Training the Nation's Elites

National - Private Sector Differences in Japanese University Education

Hiroshi Ono

Stockholm School of Economics

* Please direct all correspondences to Hiroshi Ono, Stockholm School of Economics, P.O. Box 6501, S-113 83, Stockholm, Sweden (E-mail: hiroshi.ono@hhs.se). I thank Gary Becker, Mary Brinton, and Kazuo Yamaguchi for comments on an earlier draft of the paper. I am grateful to Mary Briton and the SSM Committee for granting me permission to use the 1995 SSM data, and to Hisashi Arai of Obunsha for allowing me access to past issues of their publications. I also thank the Center for East Asian Studies at the University of Chicago and the American Compensation Association for their generous financial support.

ABSTRACT

National universities were originally established in Japan as an institution to educate the nation's elites and a recruiting ground for government ministries. The prestige hierarchy of national universities was dismantled in the postwar period through the massive expansion of private universities. Do quality differences between national and private universities still persist? Are national university graduates still more likely to represent the nation's elites? Using a 1995 cross-sectional dataset, we find that national university graduates achieve higher earnings growth and higher rates of return than do private university graduates. Our findings lend support to the 'elite' view proposed by Becker (1993), under which higher ability individuals (in this case national university graduates) have more to gain from university education than lower ability individuals.

1 Introduction

The evolution of Japanese university education dates back to the Meiji period (1868 to 1912) under which a majority of Imperial universities were founded. Imperial universities played a crucial role in the Meiji Restoration as an institution to train the nation's elites, and a recruiting ground for the central government ministries. Thus began the heritage in which the nation's best and brightest were funneled from one elite institution to the other – from the Imperial universities to the government ministries.

In the postwar period, authorities of the American Occupation imposed measures which were aimed to break up the channeling of elites and the hierarchical structure of prestige which characterized the university system. As a result, Imperial universities were henceforth to be renamed national universities, and the educational curriculum was revamped to cater to the masses and not to a selected group of elites. These measures, coupled by the growing demand for university education in the postwar period led to the massive expansion of the university system, a majority of which were private universities.

How successful were these measures in dismantling the prestige differentiation between national and private universities? Studies which examine such differences are relatively few and focus mostly on the unequal distribution of resources between national and private universities. We know for example that on average, university resources are better endowed among national universities regarding such indicators as student-teacher ratios and faculty salaries (James and Benjamin 1988; Narita 1978). What we don't know is how national-private sector differences affect individuals, or the graduates of these institutions. Do quality differences between national and private universities still persist? Are national university graduates more likely to represent the nation's elites? Do national university graduates have higher returns to their education? These are the questions that motivate our current research. Using individual-level micodata, we examine the extent to which the

traditional aspects of university education still remain or do not remain in contemporary Japanese society.

The primary focus of the current paper is on the quality dimension of university education and its influence on labor market outcomes. In Japan, "educational credentialism" implies that educational credentials are a major determinant of socioeconomic success, and that the quality or rank of universities affects the attainment of socioeconomic rewards (Ishida, Spilerman and Su 1997).

There are several ways to explain the link between university quality and elite formation. Cultural capital theory suggests that the accumulation of cultural capital in the form of educational credentials or academic qualifications determines entry into institutions of power and prestige, and ensures that the status quo is perpetuated and maintained among a handful of elites. The role of elite educational institutions, then, is to preserve tradition and existing hierarchies (Bourdieu 1998). The preservation of hierarchy and hegemony among a handful of elites is observed in Japan by the predominance of the alumni of Tokyo University – the highest ranking national university – in positions of power and influence, in politics, government and business. Taira and Wada (1987) explain that Japan Inc. is essentially governed by the exclusive institutional linkages between Tokyo University, government and business organizations, and explains that "personal networks and contacts of public officials and private business leaders render the formal structural distinction of government and business almost meaningless in Japan" (p.264). Thus, the question of "Who governs Japan?" cannot be effectively answered without considering the role of Tokyo University and their alumni who occupy the most influential positions in Japan. Rohlen (1983) echoes this view, and provides several examples of how Tokyo University graduates preserve their status quo. The faculty of Tokyo University is made up almost entirely by their own graduates. In the Ministry of Education, which is assigned the task of dismantling the elite university influence

over examinations and jobs, sixteen out of the eighteen of the top positions were filled by Tokyo University graduates in the mid-seventies (p.90).

Social capital theory complements the cultural capital thesis by suggesting that elite formation is achieved through the various network ties and linkages between individuals and organizations. Employers may recruit from a selected group of universities, rather than engage in open market recruitment. Empirical studies of Japanese university graduates have found that institutional ties between elite universities and prestigious firms facilitate better employment opportunities for the alumni (Brinton and Kariya 1998; Rebick 2000). Alumni networks (or old-boys networks) may also improve the prospects for upward mobility at later career stages, through their contacts within the organization, and/or across organizations (Abe 2002).

Our analysis of elite formation is framed in the tradition of human capital theory. Attendance at higher quality universities is an investment in human capital which subsequently increases labor market productivity and hence rewards. We apply the theory of investments in human capital as proposed by Becker (1993), to assess the costs and benefits of university education in a unifying framework. University quality is central to our analysis. The distinction between national and private universities is also crucial given the sizeable differences in their tuition costs. Two alternatives are proposed which follow directly from the Becker framework: An egalitarian perspective which posits that the returns from university education will be equalized for national and private university graduates after accounting for their costs and benefits, and an elite approach which maintains that abler persons have more to gain from their university education than less able persons.

The paper is organized as follows. In Section 2, we outline the historical background of national and private universities, with a particular focus on the expansion of private universities in postwar Japan. We also highlight some of the distinctive features of national

versus private universities and the persistence of educational credentialism in Japanese society. Section 3 introduces the theoretical framework of investments in human capital. Section 4 outlines the data and methods, and discusses the main findings and results of the statistical analysis. Section 5 concludes.

2 Background

Expansion of the university system in the postwar period

In order to meet the growing demand for university education in the postwar era, the Japanese government made efforts to improve its access to the general public by expanding the number of universities, from 201 in 1950 to 565 in 1995 (Figure 1). This expansion also reflected in part the concerns of the authorities of the American Occupation, who sought to reduce the prestige differentiation of universities (notably the Imperial Universities) in order to modify the differential recruitment practices which took place between employers and selected universities (James and Benjamin 1988).

The expansion of the university system was achieved mainly through increasing the number of private (as opposed to national) universities.[1] The Japanese government granted charters for 170 new private universities between 1950 and 1971 (Bowman 1981), and the number of private universities increased at a faster rate than national universities. The proportion of private universities was 54 percent in 1955 but rose to 73 percent in 1995. The proportion of students advancing to private universities is roughly equivalent to these figures, rising from 60 percent in 1955 to 78 percent in 1995.

(FIGURE 1 ABOUT HERE)

The postwar expansion marks a crucial turning point in the history of university education in Japan. The shift from national to private universities was not only quantitative but qualitative. The long-standing tradition that national universities offered a better quality of education at lower tuition was significantly dismantled during the postwar expansion. The following historical account draws from studies by Nagai (1971) and Ogura and Iwai (1991), and describes the process through which private universities improved their relative position.

The expansion of private universities in the latter half of the 1960s was not sufficient to meet the surging demand for university education among the first generation of baby-boomers. Many private universities were thus forced to accept up to twice as many students as their enrollment capacity. At the same time, private universities faced financial problems which were prompted by the sudden expansion. However, any attempt to raise tuition was met with violent disapproval by students. Tuition at private universities was already high relative to national universities. The tuition disparity – the ratio of tuition at private versus national universities – was about 7.0 in the 1960s, and the students protested that the massive expansion of private universities had precipitated a serious decline in the quality of their education. Financial problems were further exacerbated by the Oil Shock of 1973, after which the government finally intervened by initiating a Freeze-in Policy (*touketsu seisaku*) in 1976 with the following agenda: (i) Subsidize private universities to restructure their financial base; (ii) Restrict the expansion of private universities in large metropolitan areas; and (iii) Ban the practice of accepting students over the enrollment capacity (*mizumashi nyugaku*). These measures were put into effect for the following ten years with the intention of controlling the supply and quality of university education.

Despite the decline in the number of students graduating from high school following the baby-boom generation, the demand for university education continued to grow during the years of the Freeze-in Policy (1976 to 1986). This trend allowed private universities to

gradually raise tuition and recover their financial standing, while at the same time improve their quality of education. Meanwhile, Japan's economic performance suffered as a result of the Second Oil Shock and the exchange rate crisis in the 1980s. Instead of relaxing the subsidy to private universities, the Japanese government responded by raising the tuition charged by national universities. The tuition disparity between private and national universities narrowed to 3.0 by the end of the 1980s, and eventually to a low of 2.3 in 1994 (Ministry of Education statistics, various years).

In sum, the Freeze-in Policy initiated in 1976 allowed private universities to stabilize their financial base and improve the quality of education. Enrollment in private universities grew as the tuition disparity narrowed in favor of private universities. The relative decline in tuition accompanied by improvement in university quality boosted the overall reputation of private universities.

National versus private university differences in contemporary Japan

The postwar expansion of private universities has in many ways obscured the traditional distinctions between national and private universities. However, some notable differences still remain and should be highlighted. First, as mentioned above, tuition at private universities remains more than twice as high because they receive smaller government subsidies than national universities and must rely more heavily on tuition fees. The burden of real costs falls on the students. In specialized departments (or faculties) such as engineering or medicine, students must compensate for expensive facilities and special training. Tuition among these departments can be significantly higher among private universities, while national universities charge a flat-rate tuition across all departments.

Second, national university applicants must go through a two-round examination process versus one-round only for private university applicants. In the first-round, students

are tested on basic subject areas (e.g. Japanese, English and mathematics), while the second-round is more specific to the student's desired area of specialization. This results in their having to take a larger number of examinations over a broader range of categories. As characterized by the expression, *examination hell*, all university applicants in Japan must pass the examinations specific to the university that they apply to, but in this respect, national university applicants must undergo a more rigorous process by virtue of their having to take more examinations.

Third, national university applicants may only apply to one national university in a given year, while private university applicants may apply to as many universities as they desire. This one-shot constraint implies that it is riskier to apply to national universities. Applying to private universities involves less risk insofar as these applicants have the option to diversify their risk by applying to a wider range of universities according to their expected probability of acceptance.

And fourth, national universities are generally viewed as providing *better* education in comparison to private universities. *Better* education here refers to such university resources as student-teacher ratio, educational expenditures per student, faculty salaries, etc.[2] This argument is often extended in reference to the quality of the students; national universities attract 'smarter' students than private universities.

The perception that national university students are smarter is partially rooted in the history and the foundations under which national universities were founded in Japan – an institution to educate the nation's elite and a recruiting ground for government ministries (James and Benjamin 1988). The educational curriculum was structured in accordance with the demands of government ministries who sought new recruits from these elite institutions. Hence, national universities provided a crucial point of departure where elites were trained in

one elite institution (i.e. national universities) to be transferred to another (i.e. the government ministries).

Remnants of this particular aspect of Japanese history still remain very much intact today. A majority of the bureaucrats in the central ministries continue to be dominated by graduates of national universities (National Personnel Authority statistics, various years), a trend which has changed little in the postwar period (Koyama 1981).[3] In particular, graduates of Tokyo University consistently dominate the upper-level positions. In 1983, Tokyo University graduates alone accounted for 62.3 percent of high ranking officials in all ministries; this proportion was 88.6 percent in the Ministry of Finance, considered to be the most prestigious ministry (Rohlen 1983).

Educational credentialism in the Japanese labor market

We have thus far examined the distinguishing features between national and private universities in Japan. We further examine this phenomenon in a broader context: The hierarchy of universities and their effects on labor market outcomes. As suggested by earlier studies, the issue of who graduated from which university is a national obsession in Japan (Ono 2004). The hierarchy of universities is clearly established by numerous publications that tabulate the degree of difficulty in getting admitted to these universities as measured by the mean scores of their entrance examinations.[4] The first column of Table 1 reports one such ranking reported in Obunsha's annual publication *Keisetsu Jidai* (comparable to *Barron's Guide to American Colleges*). In addition, there are various publications that tabulate the number of executives, politicians and bureaucrats by their graduating institutions on an annual basis. The right three columns of Table 1 show a snapshot of such rankings commonly reported in the media. What is conspicuous about these rankings is that it closely resembles the ranking of universities based on the difficulty of admission (Column 1), implying a

remarkably close correlation between university selectivity and employment outcomes. Moreover, there is little variation in the university hierarchy; the rankings are dominated by national universities with Tokyo University consistently taking the top position, interspersed by a handful of private universities, notably Keio and Waseda. The rankings also mirror the previous discussion concerning the institutional linkages between national universities and the government sector; graduates of national universities are more likely to dominate the rankings of government officials and politicians than they do the rankings in the private sector.

Although not shown here, the striking feature of the CEO and executives ranking is that the top five schools comprise 49 percent of the total, and the top ten schools comprise 63 percent of the total. Given that there are close to 600 universities in Japan, the fact that half of all CEOs and executives are graduates of only the top five universities is compelling evidence that university credentials matter greatly in Japanese society.

The positive correlation between university rank (or quality) and labor market outcomes has been documented in several studies. Due to data limitations, the majority of empirical research in this area has focused on the distribution effect of university quality at labor market entry. The assumption here is that larger firms are more prestigious, higher paying and therefore more desirable than smaller firms. The reward from graduation from an elite university is that it improves the likelihood of employment in larger firms. These studies have consistently confirmed the positive correlation between university quality and firm size (Abe 1997, 2002; Higuchi 1994; Iwamura 1996; Yano 1978). Ono (2004) complements these findings by establishing that graduates from elite universities earn more even after controlling for employer characteristics such as firm size and industry sector.

(TABLE 1 ABOUT HERE)

Undoubtedly, the positive correlation between university selectivity and employment outcomes is observed in other societies, but to a lesser extent. For example, comparable estimates suggest that the graduates of the top five universities comprise just 16.7 percent of managers and directors among U.S. corporations.[5] Ishida, Spilerman and Su (1997) show that U.S. firms recruit from a variety of schools, while Japanese firms recruit heavily from only a handful of schools.

Comparative studies have also found that university credentials continue to affect labor market outcomes at later career stages in Japan. As suggested by Ishida, Su and Spilerman (2002), competition for promotion in Japanese firms takes place at later stages of the career in comparison to U.S. firms where differentiation in promotion may occur immediately after firm entry. Ishida, Spilerman and Su (1997) find that in the Japanese firm, alumni of highly competitive institutions, both private and national, were more likely to be promoted to higher ranking positions than the alumni of other universities, while no such advantages were found in the U.S. firm. In a case study of alumni from the Massachusetts Institute of Technology versus the alumni of Tokyo University and the Tokyo Institute of Technology (both top ranking national universities in Japan; see Table 1), Higuchi (1994) finds that MIT alumni are promoted to managerial positions at earlier stages of their career, but the alumni of the two Japanese universities are promoted in greater numbers at later stages, and eventually overtake their MIT counterparts in terms of the proportion of alumni in managerial positions. A comparison of the graduating cohort of 1958 from Harvard versus the graduating cohort of 1954 from Tokyo University also found that the latter achieved considerable success in their careers (Torao, Terayama and Akiba 1994). The study found that a sizeable number of the Harvard graduates had experienced job loss or economic hardship. One Harvard graduate who experienced several spells of unemployment in his career summed up that “a degree from Harvard is not a passport to success, but more like an

entry visa with an expiration date" (p.14). In this terminology, it can be said that an educational credential from Tokyo University has no expiration date.

In sum, there is a clear-cut hierarchical ranking of universities in Japan based on the degree of difficulty or selectivity of admission, and this ranking is closely correlated with labor market outcomes. National universities dominate the top ranks of this hierarchy. Graduation from elite universities improves labor market outcomes in Japan throughout the career, by increasing the probability of employment in large prestigious firms at career entry, and by improving the likelihood of promotion into higher ranks at later career stages.

3 Theoretical framework

How do national-private sector differences affect the outcomes of Japanese university graduates? We borrow from Becker's theory of investments in human capital (Becker 1993) in order to conceptualize the costs and benefits associated with university education in a unifying framework. According to this theory, marginal costs and benefits associated with human capital investments – in this case university education – can be illustrated as follows (Figure 2).

(FIGURE 2 ABOUT HERE)

The marginal benefit curves (*MB* and *MB'*) are downward sloping to account for the diminishing returns from human capital investments. *MB'* which lies above *MB* means that individuals along this curve enjoy higher benefits for the same level of investment. On the other hand, the marginal cost curves (*MC* and *MC'*) are upward sloping to account for increasing costs. For the same level of investment, individuals along the curve *MC'* have higher costs than those along the curve *MC*. The area which is formed along the left-side of

the intersections of the curves represents the surplus obtained from investments in human capital. An outcome represented by points B and C is an "egalitarian" view, under which costs and benefits from human capital investments are positively correlated. Individuals along the curve *MC'* may face higher costs, but they also enjoy higher returns resulting in equilibrium condition B. Individuals along the curve *MC* may face lower costs, but their returns will be lower as well (point C). As shown in Figure 2, surplus obtained from equilibrium conditions B and C are approximately the same under the egalitarian view.

On the other hand, the greatest inequality positions are generated by points A and D, as indicated by the surplus regions represented by these points in Figure 2. This is a condition in which costs and benefits are negatively correlated; those who face higher costs have lower returns and vice versa. Becker describes this as the "elite" view because it represents a condition in which the abler (or smarter) persons have more to gain.

With respect to tuition differences between national and private university students, the latter are positioned along the curve *MC'* while the latter are positioned along *MC*: For the same level of investment in university education, the per-unit cost (or annual tuition) is more expensive for private university students, *ceteris paribus*. In order for private university students to equalize their returns, their benefits must be higher than national university graduates; their benefits must be positioned along the curve *MB'*, and national university graduates along the curve *MB*. Otherwise, private university students will be made worse off from their investments in university education.

A frequently used measure in cost-benefit analysis is the internal rate of return (*IRR*), defined formally as the discount rate which equates the sum of discounted costs to the sum of discounted benefits. The *IRR* estimation is based on the fundamental principles of cost-benefit analysis. The *IRR* is essentially an indicator of investment outcomes where the sign of the *IRR* tells us whether the investment was beneficial or not. A negative *IRR* on an

investment decision indicates a 'bad' investment insofar as the cost of the investment outweighs its benefits.

The *IRR* to university education is derived by equating the net present value of the costs and benefits over the lifetime. This is done by first calculating the total annual cost of university education by summing its direct costs (d) and indirect costs, where the latter are estimated by the earnings of high school graduates (Y_h) who have been in the labor force for s years. The total annual cost of university education in year s of university is therefore expressed as $(Y_h+d)_s$. The annual benefit from university education in any given year of work experience (x) is the difference in earnings between university and high school graduates of the same age expressed as $(Y - Y_h)_x$. [6]

Total costs and benefits are then discounted to the year in which the university graduate enters the labor market, specifically at $x = 0$ in order to derive the *IRR* as the discount rate which sets the costs equal to the benefits:

$$\sum_{x=0}^{n}(Y - Y_h)_x(1 + IRR)^{-x} = \sum_{x=-s}^{-1}(Y_h + d)_x(1 + IRR)^{-x} \qquad (1)$$

where n is the year of work experience in which individuals retire.[7] The *IRR* for graduates of national and private universities will be estimated separately accounting for the differences in their tuition costs and earnings.

4 Analysis and Results

Data and methods

The dataset used for the analysis is the 1995 Social Stratification and Mobility National Survey (hereafter SSM) which consists of men and women between the ages of 20

and 69 residing in Japan in 1995. SSM is particularly suited for the purpose of our research because it reports the name of the university for respondents who attended university. University quality is measured by the mean scores on entrance examinations administered by each university as reported by *Obunsha* (see Appendix for description of coding procedure). The sample size is 670 consisting of 475 high school graduates and 195 university graduates.

Several shortcomings of our empirical analysis are addressed as follows. First, our analysis is restricted to men. Given the intermittent career mobility patterns of Japanese women, it is difficult to obtain reliable rate of return estimations for women. An accurate analysis of women's returns to university education would require that they be analyzed separately. Second, given the non-quantifiable nature of non-monetary benefits (and likewise costs), we focus on the monetary costs and benefits associated with university education. And third, we use the self-assessed grade point average (GPA) in ninth grade as a proxy for individual ability. The usual caveats for self-assessed ability measures apply (see for example, Kruger and Dunning [1999], Maxwell and Lopus [1994]).

The direct costs associated with university education used in the estimations were obtained from the 1995 Ministry of Education statistics. The annual direct cost of university education was estimated as tuition minus part-time earnings. Indirect costs of university education were estimated from the earnings of high school graduates in the SSM survey. These data are reported in the Appendix.

Results

We first highlight some of the distinguishing features between the graduates of national and private universities (Table 2). In our sample, 19 percent were graduates of national universities. The results reported in Table 2 generally confirm that traditional aspects of national-private sector differences remain in Japan. On average national universities attract

a 'smarter' student body as measured by their GPA in ninth grade, and their performance on the university entrance examinations. National university graduates are slightly more likely to be employed in firms greater than 1000 employers (although this difference is not statistically significant), and they are more likely to be employed in the government sector.

(TABLE 2 ABOUT HERE)

We begin with the standard Mincer type earnings regression that controls for experience (x), experience squared (x^2) and individual ability (G) for the sample of male university graduates. Our primary interest is to examine how enrollment in national universities (Z), and universities of higher quality (Q) influence earnings. The standard earnings regression takes the form:

$$\ln Y = \alpha + \beta_1 x + \beta_2 x^2 + \sigma G + \lambda Z + \omega Q + u \qquad (2)$$

where λ captures the returns to national university graduates (versus private university graduates), and ω is the return from a unit of university quality. Equation (2) can be easily modified to account for various interaction effects. For example, pursuant to our previous discussion, the difference in earnings between graduates of lower quality versus higher quality universities may diverge or converge as a function of work experience.[8] This relationship can be examined by including an interaction term with university quality and work experience ($Q \cdot x$). A minus sign of the coefficient for the interaction term indicates that the effect of Q on earnings becomes greater as workers gain more work experience, while a positive sign indicates the reverse. The quadratic term Q^2 can also be entered to examine nonlinear effects of Q on earnings. In this case, the negative sign on the quadratic term

indicates diminishing returns with respect to Q – the returns from Q may be positive, but it increases at a decreasing rate – while a positive sign indicates increasing returns with respect to Q.

Our first approach is to estimate an OLS regression where Z and Q are entered linearly. Under this formulation, the assumption is that Z and Q are exogenously determined, or corr(Z, u) = 0 and corr(Q, u) = 0. However, we must also consider the possibility that college choice is not a random process, but an investment decision motivated by the factors that are perceived to lead to higher future earnings. The decision to enroll in national (versus private) universities and the decision to attend higher quality universities are presumably linked to the same factors that lead to higher earnings. OLS estimates that do not account for the endogeneity of college choice may bias the rate of return to university education.

Our second approach is to estimate an instrumental variables (IV) regression to account for the possibility that Z and Q are endogenously determined. The instruments are variables that influence the decision to advance to national universities and universities of higher quality but do not directly affect the earnings. The instruments chosen for this purpose are variables that influence the costs of or access to resources related to university preparation. These include supplementary education in middle school, city size of residence prior to university education, sibling size, and father's occupational prestige. The assumption here is that factors such as parent's socio-economic status and urban-rural differences may favor access to the resources that improve entry into better universities. These instruments directly affect Z and Q, but not Y. The instruments are excluded from the second-stage estimation.

The results of our analysis are presented in Table 3. The OLS estimations reveal the following. First, we confirm the significant impact of university quality on earnings. The effect of university quality remains positive and significant in all models estimated here.

Although not reported here, we also included the interaction term $Q \cdot x$ in the regression, but the results were not significant. This suggests that the effect of university quality on earnings remains constant throughout the working life. We also examined the nonlinearity effects of university quality by including a quadratic term (Q^2). The coefficient for Q^2 was found to be insignificant, indicating that the effect of Q on earnings is linear.

In Model 2, the coefficient for the national university dummy (Z) is not significant. However, when we include the interaction term $Z \cdot x$ in Model 3, we find that the main effect of national universities becomes negative, and its interaction effect with work experience becomes positive. This suggests that in comparison to private university graduates, national university graduates start off with lower earnings, but they have higher earnings growth. Moreover, these effects are significant after controlling for Q. Even within universities of comparable quality, the earnings of national university graduates grow faster than their private university counterparts.

And finally, in Model 4, we include dummies for large firm size and government sector to examine the effects of employer characteristics on earnings. The baseline (or omitted) category is firm size less than 1000. We confirm that employment in large firms has a positive effect on earnings, while employment in the government sector has a negative effect. Consistent with Ono (2004), we find that graduates of higher quality universities earn more even after accounting for their distribution effect of employment.

(TABLE 3 ABOUT HERE)

Models 5 to 7 show the results of the instrumental variables (IV) regressions. The results of the first-stage estimations are reported in the Appendix. In Model 5, the instrumented variable is the binary outcome of whether the individual attended a national or

private university (*Z*). In Model 6, the instrumented variable is university quality (*Q*). We then conducted Hausman's specification tests in order to assess whether there is sufficient correlation between the disturbances to warrant estimation by IV regression. The null hypothesis is that the estimates obtained from the IV regression are consistent with those obtained from the OLS regression. Estimates from the OLS regression Model (3) were used for the comparison. The Hausman test revealed that the null hypothesis in the IV regression which accounts for *Q* is rejected ($p = .0226$), suggesting that OLS estimates that do not account for the endogeneity of *Q* are biased. On the other hand, test results indicate that the null hypothesis in the IV regression accounting for *Z* is not rejected ($p = .303$). The final IV regression (Model 7) was therefore estimated accounting for the endogeneity of *Q* but not *Z*. The coefficients for these variables remain significant even after controlling for employer characteristics leading to the same interpretation as the OLS results: University quality improves earnings, and national university graduates experience higher earnings growth.

Evaluation of findings

Our final analysis is to evaluate the returns from university quality, and the returns from attendance at national universities using internal rate of return (*IRR*) estimations. We first generate the experience-earnings profiles for national and private university graduates (Figure 3) by using the coefficient estimates obtained from Model 7 in Table 3. The earnings profile for high school graduates are illustrated as a reference category. Figure 3 confirms the steepness of the earnings profile among national university graduates. The cost region of the graph ($x = -4$ to 0) is smaller among national university graduates accounting for their lower tuition. Their earnings are lower at entry into the labor market ($x = 0$), but they overtake private university graduates at 15 years of work experience after which the earnings differential between the two graduates continues to widen. Figure 3 also shows that their

earnings peak at later stages, at $x = 32$ years compared to $x = 28$ years for private university graduates, i.e. their earnings continue to grow even after it has peaked among private university graduates.[9] This finding points to the possibility that national university graduates may be promoted to higher ranking positions which lead to higher earnings at later career stages.

(FIGURE 3 ABOUT HERE)

Table 4 shows the *IRR* by university quality and university sector. In our estimations, we assumed that individuals retire at the age of 60. If university graduates join the labor force at age 22, this implies that they retire after 38 years of work experience.[10]

The *IRR* evaluated at mean *Q* is 6.9 percent. The *IRR* ranges from a low of 2.7 percent to a high of 12.4 percent as a function of *Q*. The benefits obtained from university quality confirm that *examination hell*, or the investments undertaken in gaining entry into the higher ranking universities pay off.

National university graduates outperform private university graduates with respect to monetary rewards. The *IRR* for national university graduates is found to be a full percentage point higher than the *IRR* for private university graduates. This outcome reflects a combination of three factors. First, national university graduates pay lower tuition and hence lower costs associated with university education. It follows directly that their *IRR* will be higher, *ceteris paribus*. Second, as previously reported in Table 2, on average national university graduates attend institutions of higher quality. Since earnings and university quality are positively correlated, the *IRR* will likewise increase with respect to quality. And third, national university graduates achieve higher earnings growth leading to a sizeable premium in earnings at later stages of their work experience.

In light of these empirical findings, the costs and benefits associated with national versus private university education lend support to the 'elite' view (Figure 4). National university graduates have lower marginal costs (given their lower tuition) and achieve higher benefits, i.e. they have more to gain from their investments in university education. Figure 4 also suggests that private university graduates who invest in their human capital at the same level as that of the national university graduates will have *overinvested* (at least in comparison to the national university graduates). Such a point is obtained at *P* at which point marginal costs are greater than the marginal benefits, thereby resulting in *negative* surplus.

Would the outcome be different if private universities graduates faced the same marginal cost curves as national university graduates? One way to assess this is to simulate the *IRR* by setting the private university tuition equal to the national university tuition. Results showed that the *IRR* improves for private university graduates, but still remains below the *IRR* for national university graduates. Under this scenario, the marginal benefit curve for private university graduates would intersect the curve MC_n somewhere between "National" and *P**. Hence, even if private university graduates faced the same cost curves as national university graduates, their benefits would still be lower.

(FIGURE 4 ABOUT HERE)

Why then, would individuals choose *not* to enroll in national universities? A plausible explanation is that the marginal cost for national university applicants is higher if we account for the preparation involved in getting into these universities. In this case, the marginal cost curves for national and private university graduates would be the same (say MC_p for both graduates in Figure 4). Recall that national university applicants must prepare for two rounds of examination where they are tested on a wide range of subjects regardless of intended major.

Further, the 'perceived cost' of rejection may be significantly higher among national university applicants, since they may apply to only one school within a given year. Nevertheless, such conclusions cannot be drawn without identifying the true form of the cost function. And even if these conditions were true, it would still not be sufficient to equalize the returns between national and private universities, unless the benefits for private university graduates are at the same level obtained as those of national university graduates. Only then do we arrive at an equilibrium condition in which the net benefits (and hence the *IRR*) would be the same for both national and private university graduates.

We may, however, infer that the structural differences between the two sectors of universities function as a selection device. By imposing tougher standards and examination requirements, the national universities effectively weed out many applicants who would rather take the less rigorous route and attract only those who felt sufficiently competent. The result of such sorting is that on average, national universities attract smarter students.

5 Summary and Conclusions

National universities in Japan were originally founded more than a hundred years ago with the primary objective of training future elites. My research lends support to the position that aspects of this long-standing tradition still remain intact in contemporary Japanese society. Following Becker's framework for investments in human capital, we find that the outcome of national university graduates resembles an elite perspective; national university graduates achieve higher benefits at lower costs than do private university graduates. It is an elitist view in the sense that abler persons have more to gain from investments in their human capital. And it is an elitist view in the general sense. National university graduates achieve higher earnings growth and their earnings peak at later career stages, suggesting that they may be appointed to higher ranking positions than do private university graduates. Our results are

robust after controlling for employer characteristics and university quality, and after accounting for the endogeneity of selection into higher quality universities.

Despite efforts by the American Occupation to break up the prestige differentiation between national and private universities, and the measures taken by the Ministry of Education to expand the number of private universities, many of the prewar features of national universities still persist. On average, national universities attract smarter students – smarter in the sense that they perform better on university entrance examinations which require more rigorous preparation. They are also more likely to be employed in the government sector suggesting that the institutional linkage between government and national university still remains pervasive.

Our research also confirms the significant impact of university quality on earnings in the Japanese labor market. The reward for graduating from an elite university may be the increased likelihood of employment in large prestigious universities. However, we find that even within employers of comparable size, graduates of higher quality universities achieve higher benefits than do graduates of lower quality universities. This finding suggests that the investment undertaken in pursuit of higher quality universities in Japan is a good investment indeed.

Appendix

Coding university quality

Obunsha, a publishing company located in Tokyo, tabulates and publishes results of entrance examinations and the competitiveness scores of Japanese universities on an annual basis. Their annual publication, *Keisetsu Jidai*, is the Japanese equivalent of the *Barron's Guide to American Colleges* and ranks university departments based on results from the examinations administered in the previous year. Test scores are standardized across different universities and range from 30 to 80 (80 being the highest).

The SSM dataset is a cross-sectional survey where the respondents' ages range from twenty to seventy. In terms of the entry year into university, these years range from 1945 to 1992. In the coding process, we used the test scores from the 1966, 1972, 1977, 1982, 1986, 1992 issues of *Keisetsu Jidai* because there were small fluctuations in the scores of the individual schools over time (see Ishida, Spilerman and Su [1997] for a similar coding procedure using *Obunsha* data). We used scores from these respective issues depending upon individuals' entry year. For example, if an individual entered university in 1973, we used the 1972 scores. Because 1966 was the first year in which *Obunsha* began tabulating examination scores, individuals who entered university prior to 1966 were coded using the 1966 scores as an approximation.

Direct and indirect costs of university education

Table A.1 reports the tuition of national and private universities, and part-time earnings of the respective students. Tuition minus part-time earnings was used as direct costs in the *IRR* estimations. Earnings of high-school graduates were used as indirect costs of university education. This was done by estimating an earnings regression for the sample of male high school graduates, and then generating an experience-earnings profile. The regression results are reported in Table A.2.

(TABLES A.1 AND A.2 ABOUT HERE)

First stage regressions

Regression results reported in Table A.3 correspond to the first-stage regressions for the instrumental variables regressions presented in Models 5 to 7 in Table 3. The first column reports the results of a probit predicting the probability of entry into a national university. The second and third columns report the results of first-stage regressions predicting university quality.

(TABLE A.3 ABOUT HERE)

Bibliography

Abe, Yukiko. 1997. "Shushoku-shijo ni okeru daigaku no meigara koka" (University brand name effects in labor markets). In *Koyo Kanko no Henka to Josei Rodo* (Changing Employment Practices and Female Labor Force), edited by Hiroyuki Chuma and Terukazu Suruga, pp.151-167. Tokyo: University of Tokyo Press.

_____. 2002. "Universities and the Entry-level Job Market: Evidence from Japanese Panel Data." *Labour Economics* 9: 699-715.

Amano, Ikuo. 1986. "Educational Crisis in Japan." in *Educational Policies in Crisis*. Edited by William K. Cummings, Edward R. Beauchamp, Shogo Ichikawa, Victor N. Kobayashi and Morikazu Ushiogi. 23-43. New York: Praeger Publishers

_____. 1990. *Education and Examination in Modern Japan*. translated by William K. Cummings and Fumiko Cummings. Tokyo: University of Tokyo Press.

Becker, Gary S. 1993. *Human Capital*. Chicago: University of Chicago Press.

Bowman, Mary Jean. 1981. *Educational Choice and Labor Markets in Japan*. Chicago: University of Chicago Press.

Brinton, Mary C. and Takehiko Kariya. 1998. "Institutional Embeddedness in Japanese Labor Markets." In *The New Institutionalism in Sociology*. Edited by Mary C. Brinton and Victor Nee. Pp. 181-207. New York: Russell Sage Foundation.

Cohn, Elchanan and Woodrow W. Hughes, Jr. 1994. "A Benefit-Cost Analysis of Investment in College Education in the United States: 1969-1985." *Economics of Education Review* 13: 109-123.

Cooper, Samuel T. and Elchanan Cohn. 1997. "Internal Rates of Return to College Education in the United States by Sex and Race." *Journal of Education Finance* 23: 193-206.

Heckman, James. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47: 153-161.

Higuchi, Yoshio. 1994. "Daigaku kyouiku to shotoku bunpai." (College education and income distribution). In *Nihon no Shotoku to Tomi no Bunpai* (Distribution of Income and Wealth in Japan), edited by Tsuneo Ishikawa, pp.245-278. Tokyo: University of Tokyo Press.

Ichikawa, Shogo. 1992. "Distinctive Features of Japanese Education." *Daigaku Ronshu* 21: 225-254.

Imada, Sachiko. 1994 (reprint of 1974 edition). "Gakureki kozo no suusei bunseki" (Analysis of trends in the structure of education). in *Nihon no Kaiso Kozo*. Edited by Kenichi Tominaga. 133-158. Tokyo: University of Tokyo Press.

Ishida, Hiroshi. 1993. *Social Mobility in Contemporary Japan: Educational Credentials, Class and the Labour Market in a Cross-National Perspective*. Stanford: Stanford University Press.

Ishida, Hiroshi, Seymour Spilerman and Kuo-Hsien Su. 1997. "Educational Credentials and Promotion Chances in Japanese and American Organizations." *American Sociological Review* 62: 866-882.

Ishida, Hiroshi, Kuo-Hsien Su and Seymour Spilerman. 2002. "Models of Career Advancement in Organizations." *European Sociological Review* 18: 179-198.

Iwamura, Michie. 1996. "Koto-kyouiku no shiteki shuekiritsu" (Private rate of return to higher education). *Kyouiku Shakaigaku Kenkyu* 58: 5-28.

James, Estelle and Gail Benjamin. 1988.. *Public Policy and Private Education in Japan*. New York: St. Martin's Press.

Koh, Byung Chul. 1989. *Japan's Administrative Elite*. Berkeley: University of California Press.

Koyama, Shigeki. 1981. “Kanryo to gakureki” (Bureaucrats and educational credentials). In *Nihon no Gakureki Shakai wa Kawaru*. Edited by Hiroshi Takeuchi and Makoto Aso. 62-83. Tokyo: Yuhikaku.

Kruger, Justin and David Dunning. 1999. “Unskilled and Unaware of It: How Difficulties in Recognizing One’s Own Incompetence Lead to Inflated Self-Assessments.” *Journal of Personality and Social Psychology* 77: 1121-1134.

Maxwell, Nan L. and Jane S. Lopus. 1994. “The Lake Wobegon Effect in Student Self-Reported Data.” *American Economic Review* 84: 201-205.

Nagai, Michio. 1971. *Higher Education in Japan: Its Take-off and Crash*. translated by Jerry Dusenbury. Tokyo: University of Tokyo Press.

Naoi, Atsushi. 1994 (reprint of 1979 edition). “Shokugyoteki Chiishakudo no Kosei” (The construction of the occupational scale). in *Nihon no Kaiso Kozo*. Edited by Kenichi Tominaga. 434-472. Tokyo: University of Tokyo Press.

Ogura, Masanori and Katsunori Iwai. 1991. “Koto-kyouiku shijou no ryouteki kisei ni kansuru keiryou keizaigaku moderu” (Econometric model concerning regulations in the market for higher education). *Nihon Keizai Kenkyu* 21: 14-33.

Ono, Hiroshi. 2004. “College Quality and Earnings in the Japanese Labor Market.” *Industrial Relations* 43: 595-617.

Pindyck, Robert S. and Daniel L. Rubinfeld. 1991. *Econometric Models and Economic Forecasts*. New York: McGraw Hill.

Psacharopoulos, George. 1974. “College Quality as a Screening Device?” *Journal of Human Resources* 9: 556-558.

Rebick, Marcus E. 2000. “The Importance of Networks in the Market for University Graduates in Japan: A Longitudinal Analysis of Hiring Patterns.” *Oxford Economic Papers* 52: 471-496.

Rohlen, Thomas P. 1983. *Japan’s High Schools*. Berkeley: University of California Press.

Taira, Koji and Teiichi Wada. 1987. “Business-Government Relations in Modern Japan: A Todai-Yakkai-Zaikai Complex?” In *Intercorporate Relations: The Structural Analysis of Business*. Edited by Mark S. Mizruchi and Michael Schwartz. 264-297. Cambridge: Cambridge University Press.

Torao, Shinya, Shoichi Terayama and Daisuke Akiba. 1994. “Todai versus Harvard” (Tokyo University versus Harvard University). *Nikkei Business* (September 26, 1994).

Yano, Masakazu. 1978. “Kyouiku no toushi shuueki to shigen haibun” (Rates of return from education and resource allocation). in *Allocation of Educational Resources in Japan*. edited by Shogo Ichikawa. Tokyo: National Institute for Educational Research.

Notes

[1] References concerning national universities will hitherto include public universities unless otherwise noted.
[2] See James and Benjamin (1988) and Narita (1978) for detailed comparison of the distribution of resources between national versus private universities.
[3] Citing statistics from the National Personnel Authority which ranks the number of bureaucrats according to their graduating universities, Koyama (1981) shows that nine out of the top ten universities were national universities during the years 1973 to 1980.
[4] These rankings are constructed by college preparatory schools (e.g. Kawaijuku, Yoyogi Seminar) and publishers specialized in college preparations (e.g. Obunsha). Mean scores of the entrance examinations are standardized across all universities.
[5] Unpublished manuscript of Useem and Karabel (1986), cited in Ishida (1993).
[6] We account for the fact that entry into the labor market is delayed by s years for university graduates. Therefore, if the work experience of high school graduates is x, then the corresponding work experience for university graduates becomes $x - s$.
[7] From equation (1), it is clear that *IRR* will vary depending on the value of n, while the costs associated with university are sunk costs incurred over s years and independent of n. However, some individuals may choose to work longer than others (i.e. choose different values of n) so that they can recoup the benefits over a longer time span, thereby offsetting the proportion of benefits over costs. Individuals choose to retire at different ages for various reasons, but it is difficult to account for such individual variations in *IRR* estimations. For this reason, it is conventional to assume that n remains fixed for all individuals.
[8] This is one way to test the screening hypothesis (Psacharopoulos 1974). Employers may use university quality as a screening device to recruit workers because they do not have accurate information on their productivity. If this is the case, then the earnings differentials between graduates of universities of differing quality would eventually converge as employers learn more about the actual productivity of their workers.
[9] These estimates are obtained from Equation (2) by solving for x which sets $\partial \ln Y/\partial x = 0$.
[10] From Equation (1), it should be noted that the *IRR* may be sensitive to the age of retirement (n) because it affects the duration in which workers accumulate the benefits from university education. The *IRR* was estimated separately for retirement ages 55 and 65. These changes did not significantly influence our results.

Table 1 Rankings of universities based on various outcomes

Rank	Mean score of entrance examinations[1]	CEOs and executives[2]	Politicians and high-level bureaucrats[3]	Successful pass on government officials' examination[4]
1	Tokyo	Tokyo	Tokyo	Tokyo
2	Kyoto	Keio (*p*)	Kyoto	Kyoto
3	Hitotsubashi	Waseda (*p*)	Chuo (*p*)	Waseda (*p*)
4	Keio (*p*)	Kyoto	Waseda (*p*)	Hokkaido
5	Tokyo Univ of Foreign Studies	Chuo (*p*)	Tohoku	Tokyo Inst of Tech
6	Ochanomizu	Meiji (*p*)	Hokkaido	Tohoku
7	Osaka	Nihon (*p*)	Keio (*p*)	Nagoya
8	Nagoya	Hitotsubashi	Nihon (*p*)	Keio (*p*)
9	Tokyo Inst of Tech	Doshisha (*p*)	Kyushu	Kyushu
10	Waseda (*p*)	Kobe	Hitotsubashi	Osaka

p: private universities.
[1] [SOURCE: Obunsha 1986]
[2] [SOURCE: *Diamond Shokuin-roku* (Directory of Company Personnel) 1998]
[3] [SOURCE: Toyo Keizai 1994, reprinted from Kawaijuku 1996]
[4] [SOURCE: National Personnel Authority 1994, reprinted from Kawaijuku 1996]

Table 2 National-private sector differences

	Full sample	National	Private	Nat vs Priv
National university	0.19	-	-	-
GPA in ninth grade	3.98	4.59	3.84	**
University quality	51.7	56.6	50.5	**
Firm size >1000	0.25	0.30	0.23	
Government	0.19	0.43	0.14	**

** $p < .01$

Table 3 The effects of university quality (*Q*) and national-private sector differences (*Z*) on logged earnings

	OLS (1)		OLS (2)		OLS (3)		OLS (4)		IV (5)		IV (6)		IV (7)	
Experience	0.090	**	0.090	**	0.088	**	0.090	**	0.088	**	0.096	**	0.098	**
	(0.008)		(0.008)		(0.008)		(0.007)		(0.008)		(0.010)		(0.011)	
Experience squared	-1.50E-03	**	-1.49E-03	**	-1.53E-03	**	-1.56E-03	**	-1.52E-03	**	-1.71E-03	**	-1.76E-03	**
	(1.91E-04)		(1.92E-04)		(1.89E-04)		(1.82E-04)		(1.92E-04)		(2.54E-04)		(2.61E-04)	
GPA	-7.98E-03		-1.44E-03		-3.46E-04		-5.33E-03		-5.34E-03		-4.83E-02		-4.74E-02	
	(0.028)		(0.028)		(0.028)		(0.026)		(0.027)		(0.042)		(0.040)	
University quality (*Q*)	0.015	**	0.017	**	0.018	**	0.016	**	0.019	**	0.040	**	0.039	*
	(0.004)		(0.004)		(0.004)		(0.004)		(0.004)		(0.015)		(0.016)	
National university (*Z*)			-0.074		-0.344	**	-0.309	**	-0.402	*	-0.412	*	-0.392	*
			(0.066)		(0.116)		(0.110)		(0.159)		(0.167)		(0.162)	
National univ * experience interaction					0.014	**	0.016	**	0.015	*	0.014	*	0.016	**
					(0.005)		(0.005)		(0.007)		(0.006)		(0.006)	
Firm size > 1000 [1]							0.122	*					0.061	
							(0.056)						(0.073)	
Government [1]							-0.197	**					-0.201	**
							(0.061)						(0.069)	
Constant	13.931	**	13.849	**	13.824	**	13.924	**	13.780	**	12.823	**	12.915	**
	(0.216)		(0.228)		(0.224)		(0.216)		(0.230)		(0.716)		(0.756)	
R-squared	0.597		0.600		0.604		0.657		0.587		0.580		0.621	

* p <.05, ** p <.01. Standard errors reported in parentheses.
[1] Baseline category is firms less than 1000.

Table 4 Estimated *IRR* by university quality and sector [%]

By university quality (Q)			*By university sector*	
Mean *Q*	Min *Q*	Max *Q*	National	Private
6.9	2.7	12.4	7.7	6.7

Table A. 1 Tuition and part-time earnings in annual terms [UNIT: yen]

Tuition	
National universities	497,000
Private universities	1,095,300
Part-time earnings	
National university students	349,200
Private university students	412,200

(Ministry of Education statistics 1995)

Table A. 2 Earnings regression results for high school graduates

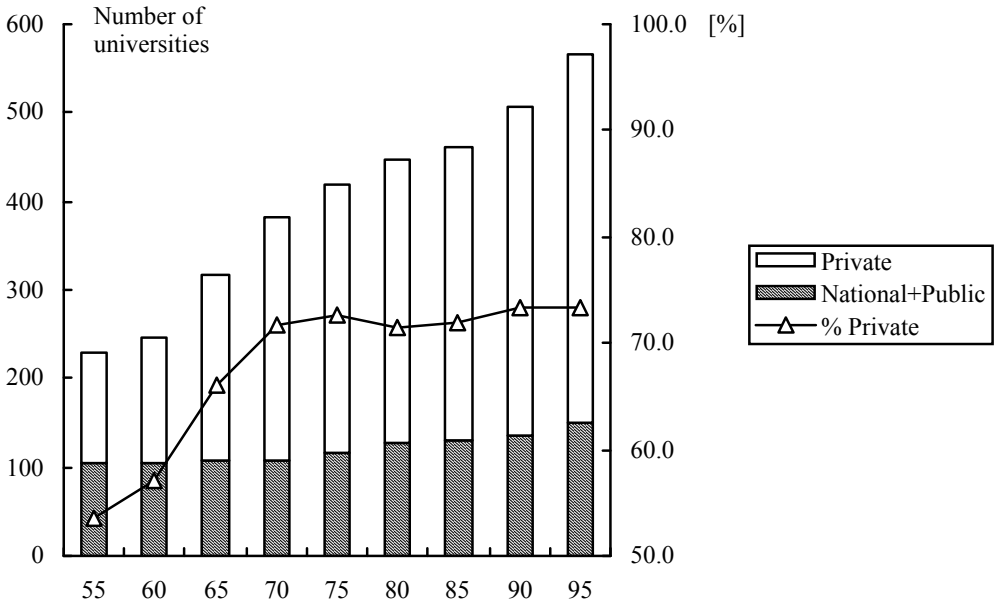
Experience	0.065	**
	(0.008)	
Experience squared	-1.10E-03	**
	(1.71E-04)	
GPA	0.057	*
	(0.023)	
Constant	14.412	**
R-squared	0.192	

* $p < .05$, ** $p < .01$.
Standard errors reported in parentheses.

Table A.3 First-stage regressions

	National University		University quality		University quality	
Experience	0.002		-0.451	**	-0.452	**
	(0.046)		(0.133)		(0.132)	
Experience squared	0.000		0.010	**	0.010	**
	(0.001)		(0.003)		(0.003)	
GPA	0.445	*	2.053	**	1.881	**
	(0.181)		(0.445)		(0.449)	
Univ quality (Q)	0.105	**				
	(0.027)					
National univ (Z)			7.475	**	7.103	**
			(2.041)		(2.036)	
National univ * experience interaction			-0.148		-0.142	
			(0.092)		(0.092)	
Firm size > 1000 [1]					2.069	*
					(0.982)	
Government [1]					0.700	
					(1.131)	
Supplementary education in middle school	-0.187		-2.844	**	-2.578	**
	(0.308)		(0.875)		(0.890)	
City size after middle school	-0.784	**	1.228	*	1.186	*
	(0.206)		(0.598)		(0.598)	
Sibship size	0.187		-0.452		-0.374	
	(0.116)		(0.367)		(0.367)	
Father's occupational prestige	-0.010		0.048		0.045	
	(0.011)		(0.034)		(0.034)	
Constant	-6.874	**	43.650	**	43.514	**
	(1.789)		(3.548)		(3.597)	
R-squared / Pseudo R-squared	0.343		0.324		0.340	

* p <.05, ** p <.01. Standard errors reported in parentheses.
[1] Baseline category is firms less than 1000.



[SOURCE: Ministry of Education]

Figure 1 Expansion of the university system in the postwar period

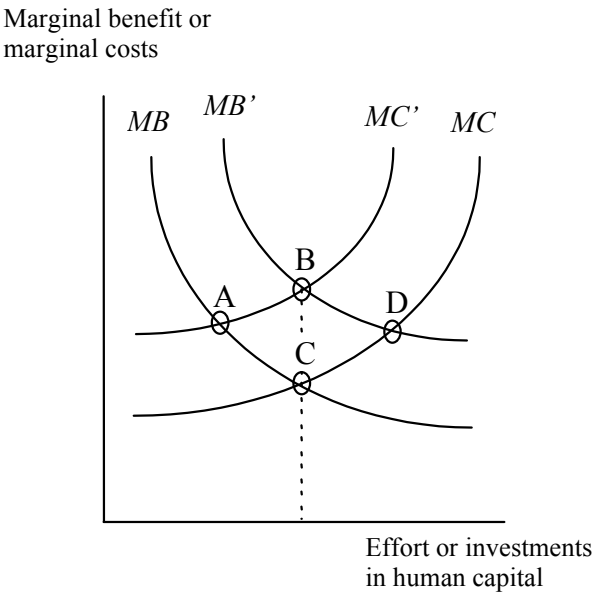


Figure 2 Marginal costs and benefits from investments in human capital

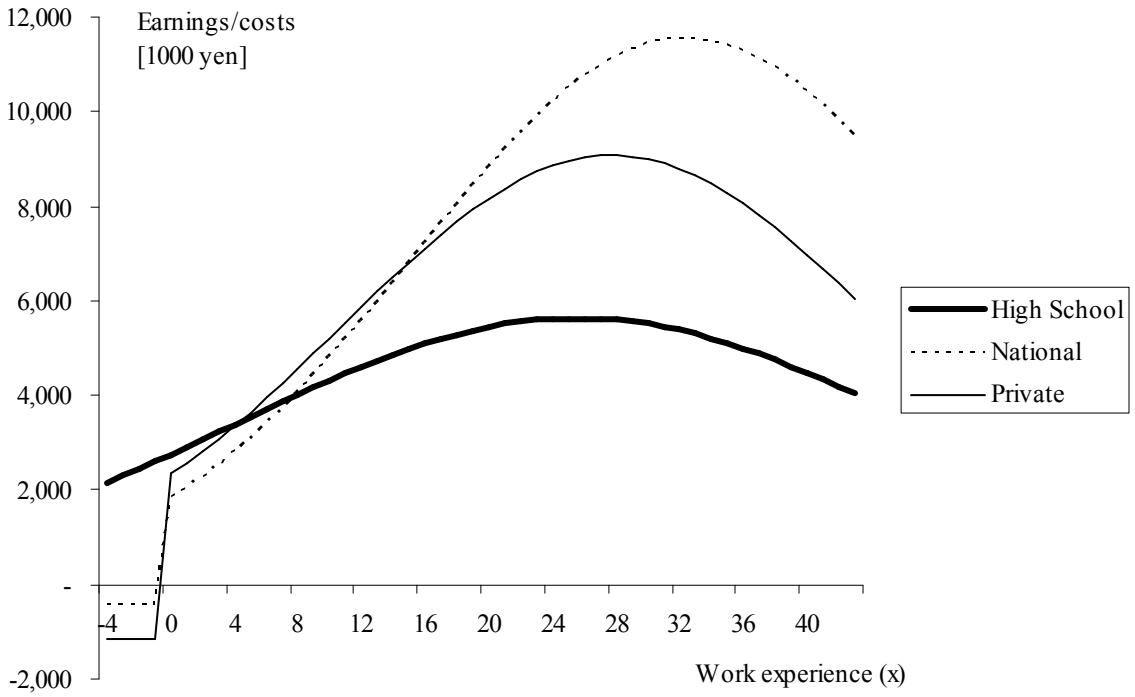


Figure 3 Experience-earnings profiles by university sector

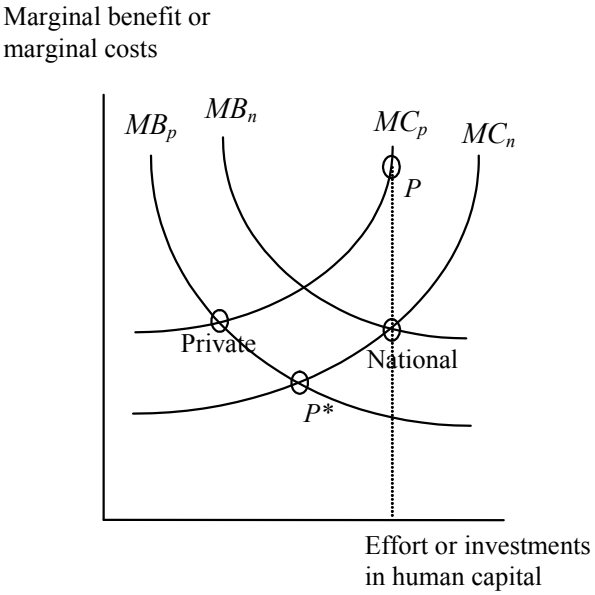


Figure 4 Investments in human capital revisited