Lifetime Labor Income and the Erosion of Seniority-Based Wages in Japan: Evidence Based on Administrative Data Records

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April, 2012

This paper examines the impact of the erosion in seniority-based wages on lifetime labor income in Japan. Despite the importance of this issue, studies to date have not been able to address it directly because reliable datasets long enough to cover individuals' entire careers were not available. Taking advantage of administrative data records on individuals' careers, which became available with the introduction of Pension Coverage Regular Notices, Takayama et al. (2012) constructed a panel dataset of career records covering a period of more than 30 years. We use the dataset to derive wage profiles throughout individuals' careers. Moreover, using the estimated wage profiles for individuals with different sets of characteristics, we calculate the lifetime labor income (over a 35-year period) for those individuals to examine the impact of the erosion of Japan's seniority wages on lifetime income. We confirm that the wage-age profile of lifetime employees over their working life has been gradually flattening in recent years. The flattening is particularly prominent among middle-aged and elderly white-collar workers with a college background, and it appears to have decreased their lifetime labor income by about 10 to 30 percent.

JEL classification: C81, D31, J31
Key words: Seniority-based wages; Lifetime labor income; Japan

1. Introduction

It is widely accepted that the Japanese employment system contributed greatly to the competitiveness of the Japanese economy (e.g., Kato and Morishima, 2002; Rebick, 2005). However, the prolonged period of slow growth in more recent years has transformed the socioeconomic conditions that supported the traditional labor practices and, as a result, the traditional employment system appears to be eroding (Hamaaki et al., 2012). Although thus far, the impact of the erosion of the traditional employment system on people's lives has received little attention in the literature, it is at least as significant as that on the corporate sector. For example, without seniority wages, individual households can no longer plan their lives based on their expectations of future salary increases.

This paper contributes to the literature by examining the impact of the erosion in seniority-based wages on the lifetime income of Japanese households. Despite the importance of this issue, studies to date were not able to address it directly, as reliable datasets long enough to cover individuals' entire careers were not available. Taking advantage of administrative data records on individuals' careers, which became available when the Social Insurance Agency started sending out *Pension Coverage Regular Notices* (referred to as *PCRN* hereafter) to insurants, Takayama et al. (2012) constructed a panel dataset of career records covering a period of more than 30 years. Using the dataset, which provides accurate wage records for individuals, we derive wage profiles for their entire working career. Moreover, using the estimated wage profiles for individuals with different sets of characteristics, we calculate the lifetime wages (over a 30-year period) for those individuals to examine the impact of the erosion of the traditional employment system – in particular the seniority wage system – on people's lifetime income.

Our analysis confirms that for lifetime employees the wage-age profile over their working life has been gradually flattening in recent years. This flattening is particularly pronounced among middle-aged and elderly white collar workers with a college background, and it appears to have decreased their lifetime income by about 20 to 35 percent.

The remainder of this paper is organized as follows. Section 2 briefly describes the *PCRN*, explains how the panel dataset for career records was constructed, and then outlines our methodology for estimating the wage profiles over individuals' life-spans and calculating their lifetime earnings. Section 3 reports our empirical results, while Section 4 concludes.

2. Data and methodology

2.1 Pension Coverage Regular Notices and construction of the dataset

While panel data on the basis of repeated micro surveys has become an indispensable tool for empirical economists, its construction is costly, especially when a long-run panel is required. To minimize costs, researchers therefore frequently use retrospective questions, but there always remains an element of doubt whether responses in long-run retrospective surveys are accurate. On the other hand, administrative bodies, such as tax authorities, often maintain accurate records on taxpayers, but such data are not usually disclosed to the public, or even to the person in question.

However, in an effort to regain public trust in the pension system following a scandal involving lost pension records, the Japanese government in 2009 started to send out a pension information record, called a "Nenkin Teiki Bin" (*PCRN*), to every public pension insurant once a year. The annual notice is designed to allow public pension holders to confirm the details of their pensions with the government, and includes detailed administrative information kept by the Social Insurance Agency such as the standard monthly salary earned by salaried workers for the period they have been or were in an employees' pension program. Therefore, the PCRN offers a unique opportunity for salaried workers to have access to administrative data and to remember what they actually earned decades ago.

Taking advantage of this unique opportunity, Inagaki (2012) proposed a novel methodology to glean information from the *PCRN*s sent to individual policy holders to construct a long-run panel dataset covering a period of decades. Applying Inagaki's methodology to larger set of observations covering about 6,000 respondents, Takayama et al. (2012) conducted the *2011 Longitudinal Survey on Employment and Fertility (LOSEF): Internet Version*. We use the long-run micro-level panel data from the *LOSEF* to elicit the wage profiles of individuals throughout their entire working career.

As our interest is in changing patterns in seniority wages, a key element of the Japanese employment system, we narrow our sample down to Category II insurants, who are covered by employees' pension programs and for whom standard monthly salary data are available. We further confine our sample to male regular workers that have no record of job changes. While these restriction result in a smaller dataset of 780 individuals and, coupled with the potential biases introduced by the fact that the survey was carried out over the internet, mean that the sample cannot be regarded as nationally representative, we believe that the observations nevertheless capture well changes in seniority wages of typical salaried workers. The composition of our resulting dataset in terms of individuals' principal characteristics is reported in Table 1. The sample appears to be biased toward highly-educated white-collar employees working in large firms under the Japanese employment system.

2.2 Estimation of wage profiles by median regression

The first step of our analysis is to estimate workers' wage profiles. We do so assuming that the relationship between wage profiles and individuals' characteristics is linearly separable. Specifically, the estimation consists of the following steps. First, we calculate the ratio of individual *i*'s real standard monthly remuneration in his/her *n*th year to that in his/her first year (henceforth, we refer to this as the wage slope from the first year to the *n*th year) for all n=2, 3, …, 35. Second, we estimate the following equation for each n using median regression:

$$\frac{MSR_{n^{th},i}}{MSR_{1st,i}} = \beta_{n,0} + \sum_{j1=EducationCategory} \beta_{n,1,j1} DEdu(j1)_i + \sum_{j2=FirmSizeCategory} \beta_{n,2,j2} DFsize(j2)_i$$
$$+ \sum_{j3=IndustryCategory} \beta_{n,3,j3} DFind(j3)_i + \sum_{j4=JobCategory} \beta_{n,4,j4} DJob(j4)_i + \sum_{j5=FirstJobYear} \beta_{n,5,j5} DFJYear(j5)_i + u_{n,i}\ ,$$

where $MSR_{n^{th},i}$ is the real standard monthly remuneration in the *n*th year for individual *i*. $DEdu(j1)_i$, $DFsize(j2)_i$, $DFind(j3)_i$, $DJob(j4)_i$, and $DFJYear(j5)_i$ are education, firm size, industry, job type, and first job year dummy variables, respectively, for individual *i*. And third, we use the predicted values for $MSR_{n^{th},i}$ / $MSR_{1st,i}$ from the model above to obtain *wages slope* estimates (from the first year to the n^{th} year) of individuals with different sets of characteristics.

We allow for the possibility that the effects of individuals' characteristics on the wage slope vary over time. For that purpose, we divide our sample into three twelve-year cohorts: (I) persons who started working in 1973–1984, (II) persons who started working in 1985–1996, and (III) persons who started working in 1997–2008.

Table 2 reports the basic statistics and number of observations for the wage slope variable for each of the three cohorts, (I), (II), and (III).

2.3 Calculation of lifetime labor income

Having obtained the estimated wage profiles for individuals with different sets of characteristics, it is straightforward to calculate the present value of their lifetime wage:

$$LW(J) = \sum_{n=1}^{35} \frac{WS(n,J)}{(1+\rho)^{n-1}} MSR_{1st,J} = \sum_{n=1}^{35} \frac{MSR_{n^{th},j}}{(1+\rho)^{n-1}}$$

Here, $WS(n,J)$ is the wage slope for an individual with characteristics J in his/her n^{th} year. We calculate the lifetime wage, $LW(J)$, as the discounted present value of wages over a 35-year period, which we use as a proxy for lifetime labor income. For the time discount factor, ρ, we use 0 and 5 percent to compare the results.

As can be seen in Table 2, due to the structure of our dataset, we cannot calculate the predicted wage slopes for the entire 35-year period for cohorts (II) and (III). Keeping in mind the available number of observations, we arbitrarily truncate our model-based predicted values and calculate the wage slopes only up to the 20$^{\text{th}}$ year for cohort (II) and up to the 10$^{\text{th}}$ year for cohort (III), respectively. For the years that follow, we extrapolate our wage slope predictions using two alternative approaches. The first is to use the predicted $WS(n,J)$ for the last year before the truncation (e.g., for cohort (II), we use the predicted value for the 20th year for years 21 to 30), while the second is to use the rate of change in the wage slope for the preceding cohort (that is, for cohort (III), we calculate the wage slop for years 11 to 20 using the rate of change for those years for cohort (II), and for both cohorts, we calculate the wage slope for years 21 to 30 using the rate of change for those years for cohort (I)).

3. Empirical findings

3.1 Regression results

The results of our median regressions for certain benchmark years (5^{th}, 10^{th}, 20^{th}, and 30^{th} year) are shown in Table 3.[1] The first row of the table shows the wage slopes for individuals in the reference group, i.e., male college-educated white-collar workers in large manufacturing firms who started working in 1975, 1990, or 2000. The predicted wage slopes clearly illustrate that wages increase on the basis of seniority, but the extent of the increase is smaller for younger cohorts.[2]

The estimated coefficients on the dummy variables, which are reported in the rows below the wage slope predictions for the reference group, show the effects of individual characteristics on the wage slope. The effects of education and job type are ambiguous and statistically insignificant. Firm size, regardless of which cohort we look at, appears to have a significant impact on the wage slope, suggesting that larger firms tend to hold on to the seniority-based wage system. If we compare seniority slopes across industries, we find that the slope for the wholesale and retail trade industry is shallower, and that that for the finance, insurance, and real estate industry is steeper than that for manufacturing.

3.2 Wage profiles

Next, using the estimated wage slopes, we look at the wage profiles of individuals with

[1] While we run the regressions for every year from the 2^{nd} to 35^{th} year to obtain wage profiles, we only report those for benchmark years here to save space.

[2] To confirm that our findings do not result from sample attrition, which can be seen in Table 2, we tried similar regressions using only observations for which there are no missing values for $MSR_{nth,i}$. The results were essentially identical.

certain characteristics. The results for workers in the manufacturing sector are shown in Figure 1. The figure consists of four panels showing the wage profiles for individuals with different sets of characteristics. Each panel compares the profiles for individuals who started working in 1975, 1990, and 2000, the reference years for cohorts (I), (II), and (III), respectively.

The panels show that regardless of the combination of characteristics, the slopes of the wage profiles are steeper for workers who started working in 1975. On the other hand, for those that started working in 1990 or 2000, we generally find a flattening of the wage profiles. In particular, we find that for college-educated white collar workers, wages for those that started working in 1990 or later stopped increasing after about 10 to 15 years of tenure. On the other hand, while there is no clearly discernible flattening in the wage profile for high school educated blue-collar workers that started working in 1990, such a flattening – in other words, an erosion in seniority wages – can be found for those that started working in 2000.

Figure 2 provides similar wage profiles for two non-manufacturing industries, finance and wholesale and retail. Again, we find that the wage profiles for white collar workers appear to be flattening from about 10 to 15 years of tenure onward, providing further evidence of an erosion of seniority wages. On the other hand, for blue-collar workers we find no clear indication of a flattening of wage profiles, although seniority-based wage increases for blue-collar workers were small to begin with.

3.3 Lifetime labor income

Finally, we look at our calculation for the present value of individuals' lifetime labor income (over a 35-year period). To save space, we focus on only the manufacturing sector. The results are shown in Table 4, with the upper half showing the results when using the 0 percent time discount factor, and the lower half showing those when using the 5 percent factor. In each half, the upper part labeled (i) reports the results based on the first of the two approaches described in Section 2.3, which is likely to understate actual lifetime wages, while the lower part labeled (ii) reports those based on the second approach, which is likely to overstate lifetime wages.

The figures in column *a* show the calculated lifetime wages of individuals (relative to the annual wage in the first job they held) who started working in 1975. For example, the value of 120 in the first row means that the lifetime wages of a college-educated white-collar worker in a large manufacturing firm amount to about 120 years' worth of his entry-level salary. Multiplying this figure by the annual wage in the first job given in column *b*, we obtain the estimate of the lifetime labor income, 317 million yen in column *c* in this case, for an individual with the specified characteristics.

The results for individuals who started working in 1990, and for those who started working in 2000, are reported in columns *d* to *g* and *h* to *k*, respectively. Comparing the figures in columns *c*, *f*, and *j*, we find that the lifetime labor income of individuals who are going to retire in years to come will not (substantially) exceed those of individuals who have just retired. While the exact results all depend on the choice of the approach, we find that, generally speaking, the estimated wages of individuals who started working in 1990 are more or less in the same range as those for those who started working in 1975; i.e., comparing these two cohorts, lifetime labor incomes have more or less stagnated. Moreover, comparing those who started working in 2000 with those who started working in 1975, estimated lifetime labor incomes in most cases are lower by a margin of around 10-30 percent.

While the levels of estimated lifetime labor income vary substantially depending on the characteristics of individuals – i.e., lifetime labor incomes are generally lower for less educated workers, blue-collar workers, and for those in smaller firms – and on the choice of the time discount factors – i.e., a larger discount factor leads to lower lifetime income – the pattern that lifetime labor incomes are decreasing for later cohorts remains generally unaffected by these factors. Therefore, we can conclude that the gradual flattening of the wage-age profile over the working life of a lifetime employee in the manufacturing sector in Japan in recent years appears to have decreased workers' lifetime labor income by about 10 to 30 percent.

4. Conclusion

Using data from the *2011 Longitudinal Survey on Employment and Fertility (LOSEF): Internet Version*, which contains accurate wage records for individuals collected for administrative purposes that were hitherto unavailable to the public, this paper examined the impact of the erosion of seniority-based wages on individual's lifetime income. We confirmed a gradual flattening of the wage profile over the working life of lifetime employees in Japan in recent years. The flattening is particularly pronounced among college-educated middle-aged or older white-collar workers with more than 10 to 15 years of tenure, and it appears to have decreased their lifetime labor income by about 10–30 percent.

Although estimating wage profiles for individuals' working careers and calculating their lifetime wages may sound like trivial undertakings, doing so is impossible without reliable long-run panel survey data such as that provide by *LOSEF*. Given that the analysis in this paper has shown that the erosion of the seniority wage system in Japan appears to have had a significant impact on people's lifetime income, an important question is how this affects consumption behavior. This is a topic we hope to address in future research.

Acknowledgements

We are grateful to Professor Takayama and Professor Inagaki for providing us with their dataset. Hori gratefully acknowledges financial support through the Grant-in-Aid for Scientific Research (A) 23243046 from the Japan Society for the Promotion of Science (JSPS). The views expressed are ours and should not be attributed to any of the organizations with which we are affiliated. Any errors and omissions are our own.

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Table 1. Sample structure

Unit: Number of observations

Total number of individuals	780	(1.00)			
Education			Job type		
High school	174	(0.22)	White-collar	604	(0.77)
College or higher	606	(0.78)	Blue-collar	167	(0.21)
			Unknown	9	(0.01)
Size of firm			Industry		
99 employees or less	119	(0.15)	Manufacturing	300	(0.38)
100 to 999 employees	204	(0.26)	Wholesale and retail trade	79	(0.10)
1,000 to 4,999 employees	208	(0.27)	Finance, insurance, and real estate	104	(0.13)
5,000 employees or more	249	(0.32)	Other	297	(0.38)

Note: Figures in parentheses show the share in the total number of observations that are used in our analysis.

Table 2. Basic statistics and number of observations for the wage slope

	Full sample (Male, regular, no job change)			Subsample: Cohort (I) (Started working in 1973–1984)			Subsample: Cohort (II) (Started working in 1985–1996)			Subsample: Cohort (III) (Started working in 1997–2008)		
Year	Mean	Std. dev.	No. of obs.	Mean	Std. dev.	No. of obs.	Mean	Std. dev.	No. of obs.	Mean	Std. dev.	No. of obs.
1st	1.000	0.000	780	1.000	0.000	208	1.000	0.000	332	1.000	0.000	230
2nd	1.092	0.175	780	1.119	0.170	208	1.100	0.206	332	1.051	0.104	230
3rd	1.247	0.257	770	1.302	0.264	208	1.254	0.275	327	1.185	0.210	225
4th	1.331	0.305	760	1.398	0.313	208	1.330	0.316	320	1.259	0.264	223
5th	1.415	0.340	748	1.540	0.359	204	1.386	0.324	317	1.326	0.307	218
6th	1.497	0.396	734	1.625	0.401	204	1.482	0.397	315	1.375	0.343	206
7th	1.591	0.442	716	1.766	0.468	201	1.557	0.414	312	1.438	0.379	194
8th	1.684	0.493	694	1.914	0.531	199	1.619	0.448	307	1.516	0.416	179
9th	1.788	0.549	669	2.038	0.561	199	1.719	0.509	303	1.567	0.459	158
10th	1.902	0.600	647	2.166	0.628	199	1.813	0.553	302	1.668	0.485	137
11th	2.004	0.641	624	2.280	0.638	198	1.914	0.607	298	1.715	0.517	119
12th	2.104	0.690	603	2.429	0.693	198	1.972	0.631	297	1.778	0.554	99
13th	2.199	0.745	571	2.535	0.759	197	2.037	0.664	294	1.819	0.597	71
14th	2.296	0.784	547	2.647	0.759	196	2.110	0.706	291	1.830	0.678	51
15th	2.401	0.808	504	2.737	0.787	196	2.178	0.725	279	1.786	0.624	20
16th	2.508	0.828	475	2.843	0.794	196	2.227	0.735	270			
17th	2.609	0.878	450	2.945	0.825	195	2.292	0.777	246			
18th	2.706	0.918	426	3.064	0.853	190	2.345	0.798	227			
19th	2.791	0.953	397	3.127	0.858	188	2.399	0.836	200			
20th	2.911	0.968	361	3.196	0.878	188	2.490	0.849	164			
21th	3.015	1.006	331	3.264	0.919	189	2.546	0.877	133			
22th	3.152	1.043	297	3.335	0.958	185	2.663	0.907	103			
23th	3.279	1.077	264	3.425	0.981	183	2.690	0.931	72			
24th	3.380	1.086	241	3.482	0.969	180	2.731	1.038	52			
25th	3.436	1.084	226	3.494	0.977	178	2.769	1.069	39			
26th	3.482	1.136	208	3.510	1.013	175	2.581	1.155	24			
27th	3.616	1.138	187	3.532	1.052	172	3.051	0.756	6			
28th	3.690	1.122	175	3.599	1.054	166						
29th	3.744	1.187	153	3.635	1.113	144						
30th	3.826	1.198	136	3.696	1.103	127						
31th	3.886	1.215	107	3.741	1.142	98						
32th	4.015	1.283	81	3.849	1.217	73						
33th	4.179	1.216	67	4.006	1.142	60						
34th	4.207	1.308	57	4.018	1.226	51						
35th	4.137	1.255	44	3.880	1.097	38						

Note: The "wage slope" here is defined as the ratio of the real standard monthly remuneration in the nth year to that in the first year.
The statistics here are for male Category II insured persons who were regular employees and did not change their job.

Table 3. Median regression results for wage profiles

Dependent variable:	(Male Category II insured persons who were regular employees and did not change their job)								
Ratio of real standard monthly wage	Cohort (I) (Started working in 1973–1984)				Cohort (II) (Started working in 1985–1996)			Cohort (III) (Started working in 1997–2008)	
in the n th year to that in the first year	5th year	10th year	20th year	30th year	5th year	10th year	20th year	5th year	10th year
Predicted wage slopes for reference group (college-educated white-collar workers in large manufacturing firms)	1.571	2.181	3.443	4.357	1.542	2.098	2.666	1.449	1.851
	(0.116)	(0.219)	(0.287)	(0.634)	(0.057)	(0.150)	(0.181)	(0.073)	(0.211)
Estimated coefficients									
Education dummy (Reference: College-educated workers)									
High school-graduated workers	-0.087	-0.199	-0.285	-0.270	-0.047	-0.014	0.234	-0.012	-0.067
	(0.070)	(0.141)	(0.174)	(0.669)	(0.040)	(0.110)	(0.167)	(0.075)	(0.211)
Firm size dummies (Reference: 5,000 persons or more)									
99 persons or less	-0.160	-0.444 **	-0.718 **	-1.188 *	-0.184 ***	-0.489 ***	-0.956 ***	-0.338 ***	-0.545 **
	(0.104)	(0.205)	(0.291)	(0.476)	(0.054)	(0.151)	(0.237)	(0.071)	(0.210)
100 to 999 persons	-0.247 ***	-0.444 ***	-0.649 ***	-0.433	-0.143 ***	-0.300 **	-0.470 ***	-0.205 ***	-0.431 **
	(0.073)	(0.144)	(0.183)	(0.402)	(0.045)	(0.122)	(0.171)	(0.061)	(0.201)
1,000 to 4,999 persons	-0.087	-0.213	-0.168	-0.494	-0.089 **	-0.327 ***	-0.225	-0.133 **	-0.172
	(0.067)	(0.129)	(0.162)	(0.587)	(0.044)	(0.119)	(0.171)	(0.061)	(0.182)
Industry dummies (Reference: Manufacturing)									
Wholesale and retail trade	-0.195 **	-0.296	-0.307	-0.433	-0.140 **	-0.103	-0.268	0.128	0.384
	(0.094)	(0.192)	(0.260)	(0.487)	(0.057)	(0.162)	(0.255)	(0.086)	(0.254)
Finance, insurance, and real estate	0.051	0.239	0.214	-0.155	-0.027	0.432 ***	0.680 ***	0.069	0.312
	(0.079)	(0.149)	(0.191)	(0.443)	(0.054)	(0.145)	(0.202)	(0.088)	(0.252)
Other	-0.101	-0.128	0.050	0.116	0.033	0.093	0.299 *	0.086 *	0.161
	(0.068)	(0.137)	(0.166)	(0.448)	(0.040)	(0.107)	(0.155)	(0.049)	(0.155)
Job type dummy (Reference: White-collar)									
Blue-collar	0.011	0.043	-0.293	-0.292	0.018	-0.049	-0.001	-0.085	-0.140
	(0.070)	(0.142)	(0.181)	(1.059)	(0.041)	(0.108)	(0.151)	(0.061)	(0.192)
Number of observations	204	199	188	127	317	302	164	218	137
Pseudo R2	0.123	0.166	0.228	0.199	0.092	0.133	0.224	0.146	0.169

Notes: 1. All regressions also include year dummies, which take one if the individual started working in the specified year.

2. The reference group consists of college-educated white collar-workers in large firms (with more than 5000 employees) in the manufacturing sector that started working in 1975, 1990, or 2000.

3. Standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 4. Comparison of lifetime labor income of individuals who started working in 1975, 1990, and 2000

			Individuals who started working in 1975			Individuals who started working in 1990				Individuals who started working in 2000			
			Lifetime wages relative to annual wage in the first job	Annual wage in individual's first job (real, JPY million)	*LW(J)* Lifetime wages (real, JPY million)	Lifetime wages relative to annual wage in the first job	Annual wage in individual's first job (real, JPY million)	*LW(J)* Lifetime wages (real, JPY million)	Lifetime wages relative to those who started in 1975	Lifetime wages relative to annual wage in the first job	Annual wage in individual's first job (real, JPY million)	*LW(J)* Lifetime wages (real, JPY million)	Lifetime wages relative to those who started in 1975
			a	b	$c = a \times b$	d	e	$f = d \times e$	$(g = f / c)$	h	i	$j = h \times i$	$(k = j / c)$
Discount rate (ρ) = 0.00													
(i) Using the last value of *WS(n,I)* before the truncation up until the 35th year													
Manufacturing	Large firms	College-educated & white-collar	120	2.64	**317**	94	3.21	**301**	(0.95)	68	3.39	**231**	(0.73)
		High school-educated & blue-collar	110	2.14	**236**	94	2.57	**241**	(1.02)	60	2.87	**172**	(0.73)
	Small firms	College-educated & white-collar	88	2.43	**213**	61	2.97	**181**	(0.85)	51	2.85	**145**	(0.68)
		High school-educated & blue-collar	82	1.77	**145**	66	2.11	**139**	(0.96)	43	2.28	**99**	(0.68)
(ii) Using the rate of change in *WS(n,I)* of the preceding cohort													
Manufacturing	Large firms	College-educated & white-collar	120	2.64	**317**	102	3.21	**327**	(1.03)	92	3.39	**313**	(0.99)
		High school-educated & blue-collar	110	2.14	**236**	110	2.57	**282**	(1.19)	88	2.87	**253**	(1.07)
	Small firms	College-educated & white-collar	88	2.43	**213**	63	2.97	**189**	(0.88)	57	2.85	**162**	(0.76)
		High school-educated & blue-collar	82	1.77	**145**	75	2.11	**159**	(1.10)	57	2.28	**130**	(0.89)
Discount rate (ρ) = 0.05													
(i) Using the last value of *WS(n,I)* before the truncation up until the 35th year													
Manufacturing	Large firms	College-educated & white-collar	49	2.64	**128**	41	3.21	**131**	(1.02)	31	3.39	**107**	(0.83)
		High school-educated & blue-collar	45	2.14	**96**	41	2.57	**105**	(1.10)	28	2.87	**80**	(0.84)
	Small firms	College-educated & white-collar	37	2.43	**90**	28	2.97	**84**	(0.94)	24	2.85	**68**	(0.76)
		High school-educated & blue-collar	34	1.77	**61**	30	2.11	**63**	(1.04)	21	2.28	**48**	(0.78)
(ii) Using the rate of change in *WS(n,I)* of the preceding cohort													
Manufacturing	Large firms	College-educated & white-collar	49	2.64	**128**	43	3.21	**138**	(1.08)	39	3.39	**132**	(1.03)
		High school-educated & blue-collar	45	2.14	**96**	45	2.57	**115**	(1.20)	36	2.87	**104**	(1.09)
	Small firms	College-educated & white-collar	37	2.43	**90**	29	2.97	**86**	(0.96)	26	2.85	**74**	(0.83)
		High school-educated & blue-collar	34	1.77	**61**	33	2.11	**69**	(1.13)	25	2.28	**57**	(0.93)

Notes: 1. Annual wage of individual's first job = Contractual cash earnings (a) × 12 + Annual special cash earnings (b). (a) and (b) are taken from the Basic Survey on Wage Structure and are the values for those aged 20-24 or 18-19.
2. All wage data are real values deflated using the 2005 base CPI.

Figure 1. Patterns of wage profiles for individuals in the manufacturing industry.

Fig. 1-1-1 Large manufacturing firms; college-graduated white-collar workers.

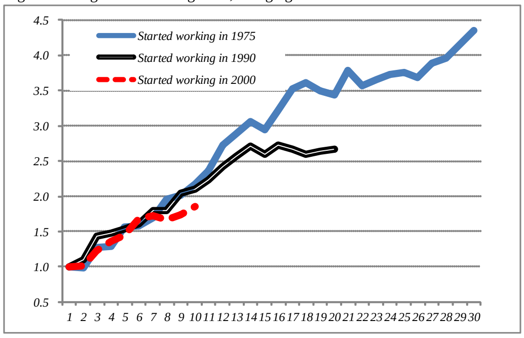

Fig. 1-1-2 Small manufacturing firms; college-graduated white-collar workers.

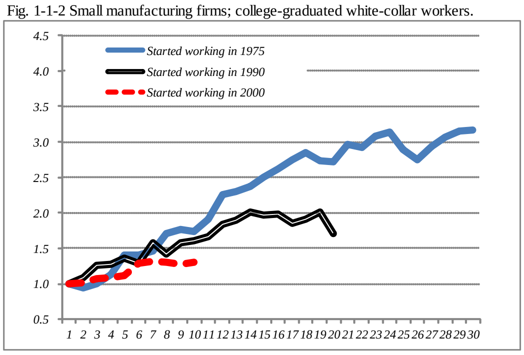

Fig. 1-2-1 Large manufacturing firms; high school-graduated blue-collar workers.

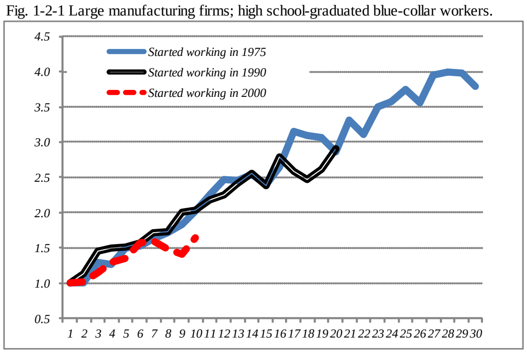

Fig. 1-2-2 Small manufacturing firms; high school-graduated blue-collar workers.

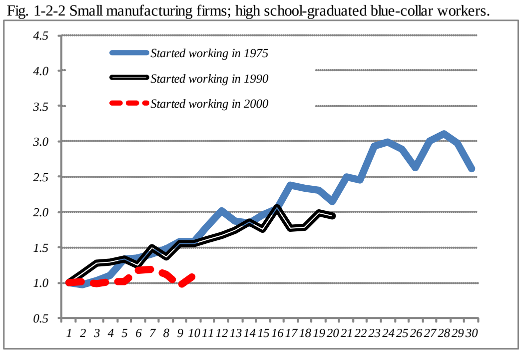

Figure 2. Patterns of wage profiles for individuals in some selected nonmanufacturing industries.

Fig. 2-1-1 Large financial firms; college-graduated white-collar workers.

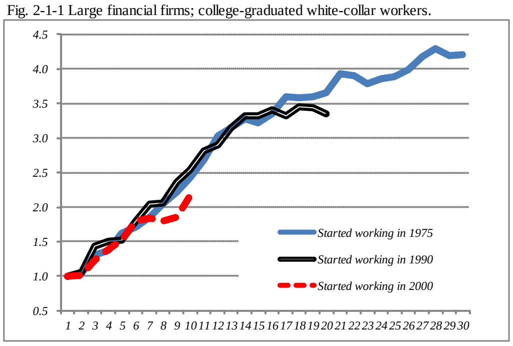

Fig. 2-1-2 Small wholesale and retail trade firms; college-graduated white-collar workers.

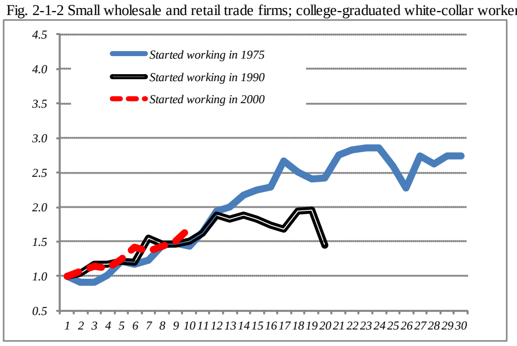

Fig. 2-2-1 Large financial firms; high school-graduated blue-collar workers.

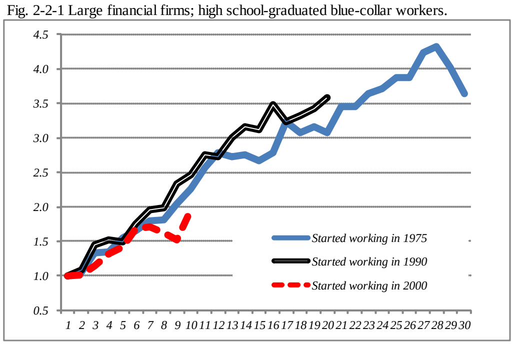

Fig. 2-2-2 Small wholesale and retail trade firms; high school-graduated blue-collar workers.