

# Long-term effects of a recession at labor market entry in Japan and the United States\*

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## Abstract

We examine the effects of entering the labor market during a recession on subsequent earnings and employment for Japanese and American men, using comparable household labor force surveys. To cut out the effect that comes from being trapped in non-regular employment in Japan, which mainly affects the less educated group, we focus on the differential pattern across groups with different educational backgrounds. We find a persistent, strong negative effect on earnings for less educated Japanese men, in contrast to no long-term effect for less educated American men; also, a substantial part of the effect for less educated Japanese men is attributed to the decreased regular employment. The effect for the more educated group is also stronger in Japan but more or less similar in both countries.

**Preliminary - comments welcome.**

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# 1 Introduction

Entering the labor market during a recession has long-term negative consequences on earnings and career prospects. This is conventional wisdom in Japan and supported by several empirical studies (Ohtake and Inoki 1997, Ohta 1999, Genda and Kurosawa 2001). The separated hiring market for new graduates, which provides much more opportunities to new graduates than other young job seekers, has been thought to be the main reason for this. However, there is increasing evidence that the labor market condition at graduation affects subsequent earnings and careers for college educated men in countries without such separated markets (Oreopoulos, von Wachter and Heisz 2006 for Canada, Kahn 2006 for the United States). Then, what is the real cause of the observed long-term effect of graduating during a recession?

Since different mechanisms predict different patterns of relative effects across skill-levels, we aim to disentangle the confounding underlying mechanisms by cross comparison across the less and the more educated groups between Japan and the United States. Specifically, factors presumably common to Japan and the United States, such as search frictions and long-term wage contracts are expected to affect more educated workers. On the other hand, the separated hiring market for new graduates and duality between regular and non-regular employment in Japan may produce a persistent negative effect for less educated men by keeping them in unstable employment.

We estimate the effects of the labor market condition (namely, the unemployment rate) at entry using two comparable cross-sectional household surveys: the Labor Force Survey in Japan and the Current Population Survey in the United States. With controls for year- and region-fixed effects and region specific linear trend, we find that a recession at entry has a strong and persistent negative effect on subsequent earnings for less educated Japanese men, a weaker but still substantial effect for more educated Japanese men, a modest, gradually fading effect for

more educated American men and only a temporary effect for less educated American men. The contrasting patterns across groups with different educational background are striking. We also find a significant negative effect on employment status only for less educated Japanese men. Further, inclusion of the ratio of regular workers in population narrows the difference in the effect of the unemployment rate at entry between the less and the more Japanese men. These findings imply that duality between regular and non-regular employment plays an important role in Japan, in addition to more general factors such as search frictions.

Our motivation for this study is a growing concern about the deteriorated employment situation of the young Japanese who entered the labor market during the prolonged recession in the mid-1990s through the early 2000s. As pointed by Genda (2001), the cost of this recession was borne disproportionately by young people who were on the course of transition from school to full-time work, since cutting new hiring was much easier than firing incumbent workers. Especially, the fraction of young labor force not in the regular full-time employment has sharply increased since the 1990s. Repairing employment prospects of the young people stranded out of the "regular" track has emerged as a pressing issue, under the growing fear of future expansion of the poverty group and increasing burden of social security. To find an effective solution, we need to understand how the labor market condition at entry affects each individual's subsequent outcome, who are affected the most, and how persistent the effects will be.

As already mentioned, this study is not the first attempt to explore the long-term effects of economic conditions in the year of leaving school in Japan: Ohtake and Inoki (1997) report a negative correlation between wages and unemployment rates at graduation using the Wage Census, and Genda and Kurosawa (2001) and Ohta (1998) find the unemployment rate at graduation is positively correlated with the subsequent quitting rate using the Survey of Young Employees

and the Survey of Employment Trend, respectively. However, we substantially improve both the methodology and the data coverage. The most important improvement is that we control for unobserved year-specific components by exploiting regional variations in unemployment rates.<sup>1</sup> This is crucial because various factors can be spuriously correlated with the unemployment rate in Japan, which has been in an upward trend with a dip around 1990: for instance, the 18-year-old population has been decreasing after the second baby-boomers (born in the early 1970s) reached the age of 18 around 1990, and the expansion of college capacity was also around 1990. Further, our specification allows us to examine the persistence of the effect. As to the data, we have two advantages. First, our dataset that spans from 1986 to 2005 allows us to look at outcomes in several years after entry for those who entered the labor market in the late 1990s, after the long recession started. Second, the use of household surveys allows us to examine the effect on employment status as well, which is important especially for the less educated group. Establishment data used by the existing studies do not include people not employed in the covered establishments.

Our result for more educated American men is within the range comparable to studies of Canadian male college graduates by Oreopoulos et al (2006) and American white male college graduates in the National Longitudinal Survey of Youth by Kahn (2006). To our knowledge, this is the first study to estimate the effect of the labor market condition at entry separately for less educated American men and compare it with that for the more educated group. Our finding of a less persistent effect for the less educated group itself contributes to the literature as evidence for differential effects across different skill levels.<sup>2</sup>

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<sup>1</sup>All three studies cited here use national rate and include a linear or quadratic trend term, probably because the regional unemployment rate prior to 1983 is not available.

<sup>2</sup>By investigating the differential effects across race and gender in the United States, Kondo (2007) provides complementary evidence for a less persistent effect for less skilled workers.

The rest of the paper is organized as follows. The next section describes the two institutional features we think important: the hiring market for new graduates and duality between regular and non-regular workers. Section 3 discusses underlying mechanisms common to both countries and those peculiar to Japan in turn. Section 4 describes data and methodology, and then Section 5 examines comparability of Japanese and American data. The basic results are reported in Section 6 and Section 7. Section 8 concludes.

## 2 Institutional background

Japan's employment system has been characterized by the long-term employment beginning right after the completion of education until the mandatory retirement. An obvious consequence of this so-called "life-time" employment system is low turnover rates. For instance, the annual job separation rate (sum of voluntary quits and dismissals/layoffs) in total employees is about 16% in Japan in the early 2000s,<sup>3</sup> less than half of the rate in the United States,<sup>4</sup> and the average tenure of men at age 30-34 is about 8.5 years in Japan, while it is about 5 years in the United States.<sup>5</sup> At the same time, many firms also hire workers on fixed term contracts or part-time basis as a buffer to temporary fluctuations of their labor demand. This two-tier structure within an employer is another consequence of the life-time employment system, in the sense that it allows employers to keep their regular employees during recessions.

Regular full-time workers (called *seishain* in Japanese) and other provisional/part-time workers are clearly distinguished in practice, although there is no legal or formal definition. A *seishain*, or a regular employee, is on a long-term employment contract that does not specify the date of ter-

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<sup>3</sup>Source: the Survey of Employment Trend conducted by the Ministry of Labor.

<sup>4</sup>According to the Job Openings and Labor Turnover Survey, the annual total job separation rate in total employees in the United States in the early 2000s is about 40%.

<sup>5</sup>Source: Wage Census (Japan) and CPS Job tenure supplement (US), both in 2000.

mination of the contract and works full-time.<sup>6</sup> Non-regular workers are usually called "*arubaito*", a Japanese word meaning side workers or just-in-time workers, or a "part-timer" regardless of how many hours she actually works. They are dismissed relatively easily and typically paid lower wages. Although a large part of the non-regular workers are married women and students, the number of young people out of school is non-negligible and increasing.

The hiring markets for the regular full-time workers and for the non-regular provisional workers work quite differently in Japan. Opportunities for regular full-time jobs that do not require related working experience are largely limited to new graduates, and schools play an important roll in matching especially for high school students. In contrast, new graduates and other young applicants are treated in the same way in the market of provisional jobs, which is more or less close to a spot market.

The school-based hiring system, a matching system between the senior students in high school and regular full-time jobs based on long-term relationships between high schools and firms, is the major way for high school students to find a job after their graduation.<sup>7</sup> The local Employment Service Agencies also provides a separate list of vacancies explicitly for new high school graduates to support schools and students. As Ariga (2005) emphasizes, long-term relationships with schools and intervention by the Employment Service Agency effectively makes the employers treat new graduates and other job applicants differently. Consequently, the market for new high school graduates is isolated from the rest of the labor market.

Unlike high schools, colleges usually do not directly mediate their students and potential

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<sup>6</sup>In some occasions, even if an employee satisfies the two conditions, she is not considered as a "regular" employee. Thus, many surveys including the Labor Force Survey directly ask how the respondent is called by the employer to classify regular and nonregular workers.

<sup>7</sup>However, many troubles with the system have arisen as both the demand for and the supply of high school graduates have declined. Ariga (2005) provides detailed description of the system and what went wrong in the 1990s.

employers. A number of large private placement-service agencies play a considerable role in the job market for college graduates, instead of public Employment Service Agencies. Also, college graduates may have more options to get through a recession, since they have more opportunities to obtain professional qualifications such as teacher's license. Nevertheless, the hiring market for new graduates from college is also separated from the rest of the labor market to some extent, because many vacancies for regular full-time jobs explicitly target at senior students in college. The private placement-service agencies also distinguish new graduates from other job seekers, though not as strict as the public Agencies. A typical recruiting process starts more than a year prior to graduation and takes several months, also posing difficulty to unemployed people with credit constraints.

Although in a declining trend, the proportion of new graduates who immediately obtain a full-time regular job is still as high as 79.8 % for high school graduates and 90.9% for four-year college graduates according to the Survey of Young Employees in 1997. Also, the Survey shows that 68.1 % of male regular employees at age 25-29 in 1997 had never changed their employer. Moreover, Kato (2001) shows that neither the job-retention rate nor the average tenure of regular employees, with controls for the age composition, has declined. The regular full-time workers remain in the long-term employment as before, while their share in total employment is decreasing.

In contrast, transition from education to stable employment in the United States is gradual and often takes several years. Schools do not intervene in the matching process between new graduates and jobs; at least, there is nothing like the Japanese school-based hiring system for high school students. Also, young workers change jobs very frequently. Topel and Ward (1992) report that two-thirds of all new jobs among young workers end in the first year. Neal (1999) shows that many job changes among young workers involve changes in industry and occupations,

emphasizing the importance of searching for well matched career. He also shows less educated workers tend to change industry and occupation more frequently. Lynch (1999) presents the relatively high employment rate among young Americans still in school as another side of gradual transition from school to work in the United States.

Probably due to the weak restrictions on dismissals in general, the distinction between fixed-term and indefinite employment contracts is relatively unimportant in the United States. Although governmental surveys such as the Current Population Surveys distinguish part-time workers from full-time workers based on hours of work, there is no discontinuity in earnings at any particular hours of work per week.<sup>8</sup> A commonly recognized dichotomous classification of workers similar to regular and non-regular workers in Japan does not exist in the United States.

To summarize, there are two notable differences between Japan and the United States. First, the hiring market for new graduates in Japan is isolated from the rest of the labor market and majority of Japanese new graduates move on full-time regular jobs right after graduation, while transition to stable employment in the United States takes several years around graduation. Second, the discrepancy between regular and non-regular worker is prominent in Japan, while this kind of distinction is subtle in the United States.

Compared to the other OECD countries, Japan and the United States are the opposite extremes as to the prevalence of job shopping among young workers. According to Table 4.7 of OECD (1996), the average number of employers per year held by young persons after leaving school is 0.86 for American men and 0.17 for Japanese men, the highest and the lowest among Germany, Japan, Norway, Great Britain and the United States. Other factors reported in OECD (1996), such as employment population rate among 20-24 years old and proportion of youth in

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<sup>8</sup>We have confirmed this by plotting annual earnings over hours worked using the March CPS.



total labor force, are similar to each other's and not very different from the OECD average. Fixed-term contracts and other "non-standard" employment in some European countries bear similarities to Japanese non-regular workers in the sense that they work as a loophole of the strict dismissal regulation and these workers receive lower training opportunities and lower wages than regular workers.

### **3 Underlying mechanisms**

#### **3.1 Mechanisms common to Japan and the United States**

Oreopoulos et al (2006) emphasize the role of time intensive search and the existence of long-term contracts as the underlying mechanisms. Search frictions prolong the process to dissolve initial bad matches take several years, and long-term contract also makes the initial shocks to wage setting persistent. Search frictions are expected to raise the turnover rate among those who enter the labor market during a recession for several years, consistent with their findings on mobility among Canadian college graduates. Furthermore, a significant part of the turnover should be moves to better matched jobs. Existing studies in the United States provide evidence for this explanation: workers move to more stable jobs during booms (Okun 1973, Devereux 2003, Hines, Hoynes and Krueger 2001), and this potential to move to better jobs increases workers' bargaining power and raises wages of incumbents during booms (Beaudry and DiNardo 1991). Also, a job that started during a recession tends to end sooner due to a bad match, implying deteriorated matching quality (Bowlus 1995). As to long-term contracts, if wages are also determined in long-term contracts, the initial conditions of labor market directly affect the subsequent earnings.

Although the evidence from existing studies is mixed,<sup>9</sup> at least for some workers wages are not very sensitive to the external labor market conditions.

The argument based on search frictions implies that the effect of entering the labor market during a recession will be less persistent for people who are more likely to be dismissed because the advantage of obtaining a high-wage job at entry vanishes when the worker is dismissed. Since the less educated group are presumably more likely to be on unstable employment situations, the effect of the unemployment rate at entry on earnings will be less persistent for the less educated group. Also, since jobs that require higher skill and pay higher wages are more likely to be associated with internal labor markets protected from fluctuations in the external labor market, the long-term wage contracts seem to be more relevant to more skilled workers.

Further, missing opportunities for on-the-job training due to a bad match can aggravate the negative effect of entering the labor market during a recession. It is ambiguous whether the losses of training opportunities matter more to less educated workers, who on average have lower pre-market human capital and fewer training opportunities on the job. If pre-market human capital increases the returns to on-the-job training, more educated worker will be affected more; if the marginal return to training is diminishing, less educated worker will be affected more. In any case, these losses of human capital would not occur if the worker could move to a job with better training opportunities without frictions.

Given the lower turnover rate in Japan, the process to dissolve initial bad matches is expected to take longer time in Japan. Also, long-term contracts are more prevalent in Japan, and it has

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<sup>9</sup>In the United States, Baker, Gibbs and Holmstrom (1994a) and Beaudry and DiNardo (1991) find apparently opposite evidence: Baker et al observe a significant “cohort” effect of external labor market conditions at entry to the firm on wage setting within a large firm, while Beaudry and DiNardo show external labor market conditions at entry does not have a significant effect on wages after controlling for the best condition during the job tenure. In Japan, on one hand, Ariga, Brunello and Ohkusa (2000) find evidence for the cohort effect similar to Baker et al (1994a); on the other hand, the annual wage bargaining between employers and unions have been traditionally thought to allow the average real wages vary with external conditions.

been said that Japanese firms invest more on training of their employees than American firms.<sup>10</sup> Therefore, all the three factors mentioned above will work stronger in Japan. Nevertheless, the relative effects between the more and the less educated groups should remain the same in the United States and Japan since the long-term contracts are more relevant to more educated workers, and unemployment rates are higher for less educated people in both countries.

### **3.2 Duality - an additional mechanism that may exist only in Japan**

The isolated market for new graduates in Japan and the discrepancy between regular employment and non-regular employment, described in Section 2, may produce an additional persistent effect of a recession at entry to the labor market. The basic idea is that, since it is difficult to get into the long-term regular employment track after leaving schools without obtaining a full-time regular job, the availability of such jobs at graduation will affect subsequent employment status and thus earnings. In contrast to the mechanisms common to Japan and the United States, this effect is expected to work stronger for less educated people given that they are more likely to fail to obtain a regular full-time job due to lack of demand. Also, the hiring market for high school graduates is isolated to a further degree than that for college graduates and makes it more difficult to access to a regular full-time job after graduation.

In fact, the negative effect of failure to obtain a regular full-time job upon graduation is substantial, at least at the individual level. Using the effective job opening ratio in the prefecture of residence as an instrument for employment status at graduation, Kondo (2006) finds that failure to obtain a regular full-time job upon graduation lowers the likelihood to have a regular full-time job 5-15 years after graduation by 50%. Sakai and Higuchi (2005) also report negative

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<sup>10</sup>See, for example, Mincer and Higuchi (1988) and Hashimoto and Raisian (1985).

consequences of non-regular employment or unemployment experience on future earnings and employment.

Kondo (2006) claims that leaving school without obtaining a regular full-time job works as a bad signal in Japan because those who couldn't obtain a job in this process are adversely selected on average. Moreover, since their average productivity is substantially lower than that of the workers in the lowest regular full-time job, firms do not want to incur costs to screen them for regular employment. Thus, even if a person who has failed to obtain a regular job purely due to a bad luck is actually productive enough, he has few opportunities to adjust prospective employer's belief about his productivity. Hence, this kind of adverse selection produces a persistent effect of failure to obtain a regular full-time job at entry on the person's subsequent employment prospects, at least at the individual level.

Can this adverse effect be aggregated to a cohort level effect? It is not obvious because the threshold between regular and non-regular worker varies with aggregate labor demand. In other words, the average productivity of people who graduate without obtaining a regular job during a recession is higher than the average productivity of people who graduate without obtaining a regular job during a boom because more people can obtain a regular job during a boom. Therefore, the increased number of new graduates who fail to obtain a regular job may be canceled out by the improved average productivity. However, under certain conditions, it is still possible that a recession at entry has a negative effect at the cohort level.

The basic idea is as follows. Assume that a worker's actual productivity is not observed directly unless the prospective employer incurs screening costs, while employment history is observed without any costs. Then, firms may not want to pay the screening costs for those with poor employment history. Also, assume that employment history as a provisional worker has little

information about his productivity, while employment history as a regular worker works as a signal of his productivity. That is, many people are bunched into a group of "those not in regular employment". If the discrepancy in the expected productivity between those in the lowest ranked regular full-time job and those without a regular full-time job is large enough, the slightly higher average productivity of those who left schools without a regular job during a recession does not matter as long as it is lower than the threshold that firms want to pay screening costs to them. Moreover, the expected productivity conditional on the first job in general is not necessarily important for workers who are already hired as regular employees because their employers can learn their productivity.

To see the first point in a more formal way, consider the following nutshell model: population is normalized to 1, and everyone is in labor force. Productivity of each person is denoted by  $n$ , and the distribution function of  $n$  is  $F(n)$ . The number of firms hiring regular workers is  $M$ , and each firm is indexed by  $m \in \{1, 2, 3, \dots, M\}$ . Firm  $m$  pays higher wages than firm  $m + 1$ , that is, the firms are sorted by wages in a descending order. Firm  $m$ 's net profit from hiring worker  $n$  is  $\pi(m, n)$ , which is increasing in  $n$  and takes negative value if  $n < \tilde{n}_m$ . For simplicity, all firms hire the same number of workers,  $L$ , where  $L$  varies with business cycle conditions and always satisfies  $LM < 1$ . Assume assortative matching between firms and workers in the hiring market for new graduates; i.e., more productive students tend to be hired by higher paying firms.<sup>11</sup> Specifically, the expected productivity conditional on being hired by firm  $m$  in the year with labor demand  $L$ ,  $E(n|m, L)$ , is  $n$  such that  $1 - F(n) = Lm$ . To keep the mathematics simple, ignore dispersions within a firm and assume everyone with  $n \geq E(n|M, L) \equiv \bar{n}(L)$  obtains a regular full-time job and

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<sup>11</sup>Shimer (2005) provides theoretical background for the assumption of assortative matching. In reality, as Shimer points, there are considerable wage dispersions within a firm or across workers with similar observable characteristics. Although dealing with these dispersions is beyond the scope of this paper, we believe that adding small dispersions within firms does not change the outcome as long as the first job works as a good signal for the worker's productivity.

anyone with  $n < \bar{n}(L)$  doesn't. Then, the distribution function of  $n$  conditional on not obtaining a regular job is  $F(n|n < \bar{n}(L))$ .

Each firm has to incur a fixed screening cost  $C$  to interview an applicant, then decide whether to hire her after learning her productivity. Thus, the expected profit from interviewing a person who entered when labor demand is  $L$  without obtaining a regular job is

$$\int_0^{\bar{n}(L)} \max(\pi(m, x), 0) dF(x|x < \bar{n}(L)) - C \quad (1)$$

Unless (1) is positive, firm  $m$  doesn't even want to interview the person. Of course, (1) is increasing in  $\bar{n}(L)$  and thus decreasing in  $L$ . Yet, until (1) reaches to zero, it does not change the firm's decision on interview. (1) varies across firms and presumably high paying firms require high expected productivity. It is possible that even firm  $M$ , the lowest ranked firm, is not willing to interview a person who graduated without obtaining a regular job when labor demand was low.

The discontinuity in expected productivity between regular and non-regular workers is essential. Screening costs exist and assortative matching is observed in the United States as well as in Japan, but the huge discrepancy between regular and non-regular workers is unique to Japan.

Admittedly, our empirical analyses examines only whether the ratio of full-time regular workers affects the average earnings of the cohort. That is, we are not proving this signaling mechanism. It is true that subjective negative perception against young people leaving school without a job could yield the same outcome, for example. The point is that, Japanese firms do not recruit their regular workers from the pool of non-regular workers and unemployed people regardless of the labor market condition at their entry to the market. The loss of working experience on regular employment track may lower the average productivity of the cohort in the long-run and aggravate the loss of earnings..

## 4 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 twelve years. We restrict our sample to men in order to avoid additional complication from the labor supply behavior of married women.<sup>12</sup> We also drop non-whites from the sample of American men to keep away from the issues related to racial disparities.<sup>13</sup>

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

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<sup>12</sup>For example, since the labor supply of married women is much lower than that of single women, if the unemployment rate at entry is negatively correlated with the likelihood of being married even after controlling for region and year fixed effects, a recession at entry can have a positive effect on women's labor supply, unlike the case for men.

<sup>13</sup>Kondo (2007) find the effect of graduating during a recession is less persistent, although the initial impact is stronger, for black men than for white men using the National Longitudinal Survey of Youth. The pattern of differential effect across race observed by her is similar to the pattern across the less and the more educated group in this paper.

from about 100,000 in the 1980s to 200,000 individuals in the 2000s.

The primary dependent variable is the log real annual earnings. This is total income from salary and wages (excluding self employed persons in incorporated business) of the person in the last year, deflated by the consumer price index. Note that income from other sources is not included. How we construct the variable is described in Appendix A.2. Most of the other dependent variables including employment status, weekly hours and part-time status are directly taken from the survey questionnaires and measured in the reference week of each survey.

The measure of regional unemployment for Japan is the rates for 10 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 datasets lacking detailed working 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.<sup>14</sup> For the U.S. sample, we compute year of graduation  $y$  as year of

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<sup>14</sup>The Japanese Labor Force Survey does not ask years of education, but asks the school attended. Thus, we define years of education as follows: 9 for jr. high school graduates, 12 for high school graduates, 14 for jr/tech college graduates, 16 for college graduates and more.



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 next section examines the adequacy of this definition and discusses reservations that come from measurement errors.

We estimate the effects of the unemployment rate at entry to the labor market on current earnings and various employment outcomes net of the region-fixed components and the year-fixed components. It is also necessary to control for temporary macro shocks at the time of survey because unemployment rates may be auto-correlated, and the effect of the contemporaneous unemployment rate is itself worth estimating. Thus, the basic form of the earnings equation to be estimated is written as follows:

$$\log I_{ityr} = \beta_{(t-y)}u_{yr} + \gamma_{(t-y)}u_{tr} + \delta'\mathbf{X}_{it} + \varphi_t + \eta_r + \theta_r t + \mu_y + \varepsilon_{iyr} \quad (2)$$

where  $I_{ityr}$  is annual earnings of individual  $i$  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  $\mathbf{X}_{it}$  is other control variables including educational background and potential experience in year  $t$ .  $\varphi_t$  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  $\mu_y$  is an entry-year fixed effect. The remaining errors are denoted by  $\varepsilon_{iyr}$ . Estimated standard errors are clustered for year and region of entry, i.e.  $\varepsilon_{iyr}$  is assumed to be the sum of a cohort-specific random shock  $\bar{\varepsilon}_{yr}$  and an individual shock  $\tilde{\varepsilon}_i$ .

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). To estimate the effect on employment status, we modify equation (1) into the probit model.

## 5 Are Japanese and American data comparable?

Since the comparison of patterns across the less and the more educated groups between Japan and the United States is a kind of differences-in-differences in a very broad sense, we need to check the comparability of Japanese and American data before the main analyses.

First, let us compare the micro datasets. Summary statistics is shown in Table 1. A notable difference is that the fraction with more than 12 years of schooling is greater than that of Japanese men. Also, 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 datasets look fairly similar except that the employment rate is slightly higher for Japanese men. The average sample size per cohort of our dataset 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, 1% 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. Also, the overall trend is upward in Japan and downward in the United States, suggesting the importance of controlling for year effects.

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, R2 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 has fewer data points and the fixed effects are 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 1994, 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.

Since we use the region of current residence as a proxy for the region of residence at entry, measurement errors due to migration across regions attenuates the estimated effect of the unemployment rate at entry. Table 3 shows the five-year migration rates in Japan and the United States, taken from the Census of each country. Japanese are less mobile, and about 90% stay in the same region. Thus, attenuation bias due to measurement errors will be greater for Americans.

A related concern is that the difference in mobility between the less and the more educated groups in Japan could be different from that in the United States. The 5-year migration rate across prefectures by age and education is available for Japanese men from the Census 2000. Under an ad hoc assumption that the share of the migration across prefectures within a region in the total across-prefecture migration is the same across groups with different educational background, the 5-year migration rate across region for 25-34 year-old Japanese men without college education would be about 6%, and that for 25-34 year-old with college education would be about 14%. Since more educated men are more likely to live in large metropolitan areas, within which the

across-prefecture migration rate is high, the gap between the two groups may be narrower. The across-state 5-year migration rate of 25-39 year-old Americans with college education is 26.0% and that of without college education is 13.5%, according to the cross tabulation from Census 2000 by Franklin (2003).<sup>15</sup> The relative gap in migration rates between college educated and not college educated is fairly similar in Japan and the United States.

Another source of attenuation bias is errors in the year of graduation. The enrollment rates by age and school type are shown in Table 4. Errors in the graduation year for Japanese high school graduates are negligible, and those for college graduates are mostly within 1 or 2 years. Admittedly, our definition of the year of graduation is noisier for American men.

Business cycles may affect schooling choice. First, let us check the effect on the completed education. Panel (A) of Table 5 shows the effect of unemployment rates around high school completion on the likelihood of being college educated among adult men. The dependent variable is an indicator of college education, and the control variables are dummies for year of birth and region of residence. The sample consists of 25 year-old or older men born after 1966, and the standard errors clustered for region-birth year groups. The estimated effect for Japanese men is not statistically significant and varies in sign. Although the effect of unemployment rate at age 19 looks substantial, the standard error is huge and also contradicts the result of no effect on college enrolment in Panel (B). On the other hand, a recession at high school completion slightly increases the likelihood to have college education among American men.

Next, Panels (B) and (C) of Table 5 show the effect of the contemporaneous local unemployment rate on enrollment for a subsample of a specific age (e.g. 18 years old), following Card and Lemieux (2000). The sample contains men in the relevant ages, and the table shows coefficients

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<sup>15</sup>This tabulation includes non-whites and women.

from probit model with year and region/state dummies in the right hand side. High school enrolment in Japan is not correlated with business cycles.<sup>16</sup> Also, the correlation between the college enrolment rate and the unemployment rate suggests that a recession may make some people to stay in college for another year but does not affect the decision upon high school graduation in Japan.<sup>17</sup> Note that the deferred graduation is not observed in the Japanese Labor Force Survey since it asks what kind of school the respondent graduated from. On the other hand, a recession increases high school enrollment of 18-year-old American men, consistent with Card and Lemieux (2000), and it also increases college enrollment of 19- and 21- year-old American men slightly. However, the effect on college enrollment is small, and no significant effect of unemployment rate in the previous year on 20- and 22-year old men suggests a substantial part of the increased college entrants quit in a year.<sup>18</sup> Overall, the effect of business cycle on schooling choice is small.

Further, to assess whether people who proceed to colleges during a recession are differently selected from those who proceed to colleges during a boom, we estimate the correlation between the unemployment rate at age 18 and future wages for college graduates. The unemployment rate at age 18 is unlikely to have any direct effect on earnings after graduation from college. Thus, if there is significant correlation, it is likely to be due to sorting on unobserved ability. Table

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<sup>16</sup>The number of observation who are not enrolled among 16-18 years old is too small to run separate regression by single age, and the number of observations enrolled to high school and older than 20 is too small to run regressions.

<sup>17</sup>This result might sound contradicting to the existing studies in Japan that show that worse labor market opportunities for high school graduates are associated to higher college enrolment rates. In fact, according to the School Census, the ratio of high school graduates proceeding to college started to rise around 1992, coinciding with the upturn of the unemployment rate. However, as Ariga (2005) emphasizes, this rise is largely attributed to the expansion of college capacity relative to the number of high school graduates. On one side, the number of colleges started to increase in the end of 1980s thanks to deregulation; on the other side, the number of high school graduates started to decrease around in the early 1990s as the second baby boomers (born in 1971-1974) finished high school. Since the most of the existing studies that find significant correlation between business cycle and college enrolment rate employ linear or quadratic trend and do not control for more flexible year fixed effects, chances are that they are picking up the spurious correlation in the early 1990s. Incidentally, the ratio of high school graduates proceeding to college stopped rising as the decrease of 18-year-old population slowed down around 2000, while the unemployment rate kept rising until 2002.

<sup>18</sup>Card and Lemieux (2000) also conclude the effect of local labor market condition on college enrollment is weak. Their result suggests the effect of cohort size on the college enrollment rate is substantial in the United States, too.

6 reports the result. Although the unemployment rate at age 18 is slightly positively correlated with earnings after graduating from college, the four coefficients are jointly insignificant and most of the individual coefficients are also insignificant in both countries. At least, there is no evidence that selection of students proceeding to college during a recession goes opposite direction in Japan than in the United States.

To summarize, both the attenuation bias and the size of average unemployment rate 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. Thus, the next section focuses on the comparison of the difference across groups with different educational backgrounds.

## **6 Effects of the unemployment rate at entry**

Table 7 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 (2); the coefficient of the unemployment rate at entry to the labor market corresponds to  $\beta$ , which is allowed to vary with experience by taking interactions with dummy indicators for 3-year potential experience categories. A high unemployment rate at entry has a very persistent negative effect for Japanese men, especially for the less educated group. 1% rise in the unemployment rate at entry leads to 7.5% earning losses for over 12 years for the group without college education. The effect is smaller and gradually fading, although still fairly persistent, for the more educated group; the initial loss is 4.6% and the gap gradually fades up to 2.3 %. 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 coun-

terpart. The effect for more educated Americans is gradually fading in about 10 years and fairly close to the estimates by existing studies using the data of college graduates in North America from other sources (Kahn 2006, Oreopoulos et al 2006).

For an intuitive grasp, Figure 2 plots the effect of the unemployment rate at entry on current earnings over potential experience. The coefficients in Table 7 are multiplied with the standard deviations in Table 2 (1.25 for Japan and 1.90 for the U.S.), since the level and thus the standard deviation of the unemployment rate are much smaller in Japan than in the United States. It is apparent that the effect of a recession at entry is strongest and the most persistent for the less educated Japanese, then comes the more educated Japanese followed by the more educated Americans. After adjusting the difference in the standard deviations of unemployment rates, the effect for the more educated groups becomes more or less similar among Japanese and Americans, although it is still stronger for Japanese. The difference in relative pattern across the less and the more educated group remains striking.

Provided that the less educated workers are less geographically mobile, all the potential attenuation biases described in the previous section affect college graduates more than high school graduates. Nevertheless, all the difference between less educated and more educated Japanese men is not likely to be attributed to such biases. First of all, we observe the opposite pattern for the American sample, which should be subject to the same kind of bias. Also, Ohtake and Inoki (1997) report that high school graduates who enter the labor market when the *national* unemployment rate is high earn lower wages, while the correlation for college graduates is smaller and statistically insignificant. We confirm the same result by regressions without the fixed effects (Appendix Table A.2).

Lastly, the effect of the contemporaneous unemployment rate on earnings among the less edu-

cated groups 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 reason is not very clear to us; the prevailed long-term contracts alone cannot explain this well because earnings of college graduates are somewhat sensitive to the contemporaneous unemployment rate. Perhaps bonus may increase more for more educated workers during booms. It is true that less educated workers are more likely to loose jobs; however, it is hard to think that they are more likely to stay unemployed and report zero earnings for the entire year than compromise on lower paying jobs and report low but positive earnings. On the other hand, earnings of the less educated group ar 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 (e.g. Hines, Hoynes and Krueger 2001). This contrast implies that the labor markets for low skilled workers may work in quite different manner in Japan and in the U.S.

Table 8 shows the effect of 1% rise in the unemployment rate at entry on the likelihood of being employed in the reference week of survey. The unemployment rate at entry has a persistent negative effect for less educated Japanese men, like the effect on earnings. The effect for less educated American men is negative and marginally significant, but the size of the effect is small. The effect is almost zero and statistically insignificant for the more educated groups both in Japan and in the United States, consistent with the existence evidence for negligible effect on employment for college graduates by Oreopoulos et al (2006) and Kahn (2006).

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 is not available for those who are not employed. Since the unemployment rate at entry has a negative effect on the likelihood of being employed only for less educated Japanese men, the estimated effect on hours worked conditional on being



employed may be biased upward for this group. Nevertheless, the upper panel of Table 9 shows that the estimated effect of the unemployment rate at entry to hours worked for Japanese high school graduates is negative and jointly significant, while the effect on college graduates is not statistically distinct from zero. Also, there is no statistically significant effect for Americans, both the less educated and the more educated groups. In any case, the effect on hours worked is very small compared to the effect on earnings; 1 % rise in the unemployment rate would change the weekly hours by less than one hour. It suggests that the negative effect on earnings comes from fall in wages per hour and/or decline in employment.

Even though the overall effect on the average hours is small, however, there can be a significant effect on full-time/part-time status. The lower panel of Table 9 is the effect on the likelihood of being full-time<sup>19</sup> The effect is negative and persistent for less educated Japanese men, a weaker, marginally significantly negative effect for less educated American men. There is no statistically significant negative effect for the more educated groups and the overall pattern across the four groups is similar to the effect on employment and hours of work.

To summarize: we find persistent negative effects of graduating during a recession on subsequent earnings and employment for less educated Japanese men. On the other hand, the effect on earnings for less educated American men is only temporary and the effect on employment for them is only marginally significant. The effect on earnings is significantly negative for more educated Japanese and American men, but weaker compared to the effect for less educated Japanese men. Also, there is no effect on employment, hours worked and full-time/part-time status for the more educated groups. The next section investigates why the effects of graduating during a recession on subsequent earnings and employment are particularly strong and persistent for less educated

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<sup>19</sup> Fulltime worker is those who worked 35 hours or more in the reference week, both in the CPS and the Japanese Labor Force Survey.

Japanese men.

## 7 Source of the difference between Japan and the United States

### 7.1 Duality in the Japanese labor market

In Section 3.2, we argue that adverse selection of people who leave school without obtaining a job on the long-term regular employment track can generate an additional negative effect at the cohort level, when there is a substantial discrepancy between the markets for regular and non-regular jobs. The persistent negative effect on earnings and employment for less educated Japanese men is consistent with this explanation, since the provisional workers not only earn less on average but also tend to get unemployed and work part-time more often.

The Japanese Labor Force Survey asks each employed person (excluding self-employed) whether he/she is employed as a "regular" employee.<sup>20</sup> We interpret the regular employees in this question as an equivalent to the general notion of *seishain*, core employees on the long-term regular employment track described in Section 2. The ratio of *seishain* is negatively correlated with the unemployment rate at entry, and the correlation is stronger for the less educated.<sup>21</sup> Table 10 shows how much of the effect of unemployment rate at entry is attributed to the reduced share of regular employment. Column 1 simply adds the dummy variable for being a *seishain* in the reference week interacted with potential experience to equation (2). Compared to Table 7, the

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<sup>20</sup>This classification is based on how their employers call them. The exact Japanese word corresponding to "regular" here is "*seiki-no*". 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 includes a significant number of part-time workers, who are not usually considered as *seishain*.

<sup>21</sup>The estimated coefficients and marginal effects are reported in Japanese version and available upon request to the author.

negative effect of the unemployment rate at entry reduced by 3% for the less educated group with experience less than 7 years, but the reduction is modest for the more educated group. The coefficient of being an *seishain* decreases over experience, perhaps because what really matters is the status at entry while the dummy variable refers to the contemporaneous employment status.

However, the positive coefficient of the dummy for *seishain* may be spurious because more productive people tend to be sorted into stable employment in general. To deal with this selection issue, we take average over cells defined by region, year of entry and survey year so that sorting within cohort is canceled out. Column 2 reports the estimated results from the regression weighted by the number of observations in each cell in the original dataset. Although the coefficients of *seishain* decreased substantially, the coefficients of the unemployment rate at entry are almost the same as those in Column 1.

## 7.2 Upward mobility after entry

Another related question is whether people already in the labor force can move to better jobs during upturns. In the United States, Beaudry and DiNardo (1991) find that, when economic conditions improve, firms raise wages of their incumbent workers to keep the workers from being bid away by other firms. Their result suggests that workers in the United States can move to better jobs without too much cost, and at the same time, employed workers are protected from deterioration in the external labor market conditions to some extent. Then, some of them should actually move to better jobs during upturns and stay in the jobs during recessions. Therefore, the best labor market conditions (i.e. the minimum unemployment rate) that one has experienced since entry to the labor market should have a considerable effect on current earnings for American men. On the other hand, there is no evidence for or against this sort of upward mobility among

Japanese men.

To examine this, Table 11 reports the estimated earnings equation with the minimum unemployment rate since entry to the labor market. For Japanese men, we have to keep in mind that the minimum rate is the rate in 1990 or 1991 for many observations; therefore, much of the variation in the minimum unemployment rate is absorbed by the region fixed effect. Thus, focusing on the coefficients of the minimum unemployment rate does not make much sense, and they are statistically insignificant in any case. Yet, we can tell that, even with controls for the best labor market condition ever experienced since entry, the labor market condition at entry has a significant and persistent effect in Japan. In contrast, inclusion of the minimum unemployment rate makes the coefficients of the unemployment rate at entry for the more educated group closer to zero and statistically insignificant. Also, the minimum unemployment rate has a substantial effect for American men, consistent with our expectation.

## 8 Concluding remarks

Entering the labor market during a recession has a persistent negative effect on earnings for young Japanese men. The effect is stronger and more persistent for the less educated group. Moreover, a recession at entry not only lowers the annual earnings, but also raises the likelihood of non-employment and part-time employment for them. Further, a considerable part of the negative effect on earnings for less educated Japanese men is the effect through the lower likelihood of regular, stable employment. In contrast, a recession at graduation from high school has no long-term effect for less educated American men, while we observe a modestly persistent negative effect for more educated American men, consistent with the existing studies that focus on college graduates.

The existing studies in North America that focus on college graduates draw on the theory of search frictions, long term contracts and human capital to explain the persistent negative effect of a recession at entry. Following their logic, the effect of a recession at entry is expected to be weaker for less educated people, and our result for American white men confirm it. To explain the even stronger effect for less educated Japanese men, we focus on the isolated hiring market for new graduates and duality between regular and non-regular employees in Japan, both of which do not exist in the United States. We find that a substantial part of the negative effect of a recession at entry for less educated Japanese men comes from the lower likelihood of having a regular full-time job.

Although we do not strictly prove that the duality in Japan is the main cause of the strong negative effect for less educated Japanese men, we show theoretical possibility that the adverse selection of non-regular workers and unemployed people may produce a negative effect of entering the labor market in a recession at the cohort level. If fixed-term workers have a similar difficulty in moving up to regular, indefinite term employment in some European countries, there may be a strong negative effect of a recession at entry for less educated workers in such countries as well. We also find that Japanese workers in general do not move to better jobs during booms, contrary to evidence for upward mobility during booms in the United States. This could also be the case in other developed countries with relatively less mobile labor force.

Our estimates suggest that, if everything else were the same, employment prospects of high school graduates and dropouts currently in their twenties would remain bleak for the next decade: given the 2% rise in the unemployment rate from the early 1990s to the early 2000s, those who graduated from or quit high schools in the early 2000s would earn about 12% less and 7% less likely to be employed than those ten years older did, throughout their twenties. To make things

worse, earnings inequality between less and more educated would also expand, since the effect of a recession at entry is relatively weak for the more educated group.

What can be done to remedy the future situation? Creating another job market for recent graduates so that everyone has two or three chances instead of only one at graduation may alleviate the problem, since it makes the institution closer to the U.S. labor market. Actually, this sort of second market has emerged for college graduates and it seems to have been working. Yet, the market for high school graduates has remained one-shot, while they are the more affected group. On the other hand, promoting the efficiency of a job search per se may not work if it does not get rid of obstacles for those lacking relevant working experience. If what keeps them away from regular jobs is the negative signaling effect that we have argued, uniformly provided training may have little effect because it does not solve the problem caused by the adverse selection. Coming up with a single concrete prescription is beyond the scope of this paper, but we hope our result give some clue about what would work and what wouldn't.

## **A Appendix**

### **A.1 Specification check**

Table A1 checks robustness to sample coverage and definition of entry for the CPS. In the main analyses, I used entry-year cohort of 1983-2003 so that the American data covers the same entry-year cohorts as the Japanese data. Column (2) includes the older cohort and the sample is extended to cohorts of 1976-2003, the maximum range available. The result for the less educated group changes in the opposite direction to the result for the more educated group. We suppose this is more like atypical of the recession in 1982 that affected the blue-collar intensive industries more. The relative pattern between the less and the more educated groups becomes subtle, yet

is not reversed.

Table 4 shows that many Americans graduate schools in one year later than the predicted entry. Thus, Column (3) uses the birth year + 7 + schooling as the year of entry. It does not change the relative pattern between the less and more educated groups. Column (4) includes older sample and uses birth year + 7 + schooling; the relative pattern between the less and the more educated groups is similar to that of Column (2).

Table A2 reports estimated effects with different sets of fixed effects and trend controls. Except that the difference between the less and the more educated groups in Japan tend to be over estimated without controls for survey year and region-specific trend, the inclusion of those fixed effects does not change the estimates substantially.

## A.2 Earnings data

We construct real annual earnings in the following way.

The Japanese Labour Force Survey asks "Earnings from employed work (including not incorporated self-employment)". The respondent chooses one of the following categories: 0, < 50, 50-99, 100-149, 150-199, 200-299, 300-399, 400-499, 500-699, 700-999, 1000-1499, 1500- for 1996-2005; 0, < 100, 100-199, 200-299, 300-399, 400-499, 500-699, 700-999, 1000-1499, 1500- for 1986-1995 (in 10,000 yen). We define the nominal earnings as the middle value of each earnings category. For the top category, we set 2,100 following the convention of dealing with the CPS top coding (in any case, very few observations are in this category). Then, we divide the nominal earnings with the regional Consumer Price Index normalized so that the national average takes 1 in 2000.

For the March CPS, we use "PEARINVAL - total persons earnings" as the nominal annual

earnings. This is the sum of wage and salary income and income from self-employment (including farm). Although this is in principle a continuous variable, 62% of the observations with positive earnings are bunched at every \$1,000 and about 23% are even bunched at every \$5,000. Thus it is more or less similar to the category data in the Japanese survey. Negative earnings are replaced with zero. We divide the nominal earnings by the national Consumer Price Index normalized to take 1 in 2000.

Table B1 summarizes the fraction with zero or missing earnings. Table B2 reports the effect of the unemployment rate at entry on the likelihood of reporting zero earnings or missing earnings. The unemployment rate at entry slightly raises the probability of lacking valid earnings data for the less educated groups, probably due to non-employment. Assuming that those with lower potential wages are more likely to lack valid earnings due to non-employment, the potential bias will, if it is not negligible, work against our argument for Japanese men.



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**Table 1: Summary statistics**

	Japanese men, high school or less	Japanese men, jr. college or more	American men, S <=12	American men, S > 12
Sample size	53,557	39,592	63,611	76,699
exp = 1-3	17,833	11,417	19,849	17,643
exp = 4-6	14,759	12,229	17,297	21,982
exp = 7-9	12,083	9,399	14,753	19,994
exp = 10-12	8,882	6,547	11,712	17,080
Educational background	without high school diploma: 6,745, high school diploma: 46,812	Jr/tech college (2 year): 11,383, 4 year college or more: 28,209	Average years of schooling: 11.6; S = 12: 65,469	Average years of schooling: 15.4; S < 16: 44,330
Log real earnings	(10,000yen in 2000)		(100 dollars in 2000)	
exp = 1-3	5.10	5.50	4.44	5.12
exp = 4-6	5.41	5.79	4.88	5.48
exp = 7-9	5.60	5.99	5.16	5.70
exp = 10-12	5.73	6.15	5.31	5.86
Employed				
exp = 1-3	76.5%	92.2%	73.9%	88.8%
exp = 4-6	88.5%	94.7%	81.6%	90.6%
exp = 7-9	90.5%	95.5%	84.8%	92.4%
exp = 10-12	90.5%	96.2%	86.6%	93.8%

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

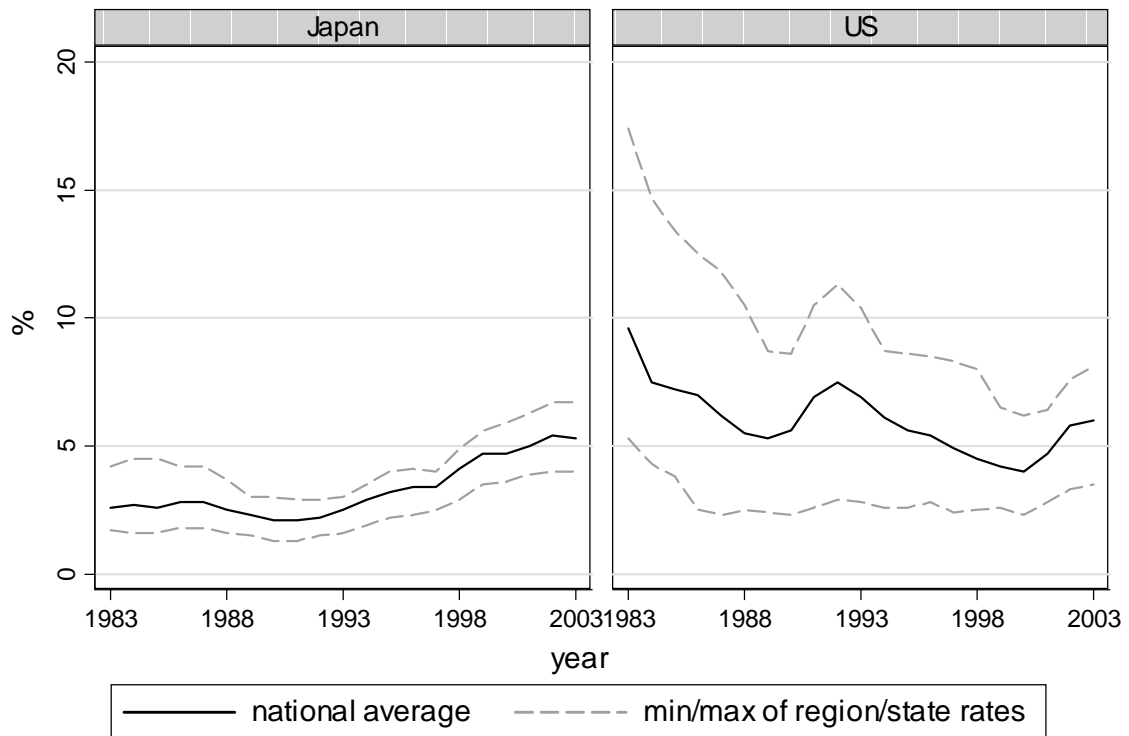


Table 2: Summary statistics of the region/state unemployment rates 1983-2003

	Obs	Mean	Std. deviation	Min	Max
Japanese regions (net of region FE, year FE & region specific linear trend)	210	3.21 (0.00)	1.23 (0.22)	1.3 (-0.60)	6.7 (0.89)
American states (net of state FE, year FE & state specific linear trend )*	1071	5.74 (0.00)	1.95 (0.75)	2.3 (-2.07)	17.4 (3.27)

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

**Table 3: Fraction moved between 1995 and 2000, % in total population in 2000.**

	Japan: Across 10 regions	U.S.: Across States
Age 15-19	6.1%	11.1%
Age 20-24	13.3%	18.5%
Age 25-29	10.0%	19.7%
Age 30-34	8.2%	15.3%

Source: Population Census 2000 (Japan) and Census 2000 (U.S.)

**Table 4: Enrollment rates by age**

Age	Not enrolled	High school	College
Japanese			
16	3.6%	96.4%	0.0%
17	5.0%	95.0%	0.0%
18	5.8%	93.7%	0.6%
19	48.3%	5.6%	46.1%
20	46.6%	0.9%	52.6%
21	67.5%	0.4%	32.1%
22	73.6%	0.1%	26.3%
23	87.0%	0.1%	12.9%
24	93.3%	0.1%	6.6%
American whites			
16	4.3%	95.3%	0.35%
17	8.8%	89.7%	1.47%
18	25.7%	49.2%	25.0%
19	45.3%	8.2%	46.5%
20	54.1%	2.5%	43.4%
21	60.1%	1.3%	38.6%
22	69.8%	0.8%	29.4%
23	79.8%	0.6%	20.3%
24	83.6%	0.4%	16.0%

Note: Unweighted averages over micro data in surveys 1986-2005. For Japanese surveys, "College" is sum of jr./tech college and four-year college for age 19 and above. For age 18 and under, those in "jr./tech college" is counted to high school because they are likely to be in the years corresponding to high school courses in the technical colleges (*koto senmon gakko*). For American sample, we simply follow the classification in the CPS.

**Table 5: The effect of the local unemployment rate on the enrollment rates**

(A) Unemployment rate around completion of high school on Pr( schooling &gt; 12 years)

	Japanese		American	
U. rate at	age 18	age 19	age 18	age 19
marginal effect	0.2%	-1.1%	0.5%	0.3%
coefficient	0.004	-0.027	0.013	0.007
S.E.	(0.004)	(0.021)	(0.005)	(0.005)

(B) Contemporaneous unemployment rate on high school enrolment rates

	Japanese		American	
Age	current	last	current	Last
16	-0.004	0.008	0.001	0.000
	(0.011)	(0.010)	(0.002)	(0.002)
17	* age	* age	0.000	0.003
	16-18	16-18	(0.002)	(0.002)
18	pooled	pooled	0.009	0.008
			(0.004)	(0.004)
19	0.002	-0.004	0.000	-0.002
	(0.018)	(0.018)	(0.003)	(0.003)
20	N/A	N/A	-0.001	0.000
			(0.002)	(0.002)

(C) Contemporaneous unemployment rate on college enrolment rates

	Japanese		American	
Age	current	last	current	Last
18	0.005	0.004	-0.001	0.002
	(0.007)	(0.007)	(0.004)	(0.003)
19	0.018	0.020	0.012	0.013
	(0.038)	(0.038)	(0.005)	(0.005)
20	0.000	-0.011	0.003	0.006
	(0.036)	(0.036)	(0.005)	(0.005)
21	0.062	0.086	0.004	0.010
	(0.039)	(0.039)	(0.005)	(0.004)
22	-0.029	0.040	-0.002	-0.002
	(0.038)	(0.039)	(0.004)	(0.004)
23	0.068	0.062	0.001	0.008
	(0.029)	(0.029)	(0.004)	(0.004)
24	0.027	0.029	0	0.003
	(0.023)	(0.022)	(0.003)	(0.003)

Note: Coefficients from probit regressions, with birth-year dummies and region/state dummies as covariates. Standard errors are clustered for birth-year and region/state. See the text for details.



**Table 6: The effect of unemployment rates at age 18 on future wages for college graduates**

	Japanese		American	
	4-yr college grads only	incl. jr/tech college	Schooling ≥16 yrs	Schooling ≥ 13 yrs
<b>U at age18</b>				
×experience 1-3 years	0.018 (0.033)	0.034 (0.018)	0.012 (0.007)	0.005 (0.005)
×experience 4-6 years	-0.005 (0.027)	0.014 (0.015)	0.009 (0.005)	0.011 (0.004)
×experience 7-9 years	-0.003 (0.024)	0.026 (0.016)	0.009 (0.005)	0.004 (0.004)
×experience 10-12 years	0.000 (0.023)	0.017 (0.019)	0.000 (0.005)	-0.001 (0.004)
<b>Contemporaneous U</b>				
×experience 1-3 years	-0.064 (0.021)	-0.064 (0.018)	-0.014 (0.011)	-0.011 (0.008)
×experience 4-6 years	-0.034 (0.020)	-0.040 (0.017)	-0.031 (0.009)	-0.024 (0.007)
×experience 7-9 years	-0.023 (0.021)	-0.024 (0.017)	-0.024 (0.012)	-0.018 (0.008)
×experience 10-12 years	-0.019 (0.021)	-0.014 (0.018)	-0.016 (0.013)	-0.010 (0.009)
Observations	18,053	27,577	38,769	72,226
R2	0.22	0.25	0.14	0.16

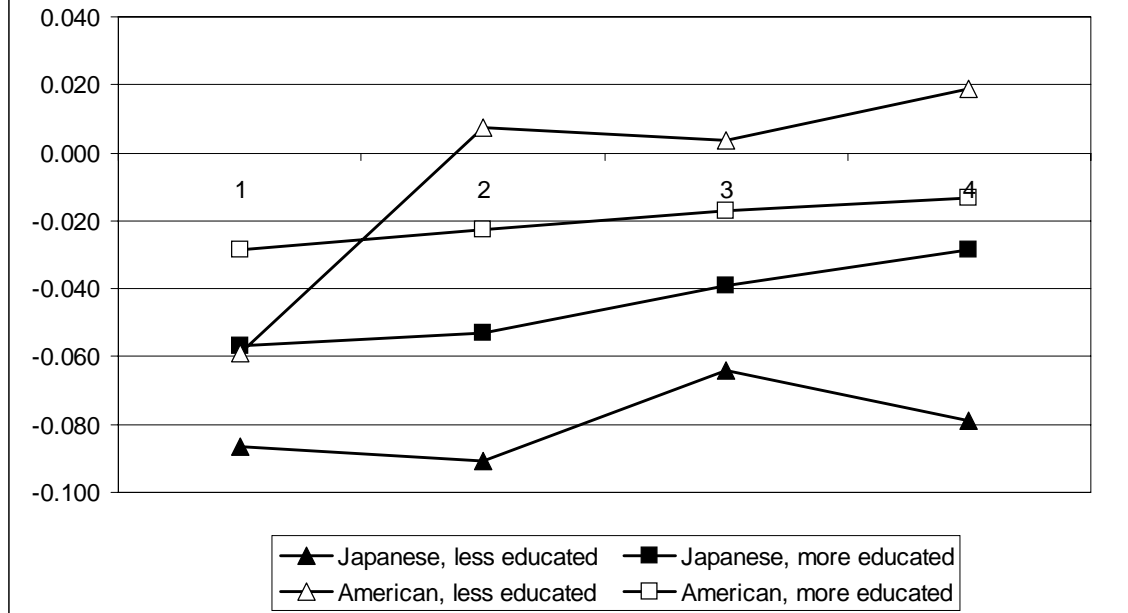
Note: Cohort-clustered robust standard errors in parenthesis. Other controls included are potential experience, education (dummies for the Japanese sample, years of schooling for the American sample), birth year dummies, region dummies, survey year dummies and region-specific linear trends.

**Table 7: The effect of the unemployment rate at entry and the contemporaneous unemployment rate on log real annual earnings**

	Japanese		Americans	
	High school	College	S≤12	S>12
U at entry to the market				
×experience 1-3 years	-0.069 (0.026)	-0.046 (0.017)	-0.031 (0.008)	-0.015 (0.007)
×experience 4-6 years	-0.072 (0.021)	-0.042 (0.014)	0.004 (0.007)	-0.012 (0.006)
×experience 7-9 years	-0.051 (0.018)	-0.031 (0.014)	0.002 (0.006)	-0.009 (0.006)
×experience 10-12 years	-0.063 (0.017)	-0.023 (0.015)	0.010 (0.007)	-0.007 (0.005)
Contemporaneous U				
×experience 1-3 years	-0.050 (0.019)	-0.050 (0.017)	-0.042 (0.008)	-0.013 (0.008)
×experience 4-6 years	-0.016 (0.015)	-0.038 (0.015)	-0.043 (0.009)	-0.022 (0.007)
×experience 7-9 years	-0.010 (0.016)	-0.032 (0.014)	-0.036 (0.010)	-0.020 (0.007)
×experience 10-12 years	0.012 (0.018)	-0.024 (0.014)	-0.033 (0.011)	-0.012 (0.008)
Observations	47,469	38,017	57,635	72,226
R2	0.23	0.27	0.17	0.16

Note: Cohort-clustered robust standard errors in parenthesis. 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.

**Figure 2: The effect of a standard deviation rise in the unemployment rate at entry on log real annual earnings**



Note: Plot of the coefficients in Table 7 adjusted using the standard deviations of raw unemployment rates shown in Table 1 (1.25 for Japan, 1.90 for the U.S.).

**Table 8: The effect of the unemployment rate at entry on employment status**

	Japanese		Americans	
	High school	College	High school	College
Marginal effects				
U 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%
Contemporaneous U				
×experience 1 - 3 years	-3.97%	0.25%	-2.53%	-0.64%
×experience 4 - 6 years	-3.71%	0.29%	-2.20%	-0.76%
×experience 7 - 9 years	-3.08%	0.70%	-1.82%	-0.72%
×experience 10 - 12 years	-2.26%	0.50%	-1.76%	-0.66%
Probit Coefficients				
U at entry				
×experience 1 - 3 years	-0.170	-0.061	-0.007	-0.002
	(0.055)	(0.068)	(0.003)	(0.002)
×experience 4 - 6 years	-0.162	-0.009	-0.003	-0.001
	(0.049)	(0.058)	(0.003)	(0.002)
×experience 7 - 9 years	-0.195	0.076	-0.003	-0.001
	(0.045)	(0.068)	(0.003)	(0.002)
×experience 10 - 12 years	-0.204	-0.001	-0.005	-0.004
	(0.042)	(0.066)	(0.003)	(0.002)
Contemporaneous U				
×experience 1 - 3 years	-0.207	0.030	-0.025	-0.006
	(0.048)	(0.068)	(0.003)	(0.002)
×experience 4 - 6 years	-0.193	0.035	-0.022	-0.008
	(0.042)	(0.053)	(0.003)	(0.002)
×experience 7 - 9 years	-0.160	0.084	-0.018	-0.007
	(0.043)	(0.054)	(0.004)	(0.002)
×experience 10 - 12 years	-0.118	0.061	-0.018	-0.007
	(0.047)	(0.060)	(0.005)	(0.003)
Sample size	53,513	39,562	53,428	39,310
Pseudo R2	0.098	0.051	0.089	0.044
LR test statistics (H0: all $\beta=0$ )	28.02	3.86	28.81	8.71
(p-value)	(0.00)	(0.43)	(0.00)	(0.07)

Note: Cohort-clustered robust standard errors in parenthesis. 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. The null hypothesis for the LR test is that all coefficients of unemployment rates at entry interacted with potential experience are zero.

**Table 9: The effect of the unemployment rate at entry on hours worked, conditional on being employed**

(1) Hours worked in last week

	Japanese		Americans	
	High school	College	S<=12	S>12
OLS Coefficients				
×experience 1 - 3 years	-0.609 (0.520)	0.587 (0.474)	0.047 (0.102)	-0.051 (0.094)
×experience 4 - 6 years	-0.356 (0.407)	0.551 (0.396)	0.018 (0.086)	0.022 (0.077)
×experience 7 - 9 years	-0.933 (0.398)	0.324 (0.426)	0.035 (0.089)	0.101 (0.080)
×experience 10 - 12 years	-0.838 (0.353)	0.570 (0.398)	0.031 (0.088)	0.029 (0.073)
Observations	46,169	37,660	50,250	68,430
Pseudo R2	0.022	0.012	0.04	0.03
F test statistics (H0: all $\beta=0$ )	2.65	0.77	0.08	0.61
(p-value)	(0.034)	(0.546)	(0.987)	(0.658)

(2) Pr( full-time | employed)

	Japanese		Americans	
	High school	College	S<=12	S>12
Marginal effects				
×experience 1 - 3 years	-2.4%	0.5%	-1.0%	-0.5%
×experience 4 - 6 years	-1.7%	0.4%	-0.5%	-0.5%
×experience 7 - 9 years	-2.2%	0.1%	-0.1%	-0.5%
×experience 10 - 12 years	-1.6%	1.4%	-0.9%	-0.5%
Probit Coefficients				
×experience 1 - 3 years	-0.161 (0.065)	0.053 (0.070)	-0.027 (0.010)	-0.019 (0.010)
×experience 4 - 6 years	-0.119 (0.050)	0.041 (0.058)	-0.013 (0.009)	-0.016 (0.009)
×experience 7 - 9 years	-0.152 (0.050)	0.012 (0.059)	-0.003 (0.009)	-0.018 (0.009)
×experience 10 - 12 years	-0.109 (0.048)	0.145 (0.071)	-0.025 (0.009)	-0.019 (0.009)
Observations	46,169	37,660	63611	76699
Pseudo R2	0.031	0.019	0.053	0.021
LR test statistics (H0: all $\beta=0$ )	9.93	5.24	12.9	7.46
(p-value)	(0.042)	(0.053)	(0.012)	(0.114)

Note: Cohort-clustered robust standard errors in parenthesis. 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. The null hypothesis for the F/LR tests is that all coefficients of unemployment rates at entry interacted with potential experience are zero.

**Table 10: The effect through employment status (*seishain*) on earnings in Japan**

	(1) Individual		(2) Cohort	
	High school	College	High school	College
U at entry to the market				
×experience 1-3 years	-0.035 (0.021)	-0.033 (0.016)	-0.033 (0.023)	-0.030 (0.017)
×experience 4-6 years	-0.049 (0.017)	-0.038 (0.013)	-0.042 (0.018)	-0.037 (0.015)
×experience 7-9 years	-0.043 (0.016)	-0.031 (0.013)	-0.026 (0.017)	-0.032 (0.014)
×experience 10-12 years	-0.058 (0.014)	-0.023 (0.014)	-0.041 (0.016)	-0.025 (0.015)
Contemporaneous U				
×experience 1-3 years	-0.037 (0.016)	-0.038 (0.015)	-0.007 (0.019)	-0.043 (0.015)
×experience 4-6 years	-0.012 (0.013)	-0.031 (0.013)	0.011 (0.015)	-0.034 (0.013)
×experience 7-9 years	-0.005 (0.014)	-0.029 (0.012)	0.006 (0.015)	-0.035 (0.013)
×experience 10-12 years	0.012 (0.016)	-0.021 (0.014)	0.018 (0.016)	-0.025 (0.014)
Dummy for /ratio of <i>seishain</i>				
×experience 1-3 years	0.778 (0.017)	0.733 (0.024)	0.651 (0.059)	0.566 (0.058)
×experience 4-6 years	0.617 (0.018)	0.611 (0.026)	0.563 (0.057)	0.520 (0.059)
×experience 7-9 years	0.598 (0.021)	0.513 (0.032)	0.451 (0.069)	0.396 (0.068)
×experience 10-12 years	0.567 (0.027)	0.414 (0.034)	0.417 (0.084)	0.388 (0.083)
Sample size	47,431	38,001	1836	1831
R2	0.38	0.38	0.87	0.87

Note: Robust standard errors in parenthesis, clustered for completion-year and region for column (1). Column (2) is weighted by number of observations in the original dataset. Other controls included are potential experience, education (dummy for/ratio of high school drop outs or jr. college graduates), graduation year dummies, region dummies, survey year dummies and region-specific linear trends.

**Table 11: The effect of the unemployment rate at entry, the contemporaneous unemployment rate and the minimum rate since entry on log real annual earnings**

	Japanese		Americans	
	High school	College	S<=12	S>12
U at entry to the market				
×experience 1-3 years	-0.063 (0.035)	-0.064 (0.031)	-0.015 (0.011)	-0.009 (0.010)
×experience 4-6 years	-0.071 (0.026)	-0.046 (0.025)	0.013 (0.008)	0.002 (0.007)
×experience 7-9 years	-0.067 (0.026)	-0.032 (0.018)	0.004 (0.007)	-0.006 (0.006)
×experience 10-12 years	-0.079 (0.022)	-0.010 (0.022)	0.013 (0.007)	0 (0.005)
Contemporaneous U				
×experience 1-3 years	-0.046 (0.021)	-0.058 (0.019)	-0.026 (0.011)	-0.008 (0.010)
×experience 4-6 years	-0.017 (0.016)	-0.038 (0.016)	-0.033 (0.010)	-0.008 (0.008)
×experience 7-9 years	-0.018 (0.017)	-0.030 (0.014)	-0.032 (0.010)	-0.015 (0.008)
×experience 10-12 years	0.005 (0.018)	-0.017 (0.015)	-0.025 (0.012)	0.003 (0.010)
Minimum U since entry				
×experience 1-3 years	0.001 (0.044)	0.025 (0.042)	-0.05 (0.020)	-0.036 (0.019)
×experience 4-6 years	0.015 (0.038)	-0.001 (0.035)	-0.042 (0.017)	-0.065 (0.014)
×experience 7-9 years	0.048 (0.039)	-0.008 (0.032)	-0.023 (0.016)	-0.039 (0.015)
×experience 10-12 years	0.050 (0.045)	-0.034 (0.040)	-0.036 (0.020)	-0.067 (0.015)
Sample size	47,469	38,017	57,635	72,226
R2	0.23	0.27	0.17	0.16

Note: Cohort-clustered robust standard errors in parenthesis. Other controls included are potential experience, education (dummies for Japanese sample, years of schooling for American sample), graduation year dummies, region dummies, survey year dummies and region-specific linear trends.

**Table A.1. Robustness check to sample coverage and definition of entry for the CPS sample**

- (1) Original (graduation cohorts 1983-2003, birth year + 6 + schooling)  
 (2) Graduation cohorts **1976**-2003, birth year + 6 + schooling  
 (3) Graduation cohorts 1983-2003, birth year + **7** + schooling  
 (4) Graduation cohorts **1976**-2003, birth year + **7** + schooling

**The coefficients of the unemployment rate at entry**

	(1)	(2)	(3)	(4)
<hr/>				
S ≤ 12				
×experience 1 - 3 years	-0.031 (0.008)	-0.036 (0.006)	-0.042 (0.009)	-0.046 (0.007)
×experience 4 - 6 years	0.004 (0.007)	-0.01 (0.005)	-0.002 (0.007)	-0.015 (0.005)
×experience 7 - 9 years	0.002 (0.006)	-0.008 (0.005)	-0.002 (0.007)	-0.015 (0.005)
×experience 10 - 12 years	0.01 (0.007)	0.002 (0.005)	0.012 (0.007)	0.002 (0.005)
<hr/>				
S > 12				
×experience 1 - 3 years	-0.015 (0.007)	-0.013 (0.005)	-0.028 (0.008)	-0.022 (0.006)
×experience 4 - 6 years	-0.012 (0.006)	-0.009 (0.005)	-0.025 (0.006)	-0.017 (0.005)
×experience 7 - 9 years	-0.009 (0.006)	-0.011 (0.004)	-0.012 (0.006)	-0.012 (0.004)
×experience 10 - 12 years	-0.007 (0.005)	-0.006 (0.004)	-0.009 (0.005)	-0.008 (0.004)



**Table A.2. Estimated effect on earnings with different sets of fixed effects/trend controls**

	Japanese high school or less			
	(1)	(2)	(3)	(4)
U at entry to the market				
×experience 1-3 years	-0.111 (0.008)	-0.110 (0.017)	-0.073 (0.021)	-0.069 (0.026)
×experience 1-3 years	-0.088 (0.010)	-0.085 (0.017)	-0.075 (0.017)	-0.072 (0.021)
×experience 1-3 years	-0.043 (0.012)	-0.043 (0.016)	-0.055 (0.016)	-0.051 (0.018)
×experience 1-3 years	-0.040 (0.012)	-0.039 (0.016)	-0.067 (0.016)	-0.063 (0.017)
	Japanese jr college or more			
	(1)	(2)	(3)	(4)
U at entry to the market				
×experience 1-3 years	-0.058 (0.008)	-0.049 (0.012)	-0.029 (0.015)	-0.046 (0.017)
×experience 1-3 years	-0.045 (0.007)	-0.039 (0.012)	-0.028 (0.012)	-0.042 (0.014)
×experience 1-3 years	-0.018 (0.008)	-0.013 (0.011)	-0.022 (0.011)	-0.031 (0.014)
×experience 1-3 years	-0.010 (0.012)	-0.002 (0.013)	-0.018 (0.013)	-0.023 (0.015)
	Americans with S≤12			
	(1)	(2)	(3)	(4)
U at entry to the market				
×experience 1-3 years	-0.046 (0.006)	-0.043 (0.007)	-0.041 (0.008)	-0.031 (0.008)
×experience 1-3 years	-0.004 (0.004)	0.001 (0.006)	-0.008 (0.006)	0.004 (0.007)
×experience 1-3 years	-0.013 (0.005)	-0.009 (0.006)	-0.009 (0.006)	0.002 (0.006)
×experience 1-3 years	-0.008 (0.005)	-0.007 (0.006)	0.002 (0.007)	0.01 (0.007)
	Americans with S>12			
	(1)	(2)	(3)	(4)
U at entry to the market				
×experience 1-3 years	-0.014 (0.005)	-0.011 (0.005)	-0.015 (0.006)	-0.015 (0.007)
×experience 1-3 years	-0.010 (0.005)	-0.007 (0.005)	-0.014 (0.005)	-0.012 (0.006)
×experience 1-3 years	-0.010 (0.004)	-0.012 (0.005)	-0.012 (0.005)	-0.009 (0.006)
×experience 1-3 years	-0.010 (0.004)	-0.017 (0.005)	-0.010 (0.005)	-0.007 (0.005)

(1) No fixed effects, no control for current unemployment rate

(2) + entry year FEs and state FEs

(3) (2) + current unemployment rate and survey year FEs

(4) (3) + state specific linear trends. This is the same as estimates presented in Table 7.

**Table B1 Fraction with zero/missing earnings**

	Japanese men, high school or less	Japanese men, jr. college or more	American white men, S ≤12	American white men, S > 12
exp = 1-3	19.1%	5.5%	13.8%	6.2%
exp = 4-6	8.1%	3.7%	7.9%	5.4%
exp = 7-9	6.9%	3.4%	7.2%	5.4%
exp = 10-12	7.2%	2.7%	6.8%	6.6%

**Table B2 The effect of the unemployment rates on the likelihood of zero/missing earnings**  
Probit coefficients

	Japanese		Americans	
	High school	College	S ≤12	S >12
U at entry to the market				
×experience 1 - 3 years	0.068 (0.054)	0.027 (0.054)	0.036 (0.013)	0.023 (0.015)
×experience 4 - 6 years	0.060 (0.041)	0.123 (0.047)	0.024 (0.012)	0.005 (0.013)
×experience 7 - 9 years	0.036 (0.036)	0.035 (0.050)	0.015 (0.013)	-0.008 (0.013)
×experience 10 - 12 years	0.033 (0.033)	0.010 (0.053)	0.021 (0.013)	0.001 (0.013)
Contemporaneous U				
×experience 1 - 3 years	0.052 (0.041)	0.020 (0.054)	0.052 (0.015)	-0.015 (0.015)
×experience 4 - 6 years	0.059 (0.031)	-0.013 (0.045)	0.032 (0.015)	0.003 (0.015)
×experience 7 - 9 years	0.036 (0.032)	0.001 (0.044)	0.046 (0.016)	-0.002 (0.016)
×experience 10 - 12 years	0.017 (0.035)	0.041 (0.051)	0.027 (0.022)	-0.005 (0.019)
Observations	52,342	39,000	63,611	76,699
Pseudo R2	0.186	0.180	0.077	0.026