Hitotsubashi Journal of Economics 49 (2008), pp.109-132.

TRANSFORMING INCENTIVES: ANALYSIS OF PERSONNEL AND EMPLOYEE OUTPUT DATA IN A LARGE JAPANESE AUTO SALES FIRM*

Tsuyoshi Tsuru

Institute of Economic Research, Hitotsubashi University
Kunitachi, Tokyo 186-8603, Japan
tsuru@ier.hit-u.ac.jp

Accepted August 2008

Abstract

This paper analyzes the economic consequences of performance-oriented human resource (HR) system reform at Auto Japan (pseudonym), one of the largest Japanese auto sales firms, using personnel and employee output data. The author overviews the three major components of the HR reform: base wages, performance-based pay, and performance rating systems. Then the author examines the productivity effect of the reform. The performance-based pay system was changed from combining a base wage with a simple performance pay system to a scheme kinked around a draw line (representing aggregate base pay) to strengthen incentives. The introduction of the draw formula performance-based pay system raised the productivity of the new car sales staff, but generally failed to raise the productivity of the used car sales staff. The evidence suggests that while Auto Japan's performance-oriented HR system reform, which was typical of reforms instituted among major Japanese firms in the late 1990s, changed the wage structure and grading pattern of employees, it brought only slight improvement in individual productivity.

Keywords: human resource management, personnel economics, automobile dealership, incentive, performance-based pay, performance rating
JEL Classification: M12, M5, J31, J33

* This paper has benefited from discussions with Masahiro Abe, Tomoko Furugori, Robert Gibbons, Katsuyuki Kubo, Katsuhide Isa, Akinori Isogai, Tatsuya Kikutani, David Levine, David Neumark, and Hideo Owan. The author would like to thank seminar participants at the Aoyama Gakuin University Business Economics International Workshop; Kyoto University; the Research Institute of Economy, Trade, and Industry (RIETI); the 2007 Annual Meeting of Society of Labor Economists held in Chicago; and the Trans Pacific Labor Seminar held at the University of California, Santa Barbara in 2007. This study was funded by the Grant-in-Aid for Scientific Research of the Japan Society for the Promotion of Science (Grant Number: 18530130) and the Nomura Foundation. Also, the author thanks Katsuhito Uehara and Charles Weathers for their outstanding research assistance and editing.

I. *Introduction*

Incentives have been the essence of economics and firm organization. The linkage between performance-based pay and productivity has drawn great interest from both economists and practitioners. However, prior to the 1990s, empirical analyses were scarce due to a lack of data.

The last decade has witnessed the emergence of empirical literature on pay schemes and productivity. Paarsch and Shearer (1999, 2000) compare worker behavior under piece rate and fixed wages, using the personnel records of a Canadian tree-planting firm. Lazear (2000) examines the effect of a switch from an hourly wage regime to a piece rate regime on worker productivity at a U.S. windshield installation company. Bandiera, Barankay, and Rasul (2005, 2007) conduct field experiments which compare relative incentives with piece rate for workers and also compare fixed wages with performance pay for managers at a U.K. producer of soft fruit. Those studies have generally presented evidence that piece rates yield higher productivity than fixed or hourly wages.

The above literature has marked significant progress in investigating the linkage between pay schemes and productivity. However, the literature has been "an excess focus on the contracts of workers for whom output measures are easily observed" (Prendergast 1999:57). In other words, the literature focuses on simple jobs to obtain aggregate measures of performance. However, those types of job do not represent most of the occupations in the contemporary labor market. In this regard, Auto Japan (pseudonym), one of Japan's largest auto sales firms, provides an interesting case because a measure of output is available and the sales job is not simple. The case is also useful for assessing the effect of human resource (HR) system reform since Auto Japan changed its HR system near the mid-point (2000) of the data period (1998-2004).

This paper examines the nature and consequences of performance-oriented HR system reform at Auto Japan. Three major outcomes are identified.

1. The skill grade system was abolished and a job-based system introduced; the latter featured job stages organized in bands, making possible a shift to a new wage system in which base wages could be reduced. As a result, the reform produced substantial wage dispersion, especially among employees under 40.

2. The performance-based pay system was changed from combining a base wage with a simple performance pay system to using a draw line to facilitate refinements in the use of performance pay. The introduction of the draw formula performance-based pay system raised the productivity of the new car sales staff, but failed to raise the productivity of the used car sales staff.

3. The performance evaluation system was changed from using composite skill-and-performance evaluations to emphasizing individual performance. In addition, job stages were determined by performance evaluation results. There were many relatively high evaluation results for employees ranked in low stages, and there were many somewhat low evaluations for employees ranked in high stages.

II. *Investigating the Sales Force Incentives: Review of Accumulated Knowledge*

Two areas of existing research provide important insights for the analysis of the wage determination and productivity for salespersons. One, from economics, is agency theory, and the other, from management studies, is the analysis of sales incentive systems. Both areas of research have developed a sizable literature, but I will focus here on the works critical to analyzing auto dealerships.

1. Agency Theory

Agency theory is the bench-marking theory for analyzing not only sales forces, but also efficiency- and performance-based personnel systems (Milgrom and Roberts 1992; Gibbons 1997; Baron and Kreps 1999; Prendergast 1999). Agency theory examines the problems — due to the incompleteness of contract and asymmetric information — that occur when the employer as a principal hires employees as agents.

There are generally latent conflicts of interest between employer and employee (the agency relationship). In addition, the firm cannot comprehensively monitor the employees' behavior (asymmetry of information), and not all of the behavior required from the employees can be included in the contract (incompleteness of contract). To resolve such agency problems, firms devise incentive and reward systems to motivate employees. Stated differently, what is important is the wage contract devised by the principal to motivate the agent to engage in behavior that upholds the interests of the principal.

Based on Gibbons (1997: 3-4), the core logic in agency theory as it relates to wage contracts can be summarized as follows. The individual wage $\boldsymbol{w}$ is composed of fixed portion α and a fluctuating portion (that changes according to performance indicator $\boldsymbol{Z}$). The reward can be depicted as a linear function of $\boldsymbol{Z}$,

$$\boldsymbol{w}=\alpha+\beta\boldsymbol{Z},$$

where β is an incentive intensity. In this case, the optimal incentive intensity can be expressed as the decreasing function of the degree of the employee's risk aversion and marginal cost of effort, as well as the error variance of performance, under appropriate assumptions.[1] If the employee's risk aversion level is zero, then β is equal to 1, and the optimal effort level is reached. However, since the employee's risk averse level is not zero, β is significantly less than one (trade-off between risk and incentive).

According to Prendergast (1999), however, there is little empirical evidence regarding whether the type of optimal wage contract summarized above can be observed in the real world. Instead, there is evidence that the linking of performance to wages can substantially raise an individual's performance. Paarsch and Shearer (1999, 2000), Lazear (2000), and Bandiera, Barankay, and Rasul (2005, 2007) show that the introduction of performance-based pay has the effect of stimulating employee effort. Their major contribution is to use company

[1] The assumptions include: (a) the employee has constant and absolute risk aversion, and (b) her/his observable performance depends linearly on her/his tasks completed, although the observations typically include a normal error.

personnel data to demonstrate that the introduction of performance-based pay systems can raise individual productivity.

What Lazear (2000) shows, however, is that the sorting effect of performance-based pay is nearly equal to the incentive-enhancing effect. A firm that adopts the piece rate system retains and attracts high performers while low performers quit; as a result, it achieves higher levels of productivity, assuming adequate influence from the external labor market. However, the logic of the sorting effect is not directly applicable to Japan's large enterprises, which hire largely graduating university seniors and guide their skill and career development over the long term in highly developed internal labor markets.

2. Sales Incentive Schemes

Academics conducting research on marketing have utilized the framework of agency theory to examine the incentive system for sales forces. The most important studies include Basu, Lal, Srinivasan, and Staelin (1985), Coughlan and Narasimhan (1992), and Mishra, Coughlan, and Narasimhan (2003). This body of research demonstrates that the performance of salespersons reflects more than just their own effort, and creates models showing how a firm decides on a reward system (composed of a fixed wage and a performance wage) that maximizes firm profits while taking into consideration changes in the effort level of salespersons under conditions of uncertainty. These researchers have sought empirical verification by using firm level data to examine predictions from the theory. For example, they have shown that as the number of phone calls necessary to complete a sale (variance of sales effort) increases, the share of performance pay in total compensation increases as well.

However, empirical analyses examining the relationship between compensation systems and individual performance of sales personnel are lacking. This is unfortunate, because it is possible to observe objective indicators for individual sales performances and salespersons perform a task that is well represented in the labor market. The most closely related research concerns the timing of sales response to non-linear compensation schemes and is performed on industry level sales data by Oyer (1998) and on individual level data for the U.S. Navy recruiters by Asch (1990).

Oyer's (1998) findings are critical. Oyer demonstrates that when a salesperson's sales target is set, and an incrementally increasing, non-linear reward function commission is used, the salesperson responds to the evaluation period (especially toward the end of the period). More concretely, both the timing of customer purchases and the level of effort can be altered. As a result, depending on her/his performance in the first half of the evaluation period, a salesperson may postpone sales to the next period (push-out) or bring sales forward to the present period (pull-in) . Oyer (1998), using industry data, confirms that there are seasonal fluctuations corresponding to the close of the fiscal year, indirectly proving the existence of such phenomenon as push-out and pull-in.

In contrast, Asch (1990) provides more direct evidence of a related phenomenon by using individual data on recruiters for the Navy. The number of new recruits grows as the end of the evaluation periods nears, and then falls off sharply when the period ends. This pattern also persists when the recruiters' length of tenure is taken into account. In short, Asch shows that the productivity of recruiters changes discretely, and that degree of effort is changed at particular points in time according to the situation of the evaluation period.

3. Research Questions

Previous studies have shown that the introduction of performance-based pay can raise the productivity of individual employees. They have also demonstrated, however, that the productivity-raising effect is not primarily attributable to the incentive-enhancing effect on employees within the internal labor market, but rather to the sorting effect operating through the external labor market. Furthermore, the individual performance of sales staff has not been examined in previous studies.

The following sections analyze the incentive mechanisms for the sales staff at one of Japan's largest auto sales firms. The car sales job in Japan constitutes an excellent case for analyzing performance-based pay because it is similar in nature to a professional occupation, but also provides an unusually clear measure of objective performance, namely the number of cars sold by individual salespersons. Personnel practices in Japan's auto sales firms mirror those of the nation's major firms: the firms hire predominantly university graduates as sales staff and utilize highly developed internal labor markets featuring long-term employment. I analyze the changes in employee behavior that occur when a performance-based pay system is introduced into an internal labor market. In other words, I highlight the effect of the introduction or intensification of a performance-based wage system on the behavior of current sales staff.

III. *Auto Japan's Business and Financial Structure and Its Work Practices*

The existing personnel economics literature has rarely analyzed in detail the business and financial structures and work practices of the firms that it has analyzed. There are no clear reasons for this, but it probably reflects economists' tendency to "let the data speak for itself." However, given that personnel and compensation systems are closely related to particular firms' business practices and financial structures, analysis of those factors is essential to this line of research.

1. Business and Financial Structures

Business Structure and Contractual Relationship with the Manufacturer

Auto Japan (pseudonym) is a large auto sales firm that also conducts service and repair and leasing businesses. It had approximately 2,300 employees in 2004. The main business areas include selling and leasing cars made by Nippon Motors (pseudonym), selling parts and supplies, and doing repair and maintenance work. As will be detailed further on, Auto Japan is one of the top-performing retail chains for cars manufactured by Nippon Motors.

In Japan as well as in the U.S., auto manufacturers utilize several distribution channels for selling different models. For example, Toyota has four distribution channels, including Toyota stores (50 dealerships), Toyopet (52), Corolla (74), and Netz (118), for a total of 294 dealerships. Nissan has two distribution channels, Blue Stage (72) and Red Stage (79), with 151 total dealerships. Honda has three channels, Verno (75), Clio (80), and Primo (863), with 1,018 dealerships in all. Auto Japan is one of the largest dealerships among the above.

In November and December, Nippon Motors, the manufacturer, and Auto Japan, the

TABLE 1. FINANCIAL STRUCTURE OF AUTO JAPAN AND OTHER JAPANESE AUTOMOBILE DEALERSHIPS

(unit: million yen)

	1995		2000		2004	
	National Average	Auto Japan	National Average	Auto Japan	National Average	Auto Japan
Sales	8,252	129,724	8,422	137,453	9,679	139,839
Gross Profits	1,279	20,437	1,368	20,716	1,508	19,420
Incentive Payments from the Manufacturer	453	9,410	442	9,570	527	9,899
Total Sales Expenses	1,603	28,096	1,679	27,800	1,890	26,898
General and Administrative Expenses	1,298	21,456	1,325	20,165	1,478	18,786
Personnel Expenses	868	14,949	867	13,740	941	12,180
	(54.1%)	(53.2%)	(51.6%)	(49.4%)	(49.8%)	(45.3%)
Sales Expenses	306	6,640	354	7,635	411	8,112
Operating Profits	122	1,477	129	2,256	145	2,399
Ordinary Profits	73	1,173	109	1,986	133	2,320

Notes: The number of dealerships surveyed by the Japan Automobile Dealers Associations was 1,852 dealers in 1995, 1,628 dealers in 2000, and 1,395 dealers in 2004. The numbers in parentheses indicate the proportion of personnel expenses to total sales, general, and administrative expenses.
Sources: The Japan Automobile Dealers Association and Auto Japan.

dealer, negotiate contracts for the number of new cars and used cars to be sold and services (such as repairs) to be transacted from January through December of the following year. In reality, the sales targets specified in the yearly contract are for planning purposes only. What really matters is the "3-month term demand" sent by the manufacturer to the sales enterprises. These mandate a certain level of business transaction (sales) goals. The manufacturer makes demands in three categories — new car sales, used cars sales, and services — and the parties then negotiate the detailed numerical goals.

However, these numerical goals have little relationship to the sales target specified in the yearly contract. In the case of car sales, the number of cars sold above the manufacturer's demanded goal becomes the actual sales outcome for the year. Auto Japan negotiates seriously over the numerical goals demanded by the manufacturer. Most other sales firms accept automatically the goals imposed by the manufacturer, but Auto Japan takes the stance that after a serious negotiation it will achieve the numerical goals determined in the negotiations.[2]

Financial Structure

As can be seen in Table 1, Auto Japan's sales for 2004 were 140 billion yen (approximately 1.3 billion dollars at the 2004 exchange rate) with an operating profit of 240 million yen (2.2 million dollars). Not shown in this table is that Auto Japan's new cars sales in 2004 were 40,000 while 16,000 used cars were sold. The 2004 earnings of 140 billion yen (1.3 billion dollars) were an increase of 100 billion yen (9 million dollars) over the 1995 figure of 130 billion yen (1.2 billion dollars). The operating profit rose by 9 hundred million yen (82 million dollars), from 1.5 billion yen (138 million dollars) to 2.4 billion yen (220 million

[2] This information is based on an interview with Auto Japan's executive director, managing director, and director of corporate planning (conducted on April 11, 2006).

TABLE 2. CHANGES IN COSTS ASSOCIATED WITH PERSONNEL EXPENSES OF AUTO JAPAN

(unit: million yen, %)

	1995		2000		2004	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
Total Sales, General, and Administrative Expenses	30,170	100.0	32,378	100.0	32,137	100.0
Personnel Expenses	17,001	56.4	18,317	56.6	17,418	54.2
Wages	10,671	35.4	10,486	32.4	10,473	32.6
Bonuses	3,471	11.5	4,285	13.2	3,634	11.3
Sales Expenses	6,640	22.0	7,635	23.6	8,112	25.2
Sales Commisions	817	2.7	1,291	4.0	1,003	3.1
Contest Charges	498	1.7	298	0.9	233	0.7

Notes: Sales, general, and administrative expenses includes wages, bonuses and retirement allowance of the service department employees. Percentage means ratio of each item to sales, general, and administrative expenses.

dollars), but the number of new cars sold fell by some 5,000, from around 45,000 to 40,000. The number of used cars sold remained about the same.

The firm's basic financial approach is, in the words of one of its directors, "make a lot of money, spend a lot of money." In other words, while the gross profit on sales and the incentive payments from the manufacturer are high, sales fees and general operating fees are also high. These points can be verified from Auto Japan's 2004 income statements. The gross profit and incentive payments from the manufacturer combined totaled nearly 30 billion yen (2.8 billion dollars), but sales and general operating fees amounted to 27 billion yen (2.5 billion dollars), leaving only 2.4 billion yen (220 million dollars) in operating profits.

While cause-and-effect is not clear, it is important to notice that the operating profit of 2.4 billion yen (220 million dollars) and the sales incentive payments from the manufacturer of 2 to 3 billion yen (185 to 278 million dollars) are very close. In short, intense market competition has squeezed operating profits to a very low level. However, sales incentive payments from the manufacturer supplement these earnings to some extent.

Shifts in Personnel Expenses

The personnel expenses of Japanese auto dealerships are generally high, due largely to long-term employment practices and a high base pay component in individual wages. As the Japan Automobile Dealers Association data shown in Table 1 indicate, auto dealers' personnel costs amount to about 50 percent of total sales, general, and administrative (TSGA) expenses. Auto Japan is no exception. Its personnel expenses are in the neighborhood of 50 percent of TSGA expenses.[3]

However, as seen in Table 2, the fraction of personnel expenses in Auto Japan's TSGA expenses declined slightly from 56.4 percent in 1995 to 54.2 percent in 2004. Moreover, if we consider only wages and bonuses, the ratio fell from 46.9 percent to 43.9 percent in the same period. This decline was achieved mainly through natural attrition of personnel (from 2,600 persons in mid-1990 to 2,250 in 2004) and not through the 2000 reform of the personnel

[3] A study by the Graduate School of Business, Stanford University (2000) estimates that 21 percent of total expenses of the average U.S. auto dealership is related to payroll expenses.

system.

Let us next examine trends in sales commissions (performance based-pay), which are an important source of the salespersons' income (Table 2) . Throughout the 1990s, sales commissions hovered around the 800 million yen (7.4 million dollars) level. In 2000, when the personnel system reform took effect, the figure shot up to 1.3 billion yen (12 million dollars). This rise is attributable to the effect of the introduction of the new performance pay system, termed draw system, which I examine below.

To sum up, the objective of the personnel system reform was not a short-term reduction of personnel costs. This is indicated by the accounting data. The ratio of personnel costs (not shown in the table) was 56.6 percent in 1999, the year prior to the reform, and 56.2 percent in 2001, the year following the reform. Hence, there was almost no change. The real objective of the HR system reform was a response to the maturity of the automobile sales market in the long run. Put differently, the automobile sales environment in Japan has changed from continuously rising sales towards slow or no growth. Auto Japan intended to cope with this change.

2. Breakdown of Business Objectives and Management of Work Practices

Auto Japan divides its territory into seven zones, with a sales management office in each zone. The chain of command is from Auto Japan's senior sales director to the seven sales management office general managers to the outlet managers. Each sales management office directs from seven to eleven dealer outlets. Each outlet includes a new car sales section, a used car sales section, and a service section. The chain of command runs from section chief (*kacho*) to sales staff. In the service section, it is section chief to "advisor" (the person in charge of handling repair and other services), then service work leader, and mechanic. The numbers vary relative to sales volume, ranging from 13 employees at the smallest outlet to 39 at the largest.

As explained earlier, there are two numerical objectives linking manufacturer and dealer — the annual contracted sales target and the quarterly manufacturer-demanded numerical goals. In accordance with these figures, each outlet has a yearly sales target and a monthly numerical goal. The yearly sales target is presented as the year's objective to be achieved by the end of March, the end of Auto Japan's fiscal year. The monthly numerical goal is presented as a breakdown of the quarterly numerical goals for all products at the regular end-of-month sales meetings, where it is distributed (in printed form) to the participants.

Auto Japan steadily revises its monthly numerical goals in accordance with market conditions, and then breaks down the resulting figures into very specific weekly and daily plans for the new car, used car, and service sections. Each dealer outlet is assigned different sales targets according to car model, but in the end it is the number of cars sold, regardless of model, that is at issue. Auto Japan's largest outlet is given a target of 80 to 90 new cars a month. This figure is apportioned carefully among the salespersons based in large part on past performance. Apportioning monthly numerical goals among sales staff is the most important task of the section manager, who tries to put pressure for better performance on subordinates. Put differently, the section chief needs to know how many "hot" negotiations the salespersons are starting up each week, and about how many cars they can expect to sell every day. For this purpose, a "control board" is set up to keep track of the number of models or cars being sold or seriously discussed with customers. The outlet managers supervise the section managers but

TABLE 3. THE FRAMEWORK OF THE SKILL GRADE SYSTEM

Position Level	Grade	Title	Responsibilities and Skill Level	Length of Service		
				Shortest	Standard	Longest
Mid-Level Managers	7	General Manager	Leadership or highly professional tasks	-	-	-
	6	Deputy General Manager	Higher managerial or professional tasks	3 years	3 years	-
	5		Supplementary performance of high-level tasks[a]	3 years	3 years	-
	4	Section Manager	Managerial or professional tasks	3 years	4 years	-
	3		Supplementary performance of high-level tasks[a]	3 years	3 years	-
	2	Deputy Manager	Planning, coaching and supervisory tasks	3 years	4 years	-
	1		Supplementary performance of high-level tasks[a]	2 years	3 years	-
Non-Managerial Employees	7	Assistant Manager	Assistance of planning, judgment, and coaching tasks	-	-	-
	6		Supplementary performance of high-level tasks[a]	-	8 years	-
	5	Chief	Judgment and simple coaching tasks	2 years	3 years	-
	4		Supplementary performance of high-level tasks[a]	2 years	3 years	-
	3	-	Routine judgment and high-skilled tasks	2 years	3 years	-
	2		Uncomplicated judgment and semi-skilled tasks	2 years	3 years	5 years
	1		Supplementary/uncomplicated and routine tasks	4 years	4 years	5 years

Note:[a] A more concrete and accurate description would be "assists in planning, coaching, and other tasks requiring discretionary judgement."

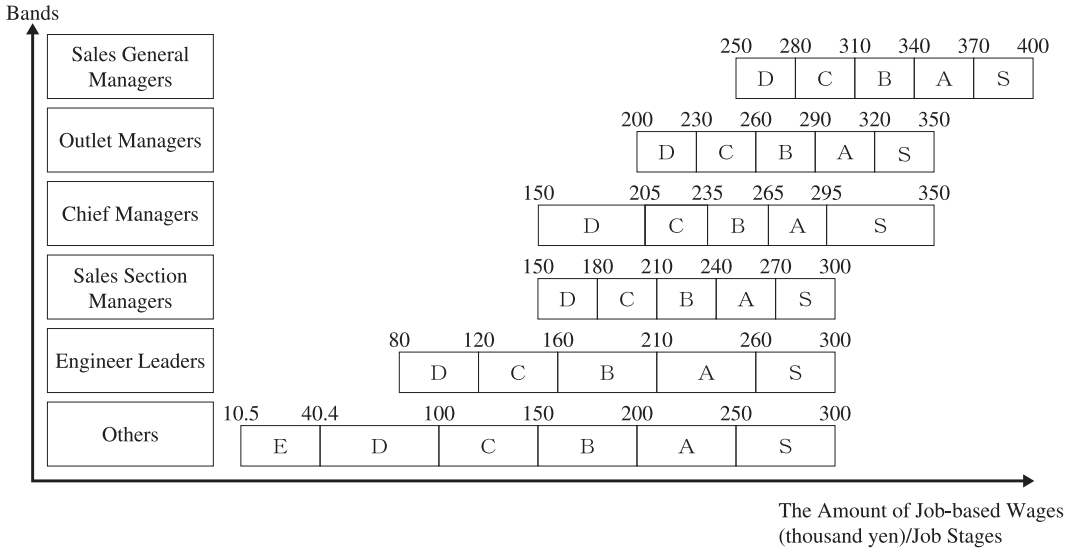
ordinarily do not exercise direct control over the salespersons.[4]

IV. *Outcomes of the Base Wage System Reform*

Auto Japan implemented the 2000 personnel system reform in order to encourage greater variation in personnel expenses, and to change from a seniority-oriented system towards a performance-based system. The first goal (greater variation in personnel expenses) was intended to cope with the change in the automobile sales environment mentioned earlier. For that reason, Auto Japan changed the base wage system. Auto Japan abolished its skill grade system (*shokuno shikaku seido*) and introduced a job-based wage system. In addition, with regard to the job-based wage system, Auto Japan expanded the performance-based component, and switched to a so-called draw formula system (discussed in detail below). In this section, I examine the personnel system reform, starting with the base wage system.

[4] This description of the company's work practices is based on interviews with the managers of three outlets, A, B, and C (May 24, 2006), and on my participatory observation of outlet D's various meetings and business operations (June 8, 2006). D is a middle-ranking (i.e., more or less average) outlet in Auto Japan.

FIG 1. NEW WAGE SYSTEM BASED ON BANDS AND STAGES



1. From the Skill Grade System to the Job-based System

Auto Japan had used the skill grade system (the standard grading system of Japanese firms from the 1970s until recently) since 1980. Auto Japan's internal materials state: "The skill grade system divides employees into ranks (qualification grades) according to level of skill development reflecting the skills necessary to the firm; along with measuring employees' skill development, the skill grade system determines the level of base wages." As shown in Table 3, responsibilities were laid out for each skill/qualification level. The distinguishing characteristic of the skill grade system compared with the U.S. job grade system is that responsibilities are not job-specific, but rather are laid out somewhat abstractly in order to preserve organizational flexibility. There were seven grades for non-managerial employees and seven grades for mid-level managers as well, making a total of 14 grades.

The fundamental change in the 2000 personnel system reform was to abolish the skill grade system and introduce the job-based system. What must be emphasized here is that the meaning of job-based system is totally unrelated to the job grade system typically observed in the U.S. That is, Auto Japan's system is not a job grade system in which a process of job evaluation and analysis is used to create quantitative measures for measuring job size.

Auto Japan has instead established a rank order of positions (bands) which incorporate a sliding scale (stage) within each position (Figure 1). Described from a different perspective, Auto Japan abolished the concept of qualification or grade, in which wage costs easily became fixed. Instead, it has established a fluid wage-adjustment system (a matrix of bands and stages) in which employee ranking corresponds directly to performance and results. This is a very flexible system with regard to wage determination.

TABLE 4. SUMMARY STATISTICS

	Full Sample			New Car Sales Staff			Used Car Sales Staff		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
New Car Sales Staff	5072	0.780	0.414						
Used Car Sales Staff	5072	0.220	0.414						
Length of Service (years)	5072	12.102	9.417	3958	11.397	9.159	1114	14.606	9.884
High School Dummy	5072	0.213	0.410	3958	0.194	0.396	1114	0.281	0.450
Vocational School / Jr. College Dummy	5072	0.168	0.374	3958	0.148	0.355	1114	0.238	0.426
University Dummy	5072	0.594	0.491	3958	0.638	0.481	1114	0.437	0.496
Annual Sales of New Car (vehicles)				3936	64.081	25.925			
Annual Sales of Used Car (vehicles)							1104	99.751	40.419
Annual National Sales of New Car				3958	4,069,001	125,536			
Annual National Sales of Used Car							1114	4,674,686	108,082
Annual National Sales of Used Mini Vehicles							1114	1,510,570	249,726
Annual Total Earnings (yen)	5072	6,536,196	1,871,105	3958	6,534,757	1,910,627	1114	6,541,312	1,724,175
Draw Line (yen)	3491	3,169,145	1,613,791	2727	3,155,614	1,601,750	764	3,217,445	1,656,226

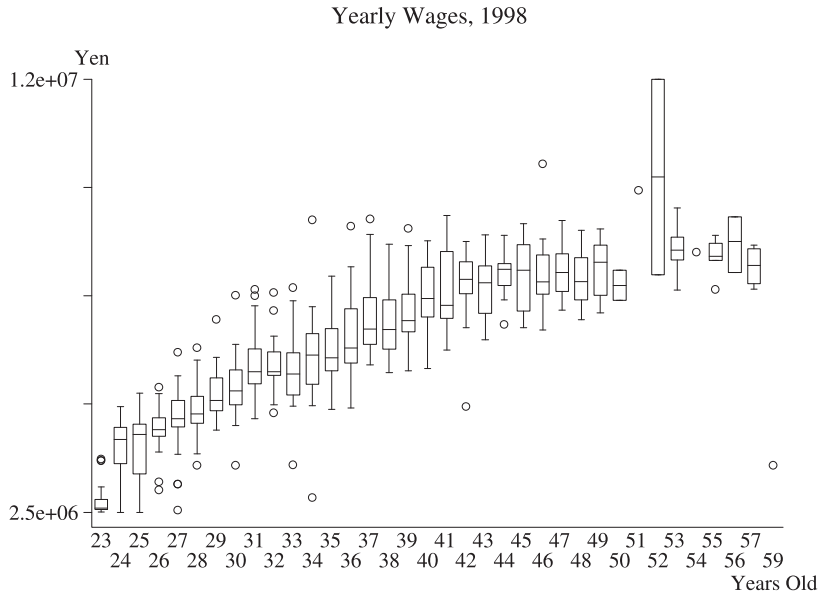
2. Changes in Wage Structure

Throughout this paper, I use Auto Japan's internal personnel data to investigate the outcomes of the HR reform. Table 4 indicates the summary statistics of the key variables used in this article. 78 percent of the employees are new car sales staff and 22 percent are used car staff. The new car sales staff has less experience and higher educational levels than the used car sales staff.

The whisker box graph, which compares the staff's yearly wages for 1998 and 2004, reveals important changes in wage outcomes (Figure 2). First, in 1998, there was a steep curve but narrow distribution under a seniority-oriented (*nenko*) wage system, but a major transformation had been achieved by 2004. The trajectory of the median continues to slope upwards toward the right, but the dispersion for employees aged from the mid-20s to mid-40s has greatly widened and the median shows significant vertical fluctuation.

To verify the situation indicated by the graph, I divided the employees into three age groups — under 30, 30-39, and 40 and over — then separated the new and used car sales staffs, and finally calculated the coefficient of variation (Table 5). First, for the under-30 new car sales staff, the coefficient of variation was 0.20 in 1998 rising to 0.26 in 2004. Similarly, the figure rose from 0.16 to 0.22 for 30-and-over new car sales staff, and from 0.09 to 1.15 for over-40 staff. There are too few under-30 and over-40 used car sales staff to produce reliable figures, but the figures for the numerous 30-39-year-old used car salesperson group rose just as they did for the new car salespersons. These calculations confirm that the sales staff's wage structure changed as a result of the 2000 reform, and indicate that its main effect was to increase wage differentials among the under-40 staff.

FIG 2. WHISKER BOX GRAPHS OF SALES STAFF'S YEARLY WAGES FOR 1998 AND 2004 (NEW AND USED CAR SALES STAFF)



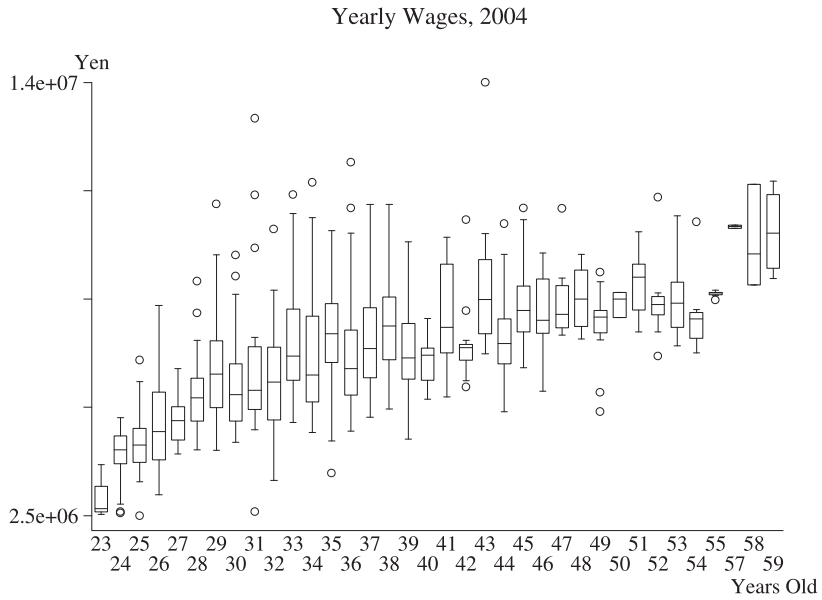


TABLE 5. COEFFICIENT OF VARIATION OF YEARLY WAGES BY AGE CATEGORIES, 1998-2004

Year	New Car Sales Staff			Used Car Sales Staff		
	-29	30-39	40-	-29	30-39	40-
1998	0.20	0.16	0.09	0.21	0.16	0.12
1999	0.18	0.17	0.09	0.22	0.17	0.11
2000	0.19	0.19	0.11	0.15	0.15	0.11
2001	0.30	0.27	0.14	0.26	0.23	0.14
2002	0.28	0.23	0.17	0.22	0.24	0.13
2003	0.28	0.22	0.15	0.18	0.22	0.12
2004	0.26	0.22	0.15	0.15	0.20	0.14

V. *The Incentive Effect of the Performance-based Pay System Reform*

1. From the Simple Performance-based Pay System to the Draw Formula Performance-based Pay System

What impacted employees most strongly in the new system was not so much the abolition of skill-based pay but the change in the performance-based pay system. Figure 3 depicts the nature of the change. Previously, the wage system included a simple performance-pay allowance that was added on to the base wage in linear fashion. But it has been changed into a non-linear system in which the performance pay is not paid at all if the amount calculated from sales does not exceed a draw line representing the total value of base wage and de facto overtime allowances of each salesperson.

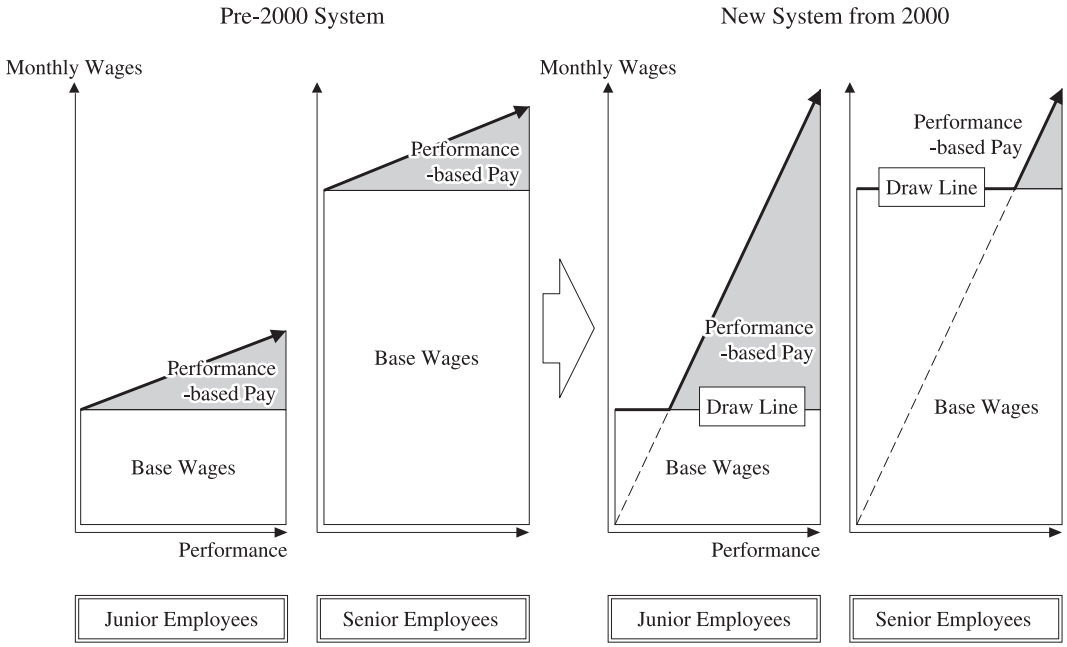
To explain in more detail, the performance payment in the previous (pre-2000) system was a small commission rate multiplied by the gross profit on each car sold (namely, gross profit times commission rate). In short, the performance-based pay was calculated by multiplying the commission rate (set at 2 to 5 percent) by the gross profit on each car sold (calculated by subtracting the cost from the sales price) . In this system, an employee would receive a performance-based payment even if she/he sold only a single car in a month.

Under the new system, an employee cannot receive a performance-based allowance if the level of sales performance fails to rise above the draw line. By contrast, it is possible for employees to increase their earnings by raising sales performance. If their level of sales performance rises above the draw line, the commission rate rises to 7 to 30 percent (compared to the set 2-to-5 percent range in the old system).

The change in wage system incorporates two management concerns. One is to greatly strengthen incentives, achieved by creating the opportunity to earn much higher performance rewards once a certain level of sales performance (i.e., sales figure) is attained. Another was to mesh a strong incentive system with long-term employment practices; this was achieved by making the draw line coterminous with the base wage for each employee. Since the base wage constitutes the stable (fixed) portion of pay, the new system clarifies the employees' responsibility to generate sales.

The first concern is so obvious as to require no discussion. However, the second entails several problems. One is that, from the company's point of view, the draw line represents the employee responsibility to generate sales. From the point of view of the employees, however, it

FIG 3. CHANGES IN THE PERFORMANCE-BASED PAY SCHEME



represents the level of effort to sell cars. In short, insofar as this line represents the possibilities of changing employee behavior, it encompasses the classic incentive problems identified by the previous research findings discussed above.

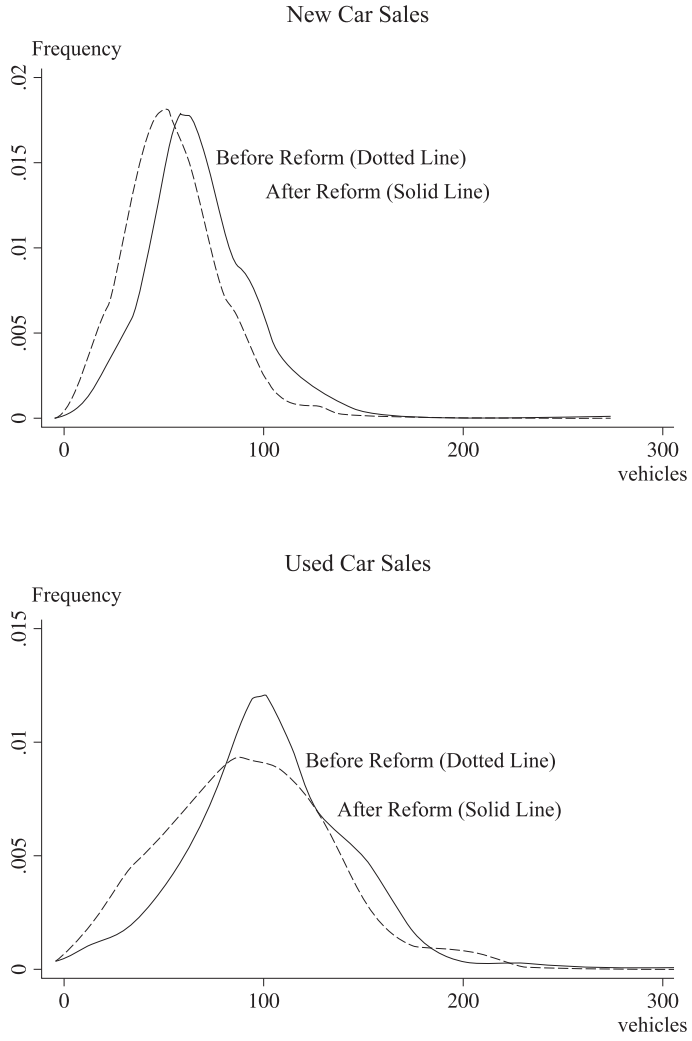
From this point, two issues arise. First, in general, to what extent does the draw system pay formula contribute to the increase in car sales? Second, how does the system change the behavior of the high and low performers of the earlier system?

2. Changes in Sales Volume

Did the new personnel system really increase the number of new car sales? Figure 4 depicts the kernel density of new and used car sales before and after the 2000 reform. First, regarding new cars, the average annual pre-reform sales figure was around 55 vehicles, about midway between 0 and 100. Following the reform, however, the average value rose to 68 cars, and the distribution curve shifted clearly to the right. In short, the graph indicates that there was an increase in the number of high performers, namely those persons able to sell a quantity of automobiles above the average.

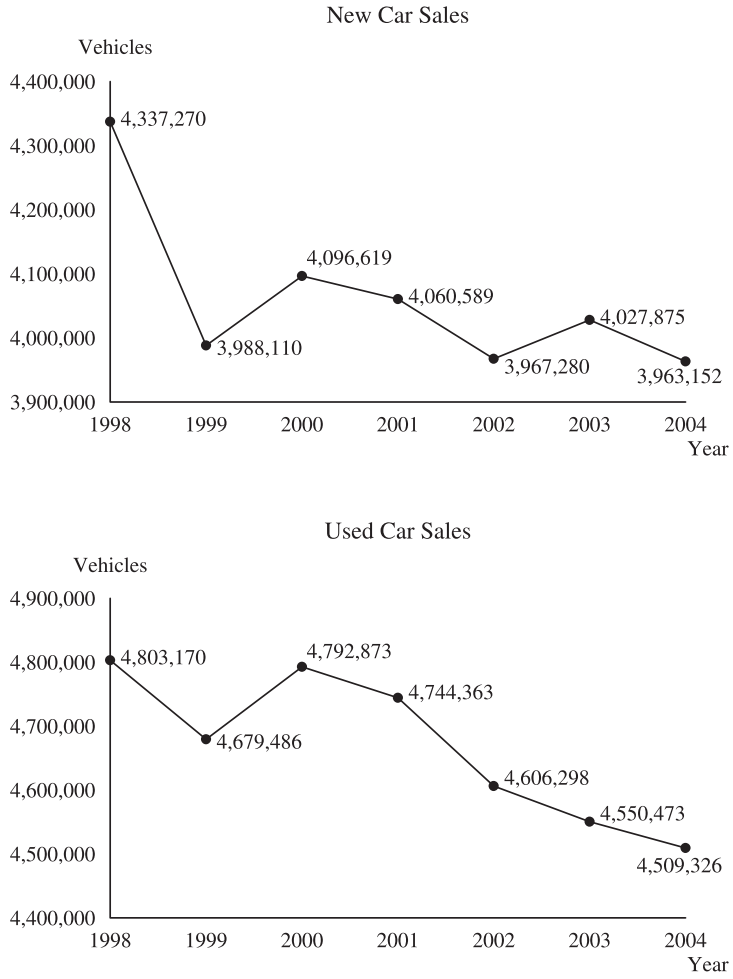
With regard to used car sales, there was a gentle slope, indicating a low peak. The pre-reform average of 92 vehicles per year increased to 103 after the reform. Moreover, the left side of the ridge sagged lower while the peak rose substantially to nearly the 100 level. In short, the new personnel system reduced the number of people with lower morale and significantly raised the number of employees with higher morale.

FIG 4. THE KERNEL DENSITY OF SALES VOLUME BEFORE AND AFTER THE 2000 REFORM



Those improvements are not simply the reflection of the macroeconomic expansion of the Japanese economy after 2002. On the contrary, domestic auto sales have *declined* in spite of the recovery. As Figure 5 reveals, new car sales nationwide decreased by 3 percent from 2000 through 2004, while used car sales declined even more sharply, by 9 percent from 2000 through 2004. Therefore, the improved sales at Auto Japan since 2000 have resulted, not from the macroeconomic environment alone, but at least partly from the HR reform.

FIG 5. TRENDS OF NATIONAL SALES VOLUME



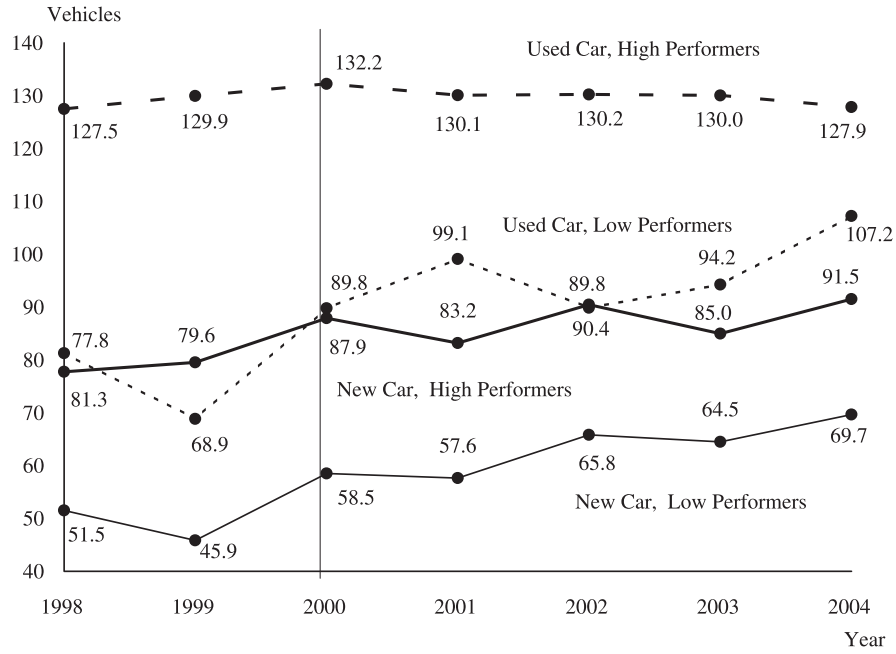
Sources: The Japan Automobile Dealers Association.

3. Incentive Effects of Draw Formula Performance-based Pay

If the overall sales increases are not due to the external environment, what is the internal mechanism that has improved auto sales? To identify the mechanism, I examine differences between high and low performers in relation to the issue of increased car sales. Figure 6 separates the high and low performers since 1998 in groups according to whether their sales were above or below the average number of vehicles sold in pre-reform years (1998 and 1999), and also tracks movement in per-salesperson yearly performance.

As can be seen, sales results for new cars for high-performing staff improved modestly, while those of low-performing staff improved much more substantially. In contrast, the results

FIG 6. TRENDS OF ANNUAL AUTO SALES BY HIGH AND LOW PERFORMING STAFF



Notes: High or low performers are separated by the standard of their annual auto sales in 1998 and 1999. If an employee's sales performance is above average, she/he is defined as a "high" performer. This sample excludes employees who had been employed less than 3 years, in order to control for the effect of initial rapid skill accumulation.

for high-performing used car sales staff showed little change, and actually fell off slightly, while results for low-performing used car sales staff increased even more than for low-performing new car sellers. Figure 6 shows that while the introduction of the draw formula performance-based pay system had no strong effect on high-performing used car sales staff, it brought improved performance from both high and low performing new car sales staff and from low performing used car sales staff.

However, this impression could be misleading. It is possible that the improved performance results derive from none other than the growing experience and accordingly improved skills of the employees. Further, Figure 6 does not take account of the high or low influences of external demand conditions and each individual's draw line. For this reason, I have analyzed the effects of the introduction of the draw formula performance-based pay system on sales results while controlling for experience-based skill development and demand conditions. For empirical estimates, I use a simple production function: the number of cars sold serves as the dependent variable, and the independent variables are the dummy for the period following the personnel system reform, national new and used car sales, length of tenure, and the draw line (namely, the sum of the individual base wage and overtime allowances). The results, from panel estimates using a fixed effect model, are shown in Table 6.[5]

Table 6 indicates two critical points. First, new car sales results after the reform for both

TABLE 6. DETERMINANTS OF ANNUAL AUTO SALES PER PERSON
(PANEL ESTIMATES USING A FIXED EFFECT MODEL)

	New Car Sales Staff				Used Car Sales Staff			
	High Performers		Low Performers		High Performers		Low Performers	
	1998-2004	2000-2004	1998-2004	2000-2004	1998-2004	2000-2004	1998-2004	2000-2004
After Reform	0.042***	-	0.084***	-	-0.027	-	-0.039	-
(2000-2004) Dummy	(0.015)	-	(0.019)	-	(0.028)	-	(0.057)	-
Log of Auto Sales	-0.373*	-2.822***	1.402***	-2.767***	0.493	0.418	5.402***	5.175***
	(0.208)	(0.716)	(0.239)	(0.781)	(0.606)	(0.796)	(1.177)	(1.424)
Log of Length of	0.217***	0.162**	0.456***	0.381***	0.155	0.216	1.086***	1.147***
Service	(0.045)	(0.077)	(0.044)	(0.072)	(0.126)	(0.191)	(0.200)	(0.293)
Log of Draw Line	-	-0.047***	-	-0.052***	-	-0.016	-	0.024
	-	(0.011)	-	(0.012)	-	(0.015)	-	(0.029)
Constant	9.484***	47.622***	-18.467***	46.004***	-3.156	-1.963	-81.463***	-78.483***
	(3.210)	(11.053)	(3.688)	(12.033)	(9.567)	(12.705)	(18.424)	(22.589)
R^2	0.0034	0.0052	0.0617	0.0013	0.0198	0.0091	0.0047	0.0140
F-Value	48.91	11.92	118.18	30.54	0.51	0.66	16.01	6.09
Number of Observations (Groups)	1199(203)	798(198)	1354(245)	892(202)	407(67)	275(67)	358(72)	221(57)

Notes: The definition of high or low performers follows Figure 6. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.
The numbers in parentheses are standard errors.

high and low performers rose significantly, even when increases in experience were accounted for. Second, raising the level of the draw line, introduced in 2000, has a negative impact on sales. In short, if salespersons think that the draw line is too high, their sales efforts lag, meaning the effect is counter-productive.

However, a different effect is observed with regard to used car sales staff. First, contrary to the impression created by Figure 6, sales results by low performers did not rise significantly. Rather, there was a very large experience effect for low performing staff. Second, there is no significant estimated effect for the draw line variable for either high or low performers. This means that the draw line is unrelated to sales figures in case of used car staff.

From the above, it is possible to conclude that the draw formula performance-based pay system has not exerted a strong impact on used car salespersons, but has exerted a strong impact on new car sales staff, especially by raising the sales results of low performers. Further, while the level of the draw line has exerted no impact on sales performance for used car staff, raising the line has generated a negative effect on sales performance of new car staff.

Two factors could account for the difference of outcomes between new car and used car staff. First, gross profits of inexpensive used cars are typically small compared with those of high-end new cars. Because smaller gross profits leads to smaller payoffs for used car staff, additional sales efforts going beyond the draw line tend to be lower than the case of new car staff. Second, maintenance and aftercare services for used cars are more time-consuming than

[5] Strictly speaking, there are attrition bias problems when we conduct a panel estimate using surviving samples. It is on the future agenda for more careful analysis.

for new cars. Although the quality of new cars is high and standardized, that of used cars varies greatly. Therefore, the maintenance service and customers' claims for used car are more frequent than for new cars. For this reason, used car salespersons spend more time on activities indirectly related to sales than new car sales people. Due to those factors, used car salespersons tend to give up making additional sales efforts if they are located below the draw line at the end of the month.

VI. *Results of the Performance Rating System Reform*

1. From General Evaluations of Skill to Focused Evaluations of Performance

In combination with the skill grade system, Auto Japan also previously used a traditional performance rating system that put strong emphasis on skill acquisition. The evaluation system included four components: performance assessments, skill level assessments, skill development assessments, and attitude assessments. Each employee met twice a year with managers to discuss whether objectives were being realized in the four areas, and managers assigned evaluation scores in each of the areas in a 5-step scale. These evaluation scores, in numerical form, were used to determine annual base wage raises and bonuses. For example, for members of the lower management (*shunin/shuji*) class, the performance assessments and skill related assessments accounted for 20 percent and 50 percent, respectively, of the total determination for raises, but 50 percent and 10 percent, respectively, in determining bonuses.

The 2000 personnel system reform implemented a major shift by focusing evaluation

TABLE 7. EXAMPLE OF A TYPICAL PERFORMANCE EVALUATION SHEET FOR SALES STAFF

	Evaluation Items	Indicators	Weights	Evaluation Scores	Total Scores	Rank	Adjustments (twice)	Adjusted Score	Adjusted Rank
Quantitative Evaluation	Per person car sales volume	absolute value	70	30	90	B		90	C
	Per person gross profit	absolute value	70	20					
	Per person insurance premiums	absolute value	20	15					
	Management by objective (quantitative)	absolute value	40	25					
Qualitative Evaluation	Days from register to collection	degree of improvement	50	25	110		- 15	95	
	Customer follow-ups	degree of improvement	50	25					
	Rate of free checking for customers	absolute value × coefficient	20	15					
	Management by objective (qualitative)	absolute value	30	15					
	Effort level in the business process	absolute value	50	30					

Notes: This table illustrates a case where the evaluator has deducted 15 points from the total score because the employee is frequently late in the morning.

TABLE 8. THE RELATIONSHIP BETWEEN JOB STAGES AND PERFORMANCE EVALUATION RESULTS

Job Stages	Performance Evaluation Results (Rank)					
	S	A	B	C	D	E
S	*	−	−−	−−	−−	−−
A	+	*	−	−−	−−	−−
B	++	+	*	−	−−	−−
C	++	++	+	*	−	−−
D	++	++	++	+	*	−−
E	++	++	++	+	*	−−

Notes: −−: substantial wage reduction, because evaluation result is far below the standard of the job stage.
−: moderate wage reduction, because evaluation result is below the standard of the job stage.
*: no reduction/increase, because evaluation result matches the standard of the job stage.
+: moderate wage increase, because evaluation result is above the standard of the job stage.
++: substantial wage increase, because evaluation result is far above the standard of the job stage.

results in just one area, performance assessment. Further, evaluations are conducted only once a year instead of twice. These changes may mean that company has shifted its HR philosophy from personnel nurturance and development, a relatively group-centered and long-term concept, toward emphasis on the short-term performance of individuals (rather than the group).

Despite the increased emphasis on individual performance, however, evaluations are not condensed into numerical indicators alone. Table 7 is a sample evaluation form for sales staff. It is divided into two sections, quantitative evaluation, which is totally numerically coded, and qualitative evaluation, which includes considerations about the performance of business duties that cannot be easily grasped by numbers. In the matrix table created by integrating the evaluation scores from the quantitative and qualitative tables, the figures are converted into a 6-level evaluation ladder, from S to E.

It is important to note that the 6-level performance evaluation and the 6-level job stages (shown in Figure 1) are connected, as shown in Table 8. Generally, a person at the S stage is expected to earn an S evaluation score, and a score below that will result in a pay reduction. On the other hand, if a person at the D stage earns a C evaluation score, she/he would be exceeding expectations and would therefore earn a raise. In simple terms, the system treats employees at higher stages more strictly, and those at lower stages more leniently. More precisely, this strengthens the incentive for people at low pay levels (who are mostly young employees) to work for pay raises, while employees who have attained high levels of pay and high levels of responsibility are evaluated much more rigorously.

Without further investigation, however, it is not clear whether the evaluations *actually* impact manager behavior and pay determination. For example, people at high stages may be concerned about the possibility of pay cuts, and managers may make adjustments to qualitative evaluations of their subordinates. Hence, the next important step is to understand the effect of performance evaluations.

2. Distribution of the Performance Rating Results

What resulted from the direct linking of the performance evaluation results and the job stage decision? To explore this issue, Table 9 shows the distribution of performance evaluation

TABLE 9. THE DISTRIBUTION OF PERFORMANCE EVALUATION RESULTS BY JOB STAGE AND OCCUPATION, 2000-2003

Stages	Performance Results of New Car Sales Staff							Performance Results of Used Car Sales Staff						
	Number of Employees	S	A	B	C	D	E	Number of Employees	S	A	B	C	D	E
S	3	0.00	100.00	0.00	0.00	0.00	0.00	3	0.00	66.67	33.33	0.00	0.00	0.00
A	85	8.24	36.47	42.35	12.94	0.00	0.00	17	0.00	17.65	70.59	11.76	0.00	0.00
B	470	2.55	30.43	49.36	16.60	1.06	0.00	158	0.00	14.56	60.76	23.42	1.27	0.00
C	650	0.00	17.08	58.46	22.77	1.69	0.00	199	0.00	8.54	61.31	28.14	2.01	0.00
D	935	0.11	1.71	30.80	56.68	10.70	0.00	219	0.00	0.00	30.14	55.71	14.16	0.00
E	3	0.00	0.00	33.33	0.00	66.67	0.00	0	-	-	-	-	-	-

TABLE 10. MOVEMENT OF EMPLOYEES AMONG STAGES

(unit: number of employees)

New Car Sales Staff		Stages in 2004						Total
		S	A	B	C	D	E	
Stages in 2000	S	2	0	0	0	0	0	2
	A	1	65	5	0	0	0	71
	B	1	29	370	5	0	0	405
	C	0	7	178	436	0	1	622
	D	0	1	14	219	666	0	900
	E	0	0	0	0	1	2	3
Total		4	102	567	660	667	3	2003

Used Car Sales Staff		Stages in 2004						Total
		S	A	B	C	D	E	
Stages in 2000	S	2	1	0	0	0	0	3
	A	1	11	2	0	0	0	14
	B	0	7	128	1	0	0	136
	C	0	2	59	137	0	0	198
	D	0	0	2	58	159	0	219
	E	0	0	0	0	0	1	1
Total		3	21	191	196	159	1	571

results broken down by job stage.[6] It can be seen that for both new and used car sales staff, it is easier to receive fairly relatively high evaluation results at the lower C, D, and E stages. In contrast, results tend to cluster at the corresponding level for the B stage employees, and fairly low results are relatively common for employees in the highest (A and S) stages. This indicates that base wage raises are fairly common at the lower stages, and that the reform has largely realized the objective of using the new evaluation system to make pay reductions possible, at least at the high level stages.

Next, let us verify what pay outcomes (raises and reductions) have actually occurred at the different job stages as a result of the performance evaluation results. Table 10 shows movements of employees among stages for both new and used car sales staff from 2000 to 2004. There are almost no pay reductions at the low C, D, and E stages. There are some

[6] Because Auto Japan did not mark evaluation result E between 2000 and 2003 and started to mark E for 2004, I exclude the evaluation results in 2004.

reductions at the higher B, A, and S stages, but most results maintain the status quo.

From these patterns, we can observe a "leniency tendency" for low-stage employees, who tend to receive fairly high evaluation results, while performance evaluation results for high-stage employees, except for the S stage, exhibit a "central tendency." Producing a leniency tendency was the intended result of linking the performance evaluations to the job stages. In contrast, the HR department did not necessarily want to produce a central tendency for higher stages. The latter situation suggests that evaluators (superiors) are able to use considerable discretion when making evaluations that impact on pay.

VII. *Conclusions*

This paper has used Auto Japan as a case study for examining the reasons for changing from a skill grade system-based personnel system to a performance-based personnel system, the content of the new system, and its economic outcomes. The results can be summarized as follows.

Auto Japan enjoyed steadily rising sales and operating profits from the mid-1990s, but rising sales of new and used cars were threatened by increasingly difficult domestic market conditions. Further, because of long-term employment practices and high ratios of basic pay in wages, the company needed to deal with a rising ratio of personnel costs relative to sales and operating expenses. As a result, Auto Japan implemented a fundamental change of its personnel system in 2000 on the basis of a management strategy calling for (a) promoting flexibility in personnel costs, and (b) shifting from a tenure-oriented to a performance-oriented personnel system and clarifying individual responsibility for improving performance.

There were three principal components to the personnel system reform and three major concomitant outcomes. First, the skill grade system was abolished and a job-based system introduced; the latter featured job stages organized in bands, making possible a shift to a new wage system in which base wages could be reduced. As a result, the reform produced substantial wage dispersion, especially among employees under 40.

Second, the performance-based pay system was changed from combining a base wage with a simple performance pay system to using a draw line (representing aggregate basic pay and de facto overtime allowances) to facilitate refinements in the use of performance pay. The introduction of the draw formula performance-based pay system raised the productivity of the new car sales staff, but failed to raise the productivity of the used car sales staff.

Third, the performance evaluation system was changed from using composite skill-and-performance evaluations to emphasizing individual performance. In addition, job stages were determined by performance evaluation results. There were many relatively high evaluation results for employees ranked in low stages, and there were many somewhat low evaluations for employees ranked in high stages.

Given the above results, it is possible to conclude that the introduction of the new wage/personnel system generally succeeded in raising the individual performance of the sales staff. However, more careful analysis indicates that the draw formula performance-based pay system did not seem to raise the productivity of the used car sales staff, and that raising the draw line had a negative effect on new car sales. These findings suggests that while Auto Japan's performance-oriented HR system reform, which was typical of reforms instituted among major

Japanese firms in the late 1990s, changed the wage structure and grading pattern of employees, it brought only slight improvement in individual productivity.

Two major issues remain on agenda for future research. First, there is the issue of how the employees react to decisions on whether or not they receive the performance payment, an outcome that lies outside the scope of this paper. While the average yearly car sales increased, the individual employees are more aware of whether they have earned performance payments from month to month. Breaking down sales on a monthly basis reveals that in some months, for example, as few as 30 percent of individual new car salespersons earned performance payments, and the figure falls to 20 percent for used car salespersons. A high ratio of non-receiving staff could produce adverse effects on morale. Further, awareness of the draw line could also induce "timing gaming," which leads employees to postpone the effort of making sales until the following period (push out) or trying harder to bring sales forward to the present period (pull in).[7] Thus, the final verdict on Auto Japan's personnel system reform must await analysis of monthly patterns of sales volumes and performance-based pay.

Second, regardless of whether the personnel system reforms raised efficiency in terms of car sales, the issues of inter-organizational equity and employee satisfaction levels remain. Previous research has examined only the efficiency effects of wage contracts and neglected the issue of equity. This study has also left these issues inadequately examined. It might be possible to investigate the equity issue using panel data. For example, it might be possible to use inequality indicators to measure the distribution of performance, evaluation, and wage outcomes, then observe their time-series movements. In addition, it is necessary to investigate the connection between the personnel system reform and the employees' satisfaction level by conducting a matching analysis of survey data and personnel data. Investigation of these issues is our next agenda, and is essential to making a conclusive evaluation of Auto Japan's personnel system reform.

References

Asch, Beth J. (1990), "Do Incentives Matter? The Case of Navy Recruiters," *Industrial and Labor Relations Review,* Vol.43, No.3, pp. 89-106.

Bandiera, Oriana, Barankay, Iwan and Rasul, Imran (2005), "Social Preferences and the Response to Incentives: Evidence From Personnel Data," *Quarterly Journal of Economics*, Vol.120, No.3, pp. 917-962.

Bandiera, Oriana, Barankay, Iwan and Rasul, Imran (2007), "Incentives for Managers and Inequality among Workers: Evidence from a Firm-level Experiment," *Quarterly Journal of Economics*, Vol.122, No.2, pp. 729-773.

Baron, James N. and Kreps, David M. (1999), *Strategic Human Resources: Frameworks for General Managers*, New York, New York: John Wiley & Sons, Inc.

Basu, Amiya K., Lal, Rajiv, Srinivasan, Venkataraman and Staelin, Richard (1985), "Salesforce Compensation Plans: An Agency Theoretic Perspective," *Marketing Science*, Vol.4, No.4, pp. 267-291.

[7] Larkin (2007) analyzes the existence of timing-gaming and its impacts on profitability, using the transaction data of a large software vending company in the U.S.

Coughlan, Anne T. and Narasimhan, Chakravarthi (1992), "An Empirical Analysis of Sales-Force Compensation Plans," *Journal of Business*, Vol.65, No.1, pp. 93-121.

Gibbons, Robert (1997), "Incentives and Careers in Organizations," in David M. Kreps and Kenneth F. Wallis (eds.), *Advances in Economics and Econometrics: Theory and Applications* (Seventh World Congress Vol.II), Cambridge: Cambridge University Press: pp. 1-37.

Graduate School of Business, Stanford University (2000),"Disintermediation in the U.S. Auto Industry," Case Number EC-10, pp.1-20.

Larkin, Ian (2007), "The Cost of High-Powered Incentives: Employee Gaming in Enterprise Software Sales," mimeo, Harvard Business School.

Lazear, Edward P. (2000), "Performance Pay and Productivity," *American Economic Review*, Vol.90, No.5, pp. 1346-1361.

Milgrom, Paul and Roberts, John (1992), *Economics, Organization and Management*, Englewood Cliffs, New Jersey: Prentice Hall.

Misra, Sanjog, Coughlan, Anne T. and Narasimhan, Chakravarthi (2003), "Salesforce Compensation: Revisiting and Extending the Agency-Theoretic Approach," mimeo.

Oyer, Paul (1998), "Fiscal Year Ends and Nonlinear Incentive Contracts: The Effect on Business Seasonality," *Quarterly Journal of Economics*, Vol.113, No.1, pp. 149-185.

Paarsch, Harry J. and Shearer, Bruce S. (1999), "The Response of Worker Effort to Piece Rates: Evidence from the British Columbia Tree-Planting Industry," *Journal of Human Resources*, Vol.34, No.4, pp. 643-667.

Paarsch, Harry J. and Shearer, Bruce S. (2000), "Piece Rates, Fixed Wages and Incentive Effects: Statistical Evidence from Payroll Records," *International Economic Review*, Vol. 41, No.1, pp. 59-92.

Prendergast, Canice (1999), "The Provision of Incentives in Firms," *Journal of Economic Literature*, Vol.37, No.1, pp. 7-63.