School–work systems in postindustrial societies: Evidence from Japan

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Abstract

The Japanese system of school–work has been widely admired for the strong communication and recruitment relationships that exist between high schools and employers. We develop a framework for understanding the macro-level conditions that fostered the effectiveness of the system up until the early 1990s. These conditions included a stratified secondary educational system, a large supply of high-quality high school graduates, and high demand for young workers to fill entry-level positions in the internal labor markets of large firms. We use original data from a sample of urban high schools to analyze how Japanese employers' recruitment patterns changed in the 1990s and beyond. The results of that analysis and a counterfactual analysis suggest that recent changes, especially in Japanese employment institutions, have significantly weakened high school–employer relationships. We suggest implications of the Japanese case for school–work processes in other postindustrial societies.

1. Introduction

The youth labor market is an important area of policy concern in postindustrial societies. Many countries have witnessed deterioration in youths' employment prospects over the past two decades, as seen in heightened rates of unemployment and idleness as well as depressed wages relative to prime-age workers. These outcomes contrast with what some social scientists had predicted for the early 21st century: that increased educational attainment, growth in economic sectors that tend to be youth-intensive, and increased labor demand due to population aging would privilege young people in the labor market (Blanchflower & Freeman, 2000; Freeman & Katz, 1995; Honda, 2003; Ryan, 2001).

The widening of labor market outcomes between highly educated and less-educated young people has been of particular concern. This has led social scientists and policymakers to be very interested in the positive contributions that institutional arrangements can make to smoothing the transition from school to work for high school graduates (Breen, 2005; Freeman & Katz, 1995; Rosenbaum & Kariya, 1989; Rosenbaum, 2001; Ryan, 2001). In particular, the German and Japanese school–work systems have frequently been singled out

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as models of efficiency. Many observers in the 1980s and early 1990s linked the strong economic performance of those two economies and the lack of severe problems in their youth labor markets to the nature of their national educational and employment institutions (Bailey, 2001; Blanchflower & Freeman, 2000; Mitani, 1999; Mortimer & Kruger, 2000; OECD, 1999; Rosenbaum & Kariya, 1989). Indeed, many social scientists have discussed high school–work policies in terms of the key features of the German and Japanese systems: apprenticeship (the "German system"), and long-term recruitment relationships between high schools and employers (the "Japanese system").

However, in recent years the Japanese school–work system appears to have unraveled to a considerable extent, and the German system has also been under duress (Honda, 2003; Müller, Steinmann, & Ell, 1998). What does the faltering nature of these heretofore effective institutional arrangements tell us about the macro-level conditions that supported them? While the German and Japanese systems have attracted less attention in their faltering phase than they did in their heyday, this paper argues for a closer look at "what went wrong." We suggest that when institutional performance declines, social scientists have a prime opportunity to analyze the underlying conditions that nurtured institutional effectiveness to begin with.

Our focus in this paper is the Japanese system of high school to work. Japan is an important case for two reasons. First, figuring out how and why its high school–work institutions have changed is significant from a policy point of view. The main reason American social scientists have paid attention to the Japanese model is because they have been interested to find features of it that might be "exportable" to the U.S. The strong points of Japanese school–work institutions have garnered attention in broad comparative studies as well as in more focused comparisons with the U.S. (Blanchflower & Freeman, 2000; Rosenbaum & Kariya, 1989; Rosenbaum, 2001; Ryan, 2001), with many observers in the 1980s and into the 1990s asserting that the U.S. would benefit from the adoption of some of these features. Second, Japan is a strategic research site from an empirical point of view: because its high school–work system is undergirded by a set of nationwide policies, we are able to focus in on a local context and analyze in-depth the operation and unraveling of the system. This is an empirical advantage because the data requirements for analyzing institutional change are very demanding, and we believe the workings of a school–work system can best be seen by looking in depth at a local labor market.

We analyze how Japan's nationally uniform, well-articulated system of moving students from upper secondary school into work has performed under significant recent change in three macro-level conditions:

(1) The transition from a manufacturing-based to a service-based economy.
(2) The rapid increase in the proportion of high school graduates who proceed to higher education.
(3) Employers' restructuring of job openings away from entry-level positions in firm-internal labor markets to part-time or temporary positions. This tendency has been particularly pronounced in the labor market for new high school graduates.

These macro-level changes are similar to the experience of many other postindustrial economies, allowing us to utilize change in Japan as a "laboratory" to see how high school–work transition processes are affected.

We draw on three original datasets generated for this project: (1) All recruitment advertisements sent by Japanese employers to high schools in a representative urban area in the mid-1990s. We use these data in a network analysis to examine which types of high schools attract the most interest from potential employers. (2) Longitudinal job placement data over two decades for graduates from a sample of these schools. These data illuminate the extent to which high school–employer ties have survived or been buffeted by the macro-level changes outlined above. (3) Qualitative data from interviews with teachers involved in graduates' job placement in 20 high schools. These data inform our general perspective and our quantitative analyses.

We argue from our data that pockets of effectiveness in Japan's school–work system remain: the system appears to be robust for certain types of schools and employers. Our network data from the 1990s show that industrial high schools received many more job opening announcements than general academic high schools. Consistent with this, our longitudinal graduate placement data suggest a significant decline in long-term recruitment relationships between general high schools and firms but the resilience of such ties between industrial high schools and firms.[2] The continued importance of qualified high school graduates for skilled manufacturing jobs seems to underlie the privileged position of industrial high schools. These findings in conjunction with qualitative evidence lead to a number of

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[2] We use the terms "general" and "general academic" interchangeably, to refer to high schools that do not have a vocational curriculum.

broader conclusions about the conditions necessary for effective high school–work institutions in postindustrial economies.

2. Theoretical background: macro-level conditions supporting high school–work institutions

2.1. Characteristics of employment and educational systems

While the vocational training of the German system and the close school–firm connections of the Japanese system have been greatly admired, the embeddedness of these institutions in national educational systems, in the industrial composition of the economy, and in the rules governing employment relationships has not been adequately theorized. Even in the heyday of American admiration of these systems in the 1980s and early 1990s, the undertheorized interdependence between school–work systems and educational systems on the one hand and labor market practices on the other made it difficult to predict whether any elements of these systems could be effectively transplanted to the U.S. context.

Fligstein (2001) provides a useful framework for conceptualizing employment systems. He identifies three prototypical systems: vocationalism, professionalism, and managerialism (see also Marsden, 1990). While Germany represents the prototype of vocationalism and the U.S. is an example of mixed systems, Japan is the clearest example of managerialism. In employment systems dominated by managerialism, firm-specific training is given to a core group of workers whose careers subsequently unfold within firm-internal labor markets. Employers' initial choices of whom to hire into career-track jobs are very important, as training costs must be recouped in the increased productivity of workers as they age (Rosen, 1985). Employers are therefore motivated to choose entry-level workers carefully and to seek accurate information and signals about prospective workers. Given that entry-level workers by definition have little experience, how do employers obtain such information? Brinton and Kariya (1998) argue that institutional ties—ties between organizations such as schools and firms—are likely to play a strong role in matching workers to jobs in employment systems like Japan's that are dominated by internal labor markets.

Some sociologists of education have also adopted a macro-level institutional view of how educational and recruitment processes operate in tandem in a society, focusing on how schools are organized vis-à-vis the economy (Allmendinger, 1989; Kerckhoff, 1995, 2000; Shavit & Müller, 1998). Allmendinger sets forth a typology of educational systems based on the dimensions of standardization and stratification, with standardization referring to the extent of nationwide standardization of educational curricula and quality, and stratification referring to the extent of tracking in secondary education. In this typology, the U.S. and Germany occupy quite different positions, with the U.S. exhibiting a low degree of stratification (as evidenced by relatively late tracking) and Germany exhibiting a high degree (with relatively early student selection into tracks that have different curricula and different implications for student advancement to tertiary education). In highly stratified systems, employers receive strong signals about which schools and tracks are preparing students primarily for advancement to higher education or for the job market.

Although not included in Allmendinger's typology, Japan lies somewhere between the U.S. and Germany in terms of the stratification built into its educational system. Entrance into high school is nearly universal in Japan but is governed by an entrance examination system, with schools arrayed in a hierarchy from highest to lowest quality in each district. Students apply to the high school to which their middle school performance and entrance exam score seems to match them most closely, under a highly supervised guidance process in ninth grade (LeTendre, 1996; Rohlen, 1983). If they prefer, they can apply instead to a vocational high school (the most common being industrial or commercial).[3] While private high schools are also an option for those families that can afford them, about three-quarters of Japanese high schools are public (Ministry of Education, Culture, and Science, 2009).

The results of this early educational selection process are that: (1) general (academic) high schools in Japan demonstrate a high degree of internal homogeneity in terms of student "quality," and (2) by deciding to attend a particular high school, students sort themselves into either an academic or a vocational track. Each high school therefore implicitly sends a strong signal to employers regarding the "quality" of potential job applicants' general human capital as well as the extent to which job applicants have acquired specific vocational training during their schooling.

Given the strength of internal labor markets in Japanese organizations, employers who wish to recruit new high school graduates into entry-level jobs are highly motivated to obtain as much information as

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[3] This school need not be in their local school district.

possible about job applicants so that they will not make potentially costly mistakes in hiring and subsequent on-the-job training. The sorting by school type and quality in the Japanese secondary educational system saves employers considerable transaction costs in their initial selection and screening of applicants. We argue that these two institutional features—the structure of the secondary school system and the employment system—are intricately related to how well Japan's school–work system seems to have performed throughout most of the post-WWII period. Moreover, the level and nature of labor demand in the 1960–1980s cemented a stable institutional equilibrium where Japanese high schools' and employers' motivations complemented each other.

2.2. The role of labor demand and supply

The historical development of a distinctive set of institutions in Japan for moving youth out of school and into the workplace has been documented extensively in the Japanese-language literature (Kariya, Sugayama, Ishida, Murao, & Nishimura, 1997) and more briefly in English (Brinton, 2001, 2010; Honda, 2003). Honda describes how employers' "periodic blanket recruitment" (large-scale recruitment of new school-leavers to begin work on a specified date in the spring) into blue-collar positions expanded and became standard practice in the 1960s, when employers faced shortages of workers for manufacturing jobs during conditions of rapid growth in the Japanese economy. Firm-internal labor markets were

already well developed for white-collar workers in large firms, and employers reorganized their human resource practices to fashion internal labor markets for young blue-collar workers as well (Honda, 2003). The practice of blanket recruitment of many high school seniors into ports of entry into internal labor markets at the point of graduation each year (with the standard starting employment date of April 1) became institutionalized during this period of high labor demand, accompanied by demographic conditions that fortuitously fit with this demand—large cohorts of young people, not all of whom were needed in Japan's shrinking agricultural sector, and rapidly increasing rates of matriculation to secondary school.

Fig. 1 shows how the educational attainment of Japanese youth changed from 1958 to the present. Employers' interest in high school graduates closely tracked the expansion of secondary education during the 1960s and 1970s; the large pool of graduating high school seniors provided them with a ready supply of young workers with basic skills. As secondary schools' involvement in introducing job applicants to employers became institutionalized, schools competed with each other to form what is called in Japanese *jisseki kankei* (literally, "results-oriented relationships") with local employers. *Jisseki kankei* has been translated into English in various ways. In their frequently cited research based on quantitative and qualitative data collected in the 1980s, Rosenbaum and Kariya termed these ties "semiformal employment contracts," stating that "Although they have no formal or written contract, each
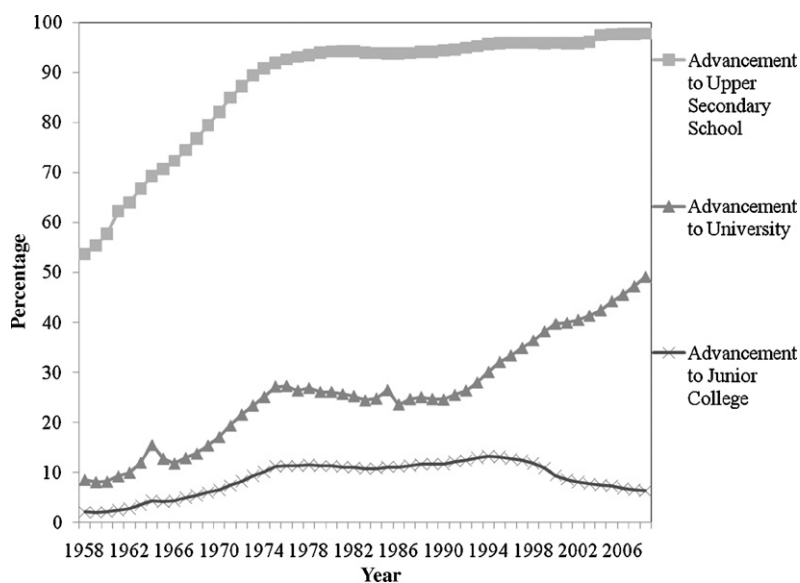

Fig. 1. Japanese advancement rates to upper secondary and tertiary education, 1958–2006 (both sexes).

school has ongoing relationships with specific employers ('contract employers') with whom they deal every year, while each employer retains relationships with specific schools ('contract schools')." They continued: "...quotas and contracts are the institutional mechanisms that define the relationships between schools and employers. They are formed in interactions over time and are hard to change. Yet they are crucial for recruitment and difficult to circumvent." (1989: 1343).

Our in-depth interviews of teachers at 20 urban public high schools regarding school–firm relationships are highly consistent with Rosenbaum and Kariya's qualitative data.[4] As one teacher stated, "In the final analysis, seniors' job search depends completely on the trust relationship between the employer and the school [*jisseki kankei*]—this relationship is everything." Another teacher spoke to the nature of school–employer relationships in the following way: "There are often connections between schools and firms. To the extent that such connections exist, the job-hunting process goes well for students. There are several companies that will hire some of our graduates if we ask them to. Or they might say, 'This year we won't hire any of your graduates, but next year we'll try to.'" The nature of the ties between schools and employers is thus well captured by the language of semiformal or implicit contracts. These ties are based not on written promises but on the shared understanding between certain schools and employers that the school will endeavor to recommend some of its best students every year and the employer will endeavor in turn to accept them as employees, contingent upon their successful performance in a job interview and any skill tests that the employer regards as important. Hereafter, we will term these relationships "implicit recruitment contracts" or "recruitment relationships"; for shorthand purposes, we will preserve Rosenbaum and Kariya's designation of employers who engage in such relationships as "contract employers."

Implicit recruitment contracts appear to have served the interests of both schools and employers under the high labor demand conditions in the Japanese economy of the 1960–1980s. Secondary schools could attract better students if they were able to offer assurances that they could introduce students to jobs as they graduated. And conversely, employers could greatly lower their recruitment costs if some schools implicitly agreed to send them some of their best graduates each year.

In sum, the Japanese system of moving secondary school graduates into the workplace developed under conditions of high labor demand for entry-level workers with basic skills, whom employers could train on the job at starting wages in exchange for the promise of promotion and seniority wages. The complementarity between a stratified educational system and internal labor markets, enhanced by strong labor demand, characterized the institutional and economic environment that nurtured Japan's strong school–work system. We believe that the importance of these three macro-level conditions became much more apparent as two of them—labor demand and internal labor markets—changed dramatically in the final decade of the 20th century.

3. Economic change and employment restructuring: Japan's "lost decade"

3.1. Declining labor demand for high school graduates

Following three decades of economic growth rates ranging from 2 percent to 7 percent, the average annual growth rate of Japanese per capita GDP fell to just 0.5 percent in the 1992–2000 period. The repercussions of the economic downturn for Japanese youth employment prospects were severe, with both the level of labor demand for young workers and the nature of the demand changing dramatically. While university and other higher education graduates certainly suffered from the effects of slack labor demand, high school graduates were the hardest hit. Fig. 2 shows the change in the ratio of full-time job openings to applicants over the period 1989–2005. Because Japanese employers designate full-time jobs for new graduates of specific educational levels, we can easily compare the relative situation of high school and university graduates.

Fig. 2 shows that new high school and university graduates both fared well during Japan's "economic bubble" period of the late 1980s–early 1990s, with the number of job openings being about triple the number of job-seekers by the early 1990s. The ratio then rapidly declined as Japan entered its worst economic recession in half a century, and the figure has remained low except for a brief uptick in 1998. Relative to university graduates, the labor market position of high school graduates progressively weakened. As one high school teacher explained in the mid-1990s, "This is really a 'glacial period' as far as employment in Japan is concerned. This is what the situation for university graduates is being called. But things are getting even worse for high school graduates."

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[4] Initial in-depth interviews were conducted at these 20 high schools by the senior author in 1995–1996, and follow-up interviews at a subset of schools were conducted in 2001 and 2005.
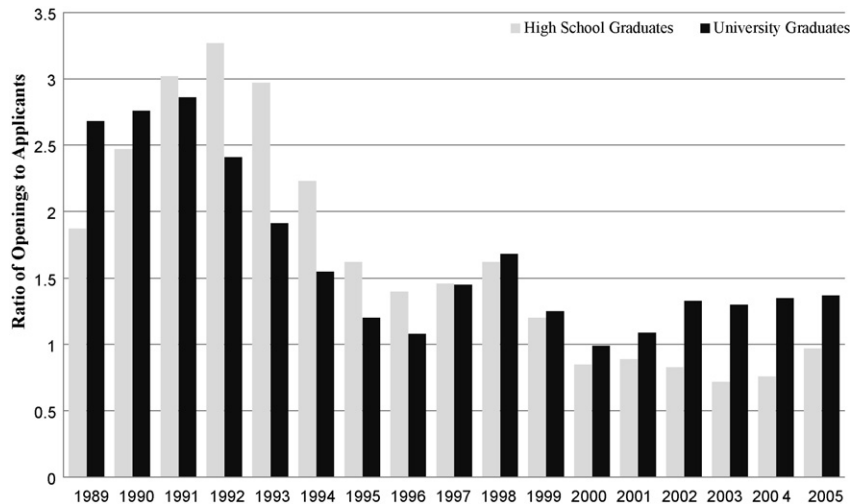
Fig. 2. Change in ratio of full-time job openings per applicant, 1989–2005: New high school and university graduates.

3.2. Employment restructuring and the increase in part-time jobs

Not only did the absolute demand for new high school graduates decline, but the nature of jobs open to them changed significantly as well. In the face of severe economic pressures, Japanese employers in the 1990s struggled to protect their core male employees in prime working ages from the risk of being laid off (Ahmadjian & Robinson, 2001; Genda & Rebick, 2000; Genda, 2001; Lincoln & Nakata, 1997). In order to do so, they transformed many entry-level jobs for new graduates from full-time positions—where both employer and worker operate under the assumption of long-term employment—into temporary full- or part-time jobs (Genda, 2001; Iwata, 2004). By 2001, over 20 percent of male and 29 percent of female Japanese employees (excluding those in school) worked in jobs that were not full-time (Kosugi, 2002). Even more striking, in 2003 the number of new male high school graduates hired as part-time employees actually exceeded the number hired as full-time employees. This was a historical first in Japan, and was a phenomenon that did not extend to university graduates (Japan Institute of Labor, 2002). It paralleled the maintenance of a higher ratio of full-time employment opportunities to new university graduates than to high school graduates after the late 1990s, as shown in Fig. 2. Comparisons of three broad cohorts of male high school and university graduates also show that post-1992 high school graduates are the group most likely to have experienced part-time employment after leaving school (Brinton, 2008, 2010). Across industrial sectors, the service sector shows the greatest increase in

part-time employment and the manufacturing sector the least.

What do these changes in the structure of employment imply for the previously stable links between Japanese high schools and firms and the smooth school–work transition processes for which Japan has been internationally recognized? Based on our theoretical framework, employers' interest in maintaining recruitment relationships with high schools should decline as full-time entry-level jobs in firm-internal labor markets are increasingly targeted to university graduates. Employers' reliance on high schools to screen and recommend particular students as job applicants should weaken because screening is not as important if high school graduates are not being hired for the long term. In these circumstances, employers' incentives to promise continuing recruitment relationships to particular schools begin to outweigh their potential savings in labor search costs. In short, firms are less motivated to make a credible commitment to recruit from specific high schools.

These processes create a vicious cycle. With high schools no longer able to promise their students that they can deliver full-time jobs to them upon graduation through the recruitment relationships the school maintains with employers, non-college bound Japanese students experience decreased motivation to study hard and to behave well in order to secure their school's recommendation to an employer (Brinton, 1998). An article in one of the major Japanese newspapers stated bluntly in 2000 that as the number of jobs for senior high school graduates continued to decline, teachers felt the very purpose of school to be increasingly under challenge.

3.3. Declining "quality" of high school graduates

The worsening labor market position of high school graduates in Japan has been compounded by increasing rates of higher education in recent cohorts, giving employers a larger pool of college-educated workers from which to hire. As Fig. 1 showed, advancement rates to university climbed substantially in the 1990s after having been stable for nearly two decades. This occurred largely because the small cohort sizes produced by the onset of Japan's "second demographic transition" beginning in 1973 (Ogawa & Retherford, 1993) led to greatly reduced competition for university spaces by the early 1990s. Solga (2002) has argued that as educational expansion proceeds and the size of the least-educated group in society declines, members of this group become stigmatized as "incapable," whether or not the quality of the less-educated labor pool has objectively declined. These stigmatization processes as well as a decline in the academic preparation of high school graduates appear more and more to characterize Japan. Prominent Japanese sociologists of education such as Kariya have argued that recent Japanese educational reforms diluting the curriculum and lowering the requirements for graduation have had a negative effect on the human capital of non-college bound graduates, most of whom come from families that cannot afford to send their offspring to the supplementary after-school "shadow education" programs that are so prevalent in Japan (Baker, Akiba, & LeTendre, 2001; Kariya & Rosenbaum, 1995, 2003; Stevenson & Baker, 1992). While we cannot assess the validity of this argument here, we find it very plausible.

Finally, our interviews with high school teachers strongly suggest that the expansion of low-wage part-time jobs in the service sector has had an unintended negative side effect on the behavior of many Japanese high school students at middle- to low-ranked high schools (those schools most likely to send graduates into employment or into non-university higher education such as 2-year training schools, *senmon gakkō*). As the number of full-time entry-level jobs for high school graduates has declined, the number of part-time jobs available to high school *students* has increased. While these jobs generally pay minimum wage and offer no job security and little chance of promotion into a full-time job, many low-performing high school students are attracted to the idea of earning spending money by working in one of urban Japan's now-ubiquitous convenience store chains, "family restaurants" (e.g. Denny's), or gasoline stations while they are still in school. No accurate estimates exist of the numbers of high school

students who now work part-time, but virtually all of the high schools where we conducted interviews had abandoned their attempt to enforce the rule against students working. As one frustrated teacher told us, "If parents don't control the behavior of their kids, there is no way the school can do it." Even in high schools that formally prohibit students from working, teachers told us that they have given up trying to regulate students' part-time work. In essence, a shadow labor market has developed for students at low-ranked high schools. We use the word "shadow" because most teachers reported to us that they tell their students not to list on their resumé the jobs they held during high school, as future employers are very unlikely to regard this as valuable work experience (and may instead actually penalize students for the behavior, believing that it is a signal of lack of commitment to their studies).

3.4. Hypotheses

Our interviews at high schools coupled with aggregate education and employment data lead to three hypotheses:

(1) Changes in the level and nature of employer demand since the early 1990s significantly weakened the unique long-term relationships between Japanese high schools and employers that were singled out and admired in the American social science literature.

(2) The weakening of recruitment relationships between high schools and firms occurred unevenly across industrial sectors. Because the manufacturing sector has undergone less employment restructuring towards part-time work than the service sector, we expect manufacturing firms to continue to benefit from recruitment relationships with schools. Manufacturers were the original participants and beneficiaries in Japan's high school–work system and are likely to disproportionately remain so.

(3) The weakening of recruitment relationships between high schools and firms occurred unevenly across types of high schools. Students in general academic high schools compete in the labor market on the basis of their general human capital and are therefore more easily overshadowed by university graduates than are students in vocational, especially industrial, high schools. General academic high schools should therefore be losing their relationships with firms to a greater extent than industrial high schools.

4. Employer interest in graduates by high school "quality" and type: data, methods, and findings

4.1. Data and methods

The field site for our research is the Yokohama–Kawasaki area, a highly urban area southwest of Tokyo and adjacent to it. We chose this area because it has traditionally had a strong labor market and high school graduates have had access to plentiful manufacturing, construction, and low-level full-time service sector jobs. If school–employer implicit recruitment contracts continue to exist in abundance anywhere in Japan, this is a likely place to find them. Kawasaki and Yokohama are in Kanagawa prefecture, a large prefecture spanning highly urban and semi-rural areas and educationally quite typical of other Japanese prefectures. Train lines link the cities to the Tokyo metropolitan area, making it possible for workers to commute to jobs in southwestern Tokyo. (Indeed, many of the firms in our analysis are located in Tokyo.)

We use labor demand data to examine employers' interest in recruiting from high schools of varying quality and type (vocational vs. general). The data are comprised of all entry-level job opening announcements that employers distributed to the 12 high schools in a large urban area. A total of 749 firms attempted to recruit seniors graduating in 1995. Each job form lists information about the firm including size, industry, occupational code for the particular job opening, and starting wages and benefit information.[5] These job opening announcements also list the names of the high schools to which the employer sent the announcement. This allows us to see which schools attract the most attention from employers.[6] We coded school characteristics from the *Kanagawa-ken Kōkō Juken Annai* (Yearly Sourcebook for Entrance to Kanagawa High Schools), a publicly available guidebook of schools.[6]

The 749 firms in our data set sent a total of 969 job announcement forms to the 12 schools. The number of job announcements is larger than the number of firms because some firms have multiple job openings. The firms and schools form a two-mode affiliation network, with each actor in one set (firms) related only to actors in the other set (schools). We formatted the data into a firm-by-school matrix Y that has 749×12 cells, where the cell y_{ik} is coded "1" if firm i contacted school k and "0" otherwise. We then calculated the Euclidean distance to measure structural equivalence in the firm-by-school network. y_{ik} is the value of the unordered tie between firm i and school k, y_{jk} is the value of the tie between firm j and school k, and n is the number of schools in the district. We used the standard definition of the Euclidean distance (Wasserman & Faust, 1994) d_{ij} to measure structural equivalence for firms i and j in terms of their relationship with the schools. Expressed formally,

$$d_{ij} = \sqrt{\sum_{k=1}^{n}[(y_{ik} - y_{jk})^2 + (y_{ki} - y_{kj})^2]}$$

If d_{ij} equals 0, it means that firms i and j are structurally equivalent in the network. In other words, they contacted the same school(s). On the other hand, if the two firms chose to contact different schools in the district, the Euclidean distance between them will be greater than one.

4.2. Variables

We coded three variables to represent the characteristics of schools: school type, minimum test score required for admission, and the distribution of student destinations after graduation. School type includes general academic high schools and two types of vocational schools, industrial and commercial. The minimum standardized test score required for admission is a key measure of where a school ranks in the academic hierarchy. There are five possible destinations for graduates: university, junior college, *senmon gakkō* (2-year training schools), job, and uncertain (neither in school nor with a job in hand at the time of graduation).[7] By knowing each school's required exam score and the percentage of its graduates going to university or into the labor market, employers can reliably estimate student quality and the number of students in the graduating class who are potential job candidates. This helps them decide which schools to recruit from.

In addition to the network analysis showing which schools are the most popular recruitment targets for firms, we performed a multinomial logit analysis to ana-

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[5] These data were coded with the assistance of Harumasa Yoshimura.

[6] Firms could also choose to attempt recruitment from schools outside of this district. Because firms provide a complete listing of the local schools in which they are interested but do not necessarily give a complete listing of the non-local schools (outside of the local public employment security office's jurisdiction) to which they send their forms, the analysis in this paper is restricted to the local area.

[7] Some proportion of graduates from top- and medium-ranking high schools typically sit out for 1 or 2 years to study for the entrance examination to their first-choice university. Called *rōnin* (literally "masterless samurai"), these are included in the "uncertain" category reported by schools because their immediate post-graduation destination is unclear.

Table 1
High schools in the local district.

School	Type	Exam score	Student destinations				
			University	Junior college	*Senmon gakkō*[a]	Job	Uncertain
A	Industrial	44	9.0	5.5	24.2	46.5	14.8
B	Industrial	NA[b]	1.7	0.9	18.9	61.8	16.7
C	Commercial	40	3.9	7.1	22.1	58.8	8.1
D	General	61	93.0	0.2	0.1	0	6.7
E	General	50	38.4	10.4	11.4	1.0	38.8
F	General	43	17.7	24.6	16.1	7.3	34.3
G	General	39	12.5	14.9	27.0	7.5	38.1
H	General	36	4.4	9.1	29.9	29.9	26.7
I	General	34	NA	NA	NA	NA	NA
J	General	33	NA	NA	22.6	38.7	33.9
K	General	32	3.2	9.4	31.3	23.0	33.1
L	General	NA	1.5	1.3	24.6	42.0	30.6

[a] *Senmon gakkō* are 2-year training schools.
[b] NA indicates that information was not available.

lyze the mix of schools from which each employer tries to recruit: industrial, commercial, general, or a mix of general and vocational (industrial or commercial) schools. We coded several characteristics of firms, including size, industry, demand (number of desired recruits), position (number of different types of jobs advertised), and annual salary (including both wages and bonus; if a firm has multiple positions, the variable indicates the mean earnings for those jobs). This analysis is supplementary to our network analysis; in the interest of space we report only the major results.

4.3. Characteristics of schools and firms

Table 1 shows the characteristics of the 12 high schools in the district. There are nine general academic schools and three vocational schools (A, B, and C)—two industrial and one commercial. In each of the vocational high schools, at least 46 percent of seniors entered the labor market directly after graduation. This figure varies among the general high schools from 0 percent (School D) to 42 percent (School L). The academic quality hierarchy is starkly apparent, as it is in most districts throughout Japan. The top school (School D) is a "feeder" school to a specific university, which explains why it was able to produce a graduating cohort from which 93 percent of students proceeded directly to university.[8] The percentage of graduates proceeding directly to university successively falls as one moves

Table 2
Descriptive statistics for firms recruiting high school graduates.

Variables	Mean	SD
Size	1318.4	5741.68
Demand (number of desired recruits)	15.9	52.54
Positions (types of jobs)	1.4	0.75
Yearly salary (yen)	2,746,908	587,710
Industry distribution		
Construction	27.9	
Manufacturing	22.6	
Sales	17.1	
Business services	22.6	
Retail, personal services	9.9	
Occupation[a]		
Technical, professional	22.4	
Clerical	21.1	
Sales, service	17.8	
Production	24.4	
Operators, laborers	14.5	
Number of firms	749	

[a] Among the firms that sent out multiple job announcements, 130 firms offered jobs that belong to different occupations; the distribution of occupation is not by firm but by position ($N = 969$).

down the table, reaching a dismal 1.5 percent in the case of School L. This is mirrored in the distribution of minimum required test scores across the 12 schools, from a high of 61 to a low of 32.[9]

Table 2 shows descriptive statistics for the 749 firms that sent their job opening announcements to one or more

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[8] A very small percentage of Japanese high schools are such feeder schools, meaning that entrance into them privileges graduates for entrance into an associated university.

[9] In an analysis of the 243 high schools in Kanagawa prefecture, we found a correlation of 0.88 between a school's exam cutpoint and the proportion of its students advancing to university.

schools in the district. The average firm size was 1318 employees but the median (not shown) was 136 employees, as nearly 75 percent of firms had fewer than 500 employees. This shows that the majority of firms hiring high school graduates are mid-sized or small. Like firm size, the mean demand of 16 employees is somewhat misleading because median demand per firm is only 5, and 80 percent of firms desired to recruit fewer than 16 new employees. The average job offered a yearly salary of 2.7 million yen including bonus (or approximately $27,000 in 1995). About half of the firms were in the construction or manufacturing industries.

4.4. The firm–school network

Fig. 3 is a visual presentation of the firm–school network based on the job announcement data. Dark-colored nodes represent schools, light-colored nodes represent firms, and the lines between nodes represent the flow of job announcements. The network is highly structured, with Schools A and B, the two industrial schools in the district, in an altogether different league from the other schools. One cluster of firms sent their job opening announcements only to School A and another group only to School B. The sole commercial school in the district, School C, is also in a position somewhat distinctive from the other schools. Schools D and E are at the periphery of the network linking firms and schools. This is understandable because they are the top two general high schools in the district, with most of their students aspiring to go to universities and colleges rather than
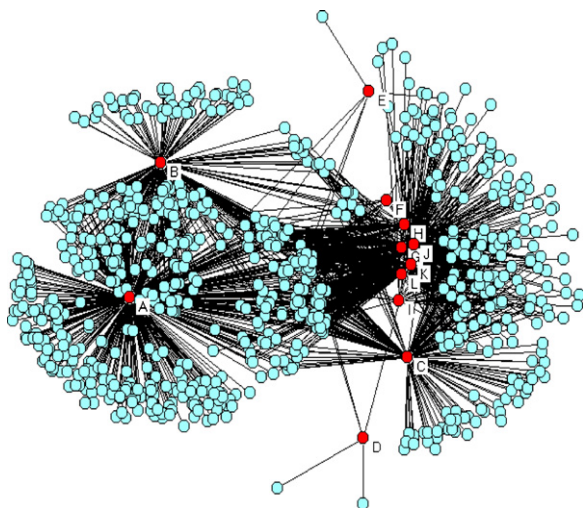

Fig. 3. The firm–school network of recruitment relations. Dark-colored nodes represent the schools and light-colored nodes represent the firms. Lines between nodes represent the flow of job announcements.

Table 3
Firms' recruiting strategies: number of firms targeting specific schools.

	Strategy[a]	Number of firms	Percent
1	A	205	27.4
2	A + B	128	17.1
3	B	52	6.9
4	C	48	6.3
5	A + C, B + C, or A + B + C (only vocational)	14	1.9
6	Vocational + general	202	27.0
7	Only general	100	13.4

[a] We identified 125 strategies firms used in contacting schools. Based on the type of schools contacted by firms that used each strategy, we aggregated these into seven types.

directly into the labor market. The other seven schools, F through L, are in a cluster that represents the middle and lower end of the quality hierarchy of general high schools.

To formally analyze the structure of the network, we calculated the Euclidean distance between firms and then grouped firms into categories reflecting their strategy for sending job announcements to schools. Table 3 shows that the majority of firms chose among a handful of recruiting strategies. Fifty-one percent of firms used one of the three strategies that involved only the two industrial high schools A and B. Another 6 percent of firms, partitioned into the fourth populous strategy, sent their announcements only to the commercial high school (School C). About 60 percent of the firms (who used strategies 1–5) contacted only the vocational high schools—they did not even bother to send job announcements to the general high schools. It is abundantly clear from this that the majority of employers focused their attention on the vocational high schools (the two industrial schools in particular) in their recruitment of high school graduates.

We used multinomial logistic regression to further examine firms' recruiting strategies, contrasting the strategies of contacting only industrial high schools, only the commercial high school, or only general schools with the strategy of contacting both vocational and general schools. Firms with a large demand for labor tend to contact both vocational and general high schools, and higher paying firms are the least likely to focus exclusively on general high schools. As we expected, construction and manufacturing firms tend to favor the industrial schools. (Regression results are available upon request.)

Finally, Table 4 shows the "opportunity" ratio—the ratio of the number of graduates whom employers wished to invite for job interviews divided by the number of graduating seniors at each school. Seniors in the three

Table 4
Job opportunities per graduate at each school[a].

School	Ratio
A	2.97
B	1.73
C	1.30
D	0.01
E	0.09
F	0.15
G	0.76
H	0.47
I	0.17
J	1.42
K	1.52
L	1.15

[a] The opportunity ratio is the number of employment forms sent to each school per graduating senior.

vocational schools (A, B, and C) and the three general schools at the bottom of the academic hierarchy (J, K, and L) have the largest opportunity ratios. In contrast, schools at the top and middle of the academic hierarchy (D through I) have a ratio smaller than 1, indicating that there are not enough interview opportunities in these firms for all of their students. For the top general high schools D and E this does not matter very much because so few of their graduates intend to go directly into the job market. But students in Schools F–I who may want to move into a job after graduation are essentially left out of the job matching process. The heterogeneity of students in these schools in terms of ability and future plans is generally greater than at the bottom of the school distribution (demonstrated in Table 1), and we think that this renders the signaling function of each school to employers less efficient.

While it may seem surprising that low-ranked general high schools had relatively good opportunity ratios, this is consistent with interviews with teachers at such high schools in the mid-1990s. A teacher at School J commented, "We had a perfect placement rate in 1993: 100 percent of our undergraduates got jobs. There were about four job openings for each graduating senior who was looking for a job. The following year we placed about 85 percent of our male graduates and just 60 percent of our female graduates."

5. Implicit contracts between schools and firms: data, methods, and findings

Through negotiations with school officials at one of the vocational high schools and two general high schools in the same local area, the senior author obtained yearly records of all graduates' labor market placements throughout the 1980s when the Japanese economy was still growing and the 1990s when the economic recession essentially "froze" the labor market. We use these data to construct a measure of the volume of recruitment relationships each school has with firms, allowing us to measure whether this volume has declined in recent years.

Prior studies of Japanese school–firm relationships have not included systematic data on firm characteristics, so it has been unclear which types of firms maintain implicit recruitment contracts with schools. A unique feature of our longitudinal placement data is that we know the names of the companies in which graduates were placed. But school records did not code any characteristics of the firms. To construct the distribution of firms by industry and size (number of employees), we located as many firms as we could in the Japan Company Handbook published by *Tōyō Keizai*, one of Japan's chief publishers of corporate and economic data. The Handbook includes all companies listed on the first or second section of the Tokyo, Osaka, and Nagoya Stock Exchanges (approximately 2600 firms), and gives information on firm size and industry. We coded these variables for every firm that appeared in the placement records of the three schools.

The firms listed on the stock exchange naturally tend to be the larger ones, and only about one-half of the firms that recruit from our high schools are listed. This in itself is a fact worth noting; as shown in our network dataset, small and medium-size firms are common destinations for high school graduates. Our subsequent analysis will show that the majority of firms engaging in continuous recruitment relationships with schools are the larger ones listed on the stock exchange.[10]

5.1. Measuring recruitment relationships

We adopt the definition of a "contract employer" used by Kariya (1991) in his study of the Japanese high school–work transition: a firm is considered a contract employer or repeat recruiter from a school if the firm hires one or more students from the school over at least five consecutive years. The 5-year cutpoint is appropriate in defining a contract employer because it is long

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[10] While we readily admit that our employer database is not perfect due to the number of small- and medium-sized firms for which we do not have information on industry and size, since prior studies of Japanese school-firm relationships have not included data on the employer side it has been left open to conjecture which types of firms engage in repeat recruitment from certain schools. Our data set therefore represents a significant advance.

enough to eliminate most random error (i.e. situations where firms generally hire in the open market but happen to hire from the same school across a few consecutive years) and also long enough to indicate genuine commitment to a school (i.e. firms that strategically hire from the same school over an extended period of time but do not do so in an occasional year).[11]

We consider a firm to be a contract employer for a given school in year *t* if it hired from the school in that year and each of the previous 4 years. We calculated for each school the probability of its employers engaging in a 5-year hiring streak for each year of the data:

$$P_{sj} = \frac{N_{s5j}}{N_{shj}}, \tag{1}$$

where *s* refers to the school for which the probability is calculated, *j* refers to the year for which the probability is calculated, N_{s5j} refers to the number of employers that hired from schools 5 years in a row (in year *j* and the 4 years before it), and N_{shj} refers to the number of employers that hired from schools in any year of the 5-year period (year *j* and the 4 years before it).[12]

The over time trend of this probability provides intuitive and straightforward evidence on how employers' repeat recruitment patterns have changed. However, it cannot tell us *why* change has occurred. Employers could be moving away from having continuous recruitment relationships with schools as a matter of preference (which would suggest institutional change) or, alternatively, they could continue to prefer stable recruitment ties but be prevented from maintaining them because of macroeconomic conditions (e.g. a sharp decline in labor demand). Distinguishing between these two possibilities is important for interpreting whether a secular change in employers' behavior is occurring or whether the change is mainly cyclical, based on economic downturn. In order to adjudicate between these two types of change, we also

Table 5
Characteristics of schools with longitudinal placement data.

	School X	School Y	School Z
School type	Vocational	General	General
Exam score cutpoint	41	39	34
Founding year	1920	1927	1979
No. of graduates	227	275	216
Percent of graduates going directly to			
University	3.1	12.5	6.3
Junior college	6.8	14.9	7.7
Two-year technical training school	17.8	27.0	30.0
Job	68.0	7.5	29.6
Uncertain	4.3	38.1	26.4
Labor market placement data	1976–2001	1988–2000	1981–1996
No. of employers	1586	235	628

generate simulation data and calculate the counterfactual probabilities of firms' engaging in 5-year hiring streaks. This provides insight into whether, given adequate labor demand, employers would continue to engage in recruitment relationships with certain schools. We turn to this after looking at the initial patterns in the data.

5.2. Findings

Table 5 shows the descriptive characteristics of the three high schools for which we have graduate placement data. The vocational school (School X) and the mid-ranked general school (School Y) are of similar academic quality, as indicated by the minimum standardized test score required for school admission (41 and 39, respectively). School Z is of significantly lower academic quality, with an exam cutpoint of 34. Schools X and Y were both founded in the 1920s and School Z was founded a half-century later.[13] School X is similar to other vocational schools in Kanagawa prefecture in terms of the exam cutpoint and also in terms of the proportions of graduates continuing to various destinations (higher education vs. the labor market).[14]

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[11] Nonetheless, five is of necessity an arbitrary number. While firms that hire occasionally from a school are clearly not in a repeat recruitment relationship with it and firms that hire in a long streak can be considered repeat recruiters, there is a gray area—firms that hire in only one 5-year streak are in a sense "borderline repeat recruiters" and firms that have hired from a school for 4 years in a row are "borderline non-repeat recruiters". As we show in the analysis section, we calculated the year-by-year probability of a firm engaging in a 5-year hiring streak and plotted the over-time trend. We also calculated the probability of a firm engaging in a 4-year hiring streak and plotted the trend (available from the authors upon request). The patterns of the two trends are very similar, indicating that our results would be very similar to what is presented had we defined repeat recruitment as occurring over four consecutive years rather than five.

[12] Note that P_{sj} cannot be calculated for the first 4 years of the time span of our examination because of the way this probability is defined.

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[13] We note the establishment date because some school officials and employers suggested in interviews with one of the authors that older schools are more likely to have established and maintained strong ties with employers.

[14] Since it has a commercial as well as an industrial track, it sends a somewhat higher proportion of its graduates to junior college (a traditionally female higher education track in Japan) than is the case for vocational high schools that teach solely an industrial curriculum.

The three schools are representative of high schools that send few graduates to universities and many into the labor market. We report 1994 data for students' post-graduation destinations in the table, as this was after the Japanese recession had begun and it is around the midpoint of our graduate placement data series. Nearly 70 percent of seniors at the vocational high school had jobs in hand when they graduated, compared to just 30 percent and 8 percent, respectively, from the general high schools. Some of this difference is explained by the higher rates of matriculation to institutions of higher education among graduates of the two general high schools: about 10 percent of vocational high school graduates proceeded on to university or junior college compared to 27 percent and 14 percent, respectively, from Schools Y and Z. Rates of matriculation to 2-year technical training schools (*senmon gakkō*) are also higher from the two general high schools.[15]

It is also important to note the proportion of seniors whose destinations were not decided at the point of graduation. This figure is much higher for the general high schools (26 percent and 38 percent) than the vocational school (4 percent). In related work we show that only a small proportion of the idle graduates from low- and mid-ranked general high schools can reasonably be assumed to be *rōnin*, graduates who are studying full-time for the university entrance exams. A much larger proportion of these graduates neither have plans for higher education nor are they gainfully employed. The large difference in graduates' idleness rates across the three schools is important because it indicates the degree to which general high school graduates *were not matched with employers by the time of graduation*; this leads naturally to the question of whether this reflects the paucity of contract employers for the general high schools.

How many "contract employers" does each school have? Table 6 shows that about 9 percent of the employers who hired from the vocational high school were contract employers. In contrast, this was the case for only about 3 percent and 5 percent, respectively, of the firms hiring students from the general high schools. These results are consistent with our expectation that vocational high schools have stronger ties with employers.[16]

While the number of contract employers may seem low even for the vocational school, the second row in the table shows that in each year they hired an average of 45 percent of that school's workbound seniors. These figures are very consistent with Rosenbaum and Kariya's study (1989), which reported that on average 11 percent of the employers who recruited from their sample of general and vocational high schools were contract employers and these employers hired an average of nearly half of all graduates.[17] We also expected to find that manufacturing firms are more likely to be contract employers. The distribution of graduates' placement in Table 6 shows that manufacturing firms do recruit large proportions of workbound high school graduates, especially from the vocational school, and that they are indeed more likely than firms in other industries to engage in repeat recruitment. This is particularly true for the vocational school, where over half (54 percent) of the contract employers are in the manufacturing sector compared to less than 20 percent in each of the other industries.

We expect the number of contract employers to decline after the early 1990s as labor demand declined and became less predictable from year to year and as the supply of university graduates created greater competition for entry-level jobs in internal labor markets. To test this, we plotted the change over time in each employers' year-by-year probability of engaging in a 5-year hiring streak. Along with this, we plotted the *counterfactual probability* that employers would exhibit this behavior. We did this by generating yearly hiring probabilities under the assumption that a firm's hiring behavior corresponds to yearly labor supply-demand conditions and is independent of its hiring decisions in prior years. The comparison of the observed and counterfactual probability of an employer being a contract employer allows us to assess the extent to which change in employers' repeat recruitment commitments to schools merely reflects lowered labor demand or, alternatively, exhibits some deviation from what economic recession would suggest. If this deviation occurs, we argue that this constitutes evidence for the durability of contract employer behavior beyond what labor demand conditions alone would predict.

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[15] These 2-year technical schools are distinct from junior colleges and universities and are not licensed by the Ministry of Education, Health, and Welfare.

[16] A skeptic might argue that School X only appears to have more implicit contract employers because we have a longer run of data for this school. To address this, we selected out the 9-year period 1988–1996 for which all three schools have available data and re-calculated the placement statistics. Even when "controlling" for the

same 9-year period, a higher proportion of the employers who hired from School X were repeat recruiters than was true for the other two schools. This reinforces the interpretation that vocational high schools are more attractive to employers and are more able to establish repeat recruitment relationships with employers than mid-ranked or low-ranked general schools.

[17] Rosenbaum and Kariya did not focus on the general-vocational high school comparison.

Table 6
"Contract employer" and "non-contract employers" for each school.

Variables	School X—vocational		School Y—general		School Z—general	
	Implicit contract employers	Non-contract employers	Implicit contract employers	Non-contract employers	Implicit contract employers	Non-contract employers
Percent of all employers	9.1	90.9	3.4	96.6	4.8	95.2
Percent of graduates hired, by employer type	45.0	55.0	13.1	86.9	27.2	72.8
Average no. of grads. hired per yr.	20.2	2.5	7.3	1.7	13.0	1.7
Average no. of yrs. hiring occurred	11.4	2.1	6.3	1.5	9.0	1.5
Mean firm size (no. of employees)	8694	3025	13,837	10,494	4833	3882
Distribution of hires by industry						
Construction	6.0	9.6	—	6.9	4.6	7.3
Manufacturing	53.9	34.3	33.3	31.4	36.4	23.3
Sales	10.3	22.7	33.3	30.4	31.8	39.7
Prof. services	18.0	18.2	—	11.8	9.1	12.3
Other services	12.0	15.2	33.3	19.6	18.2	17.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Percent missing values on firm characteristics	19.3	58.1	62.5	55.1	26.7	49.8

5.3. Counterfactual probabilities

To build the assumption of independent hiring into our simulation, we introduce three parameters—*hiring volume, hiring propensity*, and *hiring rate*. The observed hiring distribution for a given school in our data can be arranged in an $n \times t$ matrix of ones and zeros, where rows represent the n employers and columns are the t years. A "1" in cell c_{ij} indicates that firm i hired at least one student from the school in year j and a "0" indicates otherwise. Hiring volume refers to the total number of hiring transactions that have taken place between a given school and all of its employers during the entire time span of our examination. In our matrix, hiring volume HV refers to the sum of "1s".

Different employers have different types of labor demand and hence different propensities to hire from a given school. This is true whether recruitment relationships exist or not. We define firm i's hiring propensity from a given school as:

$$HP_i = \frac{\sum_{j=1}^{t} c_{ij}}{HV}, \quad i \in [1, n] \text{ and } j \in [1, t] \quad (2)$$

The third parameter, hiring rate, measures the direct effect of macroeconomic conditions on employers' hir-

ing behavior. Firms are obviously more likely to hire in good economic times than in a recession. The hiring rate of employers from a given school in year j is defined as:

$$HR_j = \frac{\sum_{i=1}^{n} c_{ij}}{HV}, \quad i \in [1, n] \text{ and } j \in [1, t] \quad (3)$$

With the three parameters, we can calculate the expected hiring probability of firm i in year j under the assumption of independent hiring as:

$$EHP_{ij} = HV \times \frac{HP_i}{HV} \times \frac{HP_j}{HV}, \quad i \in [1, n] \text{ and } j \in [1, t] \quad (4)$$

or simply

$$EHP_{ij} = \frac{HP_i \times HR_j}{HV}, \quad i \in [1, n] \text{ and } j \in [1, t] \quad (5)$$

Using formula (5), we obtain the distribution of expected hiring probabilities for all employers from a given school during the entire time span of our examination, assuming that an employer's hiring behavior in a given year is independent of their behavior in prior years. Based on this probability distribution, we simulated 10,000 counterfactual hiring distributions with
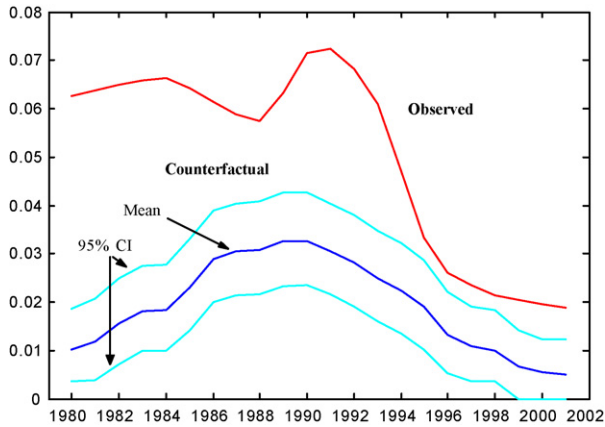
Fig. 4. Changes in the observed and counterfactual probabilities of employers engaging in 5-year hiring streaks from School X (vocational).
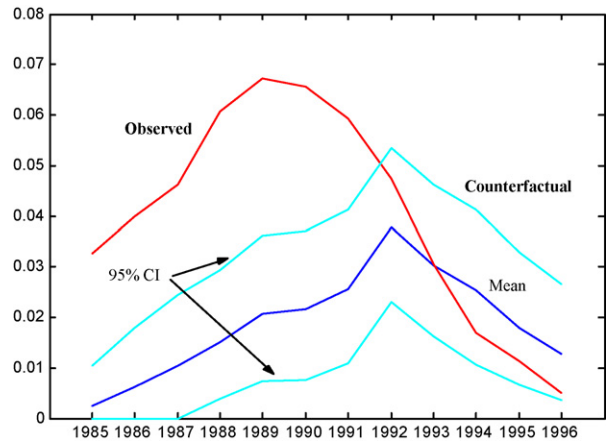

Fig. 6. Changes in the observed and counterfactual probabilities of employers engaging in 5-year hiring streaks from School Z (general).
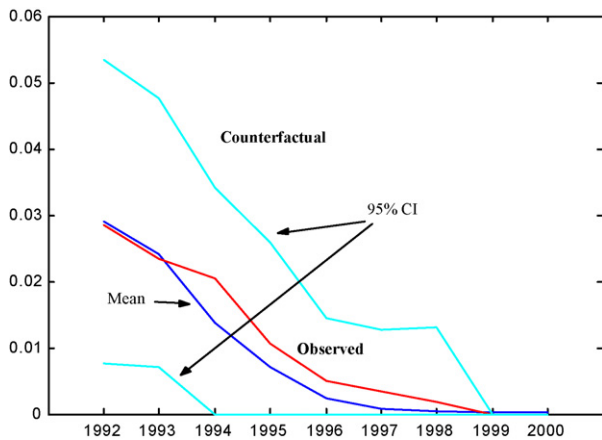

Fig. 5. Changes in the observed and counterfactual probabilities of employers engaging in 5-year hiring streaks from School Y (general).

our simulation.[18] A statistically significant number of employers who hired new graduates in the 1980s from Schools X and Z did have recruitment relationships with these schools. But there was a dramatic decline in the 1990s in the yearly probability that firms engaged in hiring streaks from the same schools. Only School X, the vocational school, has a hiring distribution that remained statistically distinguishable throughout the 1990s from the counterfactual hiring distribution based on the assumption of employers' independent yearly recruitment behaviors. That is, only the vocational school appears to have had sustained recruitment relationships with employers through the period of Japan's economic recession. And even for that school the prevalence of these relationships appears to have declined sharply from the early 1990s on, reaching a level that appeared relatively stable by the early years of the 21st century. Our analysis shows that general high schools suffered a greater loss in their continuous recruitment relationships with employers than the vocational high school did.

6. Discussion and implications

We have argued that Japan's highly praised high school–work system thrived during a period when three macro-level conditions were present: a stratified secondary educational system that sorts students into relatively homogeneous schools (on quality and on vocational vs. academic content); the existence of a large pool of high-quality secondary school graduates and high labor demand for them; and an employment system with firm-internal labor markets that included positions for

uniformly distributed random numbers (see Appendix A for details of the algorithm). We call these hiring distributions counterfactual because they represent the hiring behaviors that *would be observed* if employers' hiring decisions were independent of their decisions in prior years when we consider the overall hiring volume, each employer's hiring propensity, and employers' hiring rate in each year. From formula (1) we calculated the counterfactual yearly probabilities of employers' engaging in a 5-year hiring streak for each of these 10,000 sets of counterfactual hiring distributions.

Figs. 4–6 compare for each school the over time observed probability that employers had recruitment relationships with them and the mean probability (with a 95 percent confidence interval) based on

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[18] The lines in this and subsequent figures are 5-year moving averages.

high school graduates. The latter motivated employers to select not just university graduates but also high school graduates based on as much information as possible, thus encouraging reliance on high schools for signals.

While the first of these macro-level conditions did not change in Japan in the 1990s, the second and third conditions did. We used recruitment data between employers and a set of local high schools as well as fine-grained data over the past two decades to explore which types of secondary schools and employers tend to have recruitment relationships with each other, and how the prevalence of these recruitment relationships has changed over time. Simulation analysis provided further insight into whether economic downturn alone predicted a decline in high school–firm relationships or whether some high schools were able to maintain their relationships with firms.

Our results show that general academic high schools in the 1990s attracted little recruitment attention from employers, and workbound graduates from these schools increasingly had to fend for themselves. This is a change from the past. While the general vs. vocational high school comparison was not emphasized in their study of high school–firm relationships in Japan, Rosenbaum and Kariya found that a significant proportion of workbound graduates from medium- to low-ranking high schools were able to enter low-level white-collar jobs in the 1980s. Similarly, teachers at two of the low-ranking general academic high schools included in our study commented that up until the mid-1990s their schools had been able to place some students in positions in banks or department stores (positions in the latter are considered prestigious ones in the Japanese sales sector). As one teacher commented, "Up until now we have had an understanding with several companies in the finance field that they would hire some of our graduates every year. But this is no longer the case." While low-ranked high schools undoubtedly placed fewer graduates in such white-collar positions than higher ranking high schools even during the years of strong Japanese economic growth, it is notable that high school graduates could aspire to such jobs at all.

The pecking order *among* general academic high schools has changed little over time, but the employment situation for all of their graduates has worsened significantly. To wit, the vocational school is the only one in our sample that has continued to be involved in recruitment relationships with firms in recent years. This is related to the greater propensity of manufacturing firms to continue to be engaged in stable recruitment relationships with high schools; to the extent that positions in firm-internal labor markets continue to exist at all for

high school graduates, they are likely to be in Japan's remaining manufacturing companies.

What do these findings suggest for the adoptability of the Japanese school–work system's main features in the U.S. or other postindustrial economies? Our results do not engender great optimism. Our theoretical framework and analysis suggest that Japan's high school–work system was the most robust when there was high labor demand for young people in entry-level positions in firm-internal labor markets, as this created incentives for employers to rely on schools' intimate knowledge of their students in order to screen for the best applicants. A distinctive feature of Japan's labor market structure was that firm-internal labor markets developed during the high-economic growth period for a segment of blue-collar as well as white-collar workers. When new high school graduates far outnumbered university graduates, high school graduates could be hired not only into these blue-collar jobs but into some white-collar jobs as well.

But economic recession and employment restructuring since the early 1990s has in many ways brought Japan closer to the situation of other postindustrial economies where school–work institutions are weak and high school graduates struggle to find employment. The remaining white-collar jobs in firm-internal labor markets can be filled by the increased number of university graduates, and employers have little need to engage in cooperation with high schools to recruit students and graduates into other jobs in the service and sales sectors that are increasingly short-term and/or part-time. Most employers in postindustrial economies face an incentive structure similar to this current one faced by Japanese employers—one that hardly encourages emulation or development of an institutionalized high school–work system.

Nevertheless, we do see a limited positive lesson that can be learned from the recent history of Japan's school–work system. The minority of schools in the U.S. and elsewhere that equip students with vocational knowledge and skills could benefit from taking cues from the Japanese school–work model of strong communication and partnership efforts with manufacturers and other employers who seek a high-quality blue-collar labor force. Our data suggest the durability of links between vocational schools and employers even in Japan's postindustrial landscape.

Many postindustrial economies including the U.S. retain a small but robust manufacturing sector. We believe that is where the Japanese model is likely to have its greatest applicability. In the U.S., local examples of high school–industry partnerships are scattered throughout the reports of state workforce commissions.

These make only occasional appearances in the academic sociological literature. An important direction for future research is to compare the lessons from these partnerships with those from the Japanese case to draw out common implications for policy.

Acknowledgments

Appendix A. Algorithm for the simulation procedure

The following four-step simulation algorithm sums up the procedure we used in obtaining the counterfactual probabilities for each of the three schools:

1. Generate an $n \times t$ matrix of probability distribution P, where cell p_{ij} is the expected hiring probability calculated using formula (5).
2. Generate an $n \times t$ matrix of uniformly distributed random numbers R,[19] from which is then generated an $n \times t$ matrix of counterfactual hiring distributions C such that the cell c_{ij} is coded 1 if $r_{ij} \leq p_{ij}$ and 0 otherwise.
3. Repeat step two 10,000 times and generate 10,000 $n \times t$ matrices of counterfactual hiring distributions consisting of ones and zeros.
4. Calculate the counterfactual probabilities of employers' engaging in a 5-year hiring streak for each of the 10,000 simulated hiring distributions using formula (1). This produces a 10,000 by $(t - 4)$[20] matrix where each row represents the yearly probability of employers' engaging in a 5-year hiring streak calculated from each set of the simulated distributions.

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[19] We used the uniformly distributed random numbers in the simulation to maximize the counterfactual hiring behavior of the employers, given the constraint of the three parameters.
[20] The probability cannot be calculated for the first 4 years of the time span because of the way the probability is defined in formula (1).

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