

Empirical Analysis of Educational Outcomes Emphasizing the Role of Higher Education

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Empirical Analysis of Educational Outcomes
Emphasizing the Role of Higher Education

A dissertation presented

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-Abstract-

A central issue of higher education in Japan is the clarification of educational outcomes to ensure the quality of higher education and the improvement of student skills. Active discussion at a recent meeting of the Subcommittee on Universities of the Central Council for Education examined the question of whether higher education institutions should hire professionals to analyze their integrated educational data and feed back the results to administrators for reexamination of their educational policies. Researchers in Japan earlier assessed the effects of socioeconomic and cultural background on academic achievement at junior and high schools, mainly in the field of educational sociology. Nevertheless, few studies have addressed those issues in relation to higher education, such as determining the relation between student backgrounds and learning attitudes at college, between their attitudes and prospective salaries, and so on. Moreover, university data have not been publicized until recently. They are limited to analyses of how universities should establish effective educational policies based on evidence derived from empirical analyses.

Therefore, this dissertation investigates educational outcomes of higher education from the perspectives of individuals and of higher education institutions to bridge the gap separating them. Specifically, this dissertation presents the following investigations: (1) the degree to which extracurricular experiences during childhood, along with socioeconomic and cultural background, influence learning attitudes at college; (2) the degree to which these learning attitudes affect their salary prospects and subjective well-being in terms of happiness and labor satisfaction; and (3) whether higher education institutions can improve those educational outcomes, or not.

Chapter 1 introduces the recent background of higher education in Japan, research objectives and the potential contribution of this dissertation after reviewing earlier studies. Based on the economics of education, this chapter provides a theoretical framework for the analysis of educational outcomes at higher educational institutions.

Chapter 2, using a large database of individuals' information, examines how study experiences during college education are related to graduates' career paths, motivation for work, and life satisfaction. The 'learning habits' hypothesis stated by Yano (2009) shows that study experiences during college years improve their knowledge and capabilities, which consequently improve their current capabilities. According to this hypothesis, this chapter demonstrates the degree to which learning during college years is associated with subjective well-being (happiness, labor satisfaction, etc.). Results show that both men and women who had gained 'learning habits' during college life tend to exhibit high levels of labor satisfaction and general happiness, even after controlling for household attributes and job attributes. Moreover, people who chose 'active choices of classes' during college life, especially men, tend to receive higher compensation in the current labor market.

Chapter 3 investigates the effects of extracurricular activities on learning attitudes of university students using the data presented in Chapter 2. Previous studies have demonstrated mainly the extent to which the cultural capital influences the academic achievement of children. This chapter offers a robust estimation of learning attitudes during college student not only using cultural capital variables but also extracurricular activities such as traditional Japanese learning, *shuji and soroban* (calligraphy and abacus), music school, sports school, and cram school. Estimation results reveal that extracurricular activities and cultural capital in early childhood exert strongly positive influences on active learning attitudes such as self-motivated choices of class, eager studying, and reading habits during college. Some extracurricular activities are especially important because they foster learning motivation irrespective of a student's early childhood family background, which suggests that a parent's academic background and income class have no strong impact on a child's educational attainment, after controlling for embodied cultural capital factors and extracurricular activities.

Chapter 4, using panel data, presents analysis of the degree to which college learning and the living environment affect the control of student withdrawal and graduation within standard academic years. This chapter addresses both public and private universities. Analysis of the panel data reveals the possibility that learning environment conditions such as the convenience of college libraries and the ratio of instructors to students affect the control of dropout rates in addition to students' academic skills before college entry. This result suggests that some differences exist in dropout rates and graduation rates between those colleges that have an environment to encourage motivation for learning and those which do not, even if their deviation scores

are equal.

Chapter 5 presents an examination of the mechanism by which government subsidies for private universities affect university management in terms of improving study and research environments. This chapter specifically presents an examination of private universities because more than 70% of universities are private and because the Japanese government expends vast funds on higher education every year. Ordinary least squares estimation shows that subsidies have a significant and positive association with the number of library books per student. Furthermore, the results of mediation analysis indicate that subsidies contribute indirectly to reducing the dropout ratio through study environment improvements attributable to grants-in-aid for scientific research.

Chapter 6 presents a summary and conclusions of this dissertation. The dissertation supports the view that learning experiences obtained during higher education are beneficial for the improvement of their future quality of life. In addition, higher education institutions play an extremely important role. Policy implications are suggested based on the empirical evidence.

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Chapter 1: The Role of Higher Education: Theory and Evidence

1.1 Introduction

A recent buzz word related to Japan's education policy is "evidence-based educational policy." Because almost all Japanese residents have the experience of receiving public education, many people assert their own opinions when discussing education. In response to increasing criticism against policymaking based not on objective approaches, but personal experience, however, analysis of various data related to education and education policymaking based on evidence have recently been in high demand (Nakamuro, 2015). To address such arguments, a discipline called the economics of education, a relatively new field in the history of economics, has played an important role. Based on results of empirical analysis, the present study develops an argument, considering theories developed in the economics of education, about the effects of higher education learning experience on people's income and subjective well-being. This study also examines the role of universities in higher education policy.

Before introducing such results of empirical analyses, this chapter first provides an overview of how education is argued and what proposals it can make for education policy primarily from the perspective of the economics of education (Ch. 1.2). Outcomes of individuals' education have often been analyzed in the past using indicators of individuals' earning capacity such as income or wages after graduation, in addition to academic performance.

Different from that pattern, this study specifically examines individuals' subjective well-being (sense of happiness, sense of health, job satisfaction, etc. (Ch. 1.3)) because more countries have begun using indicators other than GDP, such as gross national happiness (GNH), as one policy target, suggesting growing interest in the importance of emphasizing not only economic development, but also the subjective well-being of people.

Subsequently, how evidence-based education policy is to be implemented at universities, the site of higher education, is summarized based on the term "institutional research" (Ch. 1.4) after reviewing the current situation of Japan's higher education policy, and after considering the theoretical background of significance and outcomes of education. The fundamental role of institutional research is to identify policy issues of an institution or organization through analysis of large amounts of data and to propose a

policy to improve the system based on the results. At institutions of higher education in Japan, demand has been increasing every year for data scientists: those who have expertise related to higher education and who can conduct educational data analysis. The importance of institutional research has also been emphasized. In the past, numerous arguments have been made related to the issue of how to measure university education outcomes. From the next chapter, this study examines dropout rates, amounts of book reading, individuals' subjective well-being, wages, and other factors as proxy indicators of outcomes of education. Also, using analyses of various data, this report describes effects on these indicators exerted by university policies and the family environment during childhood.

The “learning habit hypothesis” of Yano (2009) and the I-E-O model of Astin (1993) play important roles in the framework of this study for the argument of the educational outcomes of higher education. This study provides an overview of the theoretical models in these preceding studies, examines the feasibility of integration and development of such models, and argues the framework of policies that should be implemented by institutions of higher education in the future (Ch. 1.5).

1.2 Higher Education from the Perspective of the Economics of Education

In recent years, analytical studies that have evaluated and examined education policy based on scientific approaches have been reported by various media. A feature article in *Toyo Keizai* Vol. 10, 2015, titled “Economics of ‘Education’: Are You Not Raising Your Child in the Wrong Way?” (Japanese) describes the theoretical system of the economics of education and results of empirical analysis as an attempt to evaluate education scientifically. The March 2016 issue of *Aera* includes a featured article, “Economics of Academic Records” (Japanese), which presents research results obtained by particularly addressing the question of whether adequate return on education investment is provided when, at present, the percentage of high school graduates advancing to college exceeds 50% and large amounts of money are paid to earn a “high educational background” as opposed to when, in the past, the value of “educational background” was likely higher and education was more cost-efficient when such a percentage was lower than it is now.

These are examples from general magazines, not academic journals, the latter of which are also actively introducing research findings related to the economics of education, suggesting the high interest of many Japanese people in the questions of what better education means and how good education can be provided appropriately to their children.

One researcher who has promoted this surge in the economics of education is Makiko Nakamuro. Nakamuro (2015) asserted the necessity of incorporating scientific perspectives in education and criticized key decisions in Japan's education policy in the past, which had been made based on "subjective opinions raised from personal experience." Considering that overseas, as in the U.S., findings from empirical research in the economics of education are used for developing education policy, thereby contributing to improvement of on-site education, she asserts the necessity, also in Japan, of appropriately analyzing data based on similar empirical research and feeding back the results for use in education policy.

The Perry Preschool Project analyzed by Heckman et al., of which details are also described by Nakamuro (2015), is a valuable research achievement that demonstrated the importance of non-cognitive skills (written by Heckman and commended by Ohtake, 2015). The Perry Preschool Project was an experiment conducted in the U.S. in the 1960s, in which economically disadvantaged African-American children aged 3–4 years were provided with school education in the morning Monday through Friday. They were also visited by a teacher in the afternoon once a week for educational guidance. According to Fumio Ohtake, who explained the results of Heckman's experiment, the children who had received education through the Perry Preschool Project demonstrated growth in motivation for learning. Ohtake remarked that the project had contributed to an increase in the non-cognitive skills of the children. He reported that it was important to provide education that would encourage the development of non-cognitive skills before the age of elementary school, when non-cognitive skills rapidly develop, and that such development can be expected to increase the efficiency of subsequent education and facilitate social success. Furthermore, while quoting Heckman's opinion that investment in the education of disadvantaged children is a rare public policy that would promote fairness and efficiency simultaneously, Ohtake asserted that argument based on reliable scientific data needed to be developed in education policymaking.

Based on such examples in the U.S. suggesting that the contribution of findings from demonstration experiments increases the demand for the economics of education, researchers in Japan have also been conducting experiments and empirical analyses at educational institutions. They have been gradually developing research in the field of education economics. The literature on the economics of education written by Japanese pioneers includes reports of studies by Arai (1995), Yano (1996), and Oshio (2002, 2003). Particularly the *Economic Analysis of Education* (Nihon Hyoronsha, 2002) and *Consideration of Education in Economics* (Nihon Hyoronsha, 2003) (both in Japanese)

written by Oshio are some excellent texts to use in the economics of education in Japanese (Akabayashi, 2003). Oshio and Senoh (2003) summarized the history and trends in the economics of education in Japan, which was titled “The Economics of Education in Japan: Prospects and Challenges in Empirical Analysis” (Japanese).

Oshio (2003) presents the criticism that numerous irresponsible and idealistic theories related to education have been discussed in Japan. He also argues that when approaching education from the perspective of economics, children receiving education should be ordinary children from the majority. He further states that what education policy truly needs are objective data, analysis of the current condition, and plain but careful empirical research related to actual education.

Based on such assumptions, Oshio explained the basic idea of education in the economics of education from widely various perspectives, including 1. education as investment (means) or consumption, 2. efficiency and fairness in education, 3. education as public goods, and 4. whether education is applicable to a market mechanism, or not. This article also concisely describes these four perspectives based on Oshio (2003).

First, related to question 1. whether education is an investment or consumption, education has been understood as being an “investment” in the field of economics, as represented by Becker’s human capital theory. In other words, this is an idea that deems education to be an investment in stock, i.e., “human capital” and a “means” of achieving desirable outcomes. Simply put, education is understood, for individuals, as a means of earning future wages and in macroeconomics, as a means of increasing labor productivity of overall economy and economic growth. The act of parents having their children receive after-school tutoring or lessons from an early age by paying high fees and the act of people attending college are often considered an “investment” in their future from the perspective of economics.

In contrast, Oshio presented the criticism leveled by Uzawa (1998) that the idea of human capital theory in the economics of education was “extremely inhumane and antisocial” and remarked that human capital theory was “unreasonably limiting the approach of economics to education.” Another perspective that should be considered, then, is the idea of viewing education as consumption rather than investment. Oshio stated the following using the example of adult students having a full-time job.

“I cannot help myself feeling that the act of receiving education and learning knowledge in school has much more sublime and humane significance beyond the objectives that economists would instantly think of, such as raising wages

and labor productivities, which are important yet somewhat materialistic.”¹

The opinion of Oshio that “aside from being sublime, education as consumption is the kind that enriches life itself” resembles the view of Nel Noddings, a philosopher of education introduced later in this discussion, that education exists for people to be happy. While praising such a superb aspect of education, however, Oshio also lays bare the “dark side” of education. It is the aspect of education that reveals disparities in abilities among children. Individuals are born with unequal abilities, and those with better abilities improve their skills even further by receiving education, by which they are more likely to earn higher salaries. Individuals with lower abilities, in contrast, are able to increase their productivity by pursuing education, which, however, might result in a greater income disparity. According to Oshio, therefore, the fact that education does not bring equal happiness to all people could not be changed.

Subsequently, the evaluation criteria in economics, 2. efficiency and fairness in education, are brought in. Human capital theory argues about education basically from the perspective of efficiency as indicated in its claim that “education has the function to increase people’s productivity, and education is evaluated based on its effect of increasing productivity.” Education, however, widens the gaps among individuals’ abilities. It is likely to facilitate an increase in income inequality and other factors. Therefore, it is susceptible to problems in the first place. Oshio criticizes the lack of willingness to address the “dark side” of education among educators and the general public when, some years ago, the opinion emphasizing the importance of children’s individuality was widely accepted and the so-called “yutori education (education with latitude)” was made a policy at sites of elementary and secondary education.

Additionally, he mentions the compelling nature of education in the context of 3. education as public goods. Generally in economics, public goods refer to goods and services that have features such as non-excludability, non-rivalry, and externality. Education has external economic effects. When the amount of supply is determined based on the demand of each, it is limited to a level below the socially desirable level. Oshio explains, therefore, that it is reasonable to provide people with education led by the government using revenue sources such as taxes, considering the external economic effects of education. Evidently, education carries a heavy responsibility to society when taxes paid by the people are spent for it.

Determining the optimal amount of supply of education that has external economic effects involves numerous challenges. Based on the basic economic theory in the

¹ Oshio(2003), p.8.

economics of education, the education level selected at the point where the marginal revenue and marginal cost equal each other is the optimal level. Measuring external economic effects is difficult, which invariably faces the fundamental issues of how to define profit and cost of education and how to collect data. Particularly, Japan has a limited amount of basic data used to measure the outcomes of education. At present, the issue of data limitation cannot be ignored when investigating the outcomes of education in Japan.

Finally, Oshio summarizes the theme of 4. whether education is applicable to a market mechanism, or not. First, he adopts the stance that room exists for consideration of the introduction of market mechanisms because education is a form of service. Although education certainly has external economic effects and the characteristics of public goods, a viable option might be that the private sector takes charge of providing the actual educational services with the support of the government using taxes collected from the people as a revenue source, rather than relying the government for providing all education. Oshio describes the introduction of a school voucher system² in this case. While stating that it is still too early to implement such a system since the effect has yet to be verified, certain significance is found in the idea of increasing options on both the supply and demand sides of educational services and operating the market mechanism. Secondly, however, he cautions that letting consumers make all choices is dangerous. In the introductory theory of economics, arguments are developed on the assumption that consumers are rational individuals who make proper decisions and take optimal actions. Children, who are the consumers of educational services, however, often dislike studying and their parents, who have actual decision-making rights in demanding services, are often reluctant to spend money on education. Considering that the outcomes of education also contribute to the entire society, Oshio believes that people must be bound by education more strictly than before.

Oshio concludes the following related to the direction of future education.

1. Rather than streamlining the content of education in the field of education,

² A program that issues vouchers used for child education expenses. Recipients select a school of their preference and submit the voucher. Then the schools are eligible for a subsidy according to the value of the vouchers collected. In the field of education, such programs have been introduced in some parts of the U.K. and U.S. The program is proposed based on the intention of reducing inequality in school and education by incorporating the principle of competition into schools. In Japan, too, the program was introduced during the first Abe administration.

specifically examine “raising the bottom” of academic performance and allow every child to acquire basic academic skills properly.

2. Reform the mechanism of income redistribution in the field of taxation and social security to allow educational support and other services to function more directly on individuals.

Table 1-1 presents some roles and characteristics of education from the perspective of economics, considering the arguments of Oshio and others.

Table 1-1: Roles and characteristics of education in view of economics

1)	Means →	Investment	Human capital theory: means of increasing productivity and wages
	Purpose →	Consumption	For enriching life
2)	Efficiency	Increasing labor productivity	
	Equity	Reducing poverty while revealing disparities in abilities and facilitating an increase in inequality of income	
3)	Compelling nature →	Intervention of public sector is justified by having external economic effects	
4)	Market mechanism	Room exists for introducing market mechanisms to support a certain degree of competitiveness and exclusiveness. However, letting consumers make all choices is dangerous.	

A series of studies conducted by Yano (2007, 2009, and 2015) have examined such perspectives of education economics by application of them to Japan’s higher education. The studies have also assessed policy implications for higher education based on data analysis. Particularly the “learning habit hypothesis” proposed from the standpoint of human capital theory is extremely important (Yano 2009 and 2015). Yano first asked respondents how enthusiastic they had been about subjects in their specialized field and liberal arts in college and book reading and analyzed the relation between their enthusiasm and current income. The findings indicated that enthusiastic learning activities in college did not directly result in the current income. Factors that helped increase income included the “level of enthusiasm about working,” “current knowledge and skills,” and “current level of enthusiasm about book reading.” Moreover, the data appeared to suggest the importance of workplace experience and learning rather than college experience. Yano, however, noted an important problem with the analytical

result. In reality, the presence of an indirect path had to be examined. In other words, the levels of learning enthusiasm and reading experience in college have a significant and positive effect on the current knowledge and skills and book reading. Yano maintained that learning and reading in college helped improve the ability of learning and reading at the workplace, which, as a result, indirectly helps increase their income.

Yano (2009) argued that the effect of college education on income, measured as the accumulation of long-term learning experience, emphasized the presence of such a lifelong continuous learning path. Yano designated it as the learning habit effect of school education. A notable fact is that Yano claims that learning habits not only help increase income through learning directly related to work, but enhance people’s daily living including leisure and social activities. In other words, learning habits are capital that improves lifetime living and brings about not only a “monetary measure” for individuals, but “non-monetary measure effects” including leisure, social activities, and health. Table 1-2 presents aspects of the monetary value and non-monetary value of education based on earlier research conducted by Yano (2009).

Table 1-2: Monetary value and non-monetary value of education

	For society (for everyone)	For individuals (for myself)
Monetary	Increased tax revenues Improved productivity Reduced reliance on government spending	High income Employment Improved work conditions
Non-monetary	Reduced crime rate Improved civil life Increased social cohesion and trust	Improved health Improved quality of life Diversified leisure activities

1.3 Growing Argument about Subjective Well-being and Education

1.3.1 Development of GDP-related Indicators and Approach to Subjective Well-being in Economics

Up to this point, this article has summarized trends in recent education policy and has introduced the roles and characteristics of education and Yano’s “learning habit hypothesis” from the perspective of economics. This section presents a description of specifically how the outcomes of education have been measured based on preceding studies. In human capital theory, the main theme has been how, from a microeconomic perspective, education results in higher income. Recently, however, more analytical studies consider the outcomes of education more widely and focus not only on income, but on connection with the levels of health and happiness. In terms of Table 1-2, which

is based on Yano (2009), this corresponds to the section, “for individuals – non-monetary.”

More recently, international organizations and other groups have been widely discussing the necessity of developing indicators of national wealth instead of GDP. Bhutan’s efforts were the first to be examined. The government has adopted maintenance of a high subjective well-being of people as a national policy. The Report (2009) of the Commission on the Measurement of Economic Performance and Social Progress (so-called Stiglitz Commission) convened by former President of France, Nicolas Sarkozy, was symbolic in the sense that it indicated that many countries that had GDP growth as the national economic goal had reached their limit and needed to change their policy (The report was translated into Japanese the following year (Fukushima, 2011).).

The report primarily provides 12 proposals, one of which suggests that countries expand the range of national wealth measurement to activities outside the market. It states that the level of well-being consists of a number of dimensions, presenting the following eight: 1. physical living standards (income, consumption, and wealth), 2. health, 3. education, 4. personal activities including work, 5. political remarks and governance, and 6. social connection and various relations. The report concludes that all dimensions form people’s happiness, yet the traditional income calculation neglects many such dimensions. It points out that both the objective and subjective dimensions of well-being are important and that education is part of the “dimensions of well-being.”

The sixth proposal also mentions education and suggests, in this case, that measures must be taken to improve the method of measuring conditions such as people’s health, education, personal activities, and environment. The report asserts that objective and subjective data are required for accurate measurement of such conditions.

In other words, the 2009 report of the Stiglitz Commission already indicated that, among the well-being indicators that have replaced GDP, education serves an extremely important role and that objective and subjective data on education are important. Fukushima (2011) compiled such recent developments in a book titled “From ‘The Wealth of Nations’ to the Wellbeing of People” with a subtitle “From Adam Smith to Joseph Stiglitz.”

The OECD’s report “How’s Life? Measuring Well-Being” (2013 and 2015), too, states that education provides people with opportunities to select a desirable mode of living and overall society with various benefits such as economic growth, stronger social unity, and reduction of crimes. It asserts that because educational disadvantage accumulates throughout life, equality of opportunity for education must be provided

actively at an early stage in life.

In addition, Frey and Stutzer (2001), Bok (2010), and other related works describe the current condition of overseas well-being studies and relations between education and well-being, which have been translated into Japanese. Although studies in this field in Japan are still lagging behind those conducted in Europe, discussions related to improving people's well-being have been held at the policy level. More recently, the media have made an extensive report on the low level of Japanese people's well-being as suggested in the OECD's international comparison. The previous administration established a research group to study well-being. The Cabinet Office also reported the conditions and changes in the people's sense of well-being in the National Survey on Lifestyle Preferences (until fiscal year 2011).

Preceding studies in Japan include "Happiness in Japan: Inequality, Labor and Family" (Ohtake, Shiraishi, and Tsutsui (2010)) and other works that explain the relations among various indicators related to people's daily life and their sense of well-being, life satisfaction, etc. Urakawa (2012) described the prospects of empirical research of well-being, suggesting an increase in people's interest in well-being also in Japan.

Oshio (2014) replaced the term "subjective well-being" with "the sense of happiness" to emphasize the perspective of how people feel happy. Then, he explains how people's income, inequality, family, and work are related to their sense of happiness. This book introduces such analytical results as a difference found in the effect of employment status, i.e., whether a regular employee or irregular employee, in people's first job on their current level of life satisfaction, and the study is profoundly interesting because it presents various suggestions for education policy.

Tachibanaki et al. (2014) introduces the opinions of experts in different fields made from various perspectives on the theme of how to understand people's happiness. The argument in this book is developed by emphasizing primarily 1. the level of job satisfaction and capabilities, 2. the public pension system, and 3. SOC(sense of coherence) and health in the residential area. Urakawa (Chapter 5) analyzed the relation between job satisfaction and "capabilities" suggested by A. Sen. The job capabilities in this context is the concept expressed in a table of the levels of opportunities and freedom for people for having a "valuable job," which suggests that the level of capabilities is affected by personal factors such as skills originally held by people and social environment factors such as the environment in which they were born and raised. According to the analytical result in this chapter, job satisfaction and capability levels indicate that a certain positive correlation and people's high academic performance and

their original social class play certain roles in improving their capabilities, which provides an important perspective in the assessment of various policies for improving labor skills.

A “study of the level of happiness” might sound to many people to be situated firmly in the field of psychology. Certainly in psychology, a new research field called “positive psychology” addresses people’s “happiness” and makes an important contribution. Many books explaining positive psychology written by, for instance, Martin Seligman and Mihaly Csikszentmihalyi, who are authorities in this field, and Fredrickson (2010), Lyubomirsky (2012), Boniwell (2015), and others have been translated into Japanese and published, suggesting people’s high interest in the area.

Frey (2012), an economist, presented the following three aspects as key factors of positive psychology. First is that pleasing experiences and moments are the determinants of happiness. Secondly, individuals’ level of happiness increases when abilities, a sense of belonging, independence, and other desires are satisfied in connection with personalities such as self-organization, self-reliance, and adaptability. Finally, the awareness that people or their experience is part of a certain social condition or community affects one’s level of happiness.

1.3.2 Education and Subjective well-being

The previous section provided an overview of how arguments related to subjective well-being have been developed primarily from the perspective of economists. This section presents a description of how arguments related to education have been developed in connection with subjective well-being. The effect of education on subjective well-being is apparently substantial. However, empirical research on this theme remains inadequate in Japan.

First, an important book that connects education and subjective well-being, although not an empirical study based on data, is *Happiness and Education* of Nel Noddings (2003). Section 1.2 explained how education is understood in economics by reference to Oshio (2003). First, in the discussion of whether education is an investment or consumption, the fact was pointed out that education is regarded as a *means* if it is an investment and is regarded as a *purpose* if it is consumption. Nel Noddings is characterized by a discussion that divides the roles of education in terms of its aspect of pleasure and its aspect of happiness (see Table 1-3).

Table 1-3: Roles and characteristics of education

Oshio		Nel Noddings	
Means →	Investment	Human capital theory: means of increasing productivity and wages	Education for “happiness: (a means <i>and</i> a purpose)
Purpose →	Consumption	Has the aspect of enriching life	

Nel Noddings asserts that education must exist for people’s happiness.³ First, education helps people develop the best of themselves and is expected to help them become likable human resources, get useful and satisfactory jobs, attain self-understanding, acquire sound personalities, sense much appreciation, and participate in continuous learning. Accordingly, educators carry the obligations to help children understand the mystery and complexity of happiness, create questions about happiness, and be responsible for seeking promising potentials.

Pursuing the connection between education and happiness is the mission of educators. Then she objects to the idea that the relevance between education and happiness is explainable in economic and monetary aspects. In other words, “education as a means” argued from the perspective of economics as in human capital theory and the idea of Noddings are exactly opposite views.

Related to education for “happiness,” Noddings presents proposals by making a distinction between education for personal life and education for public life. For the former, Noddings explains how such factors as “building a family,” “love for homeland,” “connection with nature,” “becoming a parent,” “spirituality,” and “relationships with people,” contribute to people’s happiness and asserts that school education should incorporate such factors. For the latter, she lists such factors as “jobs,” “community,” “democracy,” and “volunteer activities” and states that these factors contribute significantly to people’s happiness. Therefore, as in the educational aspect of personal life, they must be incorporated into education. In presenting proposals for education for public life, she points out that, in general, policy-makers misunderstand a bright future as being the same as earning more money. She also criticizes that recent college education, too, is preoccupied with making more money.

In an effort to verify the outcomes of education, researchers tend to examine efficiency and rationality excessively and specifically, such as exploring how to obtain and analyze objective data and how to distribute resources efficiently based on the

³ Nel Noddings (2003), *Happiness and Education*, Cambridge University Press.

results and feedback to educational programs and policies. As Noddings proposes, however, the fundamental premise that education leads people to happiness is one idea that education providers should always bear in mind.

It is extremely interesting that Noddings, an educational philosopher, has stated the following about the pleasing aspects of education itself.

“When something gives us pleasure, we are inclined to study it more carefully. It can also happen, of course, that the stage of romance is characterized more by puzzlement and intrigue than by fun. But even then, the process of finding out can be fun because one truly wants to learn, and the end result is a deep form of satisfaction.”⁴

This is an issue related to the essence of education⁶: what does it mean to “learn”? Although education certainly has the aspect of investment as evident in human capital theory, Oshio (2003) has stated that education has some characteristics of consumption. In other words, he admits that people gain satisfaction through the act of receiving education and learning alone. This part can be understood as an overlap of the education as the pleasing aspect suggested by the educational philosopher and education as consumption presented by the economist. The book of Noddings (2003), “Happiness and Education,” might lead people to misunderstand that the purpose of education is happiness. The author nevertheless emphasizes that education, fundamentally, is a means of guiding people to happiness.

Uzawa (2000) defines social common capital as a social device that allows all people living in a country or specific area to have a rich economic life, develop a superior culture, and maintain an attractive society continuously and stably. One example of such capital is education. Uzawa (2000) noted the following about education.

“Education maximizes the various innate or acquired skills that each child has, develops and enhances such skills to the greatest extent possible, and helps children grow into a person capable of creating a fulfilling and happy life.” Actually, this is true because the purpose of education is to help each child grow into a respectable social person and become able to spend a personally happy and fulfilling life.

Uzawa therefore recognizes education as one means of making a life happy, calling it social common capital. It is noteworthy that this aspect is shared completely with

⁴ Noddings(2003), p.244.

Noddings's "education for happiness."

When discussing "education," various approaches have been pursued from the economics of education, educational philosophy, educational sociology, etc. Sectionalism persists among disciplines, however. Furthermore, the relevance of such disciplines and the overall picture of educational research are difficult to understand for a beginning learner. In the field of education, arguments are often developed based on personal experience. Such arguments tend to heat up quickly. The tone of the argument is sometimes even hostile to other disciplines. Analysis of the relation between education and subjective well-being requires, however, development of understanding through comparison and data organization about the roles and characteristics of education that have been argued not only within a specific academic discipline, but also among multiple disciplines.

As described previously Yano (2009) suggested that the characteristics of education are composite and multifaceted, viewing education and its outcomes from only a single perspective is risky. Therefore, one must adopt a comprehensive and multifaceted approach to the selection of techniques designed to achieve the objectives of education and objective indicators needed to evaluate education using theories and evidence developed in multiple disciplines.

1.4 Recent Conditions of Higher Education in Japan

Evidence-based educational policy that has been actively proposed in recent years is drawing attention not only for elementary and secondary education, but also for higher education. Demand for the evidence-based educational policy is also evident in the increase of college placement departments specializing in institutional research (IR). The need for IR has also been discussed at the Central Council for Education from time to time. Specific needs for IR as an institutional framework were revealed when the university governance reform was discussed at the Subcommittee on Universities of the Central Council for Education. This point is described in detail in the "Promotion of Governance Reform in Universities (summary of deliberations)" (February 12, 2014)⁵, which emphasizes the importance of improving IR as a means of establishing the President's leadership and strengthening the system of assisting the President to maximize the functions of education, research, and social contributions constituting the

⁵ MEXT "Promotion of Governance Reform in Universities (summary of deliberations)"
http://www.mext.go.jp/b_menu/shingi/chukyo/chukyo4/houkoku/1344348.htm
(accessed 10 July)

objectives of universities in the promotion of university governance.

The current universities cannot ignore evaluation by private-sector media such as University Rankings in addition to assessments such as accreditation by government bodies. Numerous publications featuring the social assessment of universities are circulated throughout Japan, including *University Rankings* from Asahi Shimbun Publications, data of which were used for this study, *Daigaku No Jitsuryoku* (Capability of universities) from the Yomiuri Shimbun, and *Daigaku No Shin No Jitsuryoku* (True Capability of universities) from Obunsha Co., Ltd., among those the author is familiar with. The influence of overseas university rankings is increasing, as exemplified by the government's proposal at the Council for Revitalization of Education to have 10 Japanese universities ranked among the world's top 100 universities. Strict assessment of universities is likely to increase in the future along with growing expectations of society.

One role of IR is to extract data required for responses to such rankings and to propose a desirable direction of reform based on objective evidence. Some of the books, journals, and other publications describing evaluation of universities in the past apparently involved problems related to their research methods, which might not accurately present the actual conditions of universities. The argument that university education and operations determined by excessively relying on external evaluation is a problem that cannot be ignored.

Therefore, universities must appropriately evaluate themselves using accurate data, determine their direction with the understanding of their stance or position using external assessment as a reference, and correct their course if necessary. According to *the Research Report on the Current Condition and Position of Institutional Research (IR) at Universities*⁶ published by The University of Tokyo, approximately a quarter of Japanese universities have emplaced a department having the function of IR. Results of this survey indicate that among the operations in which the IR organizations are in charge, "supply of survey and analysis data to the administrative division" was selected by 65.6%, the highest percentage. The report also mentions the need to assess the current condition based on data and determine goals.

Many IR organizations in Japan, called "educational IR" focusing on students' activities, are closely related to student surveys conducted by universities to gain knowledge about their students' daily life, views and behavior. Student surveys are

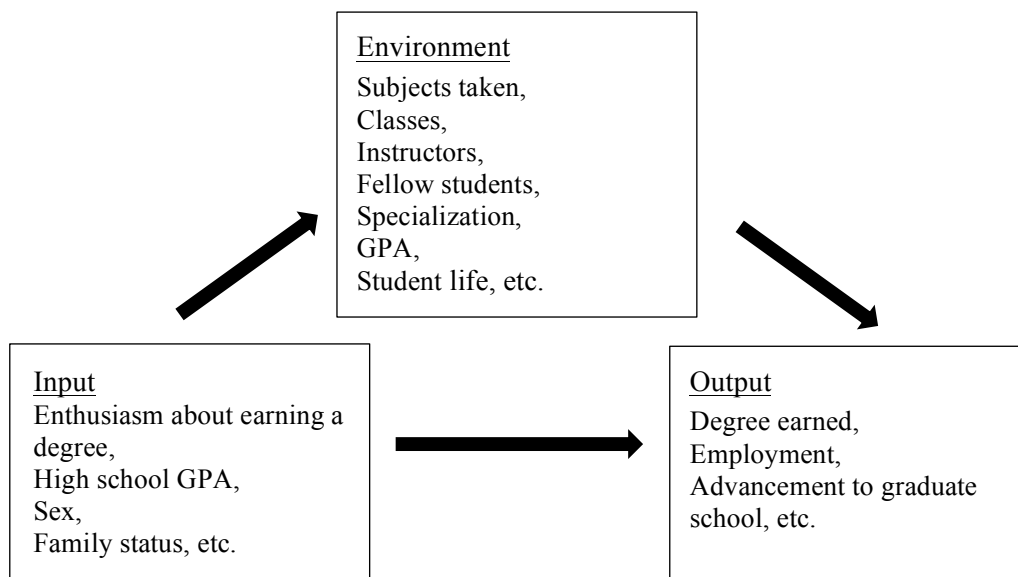
⁶ "Daigaku Ni Okeru IR (Institutional Research) No Genjou To Arikata Ni Kansuru Chousa Kenkyuu" (The University of Tokyo, March 2014), 2012–2013 university reform promotion project of the Ministry of Education, Culture, Sports, Science and Technology http://www.mext.go.jp/a_menu/koutou/itaku/1347631.htm (as of July 20, 2015)

broadly divided into those conducted at the time of entrance to universities, those at the time of graduation, and those after graduation. In recent years, Japanese universities finally began to be motivated to analyze data by connecting all the surveys to assess the personal growth of their students within the framework of follow-up studies. Particularly, the effect of university education can be measured by asking about the respondents' experience while in college and their current income and living environment, etc. in the post-graduation surveys. Therefore, the roles of IR are likely to increase through the elaboration and improvement of survey data.

1.5 Analytical Framework

This section explains the overall framework of this paper and the position of each chapter using Astin's I-E-O Model of education in addition to Yano's learning habit hypothesis described in Section 1-2. The following Table 1-4 presents Astin's I-E-O Model of education. Table 1-5 lists the education outputs. Astin's I-E-O Model is a simple yet extremely effective model for addressing complex issues related to education assessment (Yamada, 2007). The "I (input)" of the I-E-O Model includes students' academic performance before entering universities, enthusiasm about earning a degree, attributes (sex, ethnicity, age, family status, etc.), and other factors. The "E (environment)" includes factors that affect growth and change in students.

Table 1-4: Astin's I-E-O Model (source: Yamada, 2007)



According to Noda (2009), such factors are generally categorized into the

following four. These are 1. curriculum (e.g., classes taken and majors selected), 2. class experience (e.g., types of class method, quality of classes, and communication instructors in classes), 3. experience outside classes (e.g., relationships with fellow students, club activities, part-time jobs, communication with instructors outside classes, work, and family relationships), and 4. characteristics of university (e.g., type of institution, size, management structure, curriculum missions, acceptance rate, environment, culture, and human, physical, and financial resources). Finally, “O (output)” represents the experience and products gained at universities.

Table 1-5: Students output from education based on Astin’s I-E-O Model
(source: Yamada, 2007)

	Cognitive	Emotional
Internal	Subjects, knowledge by area Learning skills Critical thinking skills Basic learning techniques Special skills Learning achievement level	Value Interest Self-image Attitude Belief Satisfaction with college
Active	Degree earned Employment Awards given	Leadership Citizenship Personal relationships Personal interests

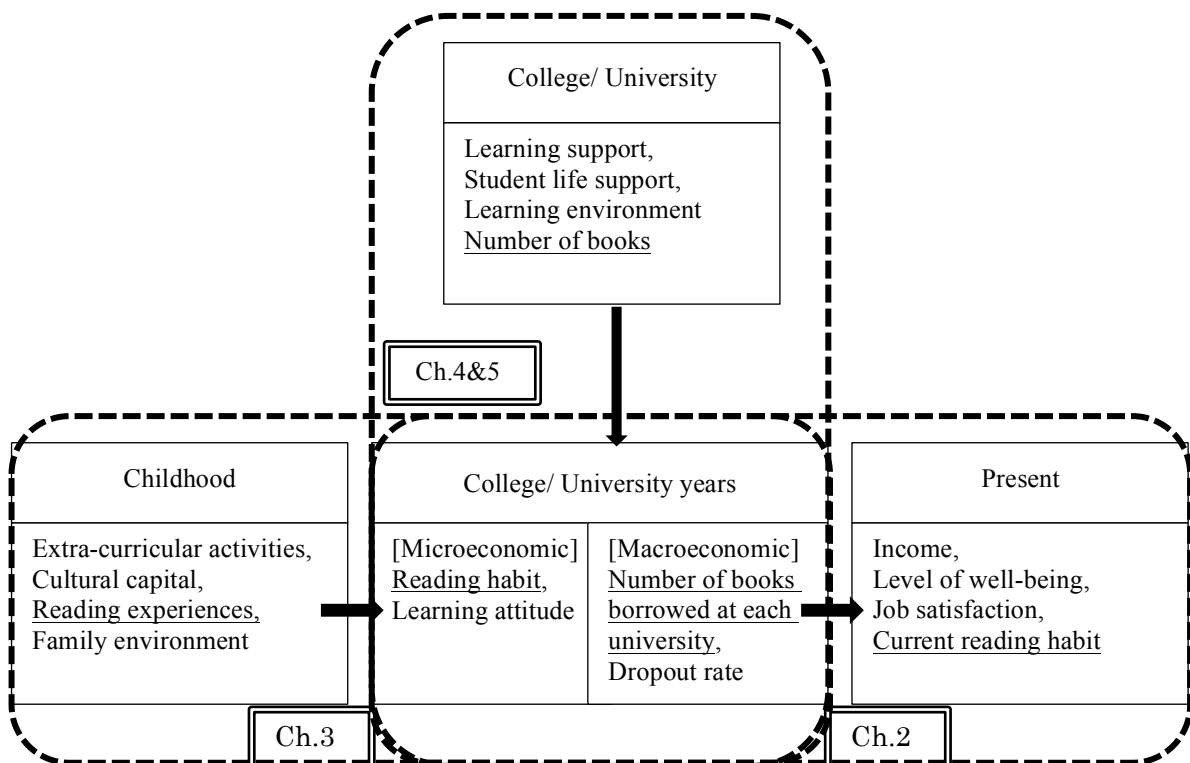
Table 1-6 depicts the framework of this paper based on these models. First, the empirical analysis in Chapter 2 specifically examines the outcomes of education experienced by individuals and identifies the effects of learning attitudes and reading habits in college on the current income, well-being, and job satisfaction based on the learning habit hypothesis presented by Yano (2009). The contribution of this paper in the field of education economics is to focus on learning experience and the non-monetary value.

Subsequently in Chapter 3, the types of potential effects that extra-curricular activities and various experiences including reading habits in childhood have on the students’ learning attitudes in college are examined while controlling such variables as the family background. Many studies have been conducted in the past on the potential

effects of cultural capital on educational achievement. In addition to these variables, this study is characteristic in the sense that it examines the effects of extra-curricular activities, such as calligraphy and abacus, that are unique to Japan, on students' learning in college. As a background, the study assumes that the non-cognitive skills acquired in pre-school education continue in college education and appears as a learning attitude.

Considering the analytical results of educational outcomes from such a microeconomic perspective, the outcomes of education from a macroeconomic perspective are examined by assuming them as the number of books borrowed and the dropout rate, which are the proxy variables of motivation for learning, for identification, the types of support that universities should provide their students with. First, in Chapter 4, using panel data, empirical analysis will be conducted of the effects that learning and student life environment of both public and private universities have on their dropout rates. Then in Chapter 5, considering that many universities are privately operated, empirical analysis will explore of the acquisition of the Subsidy for Current Expenditures to Private Institution of Higher Education and on-campus learning environment and student life environment. This dissertation presents specific examination of the importance of voluntary study habits such as book reading, a proxy indicator of motivation for learning, at all stages of life on both an individual level and a university level.

Table 1-6: Framework of the paper



Chapter 2: Empirical Analysis of Study Experiences at Colleges and Graduates' Career Paths and Subjective Well-Being

2.1 Introduction

In Japan, the percentage of high school graduates who continue their education at institutions for higher education reached 70.2% in 2013 (2013 School Basic Survey). Ongoing economic globalization increasingly requires human resources capable of communicating and negotiating with people from various countries and regions. Employers have growing expectations for the development of specialized human resources and improvement of the quality of education and research at institutions of higher education. How such institutions can ensure the quality of higher education and improve the skills of their students is a question that has arisen in recent years while numerous issues such as an increase in dropouts and a lack of expertise and communication skills of graduates when starting working for companies has become more severe.⁷

In 2012, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) issued a report “for universities developing skills to continue lifelong learning and for voluntary consideration in times of an unpredictable future” at a meeting of the Subcommittee on Universities of the Central Council for Education. In the report, ensuring the quality of education in undergraduate programs was stated as an important policy issue. As a major goal of university education, the report emphasized developing skills of young people and encouraging students to continue their lifelong learning and to discover or create optimal solutions to questions without answers under all circumstances (Anegawa, 2013).

Attempts to improve the quality of higher education and to measure such attempts using several techniques have been made in various forms by Hata, Yonezawa, and Sugimoto (2009), Yoshimoto (2007), and others. In the U.S. and Europe, too, several studies such as those by Gary Becker have been conducted to verify the effects of higher education on labor productivity from the perspective of human capital theory (OECD, 2008). Considering its relevance to Japan's technical skills and living standards,

⁷ Hata, Yonezawa, and Sugimoto (2009) conducted international comparisons of ensuring the quality of higher education.

verification of the effect of investment in higher education itself is an extremely important analytical theme, as evidenced by the fact that considerable amounts of budget resources are allocated to it.

The view that education improves the sense of happiness and welfare standards of persons who have received education, as reported by Uzawa and Noddings, cannot be ignored (Uzawa, 2000; Noddings, 2003). Oshio argued that education includes aspects of consumption in addition to aspects of investment, stating that “education as consumption not only is sublime, but enriches the learner’s life itself” (Oshio, 2003).

An important finding of a study conducted by Salmela-Aro et al. (2011) underscored the increased probability of achieving “work engagement” in the labor market that follows higher education as a result of “study engagement (adapting to a learning or social environment)” at the stage of higher education. The term “work engagement” in this case is defined as the state of willingly engaging in work and constantly feeling satisfaction, which is regarded as an important concept, along with the concept of job involvement, expressing the level of one’s involvement in the person’s job, and the concept of organizational commitment, indicating the level of one’s emotional attachment to the person’s organization, in the field of human resource management (Ulkira et al., 2006). As suggested by its definition, work engagement is closely related to people’s subjective perceptions and understanding (Schaufeli et al., 2002).⁸

The relevance between the motivation for learning in higher education and subjective well-being after graduation, however, has yet to be adequately studied in Japan, partly because of data restriction despite the research efforts undertaken overseas of Hartog and Oosterbeck (1998), Mora et al. (2007), and others. Although Yano (2009) presents an important case of examining the habit of learning at college and income levels after graduation, the study did not distinctly verify the relevance of learning habits to the difference between women and men and subjective well-being (sense of happiness and job satisfaction). The present study, therefore, empirically demonstrates how learning experience in college education is related to career paths after graduation, motivation for working, and life satisfaction based on a large-scale questionnaire survey.

This report is structured as follows. First, Section 2 provides an overview of relevant earlier studies. Section 3 presents descriptive statistics of the data and describes

⁸ Kalleberg (2003) examined differences in the work attitudes of Japanese and American manufacturing employees. His results showed strong commitment to work in Japan because of the organization and management of Japanese factories.

an examination of the relevance between college activities and job selection. Subsequently, Section 4 presents an overview of the empirical analysis and results of estimation and discusses the findings. Finally, Section 5 summarizes the results and discusses their policy implications.

2.2 Previous Research

Studies that analyzed the effect of education on people's sense of happiness include those by Hartog and Oosterbeek (1998) of the Netherlands, and Mora et al. (2007). First, Hartog and Oosterbeek (1998) performed an empirical analysis of how higher education, wealth, and health are related to people's sense of happiness using the generation born in the 1940s, considering the results of intelligence tests (IQ) and family composition. Higher education institutions in the Netherlands are broadly divisible into universities and higher vocational schools. The conclusion drawn from the estimation results was that people who had received education at high levels such as graduate schools did not necessarily create the highest wealth, best health, or most happiness. In other words, the effects of education on the sense of happiness were found to be limited in these cases.

Mora et al. (2007) pointed out that, based on questionnaire surveys on graduates of higher education institutions in Europe, factors such as the graduates' assessment of higher education they had received and applicability of such education provided by higher education institutions to the skills required of them in their current jobs exhibited significant positive correlation with their job satisfaction. These studies, however, did not analyze the level of voluntary educational activities of the students. Therefore, they did not necessarily explain the effects of motivation for education and the level of learning on the sense of happiness and job satisfaction after graduation, which leaves room for additional analysis.

Among the studies in Japan, the earlier described study by Yano (2009) presented a hypothesis called the learning habit effect and examined the relation between the level of enthusiasm in learning specialized subjects and culture in college and the graduates' current income. The estimation result obtained in the first half indicated that "enthusiastic learning" in college had not necessarily caused the current income. The result also suggested that factors having a strong correlation with an increase in income included the "level of enthusiasm about working," "current knowledge and skills," and "current level of enthusiasm about book reading." The data suggest the greater importance of experience and learning at the workplace than experience in college.

However, Yano (2009) emphasized the actual presence of indirect paths. In other

words, the author argues that the level of learning enthusiasm and reading experience in college have a positive correlation with the current knowledge and skills and book reading, and that learning and reading in college help improve the capabilities of learning and reading at the workplace and indirectly help increase their income. Yano (2009) maintained that the effects of college education on income were measurable as the accumulation of long-term learning experience, and emphasized the presence of such lifelong continuous learning paths. Collectively, they were named the learning habit effect of school education. A notable fact is that Yano (2009) claims that learning habits not only help increase income through learning that is directly related to work; they also enhance people's daily living including leisure and social activities.

This study therefore verifies, based on the Yano (2009) understanding of the issue, and using a large set of data, whether the relation between learning habits in college and subjective well-being is in fact observed, or not. In other words, this study uses a questionnaire survey to ascertain what types of education individuals experienced and how they were involved in higher education when they received such education. Furthermore, this study examines a series of variables (sense of happiness and job satisfaction) that indicate certain tendencies in the data and subjective well-being. Thereby, one can analyze the relation between the nature of higher education provided to the respondents and the objective variables, rather than the participants' simple educational background.

2.3 Study Experiences at College

2.3.1 Data

The data used for empirical analysis of this study are individual data from the internet survey "Questionnaire on the Living Environment of Residential Areas and Sense of Happiness (Japanese)" conducted in February 2011 and February 2012 through the MEXT Grants-in-Aid for Scientific Research project "Policy for Amending Income Inequality and Reforming Social Security Based on Happiness Analysis" led by Dr. Tachibanaki (FY 2010–2012) (8,058 respondents sample size; 68.3% return rate of the first survey; 69.7% return rate of the second survey).

This questionnaire asked the respondents to report details of their subjective well-being (sense of happiness, job satisfaction, etc.) and social and economic attributes such as income, educational background, occupation, their assessment of their residential areas, and characteristics of their jobs. The second survey included numerous questions asking about the knowledge and experience gained in college by respondents who had graduated from institutions of higher education such as college and junior

college.

Before administering this questionnaire survey, respondents were divided into 15 groups based on age (20s, 30s, 40s, 50, and 60s) and income (annual income of less than 3 million yen, between 3 million and 6 million yen, and more than 6 million yen) to ascertain the representativeness of Japan's population composition and to assess their attributes to the greatest extent possible. Subsequently, the population component ratio of each group was calculated based on the 2005 National Census and 2009 Comprehensive Survey of Living Conditions of the People on Health and Welfare. A sample corresponding to the actual population component ratio was selected randomly from the respondents, who had registered with a research company (Goo Research/NTT Resonant Inc.).

Note must be taken of some biases of this sample because of the nature of the online survey. First, the share of men in the original sample was slightly higher than half: 55.4%. Secondly, the educational background of the respondents was somewhat high, with approximately 50.2% of all respondents having a college or higher degree (According to the 2007 Basic Statistical Survey on Employment Structure, the percentage of people with a college or higher degree in the population aged 20–69 was 23.8%). Finally, the percentage of respondents living in Tokyo and neighboring areas was high at 35.6% (26.8% in the 2007 Comprehensive Survey of Living Conditions of the People on Health and Welfare). Therefore, results of estimation in this study must be interpreted in light of such biases.

The primary subject of analysis in this study is respondents in their 20s to 40s who graduated from college, junior college, or technical college and not currently a student. Those who do not answer questions that are important for analysis, such as their income, are excluded from analysis. As a result, the eventual sample size became 2,068 respondents (1,313 men, 755 women).

2.3.2 Studying in College Years

The Questionnaire on the Living Environment of Residential Areas and Sense of Happiness included questions eliciting knowledge and experience acquired by the respondents who had graduated from college, junior college, or technical college, during their time in college. More specifically, the key questions asked for the respondents' self-evaluation of activities in college (or junior college or technical college), book-reading experiences during college (or junior college or technical college) life, the level of knowledge and skills that had been acquired at the time of graduating from college (or junior college or technical college), and voluntary activities when selecting

classes to take in college, among others. The questions asked in this study relied considerably on questions used in the Survey of College Graduates (Japanese) used by Yano (2009)

This study specifically addressed the “active selection of classes,” “enthusiastic learning,” “experience of reading technical books,” and “association with excellent instructors” in the respondents’ learning experience during their college life and created dummy variables to indicate a high level of each item from the questionnaire.

First, the variable representing the “active selection of classes” is a dummy variable that assigns 1 to the respondents who answered either “focused to a considerable degree” or “focused to some degree” and assigns 0 to those who did not for either one of the two factors, “your interest in the subject and/or aspects of the subject” and “relevance to your future career path or area of expertise” in response to the question, “did you specifically examine the following when you selected the classes to take in college?” In other words, this variable measures whether the respondents seem to have been thinking independently and actively, rather than passively, when participating in their college classes.

Next, the variable of “enthusiastic learning” is a dummy variable that takes a value of 1 for respondents who answered either “rather enthusiastic” or “somewhat enthusiastic” and takes a value of 0 for those who did not for any one of the three factors, “subjects in your specialization (including research seminars),” “language studies,” and “general education subjects” in response to the request, “please make a self-assessment of the following factors in your college (or junior college or technical college) activities. This variable allows verification of the relation between the level of motivation for learning in college and other variables.

The variable of “experience of reading technical books” is a dummy variable that takes a value of 1 for respondents who answered “often read technical books” and that takes a value of 0 for those who did not in response to the request, “please make a self-assessment of your reading experience in your college (or junior college or technical college) life.” Yano (2009) asserts that book-reading experience during college years has a positive correlation with the amount of books read after the graduates start working. This study particularly examines the relation between reading experience in college and the respondents’ current subjective well-being (sense of happiness and job satisfaction).

The variable of “association with excellent instructors” is a dummy variable that assigns 1 to respondents who answered “yes” and assigns 0 to those who did not in response to the question, “in your life so far, have you met a college instructor who has

affected the way you live?” This variable is used to assess the effect of association with instructors when examining the relation between learning in college and current subjective well-being.

Additionally, in terms of acquiring knowledge and skills useful in the current labor market, dummy variables were created for the factors, “have problem-solving skills,” “have communication skills,” and “have specialized knowledge acquired in college,” based on the responses to the request, “please make a self-assessment of your current acquisition of knowledge and skills.” All of these variables assign 1 to respondents who selected “acquired to a considerable degree” or “acquired to some degree” from the options and assign 0 to those who did not. For the aspect of “reading technical books,” a dummy variable that assigns 1 to the respondents who answered that they “often read” “business books” or “technical books” in response to the request, “please make a self-assessment of the amount of book you currently read.” The use of these variables of “current knowledge, skills, and learning” in quantitative analysis allows the examination of the types of paths through which learning experiences in college affect subjective well-being.

Table 2-1 presents simple descriptive statistics by sex of dummy variables used for later quantitative analysis. Table 2-1 presents some characteristics. First, the age distribution differs significantly between male and female respondents because of the limitation of the sample to people who have completed higher education such as college and junior college. Secondly, employment statuses also differ substantially between the male and female respondents. The percentage of male respondents without a job is 16%; that of female respondents is 38%. The third characteristic, which is evident in the learning during college years, is that the average values of the dummies of “active selection of classes” and those of “enthusiastic learning” of the female respondents are higher than those of the male respondents. The average value of the dummies of “experience of reading technical books” of the male respondents is higher than that of the female respondents. The dummies of “association with excellent instructors” are not significantly different between male and female respondents. Finally, the results for subjective well-being indicate that the average sense of happiness of the female respondents is more than 10% higher than that of the male respondents. Moreover, job satisfaction of female respondents is also slightly higher than that of the men.

2.3.3 Job Choice and Studying in College Years

Table 2-2 presents results of *t*-tests of differences in the average values related to the relation between learning in college and current work of the respondents (in their

20s to 40s) who had completed higher education. In this case, it is examined whether the percentage of 1 assigned by the dummies of “active selection of classes,” “enthusiastic learning,” “experience of reading technical books,” and “association with excellent instructors” indicated a significant difference by particularly addressing “whether having a job,” “form of employment (regular or irregular employment),” “type of job (as a specialist or non-specialist),” and “wages (above or below the average).”

The following describes the findings presented in the table. First, regarding the aspect of whether a person has a job or not, women working at a job tended to have had more “experience of reading technical books” and “association with excellent instructors” when they were in college than people in other groups. No significant correlation was found for men between their learning habits while in college and whether the men have a job at present.

Secondly, when particularly addressing the selection between regular employment and irregular employment when the sample is limited to employees working at a job, it is apparent that more female irregular employees reported “active selection of classes” while in college than regular employees did. The correlation in this case, however, might be affected by other attributes such as the type of job, age, and marital status. Later quantitative analyses must be performed while controlling such factors.

The third finding is that both male and female respondents having a specialized job were more likely to have had learning habits in almost all aspects, including “active selection of classes,” “enthusiastic learning,” “experience of reading technical books,” and “association with excellent instructors.” In other words, a strong positive correlation was found between the development of learning habits in college and future career development, particularly including work at a specialist job.

Finally, no significant correlation was found between the current wage level and the level of learning habits in college of both male and female respondents. Positive correlation at the 10% significance level was found for male respondents.

2.4 Econometric Analysis

2.4.1 Learning Habits and Subjective Well-being

Figure 2-1 exhibits the relation between the learning habits of the respondents (in their 20s to 40s) while in college and their current subjective well-being. Figure 2-1 displays the average level of job satisfaction for each gender group based on the values (either 0 or 1) of the dummies of “active selection of classes,” dummies of “enthusiastic learning,” and dummies of “association with excellent instructors.” The figure reveals that the respondents having a dummy variable value of 1 for all three variables are more

satisfied with their jobs than those who do not. As argued by Uzawa and Noddings, therefore, involvement in education is more likely to contribute to a higher sense of happiness and level of well-being (Uzawa, 2000; Noddings, 2003). The next section will introduce an ordered probit model using multiple econometric models to assess whether these tendencies would remain when characteristics inherent in the work and household attributes are controlled, and whether such tendencies affect subjective well-being through indirect paths by giving certain effects on the characteristics of the work.

2.4.2 Estimation Results

Considering the certain correlation existing between the learning experience during college years and current subjective well-being (sense of happiness and job satisfaction), in this section, we examine whether such a correlation is significant even when other important variables regarded as affecting subjective well-being are controlled. For this purpose, we conduct ordered probit estimation by limiting the respondents to working people in their 20s to 40s and specifying job satisfaction (five levels) as the explained variable. Also, we specify the sense of happiness (five levels) as the explained variable. Table 2-3 presents results of the ordered probit estimation of job satisfaction by model and by sex. In this case, four econometric models are analyzed for each sex.

First, the following describes findings presented in Table 2-3. Model 1-1 (men) and Model 2-1 (women) represent the results of ordered probit estimation using only four important dummy variables of learning habits as the explanatory variables. The estimation result shows that the dummy variables of “active selection of classes” and “experience of reading technical books” of the male respondents have a positive correlation with job satisfaction. For the women, however, only the dummy of “association with excellent instructors” showed relevance to job satisfaction. Then variables of age group and employment status are added to Model 1-1 (men) and Model 2-1 (women), which yield Model 1-2 (men) and Model 2-2 (women), respectively. As a consequence, the dummies of “enthusiastic learning” of the female respondents have changed to a form that has a significant positive correlation with job satisfaction. Model 1-3 (men) and Model 2-3 (women), which resulted from adding the variables of type of job and wage level to Model 1-2 (men) and Model 2-2 (women), respectively, however, do not indicate a correlation between women’s dummies of “enthusiastic learning” and job satisfaction. Men’s dummies of “experience of reading technical books” also become non-significant.

We performed further estimation using Model 1-4 (men) and Model 2-4 (women)

developed by adding the dummy variables of current knowledge and skills and book reading to Model 1-3 (men) and Model 2-3 (women), respectively, to assess the relevance between learning at college and current acquisition of skills and knowledge. The result is that the male respondents who demonstrated high levels of communication skills and technical knowledge learned in college and who are currently reading technical books exhibited a significantly higher level of job satisfaction than others. Regarding the female respondents, those with a high level of communication skills tended to show a higher level of job satisfaction. Regarding the level of learning in college, men's "active selection of classes" remained positive and significant, although women's "association with excellent instructors" was not significant.

In summary, male respondents demonstrated a strong correlation between their "active selection of classes" and job satisfaction, which might reflect, as argued by Salmela-Aro et al. (2011), the achievement of study engagement that might positively affect subjective well-being through the subsequent achievement of work engagement in the labor market. The "association with excellent instructors" of the female respondents might have affected their job satisfaction through improvement of communication skills and other skills. However, the correlation between their voluntary learning activities and book reading during college years and job satisfaction proved to be weak.

In other words, learning experience in higher education correlates also with the respondents' well-being in their current jobs. Male respondents tend to show more relevance of active and voluntary learning to their subjective well-being, whereas the female respondents indicate more relevance of passive experience to their subjective well-being, namely "association with excellent instructors."

Table 2-4 presents an overview of the statistical significance of the relevance of learning during college years to the current knowledge and skills, book reading, and wages, as estimated by sex using a logit model, which suggests a positive correlation between voluntary learning and reading experience during college years and various current skills and knowledge. Among the male respondents, particularly those who were making "active selection of classes" in college are indicated as earning a high income in the current labor market.

Subsequently, the following describes the findings from Table 2-5, in which the sense of happiness is the explained variable. The first models, Model 1-1 (men) and Model 2-1 (women), present results of the ordered probit estimation using only four dummy variables of learning habits as explanatory variables. Model 1-2 (men) and Model 2-2 (women) yield results of estimation, in which these important variables are

added with household attributes (“marital status” and “presence of a preschool child”). In addition, Model 1-3 (men) and Model 2-3 (women) are econometric models that consider not only household attributes, but employment status, type of job, and wage level as the explanatory variables.

Table 2-5 reveals results that are similar to the result of estimation using job satisfaction as the explained variable shown in Table 2-3. In other words, the male respondents demonstrate a strong positive correlation between their “active selection of classes” during college years and the sense of happiness. The female respondents show a positive correlation between their “association with excellent instructors” in college and the sense of happiness. Different from the case of job satisfaction, the male respondents also show positive significance of “association with excellent instructors” in all econometric models. It is noteworthy that the female respondents exhibit a positive correlation with the sense of happiness in their “enthusiastic learning.” Surprisingly, however, female respondents having more “experience of reading technical books” than others tend to indicate less sense of happiness. Investigation into the causes of this result is left as a subject for the authors’ future research. Additionally, whereas the men display a certain correlation of their “experience of reading technical books” with job satisfaction, no model reveals statistical significance of their sense of happiness.

2.5 Conclusion

This study empirically investigated the relevance of learning experiences in college education to career paths after graduation, motivation for working, and life satisfaction using a large database. Results revealed high levels of job satisfaction and overall sense of happiness of both male and female respondents who had acquired a habit of studying during their college years, even when household and job attributes were controlled. As pointed out by Salmela-Aro et al. (2011), such a result suggests the possible contribution of study engagement (adapting to a learning or social environment) at the stage of higher education to the improvement of subjective well-being through the increased possibility of achieving work engagement in the subsequent labor market. Furthermore, the male respondents who had been making “active selection of classes” in college were earning a high income in the current labor market.

The female respondents, however, indicated some cases in which their habit of studying in college did not have a strongly significant relation with their job satisfaction. Although detailed examination into the causes of this result will be left for the authors’ future research, as pointed out by Nozaki (2010), the difference in the characteristics of

labor between men and women in Japan might complicate the linkage between learning in college and working in the labor market.

Certain relevance between motivated, voluntary learning and people's well-being was discovered through empirical analysis. The analysis, however, also suggested little relevance of factors such as the "enthusiastic learning" of male respondents and "active selection of classes" of female respondents to their current sense of happiness and job satisfaction. This lack of relevance might partly be a result of certain problems with the current method of education aiming to increase student's motivation for voluntary learning and independence practiced by the institutions for higher education. The practice of evaluating the quality of education provided by instructors at higher education institutions and attitudes of students receiving higher education has not been well-accepted in Japan. More often it has been avoided. Even today, many educational institutions are reluctant to disclose information publicly about their education practices, class evaluation, etc. Further development of detailed data related to higher education in the future is expected to facilitate widely diverse research into how the practices of higher education are related to factors such as increased students' motivation for learning, use of their skills after graduation, and improvement of their QOL.

Table 2-1: Descriptive statistics of variables

	Male (n=1313)				Female (n=755)			
	Average	St.d	Min.	Max	Average	St.d	Min.	Max
[Age group]								
20s	0.162	0.369	0	1	0.393	0.489	0	1
30s	0.451	0.498	0	1	0.388	0.488	0	1
40s	0.387	0.487	0	1	0.219	0.414	0	1
[Labor status]								
Company/organization executives	0.032	0.176	0	1	0.004	0.063	0	1
Regular full-time workers	0.772	0.420	0	1	0.355	0.479	0	1
Non-regular workers	0.077	0.267	0	1	0.252	0.434	0	1
Self-employed	0.072	0.259	0	1	0.036	0.186	0	1
Other job	0.008	0.087	0	1	0.026	0.161	0	1
Nonwork	0.040	0.195	0	1	0.327	0.469	0	1
[Job type]								
Specialist	0.353	0.478	0	1	0.159	0.366	0	1
[Income]								
Personal wage income (million yen)	5.395	3.249	0	18	1.803	1.887	0	15
[Learning in College]								
Active selection of classes	0.347	0.476	0	1	0.486	0.500	0	1
Enthusiastic learning	0.530	0.499	0	1	0.664	0.473	0	1
Experience of reading technical books	0.395	0.489	0	1	0.360	0.480	0	1
Association with excellent instructors	0.194	0.396	0	1	0.219	0.414	0	1
[Current learning ability]								
Ability to solve problems (high)	0.401	0.490	0	1	0.367	0.482	0	1
Communication skills (high)	0.478	0.500	0	1	0.528	0.500	0	1
Specialized knowledge (high)	0.594	0.491	0	1	0.648	0.478	0	1
Reading books (high)	0.359	0.480	0	1	0.224	0.417	0	1
[Subjective well-being]								
Happiness (high)	0.425	0.495	0	1	0.544	0.498	0	1
Labor satisfaction (high) (only working persons)	0.503	0.500	0	1	0.558	0.497	0	1

(Note) Calculated from *Survey on Regional life environment and Happiness*.

Table 2-2: t-tests related to the relation between learning in college and current work of the respondents

	Active selection of classes		Enthusiastic learning		Experience of reading technical books		Association with excellent instructors	
	Male	Female	Male	Female	Male	Female	Male	Female
Working	34.6%	48.6%	53.1%	67.3%	39.7%	38.4%	19.7%	24.6%
Nonworking	38.5%	48.6%	51.9%	64.4%	36.5%	31.2%	13.5%	16.2%
t-value	-0.58	0.01	0.16	0.80	0.45	1.94 +	1.11	2.63 **
Regular	33.5%	44.4%	53.2%	67.5%	38.5%	35.8%	20.1%	24.6%
Nonregular	39.6%	52.9%	55.9%	66.2%	40.5%	42.9%	20.7%	23.8%
t-value	-1.30	-1.84 +	-0.53	0.31	-0.42	-1.57	-0.15	0.21
Specialist	40.6%	55.0%	59.2%	78.3%	48.6%	50.8%	25.5%	35.8%
Nonspecialist	31.5%	47.4%	49.6%	64.1%	34.6%	33.2%	16.1%	19.2%
t-value	3.31 **	1.53	3.32 **	3.04 **	5.00 **	3.71 **	4.12 **	4.08 **
High wage	38.1%	48.7%	53.7%	70.6%	41.3%	38.4%	21.1%	26.7%
Low wage	33.3%	48.6%	52.8%	65.4%	39.0%	39.3%	19.1%	23.4%
t-value	1.61 +	0.01	0.27	1.20	0.75	-0.53	0.79	0.85

(Note) ** p<0.01, * p<0.05, + p<0.1

Figure 2-1: Learning habits of the respondents while in college and their current labor satisfaction

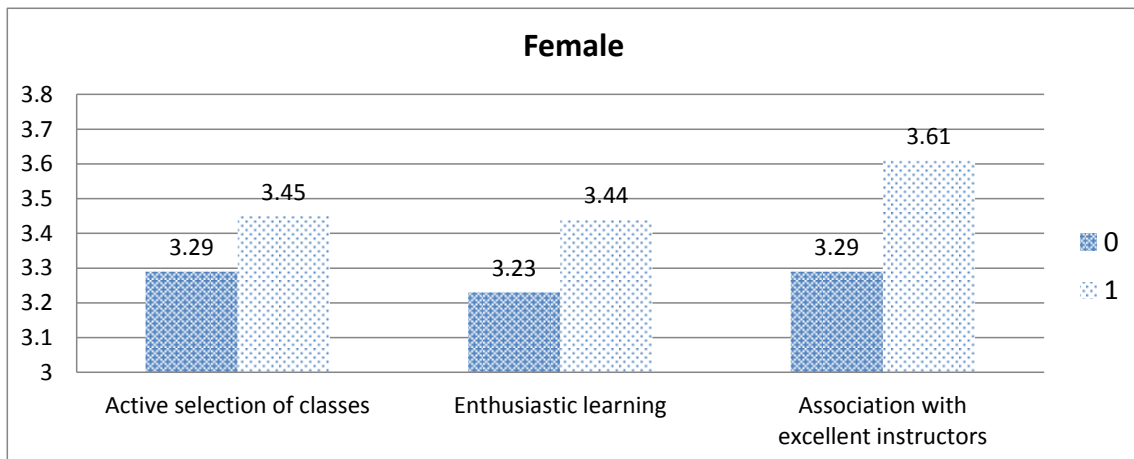
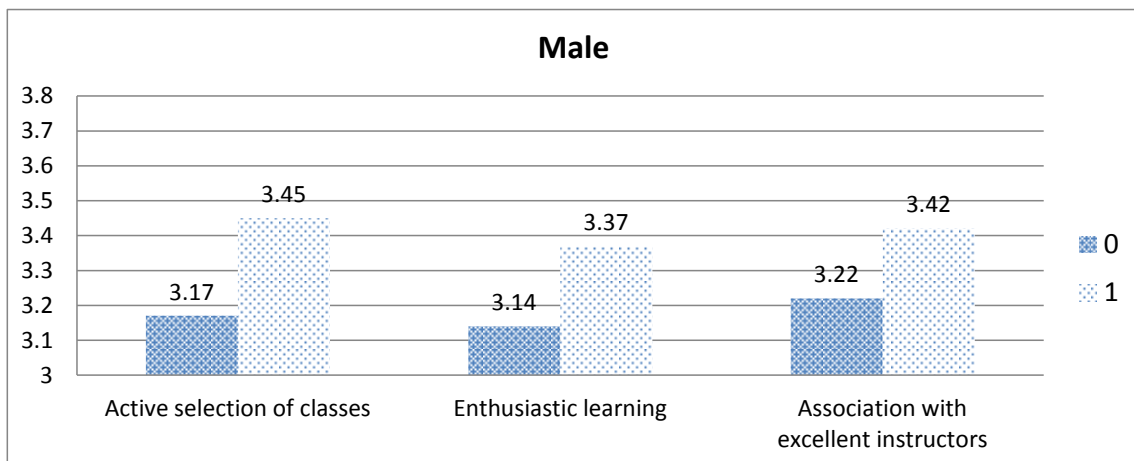


Table 2-3: Ordered probit estimation related to learning in college and current labor satisfaction

[Dependent variable]	Model.1-1	Model.1-2	Model.1-3	Model.1-4	Model.2-1	Model.2-2	Model.2-3	Model.2-4
Labor satisfaction (1-5)	Male				Female			
[Age group] (ref: 30s)								
20s		-0.230*** (0.089)	-0.0873 (0.0916)	-0.0662 (0.0919)		-0.175 (0.112)	-0.122 (0.116)	-0.105 (0.116)
40s		-0.0605 (0.0663)	-0.195*** (0.0701)	-0.196*** (0.0704)		-0.0322 (0.137)	-0.0419 (0.137)	-0.0322 (0.138)
[Job status] (ref: regular workers)								
Company/organization executives		0.105 (0.170)	0.0218 (0.172)	0.0186 (0.172)		0.211 (0.622)	0.108 (0.624)	0.0422 (0.628)
Nonregular workers		-0.483*** (0.115)	-0.237* (0.122)	-0.248** (0.122)		0.110 (0.106)	0.250** (0.126)	0.227* (0.127)
Self-employed		-0.0535 (0.115)	0.133 (0.119)	0.101 (0.120)		0.662*** (0.226)	0.761*** (0.233)	0.704*** (0.234)
Other job		-0.211 (0.378)	0.161 (0.383)	0.172 (0.385)		0.0910 (0.273)	0.277 (0.291)	0.302 (0.292)
Specialist			0.0501 (0.0641)	0.0344 (0.0651)			0.198* (0.119)	0.212* (0.120)
Personal income (million yen)			0.0727*** (0.0120)	0.0639*** (0.0121)			0.0624* (0.0341)	0.0513 (0.0344)
[Learning in College]	0.224*** (0.0693)	0.234*** (0.0695)	0.221*** (0.0698)	0.163** (0.0712)	0.117 (0.102)	0.0899 (0.103)	0.0945 (0.103)	0.109 (0.104)
Active selection of classes								
[Learning in College]	0.0847 (0.0680)	0.0894 (0.0682)	0.0903 (0.0683)	-0.00416 (0.0749)	0.176 (0.112)	0.193* (0.114)	0.177 (0.115)	0.156 (0.127)
Enthusiastic learning								
[Learning in College]	0.154** (0.0687)	0.144** (0.0693)	0.104 (0.0699)	-0.0284 (0.0764)	-0.00857 (0.109)	0.00828 (0.111)	0.00126 (0.111)	-0.0447 (0.122)
Experience of reading technical books								
[Learning in College]	0.0918 (0.0797)	0.0949 (0.0801)	0.0929 (0.0803)	0.0265 (0.0815)	0.248** (0.119)	0.263** (0.120)	0.238* (0.122)	0.192 (0.125)
Association with excellent instructors								
[Current learning ability]				0.118 (0.0742)				-0.0257 (0.118)
Ability to solve problems								
[Current learning ability]				0.171** (0.0685)				0.281** (0.117)
Communication skills								
[Current learning ability]				0.140* (0.0777)				-0.0894 (0.133)
Specialized knowledge								
[Current learning ability]				0.242*** (0.0707)				0.135 (0.126)
Reading books								
Log likelihood	-1774.6	-1760.6	-1741.2	-1724.6	-676.1	-669.4	-665.9	-662.1
N	1,245	1,245	1,245	1,245	479	479	479	479

(Note) *** p<0.01, ** p<0.05, * p<0.1

Table 2-4: Overview of the relevance of learning during college years to the current knowledge and skills, study habits, and wages (logit model)

Male						
	[Present]	Dependent variable				Wage (log)
		Ability to solve problems	Communication skills	Specialized knowledge	Reading technical books	
Explaining variables [Learning in College]	Active selection of classes	***	***	***	***	***
	Enthusiastic learning	***	***	***		
	Experience of reading technical books	***		***	***	
	Association with excellent instructors	***	***	***	***	
Female						
	[Present]	Dependent variable				Wage (log)
		Ability to solve problems	Communication skills	Specialized knowledge	Reading technical books	
Explaining variables [Learning in College]	Active selection of classes			***		
	Enthusiastic learning	***	***	***		*
	Experience of reading technical books			***	***	
	Association with excellent instructors	***	***	***	***	

(Note) Age and job status variables are controlled. *** p<0.01, ** p<0.05, * p<0.1

Table 2-5: Ordered probit estimation related to learning in college and sense of happiness

[Dependent variable]	Model.1-1	Model.1-2	Model.1-3	Model.2-1	Model.2-2	Model.2-3
Happiness (1-5)	Male			Female		
20s	-0.399*** (0.0856)	-0.0633 (0.0914)	0.0102 (0.0932)	-0.281*** (0.0890)	-0.0477 (0.0956)	-0.0149 (0.0991)
40s	-0.0109 (0.0646)	-0.0740 (0.0684)	-0.175** (0.0719)	-0.0661 (0.105)	-0.0861 (0.110)	-0.0906 (0.110)
Spouse		0.698*** (0.0730)	0.535*** (0.0771)		0.653*** (0.102)	0.758*** (0.113)
Children (preschool)		0.213** (0.0986)	0.239** (0.0991)		0.09 (0.119)	0.125 (0.122)
Company/organization executives			-0.0839 (0.172)			-0.847 (0.629)
Non-regular			-0.313*** (0.121)			0.0994 (0.122)
Self-employed			0.103 (0.121)			0.301 (0.225)
Other job			0.586* (0.349)			-0.156 (0.269)
Nonwork			-0.398** (0.165)			0.0144 (0.154)
Specialist			-0.0442 (0.0647)			0.0695 (0.116)
Personal income (million)			0.0590*** (0.0123)			0.0576* (0.0327)
Active selection of classes	0.253*** (0.0679)	0.255*** (0.0684)	0.271*** (0.0688)	0.00832 (0.0812)	-0.00336 (0.0818)	-0.00871 (0.0826)
Enthusiastic learning	0.0367 (0.0668)	0.0660 (0.0674)	0.0618 (0.0677)	0.158* (0.0887)	0.183** (0.0893)	0.199** (0.0901)
Experience of reading technical books	-0.00304 (0.0674)	0.0191 (0.0679)	-0.0196 (0.0689)	-0.187** (0.0865)	-0.152* (0.0873)	-0.159* (0.0882)
Association with excellent instructors	0.167** (0.0788)	0.139* (0.0794)	0.143* (0.0799)	0.327*** (0.100)	0.386*** (0.101)	0.372*** (0.102)
Log likelihood	-1654.8	-1591.4	-1563.7	-943.5	-912.2	-906.6
N	1,313	1,313	1,313	755	755	755

(Note) *** p<0.01, ** p<0.05, * p<0.1

Chapter 3: Extracurricular Activity Effects on Academic Achievement and Learning Motivation at Universities

3.1 Introduction

Elementary and secondary education in Japan has changed considerably in recent years. The Japanese government fundamentally revised the official curriculum guidelines in 2008. To enrich communication capability through training of image-based expression, dance instruction became mandatory in junior high school gym classes (7th – 9th grade students).

Similarly, in music class, children are provided various opportunities to enjoy traditional music to foster their sensitivity, to cultivate their musical abilities, and to refine their tastes. Previously, students had been taught mainly the western music at school, but now they have more chances to play traditional instruments, such as *Shamisen and Koto*, as well as other countries' instruments such as woodwind and stringed instruments.

Soon after the end of the World War II, children, especially girls, who were able to learn traditional Japanese instruments such as *Koto* or *Shamisen* were regarded as being from wealthy families. However, high economic growth in Japan after the war caused a drastic change for kids' extracurricular activities. The income levels of middle-class people increased in the 1970s–1980s, which enabled more children to take cultural lessons such as piano lessons.

Pierre Bourdieu developed the concept of habitus, emphasizing that differences in levels of 'cultural capital' cause differences among social classes (Bourdieu, 1973). Many researchers have used his theories, devoted attention to the reproduction of the social stratification, and tried to elucidate the relation between 'cultural capital' in early childhood and outputs after school attendance such as educational attainment (De Graaf, 1988; De Graaf et al., 2000; Buis, 2013).

In Japan as well, various studies examining the effects of cultural capital have been accumulated (Miyajima and Fujita, 1991; Kataoka, 2001). For example, Kataoka (2001) investigated how family's social status, cultural capital at home, and the number of siblings affect children's academic records and school enrollment. Her results demonstrated that people with a higher level of cultural capital at 15 years old tend to

achieve higher academic scores in the ninth grade and the admission to elite high schools.

Many studies have been conducted to elucidate how cultural experiences at an early stage influence their future educational attainment. These studies specifically examined the impacts on their academic records at educational institutions, which are alternative variables of educational performance (De Graaf, 1988; Buis, 2013). However, a main goal of education, as reported by MEXT at the Central Education Council in 2013, is to “foster the ability to learn continuously and to find the best solution for any problems.” It is therefore necessary to grasp the impact of formal education, non-formal education, and cultural experience at home on learning motivation and problem-solving faculties as well as academic records.

However, at present, few studies have examined the relations among the level of cultural capital in early childhood, learning motivation, and problem-solving ability in adulthood. Based on awareness of these problems, this study specifically examines the relation between early childhood cultural experiences and the level of learning indicators such as learning motivation and the amount of reading done at university. By particularly addressing the learning situation of higher education, it enables to examine whether cultural capital and extra-curricular activities in early childhood significantly and continuously affect learning motivation.

This article is structured as follows: Section 3.2 presents an overview of previous studies and describes the main contribution of this research. Section 3.3 explains the methodology and data used for analysis in this study. Section 3.4 outlines the econometric model and estimated results. Section 3.5 concludes the study and presents future prospects.

3.2 Previous Research

The Benesse Education Research and Development Institute conducted a survey of mothers with children aged 16–18 years old in 2009 and 2013. The survey asked about their children’s extracurricular activities and their views of education. Results show that today’s parents spend less money on extracurricular activities for their children. The monthly average was about 15,000 yen in 2013: 1,700 yen less than in 2009. That decrease is greater for girls than for boys, and is greater for children over 13 years old than for children under 12, but for out-of-school learning activities such as cram schools, expenditures were little changed in these years. More than 30% of children of 7–12 years old chose swimming school; 23.9% took musical instrument lessons in 2013. Many mothers facing severe budget constraints wish to spend more money on artistic or

sports lessons for their children.

Many studies investigating how artistic or sports lessons influence personal capabilities have been reported (Winner and Cooper, 2000; Michalos and Karlke, 2008; Pfeifer and CorneliBen, 2010). For example, Pfeifer and CorneliBen (2010) analyzed the impact of childhood sports activities on educational attainment based on the theoretical framework explaining the relation between allocation of time and educational productivity. Using the German Socio-Economic Panel (GSOEP) dataset, they applied generalized ordered probit models to estimate the effects of participation in sport activities on secondary school degrees and professional degrees. Even after controlling for important variables and selection related to sports, they found strong evidence of significant and positive effects of sports on educational attainment.

In the Japanese case, Kataoka (2001) examined how various factors such as the family's social status, cultural capital at home, and the number of siblings can influence academic records at 15 years old. She found significant correlation between the level of cultural capital and educational attainment. Moreover, she reveals a gender gap in the impacts of education and extracurricular activities. Women who have many cultural experiences such as enjoying classical music or arts can achieve higher school records and higher academic background, although men with such experiences in childhood are not as affected as women. Apparently, the profit from cultural experiences differs greatly by gender. Similar research was conducted nationwide in Canada (Smithrim and Upitis, 2005).

Several earlier studies show the strong impacts of cultural experiences and extracurricular activities on people's well-being and capabilities. However, few empirical studies have examined the relation between personal cultural experiences in childhood and a person's continuous motivation for learning. A particular cultural experience could have prolonged impacts on the ability to study more actively. For example, students who used to take piano lessons in early childhood might have a high tendency to learn in a positive attitude at the stage of higher education. In that case, it is possible to evaluate positively government educational and cultural policies to prompt extracurricular activities.

Related to students' motivation for learning, Yano (2009) reported that students who have good learning and reading habits at college can use these habits in the workplace, and can earn higher salaries than people not having such learning and reading habits. Based on results obtained using the path analysis, he presents a hypothesis called "the effect of learning habits."

Some studies have indicated that students' motivation for learning at higher

education, learning habits, and academic goals affect their learning process and show negative correlation with students' withdrawal from university (Tinto, 2006).

3.3 Methodology

3.3.1 Hypothesis

In the analysis, this study sets three hypotheses based on Bourdieu's theories(1993) and estimated results of earlier studies.

(H1) Extracurricular activities such as sports and music lessons in early childhood as well as the level of cultural capital at home positively affect self-motivated learning activities at the higher education stage.

(H2) Parental educational attitudes for children are highly related to children's self-motivated learning activities by prompting the accumulation of cultural capital.

(H3) Effects of cultural experiences and parental education on self-motivated learning activities differ by gender and age status even after controlling for family background, class, and original personality traits.

To examine whether the hypotheses above are valid or not, this study sets several econometric models and draw the parameters from the models.

3.3.2 Data

The individual data this study used for our empirical analysis were obtained from a *survey of regional life environment and happiness*, funded by MEXT and Japan Society for the Promotion of Science. The nationwide internet survey was administered in Japan in February 2011. The sample comprises 3,273 women and 2,785 men from 20s to 60s. The survey includes the information for educational and cultural experiences in widely various life-stages as well as demographic and socioeconomic statuses. In addition, it can grasp personality traits by Big 5 inventory items which were originally made by Goldberg (1992).

It is noteworthy that data collected from this internet survey had three important biases. First, the gender proportion was skewed somewhat toward men, who were 55.4% of respondents. Second, the respondents were more educated than the actual population; approximately 51% had graduated from college or had some higher education, which was well above the 28% of the actual population aged 20–69 years

(*Employment Status Survey* of 2012). Third, 35% of respondents lived in the Tokyo Metropolitan Area, which is higher than the 28% of the population of Japan who actually live there (according to the *Comprehensive Survey of Living Conditions of the People on Health and Welfare* of 2011). Because of these biases, caution is necessary when interpreting the estimated results. However, the distributions of age and household income did not differ significantly from the actual distributions. In this analysis, this study specifically focus on the younger generation (20s-40s).

3.3.3 Variables to be used

Dependent variables

This study sets three dependent variables for this study: ‘Self-motivated choice of class at college’, ‘Eagerness to study’, and ‘Reading habits in college days’. These are the measures of attitudes toward learning in college days.

First, regarding ‘Self-motivated choice of class at college’ this study used a question that asks which factors were influential on their choice of class at college. The question consists of five items at four levels (1–4): 1. Interest in contents and subjects, 2. Class reputation, 3. Influence of friends (whether their friends also take the same class or not), 4. Grading method (whether it is easy to get course credit or not), and 5. Relevance to their career and major. Among these five factors, this study used the first and fifth items and scored them, using the values of the first component estimated by principal component analysis (PCA). From these variables, it enables to confirm the degree of learning motivation which respondents have when they choose classes at college.

Second, related to the variable ‘Eagerness to study’, this study uses self-assessment for a question that asks how much respondents specifically contend with the following activities during student life to estimate the level of learning motivation: 1. Major subjects, 2. Language course, 3. Liberal arts, 4. PE, club and circle activities, and 5. Part-time job. This study used items 1, 2, and 3 as indicators of ‘Eagerness to study’ and estimated the first component by PCA because these items are regarded as closely related to positive learning at university.

Third, regarding ‘Reading habits in college days’ this survey asked respondents about their experiences of reading books from genres of business books and technical books at university, and this study used the answered result. Yano (2009) points out that ‘Reading habits in college days’ might be related to their performance in labor market. Reading habits are reportedly formed gradually through various cultural experiences from childhood. They can be expected to affect learning habits.

In later analysis, the above three variables are all transformed into dummy variables, taking one when their values surpass their average scores.

Key Independent Variables

For key independent variables, this study set three types: (1) Cultural capital (1. Early childhood cultural experiences at home [Embodied cultural capital], 2. Cultural goods at home in early childhood [Objectified cultural capital], and 3. Parental academic backgrounds [Institutionalized cultural capital]), (2) Other parents' and teachers' influence, and (3) Extracurricular activities (Music, Sports, Calligraphy and Cram school).

(1) Cultural capital

Based on the Bourdieu's concept of three types of cultural capital (1973), Kataoka (2001) constructed the path-analysis model to analyze the relations between the family background and the children's educational attainments during junior high school, particularly addressing the differences of the family's educational strategies. This study also used the same three variables as indicators of cultural capital: 1. Early childhood cultural experiences at home, 2. Cultural goods at home in early childhood, and 3. Parental academic background status⁹.

The variables of the embodied cultural capital representing the cultural experiences in early childhood were constructed by two answer results on whether parents often took respondents to art museums/art galleries, theater, and classical music in early childhood (Cultural experiences), and whether family members often read books to respondents in childhood or not (Reading experiences). The dummy variable according to the reply to the question values one when a respondent had cultural and reading experiences better than average.

Concerned the variable of cultural goods at home in early childhood which shows the objectified cultural capital, the principal component score was calculated, using the answer results regarding items on cultural resources in the home when the respondent grew up (piano/ the collections of literature, encyclopedia, and pictorial books / the complete series of art works when the respondent was aged 15).

⁹ Each indicator is based on Bourdieu's theory of cultural capital; cultural experiences applies to 'Embodied' capital, cultural goods apply to 'Objectified' capital, and parents' academic background corresponds to 'Institutionalized' capital.

Third, the dummy variables of academic backgrounds of each parent representing institutionalized cultural capital are set to one if a parent graduated from undergraduate or graduate school.

(2) Other parents' and teachers' influence

As a second key variable, this study used household income when a respondent was aged 15. However, collecting the exact numerical value from the survey is difficult, so this study used the answer results, which show evaluations for respondents' standard of living at home at 15 years old. Three dummy variables (high, middle, and low) were made according to the living standard level. Furthermore, as a key difference from previous research, a dummy variable was produced which is related to parents' educational attitude: "Whether parents were helpful to extracurricular activities."

Additionally, this study used variables representing the degree of communication with teachers at several stages of education. In the survey, a respondent was asked whether he/she had experience of meeting a teacher who left a deep impression on their life at each stage of school: elementary school, junior high school, high school, and college. Two dummy variables were set for inspirational teachers during compulsory education (at elementary and junior high school) and for those at high school and college. These variables are regarded as playing vital roles in connecting the childhood cultural experience and extracurricular activities with later learning motivation at university.

(3) Extracurricular activities

Regarding extracurricular activities, this study used responses to questions asking about activities that respondents engaged in for more than 6 months before compulsory education. The survey asked about 10 items for extracurricular activities: 1. Cram school, 2. Private tutor, 3. Sports training (e.g. swimming, baseball, soccer), 4. Music school/Painting/Ballet lessons, 5. Sado (Japanese traditional tea ceremony)/Kado (Japanese traditional flower arrangement), 6. English or other language school, 7. Calligraphy/Abacus, 8. Boy scouts/Girl scouts, 9. Others, and 10. Nothing. The selected answer results were items of 1, 3, 4, and 7 in the multivariate analysis, producing dummy variables for each category. The dummy variables were set to one if the respondent engaged in the activity around that time for more than 6 months.

Control variables

This study set several control variables to overcome the problem of artificial correlations and to examine the true impacts of cultural capital and extracurricular activities on motivation for learning activities in adulthood. In later econometric analysis, this study included a big city dummy variable, and Big five personality traits dummy variables.

Regarding the big city dummy variable, it takes one if a respondent used to live in a big city when 15 years old; otherwise it takes zero.¹⁰ In addition, this study uses personality traits variables to control respondents' inherent personalities. The Big five personality dummy variables are produced from responses to the survey questionnaire, based on Benet-Martinez (1998). Concretely, each value is set to one if the principal component analysis score surpasses the average value; otherwise it is zero. Following the previous research, this study adopts five components for each of personality traits: 1. Extraversion, 2. Agreeableness, 3. Conscientiousness, 4. Neuroticism, and 5. Openness.

Furthermore, this study examined the number of siblings and the birth order. Many studies have examined the relation among the number of siblings, birth order, and educational achievements such as educational records, as Gary Becker demonstrated in his theory of human capital. Kataoka (2001) verified in Japan that the number of siblings significantly and negatively affects the academic record of students at 15 years old. Björklund, A. and Salvanes, K. G. (2011) also demonstrate that the sibling number is extremely important for estimating educational performance.

3.3.4 Descriptive Statistics

Table 3-1 presents descriptive statistics of variables used for the samples. Samples comprise of 779 women and 1,351 men from 20s to 40s who graduated from college or graduate school. This study specifically examines the younger generation: 50s and 60s are excluded.

As for the variable used, there are mainly two types: dummy variables and continuous variables derived from the answer results by respondents. Continuous variables are the principal component scores calculated by PCA.

Regarding cultural capital, the variable of cultural goods at childhood is noteworthy that a greater than 30% difference exists between men and women who have a piano. Among extracurricular activities, music/painting/ballet lessons are popular with Japanese people and more women seem to have experience with these lessons than

¹⁰ A big city is defined as the 23 wards in central Tokyo, an ordinance-designated city, or a city of more than one million people.

men. Also, in the variables of parents' educational attitude, women tend to score higher than men.

3.3.5 Trend of Extracurricular Activities

Figure 3-1 presents the trend of extracurricular activities in each cohort from 20-40s. As Table 3-1 shows, the composition rate of each cohort is 24.9% (20s), 42.6% (30s), and 32.5% (40s). This figure helps to elucidate which extracurricular activities were popular in each generation during a respondent's childhood. Among all activities, 'Music/Painting/Ballet lessons' is the most popular, with about 540 people answering that they had taken these.

During the period of high economic growth in Japan, people were increasingly able to afford to take piano lessons, although previously only children from wealthy families had had the chance to learn and play western instruments. During this period, music school companies, such as Yamaha Corp., expanded their schools not only in big cities, but also in provincial cities, making the music lessons more popular.

With regard to 'Sports school' and 'Calligraphy, Abacus', over 200 people answered that they had these experiences. Less deviation was visible in the rate of 'Calligraphy, Abacus', which means that 'Calligraphy, Abacus' has been a common extracurricular study since World War II. This might be partly because a traditional extracurricular studies, 'Calligraphy and Abacus school', are often held in community centers that enabled people to communicate mutually and to access such education easily.

Related to 'Cram school/Correspondence course' and 'English or other language school', an almost identical number of people reported these learning experiences. Other extracurricular activities were reported by fewer than fifty people, so we excluded these activities from the analysis.

3.3.6 Relation between Children's Extracurricular Activities and Parents' Academic Background

In what follows, this study specifically examined the correlation coefficient between children's extracurricular activities and the parent academic background. Table 3-2 presents the correlation of each parent's academic background and the extracurricular activities which more than 2% respondents between 20-40 years old joined. The table shows a clear difference between each parent graduating from a university or graduate school and the remainder. Looking at the correlation coefficients, having a father with high academic background is more strongly correlated to several

extracurricular activities, such as piano and cram schools than having a mother with the same academic background.

As interesting characteristics, 'Calligraphy, Abacus' shows opposite trend between people whose educational background is junior high school and university or graduate school.

3.4 Estimation Results

3.4.1 *t*-test

t-tests was conducted to confirm the relation between three variables representing positive learning attitudes at university ('Self-motivated choice of class', 'Eagerness to study', and 'Reading habits in college days'), and several variables showing specific cultural experiences, extracurricular activities in childhood and parental information, as described in Table 3-1.

Table 3-3 presents significant differences in values of 'Self-motivated choice of class', 'Eagerness to study', and 'Reading habits in college days' between groups. Each respondent is divided into two groups according to the value of each variable presented in rows. The respondent belongs to the high score group if they take a higher value than the average. Similarly, if they take a lower value than the average, then the respondent belongs to the low score group.

First, particularly addressing the overall trend, 'Cultural goods in childhood environment' is strictly positively correlated with positive learning attitudes at university for both males and females. In addition, especially for females, 'Cultural experience' and 'Reading experience' have statistically significant positive correlation. Therefore, results suggest that cultural capital at home and cultural experiences are extremely important factors for continuous strong learning motivation during the adolescent period.

Second, regarding the impacts of parental academic backgrounds, both the father's and mother's academic background (university or graduate school) are positively correlated to 'Reading habits in college days'. However, parental academic background has no correlation with 'Self-motivated choice of class'.

Third, some different trends were apparent among 'Self-motivated choice of class', 'Eagerness to study' and 'Reading habits in college days'. Interestingly, 'Calligraphy, abacus' has a significant effect regarding 'Reading habits in college days'.

3.4.2 Estimated Logit Model Results

The following three variables were used as dependent variables to estimate a logit

model: 'Self-motivated choice of class', 'Eagerness to study', and 'Reading habits in college days'. As key independent variables, this study used dummy variables related to cultural capital, parents' and teachers' influence, and extracurricular activities. As explained earlier, cultural capital variables are defined by 'Early childhood cultural capital' (Cultural experiences and Reading experiences), 'Cultural goods at childhood environment', and 'Parental academic backgrounds'. The dummy variables of extracurricular activities are 'Music/Painting/Ballet lessons', 'Sports school', 'Calligraphy, Abacus' and 'Cram school, Correspondence course', respectively. Additionally, other important variables were controlled such as number of siblings, birth order dummy, big city dummy, and personality traits dummy variables.

As shown in Table 3-4, 3-5, and 3-6, this study adopted the odds ratio in the estimated results of logit estimation. If the odds ratio of a particular dummy variable is statistically significantly greater than 1, then it shows that the respondents fitting into the characteristic of the variable tend to take a higher value in each dependent variable: 'Self-motivated choice of classes at university', 'Eagerness to study', and 'Reading habits in college days'.

Self-motivated choice of class at university

Table 3-4 exhibits estimated results of econometric analyses by gender and cohort.

From this table, it is possible to confirm that 'Cultural goods in childhood environment' is positive and significant for both females and males at the 1% or 10% level in all samples. If children grow up surrounded by cultural goods such as literature and musical works, they are likely to examine the contents specifically and consider their future career when choosing classes at university.

In addition, variables related to extracurricular activities in early childhood are basically unrelated to 'Self-motivated choice of classes at university', when controlling other important variables. Instead, females who used to attend sports school tend to get lower scores for self-motivated choice of class. It was unable to confirm that extracurricular activities themselves directly affect the degree of self-motivated choice at adulthood except 'Cram school, Correspondence course' at 30s.

However, the variable showing 'helpful parental attitude to the extracurricular activities' has positive significance in 20s and 30s. Therefore, parents' cooperative attitudes for extracurricular activities stimulate children to have an increased long-term interest in learning, and its trend can be confirmed especially for female.

Interestingly, the existence of inspirational teacher and respondents' several personality traits are deeply related to self-motivation at university, while household

income in junior high and parent's academic background hardly affected the level.

Eagerness to study

Table 3-5 shows estimated results on 'Eagerness to study' and picks up the Odds ratios of important covariates related to the hypotheses set. It is firstly confirmed that the impacts of inspirational teacher are very large on learning attitude for almost all estimations. In addition, some variables related to 'Early childhood cultural capital' were positive and significant. In the case of male aged 30s-40s, if respondents have experiences such as their parents often taking them go to museums/art galleries, theater, or classical music concerts in early childhood, they are likely to learn more actively at university. Furthermore, it is interesting that, 'Music/Painting/Ballet lessons' and 'Calligraphy/Abacus' show statistically significant and positive relations for particular groups. 'Cultural experience' might contribute to an increase in active learning attitudes even after childhood by fostering sensitivity and activeness in children as suggested by Hetland (2000). However, it was unable to find the pronounced effects and any consistent patterns beyond generations.

Reading habits in college days

Table 3-6 shows estimated results on 'Reading habits in college days'. From the table, early childhood cultural capital doesn't seem to largely affect reading habits at college days, especially for female after controlling personality traits.

In addition, the impacts of the extracurricular activities are basically small, but 'Calligraphy, Abacus' is positively correlated to reading habits in college days for males aged 20s -30s even after controlling variables representing the level of cultural capital. It was unable to validate why such activity might prompt reading habits in college days, but it might be inferred that the succession of activities requiring concentration might contribute to continued reading activities in adulthood. Furthermore, the existence of inspirational teachers at high-school and college is very important for enthusiasm for education, for both male and female.

As for the rest, several points were found from logit estimations. (1) Regarding personality, high levels of neuroticism and agreeableness are correlated positively with active academic activities at university. (3) Number of siblings, birth order and city size show almost no correlation after controlling for important variables.

3.5 Conclusion

The study described herein specifically examined the process of fostering people's learning motivation and consequently took the learning attitude at college into consideration as a measurable academic outcome, instead of just the academic record which previous studies have examined. The authors investigated the degree to which and the manner in which various early childhood experiences have been influential on the future learning attitude at college, controlling for exogenous factors such as gender and personality traits.

Estimated results obtained using the logit models demonstrated that some of variables showing the levels of early childhood cultural capital have positive significant influences on active learning attitudes at colleges such as self-motivated choices of class and studying eagerly. These effects apply to reading habits during college.

Furthermore, extracurricular activities such as music/painting/ballet lessons, cram school, and calligraphy can have a significant effect on learning motivation at college for particular age groups. As Hetland (2000) reported from 36 relevant experiments, music stimulates the reinforcement of spatial reasoning and might strengthen learning motivation. Extracurricular activities are important because they have the possibility to enable children to foster continuous learning motivation even if original family backgrounds among them differ.

In addition, after controlling the variables related to cultural capital, extracurricular activities and parental influence on children, the logit analysis results show that household income at junior high is only slightly influential on a child's learning attitude. The parent academic background seems to have less influence on a child's learning attitude as well, although some previous studies suggests the existence of a transfer of academic ability through reproduction of the academic background.

As another finding, it can be pointed out that the experience of meeting a good teacher at school greatly influences the active learning attitude at college and reading habits in college days. This result shows that, as a matter of course, the influence of activities at school in addition to the family background, parental influence, and extracurricular activities, is important to assess whether children are motivated to study.

In conclusion, there are some limitations of this study. First, this study cannot be sure of the precise length of the respondents' experiences of extracurricular activities from the survey. To identify the relation among various extracurricular activities and learning motivation at college, more research should be conducted in the near future. In addition, it is required to investigate how active learning habits affect the career path and wage level in the labor market after graduation, the quality of family life and

well-being. Through the process, it enables to evaluate the importance of several indicators for the educational achievement more exactly.

Table 3-1: Descriptive statistics of variables

			Female	Male	Total
Self-motivated choice of class (1-4point)	interest in content and subject	Mean	3.25	3.01	3.08
		SD	0.76	0.85	0.83
	relevance to their career and major	Mean	2.65	2.62	2.63
		SD	0.86	0.88	0.88
Eagerness to study (1-4point)	major subjects	Mean	2.55	2.48	2.50
		SD	0.97	0.97	0.97
	language course	Mean	2.27	1.95	2.04
		SD	0.94	0.83	0.88
	liberal arts	Mean	2.32	2.18	2.22
		SD	0.83	0.81	0.82
Reading habits in college days (dummy)	business book	Mean	0.07	0.14	0.12
		SD	0.25	0.35	0.32
	technical book	Mean	0.37	0.46	0.43
		SD	0.48	0.50	0.50
			(Ratio; multiple answers possible)		
Extra-curricular activities (before school age)	Cram school, correspondence course		2.57	3.18	2.96
	Private tutor		0.26	0.00	0.09
	Sports school		19.26	15.40	16.81
	Music/Painting/Ballet lessons		48.14	12.21	25.35
	Sado, Kado		0.39	0.07	0.19
	English & other language school		3.08	2.22	2.54
	Calligraphy, Abacus		11.94	8.88	10.00
	Boyscout, Girlscout		0.51	0.89	0.75
	Other		1.93	2.07	2.02
Nothing		35.30	65.06	54.18	
Parents were helpful to extra-curricular activities (1-5point)	Father	Mean	2.99	2.63	2.78
		SD	1.32	1.14	1.23
	Mother	Mean	3.46	3.01	3.19
		SD	1.26	1.13	1.21

Table 3-1: Descriptive statistics of variables, continued

		Female	Male	Total	
Early childhood cultural capital (1-4point)	1. Cultural experience	Mean	2.34	1.97	2.07
		SD	-1.04	-0.87	-0.93
	2. Reading experience	Mean	2.66	2.36	2.45
		SD	-1.03	-0.92	-0.96
				(ratio)	
Cultural goods at childhood	1. piano	61.87	29.98	41.64	
Environment	2. collections of literature, encyclopedia, etc.	61.10	53.07	56.01	
	3. complete series of art works	9.76	6.37	7.61	
				(ratio)	
Father's academic background	university or graduate school	47.24	34.57	39.20	
Mother's academic background	university or graduate school	17.07	10.81	13.10	
household income (at age 15)	high	37.87	29.31	32.44	
	middle	42.75	45.52	44.51	
	low	19.38	25.17	23.05	
				(ratio)	
Meeting an inspirational teacher	elementary school or junior high school	40.69	37.38	38.59	
	high school or college	36.07	31.61	33.24	
Number of siblings dummy	more than two	33.25	35.09	34.41	
Birth order dummy	oldest	59.18	61.58	60.70	
City size	big city	26.96	25.83	26.24	
	middle city	18.74	17.54	17.98	
	other city	37.23	40.56	39.34	
	town/village	17.07	16.06	16.43	
Age	20s	39.41	16.51	24.88	
	30s	39.02	44.71	42.63	
	40s	21.57	38.79	32.49	
Number of sample		779	1,351	2,130	

(Source) *Survey of regional life environment and happiness*

Table 3-2: Correlation between extracurricular activities and parents' academic background
(20s-40s)

	(freq)	music instrument	sports	calligraphy	cram school	
Father	junior high school	830	-0.12 **	-0.10 **	0.11 **	-0.04
	high school	1687	-0.12 **	-0.02	0.04	-0.06 *
	junior college, technical college	218	0.05	0.02	0.03	0.00
	university, graduate school	1315	0.21 **	0.09 **	-0.12 **	0.11 **
Mother	junior high school	755	-0.14 **	-0.14 **	0.12 **	-0.04
	high school	2160	-0.04	0.01	0.01	-0.05
	junior college, technical college	764	0.09 *	0.07 +	0.00	0.05
	university, graduate school	427	0.13 **	0.05	-0.09 +	0.06

(Note) +p<0.1, * p<0.05, ** p<0.01

Figure 3-1: Trend of extracurricular activities in each generation (6 years old)

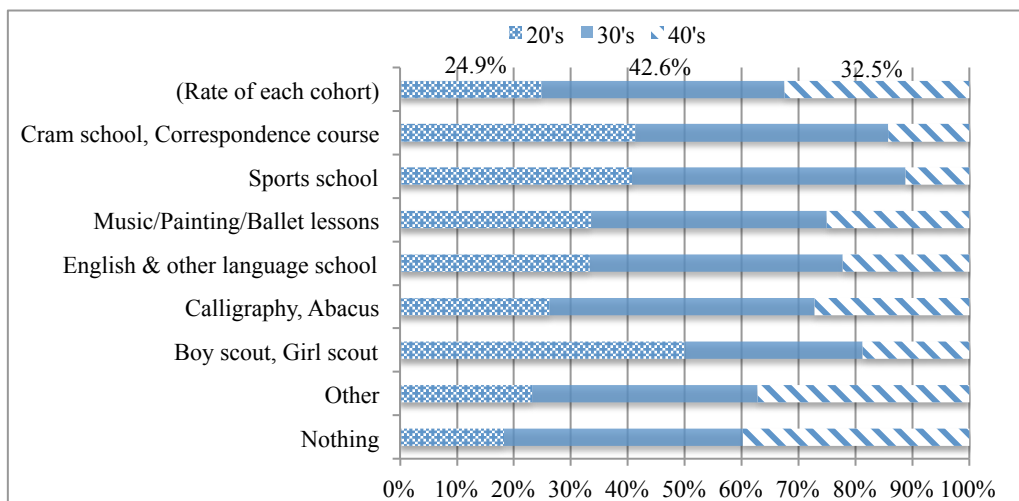


Table 3-3: Results of t-tests of differences in key independent variables

	Self-motivated choice of class			Eagerness to study			Reading habits in college days		
		t-value	p-value	t-value	p-value	t-value	p-value		
Music/Painting/Ballet lessons	female	3.307	0.00 **	4.262	0.00 **	0.297	0.77		
	male	1.092	0.28	1.958	0.05 +	0.867	0.39		
Sports school	female	-0.624	0.53	1.953	0.05 +	2.434	0.02 *		
	male	-2.309	0.02 *	0.118	0.91	0.613	0.54		
Calligraphy, Abacus	female	-0.203	0.84	1.412	0.16	2.324	0.02 *		
	male	-0.877	0.38	0.080	0.94	1.732	0.08 +		
Cram school, Correspondence course	female	0.687	0.49	1.056	0.29	2.816	0.00 **		
	male	0.730	0.47	0.671	0.50	1.514	0.13		
Cultural experience	female	2.630	0.01 **	3.126	0.00 **	5.158	0.00 **		
	male	1.083	0.28	2.824	0.00 **	2.653	0.01 **		
Reading experience	female	5.370	0.00 **	2.502	0.01 *	3.870	0.00 **		
	male	2.240	0.03 *	0.279	0.78	0.855	0.39		
Cultural goods at childhood environment	female	3.054	0.00 **	4.071	0.00 **	4.544	0.00 **		
	male	2.470	0.01 *	2.480	0.01 *	2.413	0.02 *		
Father's academic background (university or graduate school)	female	1.379	0.17	2.066	0.04 *	1.872	0.06 +		
	male	0.996	0.32	3.121	0.00 **	2.308	0.02 **		
Mother's academic background (university or graduate school)	female	1.423	0.15	0.632	0.53	1.840	0.07 +		
	male	1.014	0.31	0.940	0.35	1.753	0.08 +		

(Note) +p<0.1, * p<0.05, ** p<0.01

Table 3-4: Results of logit model estimation (Odds Ratio) - Self-motivated choice of class

	20s		30s		40s		Total	
	Female	Male	Female	Male	Female	Male	Female	Male
-Early childhood cultural capital-								
Cultural experience	0.771 (0.312)	1.016 (0.612)	1.206 (0.438)	3.967* (2.282)	0.584 (0.394)	0.984 (0.553)	0.917 (0.223)	1.472 (0.451)
Reading experience	1.148 (0.354)	1.201 (0.377)	1.117 (0.324)	0.767 (0.139)	1.500 (0.620)	1.188 (0.244)	1.236 (0.219)	0.985 (0.119)
Cultural goods	0.908 (0.320)	1.226 (0.387)	1.560 (0.576)	1.542* (0.280)	4.347** (2.330)	1.405 (0.293)	1.467+ (0.315)	1.429** (0.174)
College graduate (Father)	0.674 (0.210)	0.943 (0.317)	1.041 (0.321)	1.111 (0.241)	1.565 (0.716)	0.800 (0.173)	1.012 (0.189)	0.936 (0.126)
College graduate (Mother)	1.324 (0.490)	1.138 (0.461)	1.470 (0.623)	1.089 (0.349)	0.985 (0.657)	1.033 (0.401)	1.249 (0.304)	1.029 (0.208)
-Household income at age 15-								
High level	1.066 (0.328)	0.983 (0.368)	0.834 (0.243)	0.860 (0.182)	0.854 (0.398)	0.728 (0.162)	0.916 (0.169)	0.824 (0.114)
Low level	1.382 (0.527)	1.029 (0.346)	0.883 (0.349)	1.097 (0.242)	1.269 (0.617)	0.887 (0.206)	1.075 (0.245)	0.991 (0.141)
Helpful parents' attitude to extracurricular activities	1.732 (0.631)	1.814+ (0.623)	1.976* (0.611)	1.226 (0.235)	1.200 (0.551)	1.128 (0.229)	1.589* (0.320)	1.216 (0.153)
Inspirational teacher								
Mandatory education	1.044 (0.318)	1.699 (0.560)	1.125 (0.321)	1.282 (0.243)	3.351** (1.571)	1.278 (0.270)	1.394+ (0.255)	1.340* (0.168)
High school/ college	2.462** (0.768)	1.005 (0.338)	2.327** (0.715)	1.521* (0.299)	1.043 (0.514)	2.337** (0.522)	1.978** (0.377)	1.687** (0.222)

(Note) +p<0.1, * p<0.05, ** p<0.01

Table 3-4: Results of logit model estimation (Odds Ratio) - Self-motivated choice of class,
continued

	20s		30s		40s		Total	
	Female	Male	Female	Male	Female	Male	Female	Male
-Extracurricular activities-								
Music/Painting	1.364	0.937	1.082	0.609	1.680	0.770	1.202	0.760
/Ballet lessons	(0.403)	(0.464)	(0.303)	(0.216)	(0.754)	(0.330)	(0.213)	(0.176)
Sports school	0.596	0.629	0.476*	1.213	0.916	0.464 ⁺	0.515**	0.824
	(0.209)	(0.214)	(0.171)	(0.324)	(1.230)	(0.203)	(0.120)	(0.148)
Calligraphy/ Abacus	0.623	1.176	1.607	1.205	0.768	0.719	0.967	0.981
	(0.300)	(0.648)	(0.685)	(0.436)	(0.585)	(0.280)	(0.266)	(0.223)
Cram school,	1.688	0.534	1.612	2.753 ⁺	1.554	1.633	1.588	1.256
Correspondence course	(1.258)	(0.329)	(1.918)	(1.606)	(1.38)	(1.581)	(0.955)	(0.444)
Siblings (more than two)	1.060	0.620	0.955	0.857	0.798	0.996	0.919	0.877
	(0.329)	(0.201)	(0.268)	(0.158)	(0.358)	(0.198)	(0.165)	(0.106)
birth order dummy	1.170	0.769	1.049	1.265	1.436	1.378	1.187	1.194
	(0.348)	(0.237)	(0.286)	(0.230)	(0.624)	(0.273)	(0.207)	(0.143)
big city dummy	0.551*	1.096	0.873	0.927	1.108	1.183	0.762	1.065
	(0.157)	(0.327)	(0.231)	(0.164)	(0.480)	(0.226)	(0.129)	(0.123)
-Personality traits-								
Extraversion	1.138	1.457	1.397	1.282	1.473	1.718**	1.320*	1.455**
High	(0.320)	(0.428)	(0.373)	(0.225)	(0.603)	(0.329)	(0.220)	(0.168)
Agreeableness	0.543*	1.003	0.592*	0.729 ⁺	0.468 ⁺	0.988	0.550**	0.877
High	(0.157)	(0.301)	(0.154)	(0.127)	(0.185)	(0.186)	(0.0919)	(0.100)
Conscientiousness	0.748	0.852	0.722	1.035	0.957	0.766	0.789	0.865
High	(0.206)	(0.245)	(0.189)	(0.183)	(0.400)	(0.145)	(0.130)	(0.0994)
Neuroticism	1.767 ⁺	1.472	1.227	1.635**	1.927	1.437 ⁺	1.408*	1.436**
High	(0.529)	(0.467)	(0.330)	(0.292)	(0.786)	(0.270)	(0.238)	(0.166)
Openness	1.256	0.740	0.979	1.069	1.232	0.916	1.197	0.965
High	(0.346)	(0.223)	(0.254)	(0.190)	(0.510)	(0.181)	(0.198)	(0.113)
Observations	305	222	303	603	166	523	774	1,348

(Note) ⁺p<0.1, * p<0.05, ** p<0.01

Table 3-5: Results of logit model estimation (Odds Ratio) – Eagerness to study

	20s		30s		40s		Total	
	Female	Male	Female	Male	Female	Male	Female	Male
-Early childhood cultural capital-								
Cultural experience	1.494 (0.535)	0.893 (0.547)	1.602 (0.511)	2.428 ⁺ (1.174)	1.611 (0.714)	2.744* (1.549)	1.311 (0.308)	1.869** (0.574)
Reading experience	1.724* (0.436)	1.099 (0.340)	1.154 (0.248)	0.985 (0.180)	0.666 (0.171)	1.244 (0.253)	1.191 (0.199)	1.135 (0.140)
Cultural goods	0.702 (0.202)	1.204 (0.377)	0.898 (0.228)	0.911 (0.167)	1.517 (0.518)	1.048 (0.216)	0.779 (0.162)	0.965 (0.121)
College graduate (Father)	1.134 (0.293)	0.898 (0.300)	1.765* (0.425)	0.992 (0.217)	2.085** (0.567)	0.672 ⁺ (0.148)	1.417* (0.250)	0.844 (0.118)
College graduate (Mother)	0.935 (0.307)	0.800 (0.330)	0.706 (0.246)	0.785 (0.256)	2.796 ⁺ (1.493)	0.910 (0.357)	0.952 (0.217)	0.816 (0.171)
Inspirational teacher								
Mandatory education	1.391 (0.351)	1.239 (0.400)	1.682* (0.366)	1.975** (0.368)	1.947* (0.509)	1.338 (0.273)	1.571** (0.268)	1.551** (0.195)
High school/ college	2.684** (0.699)	2.653** (0.882)	1.807* (0.432)	2.373** (0.456)	1.649 (0.525)	2.380** (0.508)	2.193** (0.388)	2.386** (0.312)
-Extracurricular activities-								
Music/Painting /Ballet lessons	1.046 (0.256)	0.967 (0.478)	1.478 ⁺ (0.324)	1.171 (0.428)	0.938 (0.251)	1.209 (0.505)	1.130 (0.188)	1.191 (0.283)
Sports school	1.366 (0.418)	1.527 (0.523)	0.785 (0.237)	1.142 (0.302)	0.366 (0.288)	1.197 (0.519)	1.046 (0.241)	1.179 (0.215)
Calligraphy/ Abacus	1.231 (0.487)	0.642 (0.342)	1.209 (0.376)	2.523* (0.910)	2.041 (0.953)	1.026 (0.397)	1.115 (0.292)	1.319 (0.304)
Cram school, Correspondence course	1.241 (0.817)	1.005 (0.634)	0.745 (0.705)	2.214 (1.192)	1.803 (2.585)	0.236 (0.289)	0.966 (0.500)	1.339 (0.479)
Observations	305	222	303	603	166	523	774	1,348

(Note) +p<0.1, * p<0.05, ** p<0.01

Table 3-6: Results of logit model estimation (Odds Ratio) – Reading habits in college days

	20s		30s		40s		Total	
	Female	Male	Female	Male	Female	Male	Female	Male
-Early childhood cultural capital-								
Cultural experience	0.721 (0.250)	2.125 (1.346)	1.482 (0.461)	1.984 (1.000)	1.983 ⁺ (0.815)	2.756 ⁺ (1.598)	1.117 (0.249)	2.265* (0.741)
Reading experience	1.590 ⁺ (0.436)	0.988 (0.305)	1.131 (0.271)	1.127 (0.207)	1.126 (0.301)	1.212 (0.245)	1.270 (0.218)	1.164 (0.143)
Cultural goods	1.162 (0.344)	1.484 (0.462)	1.301 (0.396)	1.700** (0.314)	1.398 (0.538)	1.151 (0.239)	1.035 (0.220)	1.427** (0.180)
College graduate (Father)	0.935 (0.245)	1.067 (0.353)	1.081 (0.279)	1.021 (0.225)	1.470 (0.414)	0.961 (0.209)	1.160 (0.204)	0.954 (0.133)
College graduate (Mother)	1.058 (0.363)	0.927 (0.380)	0.914 (0.328)	1.575 (0.514)	2.064 (0.955)	1.022 (0.395)	0.974 (0.218)	1.282 (0.265)
Inspirational teacher								
Mandatory education	0.927 (0.242)	1.634 ⁺ (0.519)	1.198 (0.281)	1.365 (0.260)	1.518 (0.408)	1.130 (0.234)	1.058 (0.180)	1.263 ⁺ (0.161)
High school/ college	2.232** (0.582)	1.904* (0.622)	1.789* (0.440)	2.898** (0.569)	1.470 (0.463)	2.508** (0.537)	1.845** (0.315)	2.480** (0.327)
-Extracurricular activities-								
Music/Painting /Ballet lessons	1.121 (0.282)	1.399 (0.690)	1.366 (0.324)	1.373 (0.511)	1.144 (0.316)	2.039 ⁺ (0.849)	1.126 (0.188)	1.459 (0.348)
Sports school	0.974 (0.305)	1.063 (0.362)	1.011 (0.321)	1.020 (0.272)	0.417 (0.381)	0.733 (0.335)	1.072 (0.245)	0.958 (0.178)
Calligraphy/ Abacus	2.660* (1.052)	0.640 (0.337)	2.343** (0.751)	1.210 (0.432)	1.070 (0.484)	1.295 (0.496)	1.413 (0.363)	1.173 (0.273)
Cram school, Correspondence course	2.386 (1.647)	0.444 (0.294)	0.401 (0.385)	4.334* (2.666)	0.661 (0.941)	1.149 (1.106)	1.537 (0.762)	1.480 (0.533)
Observations	305	222	303	603	166	523	774	1,348

(Note) +p<0.1, * p<0.05, ** p<0.01

Chapter 4: The Impact of Learning and Living Environment of Colleges on Dropout Rates: A Study Using Panel Data

4.1 Introduction

The percentage of high-school graduates advancing to higher education in Japan has increased dramatically in recent years. By 2009, more than 50% of new graduates had entered undergraduate programs, and the age of “one in two is a college student” had begun. The School Basic Survey of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) reveals that the percentage of high-school graduates entering undergraduate programs in 2011 reached 56.7% (Figure 4-1). As of August 2011, a total of approximately three million students were attending colleges.

An increase in the percentage of students entering higher education is a common tendency in many developed countries including the U.S. and U.K, which reflects increasingly important roles of higher education institutions in each country as education and research facilities amid globalization. In addition to providing technical knowledge and extensive education, universities are expected to develop skilled human resources capable of broad social, economic, and cultural interaction with a diverse mix of individuals in the international community while maintaining the culture of their own countries as the backbone.

Despite the growing expectations of quality of higher education, however, various problems in ensuring the quality of higher education have recently been addressed in Japan, including students withdrawing from college and the extreme financial decline of universities attributable to enrollment falling.

The survey “*Daigaku No Jitsuryoku* (“The Capability of Universities” survey)” conducted in 2008 by the Yomiuri Shimbun was the first extensive study to ask nationwide public and private colleges about their student dropout rates, student graduation rates within the standard number of academic years, and other questions. The report indicated an average dropout rate of 2.5% and average graduation rate of 84.6% (The survey targeted 725 colleges in Japan excluding those that have only graduate schools, of which 499 colleges responded).¹¹ The Yomiuri Shimbun has been

¹¹ The Capability of Universities survey has been conducted by the Yomiuri Shimbun every year since 2008. In the fourth Capability of Universities survey in 2011, the number of respondents was 623 colleges and the response rate was 85%, both of which had increased from the previous year.

conducting the same survey annually since 2008. The average dropout rate during the four college years increased, although slightly, from 7.7% to 8.2% between the first survey in 2008 and the third survey in 2010.

Students leave college before completion for passive and involuntary reasons such as “financial difficulties” and “loss of motivation for education” in addition to positive and voluntary reasons such as “seeking overseas education” and “transfer to another college.” The Basic Survey of School Corporations conducted by the Promotion and Mutual Aid Corporation for Private Schools of Japan in 2006 reported that 55,497 students had withdrawn from private colleges in 2005, comprising 2.9% of all college students. The reasons for their withdrawal included “change of academic path or transfer to another college (21.0%),” followed by “financial difficulties (18.6%),” and “loss of motivation for education (14.2%).” In other words, in addition to economic reasons such as “heavy personal burden of education on households,” “a gap separating the needs of students and the undergraduate education provided by colleges,” exemplified by the poor connection between the educational curricula of high schools and colleges, has been indicated as a factor underlying the survey results above.¹²

These results suggest that the issue of dropouts involves problems of policies for equal educational opportunities and the governance of higher education institutions. Higher education institutions are expected to play important roles in preventing, to the highest possible extent, passive and involuntary withdrawal before completing a college curriculum and maximizing the intellectual activities and creativity of individual students. Consequently, the conditions of withdrawal in the past and their contributing factors must be examined based on reliable data.

According to the OECD (2010), the average dropout rate at higher education institutions—to be precise, the percentage of students who failed to earn the first academic qualification (e.g. a bachelor’s degree) offered at higher education institutions within the standard academic years—in OECD countries in 2008 was 31%, whereas it was approximately 10% in Japan, a low level similar to the respective rates in Denmark and Belgium. This result contrasts to the high rates in the U.S. and New Zealand, which are 54.0% and 47.1%, respectively.¹³

The number of dropouts nonetheless has been increasing even in Japan in recent

¹² Obunsha Educational Information Center provides an overview of this survey in its 2005 report on the status of students’ withdrawal from private colleges.
<http://eic.obunsha.co.jp/resource/topics/0705/0503.pdf>

¹³ The Act Policy Report of Lotkowski et al. (2004) reported the analysis of the conditions and causes of students’ withdrawal from colleges in the U.S in 1990s.

years. Chronologically following the result of subtraction of “the number of graduates after four years from the number of freshmen at four-year colleges” based on the School Basic Survey of each year to understand an approximate number of dropouts at higher education institutions reveals a substantial increase in the absolute number from approximately 25,000 of the 1990 freshmen to approximately 50,000 of the 2005 freshmen.

This increase is attributable in part to the drastic deregulation of college establishment in 1991, which markedly increased the number of colleges and students. Meanwhile, the considerable growth in the absolute number of dropouts between the 1990s and the latter half of the 2000s is an important issue, suggesting that Japan must seriously address such a trend. Approaches to the improvement of college education and research systems must also be considered.

Although some preceding studies of the causes of students’ withdrawal and efforts to solve the problem have been developed in the U.S. and Europe, such research remains rarely reported in Japan. Particularly, an analysis using panel data of individual colleges over multiple years has yet to be reported.

This study specifically examines the relationship between their learning and living environments and dropout rates. More specifically, the study examines the potential effects of development and improvement of learning and living environments, including learning and living support provided by colleges, on the reduction of dropouts based on panel data.

This article is structured as follows: First, Section 4.2 presents an overview of preceding studies that have analyzed the conditions of students’ withdrawal from college and students’ satisfaction with higher education and gives a summary of the characteristics of major factors that correlate with such conditions. Section 4.3 briefly describes data used for the analysis in this study. Section 4.4 outlines the econometric model and estimated results. Section 4.5 concludes the study and presents future prospects.

4.2 Previous Research

Some empirical studies of the conditions and causes of students’ withdrawal from higher education institutions have already been made in the U.S. The analysis reported by Robbins et al. (2004) is significant for its statistical integration of the outcomes of previous studies using the method called meta-analysis to elucidate the overall tendencies. Rather than the dropout rates, the study specifically examines the college retention rates, which indicate the proportion of students remaining in their college after

a certain period of time (often within one year after entering college) and analyzes the causes.

Robbins et al. (2004) points out that a significant correlation exists between the withdrawal of students themselves and the social economic status (SES) of their family. More specifically, students whose parents' income and educational background are high are more unlikely to withdraw from college. As in Japan, the heavy personal burden of higher education on households in the U.S. presumably causes the income of students' parents to affect the continuation of students' college education.¹⁴

The analysis of Ishitani and DesJardins (2002) shows a significantly lower dropout rate of students receiving financial aid (scholarships) from the government or college than other students without financial aid. Development of systems to provide students with economic support is likely to contribute measurably to an increase in the college retention rates and a decrease in the dropout rates also in Japan. The econometric analysis used later shows devotion of attention to the scholarships provided to students as a variable to explain the dropout rates.

Robbins et al. (2004) also examined the effects of academic factors such as the students' academic performance before college, non-academic factors such as the students' campus activities and learning environment of colleges, and other factors, including the students' household income and their parents' educational background, on students' withdrawal from college (represented in the study by the college retention rate). The results suggest a tendency of the competence of students before or at the time of entering college represented by the scores of the American College Test (ACT) taken by college applicants, grade point averages (GPA) of freshmen, and other indicators to have a certain negative effect on students' withdrawal.

An interesting finding was that factors such as the students' motivation for learning, confidence in learning, habit of studying, and academic goals that would affect their learning process had a stronger negative correlation with students' withdrawal than their academic performance before and after entering college (Tinto (2006) reported similar analytical results).

Such importance of learning habits and motivation has also been indicated in Japan in an analysis performed by Yano (2009). Yano (2009) presented a hypothesis called "the effect of learning habits" and used the method of path analysis to verify the possibility that students' learning and reading experience during college years improve their learning and reading abilities in the workplace to affect their income positively.

¹⁴ Tinto (2006) points out that a correlation between students' socioeconomic status and withdrawal is evident even at top ranking universities with high graduation rates.

Colleges' efforts to help students develop their learning habits by improving their campus life environment and improving learning and living support are likely to have a significant effect on the reducing dropout rates.

In connection with the development of learning habits explained above, increasing students' satisfaction with campus life and education is an important measure. Oshio (2003) argued that, in addition to the aspect of investment as exemplified by human capital theory, education involves an aspect of consumption and suggested the potential of education as consumption to enrich life itself. In Australia, Athiyaman (1997) regarded students as "the consumers of educational services" and investigated the relation between the quality of educational services and students' satisfaction through factor analysis from the perspective of marketing. A major finding was the correlation of variables representing the quality of campus public infrastructure, including libraries, computer rooms, and recreation facilities, with student satisfaction. This study also conducts analysis while particularly addressing variables considered in the series of preceding studies as factors to explain the dropout rates.

4.3 Data

4.3.1 Variables to be used

To perform an analysis that specifically examines the relation between the learning environment of colleges and their students' dropout rates, this study primarily uses data from yearly issues of the *Capability of Universities* survey from the education reporting team of the Yomiuri Shimbun and the yearly issues of the *University Ranking* of Asahi Shimbun Publications.¹⁵

Table 4-1 presents definitions of variables used in the analysis the sources of data. In addition to the dropout rate of each college, a range of variables related to living and learning support are employed. Particularly because the availability of an environment that allows students to increase their motivation for learning is likely to have a certain correlation with dropout rates as indicated by Willcoxson (2010), variables such as "the number of instructors per student" and "the number of books borrowed per student" that are considered closely connected to the students' campus learning environment are used in the analysis. Furthermore, the analysis has adopted variables related to "grants-in-aid

¹⁵ Colleges responding to the Capability of Universities survey of the Yomiuri Shimbun increased every year during 2008–2010. Of 725 institutions, 499 participated in the 2008 survey. Therefore, the response rate was 68.8%. In 2009, 529 colleges responded. In 2010, 592 colleges joined the survey.

obtained for scientific research” as the research level of a college is regarded as a factor to increase motivation for learning activities there.

As for living support, this study uses the colleges’ own scholarships and loans or the percentage of students granted tuition discounts among all students as variables indicating the level of living support in response to the 2009 survey of the Yomiuri Shimbun, which asked respondents about scholarships and tuition discounts that had been adopted at the discretion of the colleges.

In addition, to the variable of “the number of instructors per student” above, a variable expressing the level of learning support provided to the students by the colleges is also developed. Although variables for learning support might be designed in numerous ways, this study is conducted particularly to assess the adequacy of curricula that might facilitate exchange with instructors and other students and encourage motivation for learning. For this reason, the questions related to learning support asked in the 2010 survey are used in the study. More specifically, the 2010 survey includes such questions as the following: 1 whether problem-based learning (PBL) or fieldwork-based classes are offered; 2 whether all senior students are required to attend seminars/laboratory classes; 3 whether a place for students’ group study or discussion is available; and 4 whether classes to allow students’ group study are offered. These questions are answered on a scale of four levels, from “implemented throughout the entire college”, to “not implemented.” This study accordingly converts the four-level assessment of each question into 0–3 points for a total learning support score of 0–12 points and studies the relation with dropout rates.

In addition, the study devotes attention to questions such as whether the college is public or private, whether it is an established institution founded before World War II or a new college, and whether a difference in standard scores makes a difference in dropout rates. Aside from the dropout rate indicator, the relations of the rate of standard year graduation that indicates the percentage of students who graduate within the standard academic years (basically four years for four-year colleges) with other indicators are also regarded as necessary.

This paper prepared the college panel data for three years during 2007–2009 by constructing a dataset of variables based on data presented in Table 4-1. As Table 4-1 evidences, however, the variables include three types—those for which data for the three years of 2007–2009 are obtainable, those for which data are available only for a single year, and those such as “the year of foundation” which do not change over time. Because variables such as “learning support scores” (2008) and “living support scores” (2009), for which data are available for only one year, are unlikely to change rapidly

during one or two years, they are treated in this study as variables that do not change during 2007–2009 just as in the case of the “established university dummy (universities founded in and before 1950 are 1 and the others are 0)”. In other words, the same “learning support score” and “living support score” apply to the same college for the three years during 2007–2009. Changes in the “standard scores” during the three years are also negligible. Therefore, the standard score data of 2009 are used also for the 2007–2008 college data. Meanwhile, panel data of “dropout rates,” “the number of instructors per student,” and “the number of books borrowed” can be prepared for three years. The panel analysis helps identify the effect of changes in “the number of instructors per student” and “the number of books borrowed” on the dropout rates.

4.3.2 Descriptive Statistics of Variables

Table 4-2 presents descriptive statistics of the variables used for all colleges, public colleges, and private colleges. Data of variables with missing values in Table 4-1 are excluded, and descriptive statistics are based on a sample of 491 universities and colleges in total. The number of colleges that responded to the *Capability of Universities* survey in all three years (2008–2010) in which it was conducted, however, are 305. This renders the panel data unbalanced, which demands some attention.

Table 4-2 presents that the respective percentages of dropouts during the freshman year and during the four years are 2.41% and 8.16% in total. Data by institutions of type reveal that the dropout rate for four years is 3.80% at public universities but it is high, 9.99%, at private ones. The rate of standard year graduation is 82.3% overall, and the rate for public universities is higher than that for private universities by an average of 3.8% points.

The number of instructors per 100 students is 7.9 overall. The figure for public universities is 11.8, which is higher than the 6.3 of private universities. The same tendency is shared by variables such as “learning support scores,” “the number of books borrowed,” and “standard scores.” The living support scores represented by the “percentage of students who receive their college’s own scholarships or loans or are granted tuition discounts, however, suggest no significant difference between public and private universities.

College standard scores were made into four dummy variables representing the first to fourth quartiles, and the dropout rate [1 year], dropout rate [four years], and rate of standard year graduation of each quartile were observed. Those colleges for which standard scores are in the lowest 25% had the average dropout rate [four years] of 14.1%, which is more than 10% points higher than 3.7% of those colleges in the highest

25%. The rate of standard year graduation of the colleges shows the same tendency. Students' academic performance at the time of entering college has a significant correlation with their future withdrawal and graduation also in Japan.

Important factors in addition to the performance at the time of entering college are the learning environment of the campus and students' motivation for learning. Figure 4-2 exhibits, like the above, the dropout rates [1 year], dropout rates [four years], and the rates of standard year graduation of four dummy variables created for the first to fourth quartiles of the quantities of books borrowed per student per year. Those colleges at which the number of books borrowed is in the lowest 25% indicate the average dropout rate [four years] of 12.3%, which is approximately 6 percentage points higher than the 6.1% of the colleges in the highest 25%.

Consequently, colleges at which students frequently use libraries and where the learning environment and students' motivation for learning are seemingly at a high level tend to display low dropout rates and high rates of standard year graduation. These variables also have a positive correlation, although slight, with such indicators as "the number of instructors per 100 students" and "learning support scores." The next section accordingly estimates an econometric model to examine which indicators have significant correlations with dropout rates when these interested variables are incorporated into the explanatory variables of one another.¹⁶

4.3.3 Relation between Learning Environment and Dropout/ Graduation Rates

The following specifically examines "the number of instructors per 100 students," "living support score," "learning support score," "standard score," "the number of books borrowed," and "the number of grants-in-aid for scientific research obtained" that were developed in the previous section as variables closely related to campus learning environment and students' motivation for learning. Table 4-3 helps identify any significant difference in the "dropout rates" and "rates of standard year graduation" between the group with indicator values higher than the average and the group that is lower than the average.

As shown in Table 4-3, *t*-tests suggest correlations of variables, "the number of instructors per 100 students," "learning support score," "standard score," and "the number of books borrowed," with all indicators, "dropout rate [1 year]," "dropout rate [four years]," and "rate of standard year graduation." Those colleges for which the "number of instructors per 100 students" is larger than the average, for instance, have a

¹⁶ For all colleges, the four-year dropout rate increased from 7.8% to 8.3% and the graduation rate decreased from 84.2% to 81.3% during 2007–2009.

four-year dropout rate of 5.1%. Those colleges having fewer instructors than the average show a higher dropout rate of 9.3%. This difference is significant at the 1% significance level. Those colleges for which the “number of books borrowed” is larger than the average indicate a four-year dropout rate of 4.3%, whereas that of those below the average number of books borrowed is 8.9%, also presenting a significant difference at the 1% level.

Somewhat unexpectedly, the living support scores of colleges with the percentage of students provided with the colleges’ own scholarships, loans, or tuition discounts higher than the average revealed the rate of standard year graduation of 81.7%, which is, although only slightly, lower than 82.5% at the colleges for which percentage of students provided with financial assistance is below the average. This difference is significant at the 10% significance level. The dropout rates, however, indicate no clear difference between the group with a high living support score and the group with a low score.

Such trends suggest the ability of those colleges with a high “number of instructors per 100 students,” “learning support score,” “standard score,” “number of books borrowed,” and “number of grants-in-aid for scientific research obtained” to limit their students’ withdrawal from their education. The next section establishes verification hypotheses and performs panel data analysis to verify the reliability of the effect of these variables.

4.4 Econometric Analysis

4.4.1 Establishing Verification Hypotheses

Using the college panel data described above, the relation between the development of learning environment and students’ withdrawal is verified through econometric analyses. Four hypotheses are established in this case as specific verification hypotheses.

Hypothesis 1: The higher the academic performance of students is at the time of entering college, the lower the dropout rate.

As stated in earlier studies, students’ levels of academic skills at the beginning of their college education are likely to have a strong correlation with their ability required later for the college curriculum. Skills acquired before college also presumably have a positive effect on students’ motivation for learning in college. By regarding the “standard scores” as average academic skills of students at the time of college entry, this

study confirms the relation of this variable with dropout rates and rates of standard year graduation to determine the validity of the hypothesis presented above.

Hypothesis 2: The higher the students' motivation for learning is, the lower the dropout rate.

This study uses "the number of books borrowed per year" by students as an indicator of average "motivation for learning" of students on campus. One reason for setting up this hypothesis is an assumption that numerous highly motivated students gathering together would inspire other students to learn, thereby possibly deterring their withdrawal from college. Another conceivable mechanism is that efforts of colleges such as improving the quality of their libraries affect the students' motivation for learning. Results reported by Weiner (2008) demonstrated that the quality of libraries affected students' satisfaction with and evaluation of their campus life, and its relation with dropout rates is expected to be noteworthy.

Hypothesis 3: The better the learning environment is, the lower the dropout rate that can be expected.

Whether colleges actively provide their students with an environment that fosters their learning activities is an important perspective in considering the control of students' withdrawal. Those students who are forced to study at a college at which "each instructor teaches too many students" or where "there are no opportunities to take small classes such as seminars" are less likely to receive adequate learning support than those who are not in such a college, which might drive them to withdraw from college in some cases. Considering "the number of instructors per 100 students" and the "student support score," this study examines whether high values of these variables are associated with a lower dropout rate by estimating the parameters of an econometric model.

Hypothesis 4: The greater the living support that is provided, the lower the dropout rate.

As exemplified at the beginning of this article by the survey by the Promotion and Mutual Aid Corporation for Private Schools of Japan, approximately 20% of students report "financial difficulties" as a reason for withdrawal from college. In Japan, the

heavy personal burden of higher education on households is regarded as a problem, and life support provided to students such as colleges' own scholarships are expected to have a certain effect on the control of dropout rates.

This study incorporates the variable, "living support scores," into explanatory variables and estimates parameters to examine the validity of the hypothesis presented above.

4.4.2 Econometric Model

This study employs the value resulted from Logit transformation of "dropout rates within 1 year (of college entry)" and "rates of standard year graduation" as explained variables to perform econometric analysis. Three models, i.e., a pooled OLS model, fixed effects model, and random effects model, are used as the econometric models, and the F test, Hausman test, and Breusch and Pagan test are performed to identify the most appropriate econometric model. The parameters of the estimation results from such a model will be examined. In addition, the sample will be divided between public and private institutions to confirm the reliability of the estimation results.

4.4.3 Estimation Results

Dropout rates

Table 4-4 exhibits results of panel data analysis of all colleges, public colleges, and private colleges using "dropout rates within 1 year (of college entry)" as the explained variable. First, an F test was performed after estimating the fixed effects model in all estimation cases, and the test hypothesis that "all coefficients of individual dummy variables are zero" could not be rejected. A Breusch and Pagan test was performed after estimating the random effects model, and the test hypothesis that "the variance of fixed effects is zero" could not be rejected. The result is that a fixed effects model and random effects model are more appropriate than a normal pooled OLS model. Accordingly, the null hypothesis that the fixed effects of individual colleges are uncorrelated with the explanatory variables was tested using a Hausman test. The estimation results of the fixed effects model are presented if the null hypothesis was rejected and the fixed effects model was adopted, and the estimation results of the random effects model are shown if the null hypothesis was not rejected and if the random effects model was employed.

Table 4-4 reveals the following findings. First, overall, "the number of instructors per 100 students," "the number of books borrowed," and "grants-in-aid for scientific research dummy" were negatively significant at a 1% significance level. In other words,

colleges with high scores of these indicators that are regarded as affecting students' motivation for learning have the tendency that the dropout rate is low even when other variables are controlled. Consequently, positive significance at 1% level of the "standard score first quartile dummy" and "standard score second quartile dummy" and their connection with students' academic skills before and within one year from college entry were confirmed.

Secondly, the estimation results with separation of public and private colleges were observed. The estimation for public colleges indicate, like the overall estimation result, negative significance of "the number of instructors per 100 students," "number of books borrowed," and "grants-in-aid for scientific research dummy" whereas the dummy variable for "standard score" was not significant. In the estimation for private colleges, however, certain explanatory variables were removed throughout the points in time because a fixed effects model was adopted, and "the number of instructors per 100 students" and "grants-in-aid for scientific research dummy" were negative and significant. Consequently, the possibility that the quality of education and research environment engenders control of dropout rates was suggested in cases of both public and private colleges.

Thirdly, such variables as "living support score" and "student support score" did not have a significant effect on dropout rates. Regarding life support, students benefiting from their colleges' own scholarships, loans, and tuition discounts are limited to slightly less than 10% in both public and private colleges in this study's data, which implies that the level of support is not necessarily adequate. Although no significant correlation between the level of scholarship systems and dropout rates is evident as of now, various efforts of colleges to support their students' campus life are expected to have a controlling effect on their dropout rates. Their policies must therefore be monitored from now on.

Herein, we provide an overview of major estimation results, which validate Hypotheses 1 and 2 and a part of Hypothesis 3 of the verification hypotheses in the preceding section. Particularly the possibility that variables such as "the number of books borrowed" and "ratio of instructors to students" that change over time affect the control of dropout rates should be emphasized. Studies in the U.S. and Europe such as those of Cragg (2009) and Weiner (2008) demonstrated a positive effect of the variables, "the number of books borrowed" and "ratio of instructors to students," on college retention rates. In Japan, too, the importance of improving campus learning environments has been suggested. These variables are related to the degree to which "learning opportunities" that students themselves find in their campus life exist.

Experiencing the joy of learning conceivably increases the satisfaction of individual students with their campus life and education, leading to lower dropout rates of the entire college.

Rate of standard year graduation

The results of panel data analysis regarding the rate of standard year graduation are presented in Table 4-5. Because a random effects model was selected in all cases of overall, public, and private colleges based on Hausman tests, the estimation results of the model are presented.

Table 4-5 presents negative significance at the 1% level of “the number of instructors per 100 students” and “the number of books borrowed” in the overall sample. It is particularly interesting however, that the “grants-in-aid for scientific research dummy” caused negative significance at 1% level, implying a tendency of those colleges that, for being more research-oriented than others, have the number of grants-in-aid for scientific research higher than the median have a lower percentage of students graduating within standard academic years. This tendency persists even when the sample is divided between public and private colleges.

Considering that the “grants-in-aid for scientific research dummy” is negatively significant in the estimation of dropout rates, research-oriented institutions might tend to have more students than other colleges who repeat a year but who graduate without dropping out. Although exactly how such a tendency should be evaluated poses a difficult question, the authors consider that controlling dropout rates should be prioritized over raising the rates of standard year graduation. Therefore, the characteristics of research-oriented universities described above should not necessarily be regarded as an alarming matter.

The “standard score first quartile dummy” was significant at the 1% level only in the case of private colleges. This suggests the possibility that standard scores do not affect dropout rates and the rates of standard year graduation in public colleges, in contrast to the case of private colleges.

4.5 Conclusion

This study has specifically addressed the issue of the increasing number of dropouts in higher education and examined, using panel data, how the learning and living environment of college affects the control of students’ withdrawal and graduation within standard academic years.

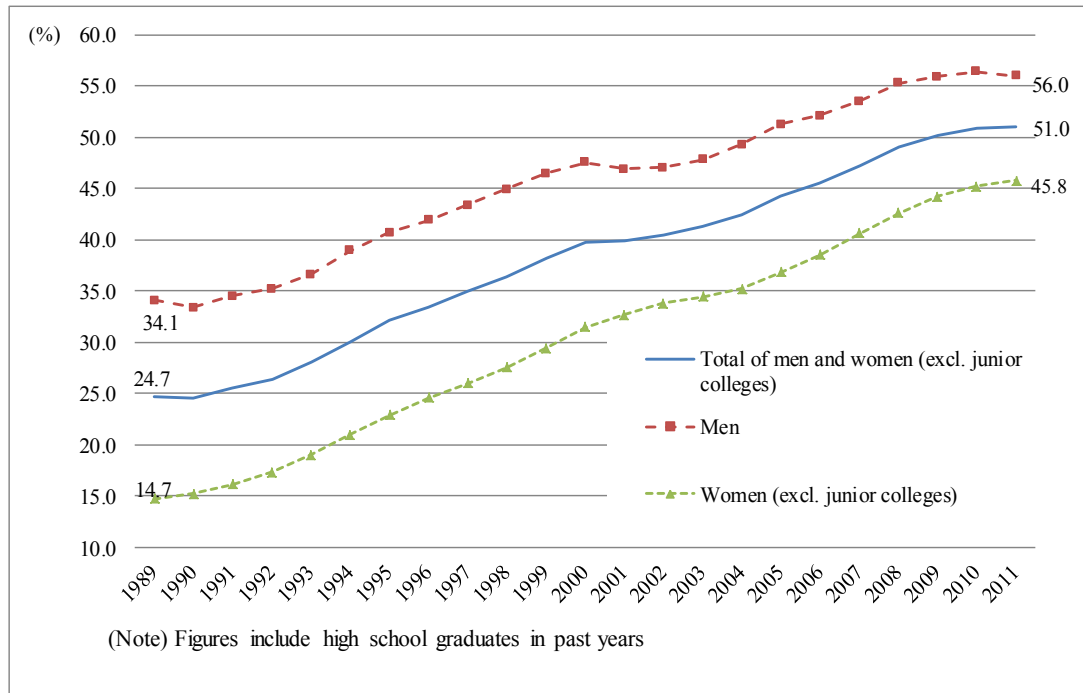
The estimation results of econometric analysis reveal that “deviation scores” used as the proxy indicator of students’ academic skills at the time of college entry have a strong effect on the dropout rates. Students who have been targeting entrance exams notice after entry that “learning” in college differs from their prior education. Students who have been studying continuously in elementary school and junior and high schools are most likely more adaptive to the academic settings of the college than those who have not. More importantly, however, the analysis in this study has indicated the possibility that the conditions of learning environment provided by colleges have a certain effect on the control of dropout rates in addition to the academic skills before college entry.

The negative correlation of such variables as “the number of books borrowed” and “ratio of instructors to students” that illustrate the students’ motivation for learning and the quality of campus learning environment with dropout rates even when other variables are controlled suggests that the opinion that “students who withdraw from college without learning are already determined based on their academic skills at the time of entry” is a simplistic idea.

Finally, in the response to some limitation of this study, the following research priorities are recommended.. First, whereas the data on “the number of instructors per 100 students” and “the number of books borrowed per year” were used as variables to explain the learning environment, there are other variables that are considered important in describing the college learning environment. Therefore, continuous efforts to identify factors that are effective in controlling dropout rates from a range of perspectives are necessary.

In the analytical results presented this time, the variables for “life support” and “learning support” showed no significant correlation with “dropout rates” and “rates of standard year graduation.” As demonstrated by prior foreign studies, effective “life support” and “student support” are nonetheless likely to increase students’ motivation for learning and to reduce dropout rates substantially. *The Capability of Universities* survey of the Yomiuri Shimbun and *the University Ranking* of Asahi Shimbun used for this study assess the “life support” and “learning support” of each college and university from diverse perspectives ever year. Using different approaches to analyze the quality of these indicators carefully might therefore produce results that differ from those obtained from this study. The study in this respect remains as a future task for the authors.

Figure 4-1: Changes in the percentage of high school graduates going to college



(Source) MEXT, School Basic Survey

Table 4-1: Definitions of variables used and sources of data

Variable Name	Definition	Year	Source
Dropout Rate (1 yr)	% of dropouts within 1 year from entry	2007-2009	<i>Capability of Universities</i> 2008 - 2011, Yomiuri Shimbun,
Dropout Rate (4 yr)	% of dropouts within 4 years from entry	2007-2009	Id.
Rate of Standard Year Graduation	% of students graduated in 4 years	2007-2009	Id.
# of Instructors per 100 Students	# of full-time instructors/# of students	2007-2009	<i>Capability of Universities</i> 2008 - 2011, Yomiuri Shimbun
Living Support Score	(# of students provided with college's own scholarships, loans, or tuition discounts)/# of all students	2008	Id.
Learning Support Score	Assessed each of (1) PBL, (2) seminars/labs, (3) place for group study, and (4) group study classes on a scale of 0-3	2009	Id.
Deviation Score (Quartile Dummy)	Average deviation score of all faculties and departments. Prepared 4 dummy variables (1st quartile dummy to fourth quartile dummy) depending on the value	2009	Sundai preparatory school, <i>2010 Target Line for Success</i>
# of Books Borrowed	# books borrowed by students per year/# of students	2007-2009	Asahi Shimbun, <i>University Ranking</i> (yearly issues)
Grants-in-aid for Scientific Research Dummy	Colleges with the number of new/continued MEXT grants-in-aid for scientific research higher than the median are 1; the rest are 0	2007-2009	Id.
Year of College Foundation ¹⁾	Year of establishment as a college/university based on government approval	/	<i>Capability of Universities</i> 2011, Yomiuri Shimbun,
Established University Dummy	Universities founded in and before 1950 are 1; the rest are 0	/	Id.
New College Dummy	Universities founded in and after 2001 are 1; the rest are 0	/	Id.
Public College Dummy	Public colleges are 1; the rest are 0	/	Id.
Private College Dummy	Private colleges are 1; the rest are 0	/	Id.

(Note) For colleges that have been merged, the survey asked the year of merger.

Table 4-2: Descriptive statistics of variables used (2007-2009)

	Overall (491 colleges: N×T=1244)				Public College (136 colleges: N×T=367)		Private College (355 colleges: N×T=877)	
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Mean	Std. Dev.
Dropout Rate (%) [1 year]	2.41	2.11	0.01	15	0.79	0.66	3.08	2.14
Dropout Rate (%) [4 years]	8.16	5.52	0.5	41.1	3.80	1.88	9.99	5.52
Rate of Standard Year Graduation (%)	82.26	8.21	41.5	98.5	84.94	7.42	81.14	8.27
No. of Instructors per 100 Students	7.90	11.18	1.94	161.29	11.76	7.73	6.29	11.99
Living Support Score	0.08	0.12	0	2.14	0.09	0.14	0.08	0.11
Learning Support Score	9.43	2.34	0	12	10.32	1.70	9.05	2.47
Deviation Score Quartile Dummy (I)	25.0%	0.42	0	1	0.0%	0.00	31.9%	0.47
Deviation Score Quartile Dummy (II)	25.0%	0.44	0	1	3.0%	0.17	35.0%	0.48
Deviation Score Quartile Dummy (III)	25.0%	0.44	0	1	42.0%	0.49	19.7%	0.40
Deviation Score Quartile Dummy (IV)	25.0%	0.44	0	1	55.0%	0.50	13.3%	0.34
Number of Books Borrowed	10.46	25.52	0	535	12.90	28.12	9.44	24.30
Grants-in-aid for Scientific Research Dummy (%)	42.7%	0.49	0	1	61.6%	0.49	34.8%	0.48
Established University Dummy (%)	32.1%	0.47	0	1	48.0%	0.50	25.4%	0.44
New College Dummy (%)	11.6%	0.32	0	1	16.1%	0.37	9.7%	0.30

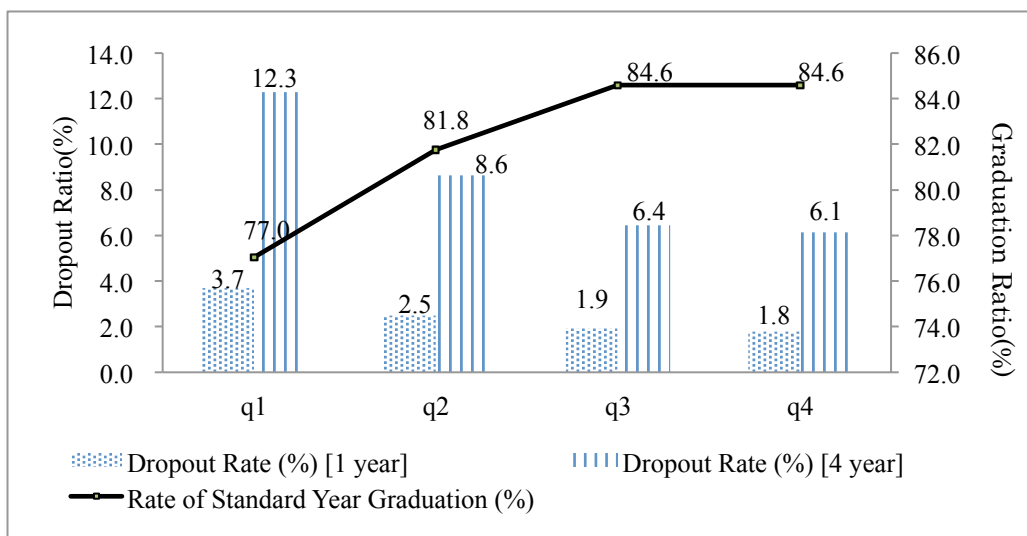
Table 4-3: Results of t-tests of differences in dropout/graduation rates based on variables

	Dropout Rate (%) [1 year]				Dropout Rate (%) [4 year]				Rate of Standard Year Graduation (%)			
	High	Low	t-value	**	High	Low	t-value	**	High	Low	t-value	
# of Instructors per 100 Students	1.4	2.8	-10.9	**	5.1	9.3	-12.8	**	84.7	81.3	6.7	**
Living Support Score	2.4	2.4	0.4		8.3	8.1	0.7		81.7	82.5	-1.7	+
Learning Support Score	2.2	2.6	-2.8	**	7.6	8.7	-3.7	**	82.7	81.8	1.9	+
Standard Deviation	1.2	3.6	-25.9	**	4.6	11.7	-29.5	**	84.6	79.9	10.6	**
# of Books Borrowed	1.9	2.6	-5.8	**	6.2	8.9	-7.8	**	84.5	81.4	6.1	**
# Grants-in-aid for Scientific Research Obtained	1.1	2.7	-10.5	**	4.3	8.9	-11.4	**	81.9	82.3	-0.6	

(Note) Each group average was calculated by assuming that the value of each variable above the mean was “high” and below the mean was “low.”

The signs **, **, and + respectively indicate that the differences in mean values are significant at 1%, 5%, and 10% levels.

Figure 4-2: Relation between the number of books borrowed per college student and dropout/graduation rates



(Source) Prepared by the authors based on the data of Table 4-1

Table 4-4: Factors of dropout rate: panel data analysis (2007–2009)

	Overall (491 colleges: n=1244)			Public college (136 colleges: n=367)			Private college (355 colleges: n=877)		
	Coef.	S.E.		Coef.	S.E.		Coef.	S.E.	
# of Instructors per 100 Students	-0.021	0.00	**	-0.043	0.01	**	-0.154	0.04	**
Learning Support Score	-0.006	0.02		0.055	0.07		/	/	
Living Support Score	-0.204	0.47		1.498	1.25		/	/	
Standard Score (1st Quartile)	1.582	0.18	**	/	/		/	/	
Standard Score (2nd Quartile)	1.251	0.16	**	0.744	0.71		/	/	
Standard Score (3rd Quartile)	0.121	0.15		-0.350	0.26		/	/	
# of Books Borrowed	-0.020	0.01	**	-0.047	0.01	**	-0.002	0.009	
Grants-in-aid for Scientific Research Dummy	-0.191	0.07	**	-0.307	0.16	+	-0.121	0.062	+
Established University Dummy	0.001	0.13		0.131	0.26		/	/	
	rho = 0.264			rho = 0.264			rho = 0.929		
[Hausman test statistics]	5.37			2.61			16.2		
[Adopted model]	Random Effects Model			Random Effects Model			Fixed Effects Model		

Table 4-5: Factors of rate of standard year graduation: panel data analysis (2007–2009)

	Overall (491 colleges: n=1244)			Public college (136 colleges: n=367)			Private college (355 colleges: n=877)		
	Coef.	S.E.		Coef.	S.E.		Coef.	S.E.	
# of Instructors per 100 Students	0.008	0.00	**	0.020	0.01	**	0.006	0.00	*
Learning Support Score	0.007	0.01		-0.016	0.03		0.012	0.01	
Living Support Score	-0.356	0.25		0.194	0.51		-0.534	0.29	+
Standard Score (1st Quartile)	-0.541	0.09	**	/	/		-0.451	0.12	**
Standard Score (2nd Quartile)	-0.205	0.08	**	0.050	0.28		-0.144	0.11	
Standard Score (3rd Quartile)	0.026	0.08		-0.032	0.10		0.077	0.12	
# of Books Borrowed	0.006	0.00	**	0.015	0.01	**	0.003	0.00	
Grants-in-aid for Scientific Research Dummy	-0.255	0.03	**	-0.304	0.05	**	-0.217	0.03	**
Established University Dummy	0.035	0.07		-0.043	0.10		0.105	0.08	
	rho = 0.683			rho = 0.511			rho = 0.761		
[Hausman test statistics]	5.37			7.44			3.67		
[Adopted model]	Random Effects Model			Random Effects Model			Random Effects Model		

Chapter 5: Government Subsidy Impact on Private University

Management in Japan

5.1 Introduction

In recent years, the ratio of high-school graduates proceeding to higher education in Japan has increased dramatically. More than 50% of new high-school graduates have enrolled in undergraduate programs since 2009, leading to the circumstances prevailing today, where “one in two is a college graduate.”¹⁷

A salient feature of higher education in Japan is that it has disproportionately numerous private universities compared to national and public universities. According to data from *the School Basic Survey* conducted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), private universities accounted for 77% of all 780 universities in 2011. In addition, the number of private university students has reached 73% of all students. These values are higher than in other OECD countries (OECD 2013).

The government expends vast funds on higher education every year. Along with national and public universities, most private universities receive government subsidies as well. Figure 5-1 exhibits the recent trend of total amounts of government subsidies granted to private universities. As the figure shows, total subsidies (general subsidy GS and special subsidy SS) amounted to about 300 billion yen in 2011, although the composition ratio of GS and SS changed dramatically that year according to the change of government. Most private universities depend heavily on student tuition fees as a main financial resource. Simultaneously, most are supported by government subsidies to a considerable degree. The subsidy amount strongly affects the management of private universities. Both GS and SS are significantly related to the number of students and faculty and staff members (Sanusi and Oyama 2008). Therefore, probably most private universities as well as national and public universities are publicly responsible for providing higher education.¹⁸ Universities are expected to justify the contents of the

¹⁷ According to MEXT, the number of high school students declined by about 20,000 in 2011 from the prior year, although the number of undergraduate students increased by more than 10,000, the most in the past. According to data from 2011, the percentage of high-school graduates entering undergraduate and associate degree programs has reached 56.7%.

¹⁸ In the Central Education Council on March 26, 2012, MEXT submitted a report titled “University education encouraging students to continue to study and to motivate them to think

higher education services that they provide.

Nevertheless, few reports to date have described investigations of the impact of government subsidies for private universities on the quality of higher education and student performance. In recent years, the number of students dropping out from higher education has been increasing, especially in private universities in Japan. The necessity has been growing for verification of the relations between university management and actual study, research, and life environments, and students' motivation for learning.

Therefore, this study was conducted using data of government subsidies for private universities from MEXT and other datasets to examine the role of government subsidies for private universities comprehensively, assessing the effects on university management in terms of education and research environments. Based on the results, the author evaluates the current impact of government subsidies and discusses several policy implications.

This chapter is structured as follows: First, Section 5.2 presents an overview of previous studies. Next, Section 5.3 explains the analytical methodology used for the analysis. Section 5.4 presents a description of the estimated results. Lastly, Section 5.5 concludes the study and presents a discussion of future research prospects.

5.2 Previous Research

Kaneko (2010) analyzed the difference of management systems between Japan's higher education institutions and the American case, particularly addressing resource the allocation. His study found that Japan's higher education institutions should evaluate the efficiency of management resource allocation and should strive to enhance their students' motivation for learning and performance. Additionally, he described that the government should become actively involved in assessing higher education institutions as well. He also refers to the Good Practice program introduced since 2003 in Japan, stating that universities faced with financial issues must undertake policies that efficiently promote the renovation of study and research environments.¹⁹

In addition, related to Kaneko's research, Maruyama (2009) estimated the education cost per student using the datasets of consumption expenditure by private

spontaneously throughout their lives," demonstrating that higher education institutions, including private universities, are increasingly expected to offer all kinds of information related to university education and their students' study environment to ensure the quality of higher education.

¹⁹ In the Good Practice (GP) program, MEXT chooses the several prominent education programs of national, public, and private universities and financially supports them. The universities which have been accepted are required to offer information related to the performance of the program for society.

universities themselves from 'Finance of private universities' in 2001 by the Promotion and Mutual Aid Corporation for Private Schools of Japan. He pointed out that the sum of average levels of student fees (per student) and government subsidies for the promotion of private universities reaches 120.8 thousand yen (per student), whereas education costs per capita for students amount to 97.1 thousand yen. Therefore, the monetary value of the higher education provided by universities is below the required level. Maruyama argues further that private universities should disclose details related to the relation between education costs for students and tuition.

Regarding the analysis examining the relation of the educational outcomes and study environments, Weiner (2008) reported a positive relation between library performance and students' evaluation of universities. Based on the research, the quality of libraries is strongly influential on students' satisfaction with their campus life.

Specifically addressing Japanese private universities, they probably depend heavily on student tuition fees. However, most universities are supported financially by government subsidies to some degree. Moreover, both GS and SS from the government are related closely to the number of students, and members of faculty and staff (Sanusi and Oyama 2008) as described above. To improve the quality of higher education in Japan, universities and government should accumulate knowledge related to management strategies for higher education that can produce good performance.

5.3 Methodology

5.3.1 Hypothesis

The econometric analyses undertaken for this study assess the effects of government subsidies for private universities on the life and study environment of students, incorporating student evaluations of their campus lives. If universities use their funds effectively for reinforcing their academic environments, then several indicators reflecting the life and study environment of students can be expected to achieve high performances.

Additionally, the differential impacts, if any, of GS and SS are examined because each subsidy type has particular characteristics. Each can be expected to have a different impact on the management of higher education institutions. Regarding econometric methods, mediation analysis is used in addition to the ordinary least squares (OLS) method to confirm the processes related to how government subsidies for private universities affect their students' performance.

5.3.2 Variables

Definitions of variables and data sources are presented in Table 5-1. This study uses subsidy data for higher education institutions published by the Promotion and Mutual Aid Corporation for Private Schools of Japan. To examine the relation between subsidies and the education environment of universities, the data were collected from the *Capability of Universities* survey (issued yearly) published by Yomiuri Shimbun (Education reporting team) and the *University Ranking* by Asahi Shimbun Publications.

As key independent variables, GS and SS are used. The former, GS, is generally provided for the costs of education and research such as salaries for faculty members under the law, whereas SS is provided for specific programs such as the development of the education environment.²⁰

This analysis specifically examines three aspects by which the life and study environments of university students are evaluated. First, a variable explaining the level of living support for students was produced. The *Capability of Universities* survey offers information related to the universities' own scholarships and loans or the percentages of students granted full or partial tuition waivers among all students. Therefore, the variable of living support is defined as the rate of respondents receiving scholarships and/or tuition discounts which had been adopted at the discretion of the universities.

Second, this study includes a variable showing the level of study environment to stimulate students' motivation for learning actively. The number of books per student in the library is regarded as a variable representing the study environment, based on previous studies such as that by Weiner (2008).

Third, a variable related to the research level in the university was set by adopting the number of grants-in-aid from the government per researcher as a variable. The higher the research level of a university, the better the learning environment which can be offered to its students.

In the first stage of the analysis, using each variable above as a dependent variable, it was estimated whether the life and study environment of students is affected by the level of government subsidy for the university through the governance of management. Furthermore, additional control variables were used: student-sufficiency ratio, deviation score quartile dummy variables, and a new university dummy variable to enhance the analytical precision. The student-sufficiency ratio, the rate of the number of students

²⁰ The government provided SS for private universities in the following four fields until 2006: (1) Promotion of graduate schools, (2) Support for research, (3) Improvement of the education study environment, and (4) Enforcement of information and communication facilities. Since 2007, the Promotion and Mutual Aid Corporation for Private School of Japan has taken over affairs related to the subsidy instead of the government.

compared to the enrollment limit under the law, is related to the amount of GS per student, as described in the next section. Deviation score quartile dummy variables are formulated according to statistical data obtained from the Sundai Preparatory School. The new university dummy is set as unity if the university was founded during the years since 2001.

Furthermore, as a second stage of analysis, the average dropout rate during four years for students was set as the key independent variable. Dropout rates are regarded as an alternative variable to those reflecting student's satisfaction with campus life. The Yomiuri Shimbun comprehensively reported each university's dropout rate in 2008.²¹ This indicator is probably an alternative variable also for evaluating the quality of higher education. According to the Japan Institute for Labour Policy and Training,²² a significant relation exists between dropping out from the university and having an insecure labor status such as being a non-regular employee. The growing dropout ratio is thought to exert bad effects not only on each university itself, but also on the Japanese economy.

The analysis checks the relation between the dropout rate of each university and a set of variables related to a living and learning environment. According to studies conducted by Robbins et al. (2004) and Willcoxson (2010), the dropout ratio is strongly correlated to the environment that a college offers its students.

Table 5-2 presents descriptive statistics of the variables used for the sampled private universities analyzed. Data of variables with missing values are excluded. Therefore, descriptive statistics are based on the total sample of 341 private universities. Table 5-2 shows substantial disparities among the amounts of GS per student and SS per student among universities. The range of GS is from 13 to 3,059 thousand yen and that of the SS is from 0 to 1,017 thousand yen. In addition, the average percentage of students receiving universities' own scholarships, loans and/or tuition discounts is only about 8% in total. The number of library books per student, representing the education environment for students, is about 117 on average. Regarding the amounts of grants-in-aid for scientific research, only about 12% of teachers acquire grants-in-aid.

5.4 Estimation Results

5.4.1 Relation between Subsidies, Student-sufficiency Ratio and Dropout Ratio

²¹ Since the 1950s, every university has been obligated to report the dropout ratio to the government every year. However, no results have been released to the public since then.

²² The Japan Institute for Labour Policy and Training (2012)
<http://www.jil.go.jp/institute/reports/2012/0148.htm>

First, this paper confirms the relation between government subsidies, the student-sufficiency ratio, and the dropout ratio. The student-sufficiency ratio is an important indicator for the management of private universities. As described above, this is defined as the ratio of the number of enrolled students to the enrollment limit under the law. For the analysis, the student-sufficiency ratio is changed into four dummy variables representing the first to fourth quartiles. Figure 5-2 portrays the average levels of government subsidies (GS and SS) and the dropout ratio by quartile class.

Figure 5-2 clarifies several important points. First, the average student-sufficiency ratio in the lowest 25% universities is low, about 71%, whereas the average in the second lowest 25% universities is 99%, which means that the number of students is almost equal to the admission capacity. In addition, in the second highest 25%, the average is 112%; in the highest 25%, it is extremely high, 123%.

Secondly, regarding the dropout ratio, the universities in the lowest 25% reported the average of 13.1%, which is over 1.5 times higher than the 7.5% of universities in the highest 25%. Therefore, it is possible to infer a negative relation between the dropout rate and the student-sufficiency rate.

Thirdly, Figure 5-2 portrays the different trends of each subsidy. Regarding GS per student, universities in the second lowest 25%, where the student-sufficiency ratio is almost 100%, receive the highest GS per student because, as described in section 1, the government has set a rule that the amount of GS is decided according to the management of enrolled students as well as the size of the educational organization, the ratio of education research expenses to the student's payments, and the extent of information disclosure. The sum of the second quartile group reaches about three times as much as that of the fourth quartile group.

Fourth, the student-sufficiency ratio seems to be unrelated directly to the SS, but the universities in the second quartile group receive SS most and follow the first quartile group, the third quartile group, and the fourth quartile group in this order, which is the same as the case of GS.

Based on the results presented above, it can be concluded that both GS and the SS per student are higher at universities where the student-sufficiency ratio is nearly 100%.

5.4.2 *t*-test

Student *t*-tests were used to assess the relation between each subsidy and environmental factors of universities. Table 5-3 presents the *t*-test results for the difference between two means by each variable. The average values of GS and SS are set as the thresholds to make two categories. Table 5-3 shows that clear correlation can

be inferred between both subsidies, living support score, and # of books per student at the 1% level. Universities with subsidies above the average tend to offer financial support for students and to keep more books in the library. As described in the previous section, the amount of GS is related to the management of enrollment limit and size of university. It can be thought that better management underpins a better life and study environment of students. In addition, SS is offered to specific study and research programs. It is expected that they improve the study and life environment as they do for GS through different processes. Furthermore, regarding the dropout rate, the tendency of low dropout rates can be confirmed for universities with more subsidies and an almost adequate student-sufficiency rate (0.8–1.1).

5.4.3 Regression Analysis

To confirm the robustness of *t*-test results, the impact of government subsidies on variables related to the campus life of students was examined using normal OLS. In the analysis, four explained variables were incorporated: living support score (logit transformation value), the number of books in the library per student (logarithmic value), the number of grants-in-aid per teacher (logarithmic value), and the dropout rate (logit transformation value). As explanatory variables, this study used the student-sufficiency rate, the new university dummy, and the quartile dummy variables of the deviation score, a new university dummy variable, in addition to government subsidies. The new university dummy represents universities established in 1990 or later. Importantly, the correlation between both subsidies is high (about 0.8), so the effect of each subsidy was confirmed using separate econometric models without including both variables simultaneously.

Table 5-4-1 and Table 5-4-2 present the estimated results of the case including GS as an explanatory variable. To consider the scale and the management level of university, the samples of universities were categorized according to the level of the student-sufficiency ratio (SSR). Private universities with SSR higher than 1.1 can probably enroll many students. The analysis assessed whether any difference is attributable to the number of students. In addition, Table 5-5-1 and Table 5-5-2 present the estimated results for the case of SS based on a similar process to that used for GS.

These results engender several important points. First, both GS and SS have negative correlations with the amount of the dropout ratio. As a general trend, the dropout rate decreases as each subsidy increases. In addition, a significant and positive association was found for both subsidies with the number of library books per student in

all samples. The subsidy levels are correlated with good study environments in the libraries that students use.

Second, in the case of limiting the samples to universities with student-sufficiency rates (SSR) higher than 1.1, it can be confirmed that both subsidies have positive associations with the living support score. Therefore, universities with numerous students tend to provide active financial support if they acquire sufficient government subsidies. This trend applies to the case of the number of grants-in-aid for scientific research per teacher. Researchers tend to acquire more grants-in-aid for their research if they work at universities in which the level of student-sufficiency ratio and subsidies are both high. Furthermore, a university for which an average deviation score is high tends to achieve a low dropout ratio, although its livelihood support for students is insufficient. This result differs from the representative analysis of foreign studies (Ishitani and DesJardings 2002; Hermanowicz 2006; Tinto 2006) because the amounts of financial support for students in Japan are greatly limited at many universities.

Figure 5-3 presents a histogram of the percentage of private universities offering financial support for students. As this figure shows, probably the percentage of students receiving any scholarship provided by universities is extremely low. As a result, financial support for students is not related to the reduction of the dropout rate.

5.4.4 Mediation Analysis

In addition to regression analysis, the framework of mediation analysis has been employed to address this issue. Mediation analysis was originally proposed by Baron and Kenny (1986) and has been developed by MacKinnon, Fairchild, and Fritz (2007), and others. Mediation analysis can measure the extent to which mediators mediate the impact of an independent variable on a dependent variable, with a set of covariates controlled for.

This analysis set life and study environment indicators as mediator variables. Concretely, the following three variables were used; logit transformation of living support score, logarithm of number of books in the library, logarithm of Grants-in-aid for scientific research. As a dependent variable, dropout ratio was employed, which is considered to be related to the evaluation of students for the university. The general subsidy (GS) per student and the special subsidy (SS) per student are used as key independent variables. In addition, the following covariates were controlled; Student-sufficiency ratio, a new university dummy, deviation score's quartile dummy variables.

Figure 4-4 shows the result of the mediation analysis when the general subsidy per capita was used as the independent variable affecting the dropout ratio of university through the change in living support and study environments for students. Also, Figure 4-5 shows the results verifying the mediation effects of the special subsidy per capita. In all figures, the coefficients and statistical significances of the subsidy and three mediator variables were showed, and omitted the other information in the interest of the space.

These figures showed the following points. First, both general subsidy and special subsidy are correlated to dropout ratio through the effect of the change in the mediator of the Grants-in-aid for scientific research in addition to the direct effect. Namely, these subsidies are thought to indirectly contribute to the reduction of the dropout ratio through the improved study environment by the Grants-in-aid for scientific research in the total samples, in addition to the direct effect that they have.

Second, when focusing on the model restricting the sample to universities whose student-sufficiency rate is high (above 1.1), both subsidies are indirectly negatively correlated with the dropout ratio through the improvement of study environment within the library, in addition to the direct effect.

Third, the living support score was not correlated with the dropout ratio, although both subsidies have positive relation with the living support score regarding universities whose student-sufficiency ratio is over 1.1. Therefore, the role of the living support score as a mediator for subsidies and dropout ratio is limited.

Fourth, the effects of the general subsidy and the special subsidy for the dropout ratio are very similar according to the estimated results of mediation analysis. However, the impact of the special subsidy is larger than that of the general subsidy.

5.4.5 Quantile Regression

Furthermore, quantile regression has been conducted because the performance of private universities is likely to be affected by the amounts of respective subsidies. Quantile regression enables examination of the effectiveness of subsidies on private universities according to the level of explained variables.²³ The explained variables are the value of the dropout rate or the number of books borrowed per student. Table 5-6 and Table 5-7 respectively present results of quantile regression and ordinary least squared analysis when each subsidy per capita was used as a dependent variable.

²³ Regarding variable parameter estimates in the quantile regression model, additional details are available from Koenker and Hallock (2001).

These tables presented the following points. First, regarding the dropout rate, the general subsidy was significant and negative in 75th quantile regression. In addition, the special subsidy was significant and negative in the 25th and 50th quantile regression. It can be inferred, therefore, that GS is significantly related with the dropout ratio at universities with a higher dropout ratio, although SS is significantly related at universities with a lower dropout ratio.

In the model for which the dependent variable is the number of books borrowed per student, the number of books per student was found to be significant and positive, although neither subsidy was found to be significant. Neither subsidy shows correlation with the number of books borrowed, but correlation was found with the number of books per student. Moreover, the study support score was positive, showing stronger correlation at universities where students borrow more books. Even after controlling for the number of books and academic ability, study support was found to have a strong influence on the number of books borrowed, the proxy variable of student motivation for learning.

5.5 Conclusion

This paper specifically examined the association between government subsidies for private universities and the quality of higher education that they provide, considering the problem of an increasing number of students dropping out from universities. The author investigated how GS and SS are related to each university's dropout ratio, study support, financial support, and other environmental factors.

According to estimation results obtained using OLS method, the dropout ratio decreases significantly as each subsidy increases. In addition, for all samples, both subsidies were found to have a significant and positive association with the number of library books per student.

It is particularly interesting that both subsidies have positive associations with the living support score when restricting the sample to universities for which the student-sufficiency rate is higher than 1.1. Results show that universities accepting numerous students tend to provide more financial support for them according to the level of subsidy. This trend applies also to the number of grants-in-aid for scientific research per teacher. Researchers tend to acquire more grants-in-aid for their research at universities that are successfully recruiting students.

Thirdly, according to the estimated results of our mediation analysis, the possibility can be indicated that both subsidies contribute indirectly to reduction of the dropout ratio through the improved study environment attributable to grants-in-aid for scientific

research in the total samples, in addition to the direct effect. Furthermore, if the sample is restricted to universities for which the student-sufficiency rate is high (above 1.1), then both subsidies can be found to mitigate the increasing dropout ratio indirectly through improvement of the study environment within the library, in addition to the direct effect.

Fourth, regarding the results of quantile regression, universities receiving more subsidies with strategic policies tend to be successful at improving the life and study environments of students, leading to improved student performance and a higher reputation from the viewpoint of student retention and learning motivation. Universities that properly manage study support tend to lead students to read more books.

However, the role of living support as a mediator for subsidies and the dropout ratio is limited. Under the present circumstances, the percentage of students receiving any scholarship provided by universities is extremely low. As a result, financial support for students is unrelated to the dropout rate reduction. Additionally, in many estimated results, the direct effects of both subsidies for the dropout ratio were confirmed. Especially, the scale of the SS coefficient is larger than that of the GS coefficient. These results show the necessity of examining details of other processes of the spillover effects of subsidies affecting dropout rates.

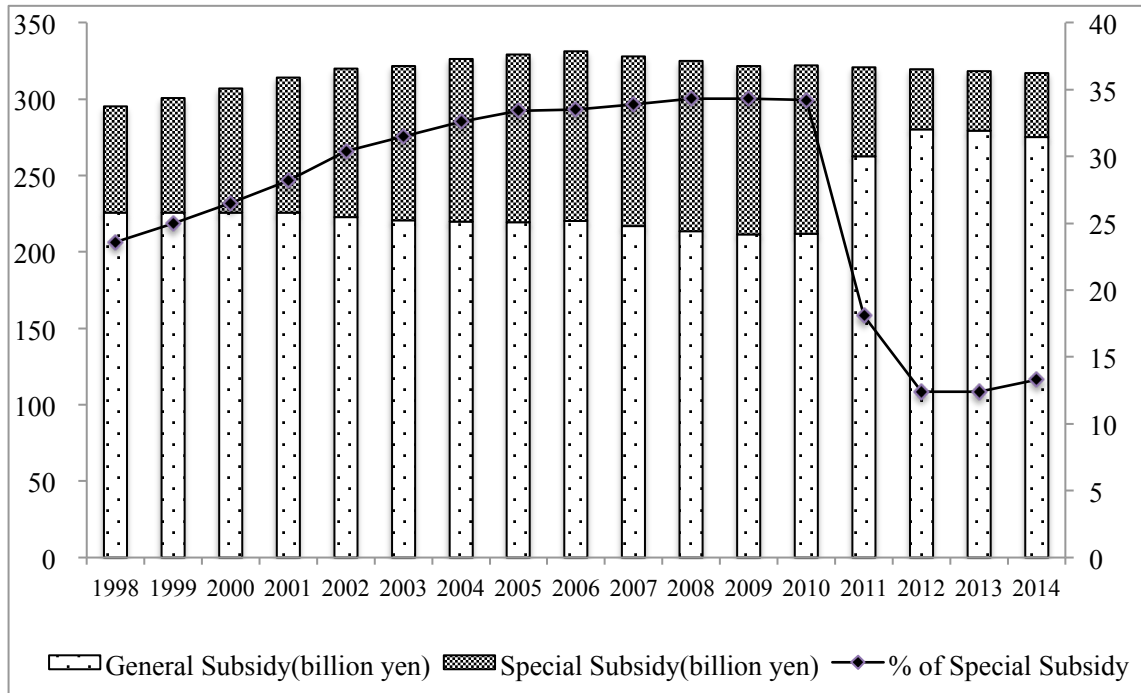
These results show that universities receiving more subsidies with strategic policies tend to improve the life and study environments of students. Importantly, several estimated results suggest that the university management is closely related to the retention of students through the improvement of the study environment. It is desirable for private universities to manage their finances appropriately and to use government subsidies strategically so that they can motivate students to study, and to train them to think and act spontaneously. Each university should review and assess the manner by which educational policies influence student motivation learning conditions. By releasing the assessment results to the public, many higher education institutes can learn more effective policies and can improve their managements by adopting other universities' best practices, which can be regarded as raising the effectiveness of higher education in Japan.

The management personnel and their staff of private universities usually earnestly engage in the application for government subsidies because they suffer severe penalties if they mistakenly report the contents of university management more than once. However, they tend to have less interest in the evaluation of outcomes than in the stage of application for the subsidy. Efforts at evaluating university management are crucially important for improving the quality of higher education.

Limitations of this study include the following. First, the impact of other alternative variables reflecting the life and study environments should be investigated to evaluate a wider range of respect and to verify the robustness of the estimated results.

Second, as is often the case with cross-sectional analysis of this type, this study was unable to identify any causality precisely between government subsidies for private universities and the environment factors for students. In addition, the endogeneity of dropout rates should be considered explicitly. Longitudinal analysis conducted in a dynamic framework in the near future, mediated by the study environments of students, might identify the roles of subsidies more precisely.

Figure 5-1: The recent trend of each subsidy



(Source) Higher Education Bureau, MEXT, and the Promotion and mutual aid corporation for Private Schools of Japan

Table 5-1: Definition of variables used and data sources

Variable Name	Definition	Source
General Subsidy per Student	amount of GS per year /# of Students	The Promotion and Mutual Aid Corporation for Private Schools of Japan
Special Subsidy per Student	amount of SS per year /# of Students	The Promotion and Mutual Aid Corporation for Private Schools of Japan
Number of Student		Yomiuri Shimbun Capability of Universities 2011
Student-sufficiency ratio	# students /# of admission capacity	Yomiuri Shimbun Capability of Universities 2011
Dropout Ratio	% of dropouts within 4 years from entry	Yomiuri Shimbun Capability of Universities 2011
Living support score	(# of students provided with college's own scholarships, loans, or tuition discounts)/# of all students	Yomiuri Shimbun Capability of Universities 2011
1) Year of University Foundation	Year of establishment as a college/university based on government approval	Yomiuri Shimbun Capability of Universities 2011
New university	University established after 1990	Yomiuri Shimbun Capability of Universities 2011
Number of Books Borrowed	# books borrowed by students per year/# of students	Asahi Shimbun University Ranking
Number of Books per Student	# books /# of Students	Asahi Shimbun University Ranking
Number of the Grants-in-aid for scientific research per Instructor	# Grants-in-aid for scientific research per year/# of Instructors	Asahi Shimbun University Ranking
Standard Score (Quartile Dummy)	Prepared 4 dummy variables (first quartile dummy to fourth quartile dummy) depending on the value	2) Sundai preparatory school "2010 Goukaku Mokuhyou Rank (target passing scores)"

Note 1) For colleges that have been merged, the year of merger is used.

2) See the website of Sundai preparatory school (https://www.i-sum.jp/sum/sum_page/topics/unvrank_s/rank.cfm)

Table 5-2: Descriptive statistics of the variables

Variable Name	Obs	Mean	Std. Dev.	Min	Max
General Subsidy per Student (thousand yen)	341	165.57	356.42	12.93	3058.56
Special Subsidy per Student (thousand yen)	341	65.30	99.76	0	1017.21
# of Student	385	4391	6696	51	69363
Year of University Foundation	386	1971	24	1872	2009
Student-sufficiency ratio	384	1.00	0.22	0.08	1.95
Dropout ratio	356	9.76	5.38	0	31.3
Living support score	385	0.08	0.12	0	0.87
# of Books Borrowed	368	9.73	10.50	0.4	90.4
# of Books per Student	368	117.09	86.89	0	727.13
# of the Grants-in-aid for scientific research per Instructor	332	0.12	0.14	0	1.42

Figure 5-2: Relation between student-sufficiency ratio (quartile) and subsidies/ drop out ratio

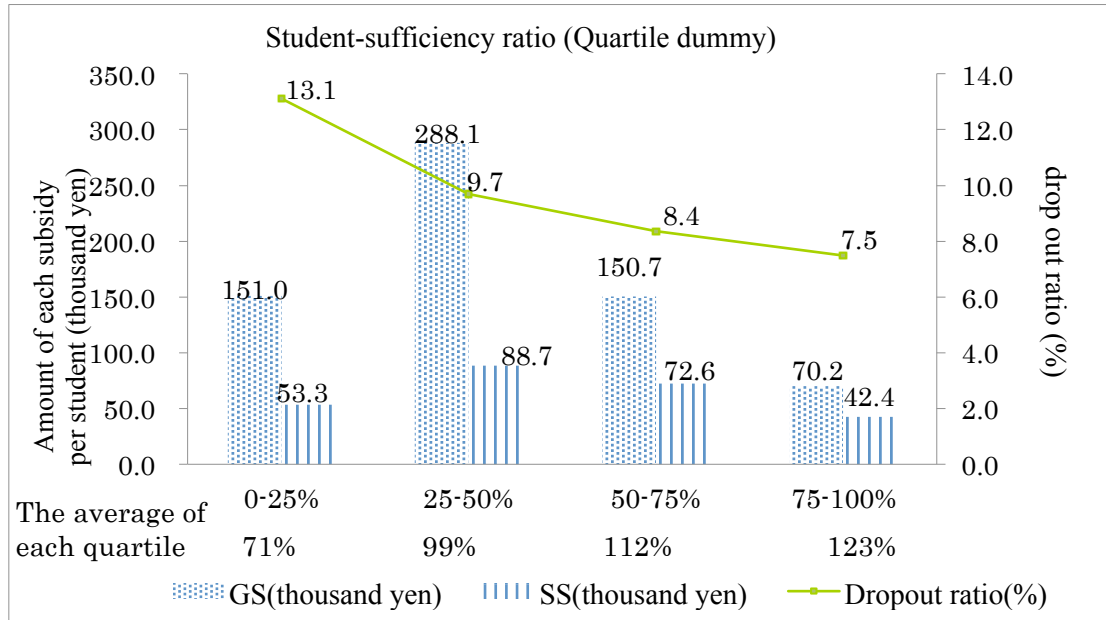


Table 5-3: Results of *t*-tests of differences in each subsidy

		Living support score	# of Books per Student	#Grants-in-aid for research subsidy per Instructor	Dropout ratio		
					Ssratio \geq 1.1	0.86 < Ssratio < 1.1	Ssratio \leq 0.86
General Subsidy	high	0.11	175.51	0.14	10.11	-7.85	-13.50
	low	0.07	98.18	0.09	9.56	-10.93	-13.06
	t-value	3.62 ***	7.93 ***	-4.09 **	0.90	-2.94 ***	0.32
	Prob.	0.00	0.00	0.00	0.37	0.00	0.75
Special Subsidy	high	0.10	141.88	0.15	8.20	-8.68	-15.72
	low	0.07	106.66	0.08	7.54	-10.67	-12.03
	t-value	2.68 ***	3.61 ***	-3.61 **	0.87	-1.91 *	2.72 ***
	Prob.	0.01	0.00	0.00	0.39	0.06	0.01

(Note) The signs **, *, and + respectively indicate that the differences in mean values are significant at 1%, 5%, and 10% levels.

Table 5-4-1: Regression analysis (Total sample) [General Subsidy]

Dependent Variable	Living support score (logit)		# of Books per student (log)		# of the Grants-in-aid per Instructor (log)		dropout ratio (logit)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Standard score quartile2	-0.91	0.17 **	-0.22	0.09 *	0.16	0.14	-0.19	0.09 *
Standard score quartile3	-1.05	0.18 **	-0.23	0.10 *	0.18	0.15	-0.54	0.10 **
Standard score quartile4	-0.91	0.20 **	-0.10	0.11	0.59	0.16 **	-0.95	0.10 **
Student-sufficiency ratio	-1.13	0.38 **	-1.10	0.21 **	0.16	0.34	-0.44	0.19 *
New university	-0.28	0.15 +	-0.29	0.08 **	-0.10	0.12	0.01	0.07
Living support score							-0.19	0.29
# of the Grants-in-aid for scientific research per instructor							-0.33	0.19 +
General subsidy per student	0.10	0.19	0.37	0.09 **	0.02	0.13	-0.29	0.09 **
	n= 315 R ² = 0.20		n= 327 R ² = 0.20		n= 292 R ² = 0.08		n= 292 R ² = 0.47	

Table 5-4-2: Regression analysis (Student-sufficiency ratio ≥ 1.1) [General Subsidy]

Dependent Variable	Living support score (logit)		# of Books per student (log)		# of the Grants-in-aid per Instructor (log)		dropout ratio (logit)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Standard score quartile2	-0.84	0.30 **	0.00	0.19	0.85	0.27 **	-0.06	0.19
Standard score quartile3	-0.86	0.28 **	-0.23	0.18	0.52	0.24 *	-0.45	0.17 *
Standard score quartile4	-0.77	0.27 **	0.00	0.17	0.85	0.23 **	-0.87	0.17 **
Student-sufficiency ratio	2.02	1.49	2.01	0.93 *	-2.55	1.28 *	0.58	0.83
New university	0.22	0.25	-0.22	0.14	-0.49	0.20 *	0.01	0.13
Living support score							0.52	0.68
# of the Grants-in-aid for scientific research per instructor							-0.59	0.31 +
General subsidy per student	3.46	0.98 **	2.16	0.63 **	3.57	0.97 **	-1.84	0.69 **
	n= 142 R ² = 0.16		n= 149 R ² = 0.12		n= 133 R ² = 0.20		n= 132 R ² = 0.38	

Table 5-5-1. Regression analysis (Total sample) [Special Subsidy]

Dependent Variable	Living support score (logit)		# of Books per student (log)		# of the Grants-in-aid per Instructor (log)		dropout ratio (logit)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Standard score quartile2	-0.90	0.17 **	-0.21	0.09 *	0.16	0.14	-0.19	0.09 *
Standard score quartile3	-1.05	0.18 **	-0.21	0.10 *	0.18	0.15	-0.54	0.10 **
Standard score quartile4	-0.94	0.19 **	-0.04	0.11	0.52	0.16 **	-0.96	0.10 **
Student-sufficiency ratio	-1.08	0.38 **	-1.22	0.21 **	0.25	0.33	-0.37	0.19 *
New university	-0.26	0.15 +	-0.29	0.08 **	-0.08	0.12	0.01	0.07
Living support score							-0.07	0.29
# of the Grants-in-aid for scientific research per instructor							-0.28	0.19
Special subsidy per student	0.89	0.60	0.84	0.33 *	0.87	0.46	-0.94	0.29 **
	n= 315 R ² = 0.20		n= 327 R ² = 0.17		n= 292 R ² = 0.09		n= 292 R ² = 0.47	

Table 5-5-2. Regression analysis (Student-sufficiency ratio ≥ 1.1) [Special Subsidy]

Dependent Variable	Living support score (logit)		# of Books per student (log)		# of the Grants-in-aid per Instructor (log)		dropout ratio (logit)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Standard score quartile2	-0.84	0.29 **	-0.10	0.20	0.79	0.27 **	0.03	0.19
Standard score quartile3	-0.84	0.28 **	-0.31	0.18 +	0.49	0.25 *	-0.39	0.18 *
Standard score quartile4	-0.74	0.26 **	-0.05	0.17	0.83	0.24 **	-0.81	0.17 **
Student-sufficiency ratio	2.02	1.46	1.72	0.96 +	-2.96	1.29 *	0.73	0.83
New university	0.36	0.25	-0.19	0.14	-0.38	0.20 +	-0.06	0.13
Living support score							0.81	0.79
# of the Grants-in-aid for scientific research per instructor							-0.72	0.30 *
Special subsidy per student	4.54	1.10 **	1.06	0.74	2.95	0.99 **	-2.00	0.87 *
	n= 142 R ² = 0.19		n= 149 R ² = 0.06		n= 133 R ² = 0.17		n= 132 R ² = 0.37	

Figure 5-3: The percentage of private universities which provide the original financial supports

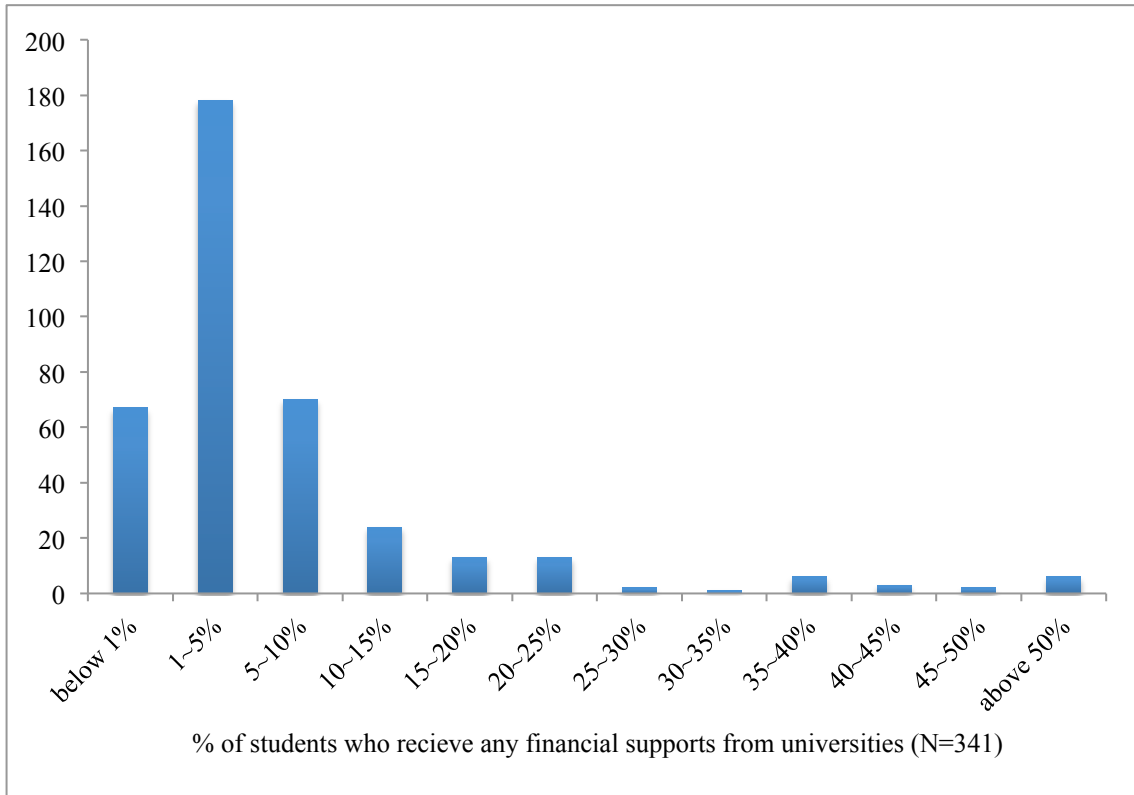


Figure 5-4: Results of mediation analysis (General subsidy)

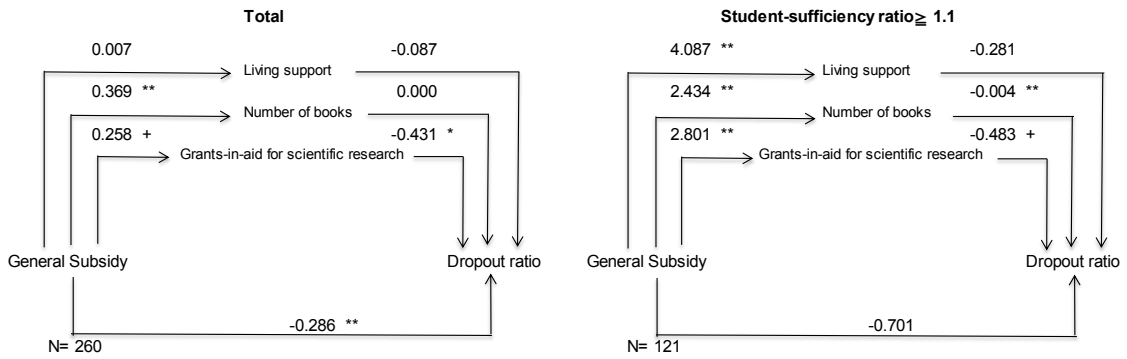


Figure 5-5: Results of mediation analysis (Special subsidy)

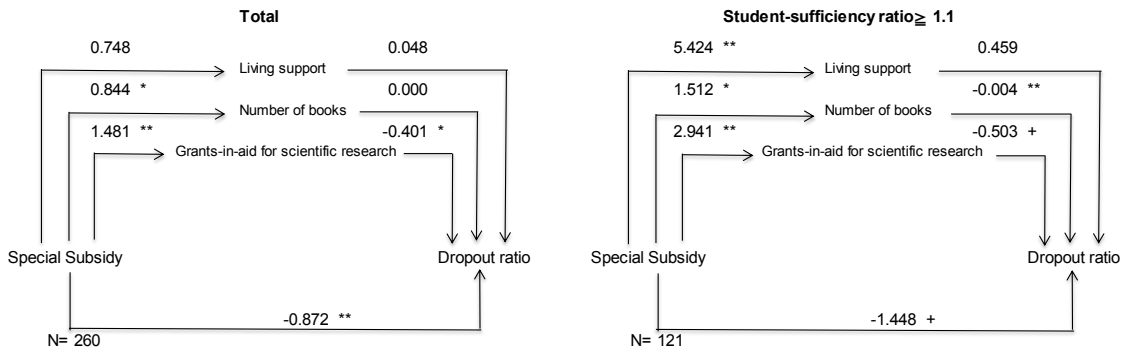


Table 5-6: Estimation results of quantile regression (dropout rate)

	25th quant.	50th quant.	75th quant.	OLS	25th quant.	50th quant.	75th quant.	OLS
# of Books per Student	-0.000597 (0.000656)	-4.51e-05 (0.000733)	-0.000259 (0.000318)	-0.000442 (0.000421)	-0.000709 (0.000561)	-0.000700 (0.000902)	-0.000369 (0.000821)	-0.000593 (0.000409)
General Subsidy	-0.232 (0.197)	-0.230 (0.154)	-0.247** (0.102)	-0.263*** (0.0917)				
Special Subsidy					-1.105*** (0.403)	-0.813** (0.363)	-0.766 (0.547)	-0.868*** (0.301)
Standard Score_Quartile1	1.065*** (0.236)	0.997*** (0.178)	0.896*** (0.155)	0.967*** (0.112)	1.012*** (0.276)	1.019*** (0.172)	0.935*** (0.123)	0.978*** (0.111)
Standard Score_Quartile2	0.877*** (0.156)	0.755*** (0.162)	0.651*** (0.108)	0.743*** (0.0888)	0.855*** (0.117)	0.751*** (0.119)	0.726*** (0.0847)	0.752*** (0.0879)
Standard Score_Quartile3	0.400*** (0.123)	0.468*** (0.123)	0.383*** (0.0876)	0.417*** (0.0832)	0.373*** (0.128)	0.483*** (0.126)	0.419*** (0.0984)	0.424*** (0.0825)
Student-Sufficiency ratio	-0.173 (0.355)	-0.113 (0.389)	-0.514** (0.251)	-0.385* (0.221)	-0.225 (0.307)	-0.195 (0.274)	-0.463 (0.332)	-0.351 (0.220)
New university dummy	-0.144 (0.180)	0.0764 (0.159)	0.157 (0.106)	0.0195 (0.0785)	-0.145 (0.135)	0.0296 (0.0912)	0.168** (0.0839)	0.0106 (0.0787)
Living Support score	0.236 (0.440)	-0.0551 (0.358)	-0.118 (0.446)	-0.178 (0.298)	0.294 (0.549)	-0.138 (0.410)	-0.0465 (0.523)	-0.0517 (0.300)
Study Support score	0.00232 (0.0252)	-0.00400 (0.0252)	0.0217 (0.0227)	0.00739 (0.0185)	0.00383 (0.0210)	-0.00873 (0.0224)	0.0121 (0.0233)	0.0103 (0.0185)
# of the Grants-in-aid for scientific research per	-0.389 (0.325)	-0.570 (0.647)	0.323 (0.497)	-0.321 (0.281)	-0.361 (0.510)	-0.529 (0.738)	0.623 (0.790)	-0.216 (0.283)
Constant	-2.899*** (0.622)	-2.667*** (0.632)	-2.104*** (0.319)	-2.407*** (0.318)	-2.810*** (0.473)	-2.477*** (0.456)	-2.149*** (0.496)	-2.453*** (0.316)
Observations	272	272	272	272	272	272	272	272
Pseudo R-squared	0.3199	0.2975	0.2851	0.477	0.3245	0.2969	0.2796	0.477

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 5-7: Estimation results of quantile regression (Books borrowed per student)

	25th quant.	50th quant.	75th quant.	OLS	25th quant.	50th quant.	75th quant.	OLS
# of Books per Student	0.00171 (0.00147)	0.00300** (0.00126)	0.00313** (0.00139)	0.00200*** (0.000589)	0.00146 (0.000989)	0.00275* (0.00152)	0.00341** (0.00142)	0.00179*** (0.000574)
General Subsidy	-0.299 (0.220)	-0.183 (0.173)	-0.272 (0.169)	-0.186 (0.125)				
Special Subsidy					-0.815 (0.920)	-0.683 (0.754)	-0.0120 (0.574)	-0.208 (0.414)
Standard Score_Quartile1	-0.869*** (0.194)	-0.607*** (0.177)	-0.341 (0.240)	-0.452*** (0.144)	-0.868*** (0.200)	-0.600*** (0.179)	-0.290 (0.319)	-0.405*** (0.141)
Standard Score_Quartile2	-0.415** (0.180)	-0.194 (0.136)	-0.0830 (0.150)	-0.127 (0.123)	-0.364* (0.206)	-0.184 (0.133)	-0.0279 (0.195)	-0.0875 (0.122)
Standard Score_Quartile3	-0.193 (0.129)	-0.0747 (0.0951)	-0.0376 (0.104)	-0.0710 (0.117)	-0.179 (0.166)	-0.0706 (0.122)	0.0106 (0.125)	-0.0354 (0.116)
Student-Sufficiency ratio	0.243 (0.305)	0.286 (0.282)	0.655 (0.603)	0.662** (0.304)	0.388 (0.341)	0.326 (0.319)	0.907* (0.509)	0.713** (0.304)
New university dummy	0.202 (0.187)	0.366** (0.147)	0.388* (0.198)	0.278*** (0.106)	0.275** (0.116)	0.339** (0.131)	0.458*** (0.152)	0.279*** (0.107)
Living Support score	0.00320 (0.462)	-0.0252 (0.320)	-0.0529 (0.281)	-0.0176 (0.0470)	-0.00338 (0.242)	-0.0244 (0.231)	-0.0564 (0.234)	-0.0177 (0.0472)
Study Support score	0.0517** (0.0227)	0.0603** (0.0275)	0.100*** (0.0386)	0.0503** (0.0255)	0.0614* (0.0313)	0.0609** (0.0280)	0.0969*** (0.0361)	0.0496* (0.0257)
# of the Grants-in-aid for scientific research per Instructor	-1.125 (1.022)	0.314 (1.030)	0.164 (0.544)	-0.137 (0.390)	-0.910 (0.843)	0.332 (0.668)	0.0929 (0.514)	-0.113 (0.395)
Constant	1.235** (0.558)	1.056* (0.556)	0.694 (0.787)	0.827* (0.438)	1.019* (0.558)	1.042** (0.498)	0.346 (0.662)	0.753* (0.438)
Observations	278	278	278	278	278	278	278	278
Pseudo R-squared	0.1202	0.0892	0.0837	0.111	0.1185	0.0851	0.0793	0.104

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Chapter 6: Conclusion

This dissertation has examined educational outcomes of Japanese higher education from the perspectives of individuals and of higher education institutions, which have not been discussed sufficiently. Specifically, this dissertation presents analyses using the following investigations: (1) the degree to which extracurricular experiences during childhood, along with socioeconomic and cultural background, influence learning attitudes at college; (2) the degree to which these learning attitudes affect salary prospects and subjective well-being in terms of happiness and labor satisfaction; and (3) whether higher education institutions can improve those educational outcomes, or not.

After introducing the recent trend of Japanese higher education and the framework of this dissertation based on the economics of education in Chapter 1, Chapter 2 presents a discussion of how study experiences during college days are related to graduates' career paths, motivation for work, and life satisfaction according to the 'learning habits' hypothesis stated by Yano (2009). Chapter 3, using the same large database of individuals' information as that used for Chapter 2, explains an examination of the effects of extracurricular activities such as Japanese traditional calligraphy on the learning attitudes of college students.

Chapter 4 and Chapter 5 specifically examined higher education institutions and analyzed the impact of university education on students' educational outcomes from a macro-viewpoint, compared to Chapter 2 and Chapter 3, which emphasized individual outcomes. Chapter 4, using panel data, described analyses of the degree to which college learning and the living environment affect the control of university student retention and graduation within the standard number of academic years. Chapter 5 proved the mechanism by which government subsidies for private universities influence university management by improving study and research environments.

Education has persisted as a center of discussion since ancient times all over the world. Noddings (2009) holds up philosophers such as Socrates, Aristotle, and Dewey as examples. Nowadays in Japan, intense attention to the economics of education indicates that society is more concerned with good and effective education for children and young people. In addition, the government specifically requires that universities deliver governance reforms under the leadership of the university president to improve efficiency in allocating resources within universities based on facts derived from integrated institutional data (Final Report of the Subcommittee on Universities of the

Central Council for Education Report, February of 2015). In spite of increasing demands for evidence-based effective education at both individual and the government levels, people continue to struggle to introduce experiments in the field of education for ethical reasons, which prevents the government and institutions from implementing drastic reforms.

A key contribution of this dissertation is its analyses of educational data comprehensively from the perspectives of individuals and of higher education institutions. The results presented in Chapter 3 reveal that extracurricular activities such as traditional Japanese learning, *shuji and soroban* (calligraphy and abacus), music school, sports school, and cram school, in addition to cultural capital in early childhood, have strong positive influences on active learning attitudes such as self-motivated choices of class, eager studying, and reading habits during college. Some extracurricular activities are especially important because they encourage learning motivation irrespective of a student's early childhood family background, which suggests that a parent's academic background and income class have no strong impact on a child's educational attainment in Japan.

For Chapter 2, by analyzing their subjective well-being, the author measured the extended educational outcomes of graduates who have already worked for years to assess learning habits. The results demonstrate that both men and women who had gained 'learning habits' during college life tend to show high levels of labor satisfaction and general happiness, even after controlling for household attributes and job attributes. Moreover, people who chose 'active choices of classes' during college life, especially men, tend to receive higher compensation in the current labor market. This fact implies that, for women in some cases, habits of studying in college did not have a strongly significant relation with their job satisfaction. Nozaki (2010) pointed out that differences in the characteristics of labor between men and women in Japan might complicate the linkage between learning in college and working in the labor market.

Although the results in Chapter 2 and Chapter 3 are important for demonstrating that peoples' happiness is determined to some degree by learning habits at universities fostered throughout experiences during childhood, the other remarkable results derived from evidence in Chapter 4 and Chapter 5 are that higher education institutions can affect students' learning attitudes by improving their learning environment. Chapter 4, using panel data of both public and private universities, presented analysis of the degree to which college learning and the living environment influence the control of students' dropping out and graduation within standard academic years. Analysis of the panel data revealed the possibility that learning environment

conditions such as the convenience of college libraries and the ratio of instructors to students affect the control of retention rates in addition to students' academic skills before college entry. This result suggests that some differences exist in retention rates and graduation rates between those colleges that have an environment that encourages motivation for learning and those which do not, even if their deviation scores are equal.

Chapter 5, using subsidy data of private universities and ordinary least squares estimation, showed evidence that subsidies have a significant and positive relation with the number of library books per student. In addition, the results of mediation analysis indicate that subsidies contribute indirectly to reduction of the dropout ratio through study environment improvements attributable to grants-in-aid for scientific research.

This chapter overviewed all analyses conducted in the previous chapters and discussed educational outcomes obtained through learning habits in addition to outcomes measured by monetary value. Some analyses should be refined using data with a higher degree of detail. Regarding university data, for instance, the impact of other alternative variables reflecting life and study environments should be investigated to evaluate a wider range of aspects and to verify the robustness of the estimated results. Moreover, cross-sectional analysis must be conducted to identify any causality between educational input and output precisely. When measuring a nonmonetary value such as subjective well-being as an educational outcome, other variables such as effort and hope for the future should be considered, which is regarded as strongly related to their happiness (Matsushima et al. 2016).

Importantly, Chapter 3 presented investigation of the experience of meeting a teacher who left a deep impression on people's life at each stage of school: elementary school, junior high school, and college greatly influence the active learning attitudes at college and reading habits. This result indicates that the effects of activities at school in addition to the family background and experiences during childhood are important to motivate students to study. In that sense, another framework to measure the social capital at school should be constructed for future research.

Policy implications are apparent based on empirical evidence to fulfill accountability in education. Decisions related to education policies based on personal experiences are much worse than conducting experiments in education. As Nakamuro (2015), Nakamura (2013), and Akabayashi et al. (2011) have reported, the collection and disclosure of educational data that are freely accessible for analysis is necessary to produce effective and evidence-based education policies through which one can make life satisfying and happy.

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