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Sheepskin Effects in Japan*

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Abstract

Using data for the 1990's, this paper examines the role of sheepskin effects in the returns to education for Japan. Our estimation results indicate that sheepskin effects explain about 50% of the total returns to schooling. We further find that sheepskin effect are only important for workers in small firms with the size of these effects being similar to comparable estimates for the US. Finally, the estimated sheepskin effects are decreasing with firm tenure, in particular for small firms. These results could be explained by the particular recruitment system of large firms in Japan, which makes university diploma as a screening device unimportant for large firms.

Keywords: Returns to Education, Sheepskin Effects, Japan

JEL classification: J31, J24, I21

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Introduction

The economic literature faces a long-lasting debate on the causes of the positive relationship between schooling and earnings. According to the human capital theory, skills obtained in school directly increase productivity which in turn results in higher earnings. According to the screening theory of education, schooling enhances earnings because it is used as a signaling device that allows employers to assess the innate productivity of potential employees, not because schooling makes individuals more productive *per se* (Arrow 1973, Spence 1973). A widely used empirical approach to evaluate the validity of the screening hypothesis is to test for the existence of sheepskin effects in the returns to schooling, because significant returns to a diploma conditional on completed years of schooling indicates that education acts as a screening device that credentiates higher innate productivity in addition to potential direct productivity effects.[1]

Existing empirical evidence on sheepskin effects is almost exclusively based on data for the US. This paper aims to test for the existence of sheepskin effects in the returns to schooling using individual data from Japan. From investigating the role of sheepskin effects in a labor market that differs substantially from the labor market in the US, we aim to provide additional insights to the human capital theory-screening hypothesis debate.

Starting in the 1960s, a period of rapid economic growth, long-term relationships between employers and employees became the norm in most Japanese firms. This "lifetime employment system" reflects the tendency of Japanese companies to make considerable investments in the skills of their employees through in-house training in order to adapt more quickly to changing economic situations and technological developments (JIL-Tokyo 2001). The expectation that an employee stays in a firm

for the rest of his working-life should give firms incentives to make considerable screening efforts before hiring an individual. Indeed, especially large Japanese firms tend to recruit new employees directly from universities, which is usually preceded by substantial screening through written examinations and interviews by the firm while applicants are still at the university (Hart and Kawasaki 1999, JIL-Tokyo 2001). Because of this special recruitment system, Japanese employers possess already considerable information on the innate productivity of their employees at the time of hiring, which in turn implies a secondary role of university diplomas as a screening device. Thus, we expect the returns to diplomas conditional on years of schooling to be lower in Japan than in the US. Since usually large Japanese corporations adopt the above-mentioned recruitment system, we further expect the importance of sheepskin effects in Japan to decrease with firm-size.

In addition to sheepskin effects, the dynamic relationship between the returns to schooling and labor market experience or firm tenure has often been used to test the signaling model against the human capital model. This test relies on the hypothesis that if education acts as a signal, the partial effect of schooling on earnings will decline with increasing labor market experience of an individual, because employers gradually obtain better information on the true productivity of a worker (Bauer and Haisken-DeNew 2001, Farber and Gibbons 1996, Layard and Psacharopoulos 1974, Riley 1979). In this study we test this hypothesis by investigating the development of sheepskin effects with increasing firm tenure. If the learning hypothesis is correct, the estimated coefficients of interactions between diploma dummies and firm tenure in a standard wage equation should be negative. In the institutional setting of the Japanese labor market, we expect sheepskin effects to decrease with firm tenure especially for individuals employed in small firms.

In the following section, we give a short description of the Japanese schooling

and recruitment system. Section III describes the data set and our empirical approach. Section IV presents the estimation results for various specifications. Our baseline specification closely follows existing studies for the US to facilitate comparability across the two countries. We further investigate whether there are significant firm-size-differences in the estimated sheepskin effects and whether sheepskin effects disappear with increasing job tenure. Section V concludes.

Education and Labor Market Recruitment in Japan

The structure of the Japanese educational system is very similar to that of the US, with compulsory education lasting 9 years, 6 years of which are primary school followed by 3 years of lower secondary school. After compulsory schooling, individuals in Japan typically attend additional 3 years of upper secondary school. Completion of upper secondary school allows individuals to proceed either to a junior college, which usually requires additional 2 years, or to university (see Table I). Conditional on attending university, a Bachelor degree could be obtained after 4 years.

Approximately 70% of the Japanese universities are private. They differ in their level of prestige and are structured similar to those in the US. Only a very small number of individuals attain only minimum compulsory education. Over the 1990s, at least 90% of all individuals receiving new diplomas finished either upper secondary or some other higher level of schooling. Between 1993 and 1997 more than 40% of new labor market entrants had a higher educational degree (JIL-Tokyo 2001).

The Japanese curricula places more emphasize on general knowledge and self-development than on acquiring specialized knowledge at an early stage. Formal education is rather understood as a general qualification for the professional life than for a certain occupation. A "streaming" of students similar to the process

in many other developed countries does not take place. In the short period of transition from school to work, however, there is nonetheless an intensive selection process. The Japanese system of recruitment and job placement also differs from that of most Western countries in that it is highly structured and strictly organized. Japanese firms tend to recruit new employees directly from schools and universities with substantial screening (Hart and Kawasaki 1999).

Japan developed a stable job placement system that involves firms, schools and administrative services, allowing a smooth transition from school to work. Throughout the process, schools play a very important role, with high schools providing career consultation to students to help them determine their future career path, i.e. whether they should enter the labor market after completion of upper secondary school or whether they should proceed to higher education. Every year, companies provide job information to the public employment security offices, who in turn pass this information on to schools. Teachers then recommend students to the appropriate firms. Compared to their western counterparts, young people in Japan start their job search activities very early, because there is only a small time window between graduation in March of a given year and when new work contracts begin on April 1. Thus, job applications and job entrance examinations start up to one year before students leave the educational system.

Although universities offer job placement services to their students, recruitment of university graduates is not as strictly organized as in upper secondary schools. As described in JIL-Tokyo (2001), students also apply directly to firms by themselves. Already at the end of their junior year, students can attend information sessions held by companies. Those who apply, go through several examinations and two or three interviews during their studies until final employment decisions are made. The selection criteria of Japanese firms concentrate on general abilities that indicate a

potential basis for the further development through on-the-job training (Hart and Kawasaki 1999). Note that the Japanese recruitment system is used predominantly by large firms. In 1999, for example, only between 4.4% and 5.0% of firms with less than 100 employees utilized this recruitment system (JIL-Tokyo 2001).

Based on the special recruitment system in Japan, we derive two hypotheses concerning the role of schooling degrees as a screening device that will be tested in our empirical analysis. First, compared to other countries without such a strictly organized placement system, we expect sheepskin effects in Japan to be less important than, e.g., in the US, since the system provides firms already considerable information on the innate productivity of applicants when they sign an employment contract, making the role of schooling degrees as screening device less important. Second, since predominantly large firms utilize this recruitment system, we expect sheepskin effects and learning effects (i.e., a decrease in the diploma effects with increasing firm tenure) to be more important in small firms.

Description of the Data and Empirical Approach

In this paper we use the *Japanese Panel Survey on Consumers* (JPSC), a data set of approximately 1,000 men, collected and made available by the Institute for Household Economy in Tokyo.[2] For the analysis, we use data from 1993 to 1997. Men working in the agricultural sector or in the public service have been excluded from the analysis. In addition, we disregarded all observations with missing values to one of the variables used in the empirical analysis leading to a final sample of 735 full-time working men, comprising a total of 2,814 person-year observations.

Many existing empirical studies of sheepskin effects do not have a direct measure of degree receipt. These studies estimate sheepskin effects by specifying a spline

function of completed years of schooling with discontinuous knots at the usual number of years needed to complete a degree. Using data from the CPS, Jaeger and Page (1996) have shown that these studies usually underestimate sheepskin effects of high school and college degrees. Similar to the data used by Jaeger and Page (1996), the JPSC provides information on both years of schooling and degrees received, which allows us to avoid the bias of studies imputing degree receipt from the usual years of education. For each level of education the JPSC provides detailed information as to whether one merely started and whether one actually completed the degree or certificate. Using this information we set up dummy variables to identify dropouts at a certain level and those with graduate degrees. Since we also have information on the year in which persons left the educational system, we are further able to calculate exact years of education.

A cross-tabulation of degrees obtained by completed years of schooling is provided by Table II. About 47% of the individuals in our sample completed upper secondary school and another 37% completed university. Note that these numbers are similar to those reported in aggregate statistics (JIL-Tokyo 2001). About 42% of the individuals who completed only upper secondary school report exactly 12 years of schooling, 9% finished in less than 12 years, and 49% report 13 years of schooling. Among those who finished junior college, 70% needed exactly 14 years of schooling. The remaining 30% report more than 14 years of education. Finally, among those who received at least a Bachelor degree, about 5% took less than 16 years of education, 33% took 16 years and more than 62% needed more than 16 years.

Our empirical strategy closely follows Jaeger and Page (1996) in order to facilitate comparison between the US and Japan. The baseline specification does not include

diploma effects, i.e.:

$$\ln Y_i \;=\; \alpha_1 \, X_i' + \beta_1 \, S_i' + \epsilon_i \, . \tag{1}$$

where Y_i denotes gross yearly labor earnings of individual i[3], including all components of labor earnings that are crucial for an analysis of Japanese earnings such as the base wage, allowances, mid-year and year-end bonuses, and overtime compensation. X_i is a vector of control variables other than schooling. In each model, X_i includes a quadratic in labor market experience and four year dummies. In a different specification we further add a quadratic in firm tenure. Labor market experience is measured as years since leaving full-time education. Firm tenure is measured using explicit information on how long a person is actually employed in the current firm provided by the data. The vector S_i includes different variables indicating the years of completed schooling. We consider two different specifications: *(i)* we use a continuous measure of the years of completed schooling, and *(ii)* we present results from a specification where the vector S_i consists of dummy variables for each year of completed schooling with 0-9 years of schooling as reference group. Finally, ϵ is a normal distributed error term with mean 0 and variance σ^2. Descriptive statistics on all variables used in the empirical analysis are provided in Appendix Table (1).

To investigate the existence of sheepskin effects, we add to the baseline specification described by equation (1) a vector D_i of dummy variables measuring degree effects, i.e., we estimate:

$$\ln Y_i \;=\; \alpha_2 \, X_i' + \beta_2 \, S_i' + \gamma \, D_i' + \epsilon_i \, . \tag{2}$$

Whereas the estimated β_1's from equation (1) could be interpreted as total returns to education, the estimated β_2's from equation (2) show the total returns to schooling *net* of degree effects. Hence, the difference between the estimated β_1 and β_2 could be interpreted as the part of the total returns to education that is due to sheepskin

effects (Jaeger and Page 1996). Similar to the specification chosen by Jaeger and Page (1996), we assume that those individuals with some junior college or some university have completed high school. Thus, we set the high school dummy equal to 1 for those with schooling beyond high school.[4] The reported coefficients on the diploma dummies which are beyond high school therefore could be interpreted as the marginal effect over a high school degree.

To test whether there are significant differences between small and large firms, we fully interacted equations (1) and (2) with two firm size dummies, differentiating small firms with less than 100 employees from large firms with at least 100 employees. In 1,169 cases (41.5% of all observations), individuals report to be working for a small firm; in the remaining 1,645 cases (58.5% of all observations) they report to be employed in a firm with more than 100 employees.

Finally, to test the hypothesis of employer learning, we add interaction terms between the vector of schooling diplomas, D_i, with firm tenure, i.e., we estimate

$$\ln Y_i \;=\; \alpha_2\, X_i' + \beta_2\, S_i' + \gamma\, D_i' + \lambda\, (D_i \cdot T_i)' + \epsilon_i\,, \tag{3}$$

where T_i denotes firm tenure. Similar to equations (1) and (2), we also report results when equation (3) is fully interacted with two firm size dummies. As already noted above, we expect λ to be negative, especially for small firms.

Estimation Results

Columns (1), (3), and (5) of Table III report the results obtained from estimating equation (1), and columns (2), (4), and (6) those from equation (2). All estimations are performed using OLS on the pooled data.[5] The total returns of receiving a particular degree beyond upper secondary are reported at the bottom of Table III.

The estimated coefficient on completed years of schooling reported in column

(1) of Table III indicates that one additional year of schooling increases gross yearly earnings by roughly 7%. This return reduces to 3% when degree effects are added to the specification (see column (2)). Hence, according to these estimates more than 50% of the total returns to schooling in Japan are due to sheepskin effects. The return to a high school degree is estimated to be 26%, which is considerably higher than the respective return of about 11% obtained by Jaeger and Page (1996) for the US.[6]

Receiving a junior college degree or attending some university without receiving a degree does not have significant additional effects to a high school diploma, indicating that a junior college degree and being accepted to university does not create a signal that is rewarded by the labor market. The marginal effect of receiving a university degree above a high school degree is, however, highly significant and estimated to be about 20%; almost 10 percentage points lower than the comparable effect in the US. Even though the Japanese recruitment system for university graduates lowers the returns to an university degree if compared to the US – which is in line with the expectations derived from the screening hypothesis – we still find significant sheepskin effects.

Using dummy variables for completed years of schooling rather than the continuous measure does not have significant effects on the estimation results. Columns (3) and (4) indicate again that sheepskin effects account on average for about 50% of the total returns to schooling. To illustrate this result in more detail, Figure 1 graphs the estimated returns to years of schooling obtained from the specifications reported in columns (3) and (4) of Table III. According to Figure 1, sheepskin effects explain about 43% of the return to completing 14 years of schooling and around 46% of the return to completing 16 years and 18 and more years of schooling, respectively.

The point estimates for the returns of a high school degree and the marginal

effect of receiving a university degree are somewhat lower than those reported in column (2). The total returns to the different degrees are 18% for a high school degree, 15% for completing junior college, 24% for attending some university, and 38% for completing university (see bottom of Table III). Controlling in addition for firm tenure lowers the point estimates for the returns to completed years of schooling. Whereas this change in the specification does not significantly affect the returns to a university diploma, the returns to a high school degree become insignificant. These changes in the estimation results could be explained with the relative importance of firm-specific human capital in the Japanese labor market.[7]

Table IV report the results when we fully interact equations (1) and (2) with the two firm-size dummies. We report only results that correspond to the specifications reported in column (4) and (6) of Table III.[8] For both specifications we further present the firm-size differences in the estimated coefficients.

Our estimation results indicate that sheepskin effects are limited to workers in small firms. For workers in large firms we do not find significant sheepskin effects on earnings. Note further that the estimated marginal returns of a university degree above a high school diploma in small firms of 26% in the specification reported in column (1) and 32% in column (2) of Table IV are comparable to those reported by Jaeger and Page (1996) for the US. The statistically significant positive coefficient for university dropouts employed in small firms indicate, that being accepted to attend university appears to have a signaling value for small firms, which is comparable to the signaling value of receiving a university degree. The point estimates for the returns to completed years of schooling are higher in large firms if compared to small firms and only for large firms these returns are statistically significant.[9] Note, however, that in most cases the estimated coefficients for small and large firms are not statistically significant different from each other.

Table V reports the results obtained from estimating equation (3). Referring to column (3) of Table V, the results from this specification indicate that sheepskin effects are decreasing with firm tenure, especially for small firms and for individuals that have completed junior college. Note that the estimated coefficients for the control variables other than the degree dummies and the interaction variables reported in Table V do not change significantly if compared to the respective specifications in Tables III and IV. Table VI shows the estimated sheepskin effects for the models in Table V evaluated at 0, 5, 10, and 15 years of firm tenure. The table confirms that the sheepskin effects are decreasing with increasing firm tenure, which gives some support to the learning hypothesis. Furthermore, significant sheepskin effects and the decrease of these effects with tenure appear only in small firms (see column 3 of Table VI).

Summary

Using individual-level data for the period from 1993 to 1997, this paper investigates the existence of sheepskin effects in Japan. Due to the particular recruitment system of large companies in Japan, which screen potential employees through exams and interviews while they are still at the university, we expect smaller sheepskin effects for Japanese workers employed in large firms. Our estimation results confirm this expectation. Not differentiating between small and large firms we find significant sheepskin effects. Sheepskin effects account on average for about 50% of the total returns to schooling. The estimated total returns to the different degrees are 18% for a high school degree, 15% for completing junior college, 24% for attending some university, and 38% for completing university. These effects are smaller than comparable estimates for the US. Differentiating sheepskin effects by firm size indicates,

that sheepskin effect are more important for workers in small firms. Furthermore the sheepskin effects for workers in small companies appear to similar in size than comparable effects in the US. Finally, the estimation results indicate that the importance of sheepskin effects in small Japanese firms decrease with increasing firm tenure of an individual. This result gives some support to the learning hypothesis that the diploma effects should decline with increasing tenure, because employers gradually obtain better information on the true productivity of a worker.

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Notes

[1]See, among others, Layard and Psacharopoulos (1974), Hungerford and Solon (1987), Belman and Heywood (1991), Belman and Heywood (1997), Card and Krueger (1992), Heywood (1994), Jaeger and Page (1996), Gullason (1999) and Park (1999).

[2]See Dross and Haisken-DeNew (2002) for a detailed description of the data set.

[3]Available starting in 1993, units are 10,000 Yen per year.

[4]For example, the dummy variables for "junior high school", "high school" and "university dropout" are set equal to 1 if individuals have finished High School and started University without receiving a certificate.

[5]In a different specification we made use of the panel character of the data set by estimating random effects models in order to account for unobserved individual heterogeneity. The results from the random effects model, which are available upon request, are not reported, because the main results do not change if compared to those described below.

[6]The percentage increase in gross yearly earnings associated with a dummy variable coefficient is calculated as $e^{\hat{\gamma}} - 1$, where $\hat{\gamma}$ is the estimated coefficient.

[7]See also Hashimoto and Raisian (1985), Clark and Ogawa (1992), and Dross and Haisken-DeNew (2002) for empirical evidence on the role of employment tenure for wages in Japan.

[8]The results for all other specifications are available upon request.

[9]These results are similar to those of Heywood (1994), who analyzed differences of sheepskin effects between workers in union and nonunion firms and between workers in the public and the private sector. Heywood (1994) finds significant sheepskin effects only for private nonunion workers.

Table I: Educational System in Japan

Type of Degree	Typical Years of Schooling	Typical Total Years of Schooling	Typical Age
Compulsory Education			
Elementary	6	6	6 - 12
Lower Secondary	3	9	12 - 15
Secondary and Higher Education			
Upper Secondary	3	12	15 - 18
Junior College	2	14	18 - 20
University (Undergraduate)	4	16	18 - 22
University (Graduate)	3	19	22 - 25

Source: JIL-Tokyo (2001)

Table II: Highest Degree by Completed Years of Schooling

Years of Schooling:	Lower Secondary	Upper Secondary Dropout	Upper Secondary Completed	Junior College Completed	University Dropout	University Completed	Total	(in %)
0 - 9	112	9	4	0	0	0	125	(4.4)
10	44	48	25	0	0	0	117	(4.2)
11	10	36	92	0	0	0	138	(4.9)
12	0	6	551	0	14	2	573	(20.4)
13	0	7	647	0	9	10	673	(23.9)
14	0	0	0	60	20	10	90	(3.2)
15	0	0	0	15	12	30	57	(2.0)
16	0	0	0	0	7	342	349	(12.4)
17	0	0	0	5	17	373	395	(14.0)
18 or more	0	0	0	6	6	285	297	(10.6)
Total	166	106	1319	86	85	1052	2814	(100.0)
(in %)	(5.9)	(3.8)	(46.9)	(3.1)	(3.0)	(37.4)	(100.0)	
Mean Years of Schooling	9.4	10.6	12.4	14.6	14.8	16.8	-	-

Source: Japanese Household Panel 1993-1997, own calculations.

Table III: Sheepskin Effects in Japan

	(1)	(2)	(3)	(4)	(5)	(6)
Upper Secondary Dropout	-	0.152**	-	0.165***	-	0.122**
		(0.062)		(0.063)		(0.059)
Upper Secondary Completed	-	0.231***	-	0.168**	-	0.099
		(0.050)		(0.072)		(0.072)
Marginal Effects over Upper Secondary:						
Junior College Completed	-	-0.034	-	-0.028	-	0.030
		(0.050)		(0.092)		(0.102)
University Dropout	-	0.044	-	0.045	-	0.095
		(0.057)		(0.062)		(0.073)
University Completed	-	0.179***	-	0.155*	-	0.193**
		(0.050)		(0.088)		(0.095)
Years of Schooling	0.067***	0.030***	-	-	-	-
	(0.004)	(0.009)				
10 Years	-	-	0.064	-0.024	0.068	0.008
			(0.066)	(0.064)	(0.057)	(0.055)
11 Years	-	-	0.173***	0.035	0.142***	0.055
			(0.064)	(0.076)	(0.053)	(0.073)
12 Years	-	-	0.294***	0.142*	0.222***	0.132*
			(0.055)	(0.080)	(0.046)	(0.076)
13 Years	-	-	0.336***	0.183**	0.268***	0.177**
			(0.053)	(0.079)	(0.044)	(0.076)
14 Years	-	-	0.365***	0.207*	0.279***	0.131
			(0.063)	(0.114)	(0.055)	(0.119)
15 Years	-	-	0.396***	0.162	0.323***	0.107
			(0.081)	(0.124)	(0.073)	(0.126)
16 Years	-	-	0.651***	0.349***	0.548***	0.272**
			(0.059)	(0.122)	(0.052)	(0.125)
17 Years	-	-	0.568***	0.270**	0.490***	0.218*
			(0.059)	(0.119)	(0.050)	(0.122)
18 Years	-	-	0.656***	0.357***	0.572***	0.297**
			(0.059)	(0.120)	(0.051)	(0.123)
Experience	0.045***	0.042***	0.040***	0.039***	0.024***	0.023***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Experience$^2\times10^{-2}$	-0.078***	-0.065***	-0.060***	-0.055**	-0.043*	-0.039*
	(0.024)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Tenure	-	-	-	-	0.020***	0.020***
					(0.005)	(0.005)
Tenure$^2\times10^{-2}$	-	-	-	-	-0.015	-0.014
					(0.024)	(0.025)
Constant	4.740***	4.994***	5.306***	5.295***	5.383***	5.378***
	(0.084)	(0.118)	(0.071)	(0.070)	(0.064)	(0.064)
Adjusted-R^2	0.25	0.26	0.26	0.27	0.32	0.32
Total Returns to Diploma over Upper Secondary:						
Junior College Completed	-	0.197***	-	0.141	-	0.129
		(0.074)		(0.116)		(0.123)
University Dropout	-	0.275***	-	0.214**	-	0.195*
		(0.076)		(0.093)		(0.100)
University Completed	-	0.410***	-	0.324***	-	0.292**
		(0.083)		(0.112)		(0.117)

Source: Japanese Household Panel 1993-1997, own calculations. *Notes:* Regression includes four year dummies; 2,814 observations of 735 individuals. Dependent variable is gross yearly labor earnings, including bonuses, units of 10,000 Yen. Standard errors in parentheses. Standard errors are corrected for the possibility that individual observations are not independent over time. *: significant at least at the 10%-level. **: significant at least at the 5%-level. ***: significant at least at the 1%-level.

Table IV: Sheepskin Effects by Firm Size

	(1)			(2)		
	Small Firm	Large Firm	Difference	Small Firm	Large Firm	Difference
Upper Secondary Dropout	0.153**	0.142	0.011	0.142**	0.085	0.056
	(0.071)	(0.208)	(0.217)	(0.064)	(0.203)	(0.211)
Upper Secondary Completed	0.095	0.235*	-0.139	0.084	0.162	-0.078
	(0.093)	(0.124)	(0.152)	(0.092)	(0.126)	(0.154)
Marginal Effects over Upper Secondary:						
Junior College Completed	-0.071	-0.140	0.069	0.049	-0.124	0.172
	(0.108)	(0.132)	(0.162)	(0.136)	(0.130)	(0.187)
University Dropout	0.230***	-0.112	0.341***	0.277***	-0.084	0.360***
	(0.042)	(0.091)	(0.098)	(0.068)	(0.093)	(0.121)
University Completed	0.192*	0.036	0.155	0.276**	0.039	0.236
	(0.114)	(0.120)	(0.156)	(0.117)	(0.120)	(0.167)
10 Years	0.015	0.086	-0.070	0.018	0.096	-0.078
	(0.068)	(0.169)	(0.180)	(0.057)	(0.156)	(0.164)
11 Years	0.060	0.019	0.040	0.040	0.061	-0.021
	(0.089)	(0.148)	(0.170)	(0.082)	(0.144)	(0.164)
12 Years	0.129	0.155	-0.025	0.106	0.165	-0.058
	(0.101)	(0.141)	(0.169)	(0.098)	(0.132)	(0.162)
13 Years	0.157	0.190	-0.032	0.125	0.211	-0.085
	(0.102)	(0.138)	(0.167)	(0.099)	(0.129)	(0.160)
14 Years	0.164	0.318*	-0.153	0.051	0.301*	-0.249
	(0.139)	(0.187)	(0.224)	(0.151)	(0.180)	(0.233)
15 Years	-0.108	0.330*	-0.438*	-0.216	0.347*	-0.563**
	(0.127)	(0.197)	(0.230)	(0.137)	(0.187)	(0.233)
16 Years	0.216	0.479**	-0.262	0.096	0.470***	-0.373
	(0.168)	(0.186)	(0.242)	(0.168)	(0.178)	(0.243)
17 Years	0.033	0.449**	-0.416*	-0.066	0.455***	-0.520**
	(0.156)	(0.184)	(0.231)	(0.157)	(0.176)	(0.233)
18 Years	0.296*	0.481***	-0.184	0.172	0.486***	-0.313
	(0.155)	(0.186)	(0.233)	(0.159)	(0.178)	(0.236)
Experience	0.036***	0.039***	-0.003	0.021**	0.027***	-0.006
	(0.011)	(0.008)	(0.012)	(0.010)	(0.009)	(0.013)
Experience$^2 \times 10^{-2}$	-0.077**	-0.031	-0.045	-0.047	-0.018	-0.029
	(0.035)	(0.024)	(0.040)	(0.031)	(0.030)	(0.041)
Tenure	-	-	-	0.024***	0.017**	0.007
				(0.006)	(0.008)	(0.009)
Tenure$^2 \times 10^{-2}$	-	-	-	-0.053	-0.028	-0.024
				(0.033)	(0.035)	(0.045)
Constant	5.392***	-0.164	-	5.428***	-0.152	-
	(0.095)	(0.158)		(0.090)	(0.141)	
Adjusted R^2		0.33			0.35	
Total Returns to Diploma over Upper Secondary:						
Junior College Completed	0.024	0.095	-0.070	0.133	0.038	0.095
	(0.141)	(0.181)	(0.222)	(0.164)	(0.179)	(0.242)
University Dropout	0.325***	0.123	0.202	0.361***	0.078	0.282
	(0.100)	(0.154)	(0.181)	(0.113)	(0.152)	(0.193)
University Completed	0.287**	0.271	0.016	0.360**	0.201	0.158
	(0.146)	(0.172)	(0.218)	(0.148)	(0.171)	(0.226)

Source: Japanese Household Panel 1993-1997, own calculations. *Notes:* Regression includes four year dummies; 2,814 observations of 735 individuals. Dependent variable is gross yearly labor earnings, including bonuses, units of 10,000 Yen. Standard errors in parentheses. Standard errors are corrected for the possibility that individual observations are not independent over time. *: significant at least at the 10%-level. **: significant at least at the 5%-level. ***: significant at least at the 1%-level.

Table V: Sheepskin Effects and Firm Tenure

	(1)	(2)	(3)		
			Small Firms	Large Firms	Difference
Upper Secondary Dropout	0.247***	0.250***	0.247***	0.538	-0.291
	(0.084)	(0.089)	(0.091)	(0.446)	(0.447)
Upper Secondary Dropout × Tenure	-0.016**	-0.016**	-0.014*	-0.050	0.036
	(0.008)	(0.008)	(0.008)	(0.051)	(0.050)
Upper Secondary Completed	0.207***	0.156*	0.184*	0.302*	-0.118
	(0.061)	(0.085)	(0.105)	(0.159)	(0.188)
Upper Secondary Completed × Tenure	-0.008*	-0.008*	-0.013**	-0.012*	-0.001
	(0.004)	(0.004)	(0.006)	(0.007)	(0.009)
Marginal Effects over Upper Secondary:					
Junior College Completed	0.013	0.083	0.230	-0.040	0.270
	(0.066)	(0.119)	(0.146)	(0.158)	(0.212)
Junior College Completed × Tenure	-0.005	-0.005	-0.021**	-0.007	-0.014
	(0.006)	(0.007)	(0.009)	(0.008)	(0.012)
University Dropout	0.037	0.052	0.221*	-0.215*	0.436***
	(0.118)	(0.114)	(0.114)	(0.112)	(0.156)
University Dropout × Tenure	0.001	0.004	0.009	0.012	-0.003
	(0.011)	(0.010)	(0.013)	(0.008)	(0.013)
University Completed	0.086	0.126	0.252*	-0.010	0.261
	(0.064)	(0.109)	(0.135)	(0.138)	(0.192)
University Completed × Tenure	0.007*	0.006	0.005	0.005	0.000
	(0.004)	(0.004)	(0.006)	(0.005)	(0.008)
Years of Scholling	0.031***	-	-	-	-
	(0.009)				
10 Years	-	0.003	0.011	0.083	-0.072
		(0.055)	(0.055)	(0.179)	(0.186)
11 Years	-	0.061	0.027	0.074	-0.047
		(0.073)	(0.082)	(0.165)	(0.183)
12 Years	-	0.137*	0.094	0.177	-0.083
		(0.076)	(0.096)	(0.154)	(0.181)
13 Years	-	0.179**	0.114	0.218	-0.104
		(0.076)	(0.098)	(0.151)	(0.179)
14 Years	-	0.133	-0.029	0.312	-0.341
		(0.128)	(0.151)	(0.205)	(0.255)
15 Years	-	0.118	-0.271*	0.362*	-0.633**
		(0.132)	(0.153)	(0.207)	(0.260)
16 Years	-	0.278**	0.065	0.478**	-0.412
		(0.131)	(0.163)	(0.201)	(0.258)
17 Years	-	0.232*	-0.087	0.466**	-0.554**
		(0.129)	(0.160)	(0.199)	(0.254)
18 Years	-	0.314**	0.159	0.501**	-0.342
		(0.129)	(0.159)	(0.200)	(0.255)
Experience	0.023***	0.022***	0.024**	0.025***	-0.001
	(0.007)	(0.007)	(0.010)	(0.009)	(0.013)
Experience$^2 \times 10^{-2}$	-0.041*	-0.036	-0.058*	-0.007	-0.052
	(0.024)	(0.024)	(0.031)	(0.031)	(0.042)
Tenure	0.024***	0.024***	0.032***	0.028***	0.004
	(0.006)	(0.006)	(0.007)	(0.011)	(0.013)
Tenure$^2 \times 10^{-2}$	-0.006	-0.006	-0.039	-0.032	-0.007
	(0.024)	(0.025)	(0.033)	(0.036)	(0.047)
Constant	5.056***	5.349***	5.344***	-0.188	-
	(0.120)	(0.078)	(0.100)	(0.180)	
Adjusted R^2	0.32	0.32		0.36	

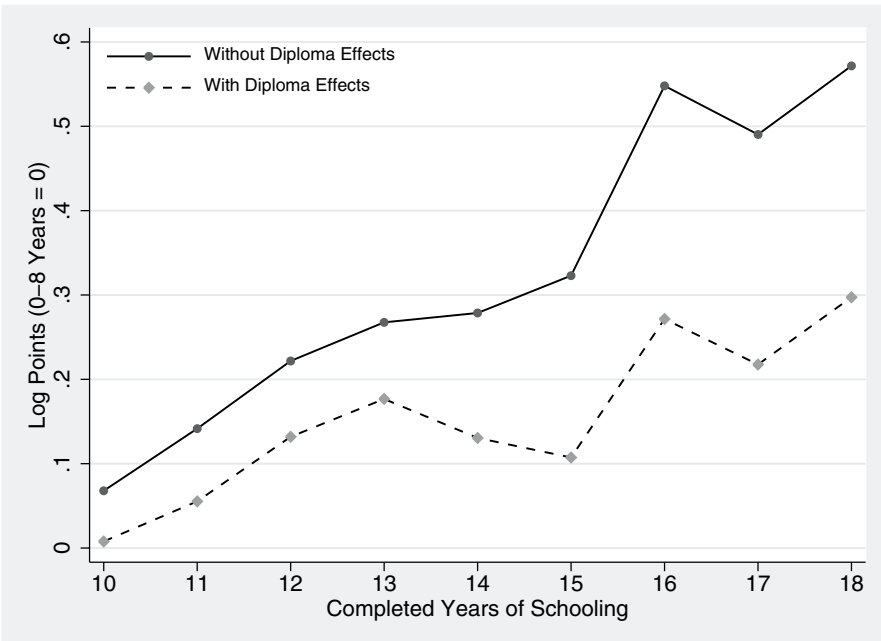
Source: Japanese Household Panel 1993-1997, own calculations. *Notes:* Regression includes four year dummies; 2,814 observations of 735 individuals. Dependent variable is gross yearly labor earnings, including bonuses, units of 10,000 Yen. Standard errors in parentheses. Standard errors are corrected for the possibility that individual observations are not independent over time. *: significant at least at the 10%-level. **: significant at least at the 5%-level. ***: significant at least at the 1%-level.

Table VI: Cumulative Sheepskin Effects by Firm Tenure

	Firm Tenure (Years)	(1)	(2)	(3)	
				Small Firms	Large Firms
Junior College Completed	0	0.220**	0.239*	0.414**	0.262
		(0.086)	(0.141)	(0.177)	(0.215)
	5	0.154**	0.175	0.247	0.167
		(0.070)	(0.131)	(0.159)	(0.200)
	10	0.088	0.111	0.079	0.071
		(0.069)	(0.131)	(0.156)	(0.197)
	15	0.022	0.047	0.089	0.024
		(0.085)	(0.140)	(0.169)	(0.205)
University Dropouts	0	0.243**	0.208	0.406***	0.087
		(0.128)	(0.136)	(0.153)	(0.181)
	5	0.211**	0.191*	0.387***	0.089
		(0.088)	(0.109)	(0.123)	(0.169)
	10	0.178**	0.174	0.368***	0.090
		(0.075)	(0.106)	(0.126)	(0.170)
	15	0.145	0.158	0.350**	0.091
		(0.100)	(0.129)	(0.161)	(0.185)
University Completed	0	0.292***	0.282**	0.436***	0.293
		(0.093)	(0.133)	(0.168)	(0.199)
	5	0.290***	0.275**	0.394**	0.254
		(0.081)	(0.126)	(0.154)	(0.189)
	10	0.288***	0.268**	0.352**	0.216
		(0.078)	(0.124)	(0.149)	(0.187)
	15	0.286***	0.262**	0.310**	0.178
		(0.083)	(0.129)	(0.153)	(0.193)

Source: Japanese Household Panel 1993-1997, own calculations. *Notes:* Calculations are based on the estimated coefficients from Table V. Standard errors in parentheses. *: significant at least at the 10%-level. **: significant at least at the 5%-level. ***: significant at least at the 1%-level.

Figure 1: Total Returns to Years of Schooling



Source: JPSC; own calculations.

Appendix Table 1: Descriptive Statistics

	Total		Small Firms		Large Firms	
	Mean	SD	Mean	SD	Mean	SD
High School Dropout	0.038	0.190	0.075	0.264	0.011	0.104
High School Completed	0.469	0.499	0.522	0.500	0.431	0.495
Junior College Completed	0.031	0.172	0.022	0.148	0.036	0.188
University Dropout	0.030	0.171	0.052	0.222	0.015	0.120
University Completed	0.374	0.484	0.210	0.407	0.491	0.500
Years of Schooling	13.990	2.733	13.039	2.715	14.666	2.537
9 Years	0.042	0.200	0.084	0.277	0.012	0.107
10 Years	0.049	0.216	0.073	0.260	0.032	0.177
11 Years	0.204	0.403	0.235	0.424	0.181	0.385
13 Years	0.239	0.427	0.252	0.435	0.230	0.421
14 Years	0.032	0.176	0.030	0.170	0.033	0.180
15 Years	0.020	0.141	0.015	0.123	0.024	0.152
16 Years	0.124	0.330	0.064	0.245	0.167	0.373
17 Years	0.140	0.347	0.093	0.291	0.174	0.379
18 Years	0.106	0.307	0.067	0.250	0.133	0.340
Experience	13.769	5.589	14.459	5.614	13.279	5.521
Tenure	9.674	6.179	8.021	5.878	10.849	6.119
1994	0.197	0.398	0.202	0.402	0.194	0.395
1995	0.200	0.400	0.203	0.402	0.198	0.398
1996	0.200	0.400	0.192	0.394	0.205	0.404
1997	0.192	0.394	0.174	0.379	0.205	0.404
Observations	2,814		1,169		1,645	

Source: Japanese Household Panel 1993-1997, own calculations.