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Economic Education for Undergraduate Students in Japan: The Status Quo and Its Problem

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Undergraduate economic education has become a serious problem in these years in Japan. It is largely derived from the complicated economics contents, a rapid change of current economy, decreased scholastic attainments among students, and the disconnection of economic instruction between senior high school and university. The authors survey the recent change of applicants to and enrollments in the faculty of economics, the career economics majors pursue on graduation, and the coursework of economics faculty in some universities focusing on instruction in the basics of economics. A mathematical knowledge is the key to understanding of modern economics, but examinees can gain admission to the economics faculty of a private university without taking an entrance examination in mathematics. This raises a math problem to be solved in many universities. Then, the authors compare the results of TUCE-4 micro and macro exam to feature the economic understanding of Japanese students as against that of American students. There is a gap of economic literacy between students in high-ranked universities and those in low-ranked universities in Japan. It is proved by means of a regression analysis. A difference of economic literacy between them may cause a change of undergraduate economic education.

Introduction

In Japan, there are 773 four-year universities in 2009, and 86 of 773 universities are national, 92 are local public or established by such local governments as prefectures and municipalities, and the rest of them, *i.e.* 595 universities are private (see Table 1). Besides four-year universities, there are 406 junior colleges with mainly two-year course, and only two of 406 colleges are national, 26 are local public, and 378 are private.[1] The percentage of senior high school graduates in 2009 who went on to university or junior college (including correspondence course) to all the graduates is 53.9%, the highest figure on record.

773 universities have 2,435 faculties (schools) of which 168 faculties are those of economics,[2] and they are larger in number than any other faculties, followed by those of engineering (149) and then by those of literature (133). 168 faculties of economics comprise 36 faculties in national universities, 16 faculties in local public universities and 116 faculties in private universities. Besides the faculty of economics, some universities have economics-related faculties, such as "law and economics," "politics and economics," "political science and economics," "international politics, economics and communication," "management and economics," "economic science," "economics and management," and "home economics." The number of these economics-related faculties is very small, and the largest one among them is 17 for the faculty of home economics

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Table 1. Number of Universities and Faculties

Academic year	2003	2006	2009
University	702	744	773
National	100	87	86
Local public	76	89	92
Private	526	568	595
Faculty	1,975	2,217	2,435
Economics	168	170	168
Engineering	151	151	149
Literature	149	143	133
Law	124	125	120
Management	80	83	88
Commerce	50	49	42

Source: The Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT), *School Basic Survey*, each year edition.

in women's universities.

As for junior colleges, only two colleges have a substantial economics curriculum individually and have had recently a new enrollment of a little more than 200 together every year. Since this number of economics majors in junior colleges is so small, we will refer to universities only hereafter.

Undergraduates as Economic Majors

In 2009, applicants of admission to the faculty of economics in Japanese universities were 384,009 and this number was largest, followed by the faculty of literature, 325,509 applicants, and then by the faculty of engineering, 239,157 applicants.[3] 29,449 of the applicants to economics faculty were to national universities, 19,824 applicants were to local public universities, and 334,736 applicants were to private universities. Applicants who could successfully obtain admission to the faculty of economics, *i.e.* new enrollments or entrants were 55,050 in total. Among them, 6,790 gained admission to national universities, 3,381 did it to local public universities, and 44,879 did it to private universities (see Table 2).

As we mentioned above, some universities have economics-related faculties, but they have not had so many new enrollments all together as the faculty of economics at all. In 2009, their number was around 13,000 of which 4,959 were in the faculty of home economics. Considering curricula of faculties of home economics in universities, only one university (Japan Women's University) has a genuine economics curriculum at the "department of social and family economy" in the "faculty of human sciences and design" (formerly the faculty of home economics). New enrollments at the department were 104 in 2009 and this level of new enrollments has kept constant in these years. Consequently, new enrollments in economics-related faculties who actually major in economics are supposed to be considerably small in number. We will take no account of economics-related faculties hereafter to deal with undergraduate economic education.

Table 3 shows that applicants to the economics faculty have decreased a little by a real number since 2002, and their percentage has decreased by 0.4 percent only in the

Table 2. Statistics for Universities in 2009

Type of School	Number of schools	Number of undergraduates	Number of applicants	Number of new enrollments
National	86 (11.1%)	452,225 (17.9%)	403,417 (11.1%)	101,847 (16.7%)
Public	92 (11.9%)	118,063 (4.7%)	148,050 (4.1%)	28,414 (4.7%)
Private	595 (77.0%)	1,957,031 (77.4%)	3,075,396 (84.8%)	478,469 (78.6%)
Total	773 (100.0%)	2,527,319 (100.0%)	3,626,863 (100.0%)	608,730 (100.0%)

Type of School	Number of undergraduates in economics faculty	Number of applicants to economics faculty	Number of new enrollments in economics faculty
National	31,072 (13.3%)	29,449 (7.7%)	6,790 (12.3%)
Public	14,338 (6.1%)	19,824 (5.2%)	3,381 (6.1%)
Private	188,628 (80.6%)	334,736 (87.2%)	44,879 (81.5%)
Total	234,038 (100.0%)	384,009 (100.0%)	55,050 (100.0%)

Source: The MEXT, *School Basic Survey 2009*.

Table 3. Applicants and New Enrollments in University

Faculty	2002				2005			
	Applicants		New enrollments		Applicants		New enrollments	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Economics	405,710	10.99	64,385	10.57	363,454	10.13	57,463	9.52
Management	151,810	4.11	23,987	3.94	159,879	4.45	23,771	3.94
Commerce	129,346	3.50	21,967	3.60	117,037	3.26	18,285	3.03
Education	109,963	2.98	17,431	2.86	103,615	2.89	17,475	2.89
Engineering[1]	412,917	11.19	77,888	12.78	343,806	9.58	68,972	11.42
Literature	375,684	10.18	58,628	9.62	352,320	9.81	50,461	8.36
Total	3,690,314	100	609,337	100	3,589,251	100	603,760	100

Faculty	2008				2009			
	Applicants		New enrollments		Applicants		New enrollments	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Economics	393,739	10.86	56,626	9.33	384,009	10.59	55,060	9.05
Management	187,991	5.18	24,957	4.11	190,054	5.24	25,911	4.26
Commerce	140,670	3.88	17,703	2.91	130,783	3.61	17,341	2.85
Education	97,245	2.68	18,737	3.09	98,923	2.73	19,130	3.14
Engineering[1]	254,633	7.02	58,850	9.69	250,110	6.90	56,850	9.34
Literature	336,172	9.27	47,042	7.75	325,509	8.97	45,508	7.48
Total	3,625,031	100	607,159	100	3,626,863	100	608,730	100

Source: The MEXT, *School Basic Survey 2002, 2005, 2008 and 2009*.

Note 1: Faculty of Engineering includes Faculty of Engineering Science and Faculty of Industrial Technology.

same period. As for the faculties of literature and engineering which have followed after the economics faculty by number of applicants, their numbers have decreased by more than 50,000 respectively since 2002 through 2009. Besides, not only the number of new

Table 4. Students in the Faculty of Economics

Academic year	2003	2004	2005	2006	2007	2008	2009
Number of Economics Majors	266,720	257,005	249,602	242,410	237,557	235,666	234,038
Percent	10.63	10.26	9.95	9.68	9.45	9.35	9.26
Total Number of Undergraduates	2,509,374	2,505,923	2,508,088	2,504,885	2,514,228	2,520,593	2,527,319

Source: The MEXT, *School Basic Survey*, each year edition.

Table 5. Career after Graduation (2009)

Category of Faculty	Number of Graduates	Employed	Go on to Graduate Courses[1]	Others[2]
Social Sciences	204,282 (100%)	155,633 (76.2%)	7,668 (3.8%)	40,981 (20.1%)
Commerce & Economics	108,128 (100%)	83,392 (77.1%)	2,896 (2.7%)	21,840 (20.2%)
Engineering	93,684 (100%)	54,578 (58.3%)	31,864 (34.0%)	7,242 (7.7%)
Human Sciences	91,138 (100%)	64,441 (70.7%)	5,179 (5.7%)	21,518 (23.6%)
Total	559,539 (100%)	382,434 (68.3%)	68,422 (12.2%)	108,683 (19.4%)

Source: The MEXT, *School Basic Survey 2009*.
Note 1: Including students who go on to other faculty or department than economics and junior colleges.
Note 2: Including students who go on to vocational school and overseas school, engage themselves in temporary work, and are dead and missing.

enrollments but also their percentage in these faculties has lessened considerably, *i.e.* by two percentage points and over, in the same period. As for the faculty of management which is said, particularly in Western nations, to compete with the faculty of economics in popularity among applicants to economics- and business-related faculties, its number of applicants has increased constantly. Besides, its number and percentage of new enrollments has increased a little from 2002 to 2009, but these figures as well as the number of applicants have been less than even the half of those for the faculty of economics.[4]

Table 4 shows the number of all the undergraduates and students in the faculty of economics, *i.e.* economics majors in recent years. The total number of undergraduates in Japan has kept constant at 2.5 million since 2003. But the number of economics majors has decreased little by little as well as their percentage to the total number of undergraduates in the same period. Nevertheless, economics majors have ever been second largest in number after engineering majors and still account for nine percent and over of all the undergraduates.

This implies that popularity or reputation of the economics faculty has kept unchanged among senior high school students who had to decide about a faculty of university they would enter after graduation. It is often said that the main reason for choosing the economics faculty from among various faculties is that the students expect to acquire economic literacy which will be useful for employment and business practice in their career. Some students think that the economics faculty has more advantage for themselves than any other faculties in seeking for employment after graduation. Most of economics majors do not want to be economists, and professors of the economics faculty do not believe, either, that the students will be economists.

Table 5 shows a career students pursued on graduation from university in 2009. The number of university graduates was 559,539 of which 108,128 graduates were from

Table 6. Employment by Sector and Job Type (for graduates in the category of social sciences in 2009)

	Number	Percent
Industrial Sector		
Wholesale & Retail trade	31,612	20.3
Finance & Insurance	26,818	17.2
Manufacturing	20,978	13.5
Information & Telecommunication	15,036	9.7
Public Services	9,472	6.1
Medical & Welfare services	9,155	5.9
Real Estate & Rental services	5,399	3.5
Job Type		
Office worker	70,847	45.5
Salesclerk	46,237	29.7
Professional & Technical employee	19,590	12.6
Total	155,645	100.0

Source: The MEXT, *School Basic Survey 2009*.

commerce- and economics-related faculties. 83,392 graduates of them, *i.e.* 77.1% were employed by various kinds of private companies. Concerning industrial sector in which they were employed, the wholesale and retail sector was first and 31,612 graduates were employed in it (see Table 6). Then the finance and insurance sector and the manufacturing sector followed in turn after the wholesale and retail sector. A little less than the half of employed graduates from commerce- and economics-related faculties, *i.e.* 45.5% of them were employed as office workers, and around 30% of them were employed as salesclerks. This proves that most of economics majors usually pursue the first career after graduation as employees of private companies.

Undergraduate Coursework for Economics Majors

Requirements for graduation

Undergraduate students are required to take at least 124 credits for graduation to receive a bachelor's degree by the Standards for the Establishment of Universities now. In general, two credits are given to one subject with a course of 15 lectures in one semester after a student passes a final examination. Subjects are usually classified into two categories: one is a category of liberal arts or general education, the other is a category of specialty or majors. All the universities but one (Kyoto University) in Japan set minimum requirements for students to take subjects of liberal arts and majors respectively.

Each student should meet the specific required courses and the minimum required credits for both liberal arts and majors. As for liberal arts in national universities, Kawaijuku reported the results from its nationwide survey in 2007 that these universities ($n=24$) impose an average of 40 credits out of 129 credits (30.8%) as the requirements for graduation on students in faculties of economics, management and commerce together.[5] The maximum of the credits is 70 out of 158 credits (University of Tokyo) and the minimum is 26 out of 124 credits (Okayama University). Before 1991 when the Standards for the Establishment of Universities were vastly reformed,[6] the minimum

Table 7. Requirements for Graduation

Keio University
Faculty of Economics

Category of Subjects	Minimum Requirements of Credits
General education	20
Basic education	10
Foreign language	14
Major	68
Approved for graduation[1]	14
Total Requirements	126

Waseda University
Department of Economics
School of Political Science and Economics

Category of Subjects	Minimum Requirements of Credits
Liberal arts	20
Foreign language	16
Major	74
Selective	0
Total Requirements	126

Note 1: Approved subjects include all the subjects but selective ones. They contain surplus subjects to minimum requirements in the categories of general education, basic education, foreign language and major subjects, selective foreign language, and physical education.

requirements of liberal arts were 48 credits out of 124 credits of total requirements, which consisted of 8 credits for foreign language, 4 credits for physical education and 36 credits for general education. Thus the percentage of liberal arts to total requirements has lessened now.[7]

As for private university, we pick two typical Japanese universities in table 7: Keio University and Waseda University. Table 7 shows minimum requirements for graduation by category of subjects in the two universities. The minimum requirements of total credits for graduation and those in the category of liberal arts or general education happen to be equal in number: 126 and 20 respectively. These universities have almost equal number of credits as requirements in foreign language and major subjects. Major subjects occupy 54 to 59 percent of total requirements in the number of credit.

General education at Keio University comprises various subjects of natural science, mathematics, the humanities and social science, and their related subjects. Students are required to take those subjects for at least 20 credits until graduation. Most of liberal arts at Waseda University are classified into four courses: the humanities and sociology, philosophy and the history of thought, literature and art, and nature and life sciences. The subjects of these courses are divided into two types: one is "basic subjects" allotted to freshmen, the other is "related subjects" allotted to sophomores.

Basic education subjects at Keio University are classified into two types: one is type I which contains linear algebra, calculus (allotted to freshmen), statistics I and II (allotted to sophomores) as required courses and also information processing I and II as elective compulsory subjects, the other is type II which contains statistics I and II (allotted to sophomores) as required courses, and introduction to mathematics I and II, status quo and problems of Japanese economy, status quo and problems of world economy (allotted to freshmen), and information processing I and II as elective compulsory subjects. The higher knowledge of a senior high school level of mathematics is a

prerequisite for courses of type I, and less high knowledge of it is a prerequisite for courses of type II. Students who can gain credits of type I courses are allowed to take more math-oriented subjects in the junior and senior years.

At Waseda University, math-related subjects are categorized in majors only and students are required to take either "introduction to analysis" or "analysis" in the first year as a basic subject. Besides, mathematics for economics, mathematical statistics, analysis of multivariate function and differential equation are elective to freshmen and sophomores.

The Math problem

The math problem has been quite important to economic education as well as to university with economics-related faculty. Mathematics is often used for economics and therefore economics majors require a certain level of mathematical literacy. But all the students are not good in mathematics, because some students have the lower level of mathematical knowledge and understanding. This is derived from an admissions policy of private university in particular. Mathematics is usually optional as a subject of entrance examination for applicants to the economics faculty, so some examinees choose mathematics and others do not choose mathematics. In 2009, 64% of all the examinees (7,572) for admission to the economics faculty of Keio University chose mathematics in the entrance examination.[8] As for the school of political science and economics, Waseda University, which comprises three departments: political science, economics and global political economy; 31% of all the examinees (9,302) for admission at the written examination chose mathematics in 2009.[9] Such the facts of private universities have urged themselves to devise a proper curriculum of the faculty for students with different backgrounds and learning experiences.

Unlike private universities, all the national universities and most of local public universities participate in the national center test every year mainly for the primary selection of applicants. Applicants to the economics faculty of those universities are almost always required to sit for an examination in mathematics as one of the test subjects in the national center test. Besides, each individual economics faculty of those universities often gives applicants a second-stage examination of itself in specific subjects including mathematics. Consequently, the faculty can plan the curriculum on the assumption that entrants have a mathematical knowledge in some degree.

Hirata surveyed students' test results of the two courses, *i.e.* introduction to microeconomics and introduction to macroeconomics in the faculty of economics of a certain Japanese university (Hirata, 2000). He divided the samples into two types: one is students who took mathematics at the entrance examination, the other is students who did not do it; and he compared the test results between the two samples as shown in Table 8. Students' achievement is ranked into four grades; A, B and C mean pass and D means fail. It is apparent, viewing them from the percentage of grade A, that students who took mathematics at the entrance examination excelled those who did not do it in every course, and there were more students who were assessed as D among those who did not take mathematics at the entrance examination than among those who did it in every course. Hirata stated that mathematics should be included in the test subjects of entrance examination in the faculty of economics, but applicants would lessen intensely when it was introduced in test subjects.[10] The economics faculty of private universities

Table 8–1. Distribution of Students' Achievement in Introduction to Microeconomics in 1997

Grade	Take Math $n=203$	Not Take Math $n=405$
A (80–100)	30%	19%
B (70- 79)	25%	23%
C (60- 69)	28%	28%
D (0- 59)	17%	29%

Source: Hirata, Jun'ichi (2000), "Diversification of Entrance Examination and a Teaching Method in the Core Curriculum of Faculty: The Case of the Faculty of Economics in a Private University," *A Research Report: How to Educate and Foster the Growth of Students in the Age of Global Market Competition*, p. 113, Tokyo: Global Industrial and Social Progress Research Institute.

Table 8–2. Distribution of Students' Achievement in Introduction to Macroeconomics in 1998

Grade	Take Math $n=240$	Not Take Math $n=500$
A (80–100)	26%	20%
B (70- 79)	40%	35%
C (60- 69)	24%	26%
D (0- 59)	11%	18%

Source: *Ibid*.

Table 8–3. Distribution of Students' Achievement in Introduction to Microeconomics in 1998

Grade	Take Math $n=109$	Not Take Math $n=577$
A (80–100)	23%	16%
B (70– 79)	29%	28%
C (60– 69)	29%	31%
D (0– 59)	18%	24%

Source: *Ibid*.

Table 8–4. Distribution of Students' Achievement in Introduction to Macroeconomics in 1999

Grade	Take Math $n=73$	Not Take Math $n=419$
A (80–100)	62%	45%
B (70– 79)	16%	21%
C (60– 69)	12%	21%
D (0– 59)	10%	13%

Source: *Ibid*.

in particular has been in a dilemma whether it should check up on the mathematical knowledge of all the applicants at an entrance examination, which has lowered among students at the secondary education level since 2002 when total class hours were reduced by the Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT).

If it is difficult for the faculty of economics to alter the selection method of applicants, it tends to modify the curriculum for students. This is true of mathematical knowledge of students. There are two ways of solving the math problem: one is to strengthen the teaching and learning of mathematics to all the students of the economics faculty, the other is to make a different curriculum for mathphobic students so that they do not have to learn mathematics nor do they have to have a good knowledge of mathematics to understand fundamental principles and theories of economics. These two methods have been adopted together positively by some universities like Keio University.

Major subjects

Table 9 shows the requirements for economics majors specified in the curriculum of

different universities in Japan by the composition of subjects, the year allotted, and the requirements for graduation. We can point out several characteristics found in the curriculum of the universities. Firstly, compulsory subjects among major subjects are more limited in number than ever. The largest number of credits as minimum requirements undergraduate students should take in the selected universities in this table are 32 credits for Chiba University. In general, students are allowed the freer option of taking major (and also general education) subjects than ever. It reflects the big change of the Standards for the Establishment of Universities in 1991.

Secondly, introductory and fundamental courses of economics named "introduction," "basic," "elementary" and "rudiments" have increased. This reflects the contents of economic instruction at senior high school in Japan and its disconnection with those at university. Students learn economy, not economics, at senior high school focused on the economic structure and the economic and financial system in a capitalist state, the development of modern Japanese economy, and the present situation and problems of Japanese and world economy, which are stipulated in the Course of Study, *i.e.* the National Curriculum. Only two topics are dealt with in the standardized senior high school textbooks, "Politics and Economy" and "Contemporary Society": the law of demand and supply and the principle of comparative advantage. On the other hand, the major subjects of the faculty of economics in a university have theoretical, abstract and mathematical contents, and some students, especially freshmen, tend to feel the contents of major subjects to be complicated and difficult. To make the connection of the economic contents between senior high school and university better as well as to improve the economic contents at the senior high school level is required to develop knowledge and understanding of economic majors in university.

Thirdly, every university prepares the list of basic courses of major or special subjects in the curriculum for freshmen and sophomores, and it has the virtually standardized requirements for them in common. Microeconomics and macroeconomics at the basic level are provided as the actual core of economics learning in almost every university, but those at the intermediate level and the applied economics courses are little required as compulsory subjects by the universities. 14 and 10 of 17 universities in table 9 provide economic history (including the history of economic thought) and statistics (including data processing) respectively in their curriculum, whether these courses are compulsory or elective. Introductory or basic courses of economic history and the related subjects are regarded as subcore subjects for freshmen and sophomores. Mathematics for economics and the related courses are prepared for students in 12 of 17 universities, but only two universities (Tohoku and Waseda) make such mathematical subjects required, neither elective nor elective compulsory. Moreover, Marxian economics is not now the core subject nor required one in the economics faculty.

Fourthly, both economics subjects and management subjects are provided in the economics faculty of national universities, therefore economics majors and management majors coexist in the faculty. They are required to take common basic and compulsory or elective compulsory subjects such as microeconomics, macroeconomics, management and accounting. Therefore, not only economics majors but also management majors in the economics faculty of national universities may be thought that they have basic economic knowledge. The economics faculty of national Osaka University

Table 9. Requirements for Economics Majors

University	Faculty〔Department〕	Compulsory Subject			Requirements
		Subject Group	Subject	Year Allotted	
Osaka (N)	Economics	Basic Major	Economics A (the Rudiments of Macroeconomics), Economics B (the Rudiments of Microeconomics), Macroeconomics, Microeconomics, Economic History, Statistics, Managerial Calculation System	1 & 2	All subjects required
Hitotsubashi (N)	Economics	Introduction to Faculty	Introduction to Economics, Introduction to Economic Thought, Introduction to Statistics, Introduction to Economic History	1 & 2	All subjects required
		Basic	Basic Microeconomics, Basic Macroeconomics, Basic Econometrics, Basic Mathematics for Economics	1 & 2	At least 2 subjects required
		Seminar	Seminar, Graduation Thesis	3 & 4	All subjects required
Tohoku (N)	Economics	Basic Major	Introduction to Economics A & B, Introduction to Management, Introduction to Accounting, Introduction to Economic History, Introduction to Statistics, Foundation of Mathematics for Economics and Management	1	All subjects required
			Reading Economic Literature A & B	2	Both required
Nagoya (N)	Economics〔Economics〕	Basic Major	Microeconomics I & II, Macroeconomics I & II, Econometrics I & II, Political Economy I & II, Economic History in General I & II, Management I & II, Accounting I & II, Financial Statement I & II	…	At least 28 credits required
Kyoto (N)	Economics	Introductory	Introduction to Microeconomics, Introduction to Macroeconomics, Introduction to Socioeconomics, Basic Statistics, Introduction to Economic History and Thought, Contemporary Economic Affairs, Introduction to Management, Introduction to Accounting, Introduction to Data Processing	1 & 2	No Subject required
		Basic Major	Microeconomics 1 & 2, Macroeconomics 1 & 2, Social Economics 1 & 2, Economic History 1 & 2, Econometrics, Economic Statistics, Economic Policy, Public Finance, Theory of Finance	2, 3, 4	
Chiba (N)	Law and Economics〔Economics〕	Basic Major (Required)	Microeconomics I, Macroeconomics I	1, 2, 3, 4	Both required (2 credits each)
		Basic Major (Elective Compulsory)	Basic Seminar, Introduction to Economic History, History of Social Thought, Introduction to Statistics, Introduction to Management, Principle of Bookkeeping	1, 2, 3, 4	At least 28 credits required
			Introduction to Economic Policy, Mathematics for Economics I, Microeconomics II, Macroeconomics II, History of Economic Thought, International Economics, Reading Foreign Literature	2, 3, 4	
Keio (P)	Economics	Basic (Type I)	Calculus, Linear Algebra I	1	Both required
			Statistics I, Statistics II	2	Both required
			Data Processing I, II	1 & 2	At least 1 subject required
		Basic (Type II)	Statistics I, Statistics II	2	Both required
			Introduction to Economics I & II, Present State of Japanese Economy and Its Problem, Present State of World Economy and Its Problem	1	At least 2 subjects required
		Major (Basic)	Economic History I & II, Elementary Macroeconomics I & II	1	All subjects required
			Elementary Microeconomics I, Elementary Microeconomics II	2	
			Economy and Environment, Introduction to Econometrics, History of Economic Thought I & II, Marxian Economics I & II, Mathematics for Economics I, II & III	2	At least 2 subjects required
Waseda (P)	Political Science & Economics〔Economics〕	Basic	Introduction to Analysis, Analysis	1	At least one subject required
		Introductory	Introduction to Economics A & B	1	Both required
		Major	Microeconomics α, Macroeconomics α	2	Both required
Doshisha (P)	Economics	Introductory	Japanese Economy, Basic Seminar	1	Registration required for both
		Basic	Elementary Microeconomics, Elementary Macroeconomics, Mathematics for Economics, Statistics, Economic History and Thought, Environment and Resources	1 & 2	At least 4 subjects required
		Information	Theory of IT Software, Theory of IT Hardware	1 & 2	Registration required for both
Nihon (P)	Economics	Basic	Microeconomics I, Macroeconomics I	1	Both required
			Economic History, Japanese Economy	1	At least one subject required
		Fundamental	Microeconomics II, Macroeconomics II, Microeconomics Seminar, Macroeconomics Seminar	2	All subjects required
			Special Study of Specific Theme, Special Study 1	2	At least one subject required

Kwansei Gakuin (N)	Economics	Basic Major	Foundation of Economy and Economics A & B	1	Both required
			Foundation of Economy and Economics C, Reading English Economic Literature IA, Introduction to Research Seminar	2	All subjects required
			Introduction to Social Science A & B, Introduction to Contemporary Economy A & B, Introduction to Mathematics for Economics A & B, Introduction to Statistics for Economics A & B, Introduction to Economic Data Processing I & II, Introduction to Regional Policy A & B	1	Elective compulsory
		Major	Research Seminar I	3	Required
			Research Seminar II, Graduation Thesis	4	Both required
Kansai (P)	Economics	Common	Introduction to Economic Tool, Economics Workshop I & II, Introduction to Information Literacy, Introduction to Japanese Economy, Elementary Microeconomics, Elementary Macroeconomics	1	All subjects required
		Elective Compulsory	Introduction to Political Economy I & II, Mathematics for Economics I & II, Statistics I & II, Economic History I & II	1	Elective compulsory
Chuo (P)	Economics〔Economics〕	Introductory	Introductory Seminar, Economic Seminar	1	Registration required
		Basic	Basic Macroeconomics, Basic Microeconomics	1	Both required
			Japanese Economic History, Western Economic History (Credits of either subject can be accepted.)	1	At least 2 subjects required
			Marxian Economics, Economic Policy, History of Economics	2 & 3	
		Fundamental	Public Finance, Social Policy, Theory of Finance I, History of Social Thought	2, 3, 4	At least 2 subjects required
			Intermediate Macroeconomics	2	At least one subject required
			Intermediate Microeconomics, Theory of Monopolistic Capitalism	3	
Gakushuin (P)	Economics	Basic Major	Basic Microeconomics, Basic Macroeconomics, Introduction to Economic Information I & II, Introduction to Statistics	1	All subjects required
			Introduction to Economic Information III, General Economic History, Japanese Economic History, Introduction to Mathematics for Economics, Studying Economics in English, Reading Foreign Literature, etc.	1, 2, 3, 4	Elective compulsory
Sophia (P)	Economics	Basic	Foreign Language as a Subject of the Department, Microeconomics I, Macroeconomics	1	All subjects required
			Microeconomics II	2	Required
Tokyo Keizai (P)	Economics〔Economics, International Economics〕	Introductory	Introduction to Contemporary Economics, Introduction to Socioeconomics, Freshman Seminar	1	All subjects required
		Basic	〔Theory〕 Game Theory, Mathematics for Economics, Microeconomics, Macroeconomics, Econometrics 〔History & Status Quo〕 Economic Principle, Theory of Economic Development, Economic Philisophy, Western Economic History, History of Economics	2	…
			〔Theory〕 Intermediate Microeconomics, Intermediate Macroeconomics, Economic Statistics, Economic Analysis with PC 〔History & Status Quo〕 Theory of Economic Cycle, Theory of Modern Capitalism, History of Social Thought, Theory of Comparative Economic Society	3	…
Japan Women's (P)	Home Economics〔Household Economics〕 (Economics Course)	Compulsory	Introduction to Economics I & II, Introduction to Home Economics, History of Economics, Theory of Life and Household Management, Introduction to Regional Economics (and Graduation Thesis for Seniors)	1	All subjects required
		Elective Compulsory	Macroeconomics I & II, Microeconomics I & II, Principles of Economics I & II, Reading Foreign Literature E-I & E-II	2 & 3	Elective compulsory
			Reading Foreign Literature E-III & E-IV, Economics Seminar I & II	3 & 4	Elective compulsory
			Economics Seminar III & IV	4	Elective compulsory

Source: The homepage and the catalogue of each university concerned.
Note: … data unavailable.
: "N" stands for natinoal and "P" stands for private university.

does not separate economics majors and management majors now, which is a progressive effort to make all the students in the faculty learn the basics and analytical tools of both economics and management.

Lastly, a research seminar is prepared for juniors and seniors in most of the universities, whether it is compulsory or elective. Students in a research seminar are often required to write and submit a graduation thesis on a specific topic of interest to their supervisors or the faculty. An undergraduate student who shows the highest level of achievement and ability in economics is allowed to take a graduate course in the year of senior at some national universities in particular. Such a learning system which connects an undergraduate course with a graduate course reflects the present state, *i.e.* a gap of economic literacy among undergraduate students.

Economic Literacy of Undergraduate Students

We conducted the *Test of Understanding in College Economics*, the fourth edition (TUCE-4), to measure the economic knowledge and understanding of Japanese undergraduate students in 2006. The test was originally developed by Fels in 1967 (Fels, 1967), and was revised for the fourth time by Walstad, Watts and Rebeck in 2004–05 (Walstad, Watts and Rebeck, 2007). The test consists of two examinations: the microeconomics (micro) exam and the macroeconomic (macro) exam; each exam has 30 multiple-choice items[11] and was administered individually for undergraduate students within the time constraints of a class hour by instructors.

30 items on each exam are classified into six content categories. As for the micro exam, the categories are A: the basic economic problem, B: markets and price determination, C: theories of the firm, D: factor markets, E: the (microeconomic) role of government in a market economy, and F: international economics. As for the macro exam, they are A: measuring aggregate economic performance, B: aggregate supply and aggregate demand, C: money and financial markets, D: monetary and fiscal policies, E: policy debates, and F: international economics.

Table 10–1 shows the test results in the United States obtained from the micro and/or macro exam, which was carried out to university and college students taking a principles of microeconomics or principles of macroeconomics course in 2005. These students are divided into three different groups: (1) The matched samples who took the micro and/or macro test both as a pretest and a posttest of the course. (2) The pretest samples who took the micro and/or macro test only as a pretest at the beginning of the term. (3) The posttest samples who took the micro and/or macro test only as a posttest at the end of the term after finishing the course. The pretest samples and the posttest samples comprise the unmatched samples.

The most important feature of the test results both for the matched samples and for the unmatched samples is a big growth of mean scores from the pretest to the posttest. The growth rate is 34–36% relative to the micro exam, and it is 44–45% relative to the macro exam. This implies the effectiveness of students' learning of microeconomics or macroeconomics, so that the mean score of every posttest jumped up from the pretest.

Table 10–2 shows the test results in Japan, but its samples are not so precisely classified by pretest or posttest as the United States. Japanese samples are divided into three groups by students' learning experience of micro- or macroeconomics: (1) Students

Table 10–1. American Results of TUCE-4

	Macro	Micro
Total Tested		
Matched (pre & post)	2,789	3,255
Pretest only	2,022	1,621
Posttest only	706	604
Total	5,517	5,480
Samples		
***Matched* (*pre & post*)**		
Students	2,789	3,255
Institutions	44	43
Instructors	62	71
Mean Scores		
Pretest	9.80	9.39
(SD)	(3.48)	(3.32)
Posttest	14.19	12.77
(SD)	(5.29)	(4.68)
Change (%)	45%	36%
***Unmatched* (*pre & post*)**		
Pretest total		
Students	4,811	4,876
Institutions	50	50
Instructors	81	84
Posttest total		
Students	3,495	3,859
Institutions	46	44
Instructors	64	72
Mean Scores		
Pretest	9.76	9.37
(SD)	(3.48)	(3.35)
Posttest	14.06	12.59
(SD)	(5.28)	(4.68)
Change (%)	44%	34%
Females	(n=1,124)	(n=1,384)
Pretest	9.24	9.04
Posttest	13.37	12.31
Males	(n=1,651)	(n=1,848)
Pretest	10.20	9.63
Posttest	14.77	13.12
Year in School (pre/post)		
Freshman	9.76/14.19	9.40/13.96
Sophomore	9.68/13.83	9.40/12.47
Junior	9.73/14.51	9.37/12.06
Senior	10.16/14.64	9.37/12.98
Other	11.63/15.81	9.39/13.72
Reliability		
Coefficient α		
Matched		
Pretest	.51	.46
Posttest	.77	.70
Unmatched		
Pretest	.51	.47
Posttest	.77	.70
*SEM**		
Matched		
Pretest	2.45	2.45
Posttest	2.53	2.58
Unmatched		
Pretest	2.45	2.45
Posttest	2.53	2.58

* SEM stands for Standard Error of Measurement.

Table 10–2. Japanese Results of TUCE-4*

	Macro	Micro
Total Tested		
never learned economics	53	65
now learning economics	261	223
have learned economics	88	151
n.a.	6	9
Total	408	448
Samples		
Students	408	448
Institutions	6	6
Mean Scores		
30 items	11.58 (38.6%)	12.51 (41.7%)
35 items	13.10 (37.4%)	13.71 (39.2%)
never learned economics	16.45 (47.0%)	14.09 (40.3%)
now learning economics	10.89 (31.1%)	13.93 (39.8%)
have learned economics	17.64 (50.4%)	13.29(37.8%)
(SD)	(5.97)	(4.48)
Females	(n=61)	(n=114)
	13.57 (38.8%)	13.61 (38.9%)
Males	(n=346)	(n=331)
	13.12 (37.5%)	13.75 (39.3%)
Year in School		
Freshman	9.55	10.38
Sophomore	11.66	12.82
Junior	15.39	14.98
Senior	15.32	16.89
Other	15.08	15.75
Reliability		
Coefficient α		
All samples	.801	.636
SEM		
All samples	2.66	2.70

* Statistics of this table are measured for 35 items on the TUCE-4.

Table 11–1. Results of Micro Exam in Japan

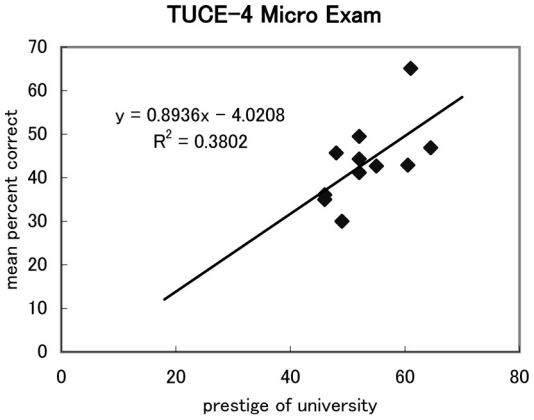
Sample	N	Faculty	Prestige*	Mean (%)
A	82	Science & Engineering	61–68	46.9
B	58	Economics	46	36.1
	28	Management	46	35.0
	2	Unknown		
	(88)	(total)		(35.7)
C	10	Economics	61	66.6
	2	Unknown		
	(12)	(total)		(65.1)
D	49	Economics	51–53	44.3
	27	Management	51–53	41.2
	11	Law	51–53	41.3
	3	Social Studies	51–53	49.5
	51	Human Culture	55	42.7
	1	Science & Engineering	48	45.7
	1	Unknown		
	(143)	(total)		(43.0)
E	1	Management	60–61	42.9
F	113	Economics	46–52	29.6
	1	Humanities	46–52	22.9
	5	International Studies	46–52	38.9
	3	Unknown		
	(122)	(total)		(30.0)

Table 11–2. Results of Macro Exam in Japan

Sample	N	Faculty	Prestige*	Mean (%)
A′	82	Science & Engineering	61–68	49.5
B′	93	Economics	46	34.8
		Management	46	
C′	141	Economics	46–48	27.1
D′	12	Economics	61	80.6
E′	25	Economics	61	58.2
		Management	60–61	
F′	55	Economics	46–52	33.5
		Management	46–52	
		Humanities	46–52	
		International Studies	46–52	

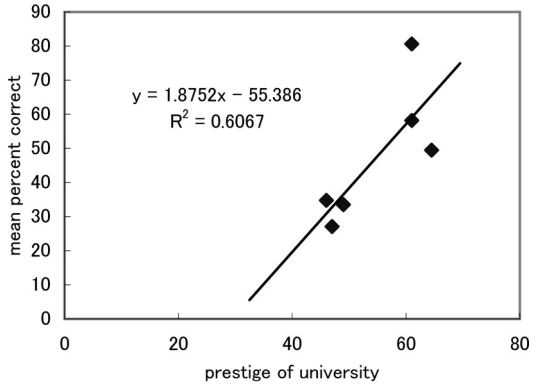
* Prestige means a degree of difficulty for students in gaining admission to the faculty of the university. It is expressed in terms of standard deviation and published by a preparatory school in Japan.

with no experience, (2) Students who were learning micro- or macroeconomics now, and (3) Students who had already learned micro- or macroeconomics. This table features the economic literacy of Japanese undergraduates, which is a contrast to the U.S. counterparts. The mean scores of each exam look inconsistent among the three groups, because



Regression analysis results

R (correlation coefficient)	0.61663889
R^2 (coefficient of determination)	0.38024352
adjusted R^2	0.31138169
standard error	7.5831977
significance	0.04331515
t-value	2.34985805
p-value	0.04331515



Regression analysis results

R (correlation coefficient)	0.77892909
R^2 (coefficient of determination)	0.60673052
adjusted R^2	0.50841315
standard error	13.9779468
significance	0.0679064
t-value	2.48417847
p-value	0.0679064

Figure 1. Students' Economic Literacy and the Prestige of University

students without any experience of learning micro- or macroeconomics, who were equivalent to the U.S. students taking the micro- or macro exam as a pretest, achieved a relatively high score. Moreover, even the students who majored in economics in a certain university achieved a relatively low score. On the macro exam in particular, students who were learning macroeconomics achieved the lowest mean score. By year in school, the mean scores are consistent in both the micro and the macro exam, because it looks like the higher the year, the better the score.

To examine a cause of the inconsistency, we supposed that the mean scores were affected by social ranking of universities. Our assumption is that a student of prestigious university can achieve rather a high score on the micro and macro TUCE-4, whether he/she has a learning experience of micro- and macroeconomics or not. The mean percent correct of sample universities on each exam and their prestige evaluated by standard deviation, which represents difficulty for examinees in gaining admission to the faculty of the university, are displayed in Table 11.

To prove this assumption, we made a regression analysis of the data in Table 11. Its results are shown in Figure 1. The prestige of university is an independent variable, and the mean percent correct of each sample of faculty (number of students >1) for the micro exam and of university for the macro exam is a dependent variable. As for the micro exam, the correlation between the two variables is considerably high, but the accuracy of this regression analysis measured by the coefficient of determination is low, though the significance is better. As for the macro exam, the correlation is very high, but the accuracy of this regression analysis is moderate, though the significance is not so satisfactory. We can infer from this analysis that one of factors influencing students' understanding of macroeconomics may be the prestige of the faculty of their university. Regarding microeconomics, it is inferred that there may be other factors influencing students' literacy than the prestige of university.

Conclusion

From the implementation of the TUCE-4 micro and macro exam, we could get information about undergraduate students' economic literacy in Japan. Unlike the United States, a learning experience or taking a principles course of micro- and macroeconomics is not so strong as a determinant of economics understanding. Some economics majors showed a high level of economics knowledge and understanding, but others showed a less high level of it. The difference between them may be derived in part from the students' general ability or intelligence, which can be measured by the social prestige of university. A high-ranked university gives admission to itself for students of higher capabilities, and a low-ranked university receives students of developing capabilities. Such the separation of economics majors' literacy suggests a different objective of their economics learning.

A high-ranked university allows students to acquire further knowledge of advanced economics which includes the graduate level of it. A low-ranked university aims at instructing students steadily in basic concepts and principles of elementary and intermediate micro- and macroeconomics as the first step, and then those of applied economics as well as the application of basics of micro- and macroeconomics. The achievement of this aim is to be assessed by setting a benchmark of student's learning

outcome for a standard bachelor of economics, as is discussed in OECD concerning the Assessment of Higher Education Learning Outcomes (AHELO).

Footnotes:

1. Statistics are cited from the *School Basic Survey 2009*, the Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT). Citation from the same source is not referred hereafter.
2. Of 168 faculties of economics, 132 faculties are day school and 36 faculties are night school.
3. If the number of applicants for admission to the faculty of science and engineering is added to that to the faculty of engineering, the sum is more than 400,000.
4. National universities often have two departments or more within the faculty of economics: the management department and the economics department. This is the difference of national universities from private universities in Japan. Private universities and some local public universities often have the faculty of management independently of the faculty of economics.
5. See Kawaijuku (2009), *A Survey Report on Liberal Arts and Common Education of National Universities in 2007*, p. 9. (in Japanese) Common education is defined in this report that it comprises introductory education, liberal arts education which includes foreign language and ICT instruction, and career education.
6. As the result of this reform, the division between general education and special education, and the subcategory of general education (general, foreign language and physical education) were abolished.
7. Kawaijuku, *op. cit.* p. 8.
8. http://www.admissions.keio.ac.jp/exam/index.html, checked on February 13, 2010.
9. http://www.waseda.jp/nyusi/e_sch/2009/data2.pdf, checked on February 13, 2010.
10. Hirata, Jun'ichi (2000), "Diversification of Entrance Examination and a Teaching Method in the Core Curriculum of Faculty: The Case of the Faculty of Economics in a Private University," *A Research Report: How to Educate and Foster the Growth of Students in the Age of Global Market Competition*, pp. 103–114, Tokyo: Global Industrial and Social Progress Research Institute. (in Japanese)
11. The micro and macro TUCE-4 had 35 items each for revision at first, and then five items of them were deleted because of their inappropriateness as test questions at last. The final items of micro and macro exams appear in Yamaoka, Michio (2007), "An International Comparison of Economic Literacy of American and Japanese College Students: A Preliminary Analysis of Their Understanding of College Economics (7th Consumer Economics Test)," *Journal of Asia-Pacific Studies*, No. 9, Tokyo: Institute of Asia-Pacific Studies, Waseda University, pp. 71–84. (in Japanese)

Reference

Asano, Tadayoshi, Michio Yamaoka, Sintaro Abe, Akira Arai, Takenori Inose, Akira Era, Misa Kubodera, Hisashi Kurihara, Ken'ichi Sasaki, Kazuhira Shimomura, Keiko Takahashi, Masanori Hotate, Katsushi Mizuno, Satoru Miyahara, Yukitoshi Yamada and Eiji Yamane (2007), "Economic Literacy of University Students: A Japan-US Comparison Based on TUCE-4," *The Journal of Economic Education*, No. 26, Tokyo: The Japan Society for Economic Education. (in Japanese)〔淺野忠克，山岡道男，阿部信太郎，新井明，猪瀬武則，江良亮，久保寺美佐、栗原久，佐々木謙一，下村和平，高橋桂子，保立雅紀，水野勝之，宮原悟，山田幸俊，山根栄次 (2007)「経済リテラシーに関する日米大学生の国際比較――第 7 回生活経済テストの結果を中心として――」『経済教育』第 26 号，経済教育学会。〕

Fels, Rendings (1967), "A New Test of Understanding in College Economics," *American Economic Review, Papers and Proceedings*, 57(2), pp. 660–666.

Hirata, Jun'ichi (2000), "Diversification of Entrance Examination and a Teaching Method in the Core Curriculum of Faculty: The Case of the Faculty of Economics in a Private University," *A Research Report: How to Educate and Foster the Growth of Students in the Age of Global Market Competition*, pp. 103–114, Tokyo: Global Industrial and Social Progress Research Institute. (in Japanese)〔平田純一 (2000)「入試の多様化と学部コアカリキュラムの教育方法――私立 A 大学経済学部を例にして」『「グローバル市場競争時代における教育・人材育成のあり方」研究委員会報告書』財団法人地球産業文化研究所，103–114 頁。〕

Kawaijuku (2009), *A Survey Report on Liberal Arts and Common Education of National Universities in 2007*. (in Japanese)〔学校法人河合塾教育研究部 (2009)『2007 年度　国立大学の教養・共通教育調査報告書』河合塾。〕

The Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT), *School Basic Survey*, each year edition. (in Japanese) http://www.mext.go.jp/b_menu/toukei/chousa01/kihon/1267995.htm 文部科学省『学校基本調査』各年版。

Rebeck, Ken, William B. Walstad, Michio Yamaoka and Tadayoshi Asano (2008), "An International Comparison of University Students' Knowledge of Economics: Japan and the United States," a paper submitted to the research session at the 2008 annual conference of National Council on Economic Education, held in Biloxi, Mississippi, in October 2008.

Walstad, William B., Michael Watts and Ken Rebeck (2007), *Test of Understanding in College Economics, Fourth Edition, Examiner's Manual*, New York: National Council on Economic Education.

Yamaoka, Michio (2007), "An International Comparison of Economic Literacy of American and Japanese College Students: A Preliminary Analysis of Their Understanding of College Economics (7th Consumer Economics Test)," *Journal of Asia-Pacific Studies*, No. 9, Tokyo: Institute of Asia-Pacific Studies, Waseda University, pp. 71–84. (in Japanese)〔山岡道男 (2007)「経済リテラシーに関する日米大学生の国際比較：第7回生活経済テストの中間報告」『アジア太平洋討究』第9号，早稲田大學アジア太平洋研究センター，59–85頁。〕

Yamaoka, Michio, William B. Walstad, Michael W. Watts, Tadayoshi Asano and Shintaro Abe, eds. (2010), *Comparative Studies on Economic Education in Asia-Pacific Region*, Kanagawa: Shumpusha Publishing.