the company (headquarters/head office)" category, with a share just shy of 70%, at 69.4%. Conversely, in the case of non-permanent employment in a different kind of workplace, the proportion accounted for by permanent employment at the company headquarters or head office is high. Of the people working as non-permanent employees at a branch office, branch store or affiliate, the proportion who became permanent employees working at the head office as a result of a change of job is around 40%.

As a result, in this area as well, the workplace composition immediately after becoming a permanent employee, as shown in the bottom row of Table 3 (II) is similar in the case of both intra-company and inter-company transfers. From (I), one can see that in the case of intra-company transfers, the proportion of non-permanent employees in the "administrative division of the company (headquarters/head office)" changing workplace was higher than in the case of inter-company transfers. However, looking at (II), we can see that the proportion accounted for by the "administrative division of the company (headquarters/head office)" is about the same in the case of intra-company and inter-company transfers, at around 36%, due to the diversity of workplace transfers arising from inter-company transfers. Moreover, as a result of the fact that most non-permanent employees who had been working at a "retail store/catering establishment" departed that category for other workplaces, the proportion of those working as permanent employees at retail stores or similar establishments after the transition was low, as in the case of intra-company transfers.

From the above, we can conclude that the transition from non-permanent to permanent employment by means of intra-company transfers often involves a move to the same kind of workplace, primarily the administrative division of a company, whereas most transitions from non-permanent to permanent employment involving a change of company are characterized by the fact that they result in a move to a different kind of workplace.

Table 3. Changes in Workplace Type Resulting from the Transition from Non-Permanent to Permanent Employment

Upper row (intra-company transfers) Lower row (inter-company transfers)		Permanent employment workplace after the transition										(I) Workplace composition at the time of non-permanent employment
		Administrative division of the company (headquarters/ head office)	Administrative division of the company (branch ffice/ branch store/ affiliate)	Research and development division of the company	Factory/ construction site/ work site	Sales office/ service center/call center	Distribution/ wholesale/ delivery center	Retail store/ catering establishment	Other premises	Other	Total (%)	
Non-permanent employment workplace immediately before the transition	Administrative division of the company (headquarters/head office)	**93.6**	2.0	1.1	0.6	1.4	0.3	0.0	0.3	0.8	100.0	**32.1**
		69.4	15.3	2.1	2.1	4.2	0.7	0.7	0.7	4.9	100.0	**15.7**
	Administrative division of the company (branch office/branch store/affiliate)	16.4	**77.4**	1.1	2.8	1.1	0.0	0.6	0.0	0.6	100.0	**15.9**
		41.8	**38.8**	1.9	1.9	4.9	1.0	1.0	1.9	6.8	100.0	**11.3**
	Research and development division of the company	1.9	1.9	**84.9**	3.8	1.9	0.0	1.9	0.0	3.8	100.0	**4.7**
		12.1	9.1	**48.5**	18.2	0.0	3.0	0.0	3.0	6.1	100.0	**3.6**
	Factory/construction site/ shop floor	5.8	3.7	1.6	**85.8**	2.1	0.0	0.0	0.0	1.1	100.0	**17.0**
		22.2	7.4	3.1	**43.8**	6.2	6.8	3.1	2.5	4.9	100.0	**17.7**
	Sales office/service center/ call center	10.1	11.2	2.3	1.1	**71.9**	0.0	0.0	0.0	3.4	100.0	**8.0**
		38.8	14.9	1.5	6.0	**23.9**	0.0	1.5	1.5	11.9	100.0	**7.3**
	Distribution/wholesale/ delivery center	8.9	8.9	0.0	2.2	0.0	**77.8**	2.2	0.0	0.0	100.0	**4.0**
		23.5	9.8	0.0	13.7	11.8	**27.5**	7.8	0.0	5.9	100.0	**5.6**
	Retail store/ catering establishment	9.9	2.2	1.1	3.3	4.4	0.0	**76.9**	2.2	0.0	100.0	**8.2**
		28.4	9.5	3.2	17.4	13.2	5.3	**11.1**	3.2	9.0	100.0	**20.8**
	Other premises	17.5	2.5	2.5	0.0	7.5	0.0	5.0	**65.0**	0.0	100.0	**3.6**
		30.4	18.8	4.4	11.6	10.1	0.0	5.8	**7.3**	11.6	100.0	**7.5**
	Other	2.7	6.8	2.7	0.0	6.8	2.7	2.7	0.0	**75.7**	100.0	**6.6**
		30.2	16.7	5.2	5.2	10.4	4.2	3.1	1.0	**24.0**	100.0	**10.5**
(II) Workplace composition after entering permanent		**36.4**	**15.6**	**5.4**	**15.9**	**7.9**	**3.4**	**6.9**	**2.6**	**6.0**	**100.0**	
		35.5	**15.2**	**4.5**	**15.2**	**9.3**	**4.6**	**4.4**	**2.3**	**9.1**	**100.0**	

Note: Apart from the column at the far right (I) and the row at the bottom (II), the figures in the table represent shares of non-permanent employment workplace types immediately before the transition. (I) shows the share of total non-permanent employment before the transition, while (II) shows the share of total permanent employment after the transition. "Retail store/catering establishment" refers to supermarkets, convenience stores, restaurants, etc., while "Other premises" refers to hotels, internet cafés, karaoke parlors, etc.

IV. Careers at the Non-Permanent Employee Stage

1. Continued Service and Experience Changing Jobs

In the previous section, it was confirmed that, in the transition from non-permanent to permanent employment, employees were more likely to stick to the same job type and workplace in the case of intra-company transfers than in the case of inter-company transfers.

In the web-based survey conducted for this paper, those currently working as permanent employees were asked about their employment circumstances when they were previously working as non-permanent employees. One of the specific questions asked was about the length of continued service at the workplace where they were most recently employed as non-permanent employees.

Genda (2008a) discovered that, compared with a continuous length of service in one's previous non-permanent employment of less than a year, the probability of finding employment as a permanent employee after leaving non-permanent employment increases significantly as the length of continued service in one's previous job increases to between two and five years. As a background to this, it was suggested that if the company considering employing a person only has incomplete information about that worker's abilities and propensity to remain in a job, his or her length of continued service in a previous job could possibly function as a signal.

The results of this demonstration were obtained as a result of analysis of the individual responses to the Employment Status Survey, but this survey did not investigate the transition from non-permanent to permanent employment within the same company. Consequently, the significance of the length of continued service during non-permanent employment in the case of intra-company transfers remained unclear, compared to the case of inter-company transfers. Accordingly, the survey conducted for this paper asked how long the respondents had worked as non-permanent employees in the workplaces where they had been employed most recently as non-permanent employees.[12] Table 4 shows component ratios of the length of continued service during the most recent period of non-permanent employment, separated into the categories of intra-company transfer and inter-company transfer.

The highest component ratio with regard to length of continuous service as a non-permanent employee was between one and three years in the case of both intra-company and inter-company transfers. However, comparing both transfer routes, the weighting of long-term continuous service was higher overall in the case of intra-company transfers compared with inter-company transfers. The component ratio of between three and

[12] Here as well, rather than asking about the dispatching company or the company issuing the contract, the survey sought answers about the place to which the respondent was dispatched or contracted, and in the case where there were multiple workplaces, the respondents were asked about the workplaces where they had spent the longest continuous amount of time.

Table 4. Employment Conditions When Still a Non-Permanent Employee and Self-Assessment Thereof

(Component ratio in each category, %)

	Intra-company transfers	Inter-company transfers
(A) Period of continued employment at the workplace where respondent was working as a non-permanent employee most recently		
Less than 6 months	17.8	20.6
More than 6 months but less than a year	22.5	29.5
More than a year but less than 3 years	36.9	34.9
More than 3 years but less than 5 years	16.0	9.7
More than 5 years	6.8	5.4
(B) Number of companies where respondent has worked as a non-permanent employee in the past		
1 company	49.2	41.2
2 companies	25.0	28.2
3 companies	12.4	14.4
4 companies	3.7	4.3
5 companies or more	9.7	11.9
(C) Is the respondent's experience gained as a non-permanent employee in the past being used in the current job (as a permanent employee)?		
Utilized	90.2	66.6
Not utilized	9.9	33.4
(D) Did the respondent feel a sense of personal growth in his or her work during the most recent period of non-permanent employment		
Yes	78.7	70.0
No	21.3	30.1

Note: With regard to (A) and (B), in the case of temporary workers and independent contractors, rather than asking about the dispatching company or the company issuing the contract, respondents were asked about the place to which they were dispatched or contracted (where there are multiple workplaces, respondents were asked to answer about the workplace where they had worked for the longest amount of time). Moreover, in all cases from (A) to (D), the component ratio is statistically significant at the level of 1%, as a result of the chi-square test.

five years applied in 9.7% of cases in inter-company transfers, while in the case of intra-company transfers it was more than six percentage points higher, at 16.0%.

From these results, it is evident that in job changes from non-permanent employment, experience of past continued employment as a non-permanent employee is emphasized in the case of intra-company transfers. However, the implication of this might perhaps differ from the interpretation of a "signaling" effect through job changes. In signaling, the asymmetric nature of information available to those changing jobs and those recruiting new employees at companies, in relation to the abilities of the potential hire and his or her propensity to remain in a job, was the basic premise. On the other hand, within companies, even if they are not perfect, opportunities for learning do arise through the close observation of a non-permanent employee's abilities and attitude towards the job, and managers and executives can gradually recognize these more accurately (Harris and Holmstrom (1982), etc.). Thus, as a result of the "learning effect" through continued employment for a particular period of time, companies become able to discern in a more "noiseless" fashion which non-permanent employees have the qualities and drive required to be permanent employees.

Furthermore, in addition to the learning effect, one can anticipate a "training effect" from continued employment at the same company for a particular period of time, whereby an employee gains the specific skills required for that company through on-the-job training. Against the background of these learning and training effects, it is likely that a longer period of continued service is required in order to make the transition from non-permanent to permanent employee status through an intra-company transfer. At the same time, these effects are consistent with the fact that some employees in non-permanent employment are coming to form the lower tier of the internal labor market, as pointed out by Genda (2008b). A certain level of continued employment promotes the internalization of non-permanent employment, not only leading to an increase in income, but also bringing about the creation of more permanent employees, with a view to their transition to the middle and upper tiers of the internal labor market.

The importance of continuous employment in intra-company transfers can also be confirmed through another question. In this survey, respondents were asked about how many companies they had previously worked at as non-permanent employees (however, casual work while still in school was excluded). The component ratios for this are also shown in Table 4.

According to this table, of the people who had achieved a transition to permanent employee status through an intra-company transfer, the percentage of those who had only experienced working at one company as a non-permanent employee – in other words, those who had only worked at the companies where they were currently working as permanent employees – is 49.2%, or about half of the respondents experiencing intra-company transfers. The proportion of those who had worked as non-permanent employees at only one other company than their current company is 25.0%, so these two possibilities together account for three-quarters of the total. In comparison, in the case of inter-company transfers,

the proportion of those who had only experienced non-permanent employment at one company was lower than in the case of intra-company transfers.[13] The trend towards continued employment at a specific company is stronger in the case of intra-company transfers than in the case of inter-company transfers.

2. Self-Assessment of Non-Permanent Employment Experience

Furthermore, this survey asked respondents to carry out a self-assessment of the careers they were pursuing during their period of non-permanent employment. More specifically, they were firstly asked "Are the experiences that you gained through your previous non-permanent employment being utilized in your current job?" It goes without saying that their current jobs are the jobs in which they work as permanent employees. The results of this assessment are shown in Table 4, categorized by intra-company and inter-company transfers.

Looking at the table, we can see that, of those people who became permanent employees through an inter-company transfer, two-thirds (66.6%) responded that the work experience that they had gained in the past as non-permanent employees was being utilized at present. In contrast, in the case of intra-company transfers, 90.2% gave a positive evaluation, stating that their past experience as non-permanent employees was being utilized at present.

Strictly speaking, what the intra-company transfer group was assessing was not necessarily their work as non-permanent employees at the same companies immediately before becoming permanent employees. However, as seen earlier, around half of the intra-company transfer group had only had experience working as non-permanent employees at their current companies, and the length of continued service was long. Consequently, one can infer that it was precisely the fact that they had useful experiences during their period of non-permanent employment at their current companies that led to their period of continuous employment as non-permanent employees. As a result, it can be said that the fact that the specific job types that they had experienced as non-permanent employees and the abilities that they had built up in the workplace were recognized by the companies led to their employment as permanent employees.

There was also a question that showed that growth opportunities as a non-permanent employee are abundant in the case of intra-company transfers. The survey asked, "When you were working as a non-permanent employee most recently, did you feel that you experienced personal growth in regard to your work?" What the survey was asking for here was the respondents' self-assessments concerning their non-permanent employment when they were working at different companies immediately before becoming permanent employees, in the case of inter-company transfers, and concerning their employment as non-permanent

[13] With regard to the component ratios for length of continuous service and number of companies where respondents had worked as non-permanent employees, the differences between intra-company and inter-company transfers were statistically significant at the 1% level.

employees at their current companies, in the case of intra-company transfers.

The results of this are shown in Table 4 as well. In the case of inter-company transfers, 70.0% stated that they had experienced a sense of growth in their most recent work as non-permanent employees, whereas in the case of intra-company transfers, the level was even higher, at 78.7%, a statistically significant difference.

Compared with inter-company transfers, work experience cultivated as a non-permanent employee is more likely to have a beneficial effect on subsequent employment in the case of the creation of permanent employees through intra-company transfers, where employees have a strong tendency to have been working in a single place of employment continuously, and is more likely to lead to a sense of growth for the individual concerned.[14]

3. Reason for Becoming a Permanent Employee

The reasons for having switched from being a non-permanent to a permanent employee have been summarized in Table 5, based on the results indicating the workers' own awareness. The table provides different options for intra-company and inter-company transfers. Both are the results of having asked respondents to provide multiple answers regarding what they feel was recognized when they were hired as permanent employees.

With regard to the reasons for changing from being a non-permanent to a permanent employee within the same company, the foremost reason was that the respondent had been highly evaluated or recommended by an executive, manager or other permanent employee, at 58.2%. The next most common reasons were that permanent employment was the result of the respondent's own efforts to become a permanent employee and the existence of a permanent employee recruitment system, but compared with recognition from the company, the levels were less than half of the overall responses.[15] There were few cases of non-permanent employees who were hired from the outset with the plan for them to become permanent employees, at 14.9%.

From these data, we can surmise that companies screen their non-permanent employees after a certain period of time, with those non-permanent employees who were rated highly in this process achieving permanent employee status as a result of having their skills improved by undergoing training.

What are the reasons for the transition through inter-company transfers? If we look at the lower table in Table 5, the overwhelming majority responded that their own characters

[14] The essential issue in bringing about an improvement in non-permanent employment is the construction of a new system for developing skills. This is a "collaborative skills development system," which is neither a system in which the individual takes responsibility him- or herself, nor a system in which someone else takes responsibility for everything, but rather a system in which the worker him- or herself, the company and the government each fulfil their responsibilities. For further discussion regarding this point, please refer to Genda (2009).

[15] For a brief summary of the current status of permanent employee recruitment systems and related issues, please refer to Takeishi (2008), etc.

Table 5. Reasons for Having Switched from Being a Non-Permanent to a Permanent Employee (by transfer type, multiple responses possible, %)

I. Reason for Having Transferred within the Same Company	(%)
• Because of being highly evaluated or recommended by an executive, manager or other permanent employee	58.2
• Because of having had a strong desire and made a major effort to become a permanent employee	27.0
• Because the company had a permanent employee recruitment system	22.7
• Because the need to consider such circumstances as childbirth or caring for elderly family members had disappeared	1.5
• Because a situation emerged in which it became an absolute necessity to work as a permanent employee	5.6
• Because the decision to employ me as a permanent employee was taken when I was employed as a non-permanent employee	14.9
• Because a job for a permanent employee just happened to come up in my workplace	5.5
• Other	5.6
II. Reason for Having Transferred between Companies (Points Thought to Have Been Recognized in Recruitment)	
• My own character and attributes (diligence, honesty, tenacity, etc.)	56.9
• The content of my job or performance and experience when working as a permanent employee in the past	25.4
• The content of my job or work experience gained when working in a position other than a permanent employee in the past, as a part-timer or a temporary employee, or on a fixed-term contract, etc.	22.7
• My qualifications and skills	34.6
• The reputation of the companies where I have worked in the past	7.7
• My academic background or circumstances during my student years (academic performance or club activities, etc.)	9.8
• My health, strength, etc.	15.1
• My network of contacts, such as family, friends and acquaintances	11.2
• Other	2.8

and qualities (diligence, honesty, tenacity, etc.) were recognized, accounting for 56.9% of the multiple responses. The next most common response was that their qualifications and skills had been recognized, at 34.6%. Genda (2008a) as well found that qualifications in fields such as social services and medical care, along with the number of years of continued service in the past, influenced the transition of the employment status of non-permanent displaced workers, and these results are consistent with those findings.

On the other hand, those responding that the content of their work and their experiences when working other than as permanent employees were recognized accounted for just 22.7%. Those listing the content of their work and past performance and experiences when working as permanent employees before their most recent period of non-permanent employment accounted for 25.4%. However, in every case, rather than the content of past "jobs," the main focus of recognition in inter-company transfers was the attributes of the "individual concerned," that is to say, the worker him- or herself, as represented by their characters and qualities.

Thus, the direct reasons for the respondents having achieved permanent employee status also imply the fact that the main factors bringing about the transition differ between intra-company and inter-company transfers.

V. Employment Conditions Brought about by the Transition

1. Changes in Employment Conditions

Finally, let us look at what kind of changes in employment conditions result from the transition from non-permanent to permanent employment, according to whether it is an intra-company or inter-company transition.

With regard to changes in employment conditions, the first thing that will be noticed is probably the change in wage earnings. Of the two types of transition, those who had undergone an intra-company transfer were asked whether or not their monthly pay (take-home) had increased since becoming permanent employees, compared to when they were working as non-permanent employees in their current companies. At the same time, those who had undergone inter-company transfers were asked whether their monthly pay had increased by their becoming permanent employees, compared to when they were last working as non-permanent employees.

The results of this are shown in the upper table of Table 6. Whereas monthly pay increased in 61.8% of cases of intra-company transfers, the figure was higher in the case of inter-company transfers, at 66.2%. In both situations, there were examples of pay decreasing, in 21-22% of cases, but overall, pay increased more often as a result of an inter-company transfer than of an intra-company transfer, and this difference is statistically significant.

With regard to the background to the increase in wage earnings, Table 6 also shows that it was more common for changes in responsibility in the respondent's normal work to have increased in the case of inter-company than intra-company transfers. The same table shows that feelings of job satisfaction resulting from having become a permanent employee increased to a greater extent in the case of inter-company transfers than in the case of intra-company transfers.

Overall, these results tell us that inter-company transfers due to a change of job give rise to greater changes in employment conditions being experienced by the worker in

Table 6. Changes in Employment Conditions Arising from the Transition from Non-Permanent to Permanent Employment

(Component ratio in each category, %)

	Intra-company transfers	Inter-company transfers
(A) Changes in monthly pay (take-home)		
Increased	61.8	66.2
Did not change	16.4	11.2
Decreased	21.8	22.6
(B) Changes in responsibility in normal work		
Increased	68.8	70.6
Did not change	30.9	26.0
Decreased	0.4	3.4
(C) Changes in job satisfaction		
Increased	48.4	57.9
Did not change	43.1	32.5
Decreased	8.5	9.6

Note: With regard to (A) from (C), the focus of the comparison with current permanent employees was the time when they were previously working as non-permanent employees at their current companies, in the case of intra-company transfers, while in the case of inter-company transfers, it was the time when they were working most recently as non-permanent employees. In addition, the component ratio in all items from (A) to (C) is significant at the 1% level through the chi-square test.

question than do intra-company transfers. In the transition from non-permanent to permanent employment, most inter-company transfers arising from a change of job result in an increase in income, as well as a rise in work-related responsibilities and job satisfaction. Compared with this, changes in employment conditions in the case of intra-company transfers are smaller. This suggests that during ongoing employment at a single company, employees had already been experiencing gradual changes in the content of their work and their pay even before normalization.

2. Annual Income and Working Hours after the Transition

So, as a result of a change of job bringing about major changes in working conditions, in the transition from non-permanent to permanent employee status, is it the case that inter-company transfers result in a higher income after becoming a permanent employee than

do intra-company transfers? Do inter-company transfers have the effect of giving rise to a bigger increase in the salary of permanent employees?

In order to clarify these points, let us estimate the earnings function of people who have experienced employment as non-permanent employees, and who are currently working as permanent employees at private sector companies. The dependent variable is the annual income (the amount before deductions, such as taxes and social insurance premiums) from a person's current job over the past year.[16]

In this survey, in order to avoid a situation in which people declined to respond, to the greatest degree possible, rather than asking them about the absolute level of their annual incomes, a method was adopted whereby they selected one option from a value range related to annual income.[17] Then, after turning the upper and lower limits of each category into a natural logarithm, interval regression was carried out.

In the explanatory variables, in the same way as the estimate of the ordinary earnings function, dummy variables were used, in relation to gender, age, academic background, job type, number of years of continued employment in the current workplace (length of service) and number of employees. In doing so, as the transition process from non-permanent to permanent employment, with intra-company transfers as the reference group, the dummy variables for inter-company transfers were added to the explanatory variables.

Furthermore, in order to research the impact of inter-company transfers on the content of work as a permanent employee from a different perspective, interval regression was carried out in relation to working hours (natural logarithm values) during a normal week, using the same explanatory variables as in the estimate of earnings function.[18] Table 7 shows the results of the interval regression in relation to the earnings function and weekly working hours.

Looking at the earnings function, we can firstly see similar results to the normal estimate. As well as the annual income of women being significantly lower than that of men, the annual income level was higher if an individual had a higher level of education, a longer

[16] However, if a year had not yet passed, respondents were asked about the amount that they anticipated receiving.

[17] More specifically, respondents were asked to select one option from among the following: "None," "Less than ¥250,000," "Around ¥500,000 (¥250,000–less than ¥750,000)," "Around ¥1 million (¥750,000–less than ¥1.5 million)," "Around ¥2 million (¥1.5 million–less than ¥2.5 million)," "Around ¥3 million (¥2.5 million–less than ¥3.5 million)," "Around ¥4 million (¥3.5 million–less than ¥4.5 million)," "Around ¥5 million (¥4.5 million–less than ¥6 million)," "Around ¥8 million (¥6 million–less than ¥10 million)," "¥10 million or more," "Don't know/don't wish to answer." Samples where the respondent had selected "Don't know/don't wish to answer" were excluded from the estimate of earnings function.

[18] Respondents were asked to select one option from among the following concerning their working hours during a normal week: "Less than 20 hours," "20 hours–less than 30 hours," "30 hours–less than 40 hours," "40 hours," "More than 40 hours–less than 50 hours," "50 hours–less than 60 hours," "60 hours or more." The estimate was conducted after formulating a natural logarithm from the upper and lower limits of each category.

Table 7. Specific Factors in Annual Income and Weekly Hours Worked (Interval Regression Analysis)

	Annual Income (Past Year)		Weekly Hours Worked	
	Coefficient	Asymptotic t-value	Coefficient	Asymptotic t-value
Gender				
Female	-0.2034	-5.14 ***	-0.0832	-4.51 ***
Age Range				
25-29 years	0.1665	1.54	0.0832	1.91 *
30-34 years	0.1966	1.84 *	0.0873	2.03 **
35-39 years	0.3279	3.06 ***	0.1054	2.41 **
40-44 years	0.4048	3.67 ***	0.1511	3.31 ***
Academic Background				
Junior high school	0.0878	0.60	-0.0212	-0.31
Technical college, junior college, vocational college	-0.0068	-0.16	0.0037	0.19
University or graduate school	0.1369	3.38 ***	0.0568	2.99 ***
Job Type				
Professional or technical position	0.1832	3.10 ***	0.0234	0.81
Clerical position	0.1079	1.77 *	-0.0019	-0.07
Sales or marketing position	0.1174	1.68 *	0.0017	0.05
Service position	-0.0063	-0.09	-0.0389	-1.15
Transport or security position	0.1154	1.44	0.0342	0.86
Other	0.1286	1.05	0.0301	0.53
Continuous Employment Period				
1 year - less than 3 years	0.0789	1.14	0.0325	1.09
3 years - less than 5 years	0.2018	2.90 ***	0.0910	2.99 ***
5 years - less than 10 years	0.2590	3.77 ***	0.0974	3.20 ***
10 years - less than 15 years	0.2649	3.39 ***	0.0884	2.44 **
15 years - less than 20 years	0.3611	3.48 ***	0.1094	1.81 *
At least 20 years	0.3804	2.41 **	0.2376	2.59 ***
Number of Employees				
5 - 9 people	0.0913	1.03	0.0207	0.55
10 - 99 people	0.1048	1.45	0.0574	1.85 *
100 - 299 people	0.2549	3.31 ***	0.1008	2.99 ***
300 - 999 people	0.3293	4.16 ***	0.1355	3.77 ***
At least 1,000 people	0.4028	5.34 ***	0.1453	4.28 ***
Inter-Company Transfers (from Non-Permanent to Permanent)	-0.0028	-0.09	-0.0036	-0.24
Constant Term	4.9348	34.16 ***	3.7616	61.31 ***
Sample Size	1,901		1,486	
Log Likelihood	-3,997.95		-2,144.79	

Note: The reference group is female (gender), 20–24 years (age category), high-school (educational establishment attended most recently), less than a year (continued employment period), production process/manual labor position (job type), fewer than five employees (organizational scale). A natural logarithm was developed from annual income and working hours. In addition, annual income is the amount before deductions such as taxes and social insurance premiums, while weekly working hours are the hours worked during a normal week, including overtime and attendance at work on days off. The number of employees is the number of permanent employees including all those at the company's head office, branch offices and factories. ***, **, * indicate the significance at the 1, 5 and 10% levels. The targets in all cases are permanent employees at private sector companies.

period of continued service, and worked at a larger company. In terms of job type, compared with production process jobs and manual labor, professional and technical positions had higher annual incomes, a difference that was significant at the 1% level, while in the case of clerical positions and sales and marketing positions, annual income is higher, albeit at the 10% level.

Looking at the inter-company transfer dummy coefficient, the absolute value of the coefficient is small and it is insignificant in statistical terms as well. In other words, compared with intra-company transfers, there is no visible effect of annual income being pushed up after transitioning to permanent employee status in the case of inter-company transfers. Furthermore, from the results of the estimate of the working hours function, we can see that the inter-company transfer dummy coefficient was insignificant, and in the same way as the earnings function, no characteristic trend was observed.

As seen in Table 6, there is a high frequency of wage increases in the case of inter-company transfers. Nevertheless, the fact that there is no visible difference in the annual income levels demonstrates that the wages of those who were in non-permanent employment and have changed jobs and moved between companies were lower when they were in non-permanent employment than in the case of those who experienced an intra-company transfer. To put it another way, whereas those experiencing intra-company transfers received gradual increases in pay as they became internalized when they were in non-permanent employment, for those experiencing inter-company transfers, from the point at which their employment as permanent employees was determined as a result of a change of job, their pay increased dramatically.

One important discovery from this is that in the case of permanent employees with identical attributes, irrespective of their transition routes from non-permanent employment, it is anticipated that there will be a tendency for their annual income to converge at a certain level. The details of their transition from non-permanent employment do not have an impact on their wage levels after the transition, so wages after becoming a permanent employee are independent of the transition route from non-permanent employment.

As a background to this, there is perhaps a type of arbitrage between non-permanent employees becoming permanent employees. Non-permanent employees with the potential to become permanent employees face a choice between staying at the same company and building up a record of achievement in their jobs, or promoting their own high ability levels through a change of job. If the expected utility of the transition through an intra-company transfer is greater than that through an inter-company transfer, the tendency of more non-permanent employees to remain settled in a company is likely to strengthen. In that event, there might be an excess supply of non-permanent employees with high potential ability within a company, and this might reduce the expected utility of intra-company transfers.

Conversely, if the expected utility of inter-company transfers through a change of job is high, there will be a lack of high-ability non-permanent employees within a company,

which is likely to have the function of increasing the effect of intra-company transfers. From this process, in equilibrium, as a result of the expected utility of intra-company and inter-company transfers becoming equal among non-permanent employees with identical potential abilities, it is conceivable that pay after becoming a permanent employee will cease to depend on the transition route. The fact that no dependency on the path from non-permanent employment can be seen in the pay of permanent employees is a new discovery from this study.[19]

VI. Conclusion

The main body of this paper compared transfers between companies as a result of changes of job with the status of transitions from non-permanent to permanent employment within a single company, with regard to which the store of positive research was hitherto inadequate. From this unique survey aimed at people currently in permanent employment who have experienced non-permanent employment since their graduation from school, it has become clear that there are major differences in the transition process from non-permanent to permanent employment in the cases of intra-company and inter-company transfers. Based on the results of this paper, the respective transitions can be summarized as follows.

Firstly, with regard to the transition from non-permanent to permanent employment through intra-company transfers, the main evaluation criterion when selecting an employee for permanent employee status is the jobs in which they were working as non-permanent employees. In the case of intra-company transfers, there is a strong tendency for workers to stick to the same kind of job type and workplace before and after their transition from non-permanent to permanent employment, while the content of their work during their period of non-permanent employment determines their jobs after the transition.

In contrast to this, in the process of the transition from non-permanent employment through inter-company transfers, after the transition, it is usual to experience a different job type and workplace from those experienced during one's period of non-permanent employment. In the case of inter-company transfers, as symbolized by the fact that character and qualities are valued as reasons for employment, the attributes of the individual are the main evaluation criterion, rather than the content of the work that they have experienced until that time.

Thus, in addition to work being the main evaluation criterion in intra-company transfers, and the individual being the main criterion in inter-company transfers, differences between the two types of transfer are also visible with regard to the degree of improvement in the employment situation arising from the transition of employee status.

[19] Papers that have used economic theory to model pay decisions based on the premise of the incompleteness of this kind of information and the learning effect include Harris and Holmstrom (1982), and Beaudry and DiNardo (1991).

In the case of intra-company transfers, the length of continued service within a single company is longer and the propensity to remain in the same job is stronger than in the case of inter-company transfers. In the internalization process, in which workers increase their abilities through continuous service for a certain period of time, and are screened through their working conditions, even non-permanent employees experience gradual increases in pay, satisfaction and responsibility levels in their work. By gradually approximating a permanent employee through incremental changes in job content, the degree of improvement in a person's employment situation is relatively small, even after becoming a permanent employee.

On the other hand, in the case of inter-company transfers, the recognition of job content during the period of non-permanent employment is weaker, and even if the individual concerned has a high level of ability and ambition, the impact of the imperfect nature of information makes it difficult for this to be immediately reflected in pay. When this was believed to contribute to permanent employment, the evaluation of the individual's abilities and ambition was promptly upgraded and a more significant improvement in conditions took place.

Another important discovery was the revelation that annual income after becoming a permanent employee does not depend on the transition route from non-permanent employment. Non-permanent employees who have become permanent employees are assessed in general on their own abilities and the content of their work, including their academic backgrounds, job types, number of years of continued service and the scale of the company, and pay is determined on the basis of these. The reason for this is likely to be the impact of permanent employee pay becoming independent of past transition routes, due to the workings of arbitration concerning the expected utility of intra-company and inter-company transfers.

Does the above have any other implications? Firstly, from this study, it has once more been verified that accumulating continued experience in a specific job type within a company gradually improves working conditions from the time when an employee is in non-permanent employment and may bring about permanent employment. This suggests that progressively developing an environment in which non-permanent employees can continue working for a certain period of time has the potential to promote the transition of their employment status.

In contrast, in order to encourage the transition as a result of inter-company transfers through job changes, it is desirable to alleviate the difficulties of non-permanent employees who, although they have the potential to work as permanent employees, remain unable to bring to the surface their latent abilities and ambitions. In the transition through inter-company transfers, the improvement of the environment from the perspective of information in the labor market is effective as a policy, in order to eliminate the asymmetric nature of information between companies and workers in relation to individual abilities.

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How Important Is Occupational Experience in Current Japan?: Analysis with Focus on Occupation-Specific Human Capital*

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In this paper, I focus on occupation-specific human capital and analyze to what extent firms value and utilize such human capital that is formed through the experience within occupation, using publicly available data. The results can be summarized as follows. First, since the 1990s, the percentage of job changers who stay in the same occupation has increased for those who were formerly specialist and technical workers, or clerical workers, but it has remained almost at the same level for those who were formerly in the other occupations. Second, in the analysis of factors that determine the percentage of job changers who stay in the same occupation, it turns out that job changers formerly in occupations that requires a larger accumulation of human capital are more likely to stay in the same occupation, both for male and female workers. Third, a worker's experience within occupation has a larger effect on wages than his or her age, both for male and female workers, and in the case of females, this occupational experience effect for specialist and technical workers relative to that for other occupational groups has risen in recent years.

I. Introduction

Firms' ability to guarantee employment is said to be on the decline due to the sluggish economic growth and the structural changes in the economic environment including the economic globalization trend and the aging of the population since the 1990s. In line with the lessening of firms' ability to guarantee employment, individuals have faced the need to increase their market value in order to preserve their employment; and to this end, they have come to acquire marketable job skills that may be valued highly not only by their current employers, but also by their potential employers. For example, the Special Committee on Education set up in the then Keidanren (Japan Federation of Economic Organizations) proposed the concept of "Japanese-style employability" (Nikkeiren 1999). This concept, while acknowledging that firms have some ability to guarantee employment, defines the "employability (of individuals)" as having two meanings: the ability that enables a worker to move within the labor market and the ability demonstrated in the current firm that enables a worker to retain employment. It is also around this time that attention was drawn to the behavior of acquiring "qualifications," which serve as a signal showing that a worker has more than a certain level of marketable job skills (Abe, Kurosawa, and Toda 2005).

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The one of the approaches that can be assumed for acquiring marketable job skills is to learn through the process of acquiring qualifications. Qualifications serve as a signal that indicates a skill level that has been achieved as a result of human investment, and they are expected to have an effect of facilitating job changes or job finding. However, workers are required to obtain other skills than those obtained through acquisition of qualifications. As in the case of on-the-job training, experiences acquired through work are also important. In Japan where workers are often recruited without the occupation being specified, as represented by the case of recruiting new graduates for a management-track career, workers are likely to acquire the knowledge necessary for work in the course of engaging in the actual work.

Under the argument of standard labor economics, human capital, which is a generic term for the skills and knowledge necessary for work, is discussed with a distinction made between general human capital and firm-specific human capital (Becker 1962). Whether human capital is general or firm-specific is explained by the specificity of the skills and knowledge. Since this two-category system is insufficient, however, studies have been made to classify the specificity of human capital into more detailed categories (Neal 1995; Hisamoto 1999). Specifically, the following concepts were introduced: industry-specific human capital that is specific to an industry and is not transferable to any another industry; and occupation-specific human capital that is specific to an occupation and is not transferable to any other occupation. This paper focuses on occupation-specific human capital, which represents marketable job skills in the sense that it is transferable to other firms in the same occupation.[1] This paper identifies what extent firms value and utilize such human capital that is formed through the experience within occupation, through carrying out the following two analyses using publicly available data.

Firstly, the paper studies the changes in the percentage of job changers who did not switch their occupations upon the job change.[2] If occupational experience is an essential factor in work, a switch of occupation upon a job change could lead to a substantial drop in wages due to the need to accumulate occupational experience from scratch. Therefore, job changers are expected to find a new job in the same occupation. Thus, the paper inquires into how the percentage of job changers who stay in the same occupation has changed, and what the determinant factors are.

Secondly, the paper studies how much the accumulation of occupational experience is reflected in wages. If occupation-specific human capital is to be substantially reflected in

[1] As a matter of course, it is meaningful to also focus on industry-specific human capital and verify whether it is industry-specific human capital or occupation-specific human capital that can better enhance productivity, and such study has already been carried out by Sullivan (2010). However, this report does not focus on industry-specific human capital due to a lack of sufficient data for analyzing the importance of industry-specific human capital.

[2] In this paper, the term “job change” is used to refer to a change of employer. While such change may be more correctly called “employer change,” this paper consistently uses the term “job change” since these two terms are generally used in the same meaning.

Table 1. Changes in the Number of Workers by Occupation

(A) Male	Upper figure: 1,000 persons; lower figure: % to total				
	1987	1992	1997	2002	2007
Specialist and technical workers	3,808	4,569	4,782	4,849	5,094
	(10.5%)	(11.8%)	(12.1%)	(12.7%)	(13.3%)
Administrative and managerial workers	2,051	2,139	2,075	1,821	1,597
	(5.6%)	(5.5%)	(5.3%)	(4.8%)	(4.2%)
Clerical workers	4,789	5,169	5,340	4,914	5,174
	(13.2%)	(13.3%)	(13.5%)	(12.9%)	(13.6%)
Sales workers	5,442	5,744	5,897	5,848	5,478
	(15.0%)	(14.8%)	(14.9%)	(15.4%)	(14.3%)
Service workers	1,610	1,799	1,930	2,165	2,283
	(4.4%)	(4.6%)	(4.9%)	(5.7%)	(6.0%)
Security workers	716	770	889	982	1,028
	(2.0%)	(2.0%)	(2.3%)	(2.6%)	(2.7%)
Agriculture, forestry and fisheries workers	2,644	2,276	2,008	1,736	1,625
	(7.3%)	(5.9%)	(5.1%)	(4.6%)	(4.3%)
Transport and communication workers	2,249	2,264	2,254	2,093	2,025
	(6.2%)	(5.8%)	(5.7%)	(5.5%)	(5.3%)
Production process and related workers	12,982	13,773	14,008	13,100	12,726
	(35.7%)	(35.5%)	(35.5%)	(34.4%)	(33.3%)
Total	36,372	38,776	39,508	38,034	38,175

(B) Female	Upper figure: 1,000 persons; lower figure: % to total				
	1987	1992	1997	2002	2007
Specialist and technical workers	2,769	3,322	3,766	4,148	4,553
	(11.5%)	(12.3%)	(13.7%)	(15.4%)	(16.4%)
Administrative and managerial workers	196	237	236	226	201
	(0.8%)	(0.9%)	(0.9%)	(0.8%)	(0.7%)
Clerical workers	6,260	7,779	8,235	7,839	8,158
	(25.9%)	(28.8%)	(30.0%)	(29.1%)	(29.3%)
Sales workers	3,249	3,573	3,485	3,527	3,409
	(13.5%)	(13.2%)	(12.7%)	(13.1%)	(12.3%)
Service workers	2,847	3,178	3,575	4,112	4,419
	(11.8%)	(11.8%)	(13.0%)	(15.2%)	(15.9%)
Security workers	19	27	43	53	66
	(0.1%)	(0.1%)	(0.2%)	(0.2%)	(0.2%)
Agriculture, forestry and fisheries workers	2,326	1,940	1,611	1,242	1,086
	(9.6%)	(7.2%)	(5.9%)	(4.6%)	(3.9%)
Transport and communication workers	120	112	135	102	91
	(0.5%)	(0.4%)	(0.5%)	(0.4%)	(0.3%)
Production process and related workers	6,295	6,619	6,191	5,353	5,008
	(26.1%)	(24.5%)	(22.5%)	(19.8%)	(18.0%)
Total	24,130	26,980	27,495	26,975	27,803

Source: Statistics Bureau, Ministry of Internal Affairs and Communications, *Employment Status Survey*.
Note: The total figures include occupations that cannot be classified.

individuals' productivity and, as a result, in wages, the longer the occupational tenure that leads to the accumulation of human capital, the higher the wages will be. Accordingly, the importance of occupational experience can be studied by analyzing the effect of occupational experience on wages.

Before making the analyses, let us look at the changes in the composition of workers in Japan by occupation. Table 1 shows that the percentage of specialist and technical workers has increased from 10.5% in 1987 to 13.3% in 2007 for males, and from 11.5% in 1987 to 16.4% in 2007 for females. The share of service workers has also increased from 4.4% in 1987 to 6.0% in 2007 for males, and from 11.8% in 1987 to 15.9% in 2007 for females. On the other hand, the shares of agriculture, forestry and fisheries workers and production process and related workers have decreased. Meanwhile, the shares of clerical workers and sales workers have hardly changed over the past 20 years.

The subsequent part of this paper is composed as follows. Section II takes an overview look at preceding studies on occupational experience and occupational mobility. Section III analyzes the percentage of job changers who stay in the same occupation. Section IV explains an empirical analysis on the effects of occupational experience on wages, and indicates the analysis results. Finally, Section V gives the conclusion to this paper and presents issues to be studied in the future.

II. Literature Review

In the context of economics, the importance of occupational experience has been pointed out in relation to analyses on wage changes following job changes and on the cost of job changes. Kishi (1998) confirmed that wage decline is smaller when changing the job in the same occupation.[3] Meanwhile, Bognanno and Kambayashi (2006) used the data of the Survey on Employment Trends published by the Ministry of Health, Labour and Welfare to investigate how wage changes following job changes are affected by a change in the firm size, industry, and occupation of the new job. As a result, they found that a change in the firm size, industry, and occupation upon job changes led to wage losses, but there were differences in the degrees of such effects during the sample period from 1991 to 2002. Specifically, they pointed out that the degree of wage losses resulting from a change in industry showed no change during the sample period, but that of wage losses resulting from a change in occupation grew toward the latter half of the sample period.

In addition, Higuchi (2001) made a comprehensive analysis on the costs of job changes from the viewpoints of the time period required for reemployment and the wage changes as the result of the job changes. According to the results of a probit analysis on job changes within the same occupation, job changes within the same occupation were charac-

[3] Japanese studies on changes in wage levels before and after job changes include Abe (1996), Muramatsu (2000), Ohashi and Nakamura (2002), Chae and Morishima (2002), Yugami (2005), and Higuchi , Kodama, and Abe (2005).

terized by the fact that a larger number of workers change jobs within the same occupation as the age becomes higher, and a larger number of workers switch occupations as the unemployed period becomes longer. Moreover, job changers moving from larger firms have a stronger tendency to stay in the same occupation. As for wage losses as the result of job changes, wage losses of job changers who stay in the same occupation are smaller than those of job changers who switch occupations. Looking by occupation of the former jobs, specialist and technical workers, administrative and managerial workers, security workers, transport and communication workers, and production process and related workers who stayed in the same occupations suffered smaller wage losses than those who switched occupations, but clerical workers and service workers who stayed in the same occupation suffered larger wage losses than those who switched occupations. Based on these findings, Higuchi (2001) indicated that occupation-specific labor markets are more easily established for specialist and technical work since the details of the occupation are relatively clearly defined and can be easily standardized beyond firm differences.

In studies outside Japan, Shaw (1984, 1987) was early to indicate that occupation-specific human capital strongly affects determination of wages. Later, Kambourov and Iourii (2009) analyzed the effects of occupational tenure on wages. In that process, the study applied an estimation method that minimizes the problem of endogeneity bias in earnings functions that had been indicated by Altonji and Shaktoko (1987), Topel (1991), and Altonji and Williams (2005).[4] Kambourov and Iourii (2009) found through an analysis that "everything else being constant, five years of occupational tenure are associated with an increase in wages of 12% to 20%" and "when occupational experience is taken into account, tenure with an industry or employer has relatively little importance in accounting for the wage one receives," and concluded that human capital is occupation specific. Sullivan (2010) discovered that whether or not human capital is occupation specific varies across occupations. It stated that human capital is primarily occupation specific in production process and related work, but is primarily industry specific in administrative and managerial work, and concluded that in other occupations such as specialist and technical work, both occupation-specific human capital and industry-specific human capital are key determinants of wages. To the extent of the author's knowledge, there are no previous studies that have analyzed the effects of occupational experience on wages using Japanese data. This is considered to be largely due to the lack of long-term panel data sets that allow for control of the endogeneity bias in earnings functions and with which the occupational experience of workers can be identified. The estimation of an earnings function that controls for occupational experience, attempted in Section IV, has some problems that need to be tackled, but it is considered to have some contributions as the first step of study for elucidating the actual

[4] A possibility that a worker who receives higher wages due to a better employer match is more likely to stay with the firm longer and, as a result, have higher employer tenure causes the problem of endogeneity bias in earnings functions. The same argument applies to occupational tenure.

conditions in Japan.[5]

Looking at studies on occupational mobility, many U.S. studies focus on such aspects as occupational choice and occupational matching. McCall (1990) theoretically and empirically indicated that, "if occupational matching is significant," "for those who have switched jobs but remained in the same occupation, increased tenure in the previous job lowers the likelihood of separation from the current job." Neal (1999) argued that young people adopt a two-stage search strategy in which they first look for a good match with a career (occupation), and then look for an employer that provides a suitable job for them, and obtained empirical results supporting that hypothesis. Kambourov and Iourii (2008) studied the actual conditions of industry mobility and occupational mobility in the United States over the 1968 to 1997 period. As a result, occupational and industry mobility rates were found to increase over the entire sample period, although with some fluctuations, both at the one-digit level of occupation codes (from 10% to 15%) and at the three-digit level (from 16% to 20%). However, Kambourov and Iourii (2008) have only presented some hypotheses such as technological changes and globalization as reasons for the increase in occupational mobility, and have not gone as far as testing the hypotheses.

III. Analysis on the Percentage of Job Changers Who Stay in the Same Occupation

As discussed in Section I, if occupational experience is significant, job changers are likely to find a new job in the same occupation. This section focuses on occupational mobility upon job changes, and examines how the percentage of job changers who stay in the same occupation has changed as compared to the past, and what the factors are that determine the percentage of job changers who stay in the same occupation.

1. Occupational Mobility of Job Changers

As information on job changers, this section uses the data of persons hired after a job change during the 1991 to 2007 period provided in the Survey on Employment Trends published by the Ministry of Health, Labour and Welfare.[6] In the Survey on Employment Trends, persons hired after a job change are defined as workers newly hired in each survey year with working experience within one year before being hired.

Table 2 shows the occupational mobility matrix of persons hired after a job change

[5] Studies that have attempted to minimize the endogeneity bias in earnings functions using Japanese data include Toda (2008).

[6] The Survey on Employment Trends has included construction in the target industries since the 1991 survey, as well as school education, social education, etc. since the 2004 survey. In order to identify the trend in as long a term as possible, the only measure taken in this paper is to exclude from the analysis the survey period that does not cover the construction industry. Attention should be paid to the fact that the 2003 data and the 2004 data are not consecutive in a strict sense.

Table 2. Occupational Mobility Matrix of Persons Hired after a Job Change (2007)

(A) Male

	Occupation of the previous job								
	Specialist and technical workers	Administrative and managerial workers	Clerical workers	Sales workers	Service workers	Security workers	Transport and communication workers	Production process and related workers	Others
Occupation of the current job									
Specialist and technical workers	74.4%	6.8%	4.1%	5.5%	8.1%	12.6%	3.1%	4.9%	11.0%
Administrative and managerial workers	1.8%	56.3%	4.1%	2.2%	1.1%	1.3%	1.1%	1.5%	2.4%
Clerical workers	2.4%	12.1%	72.4%	6.4%	3.3%	8.6%	2.0%	1.8%	3.1%
Sales workers	3.2%	8.5%	6.3%	61.8%	10.5%	2.3%	3.6%	4.8%	0.0%
Service workers	5.5%	6.5%	3.5%	8.4%	56.8%	12.6%	4.5%	6.6%	14.2%
Security workers	1.7%	1.1%	0.4%	1.7%	2.1%	30.8%	2.1%	2.0%	1.6%
Transport and communication workers	2.3%	1.3%	2.2%	3.5%	5.5%	10.6%	68.1%	6.8%	9.4%
Production process and related workers	8.4%	5.9%	6.4%	10.3%	11.8%	19.2%	14.9%	71.4%	30.7%
Others	0.4%	1.5%	0.8%	0.3%	0.9%	2.0%	0.8%	0.2%	28.3%

(B) Female

	Occupation of the previous job								
	Specialist and technical workers	Administrative and managerial workers	Clerical workers	Sales workers	Service workers	Security workers	Transport and communication workers	Production process and related workers	Others
Occupation of the current job									
Specialist and technical workers	81.6%	28.7%	3.3%	5.2%	4.9%	20.0%	10.7%	9.5%	25.3%
Administrative and managerial workers	0.1%	22.8%	0.3%	0.0%	0.7%	0.0%	0.0%	0.2%	1.3%
Clerical workers	7.9%	39.7%	77.5%	17.5%	13.6%	7.7%	46.3%	8.3%	24.0%
Sales workers	2.2%	0.7%	7.5%	51.3%	13.3%	1.5%	1.7%	5.9%	9.3%
Service workers	6.4%	2.9%	7.4%	19.1%	59.3%	6.2%	5.8%	14.2%	8.0%
Security workers	0.0%	0.7%	0.0%	0.2%	0.6%	55.4%	0.0%	1.5%	0.0%
Transport and communication workers	0.2%	0.0%	0.3%	0.2%	0.5%	1.5%	20.7%	0.8%	0.0%
Production process and related workers	1.4%	2.9%	3.5%	6.1%	6.7%	6.2%	12.4%	59.1%	24.0%
Others	0.3%	0.0%	0.3%	0.3%	0.4%	0.0%	2.5%	0.2%	8.0%

Source: Ministry of Health, Labour and Welfare, *Survey on Employment Trends*.

Note: Figures in the table show the percentages to the total number of workers in the respective occupations of the previous job.

for 2007. The table reveals that, in the case of males, the percentage of job changers who stayed in the same occupation was higher than the percentage of those who switched occupations, as represented by specialist and technical workers (74.4%), clerical workers (72.4%), and production process and related workers (71.4%). Although only about 30% of former security workers stayed in the same occupation, more than 50% of job changers who were formerly in other occupations stayed in the same occupation. In the case of females, higher percentages of former specialist and technical workers (81.6%) and clerical workers (77.5%) stayed in the same occupation. Except for former transport and communication workers (20.7%) and former administrative and managerial workers (22.8%), more than 50% of job changers stayed in the same occupation.

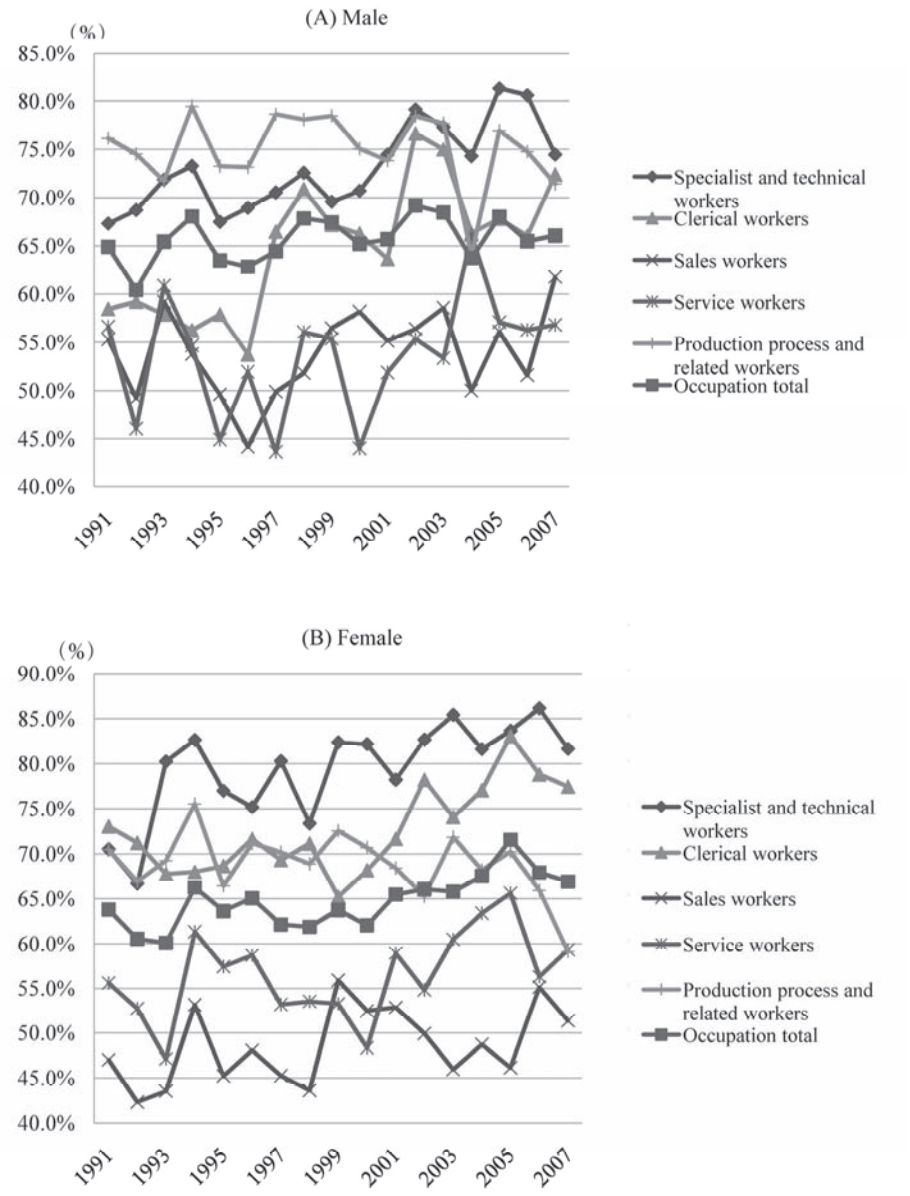
Has such tendency existed in the past? Figure 1 shows changes in the percentages of job changers who stayed in the same occupation. Although the percentages vary substantially by year, in the case of males, the percentage for production process and related workers has shifted around 75%, while the percentages for service workers and sales workers have stayed slightly above 50%. At least for the past 20 years or so, the percentages for speare some fluctuations. In the case of females as well, the percentages of job changers staying in the same occupation have been increasing for specialist and technical workers and clerical workers over the past 20 years, although with some fluctuations. While the percentage for production process and related workers is not as high as in the case of males, the cialist and technical workers and clerical workers have been on an increase although there percentages for service workers and sales workers are on a par with those of males, and the percentage for service workers seems to have increased slightly over the past 20 years.

In this manner, job changes within the same occupation have increased over the past 20 years for some occupations, but for most occupations, the frequency of such job changes has hardly changed, although there were some fluctuations. Even when taking into account the slight difference in the sample periods, it is interesting that this result differs from the U.S. data showing a decline in the percentage of job changers staying in the same occupation. The next part discusses the determinant factors for the percentage of job changers who stay in the same occupation.

2. Empirical Analysis of the Percentage of Job Changers Who Stay in the Same Occupation

This part inquires into the determinant factors for the percentage of job changers who stay in the same occupation, using publicly available data such as the Survey on Employment Trends and the Special Survey of the Labour Force Survey. The model to be estimated is as follows:[7]

[7] Since this section makes arguments on the premise of changing jobs, the analysis implicitly assumes a process of starting job hunting and finding a job after leaving the former job. Therefore, if there is an increase in job-to-job transitions in which job changers find a new job before leaving the former job, and such transitions come to account for most of the job changers, the analysis in this



Source: Ministry of Health, Labour and Welfare, *Survey on Employment Trends*.

Note: Data on administrative and managerial workers and security workers are not included in this figure. Data on security workers for 2000 through 2003 has not been published. A possible factor behind the substantial changes in the percentages for some occupations between 2003 and 2004 is that the target industries were expanded in 2004 to include school education, social education, etc.

Figure 1. Percentages of Job Changers Who Stayed in the Same Occupation

chapter will not be valid. The analysis is made under an assumption that an increase in job-to-job transitions does not affect the results.

$$R_{it} = \alpha_0 + \alpha_1 A_{it-1} + \alpha_2 U_{it-1} + \alpha_3 L_{it-1} + \alpha_4 N_{it} + \delta_i + \eta_t + \varepsilon_{it} \quad (1)$$

where R_{it} is the percentage of job changers who stay in the same occupation, A_{it-1} is the percentage of those aged 35 or over, U_{it-1} is the percentage of university graduates, L_{it-1} is the percentage of firms with 500 or more workers, N_{it} is the new opening rate, and the suffix *i* denotes the occupation, and *t* denotes the year. While equation (1) estimated separately for males and females, no suffix denoting sex is used for the purpose of simplification. δ_i represents occupation-specific factors, and η_t represents year-specific factors. Both a case that controls for η_t and a case that does not control for η_t are estimated.

The details of the variables are as follows. Attached Table 1 (p.75) shows the basic statistics of the variables used. The dependent variable R_{it} denotes the percentage of persons who were hired after having changed their job within the past one year and who stayed in the same occupation to the total job changers in the respective occupations of their former jobs. The chronological changes are shown in Figure 1. Before explaining the explanatory variables in detail, their sources are given below. Variables A_{it-1}, U_{it-1}, and L_{it-1} are created from the Special Survey of the Labour Force Survey (up to 2001) and the Labour Force Survey (Detailed Tabulation, Yearly Average) (2002 onward) both published by the Statistics Bureau, Ministry of Internal Affairs and Communications. It should be noted that, due to data limitations, these variables are designed not as indices on job changers alone, but as indices on all workers engaged in the relevant occupation. The new opening rate N_{it} is as of August for regular workers, excluding new school graduates and part-time workers, provided in the Report on Employment Service released by the Ministry of Health, Labour and Welfare.[8]

The percentage of those aged 35 or over in each occupation is controlled for, taking into account the following circumstances. In the case of occupations with older workers, job changers are more likely to stay in the same occupation in order to prevent loss of the human capital that has been accumulated. Conversely, in the case of occupations with younger workers, job changers may switch to another occupation since they still have a long time to accumulate human capital in the new job. A similar circumstance is assumed for the percentage of university graduates. In occupations with a higher percentage of university graduates, the workers are more likely to have a larger accumulation of human capital, and are likely to stay in the same occupation upon a job change. The age and academic background, which are controlled for based on the above assumptions, are deemed to be variables that represent the job changers' status of possession of human capital. However, this analysis has its limitations in that these indices do not necessarily represent occupational experience. Meanwhile, the percentage of firms with 500 or more workers indicate the percentage of workers working for firms or public agencies with 500 or more workers to the total number of workers in each occupation. In this manner, we also controlled for the firm size. A

[8] Values as of August are used because only values for August were available for the period until 1994.

one-year lag is applied to these three variables since they indicate the status of the former occupation.[9]

The new opening rate, which represents the supply-and-demand status of the labor market, is controlled for, in light of the possibility that job changers are likely to stay in the same occupation if the opening rate for the same occupation becomes high and the environment is such that it allows job seekers to find a new job easily. Since the value of the new opening rate cannot be obtained separately for males and females, the total value for males and females combined is used for both males and females. In addition to these variables, occupation-specific factors and year-specific factors are controlled for by using dummy variables.

Let us suppose that the percentage of persons hired after a job change who stay in the same occupation were decided completely at random. In such a situation, job changers would receive job offers for various occupations at random, and, as a result, they would select occupations at random. If such situation exists, and if we control for occupation-specific factors and year-specific factors, the job changers' status of accumulation of human capital and the supply-demand status of the labor market are not likely to affect determination of the occupation. If so, variables denoting such factors would be insignificant.

However, if such percentage were decided not at random, but was affected by the status accumulation of human capital and/or the supply-demand status of the labor market, it would be possible to examine the presence or absence of the two effects; in other words, whether job changes within the same occupation are affected by the status of accumulation of human capital or by the supply-demand status of the labor market. If the status of accumulation of human capital affects job changes within the same occupation, job changers with a large accumulation of occupation-specific human capital would suffer a great loss by switching occupations, so the outcome would be consistent with a hypothesis that they will try to avoid switching occupation. Also, if the supply-demand status of the labor market were the only factor having substantial effects, a high percentage of job changers who stay in the same occupation would be attributed to the fact that there are many job offers for the same occupation, which is separate from the factor that job changers try to stay in the same occupation in order to avoid a loss of occupation-specific human capital. These two hypotheses can be ascertained.

Table 3 shows the estimation results of equation (1). The estimation uses a data set covering six occupations and 18 years.[10] In the case of males, the percentage of university

[9] In order to prevent the endogeneity bias between variables, it may be necessary to apply a one-year lag to the new opening rate. Thus, the same analysis was conducted by applying a one-year lag to the new opening rate as well, but no differences were observed in the analysis results.

[10] Administrative and managerial workers are not covered in the analysis since they differ considerably from other occupations in terms of position classification, etc. Also, security workers are excluded from the analysis because the related data is not available in the Survey on Employment Trends for the 2000 to 2003 period.

Table 3. Empirical Analysis of the Percentage of Job Changers Who Stay in the Same Occupation

	Males		Females	
	(1)	(2)	(3)	(4)
Percentage of those aged 35 or over (one-year-lagged)	0.113 (0.200)	-0.080 (0.192)	0.194 (0.213)	0.158 (0.216)
Percentage of university graduates (one-year-lagged)	0.798 *** (0.184)	1.278 ** (0.509)	0.928 ** (0.387)	1.515 *** (0.480)
Percentage of firms with 500 or more workers (one-year-lagged)	-0.181 (0.318)	-0.212 (0.400)	-0.317 (0.254)	-0.384 (0.235)
New opening rate	-0.011 (0.012)	0.045 ** (0.021)	-0.017 (0.013)	-0.027 (0.032)
Occupational dummy (Reference: clerical workers)				
Specialist and technical workers	-0.057 (0.068)	-0.228 * (0.131)	-0.036 (0.072)	-0.134 (0.088)
Sales workers	-0.106 (0.111)	-0.157 (0.116)	-0.208 *** (0.032)	-0.181 *** (0.044)
Service workers	0.106 (0.115)	0.167 (0.137)	-0.140 ** (0.058)	-0.100 (0.065)
Transport and communication workers	0.281 ** (0.132)	0.405 ** (0.170)	-0.163 ** (0.075)	-0.103 (0.078)
Production process and related workers	0.331 ** (0.145)	0.421 *** (0.157)	-0.033 (0.077)	0.014 (0.079)
Constant term	0.331 (0.294)	0.230 (0.277)	0.632 *** (0.110)	0.652 *** (0.117)
Year dummy	No	Yes	No	Yes
R-squared	0.786	0.846	0.847	0.878

Note: Sample size = 102 (6 occupations × 18 years). Estimation method is OLS (Ordinary Least Squares). Figures in parentheses are heteroskedasticity-robust standard errors. Dependent variable is the percentage of job changers who were formerly engaged in the respective occupations and who stayed in the same occupation. *** denotes that the coefficient is significant at the 1% level, ** denotes that the coefficient is significant at the 5% level, and * denotes that the coefficient is significant at the 10% level.

graduates had significant and positive coefficients both with and without control for the year dummy. This revealed the possibility that job changers were selecting the same occupation according to the status of accumulation of human capital. In addition, only when we controlled for the year dummy were coefficients on the new opening rate positive and sig-

nificant. Since the supply-demand status of the labor market for each occupation is found to be affecting the selection of the same occupation even when we control for year-specific effects, we cannot deny the possibility that job changers are receiving many job offers for the same occupation. Coefficients on the occupational dummy were positive and significant for transport and communication workers and production process and related workers. Job changers formerly engaged in these occupations are considered to stay in the same occupation due to a lack of skills that are transferable to other occupations.

In the case of females, similar to the case of males, the percentage of university graduates had significant and positive coefficients. However, coefficients on the new opening rate were insignificant, suggesting that the supply-demand status of the labor market has not affected the selection of occupation. Therefore, as in the case of males, there is a tendency among females to try to avoid an occupational switch, since workers with a large accumulation of occupation-specific human capital suffer a considerable loss through a switch to another occupation. Coefficients on the occupational dummy were negative and significant for sales workers, indicating their relatively higher tendency to choose another occupation upon a job change.

These results revealed that the status of accumulation of human capital affects the selection of occupation upon a job change in the cases of both males and females, and that, in the case of males in particular, the possibility of their selecting the same occupation depending on the supply-demand status of the labor market cannot be denied. The next section takes a different viewpoint, and examines the importance of occupational experience by estimating an earnings function so as to see whether accumulation of experience in the same occupation is reflected in wages.

IV. Analysis on the Effects of Occupational Experience on Wages

This section observes how much wages would rise by accumulating occupational experience. The Basic Survey on Wage Structure published by the Ministry of Health, Labour and Welfare includes a tabulation called "scheduled cash earnings, annual bonus and other special cash earnings by occupation, sex, age group and length of experience" which provides information on wages by occupational tenure.[11] The analysis below uses this tabulation data.

1. Empirical Analysis of an Earnings Function that Takes into Account Occupational Experience

The following earnings function is assumed below. Suffixes denoting sex and year are

[11] Since the Basic Survey on Wage Structure is a survey targeting business establishments, the occupational tenure could be deemed to be the occupational tenure at the current business establishment or firm, but since the questionnaire clearly states "including experience in other firms," it is deemed here to be an individual's occupational tenure throughout his/her lifetime.

omitted for the purpose of simplification.

$$\log(w_{aik}) = \beta_0 + \sum_j \beta_j E^j_{aik} + \sum_s \beta_s age^s_{aik} + \sum_p \beta_p occu^p_{aik} + \varepsilon_{aik} \quad (2)$$

Here, the suffix *a* denotes the age group, *i* denotes the occupation, and *k* denotes the occupational tenure.

The dependent variable is the logarithmic value of the wage, which is obtained by adding one-twelfth of the annual bonus and other special cash earnings to the scheduled cash earnings, and then taking the natural logarithm. E^j_{aik} is a dummy variable for the occupational tenure. The relevant table in the Basic Survey on Wage Structure is tabulated by categorizing the occupational tenure into five groups: "0 years," "1-4 years," "5-9 years," "10-14 years," and "15 years or more." E^j_{aik} is a dummy variable which takes a value of 1 if the occupational tenure *j* is equal to *k*, and otherwise takes a value of 0. age^s_{aik} is a dummy variable for age. The relevant table in the "Basic Survey on Wage Structure" categorizes the age groups into "up to age 17," "age 18-19," "age 20-24," "age 25-29," followed by subsequent five-year groups, and finally "age 65 or over." This analysis excludes the group "age 65 or over" from its target. age^s_{aik} is a dummy variable which takes a value of 1 if the age group *s* is equal to *a*, and otherwise takes a value of 0. $occu^p_{aik}$ is an occupational dummy.[12]

In the often used Mincer earnings function, it is common to include the academic background and the employer tenure as explanatory variables (Mincer 1974; Mincer and Higuchi 1988). However, since the relevant table in the Basic Survey on Wage Structure does not provide data on the employer tenure and academic background, we assume the above model to conduct the analysis, and supplement the interpretation of the results by using additional data.

We estimate equation (2), and compare the wage increase by accumulation of occupational tenure and the wage increase with advance in age.

2. Estimation Results of the Earnings Function

Table 4 shows the results of estimation of equation (2).[13] In order to observe the chronological changes of coefficients, estimations are made separately for each year, and the results for 1987, 1992, 1997, 2002, and 2007 are shown in the table.

In the case of males, coefficients on the occupational tenure generally declined from

[12] This analysis uses the occupational classification used in the Basic Survey on Wage Structure. For the occupational classification used in the Basic Survey on Wage Structure, see the report of the survey. Since the occupational classification used in the survey does not coincide with that used in the Labour Force Survey and the Survey on Employment Trends, the data of these surveys cannot be combined in an analysis. The occupational classification used in the Basic Survey on Wage Structure is considered to be a problem of the survey which needs to be addressed in the future.

[13] The estimation faced not only the problem of the endogeneity bias in earnings functions, but also a sample selection bias resulting from a lack of observation of non-worker samples, particularly in the estimation of the earnings function for females.

Table 4. Estimation Results of Earnings Function (1)

	Male					Female				
	1987	1992	1997	2002	2007	1987	1992	1997	2002	2007
Occupational tenure dummy (Reference: "0 years")										
1–4 years	0.192 ***	0.210 ***	0.203 ***	0.182 ***	0.180 ***	0.313 ***	0.303 ***	0.272 ***	0.243 ***	0.178 ***
	(0.020)	(0.022)	(0.015)	(0.013)	(0.012)	(0.046)	(0.045)	(0.025)	(0.019)	(0.017)
5-9 years	0.293 ***	0.296 ***	0.278 ***	0.262 ***	0.287 ***	0.494 ***	0.454 ***	0.422 ***	0.351 ***	0.286 ***
	(0.019)	(0.021)	(0.014)	(0.013)	(0.013)	(0.051)	(0.049)	(0.028)	(0.019)	(0.016)
10-14 years	0.368 ***	0.343 ***	0.324 ***	0.316 ***	0.352 ***	0.621 ***	0.564 ***	0.511 ***	0.459 ***	0.382 ***
	(0.019)	(0.020)	(0.014)	(0.013)	(0.013)	(0.054)	(0.052)	(0.034)	(0.022)	(0.019)
15 years or more	0.447 ***	0.422 ***	0.435 ***	0.411 ***	0.457 ***	0.761 ***	0.691 ***	0.654 ***	0.602 ***	0.562 ***
	(0.019)	(0.019)	(0.019)	(0.018)	(0.017)	(0.054)	(0.051)	(0.031)	(0.026)	(0.023)
Age dummy (Reference: "age 20-24")										
Up to age 17	-0.279 ***	-0.302 ***	-0.313 ***	-0.256 ***	-0.381 ***	0.049	0.018	-0.038	-0.127 **	-0.380 ***
	(0.024)	(0.026)	(0.047)	(0.055)	(0.055)	(0.041)	(0.047)	(0.040)	(0.061)	(0.110)
Age 18-19	-0.163 ***	-0.178 ***	-0.173 ***	-0.151 ***	-0.144 ***	0.006	-0.019	-0.029	0.004	-0.022
	(0.024)	(0.026)	(0.019)	(0.017)	(0.016)	(0.041)	(0.037)	(0.031)	(0.026)	(0.027)
Age 25-29	0.134 ***	0.144 ***	0.144 ***	0.134 ***	0.097 ***	-0.015	0.003	0.013	0.044 ***	0.039 **
	(0.023)	(0.026)	(0.016)	(0.013)	(0.013)	(0.031)	(0.034)	(0.022)	(0.016)	(0.015)
Age 30-34	0.229 ***	0.222 ***	0.245 ***	0.240 ***	0.175 ***	-0.061	-0.058	-0.005	0.030	0.019
	(0.020)	(0.022)	(0.015)	(0.014)	(0.013)	(0.038)	(0.042)	(0.027)	(0.020)	(0.016)
Age 35-39	0.314 ***	0.292 ***	0.293 ***	0.301 ***	0.220 ***	-0.033	-0.031	-0.011	0.004	-0.025
	(0.020)	(0.021)	(0.016)	(0.015)	(0.015)	(0.035)	(0.037)	(0.025)	(0.023)	(0.019)
Age 40-44	0.375 ***	0.354 ***	0.307 ***	0.332 ***	0.240 ***	0.001	0.017	0.002	0.015	-0.027
	(0.020)	(0.022)	(0.018)	(0.017)	(0.016)	(0.032)	(0.036)	(0.026)	(0.020)	(0.019)
Age 45-49	0.396 ***	0.395 ***	0.326 ***	0.348 ***	0.251 ***	-0.004	0.027	0.031	0.033	-0.037 **
	(0.020)	(0.022)	(0.020)	(0.019)	(0.018)	(0.035)	(0.034)	(0.024)	(0.020)	(0.019)
Age 50-54	0.386 ***	0.398 ***	0.349 ***	0.356 ***	0.247 ***	-0.026	0.020	0.023	0.038 *	-0.026
	(0.021)	(0.022)	(0.021)	(0.019)	(0.021)	(0.033)	(0.038)	(0.026)	(0.022)	(0.019)
Age 55-59	0.321 ***	0.336 ***	0.309 ***	0.336 ***	0.216 ***	-0.038	-0.013	-0.004	0.031	-0.036
	(0.021)	(0.023)	(0.024)	(0.022)	(0.019)	(0.038)	(0.042)	(0.030)	(0.027)	(0.023)
Constant term	6.339 ***	5.253 ***	6.401 ***	5.233 ***	5.274 ***	4.574 ***	4.882 ***	4.927 ***	5.366 ***	4.871 ***
	(0.059)	(0.045)	(0.050)	(0.037)	(0.040)	(0.056)	(0.070)	(0.049)	(0.048)	(0.071)
Observations	3727	3686	3238	3121	3656	1385	1398	1571	1502	1601
R-squared	0.929	0.920	0.896	0.911	0.879	0.914	0.910	0.877	0.896	0.883

Note: Estimation method is OLS. Figures in parentheses are heteroskedasticity-robust standard errors. Although not indicated in the table, the occupational dummies are also included in the explanatory variables. *** denotes that the coefficient is significant at the 1% level, ** denotes that the coefficient is significant at the 5% level, and * denotes that the coefficient is significant at the 10% level.

1987 through 2002, apart from some exceptions, but increased slightly from 2002 through 2007. We can say that the wage return to occupational experience has remained stable, staying at almost the same level. As for the effects of age, the effects have been stable from 1987 through 2002, constantly shifting around the same level. Comparing the results for 2002 and 2007, coefficients are smaller in 2007 for age 20 and over. This proves that the age-wage profile has become flatter.[14]

Next, comparison is made between the wage increase with advance in age and the wage increase by accumulation of occupational tenure. Since they cannot be strictly compared due to the difference in the grouping intervals of the respective dummy variables, the following style of comparison is attempted. In the age group "age 20-24," we focus on age 22, which is the mean value of the upper limit and lower limit of the age group, and consider the case where a person aged 22 becomes five years older and the case where that person has accumulated another five years of occupational tenure.[15] In the results for 1987, the wage increase with an advance of five years of age is 0.134, and the wage increase by accumulation of five years of occupational tenure is in the middle of the coefficient on "1-4 years" which is 0.192 and that on "5-9 years" which is 0.293. Since the coefficient on "1-4 years" of accumulation of occupational tenure is larger than the wage increase with an advance of five years of age, the effects of occupational experience were relatively larger than the effects of age. When making the same comparison for the results for 2007, the wage increase with an advance of five years of age is 0.097, and the wage increase by accumulation of five years of occupational tenure is in the middle of the coefficient on "1-4 years" which is 0.180 and that on "5-9 years" which is 0.287. Accordingly, the effects of occupational experience were relatively larger also in 2007.

Next, the results for females are studied. Although coefficients on occupational tenure have constantly declined from 1987 through 2007, they were positive and statistically significant even in 2007. This result is contrastive to the result that coefficients on age were mostly insignificant. An upward sloping age-wage profile that exists for males cannot be observed for females. One possible reason is that a wage increase through continuous employment cannot be observed at the aggregate level since many females leave their jobs upon marriage or childbirth.[16]

The analysis revealed that occupational experience is linked to wage increase, but does the degree of such effect differ by occupation? The following part examines whether or not there is difference in the extent of wage increase by accumulation of occupational expe-

[14] Studies including Nakamura and Ohashi (2002) have confirmed that the slant of the wage profile has become notably flatter since the collapse of the bubble economy.

[15] Here, the comparison is made on an assumption that the mean value of the upper limit and lower limit of the age group corresponds to the coefficient on the relevant variable. In other words, where the coefficient on the age group "age 25-29" is 0.134, the wage return of a person whose age is 27, which is the mean value of age 25 and age 29, is deemed to be 0.134.

[16] Kawaguchi (2005) clarified that women's wages decrease by childbirth and marriage, and that such decrease is caused by unobservable personal attributes.

Table 5. Estimation Results of Earnings Function (2)

	Male					Female				
	1987	1992	1997	2002	2007	1987	1992	1997	2002	2007
Occupational tenure dummy (Reference: "0 years")										
1-4 years	0.188 ***	0.204 ***	0.200 ***	0.170 ***	0.177 ***	0.318 ***	0.313 ***	0.266 ***	0.219 ***	0.130 ***
	(0.020)	(0.022)	(0.016)	(0.014)	(0.013)	(0.061)	(0.063)	(0.040)	(0.032)	(0.025)
5-9 years	0.282 ***	0.288 ***	0.270 ***	0.252 ***	0.278 ***	0.501 ***	0.465 ***	0.439 ***	0.336 ***	0.229 ***
	(0.019)	(0.021)	(0.014)	(0.013)	(0.014)	(0.064)	(0.064)	(0.040)	(0.030)	(0.026)
10-14 years	0.351 ***	0.325 ***	0.308 ***	0.300 ***	0.338 ***	0.616 ***	0.568 ***	0.508 ***	0.439 ***	0.311 ***
	(0.018)	(0.020)	(0.015)	(0.013)	(0.015)	(0.066)	(0.066)	(0.049)	(0.034)	(0.030)
15 years or more	0.430 ***	0.404 ***	0.416 ***	0.386 ***	0.435 ***	0.748 ***	0.686 ***	0.624 ***	0.554 ***	0.508 ***
	(0.019)	(0.019)	(0.019)	(0.018)	(0.018)	(0.067)	(0.066)	(0.048)	(0.044)	(0.038)
Interaction term between the occupational tenure dummy and the specialist and technical worker dummy (D)										
1-4 years × D	0.045	0.058 *	0.032	0.076 **	0.012	-0.018	-0.032	0.016	0.051	0.092 ***
	(0.042)	(0.032)	(0.032)	(0.031)	(0.027)	(0.064)	(0.066)	(0.042)	(0.035)	(0.029)
5-9 years × D	0.099 **	0.104 ***	0.084 ***	0.062 *	0.040	-0.011	-0.034	-0.043	0.038	0.110 ***
	(0.042)	(0.037)	(0.033)	(0.032)	(0.026)	(0.062)	(0.064)	(0.041)	(0.032)	(0.029)
10-14 years × D	0.201 ***	0.215 ***	0.145 ***	0.105 ***	0.074 ***	0.057	0.008	0.012	0.050	0.136 ***
	(0.038)	(0.035)	(0.032)	(0.033)	(0.027)	(0.062)	(0.065)	(0.049)	(0.036)	(0.033)
15 years or more × D	0.257 ***	0.272 ***	0.207 ***	0.178 ***	0.124 ***	0.084	0.036	0.069	0.103 **	0.105 **
	(0.039)	(0.033)	(0.033)	(0.035)	(0.030)	(0.061)	(0.065)	(0.051)	(0.046)	(0.042)
Observations	3727	3686	3238	3121	3656	1385	1398	1571	1502	1601
R-squared	0.934	0.926	0.900	0.914	0.881	0.916	0.911	0.879	0.898	0.886

Note: Estimation method is OLS. Figures in parentheses are heteroskedasticity-robust standard errors. Although not indicated in the table, the age dummy, the occupational dummy, and the constant term are also included in the explanatory variables. *** denotes that the coefficient is significant at the 1% level, ** denotes that the coefficient is significant at the 5% level, and * denotes that the coefficient is significant at the 10% level.

rience between specialist and technical workers and other occupations.[17] For this purpose, equation (2) includes the interaction term between the occupational tenure dummy and the specialist and technical worker dummy as an explanatory variable, and the results are observed.

The results are shown in Table 5. In the case of males, coefficients on the interaction term were positive and significant until 2002, but coefficients on five years or more of occupational tenure showed a decline from 1992 through 2007. This suggests that the premium on specialist and technical workers has decreased during that period. On the other hand, in the case of females, the interaction term was not at all significant until 1997. Later, in 2002, only coefficients on 15 years or more of occupational tenure became significant, and by 2007, all interaction terms became significant along with an increase in the coefficients. This indicates that, in the case of females, extra premium was attached to specialist and technical workers from 2002 through 2007.

V. Closing Remarks

In this paper, I focus on occupation-specific human capital and analyze to what extent firms value and utilize such human capital that is formed through the experience within occupation, using publicly available data.

Firstly, the percentage of job changers who stay in the same occupation has increased with regard to job changers who were formerly specialist and technical workers or clerical workers, but has remained almost at the same level, though with some fluctuations, with regard to job changers formerly engaged in other occupations. This result differs from the result presented by Kambourov and Iourii (2008) that the percentage of job changers who stay in the same occupation has decreased in the United States.

Secondly, as a result of investigating the factors that determine the percentage of job changers who stay in the same occupation, it was found that, in the cases of both males and females, job changers formerly engaged in occupations with larger accumulation of human capital are more likely to stay in the same occupation. This suggests that jobs are not selected at random upon job changes. Meanwhile, the analysis also revealed a possibility that, in the case of males, job changers choose to stay in the same occupation according to the supply-demand status of the labor market. The question as to whichever factor has a larger

[17] Specialist and technical workers shall be the following workers. However, some of these occupations are not cited as categories for some survey years.
Scientific researcher, chemical analyst, professional engineer, first grade architect, surveying engineer, system engineer, computer programmer, medical doctor, pharmacist, professional nurse, auxiliary nurse, nursing aid, clinical X-ray technician, clinical examination technician, physical therapist or occupational therapist, dental hygienist, dental technician, dietitian, nursery teacher, care manager, kindergarten teacher, high school teacher, professor of college and university, assistant professor of college and university, college lecturer, miscellaneous school teacher, tutor, cram school lecturer, and journalist.

effect remains as an issue to be studied in the future.

Thirdly, as a result of inquiring into the effects of occupational experience on wages, it was found that occupational experience has a larger effect on wages than the worker's age, both in the case of males and females. Also, in the case of males, the wage return to occupational experience showed a slight increase from 2002 through 2007. In the case of females, the wage return to occupational experience was found to be rising higher than females' average wage return, particularly for specialist and technical workers. We pointed out the possibility that these effects may incorporate the effect of accumulation of employer tenure, and confirmed that the effect of employer tenure is small by examining the distribution of employer tenure.

Although these analyses have several limitations, their results collectively suggest that occupational experience has also an important role in Japan. In particular, the fact that the wage return for female specialist and technical workers is rising higher than females' average wage return is considered to be a useful finding for promoting women's social participation.

Lastly, the author would like to mention the limitations of this paper and the issues that need to be studied in the future.

The first point is the definitions of occupations. While this paper used the major-level categories of occupational classification, a question remains as to how useful this is for determining the importance of occupational experience. As already pointed out by Kambourov and Iourii (2008) and other studies, efforts should be made in the future to use indices of minor-level categories that better reflect the actual conditions of the occupations. The only statistics in Japan that tabulates the number of workers for minor-level categories of occupation is the Population Census. We hope that other statistics will also come to aggregate data in more detailed-level occupational categories and that such data will come to be used more actively in the future. At the same time, there is a problem that the Basic Survey on Wage Structure uses its original occupational classification. We hope that the occupational classification will be standardized among surveys in the future.

The second point is accumulation of panel data. As in the case of Kambourov and Iourii (2009), U.S. studies investigate occupational tenure by using long-term panel data. Although retrospective data is also effective for identifying occupational tenure and employer tenure, long-term panel data would be required in order to carry out more sophisticated analysis. Due to the growing need for Japanese panel data, efforts have started to be made in Japan to collect it, although Japan is still greatly behind Europe and the United States in this respect. The second best solution would be to carry out detailed surveys by limiting the occupations. Such surveys, though limited in scope, would be useful for investigating the importance of occupational experience.

The third point is the explanation as to why the changes in the percentage of job changers who stay in the same occupation differ between Japan and the United States. While Kambourov and Iourii (2008) have proposed some hypotheses, an in-depth study on

what kind of structural differences between the Japanese and U.S. labor markets bring such differences in trend would be important also from the viewpoint of clarifying the labor market structure.

Attached Table 1. Basic Statistics of the Analysis on the Percentage of Job Changers Who Stay in the Same Occupation

Male

	Average	Standard deviation	Minimum value	Maximum value
Percentage of job changers who stay in the same occupation	0.646	0.099	0.437	0.813
Percentage of those aged 35 or over (one-year-lagged)	0.670	0.050	0.575	0.807
Percentage of university graduates (one-year-lagged)	0.286	0.210	0.018	0.648
Percentage of firms with 500 or more workers (one-year-lagged)	0.353	0.130	0.190	0.618
New opening rate	1.373	0.613	0.330	2.990

Female

	Average	Standard deviation	Minimum value	Maximum value
Percentage of job changers who stay in the same occupation	0.609	0.155	0.172	0.861
Percentage of those aged 35 or over (one-year-lagged)	0.635	0.108	0.417	0.818
Percentage of university graduates (one-year-lagged)	0.089	0.095	0.000	0.321
Percentage of firms with 500 or more workers (one-year-lagged)	0.286	0.131	0.106	0.667
New opening rate	1.373	0.613	0.330	2.990

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Measuring Matching Efficiency Using the Public Employment Service Agency in Japan

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This paper decomposes the probability of a match being formed between a job seeker and a firm into two components. In the first matching process, a job seeker applies for a job and manages to obtain an interview with a firm advertising a job vacancy at the employment service office, and in the second process, upon contact, the job seeker and the firm agree to form a match. This allows us to explore in which process matching efficiency has improved over the sample period.

I. Introduction

This paper estimates the probability of a job seeker exiting from unemployment, using prefectural-level panel data from Japan. Our estimate decomposes the exit probability into two components; the first is the probability that a job seeker contacts a firm advertising a job vacancy at the employment service office, with the help of an employment counselor, and the second is the conditional probability that, upon contact, the job seeker and the firm agree to sign an employment contract. This enables us to explore in which process matching efficiency has improved. Because our dataset includes the number of referral flows, indicating the number of contacts between job seekers and job vacancies, we can contribute to decomposing the exit probability of a job seeker.

The unemployment rate was not a serious issue in Japan until the early 1990s, particularly compared with unemployment in the United States and European countries. The Japanese unemployment rate was between 2% and 3% in the 1980s, but it rapidly increased to over 5% in the 1990s and, as of June 2003, it had reached 5.3%. The unemployment rate currently remains at around 5%.[1]

What was the cause of this rapid increase in the unemployment rate that occurred in the 1990s? There are three possible elements to be considered. The first is a steady decrease in the level of effort that job seekers put into searching for a job. To obtain an interview with a firm, a job seeker has to visit the local employment service office, search for an appropriate job using a job vacancy database and request an employment counselor to issue a referral letter and to arrange an interview with the firm. Therefore, the extent of the search effort by a job seeker can be measured by how many referral letters the job seeker asks his or her employment counselor to issue during a given length of time.[2]

[1] The data on the unemployment rate are obtained from the Labour Force Survey conducted by the Japanese Ministry of Health, Labour and Welfare.

[2] A job seeker can apply for a firm without a referral letter issued by the employment service office. However, because the referral letter gives the job seeker a stamp of approval, it is more advanta-

According to the 2002 Actual Condition Survey of Job Seekers (released in December, 2005), 60.2% of job seekers who registered at an employment service office in December 2002 had applied for at least one job vacancy using the public employment service up to June 2005.[3] Note that job seekers who do not visit an employment service office are not necessarily lazy about searching; when job seekers recognize that there are no appropriate job vacancies compatible with their skill, they do not visit the employment service office, which usually posts medium-skilled and low-skilled job vacancies, and may instead search for an appropriate job through the channel of private employment services.

The second element to be considered in understanding the rapid increase in unemployment is coordination failure among job seekers. When job seekers decide which job to apply for, usually they do not take account of which job other job seekers will apply for; in other words, the job seekers do not coordinate with each other about which job each applies for. As a result, it is possible to observe that, on the one hand, there are excess applicants for one job vacancy, but, on the other hand, that no one applies for a different job vacancy. If job seekers coordinated their efforts in relation to the allocation of job seekers to job vacancies in order to avoid multiple applications for one job vacancy, the number of job placements would increase, thereby leading to a decrease in the unemployment rate.

The final element in understanding the increase in unemployment is the decision process regarding acceptance of a job vacancy upon contact with the firm. Even though at least one job seeker applies for a job vacancy within a firm, the job vacancy will not be occupied if either the job seeker or the firm does not agree to sign the employment contract. Both the job seeker and the firm with a vacancy mutually agree to consummate a job match if and only if the pair's idiosyncratic productivity equals or exceeds the reservation productivity level. However, if the pair's idiosyncratic productivity is lower than the reservation productivity level, the firm does not send an acceptance letter to the applicant, and, simultaneously, the job seeker is better off not forming a match with this firm, instead looking for another job.[4] If the firm does not agree to form a match with any of the job seekers who applied for the job vacancy, then the job remains vacant. A firm has additional conditions of employment that are not included in the posted job-placement ads, which a job seeker applying for a job vacancy realizes only when he or she is interviewed by the firm. Therefore, there is a possibility that some job applicants will end up rejecting an offer from a firm despite the fact that they applied for the position.

This paper focuses on the first element, i.e., a decrease in search efforts, and also

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geous for the job seeker to have the referral letter.

[3] This survey is called *Kyushokusha Sogo Jittai Chosa* and is conducted by the Japanese Ministry of Health, Labour and Welfare.

[4] We assume here that the total surplus that a matched job creates is transferable; both a job seeker and a firm with a job vacancy mutually agree to match if the total surplus is positive; otherwise, neither of them agrees to match. If the total surplus is nontransferable, it is possible to observe one side agreeing to a match despite the fact that the other side does not.

considers, separately and then jointly, the second and third elements, the coordination failure among job seekers and the decision process regarding acceptance of a job vacancy following contact with a firm. The first element relates to the intensity of the search process, in which a job seeker visits the employment service office, searches for an appropriate job using the job vacancy database and manages to obtain an interview. The second and third elements relate to the process of matching formation in which, upon contact, the job seeker and the firm with the job vacancy agree to sign an employment contract.

In this study, we employ aggregate data on labor market conditions from the *Report on Employment Services* produced by the Employment Security Bureau, Japanese Ministry of Health, Labour and Welfare. This dataset contains prefectural-level, quarterly data on the numbers of job seekers, job vacancies, job placements and referral flows, covering the period from the first quarter of 1998 to the first quarter of 2007. Because the Japanese economy was recovering during the sample period, we can observe how the economic recovery affects the matching efficiency of each search process.

The main findings are as follows. We begin with the first search process (search intensity). When we regress the ratio of job vacancies to referral flows (the labor market tightness) on the ratio of job vacancies to job seekers (the application ratio), its coefficient is positively significant and ranges between 0.944 and 0.980. This result implies that, holding the number of job vacancies constant, a 1% increase in the number of job seekers raises the number of contacts between job seekers and job vacancies by approximately 1%.

For the second search process (matching formation), when we regress the ratio of job placements to job vacancies (the adequacy ratio) on the ratio of job vacancies to referral flows (the labor market tightness), its coefficient is negatively significant and ranges between –0.782 and –0.818. There are two intuitions underlying this result. The first is that because an increase in job vacancies per referral flows implies a decrease in the number of applicants per job vacancy, the job vacancy is less likely to be occupied. Second, as it is more competitive for firms to hire, the firms raise the offered wage to attract more job seekers and, in response, job seekers demand a higher wage in order to accept an offer. In order to maintain profitability in the face of the increase in the hiring cost, firms raise the reservation productivity level required to form a match with a job seeker. Therefore, the probability that both the firm and the job seeker agree to sign the employment contract is lower, implying a decrease in the ratio of job placements to job vacancies.

The coefficients on the year dummies capture variations in the matching efficiency over the sample years. The estimate of the first search process shows that the number of referral flows increased during the sample period. This result implies an improvement of matching efficiency in the contact process. As the economy was recovering, firms advertised better job terms to attract more job seekers. In response, job seekers more frequently visited employment service offices and asked employment counselors to issue referral letters. Alternatively, it could be interpreted that the productivity of employment counselors at the reception desks of the employment service offices improved over the years.

The estimate of the second search process shows that the coefficients on year dummies are significantly negative and, therefore, that the ratio of job placements to job vacancies declined over the years. This implies that the efficiency of the matching formation process worsened over time. As the economy was recovering, job seekers searched for jobs using different methods (e.g., newspaper and/or magazine classifieds, word of mouth from acquaintances, private employment services), as well as using the public employment service. Because job seekers had more job opportunities offered to them as a result of using different service mediums, on average, the job seekers were more likely to reject a job offer from a firm referred to them by the public employment service office. An increase in the use of different search methods worsened the matching efficiency of the public employment service office.

The remainder of the paper is organized as follows. Section II develops a simple urn-ball matching model with search and matching between a job seeker and a job vacancy, and presents the implications from the model. Section III presents the econometric specifications and describes the prefectural-level data. Section IV reports the estimated results, and Section V provides some concluding remarks.

II. Matching Process

This section describes the formation of a match between a job seeker and a job vacancy in which the public employment service office is used as a mediator. To do this, we extend the basic urn-ball matching model (Butters 1977 and Hall 1979). The essence of the model is as follows. Each job seeker chooses one job vacancy randomly and applies for it without any coordination with other job seekers. A firm with a job vacancy randomly chooses one of the applicants if at least one job seeker applies for its job vacancy. If an applicant is not chosen, he or she remains unemployed. If no one applies for the job vacancy, it automatically remains vacant. Coordination failure among job seekers is the source of search frictions.

This study is different from past studies in that we decompose the search process into two processes: first, the process whereby a job seeker makes a search effort and manages to contact a firm; and second, the process whereby the job seeker and the encountered firm agree to consummate a match. We begin with the first process. In the placement role played by the employment service office, a job seeker leaves his or her residence and travels to the local employment service office, searches for an appropriate job vacancy posted there and asks a counselor at the reception desk to arrange an interview with the firm and to issue a referral letter. Therefore, job seekers have to make significant search efforts to obtain an interview. For this reason, job seekers who receive referral letters are considered to be seriously looking for a job, and the number of referral letters is used to measure the efficient number of job seekers.

The number of referral flows is given by:

$$E = kU,$$

where E represents the number of referral flows and U indicates the number of job seekers who register at the employment service office. Therefore, k implies an average number of referral letters per job seeker. Alternatively, k indicates the extent to which job seekers put search efforts into obtaining an interview with a firm. If $k \geq 1$, a job seeker applies for more than one job vacancy on average. Dividing the number of job vacancies (V) by the above equation gives:

$$\phi = \frac{1}{k}\theta,$$

where ϕ ($\equiv V/E$) represents the ratio of job vacancies to job seekers who seriously look for a job. This ratio is referred to as "labor market tightness." The symbol θ indicates the ratio of job vacancies to all job seekers, regardless of whether they have referral letters. This is referred to as the "application ratio."

In the context of the urn-ball matching model, each serious job seeker chooses one job vacancy randomly, not taking into account which jobs other job seekers apply for. Thus, the probability of a firm having a job seeker respond to its vacancy is 1/V.[5]

Our focus now shifts to the second process of matching formation. Our paper differs from the previous literature in regard to the matching technology, as we do not assume that all contacts result in matching formations. We employ a stochastic matching model, following Pissarides (2000), in which it is assumed that job matches are *ex post* heterogeneous with respect to the productivity of a matched pair, although all job seekers and vacancies are *ex ante* identical. Therefore, the conditional probability of forming a match upon contact needs to be modeled as well. We assume that each matched pair produces α units of output. α is specific to the job match and is known by the job seeker and the firm with a job vacancy prior to the decision to form a match upon contact. The job-match-specific productivity is idiosyncratic and is considered to be a random variable drawn from a continuously differentiable and time-invariant distribution of $G(\alpha)$.

Because all job seekers and firms with job vacancies are assumed to be *ex ante* identical, they all realize which job match is formed in equilibrium. In other words, there is a common reservation productivity for job matching among job seekers and job vacancies in equilibrium. If the job-match productivity equals or exceeds the reservation productivity, a matching formation is consummated, but otherwise, it is not. Let α^* denote the reservation productivity. Then, the fraction of successful job matches as a proportion of contacts is $[1-G(\alpha^*)]$.

Pissarides (2000) shows the uniqueness of the equilibrium in the stochastic matching model in which free entry and the steady-state conditions are allowed. One of the characte-

[5] In the urn-ball matching model, we assume that all job vacancies are homogenous with respect to job characteristics. However, this does not seem to be the case in reality. Ueno, Kambayashi, and Muraoka (2004) show that a job seeker's choice of a job vacancy is not random, according to the Survey on Employment Trends conducted by the Japanese Ministry of Health, Labour and Welfare.

ristics is that the reservation productivity depends positively on unemployment benefits (z) and labor market tightness (ϕ). An increase in unemployment benefits raises the reservation productivity, thereby leading to a lower probability of matching formation upon contact. As unemployment benefits increase, job seekers increase their reservation wage and demand an increase in the offered wage. In response, firms increase the wage offered to attract more job seekers. Thus, the firms raise the reservation productivity of the job to compensate for the increased hiring cost incurred by the increase in the wage.

An increase in labor market tightness also raises the reservation productivity. As the labor market becomes tighter, the job seeker's bargaining strength becomes stronger, thereby resulting in an increase in the wage. Firms then raise the reservation productivity to maintain profitability in response to the increase in hiring cost. In contrast with the above argument, it is argued that labor market tightness has a negative effect on the reservation productivity if the number of job vacancies is fixed in the short run. The tighter labor market means firms must compete more to attract job seekers and the firms consequently become less selective in hiring a job seeker from among the applicants who apply for the job vacancy. That is, it results in lower or less selective hiring criteria. From an alternative perspective, because the number of job vacancies is limited, a job seeker's bargaining strength is not as strong as when free entry is allowed, and he or she becomes less selective in accepting a wage offer. A decrease in the reservation productivity results in an increase in the matching formation. Overall, therefore, the impact of labor market tightness on the reservation productivity is theoretically ambiguous.

The probability that a firm faces an applicant and then the job-match productivity equals or exceeds the reservation productivity is $[1-G(\alpha^*)]/V$. We assume that job seekers who seriously look for a job (E) are binomially distributed according to Bin (E, $[1-G(\alpha^*)]/V$). Therefore, the probability that a firm has at least one applicant whose job-specific productivity equals or exceeds the reservation productivity is:

$$1-\left(1-\frac{1-G(\alpha^*)}{V}\right)^{E}.$$

The firm chooses the applicant whose job-specific productivity is the highest. The number of matches is:

$$X=\left[1-\left(1-\frac{1-G(\alpha^*)}{V}\right)^{E}\right]V.$$

If E and V are sufficiently large, holding ϕ ($\equiv V/E$) constant, the binomial distribution approximates the Poisson distribution. The number of matches is rewritten as:

$$X=\left[1-\exp\left(-\frac{1-G(\alpha^*)}{\phi}\right)\right]V.$$

Because doubling the number of job seekers and job vacancies delivers twice as many job matches, this matching process exhibits constant returns to scale with respect to job seekers and job vacancies.

The ratio of job placements to job vacancies (the adequacy ratio) is then given by:

$$q^V \equiv X/V = \left[1 - \exp\left(-\frac{1 - G(\alpha^*)}{\phi}\right)\right].$$

As ϕ rises, the adequacy ratio declines because the probability that a job seeker applies for a firm with a job vacancy is lower. Pissarides (2000) refers to this as the job-offer effect. There are two other effects that ϕ has on the adequacy ratio, which occur through the reservation productivity channel. The first captures the long-run effect of ϕ. As the labor market becomes tighter, firms raise the wage to attract more selective job seekers. In response, firms raise the reservation productivity to compensate for the increase in their hiring cost. In this case, a job seeker and a firm are less likely to reach an employment agreement, which in turn lowers the adequacy ratio. The second effect is a short-run effect. Firms are encouraged to lower the reservation productivity level to ensure their own vacancies are occupied as soon as possible, which then raises the adequacy ratio. Together, these two opposite effects of ϕ that occur through the channel of the reservation productivity are referred to as the reservation-wage effect. The overall effect, combined with the job-offer and reservation-wage effects, is ambiguous, and hence our empirical task is to determine the overall effect.

III. Data and Specifications

In this section, we construct the estimating equations for the ratio of job vacancies to referral flows (labor market tightness) and the ratio of job placements to job vacancies (the adequacy ratio), using the prefectural-level panel data. This study employs quarterly data on labor market conditions from the *Report on Employment Services* produced by the Employment Security Bureau, Japanese Ministry of Health, Labour and Welfare. The heterogeneity across prefectures should be controlled in estimating the equations.

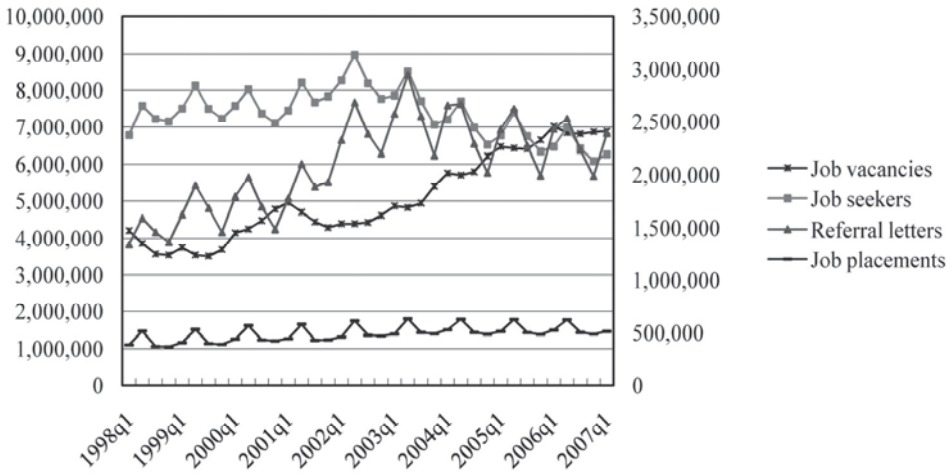
Labor market tightness and the adequacy ratio are estimated using the recursive simultaneous equations indicated below:

$$\ln\phi_{it} = \eta_i + \gamma \ln\theta_{it-1} + \mu D_t + v_{it},$$

and

$$\ln q^V_{it} = \delta_i + \beta \ln\phi_{it} + \lambda D_t + \varepsilon_{it}.$$

In the first equation, the dependent variable indicates the logarithmic value of the ratio of job vacancies at t–1 to referral flows at t (the labor market tightness), whereas the independent variables indicate the logarithmic value of the ratio of job vacancies at t–1 to job seekers at t–1, regardless of whether the job seekers are eager to search for a job (the application ratio). The year dummies capture the variation in the matching efficiency over the sample years. We use the one-year lagged variable of the ratio of job vacancies to job seekers to control for the simultaneous bias. η_i represents the individual effect controlling for the heterogeneity across prefectures. If this individual effect is time-invariant and



Note: The left vertical axis measures numbers of job vacancies and job seekers, while the right vertical axis measures numbers of referral letters and job placements.

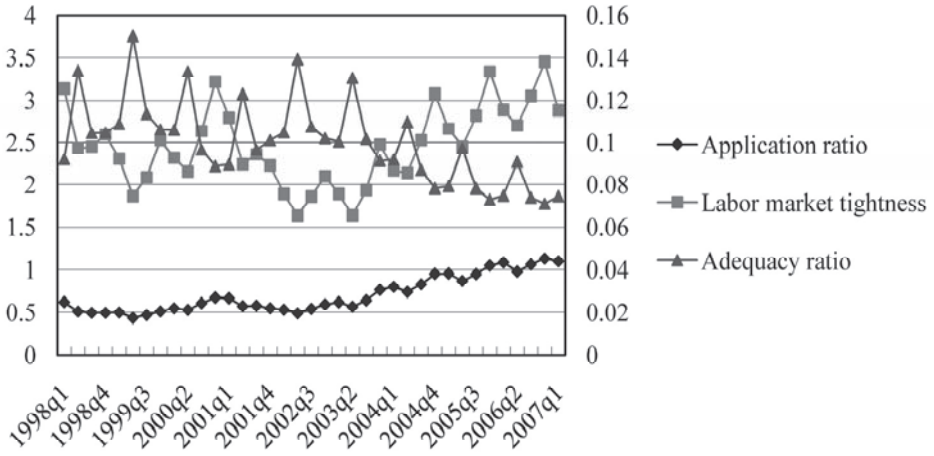
Figure 1. Trends for Job Seekers, Job Vacancies, Referral Letters

prefecture-specific, the individual effect is treated as the fixed effect. On the other hand, if the individual effect is the random variable, we employ the random-effect estimation. Whether the individual effect is fixed or random is tested according to the Hausman test. The symbol v_{it} represents the error term.

Looking at the second equation, the dependent variable is the logarithmic value of the ratio of job placements at t–1 to job vacancies at t (the adequacy ratio), whereas a vector of dependent variables consists of the ratio of job vacancies at t–1 to referral flows at t and year dummies. As in the previous section, unemployment benefits should be included in the vector of dependent variables, but we cannot obtain the appropriate variable indicating the extent of unemployment benefits. δ_{it} is the variable controlling for heterogeneity across prefectures, and ε_{it} is the error term. If the error terms v_{it} and ε_{it} are correlated, ε_{it} and $\ln\phi_{it}$ are correlated as well, in which case the OLS estimation provides a biased estimate for $\ln\phi_{it}$. Therefore, it is necessary to correct for this bias.

This dataset covers from the first quarter of 1998 to the first quarter of 2007. This sample period is interesting because it covers the dynamic variations of the Japanese economy from the recession to economic recovery. The dataset combines matching formations in both full-time and part-time occupations, and new college graduates are not included in the dataset.

Some graphical views are presented before the estimated results are reported. Figure 1 shows the time trends for the aggregate numbers of job seekers, job vacancies, referral flows and job placements over the sample period. In the first quarter of 1998, the number of job seekers greatly exceeded that of job vacancies, although the gap has become smaller



Note: The left vertical axis measures the application ratio and the extent of labor market tightness, while the right vertical axis measures the adequacy ratio.

Figure 2. Trends for Application Ratio, Labor Market Tightness, Adequacy Ratio

since then, and the relation was finally reversed in the fourth quarter of 2005, meaning that the application ratio became greater than one. The economic recovery and an increase in labor demand due to the retirement of the baby-boomer generation were the main factors responsible for the improvement in the employment situation. In a tight labor market, the number of referral flows also increased; there were 1.37 million referral flows in the first quarter of 1998, increasing to 2.39 million in the first quarter of 2007. As the labor market became tighter, job seekers became more eager to search for a better job and received more referral letters. The number of job placements also increased over the sample period, but not as rapidly as the number of referral flows. One possible reason is that because the labor market was tighter, job seekers were more selective in their choice of an appropriate job, which delayed exit from the unemployment pool.

As shown in Figure 2, the ratio of job vacancies to job seekers (the application ratio) gradually increased over the sample period, reaching 1.09 in the first quarter of 2007. This implies an improvement in the employment situation. The ratio of job vacancies to referral flows (labor market tightness) fluctuated over the sample period. Roughly speaking, labor market tightness experienced a downward trend until 2002, but then this trend reversed. The ratio of job placements to job vacancies (the adequacy ratio) subsequently remained at low levels and experienced a gradual downward trend. This implies that the number of job vacancies increased more than did the number of job placements.

Figure 3 shows the trend in the ratio of referral flows to job seekers. This ratio represents the proportion of job seekers who seriously looked for a job, and also proxies the average level of search effort by a job seeker. As of the first quarter of 1998, a job seeker

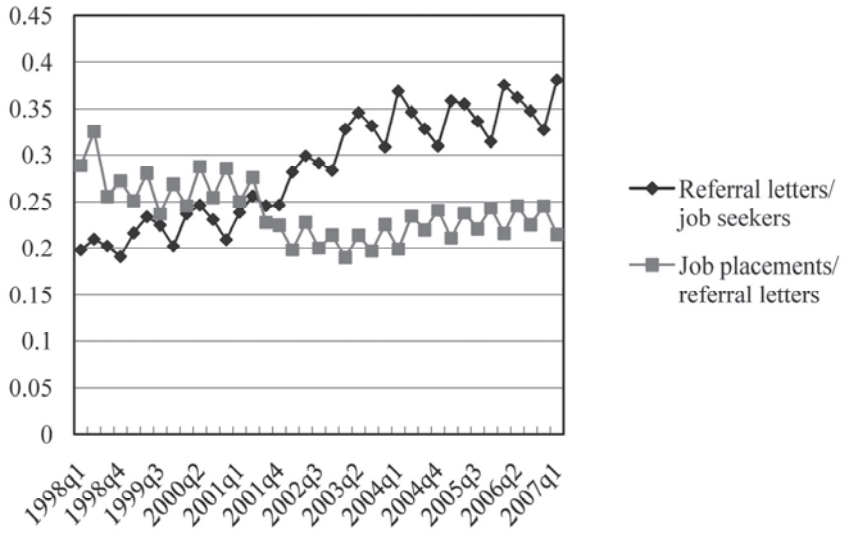


Figure 3. Trends for Referral Letters/Job Seekers and Job Placements/Referral Letters

received an average of 0.2 referral letters, but the average number of referral letters per job seeker increased to 0.4 in the fourth quarter of 2007. The figure also reports that job seekers were encouraged to apply for more firms over the sample period. In addition, Figure 3 indicates the ratio of job placements to referral flows (the acceptance ratio), which experienced a gradual downward trend. This implies that the number of job placements did not increase as much as the number of referral flows, probably because job seekers became choosier in their job search.

IV. Results

We begin with estimations of a matching function as a benchmark for matching formation between job seekers and job vacancies. In a similar way to the existing studies, we regress the number of job placements on the numbers of job seekers and job vacancies (see Petrongolo and Pissarides [2001]). The first column of Table 1 shows the estimated result when contemporary values are used for both independent and dependent variables. Therefore, a simultaneous bias arises in the estimation. In contrast, the second column shows the result when the one-year lagged values are used for job seekers and job vacancies. This corrects for the endogenous problem caused by the simultaneous bias. Finally, the third column shows that the number of job seekers (job vacancies) is calculated by the sum of the number of job seekers (job vacancies) still remaining from the previous year, plus the new inflow of job seekers (job vacancies), following Berman (1997). Both fixed- and random-effect estimates are displayed, although the Hausman test indicates that the random-effect model is preferable.

Table 1. Estimations of a Matching Function

Dependent variable ln(job replacements)	[1] fixed	[1] random	[2] fixed	[2] random	[3] fixed	[3] random
ln(job seekers)	0.612 ***	0.617 ***	0.545 ***	0.618 ***	0.614 ***	0.631 ***
	(0.050)	(0.031)	(0.056)	(0.032)	(0.056)	(0.032)
ln(job vacancies)	0.218 ***	0.214 ***	0.163 ***	0.178 ***	0.188 ***	0.187 ***
	(0.025)	(0.021)	(0.025)	(0.022)	(0.027)	(0.022)
year dummies	+	+	+	+	+	+
constant	-0.459	-0.462	1.156	0.018	-0.052	-0.267
	(0.789)	(0.417)	(0.866)	(0.417)	(0.879)	(0.419)
sample	423	423	376	376	376	376
groups	47	4.7	47	47	47	47
R2-within	0.872	0.872	0.831	0.830	0.841	0.841
R2-between	0.913	0.913	0.917	0.918	0.917	0.917
R2-overall	0.911	0.911	0.915	0.915	0.915	0.915
F-value	248.77		175.02		188.05	
Wald Chi2		2966.82		2066.29		2193.78
Hausman	1.33		3.31		1.25	

Notes: 1. The contemporary values are used for job seekers and job vacancies.
2. The one-year lagged values are used for job seekers and job vacancies.
3. The independent variable of job seekers (job vacancies) is defined by the sum of job seekers (job vacancies) still remaining from the previous year plus the new inflow of job seekers (job vacancies).
4. *** 1%, ** 5%, * 10% significant.

As we would expect, the coefficients on both job seekers and job vacancies are positive in terms of the matching formation with a 1% level of significance. Because the results do not vary much by column, we interpret this to mean that simultaneous bias is not a serious issue. The coefficient on job seekers is approximately three times as large as that on job vacancies. This implies that the elastic value of matching is larger with respect to job seekers than with respect to job vacancies.[6] The sum of these coefficients is less than one, ranging from 0.796 to 0.831, which implies that the matching formation exhibits decreasing returns to scale with respect to job seekers and job vacancies. This result is consistent with that of Kano and Ohta (2005).[7] On the other hand, Kambayashi and Ueno (2006) and Ueno, Kambayashi, and Muraoka (2004) conclude that the matching formation exhibits constant returns to scale.[8] Sasaki (2007) corrects for the temporal aggregation bias and then estimates the matching function using both monthly and quarterly data from April 1982 to December 2006. He also shows that the matching function exhibits constant returns to scale.

Table 2 displays the results of alternative estimations when the adequacy ratio is

[6] The coefficients on job seekers and job vacancies indicate the extent of labor market externalities.

[7] Kano and Ohta (2005) use the prefectural and yearly panel data from 1973 to 1999.

[8] They use the prefectural and yearly panel data from 1991 to 2001.

Table 2. Estimations of the Adequacy Ratio

Dependent variable ln(adequacy ratio)	[1]		[2]		[3]	
	fixed	random	fixed	random	fixed	random
ln(application ratio)	-0.740 ***	-0.742 ***	-0.773 ***	-0.774 ***	-0.765 ***	-0.767 ***
	(0.019)	(0.019)	(0.021)	(0.021)	(0.021)	(0.021)
year dummies	+	+	+	+	+	+
constant	-2.643 ***	-2.645 ***	-2.602 ***	-2.603 ***	-2.605 ***	-2.606 ***
	(0.013)	(0.035)	(0.013)	(0.035)	(0.014)	(0.035)
sample	423	423	376	376	376	376
groups	47	47	47	47	47	47
R2-within	0.893	0.893	0.903	0.903	0.894	0.894
R2-between	0.521	0.521	0.512	0.512	0.519	0.519
R2-overall	0.578	0.578	0.575	0.575	0.57	0.57
F-value	340.72		371.91		339.05	
Wald Chi2		3118.40		3029.36		2765.47
Hausman	0.56		0.13		0.33	

Notes: 1. The contemporary values are used for job seekers and job vacancies.
2. The one-year lagged values are used for job seekers and job vacancies.
3. The independent variable of job seekers (job vacancies) is defined by the sum of job seekers (job vacancies) still remaining from the previous year plus the new inflow of job seekers (job vacancies).
4. *** 1%, ** 5%, * 10% significant.

regressed on the application ratio. Both fixed- and random-effect estimates are displayed, although the random-effect model is preferable according to the Hausman test. The coefficient on the application ratio is negative at the 1% level of significance. A 1% rise in the application ratio leads to a decline in the adequacy ratio of 0.7%.

Tables 1 and 2 show that the year dummies are significantly positive, which implies that the matching efficiency has improved between 1998 and 2007, partially because of the economic recovery.

Table 3 shows the estimated results of the recursive simultaneous equations. The upper half of Table 3 presents the estimated results when labor market tightness is regressed on the application ratio, whereas the lower half displays the results when the adequacy ratio is regressed on labor market tightness. We begin with the second process of matching formation to estimate the adequacy ratio (the lower half of Table 3). The coefficient on labor market tightness is negative at the 1% level of significance. This result ensures that the job-offer effect and the long-term reservation-wage effect are dominant over the short-term reservation-wage effect. A rise in the ratio of job vacancies to referral flows implies that the number of applicants per job vacancy decreases, resulting in the lower adequacy ratio. Because it is a much more competitive strategy for firms to hire a worker, the firms have to raise the wage to attract more applicants. In turn, this raises the hiring cost, which leads firms to become more selective in regard to the matching quality. Therefore, it leads to

Table 3. Recursive Simultaneous Estimations (Labor Market Tightness and Adequacy Ratio)

Dependent variable ln(labor market tightness)	[1] fixed	[1] random	[2] fixed	[2] random	[3] fixed	[3] random
ln(application ratio)	0.945 ***	0.946 ***	0.944 ***	0.947 ***	0.980 ***	0.981 ***
	(0.026)	(0.025)	(0.031)	(0.029)	(0.031)	(0.030)
year dummies	-	-	-	-	-	-
constant	1.561 ***	1.562 ***	1.422 ***	1.423 ***	1.451 ***	1.452 ***
	(0.018)	(0.046)	(0.020)	(0.029)	(0.020)	(0.047)
F-value	339.33		264.28		271.81	
Wald Chi2		3409		2403		2472
Dependent variable ln(adequacy ratio)	[1] fixed	[1] random	[2] fixed	[2] random	[3] fixed	[3] random
ln(labor market tightness)	-0.783 ***	-0.784 ***	-0.818 ***	-0.818 ***	-0.781 ***	-0.782 ***
	(0.017)	(0.017)	(0.020)	(0.020)	(0.019)	(0.019)
year dummies	-	-	-	-	-	-
constant	-1.421 ***	-1.420 ***	-1.438 ***	-1.439 ***	-1.472 ***	-1.470 ***
	(0.019)	(0.033)	(0.019)	(0.033)	(0.018)	(0.033)
sample	423	423	376	376	376	376
groups	47	47	47	47	47	47
R2-within	0.924	0.926	0.920	0.923	0.916	0.919
R2-between	0.637	0.637	0.633	0.634	0.635	0.635
R2-overall	0.681	0.681	0.681	0.681	0.673	0.673
Wald Chi2	1.29+e6	4376.93	1.00+e6	3679.22	1.17+e6	3488.59
Hausman	0.25		0.02		0.13	

Notes: 1. The contemporary values are used for job seekers, referral letters and job vacancies.
2. The one-year lagged values are used for job seekers, referral letters and job vacancies.
3. The independent variable of job seekers (job vacancies) is defined by the sum of job seekers (job vacancies) still remaining from the previous year plus the new inflow of job seekers (job vacancies).
4. *** 1%, ** 5%, * 10% significant.

an increase in the reservation productivity and, thereby, a decline in the adequacy ratio.

For comparison purposes, we estimate a single regression of the adequacy ratio on labor market tightness, shown in Table 4. The coefficient on labor market tightness remains negative at the 1% level of significance. This reconfirms that the job-offer effect and the long-term reservation-wage effect are large enough to dominate the short-term reservation-wage effect.

A comparison of the lower half of Table 3 with Table 2 shows that the coefficient on the application ratio is almost the same as that on labor market tightness. This implies that all job seekers who register at the employment service office actively look for a job and apply for a posted job vacancy. A 1% increase in job seekers implies a 1% increase in

Table 4. Estimations of the Adequacy Ratio

Dependent variable ln(adequacy ratio)	[1] fixed	[1] random	[2] fixed	[2] random	[3] fixed	[3] random
ln(labor market tightness)	-0.719 ***	-0.722 ***	-0.726 ***	-0.729 ***	-0.701 ***	-0.705 ***
	(0.015)	(0.015)	(0.017)	(0.017)	(0.016)	(0.016)
year dummies	-	-	-	-	-	-
constant	-1.487 ***	-1.484 ***	-1.520 ***	-1.517 ***	-1.542 ***	-1.539 ***
	(0.016)	(0.032)	(0.016)	(0.032)	(0.015)	(0.032)
sample	423	423	376	376	376	376
groups	47	47	47	47	47	47
R2-within	0.928	0.928	0.927	0.927	0.922	0.922
R2-between	0.637	0.637	0.633	0.634	0.635	0.635
R2-overall	0.680	0.680	0.680	0.680	0.672	0.672
F-value	523.77		506.33		475.53	
Wald Chi2		4783.59		4128.74		3872.47
Hausman	1.77		0.89		1.91	

Notes: 1.The contemporary values are used for referral letters and job vacancies.
2. The one-year lagged values are used for referral letters and job vacancies.
3. The independent variable of job seekers (job vacancies) is defined by the sum of job seekers (job vacancies) still remaining from the previous year plus the new inflow of job seekers (job vacancies).
4. *** 1%, ** 5%, * 10% significant.

applicants who actually apply for a job.

To confirm this finding, we move to examining the first process of search intensity to indicate that job seekers who register at the employment service office actually receive a referral letter and contact a firm. Examining the upper half of Table 3, where labor market tightness is regressed on the application ratio, the coefficient on the application ratio is positive at the 1% level of significance, and is approximately one; that is, a 1% increase in job seekers leads to a 1% increase in applicants. This is consistent with the finding that there is little difference in size between the coefficients on the application ratio and on labor market tightness between Table 2 and the lower half of Table 3.

Table 5 shows the estimated results when the number of referral flows is regressed on the numbers of job seekers and vacancies. The coefficient on job seekers is positive at the 1% level of significance and is approximately one (0.949–1.084). The size of this coefficient is larger than that calculated by Ueno, Kambayashi, and Muraoka (2004). We again confirm that a 1% increase in job seekers leads to a 1% increase in applicants who actually look for a job. In contrast, the coefficient on job vacancies is not necessarily significant, and its size is very small. It is concluded that the effect of job vacancies on the number of referral flows is trivial. The number of referral flows depends on the number of job seekers, but not on the number of job vacancies.

In Tables 3–5, we investigate in which search process the matching efficiency has

Table 5. Estimations of Referral Letters

Dependent variable ln(referral letters)	[1] fixed	[1] random	[2] fixed	[2] random	[3] fixed	[3] random
ln(job seekers)	1.072 ***	0.953 ***	0.949 ***	0.941 ***	1.084 ***	0.977 ***
	(0.068)	(0.030)	(0.085)	(0.033)	(0.082)	(0.034)
ln(job vacancies)	0.097 ***	0.048 *	0.057	0.036	0.053	0.009
	(0.033)	(0.025)	(0.038)	(0.029)	(0.039)	(0.029)
year dummies	+	+	+	+	+	+
constant	-3.741 ***	-1.577 ***	-1.497	-1.137 ***	-3.2150 **	-1.2870 ***
	(1.071)	(0.318)	(1.299)	(0.320)	(1.290)	(0.320)
sample	423	423	376	376	376	376
groups	47	47	47	47	47	47
R2-within	0.916	0.915	0.864	0.864	0.878	0.877
R2-between	0.970	0.971	0.970	0.971	0.971	0.971
R2-overall	0.965	0.967	0.965	0.965	0.965	0.966
F-value	398.88		225.88		254.97	
Wald Chi2		5440.44		3526.96		3781.18
Hausman	5.07		1.37		2.81	

Notes: 1. The contemporary values are used for job seekers and job vacancies.
2. The one-year lagged values are used for job seekers and job vacancies.
3. The independent variable of job seekers (job vacancies) is defined by the sum of job seekers (job vacancies) still remaining from the previous year plus the new inflow of job seekers (job vacancies).
4. *** 1%, ** 5%, * 10% significant.

improved. First, we focus on the first search process of search intensity, which captures whether a job seeker receives a referral letter at the employment service office and manages to obtain an interview. As shown in the upper half of Table 3, the year dummies are significantly negative for labor market tightness (the ratio of job vacancies to the number of referral letters), whereas Table 5 shows that the year dummies are significantly positive in relation to the referral flow. These results indicate that the number of referral letters received by a job seeker has increased over the sample period, given the numbers of job seekers and job vacancies. Both tables confirm that the matching efficiency has improved in relation to the first search process between 1998 and 2007. As the Japanese economy was recovering, firms posted better job terms in the job-placement ads to attract qualified job seekers. Job seekers then more frequently visited the employment service office and asked employment counselors to issue referral letters. From a different point of view, we can interpret the result to indicate that the productivity of the employment counselors at the employment service offices improved over the years in question.

We turn our attention to the second process of matching formation in which a match between an interviewed applicant and an interviewing employer is formed. The lower half of Table 3 and Table 4 show that the year dummies are significantly negative for the adequacy ratio, which indicates that the adequacy ratio has deteriorated over the sample period,

given the labor market tightness. Because job seekers had more job opportunities offered to them from media other than the public employment service office, job seekers were more likely to reject a job offer from a firm contacting them through the public employment service office. The availability of different search methods lowered the matching efficiency of the public employment service office.

The matching efficiency has improved for the first search process but deteriorated for the second search process. Overall, however, as shown in Tables 1 and 2, the matching efficiency has improved.

V. Concluding Remarks

This paper estimates the probability of a matching formation occurring between a job seeker and a firm, using prefectural-level panel data from Japan. The exit probability is decomposed into two components, based on matching processes: the first matching process occurs when a job seeker contacts a firm advertising a job vacancy at the employment service office and manages to obtain an interview with the firm; in the second process, upon contact, the job seeker and the firm agree to form a match. This allows us to explore in which search process matching efficiency has improved. Our dataset includes the number of referral flows, indicating the number of contacts between job seekers and job vacancies, which makes it possible to decompose the exit probability of a job seeker.

The main findings are summarized as follows. In the first process of search intensity, a 1% increase in the number of job seekers raises the number of contacts between job seekers and job vacancies by approximately 1%. In the second process of matching formation, the ratio of job vacancies to referral flows has a significantly negative effect on the ratio of job placements to job vacancies (the adequacy ratio). There are two intuitions supporting this result. First, a decrease in the number of applicants per job vacancy makes a job vacancy less likely to be occupied. Second, as it is more competitive for firms to hire, the firms raise the offered wage to attract more job seekers and, in response, job seekers demand a higher wage to accept an offer. To compensate for an increase in their hiring cost, the firms then raise the reservation productivity level required to form a match. Therefore, the probability that a match between the firm and the job seeker is formed becomes lower.

The matching efficiency has improved in the first process of search intensity but deteriorated in the second process of matching formation. Overall, the matching efficiency has improved over the sample period (1998–2007), partly as a result of the economic recovery that occurred over the sample period.

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The Labor Market for Japanese Scientists and Engineers: Is the Labor Market Externalized? What Has Happened at Their Workplace?

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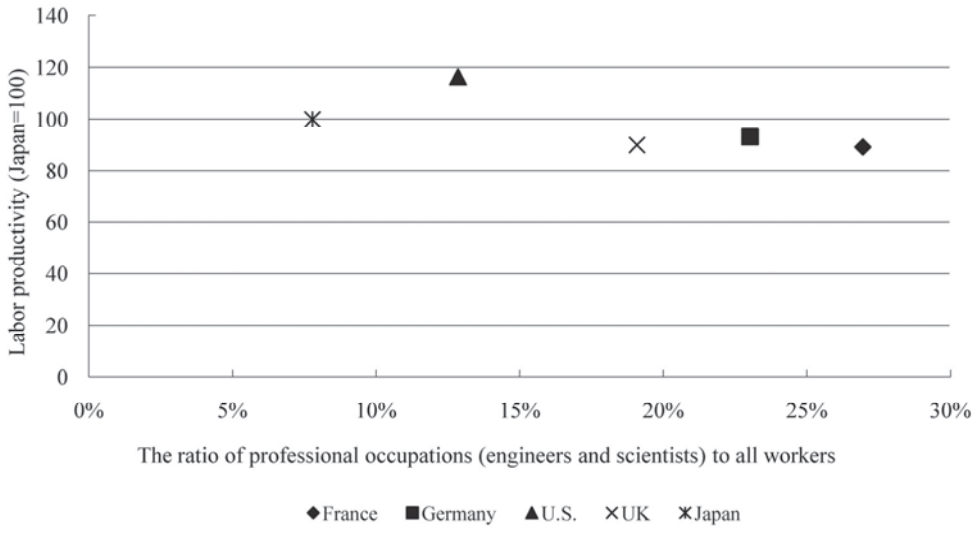
In recent years, the management of Japanese companies has been responding to changes in the surrounding business environment characterized by increasing and inevitable globalization.[1] Amongst such changes, attracting particular interest are those in human resource management. This is because the human resources are the most difficult among various management resources to move across borders, and as a result the management of human resources is strongly influenced by their respective regional social conventions and culture and thus varies substantially across regions. From that standpoint, a country's readiness for globalization may be measured by changes in the management of human resources. Can a change be seen in the commitment to long-term employment and of the promote-from-within policy that have featured the human resource management of Japanese companies for a long time? Of the corporate professions, scientists and engineers are the occupations in which standardization of jobs and a switch to an external labor market are considered to be the easiest. This paper explores how such "externalization" progressed in their employment, how the human resource management of companies has changed in relation to them, and what kind of changes can be observed regarding these groups' perception of their job and company accordingly.

I. Introduction: The Current State of Japanese Scientists and Engineers

What image do we have of Japanese scientists and engineers? Many are said to have the general characteristics of the Japanese people—there is an impression that they have positive qualities such as diligence, patience and strong loyalty to their company. Here we would like to share with our readers interesting data, not popular images, concerning them. It is data relating to the Japanese manufacturing industry's labor productivity and the share of the scientists and engineers among its manufacturing workers. Labor productivity is the total economic value created by a company or a country divided by the total number of workers involved in its production. Essentially, it is an index representing how much economic value is produced by one worker by looking at the average. When this index is applied to the manufacturing industry, it becomes an indicator for the creation of economic value of the country's manufacturing workers.

In Figure 1, the vertical axis indicates the manufacturing labor productivity of each

[1] Some of the recent works on this topic include 2007 special issue of *Asian Business and Management* and Miyoshi and Nakata (2011).



Source: ILO LABORSTA and OECD National Account.

Figure 1. International Comparison of the Ratio of Professional Occupations and Labor Productivity in the Manufacturing Industry (2005)

country and the horizontal axis represents the ratio of scientists and engineers that comprise the total persons engaged in manufacturing in each country.[2] From this, we can see that the labor productivity of Japanese manufacturing workers is slightly inferior to that of their U.S. counterparts; however it surpasses that of the workers employed in the German, English and French manufacturing industries and shows that they are creators of high economic value. An important point to note is that the Japanese manufacturing industry achieved this high labor productivity with the lowest proportion of scientists and engineers of the five countries compared (left-most position in the chart). From the chart we can see that the favorably compared labor productivity of the Japanese manufacturing industry is achieved with a proportion of scientists and engineers about half of that of the U.S., which has the highest labor productivity.

How is it possible for Japan's manufacturing industry to achieve such labor productivity with so few engineers? We will find an answer for this question as we proceed with our inquiry, but first let's review the features of both the quality and quantity of Japanese scientists and engineers and take a look at the current situation.

[2] The only internationally comparable data available from the ILO was that of a wide range of professional job classifications in which technicians were included. However, because almost all of the professional jobs in the manufacturing industry are comprised of scientists and technicians, it was used as a substitute index.

Table 1. Changes in the Nnumber of Natural Scientists, Engineers and All Other Workers

(A) All industries

Year	All other workers	*Index*	Natural scientists and engineers			
			Total	*Index*	Engineers	Natural scientists
1980	55,778,234	*100*	937,871	*100*	874,142	63,729
1985	58,336,129	*105*	1,824,045	*194*	1,729,536	94,509
1990	61,679,338	*111*	2,218,603	*237*	2,108,239	110,364
1995	**64,181,893**	***115***	2,537,927	*271*	2,370,303	**167,624**
2000	63,032,271	*113*	**2,676,227**	***285***	**2,523,885**	152,342
2005	61,530,202	*110*	2,283,097	*243*	2,140,612	142,485

(B) Manufacturing industry

Year	All other workers	*Index*	Natural scientists and engineers			
			Total	*Index*	Engineers	Natural scientists
1980	13,041,563	*100*	258,404	*100*	246,692	11,712
1985	13,837,254	*106*	617,195	*239*	593,979	23,216
1990	**14,502,665**	***111***	643,056	*249*	621,076	21,980
1995	13,374,189	*103*	**668,915**	***259***	**625,329**	**43,586**
2000	12,202,064	*94*	657,603	*254*	618,804	38,799
2005	10,485,635	*80*	602,396	*233*	569,666	32,730

Source: Population Census (Statistics Bureau of MIC).

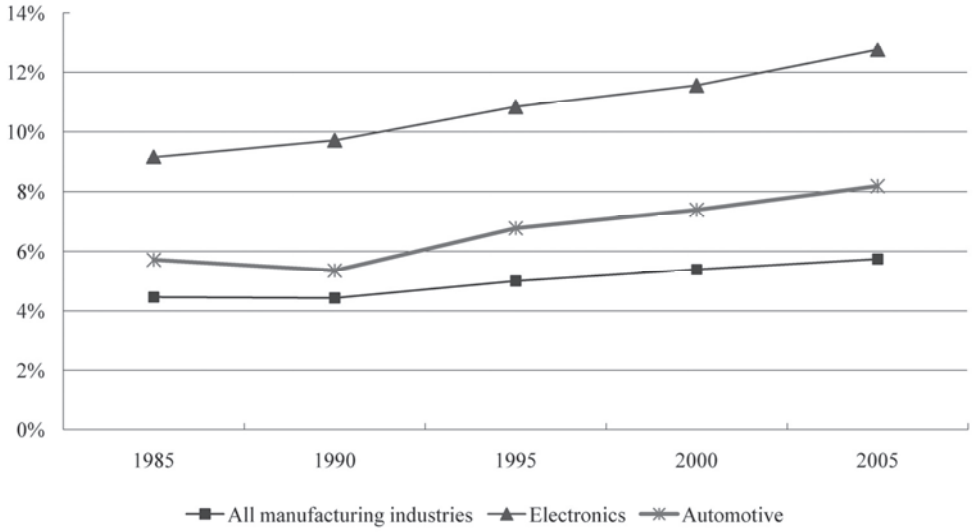
1. Quantitative Features of Japan's Scientists and Engineers

(1) Changes in Absolute Numbers: In All Industries and the Manufacturing Industry

The number of Japanese engineers has decreased since 2000 following the shrinkage of the macro labor market. In the manufacturing industry, which is the main receptacle for engineers, the labor market for engineers began to shrink earlier in the mid-1990s. We show these changes in Table 1.[3] From this table, using an index of 100 for 1980, we can see that after the number of scientists and engineers in all industries grew rapidly by a factor of 2.8 in 20 years, this number decreased more than 40 points in the five years since 2000. The manufacturing industry experienced a gradual decline—after the number of scientists and engineers grew rapidly by a factor of 2.6 in the 15 years from 1980, this number decreased 30 points in the ten years from 1995 to 2005.

The decline in the number of scientists and engineers, however, is relatively smaller in comparison to the decrease in total workers in all industries and as a result a steady up-

[3] Engineer is broadly defined here to include natural scientists engaged in R&D activities for the changes shown in Table 1.



Source: Population Census (Statistics Bureau of Ministry of Internal Affairs and Communications: MIC).

Figure 2. Change in the Ratio of Scientists and Engineers in the Manufacturing Industry: 1985-2005

wards trend can be seen in the ratio of scientists and engineers comprising all workers. For example, the proportion of scientists and engineers comprising the human resources in the manufacturing industry has continually increased from 1985 to present (Figure 2). There are also differences in this ratio within the manufacturing industry according to the type of business. For example, in two of Japan's large manufacturing sectors—the automotive industry and electronics manufacturing—the proportion of scientists and engineers engaged is two times higher in electronics manufacturing. It is thought that the proportion of scientists and engineers will further increase along with an expansion of digitalization in not only the automotive industry, but various manufacturing industries.

(2) The Low Proportion of Scientists and Engineers Comprising Workers in the Manufacturing Industry

Another quantitative feature of Japanese scientists and engineers was stated previously—the ratio of scientists and engineers comprising workers is low in comparison to other countries despite the above mentioned upward trend of recent years. However, as shown in Table 2, the industry-wide difference is not so great—5.1% in the U.S. and 4.2% in Japan. In particular, the difference is almost eliminated when the ratio is limited to the number of engineers—4.1% in the U.S and 4.0% in Japan. However, the results of a detailed comparison reveal the existence of big US-Japan difference. When we focus on the manufacturing industry, the ratio in Japan (5.4%) is almost half that of the U.S (10.1%).

Table 2. The Proportion of Scientists and Engineers in Japan and the U.S. (2000)

	Number of total workers	Engaged in R&D		
		Total	Natural scientists	Engineers
All industries				
Japan	2,676,227	4.20%	0.20%	4.00%
U.S.	*6,492,790*	*5.10%*	*1.00%*	*4.10%*
All manufacturing industries				
Japan	657,603	5.40%	0.30%	5.10%
U.S.	*1,805,927*	*10.10%*	*1.20%*	*8.90%*
Transportation equipment				
Japan	79,020	7.70%	0.20%	7.50%
U.S.	*353,264*	*15.10%*	*0.90%*	*14.10%*
Electronic				
Japan	240,560	11.60%	0.20%	11.30%
U.S.	*603,968*	*24.90%*	*1.70%*	*23.20%*

Sources: Japan = Population Census (Statistics Bureau of MIC). U.S. = CENSUS 2000 (U.S. Census Bureau).
Note: Industry and occupation classifications are based on Japanese criteria.

This large disparity in the manufacturing industry can even be confirmed at an industry sector level where similar products are produced. Table 2 is also taken up in Figure 2, and both indicate the ratio of scientists and engineers comprising workers in the automotive industry and electronics manufacturing—typical manufacturing industries. Japan's ratio is less than half that of the U.S. in these industries. The low ratio of scientists and engineers in Japanese manufacturing may be related to the breadth and depth of the skills of manual workers in manufacturing that complement the skills of engineers.

2. Qualitative Features of Japan's Scientists and Engineers

Now, let's look at the qualitative features of Japanese scientists and engineers.

(1) Education Level and Age Structure

Table 3 displays the educational training of Japanese engineers. Scientists were excluded from the table as it is difficult to accurately measure the proportion of scientists with a low-level education due to the low absolute number of scientists and the bias towards a high level academic background. From this table, we can understand that engineers consist of people with a high-level educational background. Even if we divide into information system engineers such as SE and other engineers including civil engineers and architects,

Table 3. Comparison of the Educational Attainment of Engineers in Japan and the U.S.: Employees under 65 Years of Age

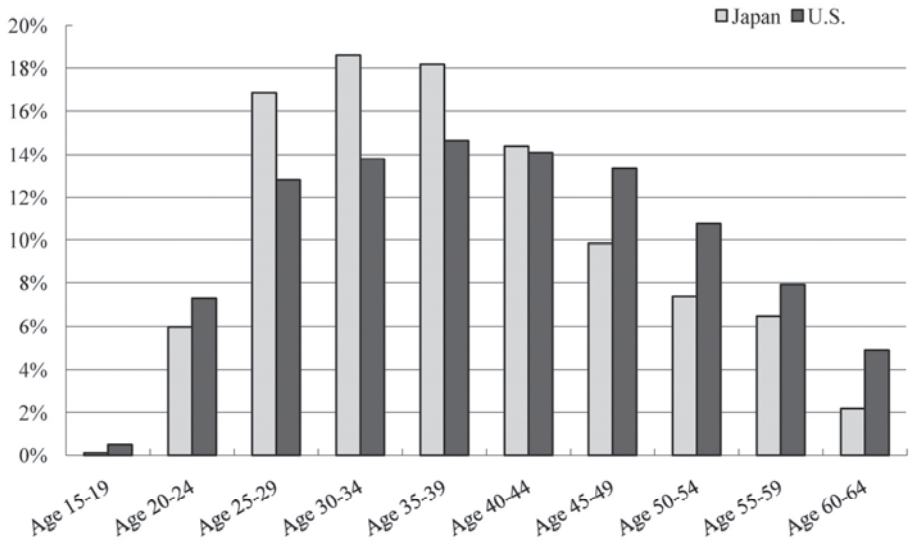
Highest education completed	Japan		U.S.	
	Number	%	Number	%
All engineers				
No high school diploma	14,835	0.7%	20,132	0.3%
High school or equivalent	416,351	19.0%	1,330,572	***22.2%***
Junior college or equivalent	393,132	***17.9%***	624,947	10.4%
University or equivalent	1,042,578	47.5%	2,777,501	46.4%
Graduate school or equivalent	327,975	14.9%	1,229,068	***20.5%***
Information engineers				
No high school diploma	2,349	0.3%	17,801	0.5%
High school or equivalent	118,201	12.9%	774,538	***22.2%***
Junior college or equivalent	212,520	***23.2%***	321,090	9.2%
University or equivalent	486,669	***53.2%***	1,682,943	48.2%
Graduate school or equivalent	94,842	10.4%	693,049	***19.9%***
General engineers				
No high school diploma	12,485	1.0%	2,331	0.1%
High school or equivalent	298,151	23.3%	556,034	22.3%
Junior college or equivalent	180,612	14.1%	303,856	12.2%
University or equivalent	555,907	43.4%	1,094,558	43.9%
Graduate school or equivalent	233,134	18.2%	536,019	21.5%

Sources: Japan = *Employment Status Survey 2007* (Statistics Bureau of MIC). U.S. = *Current Population Survey,* 2008 Annual Social and Economic (ASEC) Supplement (U.S. Census Bureau and Bureau of Labor Statistics: BLS).

Note: Japanese data are excluding executives and workers currently undertaking education.

the results are similar. Over 60% of engineers have a university or higher level educational background. And there is also a weak presence of graduate school graduates in information systems (10%) and a stronger presence in general engineers (20%). However, the high academic background of Japanese engineers is by no means unique. This point is confirmed in a comparison with U.S. engineers who similarly consist of a high proportion of individuals with a high-level academic background—2/3 of U.S. engineers have a university or higher level educational background. The only discrepancy noticed between Japan and the U.S. concerns information system engineers—In Japan, a high proportion of information system engineers consist of junior (two year) college equivalent graduates and in the U.S. a high proportion consist of high school graduates and graduate school graduates.

Next, let's look at the age structure in Figure 3. For similar reasons as in Table 3, workers over the age of 65 are excluded. We can see that workers aged 39 and under



Sources: Japan = *Survey on Employment Structure (2007)*, employees only (admin. excluded)/workers currently undertaking education excluded. U.S.A. = *Current Population Survey*, 2008 Annual Social and Economic (ASEC) Supplement (2007 data).

Figure 3. The Age Structure of Engineers in Japan and the U.S. (2007): Employees under 65 Years of Age

comprise 60% of Japan's total engineers—an extremely young age structure. The youth of Japan's engineers is evident from a comparison with the age structure of U.S. engineers —Japan has a much greater proportion of engineers aged 25-39 while the proportion of engineers over 45 is much higher in the U.S.

(2) Patent Productivity

Now let's look at a quality indicator that is thought to have greater relationship to labor productivity. Previously, the relationship between labor productivity in the manufacturing industry and the ratio of scientists and engineers that comprise the total persons engaged in manufacturing was displayed in Figure 1. Unfortunately, as there is no internationally comparable labor productivity data that is limited to engineers in a similar way, here we use commonly used patent productivity data as a simple measure of engineer quality. There are several alternative measures of the patent productivity. Here, displayed in Table 4, we evaluate the quality of scientists and engineers with three indexes—the total number of patent applications, the total number of patents registered, and the actual number of patent applications. First, the total number of patent applications; this is the total number of patents filed by Japanese companies in various countries around the world. Similarly, the total number of patents registered is the total number of patents filed by Japanese companies in various

Table 4. Changes in the Patent Productivity of Engineers: A Comparison between Japan and the U.S. (per 1000 engineers)

	1995	2000	2005
Total number of patent applications			
Japan	300.4	360.0	482.0
U.S.	*95.7*	*131.1*	*198.9*
Total number of patents registered			
Japan	104.5	122.7	171.5
U.S.	*51.7*	*63.3*	*73.1*
Actual number of patent applications			
Japan	229.7	259.7	305.1
U.S.	*44.5*	*65.1*	*79.1*

Sources: Patents = WIPO Statistics Database, September 2010. Japan engineers = Population Census (Statistics Bureau). U.S. engineers = *Current Population Survey* ASEC supplement (U.S. Census Bureau and BLS). GDP = World Development Indicators (World Bank).

Note: In order to maintain data consistency, here architects and information engineers are excluded from the definition of "engineers." "Actual number of patent applications" means the patent family excluding duplicates for the purpose of applying in multiple countries.

countries around the world where review has been completed and registration of the patent has been granted. The final index, the actual number of patent applications, is the total number of patents when the same patent filed and registered in a number of countries is counted as the one patent as opposed to being counted as separate patents in each country. For this reason, the actual number of patents more accurately represents the production of patents of Japanese engineers while on the other hand the total number is the result of patent protection in multiple countries and can be said to reflect the global market value of patents. For these reasons, here we examine the quality of Japan's scientists and engineers with the three different indexes (production per 1,000 engineers). Table 4 displays the patent productivity of Japanese and U.S. engineers as expressed by those three indexes. Looking at the figures, we can see that the patent productivity of Japanese engineers has continued to rise steadily since the mid-1990s on all indexes. Furthermore, it can be confirmed on all three indexes that the patent productivity of Japanese engineers greatly exceeds that of their U.S. counterparts. It can also be confirmed that Japanese engineers retain their superiority even when this comparison is extended to other major countries and their patent productivity can therefore be said to be extremely high.

(3) Salary Levels of Engineers

While we have looked at the quality of Japanese engineers, their salary levels also

Table 5. A Wage Comparison of Japanese and U.S. Engineers (2007)

Standard: U.S. wage = 100

Conversion by:	Exchange rate		Purchasing power	
Wage unit:	Yearly	Hourly	Yearly	Hourly
Male				
Natural science researchers	80.5	86.7	72.6	78.3
General engineers (*Gijutsushi*)	62.7	62.8	56.6	56.7
Information engineers (System engineers)	57.1	54.0	51.6	48.7
Managerial staff	***91.0***	**105.4**	82.2	***95.1***
Female				
Natural science researchers	***93.6***	**104.1**	84.5	***94.0***
General engineers (*Gijutsushi*)	66.7	60.8	60.2	54.9
Information engineers (System engineers)	62.4	60.3	56.3	54.4
Managerial staff	**106.9**	**119.9**	***96.5***	**108.2**

Sources: Japan = *Basic Survey on Wage Structure* (Ministry of Health, Labour and Welfare). U.S. = *Current Population Survey*, ASEC Supplement (U.S. Census Bureau and BLS).

Note: The exchange rate is based on the standard foreign exchange rate and a fixed exchange rate. The purchasing power rate is based on IMF PPP Comparison. Parenthetical words next to job names are used in Japanese data.

provide an economic valuation of quality. Here, let's see if their salary levels are consistent with the discussion of quality utilizing the three indexes that we looked at by comparing the salaries of Japanese and U.S. engineers.

A comparison of the salaries of Japanese and U.S. engineers with an adjusted currency unit is displayed here in Table 5. Calculation based on the USD/yen exchange rate as well as a calculation based on a purchasing power parity were both considered as methods of creating an adjusted unit of currency and a comparison was undertaken using both methods. With both methods, the results show that the salary level of Japanese scientists and engineers is significantly lower than their U.S. counterparts on a yearly and hourly basis. SE salary—a typical position for information industry engineers—was particularly low in Japan at 60% or less compared to the U.S. average SE salary. The only exception is seen in female natural scientists where there is little difference in salary between Japan and the U.S, particularly at an hourly rate. Despite the relatively low salary of these various Japanese scientists and engineers, there is little difference in salary among management positions in the two countries. That is to say, the salaries of Japanese scientists and engineers are relatively low in comparison to other domestic jobs, and engineers only receive wages on par with their U.S. counterparts after they are promoted to a management position in Japan.

Table 6. Transfer Ratios by Occupation (2007, male regular employees)

	Engineers			Clerical staffs	Sales and marketing staff	Manual workers	All occupations
	Total	*General engineers*	*Information engineers*				
Total	7.6%	*5.9%*	*10.2%*	5.4%	7.7%	7.5%	7.2%
Age 25-29	15.0%	*14.0%*	*16.0%*	12.7%	12.3%	10.6%	12.0%
Age 30-34	4.6%	*3.4%*	*6.4%*	4.7%	6.8%	6.6%	6.4%
Age 35-39	5.0%	*3.7%*	*6.5%*	3.2%	4.7%	4.6%	4.6%
Age 40-44	1.7%	*1.8%*	*1.7%*	2.5%	4.2%	3.8%	3.6%
Age 45-49	2.0%	*1.6%*	*2.6%*	1.8%	3.3%	3.1%	2.8%
Age 50-54	2.7%	*1.1%*	*8.1%*	1.7%	3.8%	2.8%	2.9%
Age 55-59	2.6%	*2.9%*	*1.0%*	2.6%	2.7%	3.0%	3.0%

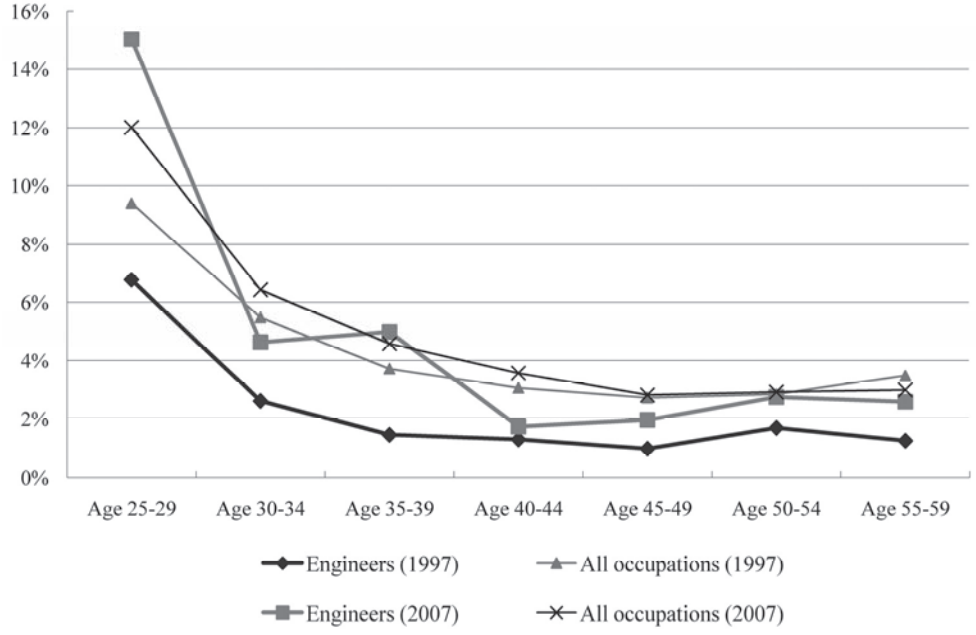
Source: Employment Status Survey (Statistics Bureau of MIC, Recounted).
Note: In this paper, hiring rates are the rate of employees with tenure of less than a year.

II. Changes in Mobility of Japanese Scientists and Engineers

1. The Transfer Ratio of Japanese Scientists and Engineers and Changes in This Ratio

(1) A Comparison of the Transfer Ratios by Occupation

Now, what kinds of changes are occurring in the workplaces of these Japanese scientists and engineers with the above quantitative and qualitative features and what kinds of changes are occurring in the external labor markets surrounding them? First, the number of worker turn-over during a fixed period of time is regarded as an indicator of external labor market development, so let's take a look at yearly ratios. Japan is said to be a country where the external labor market is undeveloped, but on the other hand, if the mechanisms for intra-company transfers is considered a market mechanism then Japan can be said to have a highly developed internal labor market. However, there are also countries such as the U.S. where an external labor market has developed for highly skilled professionals such as engineers. Can development in the external labor market for engineers been seen amid the developing trend towards non-regular employment in the Japanese labor market in recent years? The estimated ratio of job changers and new entrants into their current workplace within the previous year by occupation is displayed in Table 6 in order to answer this question. Looking at the average ratio of all engineers, there are no significant discrepancies in comparison to the ratios for other occupations. In fact, engineers are placed in the middle of



Source: *Employment Status Survey* (Statistics Bureau of MIC, Recounted).

Figure 4. Engineer Hiring Rate by Age Group (Male regular employee): 1997 vs. 2007

the distribution. If clerical staffs are excluded, the yearly ratio for male Japanese employees (including engineers) is around 7%. However, if we further divide engineers into information system engineers and other engineers, the ratio of information system engineers is double that of the other engineers and we can see a high level of labor market externalization there. Furthermore, the table suggests that the ratio is greatly influenced by age across all occupations. A pattern can be seen in that engineers in their 30s are comparatively mobile—this mobility decreases as they reach their 40s and they then become mobile once again as they approach retirement age. Are changes occurring to this age transfer pattern?

(2) Has the Mobility of Scientists and Engineers Increased in Recent Years? A Comparison between 1997 and 2007

In order to identify the externalization of the engineer labor market we compared the average ratio of job changers and new entrants among engineers as well as the ratio over all occupations classified by age in 1997 and 2007 and displayed them in Figure 4. From this, we can see that there is a significant difference between the changes in the engineer ratio and changes in the overall ratio. If we look at the overall ratio across all occupations we can see a slight increase in the ratio of young persons from 1997 to 2007, however a time oriented change cannot be observed in the middle age group. On the other hand, it is clear that the external labor market for engineers has developed—the ratio for engineers has significantly

Table 7. Ratio of Employees Transferred within the Previous Five Years
(Male regular employees aged 64 and under)

	1997	2002	2007
Engineers	7.6%	9.4%	11.5%
General engineers	—	*7.8%*	*9.4%*
Information engineers	—	*12.1%*	*14.7%*
Clerical staffs	7.8%	10.4%	10.8%
Sales and marketing staffs	14.3%	16.9%	17.0%
Manual workers	15.5%	15.1%	15.5%
All occupations	13.4%	14.6%	14.7%

Source: *Employment Status Survey* (Statistics Bureau of MIC, Recounted).
Note: "Transferred employees" in this table refers to employees who have been transferred within the previous five years at the time of the survey. There is no breakdown of engineers for the 1997 data due to limitations.

increased across all age groups from 1997 to 2007. In fact, the ratio has doubled in all age groups except the 40-44 age group. These statistics, however, reflects the growing share of information system engineers where there is a highly developed external labor market.

2. Changes in the Ratio of Job Changers and New Entrants among Japanese Scientists and Engineers within the Previous Five Years and Their Length of Their Service

(1) The Ratio of Job Changers and New Entrants within the Previous Five Years by Occupation and Changes in This Ratio.

The ratios discussed in the previous section are an indicator of the movement of workers within a given year, this time one year, and are a valuable indicator to provide insight into the circumstances of that particular year. However, labor movement is significantly affected by economic cycles and so it is difficult to compare this data to data taken in another year with a similar cycle due to the limitations of available data that year. In that regard, comparison by compiling multiple sets of stock data obtained at particular times dilutes the effect of a particular year and the cumulative trends of a wide observation period can be compared. So in Table 7, we display the aggregated ratio[4] of workers transferred within the previous five years by occupation. The engineer job changers and new entrants ratio varies slightly by sex and employment status, however due to the limited space we will

[4] An application was made to the Statistics Bureau for use of their questionnaire information under the Statistics Act and our result is a recount of that data.

Table 8. Engineer Average Years of Tenure by Age Group

	All employees (Male and female)			Regular employees (Male)		
	1997	2007	Change	1997	2007	Change
Age 25-29	4.82	3.27	-1.55	4.88	3.30	-1.58
Age 30-34	8.51	7.14	-1.37	8.80	7.48	-1.32
Age 35-39	12.04	11.14	-0.90	12.47	11.83	-0.64
Age 40-44	16.51	16.02	-0.50	17.66	16.98	-0.69
Age 45-49	21.19	19.61	-1.58	22.40	20.93	-1.47
Age 50-54	25.07	23.44	-1.63	26.70	25.00	-1.71

Source: *Employment Status Survey* (Statistics Bureau of MIC, Recounted).

focus on full-time male employees, the largest demographic. The first thing that can be confirmed is a high growth in the ratio of engineers job changers and new entrants within the previous five years, even amidst the overall increase in all occupations. Another interesting point is that in comparison to other occupations, the ratio of information engineers such as system engineers falls under the "high" category, while the job changers and new entrants ratio of engineers in traditional fields other than IT (hereafter referred to as "general engineers") is extremely low. Essentially, what can be confirmed in the comparison of the job changers and new entrants ratios between jobs and their change in the previous section, even in the stock data, is the externalization of the engineer labor market and differences in the progress of labor market externalization between the two different groups of engineers.

(2) Changes in Length of Service by Occupation (1997 vs. 2007)

Let's continue the analysis of stock data and have a look at how long on average scientists and engineers work continuously for the same organization (company). The flow and stock indexes used so far have focused on worker transfer. The average length of service looks at the segment of workers who do not transfer. The reason for looking at this index is to find if there is a change in the ratio of workers who don't transfer that couldn't be reflected in the previous two indexes. For example, flow indicators will appear the same regardless of whether similar workers change their jobs every year or whether that ratio consists of different workers each year. However in stock indexes, the figure will grow higher year-by-year in the case of a ratio consisting of different workers. The reason for looking at the average length of service of all workers is that it reflects changes in long-term flow better than accumulated stock data limited to five years of flow. So, let's look at the data in 1997 and 2007 concerning the length of time engineers have been working at their present companies and estimate the average by age group. There are two reasons for esti-

mating the length of service by age group, firstly because the maximum of length of service is restricted by age and secondly, that changes in the age structure of engineers have occurred within these ten years of our observation. When age structure changes, the effect of labor market externalization cannot be distinguished by looking at the overall average. The estimated results obtained in this manner are displayed in Table 8: average length of service. The 55-year-old and over age group was excluded because due to the extension of the retirement age in many Japanese companies recently, their data would boost the average length of service and the effects of externalization would not be properly ascertainable.

Looking at this, the average length of service of engineers has decreased within this period in all age groups. From this result, we can confirm that the externalization of the engineer labor market is not only progressing in the younger age groups and over-50s age group but is a general change encompassing all age segments.

III. Changes in the Workplace Environment Surrounding Scientists and Engineers

1. Changes in the Employment System of Engineers

So, what factors have caused the externalization of scientists and engineers as shown above? Here we examine this with a focus on their workplaces with particular attention given to company employment systems, personnel evaluation systems and salary systems and the effects that they have.

First, let's look at current employment systems and their recent changes. For reference, the results of a survey carried out in 2008 on companies affiliated under the Japanese Electrical Electronic and Information Union are listed below. Within the Japanese manufacturing industry, the electronic industry, along with automobile manufacturing, is the most important industry in terms of the volume of employment and creation of value added and has the highest ratio of engineers in the manufacturing industry. Therefore, the electronic industry is thought to be the most appropriate industry to gain insight to the current conditions of engineers and changes in conditions.

The features of the employment system of Japanese companies are said to be that internal workers are valued and stable employment is guaranteed to them. Does this kind of employment system still exist today in the rapidly evolving electronic industry or are changes already beginning? Table 9 is a summary of the answers regarding changes in the employment systems of 63 of the major companies in the industry.

First, 80% of companies responded that there have been increases in the mid-career recruitment of engineers as well as all other employees. Similarly, 60% of companies responded that there has been a strong trend towards the wider use of external talent both for engineers as well as all other employees. The externalization of employment systems has been steadily progressing as far as we can see from these figures. These results are also consistent with the other various statistics we have looked at until now that support the

Table 9. Changes in Human Resource Management in the Previous Five Years: For Engineers and All Employees (2008)

	Expanded	Slightly expanded	Almost no change	Slightly reduced	Reduced	No response
Mid-career recruitment						
Engineers	*31.7*	**50.8**	15.9	0.0	0.0	1.6
All employees	*19.0*	**60.3**	17.5	0.0	0.0	3.2
Use of external resources						
Engineers	9.5	**47.6**	*41.3*	0.0	0.0	1.6
All employees	12.7	**50.8**	*34.9*	0.0	0.0	1.6
Long-term stable employment						
Engineers	3.2	3.2	**76.2**	*12.7*	3.2	1.6
All employees	3.2	3.2	**73.0**	*15.9*	3.2	1.6

Source: Japanese Electrical Electronic and Information Union (2008), *Survey Report*, no.374.

externalization of scientists and engineers. So, is the movement towards externalization accompanied by changes in the employment systems for full-time workers, in particular engineers, leading to decreased employment stability? As far as we can see from looking at Table 9, such changes are still not of significance. The majority of companies still adopt a basic policy of stable long-term employment and only a small number of companies (16%) have recognized abatement in the stable long-term employment of engineers. However, this recognition of the weakening of stable long-term employment in a 16% ratio of companies that can't be overlooked together with the movement towards externalization already identified is evidence that a major change is taking place discretely.

2. Changes to Scientist and Engineer Personnel Systems

(1) Changes to the Salary System of Scientists and Engineers in the Past Five Years

So, have changes to personnel evaluation systems also been occurring to ensure consistency with the externalization of employment systems as seen above? First, let's look at changes in salary systems. To what extent have performance-based salary systems passed through to engineers?

Table 10 displays the various changes to the salary systems of engineers that have occurred in the past five years (survey taken in 2008) based on the survey data in the previous table.

First, let's look at the changes in base salary regarding regular (annual) pay raises, which have been the major system up until now, and performance-based pay. We can see

Table 10. Changes in the Salary System of Engineers in the Past Five Years

	Expanded	Slightly expanded	**Almost no change**	Slightly reduced	Reduced	No response
(A) About base wage						
Regular (annual) pay raises	3.2%	4.8%	**44.4%**	*20.6%*	*15.9%*	11.1%
Salary based on job capability evaluation	4.8%	*19.0%*	**58.7%**	6.3%	3.2%	7.9%
Salary based on personal performances evaluation	*19.0%*	*25.4%*	**44.4%**	4.8%	1.6%	4.8%
Based on team or department performances evaluation	3.2%	3.2%	**66.7%**	1.6%	0.0%	25.4%
Salary based on job and position	*15.9%*	*15.9%*	**52.4%**	4.8%	0.0%	11.1%
Linkage of internal salary to external labor market conditions	1.6%	6.3%	**65.1%**	7.9%	0.0%	19.0%
(B) About bonuses						
Linkage between bonus and personal performances	*12.7%*	*34.9%*	**46.0%**	1.6%	0.0%	4.8%
Linkage between bonus and team or department performances	7.9%	3.2%	**65.1%**	1.6%	1.6%	20.6%
Linkage between bonus and company performances	*12.7%*	*17.5%*	**58.7%**	0.0%	0.0%	11.1%

Source: Japanese Electrical Electronic and Information Union (2008), *Survey Report*, no.374.

that there is a trend of an expansion or slight expansion in the proportion of salaries "based on job capability evaluation" while 36% of companies have reduced regular (annual) pay raises. This represents a move in different directions of the two pay elements that have been the backbone of the Japanese salary system until now. The regular (annual) pay raise system promotes long-term service and is incompatible with externalization. Therefore, the large-scale reduction in regular (annual) pay raises we have seen is consistent with the flow of labor market externalization.

So, can new movements within the salary system to promote further externalization be seen? Such movements concern performance-based salaries—45% of companies have strengthened their "individual performance/achievement" performance-based salary system, which promotes externalization. However, we can also confirm that company salary levels are not yet directly linked with market wage levels and the labor market conditions.

The situation regarding bonuses is similar to the situation regarding base salary. From the table we can see a growing linkage with individual achievement—46% of companies have strengthened the linkage between their bonuses and individual achievement. Furthermore, 30% of all companies have also strengthened linkages to company achievement and 11% have strengthened linkages to team/department achievement. So, we can also see a steady increase in performance-based bonuses consistent with the externalization of employment systems from these figures.

(2) Annual Salary of Scientists/Engineers and Determining Factors

So, can the transition to performance-based salary systems we looked at above also be confirmed in the determination of the salary levels of engineers? We combined survey information obtained from approximately 3,000 non-managerial engineers working in large- and medium-size companies in the electrical/electronic industry with the information on the employment and personnel system, etc, of the companies that they work for and undertook a multiple regression analysis to determine what kind of correlation exists between engineers annual salary and not only individual factors, but organizational factors such as each company's human resource management system. Let's look at the effects of changes in the salary system using these results.

From Table 11, we can see that that the method of determining the salary of engineers working in the electronic industry corresponds extremely well to the recent changes in employment and personnel systems in the industry discussed in the previous section. The dependent variable in the regression analysis was each engineer's annual salary. Essentially, the monthly salary x 12 + yearly bonus was the target of explanation in this regression analysis. The explanatory variables were the factors cited in the left column of the table. We tested three combinations of explanatory variables to express each engineer's willingness to work—The feeling of "fulfilling work" in model 1, "company loyalty" in model 2 and a combination of both in model 3. We confirmed that regular (annual) pay raises are still implemented in the majority of companies and under the system of an annual increase in salary with regular pay raises, a strong positive partial correlation between age and annual salary can be assumed. In fact, the estimated age variable coefficient was positive and confirmed to be statistically significant under all models (1-3) in the table. In addition, the engineer's capability variable is suggested to have a positive effect on yearly salary in job capability based salary systems in which progressive expansion has been confirmed in recent years, and a statistically significant positive coefficient value is estimated in practice. So, the spread in recent years of the performance-based salary systems that are the focus of our

Table 11. Annual Salary Analysis

Dependent variable is a logarithm of annual earning			
	Model 1	Model 2	Model 3
Explanatory variable	Coefficient	Coefficient	Coefficient
Constant term	4.835 **	4.801 **	4.817 **
Female dummy	-0.127 **	-0.127 **	-0.125 **
Age	0.033 **	0.033 **	0.033 **
High academic background	0.047 **	0.047 **	0.047 **
Ability as an engineer	0.017 **	0.016 **	0.016 **
Motivation to work	-0.011	N.A.	-0.015 +
Corporate loyalty	N.A.	0.016 *	0.018 **
Job satisfaction	0.007	0.001	0.006
Overtime work	0.002 **	0.002 **	0.002 **
Job discretion	0.000	0.000	0.000
Importance of work	0.047 **	0.044 **	0.046 **
Positive workplace relationships	-0.002	-0.005	-0.003
Comfortably challenging workplace culture	0.006 *	0.005	0.006 +
Change in R&D expense ratio to sales in the past 5 years	0.028 **	0.030 **	0.030 **
Personal performance indicator	0.021 **	0.019 **	0.020 **
Product category engaged in (standard: capacitors, batteries, etc.)			
Semiconductors	0.010	0.012	0.011
Electronic components other than semiconductors	0.038 +	0.036 +	0.036 +
Motors, elevators, robots, etc	-0.023	-0.020	-0.021
Transformers, control instrumentation, switchboards, etc	-0.041 +	-0.040 +	-0.041 +
Plant related	0.007	0.011	0.010
Commercial/business equipment	-0.045 *	-0.042 *	-0.043 *
Consumer electronics and related electrical equipment	0.027 +	0.028 +	0.028 +
Individual solutions	0.030	0.033 +	0.032
Software development, network construction	0.034 *	0.039 *	0.037 *
Other	0.016	0.018	0.017
Corporate performance trend	0.006 *	0.006 *	0.006 *
R^2	0.519	0.520	0.520
Adj. R^2	0.515	0.516	0.516
D.W.	1.767	1.770	1.772
F value	138.7 **	138.9 **	133.5 **
Sample size	3108	3106	3106

Note: **= 1% significance, * = 5% significance, + = 10% significance.

attention means that individual performance indicators have a strong positive effect on salary and the results from the table confirmed this with the expected significant positive coefficient. Furthermore the spread of job/position based salary could be confirmed with the "Importance of work" variable having a strong positive effect on salary. In addition, the fact

that the trend of engineers having responsibility of their respective product (project) area and corporate performance has a strong positive effect on yearly salary levels also corres ponds to the direction of change which we previously looked at in the bonus system.

From the above results we can see the changes in the personnel and salary systems we looked at previously and that the determination of engineer salary levels is regulated through the actual operation of these systems at present.

IV. The Relationship between Changes in Employment and Personnel Systems and Externalization of the Scientist and Engineer Labor Market

From the analysis so far, various indicators have confirmed a gradual increase in the turn-over of scientists and engineers as well as a shift in the direction of labor market externalization. We have also confirmed that Japanese companies have experienced parallel changes in their employment and personnel systems consistent with this movement towards labor market externalization. Now, let's see if there is a cause and effect relationship between these two consistent trends. Do system changes create externalization or does externalization drive changes in the system? We haven't come across any previous studies to give us a clear answer as to the cause and effect relationship between the two. Here, let's say the employment and personnel system changes discussed in this paper encourage externalization and are necessary for the employment and treatment of more mobile scientists and engineers in line with business objectives. While we can't delve into a further study of this cause and effect relationship in this paper, we can however introduce data that could be a reference for future discussion and discuss the meaning of this data. This data concerns the feelings of scientists and engineers. Essentially, that a change of heart is required in order for employees to take the action of leaving their company—a so-called "willingness to change jobs." This willingness to change jobs is coupled with a change in the worker's previous perception towards their company and work. So, let us show what kinds of changes have occurred in the hearts of scientists and engineers together with the changes in the systems and labor market shown above.

1. Changes in Feelings towards Their Jobs and Their Companies

When scientists and engineers feel disillusioned towards the company that they (until then) belonged to for whatever reason, they will follow their inner feelings and move between organizations, seeking a workplace with a better job. So, how have the feelings of Japanese scientists and engineers changed towards their job and company? Here we examine data on union workers collected by the Japanese Electrical Electronic and Information Union regarding job fulfillment and attitudes towards their companies.

Something that needs to be recognized is that these feelings tend to vary by age, sex and length of service, and recent changes in the composition of age, sex and length of service could have a major influence on this data regarding changes in attitudes. So here in

Table 12. Changes in Feelings towards Jobs and Companies by Occupation (Adjusted)

Occupation	Motivation to work			Corporate loyalty		
	1994	2005	Change	1994	2005	Change
General engineers	0.45	0.15	-0.30	0.03	-0.28	-0.31
Information engineers	0.25	-0.09	-0.35	-0.01	-0.32	-0.31
Manual workers <Standard>	0.00	0.00	0.00	0.00	0.00	0.00
Clerical staff I (university graduate or above)	0.21	0.26	0.05	0.32	0.08	-0.24
Clerical staff II (junior college or below)	0.03	-0.10	-0.14	0.17	0.16	-0.01
Sales and marketing staffs	0.31	0.28	-0.02	0.14	0.25	0.11

Sources: Fujimoto and Nakata (2007), table 6, table A2. Original data: Japanese Electrical Electronic and Information Union Member Surveys 1994/2005.
Note: Manual workers were standardized to 0.

Table 12, we look at employee feelings towards their job and company after adjusting for the effect that the above composition changes have on data. These numerical values regarding the feelings of workers in each occupation represent the relative difference from the feelings of manual workers engaged in manufacturing.

First, looking at the changes in the relative levels, the levels of work motivation among engineers (both general and information system engineers) were extremely high in comparison with other occupations in 1994; however the high motivation decreased significantly in the following ten years and as a result their work motivation was about level with other occupations in 2005. On the other hand, company loyalty among both kinds of engineers has been the lowest amongst all occupations, on par with manual workers since the first survey in 1994, and it declined even further over the following years until 2005.

In other words, we can see the rapid decay of employee attachment to their jobs and companies in recent years as a trend amongst all scientists and engineers. The timeframe in which these surveys were carried out, around 2000, was a period when large-scale restructuring (cutbacks in personnel) was taking place in many electronic companies and the previous climate of long-term stable employment changed significantly. Did the retreat from a regular (annual) pay raise system which evaluates long-term familiarization and the change to a system evaluating shorter-term results along with the kinds of changes to employment systems we looked at in the previous section cool the engineer's feelings towards their company and jobs while increasing their desire to change those jobs? Let's examine these changes further.

Table 13. The Ratio of Engineers Wishing to Change Jobs

	1997	2007	Change
Age 20-24	16.23%	17.70%	1.47%
Age 25-29	16.88%	15.91%	-0.97%
Age 30-34	13.39%	15.05%	1.66%
Age 35-39	7.67%	12.25%	**4.58%**
Age 40-44	6.49%	9.39%	**2.89%**
Age 45-49	3.74%	6.11%	**2.37%**
Age 50-54	3.62%	5.23%	1.61%
Age 55-59	3.61%	5.21%	1.60%

Source: *Employment Status Survey* (Statistics Bureau of MIC, Recounted).

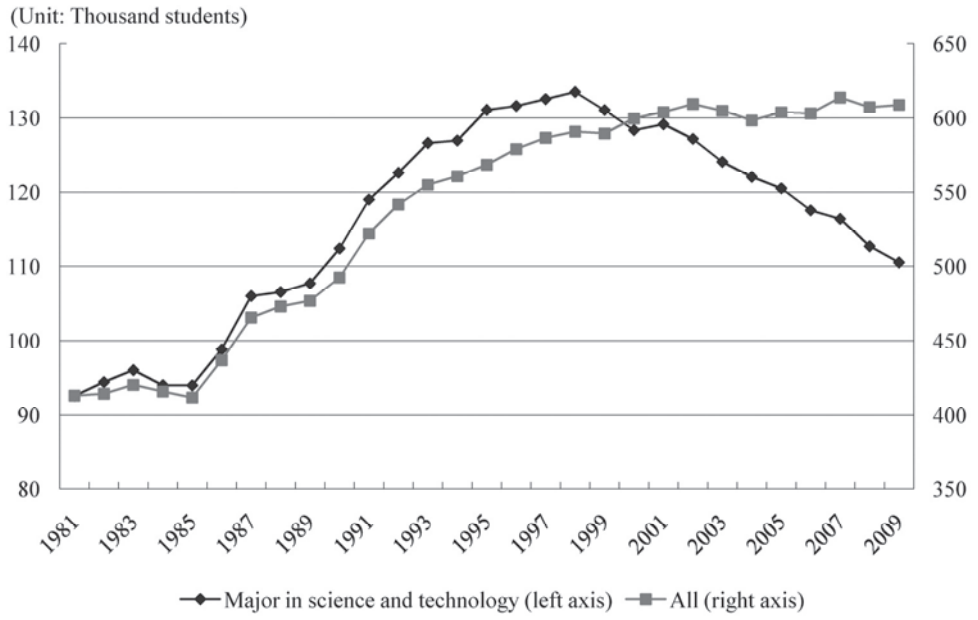
2. Growing Desire to Change Job

Table 13 displays the ratio of engineers wishing to change jobs grouped by age in 1997 and 2007—around the same timeframe as the above Table 12.

The right hand column of the table is the change of % share of those wishing to change jobs in the corresponding age group over 10 years. The increase in the ratio of engineers wishing to change jobs from 1997 to 2007 is obvious—the ratio increased over all age groups with the exception of the 25-29 year-old age group. Interestingly, the highest increase in ratio was seen in the 35-49 year-old middle-aged group where the transfer rate has been the lowest. The actual transfer rates looked at earlier indicate low mobility and high job stability in this age segment; however, the trend towards higher mobility can be confirmed by the feelings of these workers. We can say that as a result of this, greater turn-over in this age segment can be predicted in the near future.

V. The Future of Japanese Engineers

In this paper, we examined the present situation of the labor market for Japanese scientists and engineers and its recent changes. We learned that they are young, highly educated and very productive, which explains why the Japanese manufacturing industry has achieved high labor productivity with a relatively small share of such workers. Despite their high contribution to value-creation, they are treated relatively poorly in comparison to their international counterparts. This is made possible by insulating them from the external labor market forces. But now new reality of the labor market is emerging. While the Japanese labor market for scientists and engineers shrinks, there is a steady increase in



Source: National Institute of Science and Technology Policy (2010).

Figure 5. Changes in the Number of Students Entering University per Year

externalization. So, what future lies in the wake of these trends? The future decrease in domestic supply of scientists and engineers is the key to correctly forecasting the future shape of the Japanese scientist and engineer market. As made clear in Figure 5, the number of science and technology students in Japanese universities has continued to decease steadily since 1998. The majority of students studying science and technology at university now will bear the responsibility for Japan's manufacturing as graduate scientists and engineers in a few years and a reduction in the supply of new human resources is inevitable in the near future. The problem isn't just limited to numbers; the reduction in the amount of new workers will naturally result in a reduction of highly capable engineers and this will become a factor in the further decline in the research and development capabilities of Japanese companies.

The current trend towards the externalization of the labor market may enhance the overall macro efficiency for the utilization of scientists and engineers. But it is doubtful if market externalization will solve the problem above. So, are there any measures that can be taken in regard to the decline in both the quantity and quality of Japan's science and technology personnel? The solution may well be the proactive training of female engineers and calling upon more international university students studying to be engineers. International science and technology students at Japanese universities now will have a lead role when

Japanese companies expand their research and development activities overseas. In addition, female engineers with perspectives differing from their male counterparts are a great source of new ideas. These people may be able to play the role of the leading the transformation of Japanese companies into truly diverse global organizations, as well as engaging in research and development as talented scientists and engineers in their own right.

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Analysis of the Content of Individual Labor Dispute Resolution Cases: Termination, Bullying/Harassment, Reduction in Working Conditions, and Tripartite Labor Relationships

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Analysis of the 1,144 individual labor dispute cases handled by the four prefectural labor bureaus during fiscal 2008 show that two-thirds of these cases (756 cases) involved termination of employment, approximately 20% (260 cases) involved bullying or harassment, and approximately 10% (128 cases) involved the reduction in working conditions. In addition, roughly half the cases involved regular employees, around 30% involved directly hired non-regular employees, and approximately 10% involved temporary agency workers. Approximately 30 % of these cases reached resolution, with the majority (around a quarter) involving a settlement between 100,000 and 200,000 yen, and other cases reaching settlements between 300,000-400,000 yen, 200,000-300,000 yen and 50,000-100,000 yen in order of decreasing frequency. This represents a significantly low level overall. In terms of content, many cases of termination involved reasons relating to "attitude," although it was difficult to clearly distinguish cases relating to "ability" from those relating to "attitude." The frequency of cases citing the sanctioning of expression (restricting the "voice" or "exercise of rights" of workers) was also noticeable. This may indicate a state of "real world" termination, differentiated from the doctrine of the abuse of the right to dismiss, which is applied in court.

I. Introduction

The following table shows changes in the number of incidents of labor consultations, advice/guidance, and conciliation recorded at prefectural labor bureaus since their instigation in October 2001 (Table 1).

The content of these individual dispute resolution cases has to date been published only as a general set of data entitled "Implementation Status of Systems for the Resolution of Individual Labor Disputes," issued once per year by the Ministry of Health, Labour and Welfare. No clarification is given regarding individual specific disputes or the way in which disputes are resolved. There is some introduction of cases considered "typical," but it does not give a clear picture of the overall situation.

For this reason, the Japan Institute for Labour Policy and Training (JILPT)'s Department of Labour Laws and Industrial Relations has focused on a comprehensive analysis of individual labor dispute resolution cases handled by labor bureaus as a main pillar of its project research since fiscal 2009, beginning research in order to give a statistical and content-based analysis of the state of labor disputes and their resolutions as they actually occur in the workplace within contemporary Japanese society, in order to clarify the overall picture.

Table 1. Changes in Number of Incidents of Labor Consultations, Advice/Guidance, and Conciliation Recorded at Prefectural Labor Bureaus

	Total number of labor consultations	Number of individual civil labor disputes	Number of advice/guidance offers received	Number of applications for conciliation received
FY2001 (second half)	251,545	41,284	714	764
FY2002	625,572	103,194	2,332	3,036
FY2003	734,257	140,822	4,377	5,352
FY2004	823,864	160,166	5,287	6,014
FY2005	907,869	176,429	6,369	6,888
FY2006	946,012	187,387	5,761	6,924
FY2007	997,237	197,904	6,652	7,146
FY2008	1,075,021	236,993	7,592	**8,457**
FY2009	1,141,006	247,302	7,778	7,821

In order to achieve this, the Labor Dispute Resolution Administration Office of the Regional Bureau Administration Division of the Minister's Secretariat within the Ministry of Health, Labour and Welfare supplied the records of all advice/guidance, and conciliation given, in fiscal 2008, by four of the labor bureaus from a total of 47 prefectural labor bureaus nationwide, subsequent to the erasure of personal information. The records supplied included "Advice/guidance resolution slips issued by the director of the labor bureau" in the case of advice/guidance, as well as, in the case of conciliation, "Applications for conciliation," "Conciliated resolution slips," "Hearing records (conciliation)," "Conciliation outline record slips" and their appendices. These appendices include "Response documents" submitted by the accused parties in issues requiring conciliation, as well as "Agreement documents" issued in cases where conciliation resulted in an agreement.

As the volume of records and information available per case was far larger for cases of conciliation than for incidents of advice/guidance, this research project focused far more heavily on cases of conciliation, with advice/guidance being utilized only in those cases where it was considered necessary. This research covered 1,144 cases of conciliation, the equivalent of 13.5% of all cases accepted nationwide in the same period (8,457 cases of conciliation).

The overall research period was intended to last for three years, from fiscal 2009 to fiscal 2011, but during the first year (fiscal 2009), deeper analysis was implemented, focusing on the content of the four areas that made up the highest proportion of individual labor disputes—dismissal and other cases of termination, bullying/harassment, reduction in working conditions, and cases of tripartite labor relationships, including temporary agency workers—so as to illustrate the major issues that are the focus of current labor law policy.

Table 2. Employment Status (by Gender) as Seen through Cases of Conciliation

	Conciliation cases (%)	Men (%)	Women (%)	Unknown (%)	Total (%)
Regular employees	583 (51.0)	382 (65.5)	190 (32.6)	11 (1.9)	583 (100.0)
Directly hired non-regular employees	344 (30.1)	139 (40.4)	204 (59.3)	1 (0.3)	344 (100.0)
Temporary agency workers	132 (11.5)	64 (48.5)	68 (51.5)	0 (0.0)	132 (100.0)
Trial employment period	76 (6.6)	51 (67.1)	24 (31.6)	1 (1.3)	76 (100.0)
Other	4 (0.3)	3 (75.0)	1 (25.0)	0 (0.0)	4 (100.0)
Unknown	5 (0.4)	5 (100.0)	0 (0.0)	0 (0.0)	5 (100.0)
Total	1144 (100.0)	644 (56.3)	487 (42.6)	13 (1.1)	1144 (100.0)

Table 3. Number of Conciliation Cases, by Size of Company

Number of employees	Number of cases (%)
1-9	183 (**16.0**)
10-29	230 (**20.1**)
30-49	120 (**10.5**)
50-99	133 (**11.6**)
100-149	65 (5.7)
150-199	30 (2.6)
200-299	39 (3.4)
300-499	49 (4.3)
500-999	26 (2.3)
1000 or more	43 (3.8)
Unclear	226 (19.8)
Total	1144 (100.0)

The research topics were delegated as follows: termination cases: Keiichiro Hamaguchi (Research Director), bullying/harassment cases: Shino Naito (Researcher), cases of reduction in working conditions: Makoto Suzuki (Assistant Fellow), and cases of tripartite labor relationships: Ryo Hosokawa (Temporary Research Assistant). The report was issued in June 2010,[1] and this paper is a summary of the results therein.

II. Outline of Cases of Conciliation in Individual Labor Disputes

Firstly, Table 2 shows the overall trends within the 1,144 cases of conciliation. Of these cases, 51.0% involved regular employees, followed by 30.1% involving directly hired non-regular employees. Cases dealing with temporary agency workers amounted to 11.5%, a relatively low proportion of the overall number of cases of conciliation. Given, however, the fact that the Employment Status Survey (2007) by the Statistics Bureau of Ministry of

[1] http://www.jil.go.jp/institute/reports/2010/0123.htm.

Table 4. Proportion and Number of Cases by Type

Case type	Number of cases (%)
1. Ordinary dismissal	330 (28.8)
2. Collective redundancy	104 (9.1)
3. Disciplinary dismissal	26 (2.3)
4. Reduction in working conditions (wages)	102 (8.9)
5. Reduction in working conditions (retirement benefits)	19 (1.7)
6. Reduction in working conditions (other)	8 (0.7)
7. Transfer to another company	5 (0.4)
8. Transfer within a single company	53 (4.6)
9. Suggestion of termination	93 (8.1)
10. Disciplinary measures	8 (0.7)
11. Withdrawal of tentative hiring decision	29 (2.5)
12. Refusal to renew repeatedly renewed fixed-term contract	109 (9.5)
13. Increase in wages/promotion	1 (0.1)
14. Resignation for personal reasons	64 (5.6)
15. Other employment conditions	80 (7.0)
16. Parental or nursing care leave	2 (0.2)
17. Recruitment	0 (0.0)
18. Hiring	0 (0.0)
19. Mandatory retirement age etc.	1 (0.1)
20. Age discrimination	0 (0.0)
21. Disability discrimination	3 (0.3)
22. Employment management improvements, etc.	6 (0.5)
23. Succession of labor contract	0 (0.0)
24. Bullying/harassment	260 (22.7)
25. Education and training	2 (0.2)
26. Evaluation	12 (1.0)
27. Damages	20 (1.7)
28. Sexual harassment	1 (0.1)
29. Maternal health management	0 (0.0)
30. Mental health	34 (3.0)
31. Other	99 (8.7)

Internal Affairs and Communications shows the proportion of “Temporary employees placed by temporary staff businesses” to be 3.0%, 11.5% could be seen as relatively high figure. The majority (65.5%) of cases involving regular employees dealt with men, while cases involving directly hired non-regular employees largely dealt with women (59.3%). A slight majority of temporary agency worker cases dealt with women, although the proportion was roughly half-and-half.

When categorized according to the scale of the company involved, a majority (58.2%) of cases involved companies with fewer than 100 employees (Table 3). This is thought to reflect the fact that companies with fewer than 100 employees do not have suitable dispute resolution procedures in place, and externalize the process of dispute processing through applying for conciliation.

Table 4 shows the proportion and number of cases by type.

Table 5. Proportion and Number of Cases of Termination of Employment, Bullying/Harassment, and Reduction in Working Conditions

	Total (%)
Termination of employment	756 (66.1)
Bullying/harassment	260 (22.7)
Reduction in working conditions	129 (11.3)

Table 6. Completion Categories, by Type of Application

	Agreement reached	Withdrawals, etc.	Non-participation of other party	Unresolved	Cases outside scope of system	Total
Termination of employment (%)	233 (30.8)	60 (7.9)	329 (43.5)	133 (17.6)	1 (0.1)	756 (100.0)
Bullying/harassment (%)	80 (30.8)	17 (6.5)	96 (36.9)	67 (25.8)	0 (0.0)	260 (100.0)
Reduction in working conditions	34 (26.6)	14 (10.9)	56 (43.8)	24 (18.8)	0 (0.0)	128 (100.0)
Total (%)	346 (30.2)	97 (8.5)	489 (42.7)	211 (18.4)	1 (0.1)	1144 (100.0)

Of these, three areas were extracted for analysis as part of this research (Table 5). "Termination of Employment" includes the eight categories of "Ordinary dismissal," "Collective redundancy," "Disciplinary dismissal," "Suggestion of termination," "Withdrawal of tentative hiring decision," "Refusal to renew repeatedly renewed fixed-term contract," "Resignation for personal reasons" and "Mandatory retirement age, etc." "Reduction in working conditions" includes those conditions relating to "Wages," "Retirement benefits" and "Other."

Even if an application for conciliation is submitted, if the party in regard to whom the application is made shows no inclination to participate in conciliation, the process ends there. Some 42.7% of cases (almost half) end in this way (in this paper, these cases are referred to using the abbreviated term "non-participation"). In addition, parties who enter into conciliation but who are unable to accept the proposed conciliation solution, and for whom no resolution appears possible, are removed from conciliation as unresolved. These cases account for 18.4% of the total. On the other hand, 8.5% of conciliation applications are withdrawn by the applicant, leaving only 30.2% of cases that reach an agreement. Table 6 shows a breakdown of the content of these applications.

Table 7 shows the resolution payment amounts awarded, categorized by employment status in cases where an agreement was reached. In cases involving regular employees, sums were concentrated between 100,000 and 400,000 yen, with amounts between 1 and

Table 7. Settlement Payments, Categorized by Employment Status

	1-49,999 yen	50,000-99,999 yen	100,000-199,999 yen	200,000-299,999 yen	300,000-399,999 yen	400,000-499,999 yen	500,000-999,999 yen	1 million-4,999,999 yen	5 million-9,999,999 yen	10 million yen or more	Unknown/ other	Total
Regular employees (%)	7 (4.3)	8 (4.9)	39 (**23.9**)	22 (**13.5**)	25 (**15.3**)	12 (7.4)	19 (**11.7**)	11 (6.7)	1 (0.6)	1 (0.6)	18 (11.0)	163 (100.0)
Directly hired non-regular employees (%)	14 (**13.1**)	18 (**16.8**)	28 (**26.2**)	10 (9.3)	14 (**13.1**)	1 (0.9)	7 (6.5)	6 (5.6)	0 (0.0)	0 (0.0)	9 (8.4)	107 (100.0)
Temporary agency workers (%)	6 (**14.3**)	9 (**21.4**)	11 (**26.2**)	7 (**16.7**)	6 (**14.3**)	2 (4.8)	1 (2.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	42 (100.0)
Trial employment period (%)	6 (**18.8**)	8 (**25.0**)	5 (**15.6**)	6 (**18.8**)	2 (6.2)	2 (6.2)	2 (6.2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.1)	32 (100.0)
Other (%)	0 (0.0)	0 (0.0)	1 (100	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Unknown (%)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Total (%)	33 (9.5)	43 (12.4)	84 (24.3)	45 (13.0)	47 (13.6)	18 (5.2)	29 (8.4)	17 (4.9)	1 (0.3)	1 (0.3)	28 (8.1)	346 (100.0)

Table 8. Settlement Payments, Categorized by Application Content

	1-49,999 yen	50,000-99,999 yen	100,000-199,999 yen	200,000-299,999 yen	300,000-399,999 yen	400,000-499,999 yen	500,000-999,999 yen	1 million-4,999,999 yen	5 million-9,999,999 yen	10 million yen or more	Unknown/ other	Total
Termination of employment (%)	19 (8.2)	34 (**14.6**)	58 (**24.9**)	31 (**13.3**)	30 (**12.9**)	12 (5.2)	23 (9.9)	12 (5.2)	1 (0.4)	1 (0.4)	12 (5.2)	233 (100.0)
Bullying/harassment (%)	5 (6.2)	6 (7.5)	22 (**27.5**)	16 (**20.0**)	12 (**15.0**)	8 (**10.0**)	4 (5.0)	2 (2.5)	0 0.0)	1 (1.2)	4 (5.0)	80 (100.0)
Reduction in working conditions (%)	6 (**17.6**)	2 (5.9)	8 (**23.5**)	2 (5.9)	6 (**17.6**)	0 0.0)	2 (5.9)	3 (8.8)	0 0.0)	0 0.0)	5 (14.7)	34 (100.0)

50,000 yen accounting for 4.3% and those between 50,000 and 100,000 yen accounting for 4.9%. This demonstrates a relatively low proportion of settlements at low levels. Of the settlements, 11.7% were between 500,000 and 1,000,000 yen.

On the other hand, in cases involving directly hired non-regular employees, 13.1% of cases resulted in a settlement between 1 and 50,000 yen, while 16.8% were between 50,000 and 100,000 yen. In cases involving temporary agency workers, these figures equated to 14.3% and 21.4% respectively, indicating a greater trend towards low-value settlements than those awarded to regular employees. This is thought to originate in the fact that the original applications are often seeking a lower settlement, but it also indicates how non-regular employees seeking a higher value may end up accepting a lower settlement, as the resolution does not proceed as they had hoped.

In addition, when the distribution of settlement amounts is broken down according to the broad categorization of application content (Table 8), it shows that 65.7% of "Termination of employment" cases are settled between 50,000 and 399,999 yen. There were also incidences, however, of cases settled at over 10 million yen.

Of "Bullying/harassment" cases, 72.5% are settled between 100,000 yen and 499,999 yen, giving them a slightly higher settlement value in general than cases of "Termination of Employment." There were also incidences of cases settled at over 10 million yen.

Settlements in cases of "Reduction in working conditions" tend to come in lower than those in other cases, with 23.5% being settled between 100,000 and 199,999 yen, and 17.6% being settled either between 1-49,999 yen, and 300,000-399,999 yen.

III. Analysis of Cases of Termination of Employment

As mentioned above, of the 1,144 cases referred to conciliation from the four labor bureaus under the scope of this research, 756, or a majority at 66.1%, involved termination of employment in the form of dismissal, refusal to renew repeatedly renewed fixed-term contract, suggestion of termination, resignation for personal reasons, etc. Socially, cases of termination of employment are noted as the most common type of individual labor dispute.

At the same time, under the terms of labor legislation, revisions to the Labor Standards Act in 2003 established the doctrine of the abuse of termination rights developed in legal precedents. The article was transferred to the Labor Contract Act in 2007. However, with the exception of the four conditions (or four elements)[2] of collective redundancy, there were al most no criteria formularized to specifically define what decision should be made when each type of termination occurred, and as a result, individual cases were left to the discretion of the courts. In addition, the doctrine of precedent in Japan means that, in principle, since legal measures such as invalidation of termination or its application by analogy

[2] Conditions for acknowledging collective redundancy include the principle of requiring precedent, such as (1) the need for a reduced workforce, (2) the obligation to strive to avoid termination, (3) the rationality of selection of those being terminated, and (4) a consultation with labor unions, etc.

would be taken according to the abuse of dismissal rights, leaving no room for a financial settlement, then for any settlement reached that does not depend on the courts, the standard for financial settlement has hardly been socially formulated.

In this research, therefore, the authors diligently studied individual cases, precipitating types of reasons for termination of employment. Cases were categorized based thereon, in order to clarify the current state of employment termination within Japanese society. This categorization did not necessarily correspond to the status of employment termination allocated by the labor bureaus. For example, some cases considered to be management-related were listed not as collective redundancies, but as ordinary dismissals, while a significantly large number of cases involving misconduct were processed not as disciplinary dismissal but as ordinary dismissal. Furthermore, in a fair number of cases, not only was it not at all clear whether the case should be categorized into dismissal, suggestion of termination, or resignation for personal reasons, depending on the interpretation of specific statements made both by the employee and the management, a situation requiring extremely delicate judgment, but also the categorization of the case itself had become a point of dispute between the employee and the management.

Table 9 shows the categorization of final reasons for termination, and the number of cases in each category, utilized in this research.

Ordinarily, the labor law debate regarding dismissal for reasons relating to the individual employee in question, such as his or her behavior and attributes (in other words, when termination does not result from reorganization for management reasons), depends on three typical reasons for termination: insufficient achievement at work, illness or injury, or inappropriate behavior. In regard to these, consideration must be given to a comparison between elements that give grounds for judging that the right to dismiss has been abused, and those that negate this, before a decision is made as to whether the dismissal is valid or not. In such cases, where these reasons are shown to exist, it is assumed that there may have been grounds to terminate employment, and as such it could be said that the final decision is based on objective rationality and social appropriateness.

In regard to this, it is noticeable that a large number of cases referred to labor bureaus for conciliation give “attitude” as the reason for termination of employment, and that many of them represent the sanctioning of expression. In cases referring to “attitude,” it was not always clear that this had been differentiated from “ability,” and whilst this does not preclude consideration within the broad definition of “insufficient achievement at work,” given that any such decision is based essentially on the subjective view of the employer, it is considered necessary to reconsider such cases in a separate category from those giving “ability” as the reason for termination. Furthermore, it is impossible to consider termination relating to the sanctioning of expression (“voice”[3] and “exercise of rights”) to date as having been

[3] “Voice” as defined in this paper is based on the terminology of the economist Albert Hirschman, who defined the terms “voice” and “exit.” When a problem arises in an organization, either improve-

Table 9. Final Reasons for Termination, by Number of Cases

	Number of cases (%)	
Exercise of rights	14	(1.9)
Voice	23	(3.0)
Refusal to accept change in working conditions	26	(3.4)
Notification of change or termination	21	(2.8)
Attitude	167	(22.1)
Misconduct	39	(5.2)
Private issues	7	(0.9)
Side job	5	(0.7)
Ability	70	(9.3)
Illness/injury	48	(6.3)
Disability	4	(0.5)
Age	11	(1.5)
Racial discrimination	1	(0.1)
Management	218	(28.8)
Employment status	4	(0.5)
Quasi-dismissal	47	(6.2)
Miscommunication	17	(2.2)
Retirement problems	8	(1.1)
Reasons unknown	26	(3.4)
Total	756	(100.0)

implemented based on objective rational reasons from the perspective of precedent, and as such, this category could be considered the one most strongly indicative of the state of employment termination in society, separate from the doctrine of abuse of the right to dismiss as applied in court.

The following gives consideration to types of employment termination in descending order of lacking objectivity.

1. Sanctioning of the Exercise of Rights

From among termination cases relating in the broad sense to the sanctioning of expression, cases of termination where the reason given related to behavior undertaken on the initiative of the employee in question, and where such behavior was an appropriate exercise of the employee's rights based on labor law, are referred to as "exercise of rights."

A total of 14 such cases were reviewed, five of which were resolved with financial settlements. These included "Ordinary dismissal as a result of reporting to the labor stan-

ments are sought through "expression" ("voice") within the organization, or through "resignation"("exit") from the organization.

dards office that there was no paid leave or overtime allowance" (settled for 250,000 yen), "Ordinary dismissal as a result of taking paid leave" (settled for 120,000 yen), "Refusal of renewal as a result of taking maternity leave" (settled for 300,000 yen), among others.

2. Sanctioning of "Voice"

"Voice" cases are here defined as termination where the reason given related to behavior undertaken on the initiative of the employee in question, and where such behavior was not an appropriate exercise of the employee's rights based on labor law. In this category, 23 such cases were recorded.

Broadly divided, these cases were as follows.

i. Termination in order to sanction protest by an employee that is not necessarily within the range of rights which may be exercised under labor law, but which can be seen as the exercise of generally appropriate rights as an individual employee. Nine such cases were recorded, including "Ordinary dismissal after protesting in regard to personal information (family records) being leaked to other employees" (settled for 70,000 yen), "Refusal of renewal through termination of dispatching contract after revealing a situation of bullying" (settled for 200,000 yen). Of the nine, four were resolved through a financial settlement.

ii. Termination in order to sanction an emphasis on social justice rather than individual rights, for example, "Ordinary dismissal on refusing to falsify data" (settled for 300,000 yen). Three such cases were recorded, of which one was resolved through a financial settlement.

iii. Five cases were recorded where termination occurred as a result of the employee expressing an opinion about how the company was being managed. None of these was resolved.

iv. Six other "voice" cases of termination were recorded, of which three were resolved through a financial settlement.

3. Refusal to Accept Change in Working Conditions

Twenty-six cases were recorded of employment termination resulting from an employee's negative response to changes implemented in his/her working conditions on the initiative of the employer. These could be regarded as a type of "sanctioning of expression," but in fact content-wise they come into a mixed area somewhere between disadvantageous changes to working conditions and termination, and are closely connected to "notification of change or termination."

i. The majority of such cases related to an employee's refusal to be transferred within a single company (13 cases), of which three were resolved.

ii. On paper, 11 cases referred to termination of employment based on refusal to accept disadvantageous changes to conditions such as wage reductions, but of these, eight cases involved the same subject matter and were submitted by em-

ployees of the same company. Two cases were resolved with a financial settlement.

iii. In addition to this, two cases involved termination resulting from refusal to accept changes in the employment status. Neither of these cases has been resolved.

4. Notification of Change or Termination

Closely related to the category above are 21 cases in which termination occurred after the employer gave the employee a choice between disadvantageous changes in the working conditions and termination of employment ("notification of change or termination").

i. Firstly, nine cases involved changes in conditions relating to transfer within a single company, such as "Suggestion of termination after being given an order to be transferred to a distance despite his daughter's long-term hospitalization; told 'obey or leave'" (case unresolved). Of these, one was resolved with a financial settlement.

ii. Four cases were recorded of notification of change or termination relating to wages or other disadvantageous changes to conditions. Of these, only one was resolved, with a settlement figure of zero.

iii. Many of the cases involving notification of change or termination related to employment status. There were seven such cases of this, including that of an employee who was told to "transfer to a subcontractor or leave" (settled for 80,000 yen). What is clear here is that while such cases become apparent because they resulted in termination, in fact there are likely to be many more such cases in which employees have chosen to remain at work, in employment statuses different to those in which they were originally employed.

iv. Some cases involve combinations of the above situations.

5. Attitude

The largest number of cases citing personal reasons relating to the employee in question referred to their "attitude" as the reason for termination. These cases made up the largest category of cases after those relating to termination for management reasons, with a total of 167 cases. Such cases are related both to cases of sanctioning expression ("exercise of rights" and "voice"), and to cases relating to "ability" when given as the reason for termination. Although categorized as "attitude" cases, these cases in fact cover a wide range of areas.

i. Firstly, the most demonstrable cases of "attitude" included refusal to follow instructions at work, or more accurately, refusal to implement orders given in the ordinary course of work by a supervisor. There were 21 such cases of termination, including "Terminated dispatching contract on request of client company due to refusal to engage in some work responsibilities" (settled for 150,000 yen), of which five were resolved with a financial settlement.

ii. Twenty-nine cases cited termination as a result of poor attitude at work. These did not relate to refusal to follow orders, but rather something close to this, such as laziness at work. Only six of these cases were resolved with financial settlements, and the amounts involved were small.
iii. Of all cases citing "attitude," the largest group (49 cases) cited trouble in the workplace. Seventeen of these were resolved with a financial settlement. It is considered that this indicates the significance of human relationships at work within Japan's labor society.
iv. There were 22 cases of employment termination that cited trouble in regard to customers. Nine of these were resolved with a financial settlement. This is thought to reflect the importance placed on high levels of customer service in Japan, and indicates a trend within businesses to place the highest priority on honoring the customer's opinion.
v. Thirteen cases of employment termination cited tardiness or absence from work, of which five were resolved with a financial settlement.
vi. Ten cases of employment termination cited the taking of leave, of which six were resolved with a financial settlement.
vii. Five cases cited the expression of complaints as the reason for termination.
viii. While it is true that such cases come under the broad definition of "attitude," there were a number that cited "compatibility" or "chemistry" as the reason for termination ("Does not match the company culture," "Does not fit in," etc.), and did not give any indication of exactly what had been done by whom. The fact that there were as many as 15 such cases may indicate the extent to which Japanese labor society prioritizes human relationships at an instinctive level.
ix. Three cases had no clear explanation.

6. Misconduct

Considering that inappropriate conduct is a major element of justification for individual dismissal in labor law, it seems perhaps surprising that only 39 cases of termination were referred to the labor bureau for conciliation citing misconduct. It seems that misconduct as a reason for termination does not always correspond with disciplinary dismissal as a type of dismissal. While many cases cite misconduct as a reason for ordinary dismissal, there were a number of cases of disciplinary dismissal that cited attitude or "voice," which may not necessarily be defined as misconduct.

i. The majority of cases of misconduct involved breach of trust, with 17 cases including "An employee commuted to work by bicycle despite having received a commuting allowance for a commuter bus pass and neglected to submit a written apology, resulting in the implementation of disciplinary dismissal" (settled for 58,600 yen). Four of these cases involved misconduct denied by the employee in question, such as "30,000 yen in sales income having gone missing and the em-

ployee, who knew nothing of it, being suspected of stealing it, resulting in the refusal of renewal" (settled for 50,000 yen).

ii. The number of cases (six) involving incidents at work that did not constitute deliberate misconduct by the employee was also relatively large.
iii. One case of termination involved financial trouble.
iv. Five cases of termination cited theft in the workplace. The employee acknowledged the theft in only one of these cases. It was denied in all four of the other cases.
v. Two cases of termination cited clear incidents of physical violence in the workplace.
vi. Four cases cited bullying or sexual harassment instigated by the employee, whose employment was terminated, but of these, the charge was denied by three of the employees concerned.
vii. One example involved impropriety at work, in the form of inappropriate urination at the workplace.
viii. Only one case cited falsification of a work record.
ix. One case of termination did not give a clear reason for disciplinary action.

7. Private Issues

Seven cases cited private behavior as the reason for termination of employment. These included cases such as "An employee started to receive phone calls from loan sharks at work, and was ordered to stay at home and then he was ordinarily dismissed" (settled for 100,000 yen). If the company considers that such phone calls are an obstacle to work, then it is difficult to classify them entirely as "private" issues.

On the other hand, there were three cases in which the employee him/herself was not directly involved in the problems cited, which centered on family members or relatives, such as "Ordinary dismissal due to an incident involving employee's father" (non-participation).

8. Side Job

Five cases recorded side job as the reason for termination, of which two were resolved with a financial settlement.

9. Ability

Termination of employment based on reasons of "ability" is considered to be the most typical pattern of individual termination. After "attitude," the number of cases citing "ability" (70) makes it the second most common reason for individual termination. Since the Japanese workplace does not always clearly differentiate between "attitude" (subjective) and "ability" (objective). It is therefore possible to consider that "attitude" is somewhat treated as part of "ability," and that there is perhaps little significance in merely comparing

the number of cases.

i. A surprisingly small number of cases (only six) cited a specific lack of skill for the work allocated, which is perhaps the most objective interpretation of the term. Two of these cases related to driving skills, while four related to computer skills. Since some of these cases involved situations in which the employee concerned had been hired without agreeing to such conditions, it is difficult to find objective rationality in them being used as a reason for termination of employment.
ii. Seven cases involved termination for reasons relating to poor performance. In none of these cases was it demonstrated that the employee in question had agreed to performance conditions when hired.
iii. Ten cases involved termination relating to mistakes made at work. It is true that making, or particularly repeating, mistakes at work can be an objective indicator of ability, but these cases included "Ordinary dismissal after only one mistake was made" (settled for 100,000 yen).
iv. Among "ability" related termination cases, there was a significant number (38) that cited only general lack of ability, with no reference to specific work skills, mistakes made, or poor performance.
v. Nine cases cited "Unsuitability" as a reason for terminating employment. This is considered relatively abstract and unclear in comparison with general "lack of ability."

10. Illness/Injury

There were 48 cases of employment termination based on illness and/or injury. Since illness and injury undoubtedly reduce an employee's ability to work, in general they can be considered justifiable reasons to terminate employment. However various problems can be identified from the content of cases referred to labor bureaus for conciliation.

i. Eleven cases involved termination of employment resulting from an accident at work. The Labor Standards Act prohibits termination of employees involved in such an accident while he/she is on leave or within 30 days of returning to work. Details were unclear in non-participation cases, but it appears that a significant number of cases are inappropriate in regard to the spirit of the Act.
ii. Two cases cited termination for reasons of private accident/injury.
iii. Ten cases cited termination of employment for the reason of chronic illness. Of these, some cases could be considered to demonstrate discrimination on the basis of illness, such as "Ordinary dismissal due to specific illness (diabetes), citing the fact that the company did not want customers to witness the employee injecting insulin" (settled for 200,000 yen).
iv. The most common form of termination relating to illness involved mental illness. A significant number of cases deal with mental health problems playing some role in the termination of employment, while 15 cases gave mental illness

as the clear reason for termination. In almost all these cases, bullying or harassment was also involved, giving an indication that the today's Japanese workplace has some problems with maintaining a social atmosphere beneficial to mental health.

v. In contrast to this, relatively few cases of employment termination related to "normal" physical illness cited lack of work ability as a result of poor physical condition. Rather, "attitude" related issues (the fact that the employee took time off when only mildly unwell, etc.) appeared to be the true cause of the termination in many cases. None of these cases was resolved with a financial settlement.

vi. Two cases of termination cited the illness not of the employee in question, but rather a family member. These cases are considered potentially problematic in the light of the Child Care and Family Care Leave Act.

11. Disability

Since it is indisputable that physical or mental disability can be a factor causing a negative effect in an employee's ability to work, the three cases of employment termination citing reduced ability to work caused by disability may be considered to come within the definition of "ability-related" dismissal in a broad sense. At the same time, they also constitute discrimination against those with a disability.

Related to this, there was one case of "Ordinary dismissal resulting from poor attendance due to the worker's child's disability" (settled for 300,000 yen).

12. Age

There were 11 cases of termination of employment based on age, mostly involving non-regular workers for whom no mandatory retirement age was defined. Cases where increasing age is cited as a factor in reduced ability to work can be categorized as "ability" related. Ages used as reasons for termination tended to be high (65-70), which indicates that the dismissal would have been considered rational if the company had a mandatory retirement system or continued employment system in place.

13. Racial Discrimination

There was one unusual case citing "Ordinary dismissal of non-Japanese employee due to not wanting to work with him" (non-participation).

14. Management

The categories above all relate to the behavior or attributes of the employee. Reasons relating to organizational management are, however, obviously the most common in incidents of termination, with a total of 218 cases (144 cases in real terms, if counting each case per company) recorded. Divided by type of employment status, these cases can be seen as

follows.

i. Termination of employment of temporary workers for management reasons: In the case of registered temporary workers, most terminations occur for reasons relating to the company to which they are dispatched, rather than for reasons relating to the temporary agency that placed them in post. Of the 36 cases (33 in real terms) relating to such employees, 16 (13 in real terms) involved midterm dismissal—almost the same number as those involving non-renewal at the end of a contract period (15 cases).

ii. Termination of the employment of directly hired non-regular employees for management reasons: Comparing the number of incidents of midterm dismissal with those of non-renewal at the end of a contract period for directly hired non-regular employees (part-timers, casual staff, and fixed-term contract staff, etc.) shows that of 61 cases overall (41 in real terms), 32 cases referred to the former (22 in real terms) and 27 to the latter (12 in real terms). This shows that there was a slightly higher incidence of cases of midterm dismissal.

iii. Termination of employment of regular employees for management reasons: There were 109 cases of termination of employment of regular employees for management reasons (58 in real terms). Regular employees cannot have their employment ceased at the end of a contract period, but seven of these cases did involve the withdrawal of tentative hiring decision before the period of employment actually began.

Eleven cases cited management-related reasons as the cause of termination of employment, but whether or not this was the true reason for termination was considered doubtful.

15. Disputes Relating to Employment Status

Four cases involved a dispute over employment status as their main point of disagreement.

16. Quasi-Dismissal

Quasi-dismissal is defined as a case in which the employee is stated to have resigned for personal reasons, but in fact has been pressured into resignation by the behavior of his/her employer. Forty-seven such cases were recorded. Broadly categorized according to the cause of the pressure to resign, they can be viewed as follows.

i. Bullying/harassment was the cause in 17 cases. This reflects only the number of cases in which employees resigned for personal reasons as a result of bullying/harassment, and in which conciliation was subsequently requested in the termination case caused by resignation for personal reasons. In many more cases, bullying/harassment was given as the reason for the resulting resignation.

ii. Change in employment conditions: Nine cases involved transfer, eight involved

disadvantageous changes to wages or other working conditions, and two involved change in employment status, giving a total of 19 cases. These cases are linked to those described in "3. Refusal to accept change in working conditions" and "4. Notification of change or termination."

iii. Eight cases related to trouble in the workplace.

iv. Three additional cases were considered apparent quasi-dismissal, but involved situations that were unclear.

17. Miscommunication

A relatively large number of 17 cases involved termination of employment for no clear reason originating with either the employer or the employee. These cases rather appeared to involve miscommunication between the two parties, resulting in termination.

18. Retirement Problems

In eight cases, the justification for termination of employment was not in itself listed as a problem, but disputes centered on refusal by the employer to accept resignation; the date, format or reason for termination; or the amount of compensation paid.

19. Reasons Unknown

In 26 cases, while there must have been a reason for the termination of employment, the reason was impossible to establish based on the conciliation documents.

20. Collective Mediation Application

Whilst not a termination category in and of itself, a significant number of conciliation application cases (25, or 121 if counting the individual employees) involved multiple employees applying for conciliation in regard to the same workplace within the same company. Of these, cases relating to termination for management reasons and changes in working conditions by nature not only apply to individual employees but also are shared by their co-workers, and as such bear the attributes of collective labor relations problems. Companies with collective labor relations frameworks in place, such as labor unions, should use these frameworks to implement deliberation and negotiation on such matters in order to find a solution. Alternatively, the Labor Relations Committee or other collective labor dispute resolution system should be involved in finding a resolution for such cases.

IV. Analysis of Cases of Bullying/Harassment

A total of 260 cases were recorded citing bullying/harassment. When categorized according to the perpetrator, the most typical pattern was (a) supervisory employees bullying subordinate employees (44.4% of cases), followed by (b) senior employees or co-workers (27.1%), and (c) company directors (17.9%). When categorized according to victim, (a)

bullying of women accounted for 54.6% of cases, significantly higher than the 42.6% of overall conciliation cases in which women were the victims. In cases involving women, their family situation (having children, being a single mother, being divorced) often played a part in their being subject to bullying. In addition, (b) there was a somewhat disproportionately high number of cases involving non-regular employees, and (c) a noticeable number of cases involved disabled employees.

Categorized according to type of behavior, bullying cases can be broken down as follows: (a) cases involving physical harm (violence, injury, etc.), (b) cases involving mental harm (verbal abuse, profanity, criticism, discrimination, prejudice, invasion of privacy, ignoring, etc.), and (c) cases involving social harm (not being given work to do, etc.). Some cases referred for conciliation also involved relatively minor petty behavior, which should not really be classified as bullying/harassment.

In many cases, the victims of bullying incidents had approached a superior or the company in the first place, but most times this consultation had failed. Few cases involved a labor union; almost none of those that did actually reached a solution that way. It may be the case that the referral to the labor bureau was only made because the labor union could not resolve the dispute.

Among the effects of bullying on the victim, (a) the impact on mental health was significant. Around 30% of all cases involved the victim being diagnosed as having some sort of mental health problem by a doctor, or identifying it in himself/herself. For this reason, many of the applicants chose not to pursue a potentially time-consuming legal action, but rather to use the labor bureau conciliation system in order to reach a swift solution, thereby allowing them a fresh start to concentrate on their treatment. In addition, (b) the impact on employment status was also clear in many cases, with victims either being forced to resign as a result of bullying, or being dismissed (or refused the renewal of contract) as a result of seeking advice relating to bullying.

V. Analysis of Cases of Reduction in Working Conditions

Some 129 cases dealt with reductions in working conditions. Categorized according to cause of dispute, there were 21 cases of wage reduction due to change in job type, transfer within and beyond company; 18 cases of wage reduction due to reduction in working hours or number of days worked; 12 cases of wage reduction due to downturn in business; 10 cases of wage reduction based on performance evaluation; seven cases of wages being different to those agreed on hiring; six cases of wage reduction due to change in employment status (regular employee → non-regular employee); three cases of wage reduction as a result of change in wage system (monthly wage → hourly wage); two cases of wage reduction resulting from demotion; six cases of reduced or unpaid bonuses; three cases of the non-payment of commissions; two cases of reduction in benefits; and 12 cases of wages being reduced for other reasons.

In cases relating to retirement payments, seven involved the non-payment or reduction of retirement payments due to dismissal, three involved a reduction based on performance evaluation, three involved non-payment or reduction due to a downturn in business, and six cases involved reduction in retirement payments for other reasons. Eight other cases involved a reduction in conditions related neither to wages nor retirement payments.

Categorizing the 34 resolved cases among these according to type of dispute resolution resulted in (a) four cases (all involving regular employees) which resulted in the removal of reductions to working conditions and ongoing employment; (b) five cases where ongoing employment was requested, but in the end a settlement payment was accepted and the employee resigned; (c) six cases where ongoing employment was not requested, a settlement payment was accepted, and the employee resigned; (d) 14 cases in which, after resignation, an application for conciliation was made and a settlement payment was accepted (this being the largest category within the resolved cases). Additionally, (e) four cases relating to retirement payments were settled, reversing the non-payment or reduction of retirement payments, and (f) one case resulted in resignation without the acceptance of a retirement payment.

VI. Analysis of Individual Dispute Cases Involving Tripartite Labor Relationships

There are five categories included in the term "tripartite labor relationships"—temporary agencies, subcontractor companies, employment brokers, individual subcontractors, and "other." There were 270 such cases—around 25% of the total. Of these, 48.9% of cases involved dispatched workers, while 40.4% involved subcontracted work (employees of a subcontractor).

Tripartite labor relationships are the cause of a large number of disputes, but a high proportion of these disputes are resolved, and only a small proportion are abandoned as a result of non-participation of the accused party. There is, however, a trend towards financial settlements being low, as when dealing with directly hired non-regular employees.

In cases of employment termination, employees working under tripartite labor relationships are generally placed in an unstable position, with the danger of their employment being terminated at any time at the mercy of the company for which they are working. Furthermore, in the case of registered temporary workers, many cases included a dispute regarding to the introduction of a new work placement at the point at which their employment was terminated.

In addition to this, temporary workers appear more likely to be involved in disputes within the workplace environment, such as those categorized as bullying/harassment, and in a number of such cases, conciliation applications are filed with workplaces to which workers are dispatched.

VII. Continuing Research

The Japan Institute for Labour Policy and Training's Department of Labour Laws and Industrial Relations has gone on to analyze the contents of individual resolution cases during fiscal 2010, and has compiled information relating to quasi-dismissal of employees who were subjected to bullying and therefore resigned, even though there was no actual dispute regarding the termination itself, cases relating to mental health, cases relating to transfer, cases in which employees are requested damages, and cases of employees engaged in trial work periods, among others.

Working Hours of White-Collar Workers in Terms of Work Characteristics and Personal Characteristics

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In order to explore factors causing long working hours, we conducted a survey by interview targeting white-collar workers and reanalyzed data obtained through the survey by questionnaire that we had conducted previously. The results of the interview suggest that the length of working hours vary depending on (i) work characteristics, such as ways of working and relationships with customers, (ii) management of the working staff of a company, such as the workforce and working hours, and (iii) personal characteristics of each worker, such as their willingness to work. We analyzed the factors (i) and (iii), which can be ascertained quantitatively by using surrogate indicators. As a result, we found out that work characteristics affect male workers to some extent, while personal characteristics have rather clear influences on both male and female workers. That is to say, the strength of one's work-oriented attitude affects the length of the total actual working hours.

I. Objectives of This Study

Various surveys we have conducted so far revealed that the top reason for working overtime is that the workload is too heavy to finish within the prescribed working hours (hereinafter referred to as a "heavy workload").

A heavy workload may arise due to a lack of working staff, which results in an increase in each worker's workload, or, in some cases, members of the working staff with a specific capacity or skill may be intensively assigned a heavier workload.

However, it is difficult to objectively measure a heavy workload in numerical terms. In order to objectively measure workloads, we have to examine how many workers spent how many hours to achieve certain performances at a workplace during a certain period of time, under the assumption that all of the working staff have capacity and skills of the same level. In reality, however, each worker's capacity and skill level is different, and therefore a heavy workload concentrates on specific workers. Furthermore, workers who always seek higher-quality results than necessary may unnecessarily increase their workload on their own, compared with those who do not. Means to measure workloads may also differ by workplace or by the content of the work in question.

Therefore, this study does not directly deal with workloads, but tries to explore the causes of long working hours which are common to those working long hours regularly. The major objective is to ascertain the generalizability of those common causes, as explanatory variables, to wide-ranging workers. In this process, we also aim to clarify the necessity of further research into this issue. For that purpose, we employ the following two means.

One is an interview with workers working for a major IT company. We considered that interviews would be more effective than a survey by questionnaire for examining qualitative matters, such as each worker's way of working and their awareness toward work. It is also important to conduct surveys with multiple companies and compare the results by industry and company, but we thought it more appropriate to start with the examination of multiple workers working for a specific company, where the same personnel system is adopted. Therefore, we conducted an interview of ten white-collar workers working for a major IT company representative of Japan.

The other is reanalysis of the past questionnaire results, also based on the results of the interview, to explore in more detail what type of workers are apt to work long hours. We used the micro-data of the surveys we had conducted in the past, and therefore, we could not add new survey items. However, as will be explained later, we focused on features of each worker's ways of working and their willingness to work, which were revealed through our interview, and studied how these features affect their working hours.

II. Survey by Interview

We conducted an interview of ten white-collar workers working for a major IT company, with regard to their work content, ways of working, and working hours.[1] The following are the outline of the interview. Major features of the interview subjects are shown in Table 1.

A and B are sales staff engaged in the "solution sales business," dealing with customer companies' IT equipment and communication networks as a whole, instead of selling single items. They need to handle diversified requests from customers, as well as deal with highly specialized issues such as IT systems. They often have to communicate and coordinate with other departments of the company. Their duty is categorized as consulting work, rather than sales work, requiring a lot of liaison work within the company. A says that increasing new working staff alone is not a solution, as such staff need to be trained. A also points out the problem of the management of supervisors, stating that they should accurately grasp the workloads of their subordinates and make proper judgment on what work to do. B does not work as many hours as his/her subordinate, A. B seems to be aware of the problem of his/her management, but is not willing to change work process due to the shortage of labor, as well as the nature of the duties at hand, which require a lot of liaison work.

C and D are engineers belonging to the development department. D is C's supervisor. This department seems to be a rather busy section, compared with the research department mentioned later. While competition with rival companies has intensified and cost reduction

[1] This paper is a summary of the discussion paper no. 10-02 "Working Hours of White-collar Workers in Terms of Work Characteristics and Personal Characteristics," (Ogura and Fujimoto 2010), the Japan Institute for Labour Policy and Training

Table 1. Major Features

Person	Academic degree	Age	Service years	Mana-gerial post	Job category	Working hour system	Work hours Arrival/Leaving time
A	Bachelor	31	9	×	Solution sales	Discretionary work system	8:30-22:00 (Normally) 8:30-24:00 (Busy periods)
B	Bachelor	39	17	○	Solution sales	Supervising personnel	8:30-20:30 (Normally) 8:30-21:30 (Busy periods)
C	Master	32	8	×	Development	Discretionary work system	8:50-21:30 (Normally) 8:50-23:00 (Busy periods)
D	Bachelor	39	17	○	Development	Supervising personnel	8:50-23:00 (Normally) 8:50-24:00 (Busy periods)
E	Bachelor	35	10	×	SE	Discretionary work system	9:30-22:00 (Normally) 9:30-24:00 (Busy periods)
F	Bachelor	39	17	○	SE	Supervising personnel	9:30-21:30 (Normally) 9:30-22:00 (Busy periods)
G	Master	35	10	×	Application research	Discretionary work system	8:50-19:00 (Normally) 8:50-22:00 (Busy periods)
H	Ph. D.	37	8	×	Application research	Discretionary work system	8:30-19:00 (Normally) 8:30-21:30 (Busy periods)
I	Master	42	18	○	Application research	Supervising personnel	8:00-19:00 (Normally) 8:00-24:00 (Busy periods)
J	Ph. D.	49	24	○	Basic research	Supervising personnel	7:45-17:35 (Every day)

of Interview Subjects

Nature of job	Problems concerning workload (personnel)	Willingness/Awareness
Coordinating various requests from customers with the many departments of the company.	Always lacking in personnel, but increasing new working staff alone is not a solution.	Colleagues often point out that I am too serious.
Attending several meetings every day.	Always lacking in personnel.	Aiming to achieve 80%.
Short job cycle. Often needs to coordinate with partner companies.	Working overtime is a must. All staff work overtime.	Want to go home earlier. Aiming to achieve 80%.
Endless job, as always required to reduce time and cost.	"Administrative time" sometimes exceeds 130 hours per month.	Want to go home earlier.
At the mercy of customer companies.	Lacking in personnel due to low unit prices of orders	Always working overtime in response to sudden requests.
Manager of the overall system.	Workload imbalance due to required speed and cost. Lacking in an environment to foster personnel.	Want to go home earlier. Company regulations function well.
Spending nearly three years for one product. Attending academic meetings and writing articles are also part of the job.	Although there is clerical staff, the scope of their work is limited and I sometimes handle clerical work by myself.	It is difficult to enhance production efficiency by reducing working hours for research work.
Nearly one year on one cycle. Commercialization of research results is a long way off.	I can handle the job on my own, although often not as previously scheduled.	Do not want to be regarded as inefficient.
Professional manager. Coordinating the overall team.	A lot of paperwork, but not so much as at other departments.	It is not always preferable that conversation among workers reduces (due to the limitation on working overtime).
A top-level reseacher in the industry. Supervisory personnel.	Lacking in personnel, but working staff cannot be increased all the time.	I do not highly evaluate working overtime but give it some consideration.

and speeding-up has come to be required concurrently, workers are forced to work long hours regularly, often exceeding the company's so-called "administrative time." [2] Worker-hours in the original schedule include the calculated number of personnel, which is beyond the real number. However, the specifics of the actual work differ from calculated worker-hours and workers have to do overtime so as to keep up with the original schedule. Nevertheless, workloads for respective personnel are often too much and they have no choice but to delay the schedule as a last resort.

E and F are system engineers. F is E's supervisor, but E is also in a managerial post, leading the heads of partner companies (subcontractors). Staff of this department also work long hours regularly. Unlike other departments and job categories, this department is at the mercy of requests from customer companies. As E and F actually work mainly at establishments of customer companies, their working hours depend on those of the respective customer companies. System replacement is often carried out on holidays or after midnight, and the need to respond to sudden changes in specifications or other various troubles makes it difficult for them to decide their working hours autonomously. Depending on unit prices of orders, personnel that can be input are relatively limited, which may also have negative effects.

G, H, and I are researchers belonging to the application research department. I is the supervisor of G and H. Job cycles are relatively longer at their department, compared with other departments, and they seem to have leeway in their working hours, except for certain periods. However, they are researchers and making presentation at academic meetings and writing articles are part of their important duties. They often spend time studying at home for that purpose and cannot clearly draw the line between work and research, feature unique to the staff of this department. We also have to take note of the observation that the nature of research work makes it difficult to enhance production efficiency only by eliminating useless duties. Judging what is useless is a hard task. Furthermore, I, who basically serves as a professional manager, points out the problem of busy paperwork.

J is a researcher belonging to the basic research department. Being personally famous as a researcher in academic circles, J conducts research personally and at the same time has to provide advice to his/her subordinates and assess their performance. J does not place so much importance on the length of working hours to evaluate research performances but does not seem to ignore it either. J points out that companywide regulations on working hours (for the purpose of reducing overtime work) may enhance productivity per unit of time in the short run, but the productivity may decline again in the long run.

As interview subjects, we asked for the cooperation of those who are in managerial posts and those not, from the solution sales department, development department, SE

[2] The company has adopted a system under which it ascertains the number of hours each worker spends at his/her workplace, from arrival time to leaving time, instead of his/her actual working hours. If the number of hours exceeds the prescribed maximum, the personnel department warns the relevant workers and recommends that they schedule an interview or receive medical check-ups.

department, and research department of the company, with a view to ascertain to what extent the differences in white-collar workers' job categories can reveal the differences in their work characteristics (such as ways of working) and in their personal characteristics (such as their awareness toward work). From such viewpoints, the following qualitative features can be pointed out.

(i) Relationships with customers, other departments of the company, and partner companies have a significant influence on the working hours of staff members and their ways of working (in the solution sales department, SE department, and development department). If such relationships are not strong, working hours can be decided under workers' discretion and are less prolonged (in the research department).

(ii) Although wasteful working practices and the lack of personnel for relatively easy work are pointed out (in the solution sales department and development department), concrete solutions have not been worked out or implemented.

(iii) Almost all departments are aware of the shortage of personnel. As pointed out by Sato (2008), gaps between original schedules and actual work after receiving orders are seen in various departments of the company. However, the point is that, in spite of suffering from personnel shortage, they do not consider it a solution to just increase the number of workers. They are in favor of accepting new personnel with the capacity and skills of a certain level, but share the idea that it is troublesome if they have to accept and train unskilled new recruits.

(iv) The company has adopted a system to ascertain the number of hours all workers spend at their workplaces and warn those who exceed the prescribed administrative time. This system and other companywide efforts to reduce overtime work have contributed to the reduction in the number of working hours of those who are not in managerial posts, in particular.

(v) Almost all the survey subjects reply that they do not aim to get a perfect score in pursuing their duties. Even those who seem to the author to be a model of sobriety say that they aim to achieve around 80% (not specifically stating numbers). They all feel strong satisfaction with their present job, but those who regularly work until late at night or on holidays say that they want to go home earlier and get more rest. In contrast, a person who now works shorter hours than in the last year states that he/she would have nothing particular to do outside of work, even if his/her working hours further decrease.

(vi) All the interview subjects are employed under the discretionary work system or are in managerial posts (treated as supervising personnel), but none of them change their arrival time or leaving time flexibly.

Among (i) to (vi) above, (i) and (ii) are considered to show characteristics related to ways of working and relationships with customers (hereinafter referred to as "work characteristics"). It is pointed out in (iii) that the number of personnel is not enough for any

of the surveyed departments to completely avoid overtime work, yet at the same time not just anyone would be willingly accepted as new additional. Item (iv) touches on the issue of companywide management of working hours. Therefore, these are related to long-term and constant issues of the company's management of working staff. Furthermore, (v) and (vi) indicate characteristics of workers, who do not fully utilize their flexible working hour system, complaining of long working hours but taking for granted overtime work and work on holidays to some extent; such individuals usually aim to achieve 80% in their work (qualities hereinafter referred to as "personal characteristics").

The issue mentioned in (iii) is the personnel shortage, but this does not merely mean the shortage in number but also the scarcity of personnel with the capacity and skills of a certain level. The fact that many companies consider overtime working hours as the major means of employment adjustment suggests their strong guarantee of employment for full-time workers (Ogura and Fujimoto 2007). However, the interview results also reveal the necessity to allot specific personnel to specific types of jobs.

III. Quantitative Analysis

1. Scope of the Analysis

We made a comparison between our target company and other major IT companies through consulting with persons from other companies' personnel departments, and confirmed that the target company is not exceptional. Cases of the target company may not represent those of all Japanese companies but may serve as a useful reference, showing the example of a major manufacturer where various types of white-collar workers work. In this sense, the issue mentioned in (iii) above is an essential cause of prolonged work commonly observed in many Japanese companies. Nevertheless, it is very difficult to explore this issue by analyzing the micro-data of the questionnaire, whose subjects were individual workers. This is because the capacity and skill level of respective workers cannot be properly relativized and the differences between companies' original schedule on personnel management and their actual situations are not clear. Therefore, we have no choice but to limit the scope of the analysis.

Still, we can analyze work characteristics (as mentioned in [i] and [ii]) and personal characteristics (as mentioned in [v] and [vi]) to some extent, based on responses of individual workers. It is important to ascertain whether larger number of white-collar workers share the same work characteristics and personal characteristics. Except for a report by Sato (2008), the relationship between working hours and the factors of work characteristics and personal characteristics have rarely been examined quantitatively. We tried to analyze such relationship to the extent possible, based on the micro-data of the questionnaire we conducted.

We used the micro-data compiled by the Japan Institute for Labour Policy and Training (2009). The survey was conducted for the purpose of grasping the actual state of

diversification of working places, such as telework, and diversification of working hours, including the discretionary work system and systems for managerial employees. It also included questionnaire items relating to work characteristics and personal characteristics, which are the very themes of this paper. These micro-data are the best sources available at present.[3]

2. Definition of Variables[4]

"Work characteristics" refers to ways of working and maintaining a relationship with customers. The questions relating to this topic are those asking about (i) discretion over one's work[5] and (ii) flexibility of workplace.[6] Unfortunately, as the questionnaires do not include questions for measuring the level of relationships with customers, other departments of the company, and partner companies, we used the above two factors (i) and (ii) as variables mainly relating to ways of working. With regard to personal characteristics, various awareness-related question items are possible, but the questionnaires contain no questions asking about workers' ideas to aim to achieve 80% as mentioned above. The questionnaires ask about various types of worker satisfaction and stresses, but these can be used as dependent variables rather than as explanatory variables, indicating the results rather than causes of prolonged working hours. Therefore, as a surrogate indicator for personal characteristics, we used (iii) work/leisure-orientedness.[7] This question asks for

[3] Questionnaires were sent by mail to 8,000 cooperative monitors of a survey company, selected by gender and age group from among "employed" people aged 20 to 59 who are "mainly working" based on the National Census in 2005. The collection rate was 88.2% (7,056 respondents). The data were compiled for a total of 6,430 regular employees, excluding those who were not regular employees as of the time of conducting the survey. For other details of the survey, see the Japan Institute for Labour Policy and Training (2009).

[4] This paper considers the following as "white-collar workers": "those in charge of general affairs (general affairs, personnel affairs, accounting, etc.)"; "those engaged in sales work (sales and marketing)"; "clerical specialists (those specializing in survey analysis, patent legislation, etc.)"; "technical specialists (those specializing in research and development, design, system engineering)"; and "those engaged in medical or educational work (those specializing in medical services, education, etc.)." The survey originally included "general clerks, reception clerks, and secretaries," "customer service staff," "field management and supervision staff," "manufacturing and construction staff," "transportation and driving staff," "security and cleaning staff," and "others," but these are excluded from the target population for this study.

[5] The question is "How much discretion do you have over your work schedules and procedures?" The answer was chosen from among "[1] Considerably," "[2] To some extent," "[3] Not much," and "[4] Very little."

[6] The question is "To what extent can you do your work outside of your usual workplace, such as on a train or at a coffee shop?" The answer was chosen from among "[1] Considerably," "[2] To some extent," "[3] Not much," and "[4] Almost impossible."

[7] The question is "Please check the one that is most applicable to your idea concerning the balance between work and leisure." The answer was chosen from among "[1] I feel a strong motivation toward work and devote all my energy to it," "[2] I devote my energy to work but also enjoy leisure at times," "[3] I think that both work and leisure are equally important," "[4] I always try to finish work as soon as possible to enjoy leisure," "[5] I seek satisfaction in leisure rather than in work."

respondents' individual idea concerning the balance between work and leisure, separately from other questions, and can be used as an explanatory variable.

3. Comparison of Mean Values

Table 2 below shows the mean values of the total actual working hours per month[8] by gender and job category of white-collar worker. For both male and female workers, those engaged in sales work and medical or educational work generally work long hours. Working hours of male workers engaged in sales work are significantly-longer compared with other job categories, except for medical or educational work. Working hours of male workers engaged in medical or educational work are significantly longer than those of workers in charge of general affairs and clerical specialists. No significant differences are observed among working hours of those in charge of general affairs, clerical specialists, and technical specialists. Female workers engaged in sales work generally work longer hours than those in charge of general affairs, and the same applies to female workers engaged in medial or educational work.

Table 3 shows discretion over one's work by gender and job category. Comparing the male total and the female total, the percentage of those replying "Considerably" is slightly higher for male workers, and that of those replying "Very little" is slightly higher for female workers. This indicates that male workers generally have greater discretion than female workers (or a larger number of male workers replied that they have considerable discretion). Regarding male workers, the percentage of those replying "Considerably" is the highest for clerical specialists, and the lowest for those engaged in medical or educational work, with a gap of over 20 points. As for female workers, the percentage of those replying "Considerably" is the highest for those in charge of general affairs and the lowest for clerical specialists, with a smaller gap of around 14 points.

Table 4 shows flexibility of workplace by gender and job category. Comparing the male total and the female total, the percentages of those replying "Considerably" and "To some extent" are slightly higher for male workers, and the percentage of those replying "Almost impossible" is higher for female workers. Male workers generally enjoy higher flexibility of workplace than female workers. Among male workers, the percentage of those replying "Considerably" is the highest for clerical specialists and the lowest for those in charge of general affairs. The percentage of those replying "To some extent" is also rather

high for clerical specialists. This suggests that male clerical specialists are highly more likely to work outside of their usual workplace than those classified into other job categories. Female workers show different trends, with the percentage of those replaying

[8] The total number of actual working hours during July 2008 (for one month), including hours spent working overtime (with and without pay). Hereinafter, the term " total actual working hours" as used in this paper means the same. In terms of the total working hours for one month of regular employees, 365 cases of less than 80 hours and 11 cases of 600 hours or more are recognized as statistical outliers and are treated as missing values.

Table 2. Multiple Comparison of the Total Actual Working Hours per Month by Job Category

Male			Female		
A	B	Differences (A-B)	C	D	Differences (C-D)
General affairs	Sales work	-17.4 **	General affairs	Sales work	-14.8 **
Mean value = 201.7	Clerical specialists	2.5	Mean value = 181.2	Clerical specialists	-5.8
N = 323	Technical specialists	-6.5	N = 264	Technical specialists	-5.9
	Medical/educational work	-15.9 **		Medical/educational work	-15.4 **
Sales work	General affairs	17.4 **	Sales work	General affairs	14.8 **
Mean value = 219.1	Clerical specialists	19.8 **	Mean value = 196.0	Clerical specialists	9.0
N = 887	Technical specialists	10.9 **	N = 201	Technical specialists	8.9
	Medical/educational work	1.4		Medical/educational work	-0.6
Clerical specialists	General affairs	-2.5	Clerical specialists	General affairs	5.8
Mean value = 199.2	Sales work	-19.8 **	Mean value = 187.0	Sales work	-9.0
N = 107	Technical specialists	-9.0	N = 26	Technical specialists	-0.1
	Medical/educational work	-18.4 *		Medical/educational work	-9.6
Technical specialists	General affairs	6.5	Technical specialists	General affairs	5.9
Mean value = 208.2	Sales work	-10.9 **	Mean value = 187.1	Sales work	-8.9
N = 778	Clerical specialists	9.0	N = 93	Clerical specialists	0.1
	Medical/educational work	-9.4		Medical/educational work	-9.5
Medical/educational work	General affairs	15.9 **	Medical/educational work	General affairs	15.4 **
Mean value = 217.6	Sales work	-1.4	Mean value = 196.6	Sales work	0.6
N = 252	Clerical specialists	18.4 *	N = 363	Clerical specialists	9.6
	Technical specialists	9.4		Technical specialists	9.5

Source: From survey data by the Japan Institute for Labour Policy and Training (2009).

Note: **: P<0.05; *: P<0.1.

Table 3. Discretion over One's Work by Gender and Job Category (%)

	Considerably	To some extent	Not much	Very little	Total	N
Male						
General affairs	28.5	51.2	17.6	2.6	100.0	(340)
Sales work	31.5	54.3	11.1	3.1	100.0	(922)
Clerical specialists	38.4	46.4	14.3	0.9	100.0	(112)
Technical specialists	25.7	53.5	16.3	4.5	100.0	(795)
Medical/educational work	17.4	53.6	23.8	5.3	100.0	(264)
Total	28.0	53.2	15.2	3.7	100.0	(2,433)
Female						
General affairs	25.8	57.1	13.5	3.6	100.0	(275)
Sales work	21.9	50.2	20.9	7.0	100.0	(214)
Clerical specialists	11.5	65.4	15.4	7.7	100.0	(26)
Technical specialists	22.4	43.9	24.5	9.2	100.0	(98)
Medical/educational work	16.7	53.5	22.5	7.3	100.0	(383)
Total	20.8	53.2	19.7	6.4	100.0	(996)

Source: From survey data by the Japan Institute for Labour Policy and Training (2009).

Table 4. Flexibility of Workplace by Gender and Job Category (%)

	Considerably	To some extent	Not much	Almost impossible	Total	N
Male						
General affairs	4.7	27.4	35.6	32.4	100.0	(340)
Sales work	6.6	34.1	32.1	27.2	100.0	(922)
Clerical specialists	8.0	35.7	24.1	32.1	100.0	(112)
Technical specialists	6.0	31.0	28.5	34.5	100.0	(797)
Medical/educational work	5.7	27.3	28.0	39.0	100.0	(265)
Total	6.1	31.5	30.6	31.8	100.0	(2,436)
Female						
General affairs	3.3	23.0	33.9	39.8	100.0	(275)
Sales work	8.9	29.9	27.6	33.6	100.0	(215)
Clerical specialists	0.0	34.6	26.9	38.5	100.0	(26)
Technical specialists	4.1	25.5	25.5	44.9	100.0	(98)
Medical/educational work	3.4	19.1	26.9	50.7	100.0	(383)
Total	4.5	23.5	28.8	43.1	100.0	(997)

Source: From survey data by the Japan Institute for Labour Policy and Training (2009).

Table 5. Work/Leisure-Orientedness by Gender and Job Category (%)

	[1] I feel a strong motivation toward work and devote all my energy to it.	[2] I devote my energy to work but also enjoy leisure at times.	[3] I think that both work and leisure are equally important.	[4] I always try to finish work as soon as possible to enjoy leisure.	[5] I seek satisfaction in leisure rather than in work.	Total	N
Male							
General affairs	2.6	26.2	40.3	23.5	7.4	100.0	(340)
Sales work	2.9	25.9	43.8	20.7	6.6	100.0	(922)
Clerical specialists	3.6	25.9	43.8	20.5	6.3	100.0	(112)
Technical specialists	2.1	21.8	44.5	24.4	7.2	100.0	(795)
Medical/educational work	3.4	35.2	36.4	18.6	6.4	100.0	(264)
Total	2.7	25.6	42.7	22.1	6.9	100.0	(2,433)
Female							
General affairs	1.1	19.6	48.0	24.4	6.9	100.0	(275)
Sales work	0.9	21.0	41.1	30.8	6.1	100.0	(214)
Clerical specialists	0.0	26.9	50.0	19.2	3.8	100.0	(26)
Technical specialists	1.0	17.3	40.8	33.7	7.1	100.0	(98)
Medical/educational work	2.6	21.9	48.8	21.1	5.5	100.0	(383)
Total	1.6	20.8	46.2	25.3	6.1	100.0	(996)

Source: From survey data by the Japan Institute for Labour Policy and Training (2009).

"Considerably" being the highest for those engaged in sales work and the lowest for clerical specialists.

Table 5 shows work/leisure-orientedness by gender and job category. Comparing the male total and the female total, the percentages of those replying "[1] I feel a strong motivation toward work and devote all my energy to it" and "[2] I devote my energy to work but also enjoy leisure at times" are higher for male workers, while the percentage of those replying "[4] I always try to finish work as soon as possible to enjoy leisure" is

slightly higher for female workers. Among male workers, the percentage of those choosing [1] is the highest for clerical specialists and the lowest for technical specialists. The percentage of those choosing [3] is relatively lower for those engaged in medical or educational work, compared with other job categories. The percentage of those choosing [2] is rather high among those engaged in medical or educational work, as a result of lower percentages of those choosing [3] and [4]. With regard to female workers, the percentage of those choosing [1] is the highest for those engaged in medical or educational work and the lowest for clerical specialists. However, even among clerical specialists, the percentage of those choosing [2] is rather high, while that of those choosing "[5] I seek satisfaction in leisure rather than in work" is low.

4. Regression Analysis

Based on cross tabulation and comparison of the mean values we have made so far, we will next examine how working hours are affected by the differences in discretion over one's work, flexibility of workplace, and work/leisure-orientedness, assuming that the impact of other factors is the same.

The dependent variable here is the total actual working hours (LN), and major explanatory variables are job category, discretion over one's work, flexibility of workplace, and work/leisure-orientedness. In order to adjust other factors' impacts to be the same, annual income (LN), age (LN), being married or single, post, company size, and whether or not the company has a labor union are also input as factors.

Table 6 shows the analysis results for male workers. Looking at major explanatory variables, we found the following:

(i) Although Table 2 shows that working hours are longer for those engaged in sales work than those classified into other job categories, except for medical or educational work, when we assume that the impact of other factors is the same, their working hours turn out to be shorter than those of workers in charge of general affairs. Working hours are also relatively short for technical specialists.

(ii) Discretion over one's work has only a little influence on the mean values of the total actual working hours as mentioned above, but the total working hours of workers who have discretion to some extent tend to be shorter that those of workers who have very little discretion. This suggests the possibility that the level of discretion has certain impacts.

(iii) Regarding flexibility of workplace, working hours are longer for workers choosing "To some extent" and "Not much." Considering that the benchmark is "Almost impossible," it can be construed that the higher the flexibility workers have to work outside their office, the longer hours they tend to work.

(iv) Work/leisure-orientedness shows rather clear tendencies. Compared with the benchmark (workers choosing "[3] I think that both work and leisure are equally important"), working hours are longer for those choosing "[1] I feel a strong

Table 6. Determinant for the Total Actual Working Hours (Male Workers)

Dependent variable: Total actual working hours (LN) Method: 2SLS		N=2104 R^2=0.06 F= 5.24 (P=0.00) Sargan χ^2= 73.29 (P=0.00) Basmann χ^2= 74.49 (P=0.00)		
Explanatory variables		Coefficient value	Standard error	Z-value
Annual income (LN)		0.054	0.038	1.400
Job category {General affairs}	Sales work	-0.039	0.014	-2.830 **
	Clerical specialists	-0.036	0.029	-1.240
	Technical specialists	-0.066	0.016	-4.090 **
	Medical/educational work	0.014	0.015	0.920
Discretion over one's work {Very little}	Considerably	-0.026	0.022	-1.160
	To some extent	-0.046	0.020	-2.230 *
	Not much	-0.030	0.022	-1.340
Flexibility of workplace {Almost impossible}	Considerably	0.013	0.023	0.570
	To some extent	0.021	0.013	1.650 *
	Not much	0.035	0.012	2.960 **
Work/leisure-orientedness {[3] Equal}	[1] Devote all energy to work	0.065	0.030	2.160 **
	[2] Enjoy leisure at times	0.042	0.012	3.400 **
	[4] Finish work earlier to enjoy leisure	-0.023	0.012	-1.850 *
	[5] Seek satisfaction in leisure	-0.058	0.020	-2.920 **
Age (LN)		-0.070	0.013	-5.380 **
Married or single		0.033	0.013	2.560 **
Post {Rank-and-file workers}	Unit head or chief	0.002	0.012	0.170
	Section chief level	0.028	0.016	1.780 *
	Department head level	-0.022	0.022	-0.990
Company size {99 or fewer employees}	100 to 999 employees	-0.011	0.013	-0.880
	1,000 or more employees	-0.046	0.014	-3.310 **
Whether or not the company has a labor union		-0.033	0.011	-2.840 **
Constant term		5.319	0.239	22.260 **

Source: From survey data by the Japan Institute for Labour Policy and Training (2009).

Note :{ }shows the reference group for each dummy variable. **: P<0.05; *: P<0.1.

motivation toward work and devote all my energy to it" and "[2] I devote my energy to work but also enjoy leisure at times," and shorter, in contrast, for those choosing "[4] I always try to finish work as soon as possible to enjoy leisure" and "[5] I seek satisfaction in leisure rather than in work."

Table 7 shows the analysis results for female workers. The findings concerning major explanatory variables are as follows:

(i) Although Table 2 shows that working hours are longer for those engaged in sales work and medical or educational work, when we assume that the impact of other features is the same, working hours of those engaged in sales work turn out to be neither long or short.

Table 7. Determinant for the Total Actual Working Hours (Female Workers)

Dependent variable: Total actual working hours (LN) Method: 2SLS		N=884 R^2=0.05 F= 2.89 (P=0.00) Sargan χ^2= 32.11 (P=0.00) Basmann χ^2= 31.82 (P=0.00)		
Explanatory variables		Coefficient value	Standard error	Z-value
Annual income (LN)		0.045	0.041	1.080
Job category {General affairs}	Sales work	-0.007	0.018	-0.360
	Clerical specialists	-0.062	0.034	-1.820 *
	Technical specialists	-0.036	0.021	-1.720 *
	Medical/educational work	0.033	0.022	1.490
Discretion over one's work {Very little}	Considerably	-0.033	0.029	-1.160
	To some extent	-0.032	0.025	-1.260
	Not much	-0.007	0.027	-0.250
Flexibility of workplace {Almost impossible}	Considerably	0.051	0.041	1.250
	To some extent	0.001	0.017	0.060
	Not much	0.016	0.015	1.020
Work/leisure-orientedness {[3] Equal}	[1] Devote all energy to work	0.119	0.062	1.930 *
	[2] Enjoy leisure at times	0.019	0.017	1.130
	[4] Finish work earlier to enjoy leisure	-0.032	0.015	-2.050 **
	[5] Seek satisfaction in leisure	-0.041	0.027	-1.530
Age (LN)		-0.053	0.015	-3.500 **
Married or single		-0.050	0.014	-3.430 **
Post {Rank-and-file workers}	Unit head or chief	0.003	0.019	0.140
	Section chief level	0.064	0.052	1.240
	Department head level	0.050	0.096	0.520
Company size {99 or fewer employees}	100 to 999 employees	-0.026	0.016	-1.630
	1,000 or more employees	-0.050	0.018	-2.760 **
Whether or not the company has a labor union		0.007	0.015	0.470
Constant term		5.203	0.265	19.620 **

Source: From survey data by the Japan Institute for Labour Policy and Training (2009).

Note: { } shows the reference group for each dummy variable. **: P<0.05; *: P<0.1.

(ii) Discretion over one's work has only a little influence on the mean values of the total actual working hours as mentioned above, and the results of the regression analysis are the same.

(iii) Flexibility of workplace causes certain differences in the mean values of working hours as shown above, but its impact seems to diminish under the assumption that the impact of other features is the same.

(iv) Work/leisure-orientedness causes relatively clear differences, although not as strongly as in the case of male workers. Compared with the benchmark (workers choosing [3]), working hours are longer for those choosing [1] and are shorter for

those choosing [4].

What is common between male and female workers, concerning major explanatory variables, is that being highly work-oriented tends to increase total actual working hours. It is suggested that a greater discretion over one's work serves to shorten total actual working hours in the case of male workers, but not in the case of female workers. Flexibility of workplace seems to have a slight impact on total actual working hours of male workers but has no impact on those of female workers.

Regarding variables other than major explanatory variables, it is found that younger workers tend to work longer hours, irrespective of gender, and that the number of total actual working hours is shorter at companies with 1,000 or more employees than at those with 99 or fewer employees. Male workers at the section chief level generally work longer hours but this does not apply to female workers in the managerial posts. Furthermore, being married is a factor that lengthens total actual working hours of male workers, but this works conversely for female workers, shortening their total actual working hours. In the case of married male workers, their wives are highly likely to take charge over housework and child-care duties, which enables them to work longer hours. In contrast, married female regular workers often bear such duties (on top of work) and inevitably have to shorten their working hours. This also reveals the difference in work-life balance between men and women and the issue of their working hours.

IV. Conclusion

We have analyzed data, mainly aiming to ascertain cause-and-effect relationship between the length of working hours and the factors of work characteristics and personal characteristics. Based on our interview, and the results obtained through the above method, it has become clear that work characteristics have a certain influence on the length of male workers' working hours and that the impact of personal characteristics is more clearly detected both for male and female workers. However, discretion over one's work and flexibility of workplace, which we used as surrogate variables, represent only part of work characteristics that we had supposed they would, based on the interview, and variables related to the level of relationships with customers, other departments of the company, and partner companies, which seem to be more important, are not included. This poses a problem that we need to consider in the future. Nevertheless, work/leisure-orientedness, which is a surrogate variable for personal characteristics, revealed rather clear results. Even when the impact of various features are assumed to be the same, those who are highly work-oriented work longer hours (irrespective of gender), while those (especially male workers) who are highly leisure-oriented work shorter hours.

Some deal with the problem of long work hours only as the problem of legal systems or company personnel management. However, when considering the problem of long work hours, it should be noted that work hours are also affected by personal characteristics, such

as each worker's willingness to work and their level of work/leisure-orientedness. Needless to say, overwork should never be highly evaluated, and there may be some workaholics who are obsessed with the idea that they work long hours because they like it, though this is not the case. However, the analysis results also suggest that it is not a practical solution to utterly deny overtime work even for those who really want to work. We need to conduct further, more multilateral surveys on worker attitudes and ideas toward work and their actual behaviors. This would enable us to examine the relationship between these features and working hours, from such viewpoints as whether certain workers are prone to become workaholic, or whether they are career-oriented. We are going to continue studying how many workers nationwide are like those who replied that they aim to achieve 80%, and more specifically, what ideas they have and how they actually work. At the same time, we are planning to analyze work characteristics in more detail, by adding survey items that ask about ways of working and relationships with customers, other departments of the company, and partner companies, as much as possible.

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JILPT Research Activities

International Workshop

On May 27, 2011, the Japan Institute for Labour Policy and Training (JILPT) held its 11th joint workshop with Korea Research Institute in Seoul, Korea. The event was used as a forum for addressing the theme of long working hours in Japan and Korea. The joint workshop has been held every year since 2001 in order to foster active discussion and deepen bilateral study regarding common policy topics in Japan and Korea. The submitted papers (in Japanese) will be published and are scheduled to be posted on the JILPT website. The list of speakers and submitted papers is as follows:

Kiu-Sik Bae (Korea Labour Institute), *An Analysis on the Current Status of Working Hours and Considerations Related to a Policy of Shorter Working Hours in Korea*

Soo-Bong Uh (Korea University of Technology and Education), *Case Studies into Long Working Hours in the Banking Industry and Automotive Parts Industry in Korea*

Yutaka Asao (The Japan Institute for Labour Policy and Training), *An Analysis of Transitions and Trends in Working Hours in Japan*

Hirokuni Ikezoe (The Japan Institute for Labour Policy and Training), *Regarding Recent Discussions about Legislation and Policies on Working Hours in Japan*

Research Reports

The findings of research activities undertaken by JILPT are compiled into Research Reports (in Japanese). Below is a list of the reports published from December 2010 to May 2011. The complete text in Japanese of these reports can be accessed from the JILPT website (http://www.jil.go.jp/institute/seika.html). We are currently working on uploading abstracts of reports in English onto the JILPT website as well.

Research Reports

No.135 *Work-Life Balance of Small and Medium-Sized Companies in Transition* (May 2011)

No.134 *A Study on the Promotion of Former and New Residents' Moves to Cities Other Than the Three Major Metropolises and Activation of Spontaneous Job Creation to Employ Them* (May 2011)

No.133 *Content Analysis on the Treatment of Individual Labor Disputes Resolution Cases: Quasi-dismissals, Mental Health Problems, Job Transfers, Probationary Periods, and Claims for Compensation against Workers* (April 2011)

No.132 *Research Report on Non-Regular Employment: Focusing on Trends, Equal Treatment, and the Transition to Regular Employment* (April 2011)

No.131 *Human Resources Development at SMEs in the Manufacturing Industry (Machinery and Metals)* (March 2011)

No.130 *Study on Personnel Management and Employment Situation of Fixed Term Full Time Employees* (March 2011)

No.129 *The Potential of Social Enterprises That Assist with the Social Integration of Youth and Related Themes* (March 2011)

No.128 *Job Characteristics, Personal Characteristics, and Working Hours* (March 2011)

No.127 *How Wives View Their Husbands' Working Hours: An Analysis of the Results of a Questionnaire Surveying Wives about Their Husbands' Working Hours* (March 2011)

Discussion Papers

DPS-11-04 *The Results of Career Consulting Using Job Cards* (April 2011), Kimiko Nishimura and Jun Kayano

DPS-11-03 *A Study on the Development of the VRT Card and the Potential for Its Use* (April 2011), Harumi Muroyama

DPS-11-02 *Internal Promotions and Job Transfers in Early Career: An International Comparison of the Transitions of Non-Permanent Employees* (April 2011), Shuichi Hirata and Kazufumi Yugami

Research Series

No.69 *Survey Results on Employment Management and Support for Work-Life Balance in SMEs* (2) (March 2010)

No.66 *Choices in Work Styles for People Past Mandatory Retirement Age: Dealing with Changed Conditions* (March 2010)

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