and bear risks that the applicant turns out to be unqualified. Hiring an unqualified applicant is especially costly in Japan, where the dismissals are very costly. Since Japanese high schools have much better information on their students than the prospective employers do, they can screen the job applicants beforehand to reduce risks borne by the employers. Therefore, firms prefer to rely on the school-based hiring than open the door to nonregular workers and unemployed. Thus, even though the average nonregular worker in a cohort that entered the labor market during a recession is likely to be of higher quality than those in a cohort that entered the labor market during a boom, it may be almost equally difficult for them to get back to the market of regular jobs.

To see this point, suppose that each person stays in the labor force for two periods and there are two states: good ($G$) or bad ($B$). Each cohort consists of workers heterogeneous in productivity. The cohort size is fixed to $N$, and the distribution of productivity is uniform between 0 and $N$: $U[0,N]$. The number of vacancies for regular jobs is $E_B$ in a bad year and $E_G$ in a good year, where $E_B < E_G \leq N$. Students who cannot find any jobs become unemployed, and apply for regular jobs in the next period if any jobs are open to them. Each firm knows the distribution of productivity and can distinguish graduating seniors from unemployed people who have already left schools. However, the firm cannot observe each worker's productivity until it hires him. On the other hand, when school intervenes, the school can observe each student's productivity.[10] To keep the discussion as simple as possible, hereafter we describe the process as if there were only one firm offering a fixed wage to everyone.[11]

The job markets under different institutional settings work as follows. Without school's mediation, the employer randomly picks an applicant from the pool of graduating seniors or the pool of unemployed from the previous cohort. Then, it hires the applicant and learns his productivity. If dismissals are not too costly, a worker whose productivity turned out to be below a certain threshold is fired and goes back to the pool of job seekers. The firm no longer remembers workers whom it fired[12] and picks another applicant and repeats the same process until all vacancies are filled with workers above the threshold. Hence, at the end, the worst jobseekers are left unemployed. We call this "the U.S.-type market" hereafter. If dismissals are too costly, firms have to be stuck with the randomly picked workers. Lastly, under the school-based hiring system, the school simply assigns regular jobs to students in order of their productivity, and the least productive ones are left unemployed.

10. This is an extreme assumption just for simplicity. In reality, firms can screen job applicants by interviews to some extent, and school's information is not perfect. The point is that schools have better information than firms.

11. We are assuming that wages do not adjust and the number of vacancies is rationed. Although exploring why wages do not adjust is beyond the scope of this paper, the Wage Census shows that the starting salaries for Japanese new graduates (conditional on educational background) have been downwardly rigid in Japan since the 1980s. Having multiple firms does not change the results qualitatively but complicates the case without school's mediation. For the case of the school-based hiring system, introducing heterogeneous employers shows that, even if some firms start hiring from the pool of unemployed, the jobs available to unemployed workers are far worse than the job that the most productive unemployed worker could have obtained if he had graduated in a good year.

12. Because, in reality, he would apply for jobs offered by other employers.

Because we are interested in job reallocation during upturns, consider the case where a good year comes after a bad year. The most productive $E_B$ students who graduated in year t-1 have settled in regular jobs, and the remaining $N-E_B$ students have become unemployed. In year t, the total number of job openings increases to $E_G$. Since the best $E_B$ students graduating in this year are more productive than any unemployed people from the previous cohort, they must settle in regular jobs in both the U.S.-type market and the school-based hiring system. The distribution of productivity among the rest of the students is the same as the distribution among the unemployed people who graduated in the previous year: $U[0,N-E_B]$.

If the firm continued to hire from the pool of graduating seniors, the average productivity among the students who are still seeking for a job would fall below the average productivity among unemployed people from the previous cohort. Thus, in the U.S.-type market, the firm should start hiring from the pool of unemployed people when the best $E_B$ students have been already hired. In contrast, the school-based hiring system ensures that students who are assigned to regular jobs are at least as productive as $N-E_G$. Recall that the average productivity of the unemployed from the previous cohort is $\frac{N-E_B}{2}$. Then, the firm is unwilling to hire from the pool of unemployed people from the previous cohort if

$$(1) \quad N-E_G \geq \frac{N-E_B}{2}$$

Inequality Equation 1 can be rewritten as follows:

$$(2) \quad E_G-E_B \leq 1/2[N-E_B]$$

This simple model therefore implies that the firm does not hire from the pool of unemployed during an upturn unless the boost in labor demand exceeds half of the level of unemployment during the preceding recession. Although the model is overly simplified and exaggerates the difference in information on workers' productivity between the school and the firm, it illustrates how the subsidized screening of new graduates and strict employment protection could deprive young Japanese who dropped out from the system of opportunities to recover the initial loss.

In reality, many high school graduates in Japan who failed to obtain a regular job upon graduation find a nonregular job, thus "unemployed" in the above model includes nonregular workers. This is roughly 15–30 percent of high school graduates who do not proceed to college, and the ratio is countercyclical. If they are trapped in nonregular job and unemployment regardless of labor market conditions in the year they graduated, a recession at graduation has a persistent negative effect at the cohort level by reducing the number of regular jobs available to the cohort.

The loss of opportunity to accumulate human capital can magnify the negative effect of graduation during a recession. As pointed by Oreopoulos, von Wachter, and Heisz (2006), it is difficult to explain long-term effects of short-term shocks to the labor market with models of human capital accumulation unless job mobility is limited. However, if a worker who enters the labor force during a recession is forced to enter a sector with fewer training opportunities than he would have otherwise and it takes time to dissolve this initial match, the loss of opportunity to accumulate

human capital also will lower the average productivity of the cohort in the long run. Provided that provisional workers have much fewer opportunities of training, the loss of work experience on the regular employment track is likely to lower the average productivity of the cohort in the long run and aggravate the loss of earnings for less-educated Japanese men.

Given the lower turnover rate in Japan, the process of dissolving initial bad matches is expected to take a longer time in Japan. Nevertheless, the turnover rate is lower and returns to experience/tenure are greater for the more-educated group in both countries. Thus, without additional mechanisms that affect less-educated Japanese, the resulting penalties for graduating during a recession would be stronger for the more-educated group in both Japan and the United States. Hence, if the negative effect of graduating during a recession is particularly strong for less-educated Japanese men, it is likely to be attributable to the lack of opportunity to rejoin in the regular job market after graduating without a job.

## IV. Data and Methodology

Our sample consists of Japanese men and American white men who completed their education in 1983 or later and have potential experience in the range of one to 12 years. We restrict our sample to men in order to avoid additional complications from the labor supply behavior of married women, which is quite different in the United States and Japan. We also drop nonwhites from the sample of American men to keep away from issues related to racial disparities.

Our primary sources of data for Japanese men are the Special Survey of the Labour Force Survey (*Roudouryoku Chousa Tokubetsu Chousa* 1986–2001) and the Detailed Supplement to the Labour Force Survey (*Roudouryoku Chousa Tokutei Chosahyo* 2002–2005), both conducted by the Statistics Bureau. The Special Survey was conducted annually in February until 2001, and each year's sample consists of about 90,000 individuals older than 15 in about 40,000 randomly drawn households. In 2002, the annual Special Survey was replaced with the monthly detailed supplement with a sample size of 23,000 individuals; to avoid seasonality bias, we use February samples only. Both surveys are cross-sectional and include the same questions on annual earnings, detailed employment status and employer characteristics, and basic demographic characteristics.

We use the March Supplement to the Current Population Survey, conducted by the Census Bureau and the Bureau of Labor Statistics, to do the same exercise for American men. The March supplement to the Current Population Survey is also cross-sectional, consists of a random sample of households and contains most of the key variables in a comparable form. The sample size varies from about 100,000 in the 1980s to 200,000 individuals in the 2000s.

One of the primary dependent variables is log real annual earnings.[13] This is the total income from salary and wages (excluding self-employed persons in incorpo-

13. Ideally, using the average hourly earnings would be helpful to make our results more comparable to the much of the U.S. literature. However, we had to give up calculating hourly wages because the Japanese Labour Force Survey does not include information on the weeks worked last year or usual hours per week, while its only income measure is total annual labor income in the previous year.

rated business) of the person in the past year, deflated by the consumer price index. Note that income from other sources is not included. Also, even if the respondent is not employed in the reference week, he is supposed to report positive earnings as long as he has worked at some point in the previous year. Thus, only people who report zero income for the whole year are dropped from the regression. The appendixes describe construction of the variable and detail of those missing observations. The other dependent variables including employment status and weekly hours worked are directly taken from the survey questionnaires and measured in the reference week of each survey. The measure of regional labor market conditions for Japan is the unemployment rates for ten regions based on the monthly Labour Force Survey, which are available since 1983. For the United States, we use the state unemployment rates issued by the Bureau of Labor Statistics as the Local Area Unemployment Statistics. The Japanese regions are on average one-fifth the size of the average American state, while having twice the average population.

We define a cohort as a group of people who entered the labor market in the same year and region or state, and then assign each person a vector of past and current regional unemployment rates based on his cohort. Since both the Labour Force Survey and the Current Population Survey are cross-sectional data sets lacking detailed employment history, we have to compute the year of graduation from the year of birth and educational background. Students in Japan typically receive job offers by the autumn of their last year of enrollment, while they graduate in March of the following year. Thus, we define entry-year $y$ for the Japanese sample as follows: *year of birth* + 6 + *schooling* for those born in April-December, and *year of birth* + 5 + *schooling* for those born in January-March.[14] For the U.S. sample, we compute year of graduation $y$ as year of survey − age + 6 + the highest grade attended. This corresponds to the year of graduation for a person who entered elementary school at age 6 and went straight to the highest grade. Also, we have to use the region/state of current residence as the best available proxy for the region/state of residence at entry. The appendixes provide a lengthy discussion about the adequacy of our definition of cohorts and reservations that come from measurement errors.

We estimate the effects of the unemployment rate at entry to the labor market on current employment status and earnings net of region-fixed components and year-fixed components.[15] It is also necessary to control for temporary macro shocks at the time of the survey because unemployment rates may be autocorrelated, and the effect of the contemporaneous unemployment rate is itself worth estimating. To take into account these issues, we estimate the following probit model:

$$(3)\quad Y_{ityr} = 1 \text{ if } Y^{*}_{ityr} = \beta_{(t-y)} u_{yr} + \gamma_{(t-y)} u_{tr} + \delta' X_{it} + \phi_t + \eta_r + \theta_r t + \nu_y + \varepsilon_{ityr} > 0$$
$$= 0 \text{ otherwise}$$

14. The Japanese Labor Force Survey does not ask years of education, but asks the school attended. Thus, we define years of education as follows: nine for junior high school graduates, 12 for high school graduates, 14 for junior/tech college graduates, 16 for college graduates and those with further education.

15. The results from specifications without year dummies are presented in the appendixes for sensitivity checks.

where $Y_{ityr}$ is an indicator variable that takes one if employed, for person $i$ who left school in year $y$ and in region $r$ observed in year $t$, $u_{yr}$ and $u_{tr}$ are the unemployment rates at entry and at present, and $X_{it}$ is other control variables including educational background and potential experience in year $t$. $\phi_t$ is a survey-year fixed effect, $\eta_r$ is a region fixed effect, $\theta_r$ is the coefficient of linear trend, which varies with region, and $\nu_y$ is an entry-year fixed effect. The remaining errors, $\varepsilon_{ityr}$, include a random cohort-region effect and a random region-calendar year effect, which are likely to be autocorrelated. To account these aggregate random shocks, standard errors of coefficients are estimated by block bootstrap with clusters by region/state.[16] Likewise, the basic form of the earnings equation to be estimated is written as follows:

$$(4) \quad logI_{ityr} = \beta_{(t-y)}u_{yr} + \gamma_{(t-y)}u_{tr} + \delta' X_{it} + \phi_t + \eta_r + \theta_r t + \nu_y + \varepsilon_{iyr}$$

where $I_{ityr}$ is annual earnings.

We allow the coefficients of the unemployment rates, $\beta$ and $\gamma$, to vary with the years since entry to see the persistence of the effect. Ideally, we would like to estimate separate $\beta$ and $\gamma$ by every single year of potential experience. However, in consideration of the sample size of each cohort, we choose a more parsimonious specification with separate $\beta$s and $\gamma$s for four ranges of potential experience (1–3, 4–6, 7–9, and 10–12 years).

Before going into the main analyses, let us check the comparability of Japanese and American data. The summary statistics of the micro data sets are shown in Table 1. American men are on average more-educated, and the earnings gap between the more-educated group and the less-educated group is larger for American men. Nevertheless, within each group by educational background, the two data sets look fairly similar except that the employment rate is slightly higher for Japanese men. The average sample size per cohort (defined by region/state and year of graduation) is 222 for Japanese men and 135 for American men.

On the other hand, the unemployment rates in Japan and the United States have moved quite differently. Figure 1 plots the national average unemployment rates and the minimum and the maximum of region/state unemployment rates over time for Japan and the United States in 1983–2003. Obviously, both the level of the average unemployment rate and the variation across states are much greater for the United States than Japan. Therefore, a one percentage point rise in the unemployment rate could have a greater impact in Japan than in the United States, just because of the differences in the average level.

Further, Table 2 shows summary statistics of the regional unemployment rates, both raw levels and net of the year- and the region/state- fixed effects and the region/state specific linear trend. Variation net of these fixed effects and trend terms is essential for identification. Admittedly, a large part of the variation in the raw rates is absorbed by the fixed effects; especially, R-squared for the Japanese regional rates is as high as 0.96, while that for the American state rates is 0.84. This could be partly because the Japanese data have fewer data points and the fixed effects are

16. We use block bootstrap to cluster the standard errors by region, because the ordinary clustered sandwich estimator is likely to overestimate the standard errors given only ten regions in Japan. Even the block bootstrapping substantially boosts the standard errors compared to those estimated with clustering by region-year.

**Table 1**
*Summary Statistics*

| | Japan, High School or Less | Japan, Junior College or more | United States, schooling $\leq 12$ | United States, schooling $> 12$ |
|---|---|---|---|---|
| Observations | 53,557 | 39,592 | 63,611 | 76,699 |
| Experience = 1–3 | 17,833 | 11,417 | 19,849 | 17,643 |
| Experience = 4–6 | 14,759 | 12,229 | 17,297 | 21,982 |
| Experience = 7–9 | 12,083 | 9,399 | 14,753 | 19,994 |
| Experience = 10–12 | 8,882 | 6,547 | 11,712 | 17,080 |
| Educational background | Without high school diploma: 6,745, high school diploma: 46,812 | Junior/tech college (two-year): 11,383, four-year college or more: 28,209 | Average years of schooling: 11.6; S = 12: 49,798 | Average years of schooling: 15.4; S < 16: 35,216 |
| Log real earnings | (10,000 yen in 2000) | | (100 dollars in 2000) | |
| Experience = 1–3 | 5.10 | 5.50 | 4.44 | 5.12 |
| Experience = 4–6 | 5.41 | 5.79 | 4.88 | 5.48 |
| Experience = 7–9 | 5.60 | 5.99 | 5.16 | 5.70 |
| Experience = 10–12 | 5.73 | 6.15 | 5.31 | 5.86 |
| Employed | | | | |
| Experience = 1–3 | 76.5% | 92.2% | 73.9% | 88.8% |
| Experience = 4–6 | 88.5% | 94.7% | 81.6% | 90.6% |
| Experience = 7–9 | 90.5% | 95.5% | 84.8% | 92.4% |
| Experience = 10–12 | 90.5% | 96.2% | 86.6% | 93.8% |

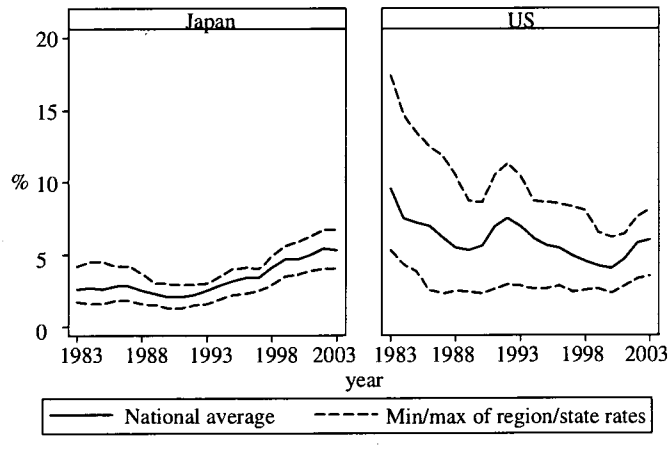


**Figure 1**
*Unemployment rate in Japan and the United States: 1983–2003*

**Table 2**
*Summary Statistics of Region/State Unemployment Rates 1983–2003*

| | Observations | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Regions in Japan | 210 | 3.21 | 1.23 | 1.3 | 6.7 |
| Net of region fixed effects, year fixed effects and region specific linear trend[a] | | (0.00) | (0.22) | (−0.60) | (0.89) |
| States in the United States | 1,071 | 5.74 | 1.95 | 2.3 | 17.4 |
| Net of state fixed effects, year fixed effects and state-specific linear trend[a] | | (0.00) | (0.75) | (−2.07) | (3.27) |

a. Residuals from a regression of raw rates on year dummies and region/state dummies.

over fitted. Yet, studies on the wage curve in Japan show that regional unemployment rates have significant impacts on contemporaneous wages even with controls for region fixed effects and time dummies (Montgomery 1993; Poot and Doi 2005).

Thus, we believe that we can identify the effect of the unemployment rate at entry net of region and year dummies as well.

Note that entry to the labor market is, by definition, observed only once for each person. Therefore, even if we had a panel data set, we could not control for individual fixed effects. Also, as shown in Appendix, the effect of contemporaneous unemployment rate on the enrollment rate is weak, suggesting that endogeneity of entry is quantitatively negligible.[17] A recession at graduation from high school does not significantly affect the selection of those who proceeds to college, either. Thus, the major limitation of cross-section data is that the year and place of graduation are measured less precisely than panel data. Given that the measurement errors in the year and region of graduation are larger for American men (see Appendix), both the attenuation bias and the size of average unemployment rate will make the estimates for American men smaller than those for Japanese men. However, the difference between more and less-educated Japanese men and that between more and less-educated American men will be comparable because more-educated men are more mobile in both countries.

## V. Estimated Effects of a Recession at Entry

### *A. Effects on Employment Status*

Table 3 shows the effect of a one percentage point rise in the unemployment rate at entry on the likelihood of being employed in the reference week of the survey. The estimated equations are exactly the same as Equation 3. The unemployment rate at entry has a persistent negative effect for less-educated Japanese men: A one percentage point rise in the unemployment rate at entry reduces the likelihood of employment by 3–4 percentage points for over twelve years. The effect for less-educated American men is also negative and marginally significant, but the size of the effect is small. The effect is almost zero and statistically insignificant for more-educated groups both in Japan and in the United States, consistent with the existence evidence for a negligible effect on employment for college graduates by Oreopoulos, von Wachter, and Heisz (2006).

The negative effect of a one percentage point rise in the unemployment rate is not necessarily the same magnitude as the positive effect of a one percentage point fall in the unemployment rate. To see if there is any asymmetry in the response to the unemployment rate between upturns and downturns, we take interactions of the unemployment rate at entry and an indicator variable for a declining unemployment rate (upturns).[18] As shown in Table 4, the negative effect for Japanese less-educated

17. This is an important difference from the study of the effect of labor market condition at the beginning of job. On the one hand, each person can have multiple jobs over time. On the other hand, each worker is likely to have much more choice in the timing of starting a job than the timing of completing education. Thus, it is not surprising that Beaudry and DiNardo (1991) find different results from pooled regressions and fixed effect regressions exploiting multiple spells per worker.

18. This variable takes one if the unemployment rate of the year is lower than the previous year's rate, and zero otherwise.

**Table 3**
*The Effect of the Unemployment Rate at Entry on Employment*

| | Japan | | United States | |
|---|---|---|---|---|
| | High school | College | Schooling ≤ 12 | Schooling > 12 |
| Marginal effects | | | | |
| Unemployment rate at entry | | | | |
| × experience 1–3 years | −3.26% | −0.51% | −0.67% | −0.20% |
| × experience 4–6 years | −3.12% | −0.08% | −0.30% | −0.12% |
| × experience 7–9 years | −3.75% | 0.62% | −0.30% | −0.13% |
| × experience 10–12 years | −3.93% | −0.01% | −0.55% | −0.37% |
| Probit Coefficients | | | | |
| Unemployment rate at entry | | | | |
| × experience 1–3 years | −0.170 | −0.061 | −0.026 | −0.013 |
| | (0.074) | (0.056) | (0.012) | (0.013) |
| × experience 4–6 years | −0.162 | −0.009 | −0.011 | −0.008 |
| | (0.072) | (0.064) | (0.010) | (0.014) |
| × experience 7–9 years | −0.195 | 0.076 | −0.011 | −0.008 |
| | (0.061) | (0.064) | (0.011) | (0.010) |
| × experience 10–12 years | −0.204 | −0.001 | −0.021 | −0.025 |
| | (0.058) | (0.083) | (0.011) | (0.013) |
| Observations | 53,513 | 39,562 | 63,611 | 76,699 |
| Pseudo $R^2$ | 0.10 | 0.05 | 0.06 | 0.03 |

Note: Standard errors in parenthesis are calculated by bootstrapping (reps = 200) with clustering by state/region. Other controls included are potential experience, education (dummies for the Japanese sample, years of schooling for the American sample), graduation year dummies, region dummies, survey-year dummies, and region-specific linear trends.

men remains substantial and statistically significant while the difference in the estimated effect is small and statistically insignificant for all the other groups.

To look at the effect on hours worked, we have to restrict the sample to those employed in the reference week because the data on hours worked are not available for those who are not employed. Since the unemployment rate at entry has a negative effect on the likelihood of being employed for less-educated Japanese men, the estimated effect on hours worked conditional on being employed may be biased upward for this group. The upper panel of Table 5 shows that the estimated effect of the unemployment rate at entry on hours worked is not statistically significant for any groups. The size of the effect is also small; a one percentage point rise in the unemployment rate would change weekly hours by less than an hour. It suggests that, if there is a negative effect on earnings, it comes from a fall in wages per hour and/or a decline in employment.

**Table 4**
*The Effect of the Unemployment Rate at Entry on Employment, Allowing Different Effect between Upturns and Downturns*

| | Japan | | United States | |
|---|---|---|---|---|
| | High school | College | Schooling ≤ 12 | Schooling > 12 |
| Marginal effects | | | | |
| Unemployment rate at entry during downturn | | | | |
| × experience 1–3 years | −3.5% | −0.7% | −0.79% | −0.20% |
| × experience 4–6 years | −3.1% | −0.3% | −0.39% | −0.10% |
| × experience 7–9 years | −3.6% | 0.5% | −0.45% | −0.15% |
| × experience 10–12 years | −4.3% | 0.0% | −0.70% | −0.31% |
| Unemployment rate at entry during upturn | | | | |
| × experience 1–3 years | −3.9% | −0.5% | −0.64% | −0.17% |
| × experience 4–6 years | −4.2% | −0.3% | −0.35% | −0.14% |
| × experience 7–9 years | −4.3% | 0.7% | −0.29% | −0.02% |
| × experience 10–12 years | −4.9% | 0.5% | −0.53% | −0.38% |
| Probit coefficients | | | | |
| Unemployment rate at entry to the market | | | | |
| × experience 1–3 years | −0.175 | −0.079 | −0.030 | −0.014 |
| | (0.093) | (0.066) | (0.014) | (0.014) |
| × experience 4–6 years | −0.158 | −0.030 | −0.015 | −0.006 |
| | (0.084) | (0.083) | (0.012) | (0.015) |
| × experience 7–9 years | −0.180 | 0.062 | −0.017 | −0.010 |
| | (0.068) | (0.072) | (0.011) | (0.013) |
| × experience 10–12 years | −0.215 | −0.006 | −0.027 | −0.021 |
| | (0.073) | (0.090) | (0.013) | (0.015) |
| Unemployment rate at entry × upturn dummy | | | | |
| × experience 1–3 years | −0.021 | 0.024 | 0.006 | 0.002 |
| | (0.029) | (0.041) | (0.008) | (0.009) |
| × experience 4–6 years | −0.054 | −0.005 | 0.001 | −0.003 |
| | (0.020) | (0.055) | (0.008) | (0.009) |
| × experience 7–9 years | −0.037 | 0.018 | 0.006 | 0.008 |
| | (0.027) | (0.049) | (0.008) | (0.009) |
| × experience 10–12 years | −0.033 | 0.067 | 0.006 | −0.005 |
| | (0.020) | (0.052) | (0.009) | (0.008) |

*(continued)*

**Table 4** *(continued)*

| | | | | |
|---|---|---|---|---|
| Observations | 49,336 | 36,668 | 63,611 | 76,699 |
| Pseudo $R^2$ | 0.10 | 0.05 | 0.06 | 0.03 |

Note: Standard errors in parenthesis are calculated by bootstrapping (reps = 200) with clustering by region/state. Other controls included are the upturn dummy itself, the unemployment rate in survey year, potential experience, education dummies, graduation year dummies, region dummies, survey-year dummies, and region-specific linear trends.

**Table 5**
*The effect of the unemployment rate at entry on fulltime status*

(1) Hours worked in last week

| | Japan | | United States | |
|---|---|---|---|---|
| | High school | College | Schooling ≤ 12 | Schooling > 12 |
| OLS Coefficients | | | | |
| × experience 1–3 years | −0.609 | 0.587 | 0.047 | −0.051 |
| | (0.949) | (0.322) | (0.102) | (0.0106) |
| × experience 4–6 years | −0.356 | 0.551 | 0.018 | 0.022 |
| | (0.754) | (0.365) | (0.081) | (0.078) |
| × experience 7–9 years | −0.933 | 0.324 | 0.035 | 0.101 |
| | (0.623) | (0.294) | (0.088) | (0.081) |
| × experience 10–12 years | −0.838 | 0.570 | 0.031 | 0.029 |
| | (0.718) | (0.361) | (0.078) | (0.072) |
| Observations | 46,169 | 37,660 | 50,250 | 68,430 |
| $R^2$ | 0.02 | 0.01 | 0.04 | 0.03 |

*(continued)*

Even though the overall effect on average hours is small, there can be a significant effect on fulltime/parttime status. The lower panel of Table 5 shows the effect on the likelihood of being fulltime.[19] The effect is negative and persistent for less-educated Japanese men, and weaker and marginally significant for less-educated American men. There is no statistically significant negative effect for more-educated groups, and the overall pattern across the four groups is similar to the effect on employment.

19. Fulltime workers are those who worked 35 hours or more in the reference week.

**Table 5** *(continued)*

(2) Pr(fulltime | employed)

| | Japan | | United States | |
|---|---|---|---|---|
| | High school | College | Schooling ≤ 12 | Schooling > 12 |
| Marginal effects | | | | |
| × experience 1–3 years | −2.4% | 0.5% | −0.5% | −0.4% |
| × experience 4–6 years | −1.7% | 0.4% | −0.3% | −0.4% |
| × experience 7–9 years | −2.2% | 0.1% | 0.2% | −0.4% |
| × experience 10–12 years | −1.6% | 1.4% | −0.6% | −0.2% |
| Probit Coefficients | | | | |
| × experience 1–3 years | −0.161 | 0.053 | −0.019 | −0.019 |
| | (0.075) | (0.059) | (0.012) | (0.013) |
| × experience 4–6 years | −0.119 | 0.041 | −0.010 | −0.019 |
| | (0.056) | (0.048) | (0.012) | (0.010) |
| × experience 7–9 years | −0.152 | 0.012 | 0.007 | −0.019 |
| | (0.052) | (0.055) | (0.014) | (0.011) |
| × experience 10–12 years | −0.109 | 0.145 | −0.022 | −0.011 |
| | (0.054) | (0.101) | (0.012) | (0.012) |
| Observations | 46,169 | 37,660 | 51,435 | 70,087 |
| Pseudo $R^2$ | 0.03 | 0.02 | 0.03 | 0.02 |

Note: Standard errors in parenthesis are calculated by bootstrapping (reps = 200) with clustering by state/region. Other controls included are the unemployment rate in survey year, potential experience, education (dummies for the Japanese sample, years of schooling for the American sample), graduation year dummies, region dummies, survey-year dummies, and region-specific linear trends.

### *B. Effect on Earnings*

Figure 2 shows the correlation between each cohort's log annual earnings and its unemployment rate at entry *without* controls for year- or region- fixed effects. Specifically, we split the sample into 16 groups by country, educational background and experiences, and regress log annual earnings on the contemporaneous unemployment rate, years of schooling and experience by single year. Then we take the average of the residuals from this regression for each cohort and plot it over the unemployment rate at entry. Not surprisingly, the unemployment rate at entry is negatively correlated with earnings for groups within three years from entry regardless of country and educational background. However, the persistence of the correlation shows an interesting pattern: In Japan, the negative correlation is more persistent for the less-educated group, while the opposite seems to be the case in the United States.

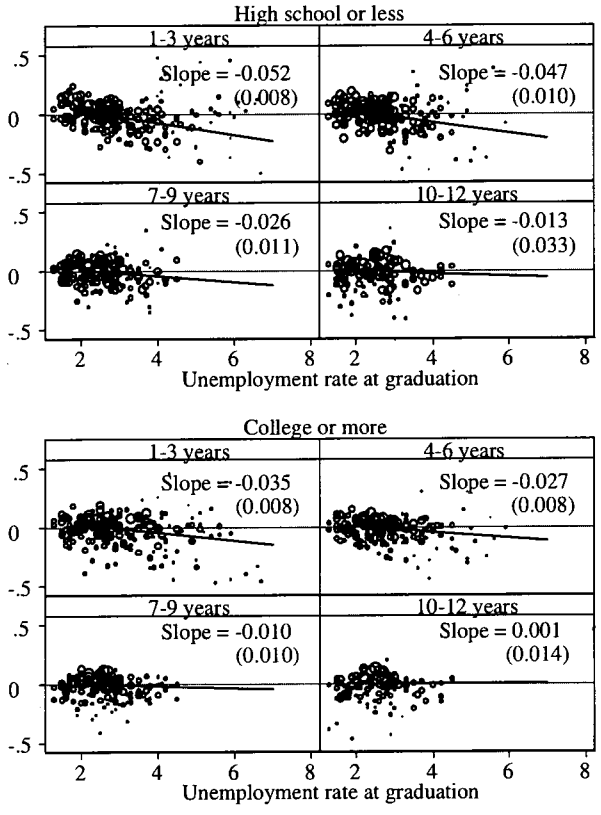


**Figure 2a**

*Regional unemployment rates and log earnings (Japan)*

Note: "cohort" is defined by region and year of graduation. Each cohort is weighted by the number of individual observations that belong to the cohort. Log annual earnings are residuals net of the contemporaneous unemployment rate, years of schooling and experience by single year. Figures in parenthesis under the slopes are standard errors.

This pattern is robust to the inclusion of region- and graduation year-fixed effects. Table 6 reports the estimated coefficients of the unemployment rate at entry and the contemporaneous unemployment rate on log real annual earnings. The estimated equations are exactly the same as Equation 4.[20] A high unemployment rate at entry

20. Appendix Table A7 presents estimates with controls for industry. It makes the estimated effect slightly weaker for Japanese men, but it does not change the relative pattern across groups with more and less education.

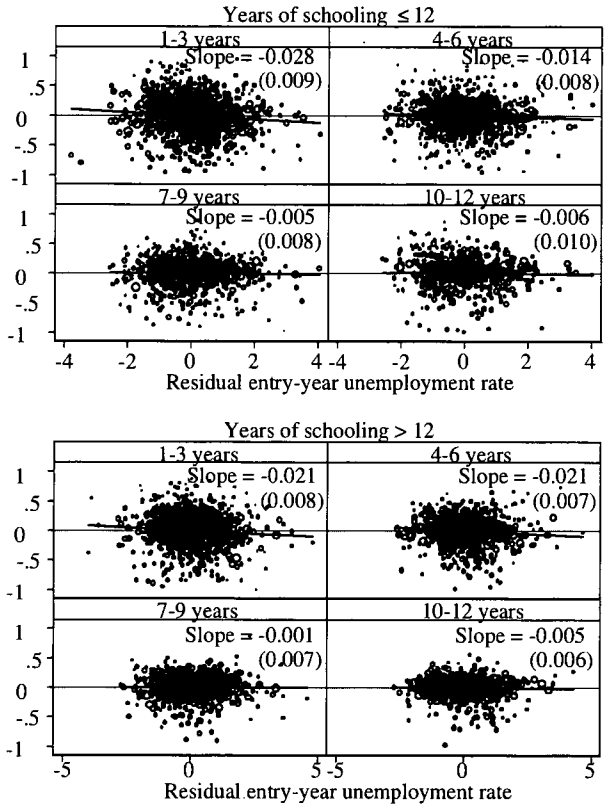


**Figure 2b**

*State unemployment rates and log earnings (United States)*

Note: "cohort" is defined by region and year of graduation. Each cohort is weighted by the number of individual observations that belong to the cohort. Log annual earnings are residuals net of the contemporaneous unemployment rate, years of schooling and experience by single year. Figures in parenthesis under the slopes are standard errors.

has a persistent negative effect for Japanese men. A one percentage point rise in the unemployment rate at entry leads to earning losses by 5–7 percent for over 12 years for the group without college education, although the large standard errors make the statistical significance marginal.[21] The effect is smaller but more precisely estimated,

21. These large standard errors seem to be due to serial correlations within regions. If we ignored serial correlations and clustered standard errors by region-graduation year instead of region, the effect for less-educated Japanese would be significant at least at 5 percent level for all experience categories.

**Table 6**
*The Effect of the Unemployment Rate at Entry and the Contemporaneous Unemployment Rate on Log Real Annual Earnings*

| | Japan | | United States | |
|---|---|---|---|---|
| | High school | College | Schooling ≤ 12 | Schooling > 12 |
| Unemployment rate at entry to the market | | | | |
| × experience 1–3 years | −0.069 | −0.046 | −0.031 | −0.015 |
| | (0.049) | (0.017) | (0.009) | (0.008) |
| × experience 4–6 years | −0.072 | −0.042 | 0.004 | −0.012 |
| | (0.044) | (0.017) | (0.006) | (0.007) |
| × experience 7–9 years | −0.051 | −0.031 | 0.002 | −0.009 |
| | (0.036) | (0.015) | (0.006) | (0.005) |
| × experience 10–12 years | −0.063 | −0.023 | 0.010 | −0.007 |
| | (0.036) | (0.018) | (0.010) | (0.006) |
| Contemporaneous unemployment rate | | | | |
| × experience 1–3 years | −0.050 | −0.050 | −0.042 | −0.013 |
| | (0.020) | (0.025) | (0.009) | (0.011) |
| × experience 4–6 years | −0.016 | −0.038 | −0.043 | −0.022 |
| | (0.020) | (0.025) | (0.010) | (0.007) |
| × experience 7–9 years | −0.010 | −0.032 | −0.036 | −0.020 |
| | (0.023) | (0.019) | (0.009) | (0.010) |
| × experience 10–12 years | 0.012 | −0.024 | −0.033 | −0.012 |
| | (0.023) | (0.017) | (0.013) | (0.011) |
| Observations | 47,469 | 38,017 | 57,635 | 72,226 |
| $R^2$ | 0.23 | 0.27 | 0.17 | 0.16 |

Note: Standard errors in parenthesis are calculated by bootstrapping (reps = 200) with clustering by state/region. Other controls included are potential experience, education (dummies for the Japanese sample, years of schooling for the American sample), graduation year dummies, region dummies, survey-year dummies, and region-specific linear trends.

and still fairly persistent, for more-educated Japanese; the initial loss is 4.6 percent and the gap gradually fades up to 2.3 percent. Turning to American men, the unemployment rate at entry has only a temporary effect for the less-educated group, in a sharp contrast to the almost permanent effect for their Japanese counterparts. The effect for more-educated Americans is gradually fading in about ten years and fairly close to the estimates by Oreopoulos, von Wachter, and Heisz (2006) for college graduates in Canada.

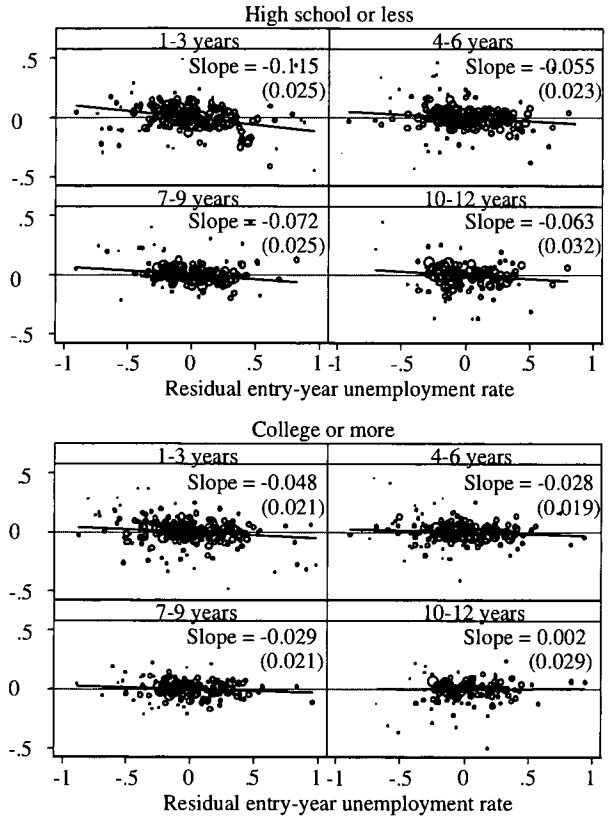


**Figure 3a**

*Residual regional unemployment rates and residual log earnings (Japan)*

Note: "cohort" is defined by region and year of graduation. Each cohort is weighted by the number of individual observations that belong to the cohort. See the text for variable definitions. Figures in parenthesis under the slopes are standard errors.

Figure 3 plots residual log earnings net of graduation year- and region/state- fixed effects over residual unemployment net of these fixed effects. The slopes are equivalent to βs in Equation 4 except that the effect of contemporaneous unemployment rate is not allowed to vary with the years since graduation. The same observations hold: the largest and most persistent negative effect for less-educated Japanese, a weaker but still fairly persistent effect for more-educated Japanese, a modest effect for Americans. Although the relative pattern across the less- and the more-educated

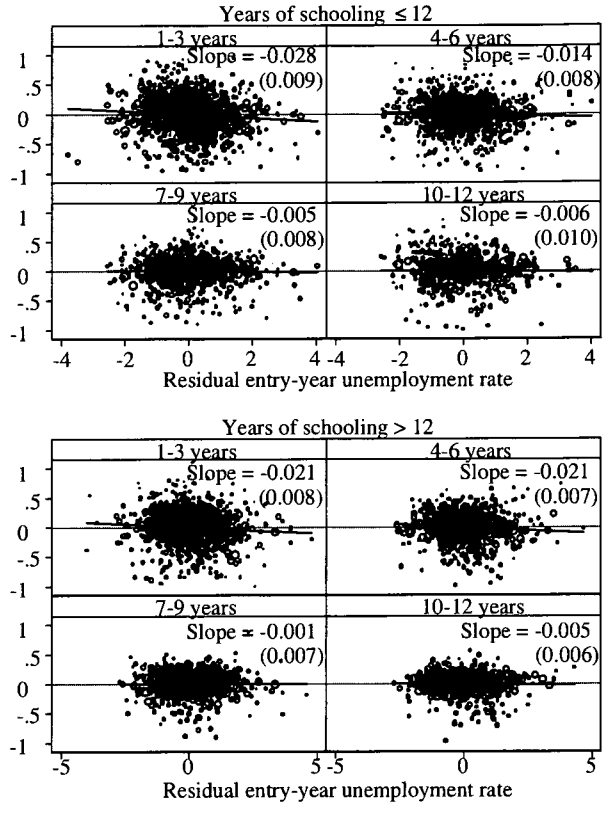


**Figure 3b**

*Residual state unemployment rates and residual log earnings (United States)*

Note: "cohort" is defined by state and year of graduation. Each cohort is weighted by the number of individual observations that belong to the cohort. See the text for variable definitions. Figures in parenthesis under the slopes are standard errors.

groups becomes subtle for American men, the difference in these patterns between Japan and the United States remains striking.[22]

22. The effect of the contemporaneous unemployment rate on earnings among less-educated groups also shows an interesting contrast between Japan and the United States. In Japan, high school graduates become less sensitive to contemporaneous business cycles as they get older. The prevailing long-term contracts alone cannot explain this well because earnings of college graduates are somewhat sensitive to the contemporaneous unemployment rate. Perhaps bonuses may increase more for more-educated workers during booms. On the other hand, earnings of the less-educated group are more sensitive to business cycles in the United States. This is consistent with existing evidence for costs of a recession born disproportionately by less skilled workers (Hines, Hoynes, and Krueger 2001).

**Table 7**
*The Effect of the Unemployment Rate at Entry on Log Real Annual Earnings, Allowing Different Effect between Upturns and Downturns*

| | Japan | | United States | |
|---|---|---|---|---|
| | High school | College | Schooling ≤ 12 | Schooling > 12 |
| Unemployment rate at entry to the market | | | | |
| × experience 1–3 years | −0.079 | −0.042 | −0.034 | −0.016 |
| | (0.055) | (0.016) | (0.011) | (0.009) |
| × experience 4–6 years | −0.080 | −0.042 | 0.000 | −0.016 |
| | (0.049) | (0.018) | (0.008) | (0.008) |
| × experience 7–9 years | −0.062 | −0.028 | −0.003 | −0.011 |
| | (0.040) | (0.016) | (0.007) | (0.006) |
| × experience 10–12 years | −0.073 | −0.022 | 0.007 | −0.008 |
| | (0.039) | (0.020) | (0.011) | (0.007) |
| Unemployment rate at entry × upturn dummy | | | | |
| × experience 1–3 years | 0.010 | 0.003 | 0.003 | 0.001 |
| | (0.009) | (0.013) | (0.006) | (0.005) |
| × experience 4–6 years | 0.006 | 0.008 | 0.004 | 0.006 |
| | (0.009) | (0.013) | (0.006) | (0.005) |
| × experience 7–9 years | 0.012 | 0.002 | 0.008 | 0.003 |
| | (0.009) | (0.012) | (0.005) | (0.006) |
| × experience 10–12 years | 0.009 | 0.006 | 0.004 | 0.000 |
| | (0.009) | (0.009) | (0.005) | (0.006) |
| Observations | 43,574 | 35,190 | 57,635 | 72,226 |
| $R^2$ | 0.22 | 0.27 | 0.17 | 0.16 |

Note: Standard errors in parenthesis are calculated by bootstrapping (reps = 200) with clustering by region/state. Other controls included are the upturn dummy itself, the unemployment rate in survey year, potential experience, education dummies, graduation year dummies, region dummies, survey-year dummies, and region-specific linear trends.

Table 7 allows the effect of unemployment rate at entry to vary between upturns and downturns; this is the same exercise as Table 4 for employment. Although the effect of the unemployment rate is slightly more negative during downturns for all groups, the differences are small and statistically insignificant.

Assuming that those who become unemployed due to a recession at entry would earn less than the average of the cohort they belong to, the negative effect of the unemployment rate at entry on employment biases the effect on earnings upward.

Since many of those unemployed in the reference week report some positive earnings, this bias seems to be small (see the appendixes for more discussion); in any case, if there is any bias, it should work against our findings that the negative effect on earnings is stronger for less-educated Japanese men, because the negative effect on employment is also stronger for them.

The persistent negative effects on employment and fulltime status for less-educated Japanese men suggest that a part of the negative effect on earnings comes from unstable employment among them. This is consistent with our argument that the school based hiring system in Japan leaves less-educated Japanese men who failed to obtain a regular job upon graduation in unstable employment for a long time. For more direct evidence, Panel 1 of Table 8 confirms that worse labor market conditions at entry lower the ratio of regular employees (*seishain*)[23] among less-educated Japanese men, and that this effect lasts up to ten years. Also, the effect is weaker and statistically insignificant for the more-educated group.

If a recession at entry lowers the likelihood of having a regular job and it really affects earnings, the estimated effect of the unemployment rate at entry should be smaller within the sample of who obtained regular job upon graduation than in the entire sample. Since the information on the first job is not available, we estimate Equation 4 using the sample of workers currently in regular jobs.[24] Panel 2 of Table 8 shows that, as expected, the negative effect of graduating from high school during a recession is much smaller for regular employees.[25] Moreover, the effect does not change much for college graduates, who are not affected by the school-based hiring system.

## VI. Concluding Remarks

Entering the labor market during a recession has a persistent negative effect on earnings for young Japanese men. Moreover, a recession at entry not only lowers the annual earnings, but also raises the likelihood of nonemployment and parttime employment for less-educated Japanese, and a considerable part of the neg-

23. The Japanese Labor Force Survey asks each employed person (excluding self-employed) whether he/she is employed as a regular employee, based on how their employers call them. The exact Japanese word corresponding to "regular" here is "*seiki*." There is another definition of "regular employees," which means those whose employment contracts do not specify termination date. Although the two classifications are determined independently from each other, the latter category based on the length of contract includes almost everyone classified as "regular" based on how they are called. We decide to use the classification based on how they are called because the classification based on the length of contract also includes a significant number of part-time workers, who are not usually considered as "*seishain*" or "*seiki*."

24. It is difficult to estimate the effect within people who do not have a regular job, because a substantial number of them report zero-income and, at the same time, this group includes a nonnegligible number of high-earning free lancers. This complicates the effect of business cycle on the composition of this group and makes the direction of the potential bias ambiguous.

25. One might suspect that high school graduates who can obtain a regular job during a recession are likely to be positively selected and it biases the estimated effects upward. Though we cannot rule out it completely, we believe that this bias is small because the quantile regression including nonregular employees shows that the effect of the unemployment rate at entry on earnings is small for those at 75 percentile in the conditional distribution, who are very likely to be regular employees.

**Table 8**
*The Effect through Declined Regular Employment (Seishain) on Earnings in Japan*

(1) Ratio of *seishain* in the entire cohort (probit)

| | Japan | |
|---|---|---|
| | High school | College |
| Marginal effects | | |
| ×experience 1–3 years | −4.6% | −1.9% |
| ×experience 4–6 years | −4.0% | −0.9% |
| ×experience 7–9 years | −2.3% | 0.3% |
| ×experience 10–12 years | −1.5% | 0.2% |
| Probit coefficients | | |
| ×experience 1–3 years | −0.142 | −0.090 |
| | (0.052) | (0.041) |
| ×experience 4–6 years | −0.121 | −0.041 |
| | (0.060) | (0.051) |
| ×experience 7–9 years | −0.071 | 0.015 |
| | (0.037) | (0.048) |
| ×experience 10–12 years | −0.046 | 0.009 |
| | (0.034) | (0.051) |
| Observations | 53,441 | 39,521 |
| Pseudo $R^2$ | 0.07 | 0.03 |

(2) Log real annual earnings, for *seishain* only (OLS)

| | Japan | |
|---|---|---|
| | High school | College |
| OLS coefficients | | |
| ×experience 1–3 years | −0.007 | −0.046 |
| | (0.019) | (0.012) |
| ×experience 4–6 years | −0.015 | −0.056 |
| | (0.020) | (0.014) |
| ×experience 7–9 years | −0.013 | −0.042 |
| | (0.017) | (0.012) |

*(continued)*