Research Paper | 14-06

Long-term Prospects of Government Spending on Higher Education

November 2014 | An, Jongseok

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Introduction

The objective of this study is to estimate the future increases in government spending on higher education in Korea by estimating the long-term changes in the demand for higher education in the country.

The Korean government has steadily increased its spending on and investment in education since the days of economic development. Until recently, the focus of government spending had been the expansion of universal primary and secondary education. In the last several years, however, we have begun to see increasing demand for greater government spending on preschool and higher education, two areas of education that have been given relatively little attention over the last few decades. In 2012, the Korean government thus launched the Nuri Curriculum, providing free education for children aged three to five. The government also began to increase its budget for higher education, ambitiously promising the public that it would halve the tuition fees. Until now, Korean parents have had to pay at least 70 percent of all higher-education costs and expenses for their children, with tuition fees being a great financial burden on households. With the emerging society-wide consensus on the need to minimize the burden of higher education on private households, Korean policymakers have finally come to recognize the need to bear at least half the cost thereof.

Since 2012, therefore, the Korean government has been working to lower the tuition fees at Korean universities through diverse programs and incentives. These efforts have mainly involved encouraging universities to reduce their tuitions voluntarily, while also expanding the range and pool of government scholarships for students. Nevertheless, it would be unrealistic for the current

inhibitions on tuition increases to be maintained long into the future. We therefore need to forecast how university tuition fees will change once the current strict regulation is removed. Such forecasting will be necessary to conduct a proper appraisal of the current half-tuition policy and find new directions for government spending on higher education in the long run.

In order to forecast changes in tuition fees, we need to determine the factors that contribute to increases and decreases thereof. One major factor contributing to the increase in tuition fees is the improvement of the quality of higher education offered. In order to increase and improve human capital in Korea, thereby securing our continued economic growth and expansion of creative potential, we need to increase investment in higher education. As a rule, increases in the cost of primary and secondary education tend to be in proportion to the increases in the gross domestic product (GDP) per capita. However, the cost of higher education grows much more rapidly than the increase in the GDP per capita. This means that, as the economy grows and advances, the amount of investment the nation is required to make in higher education and its quality increases more rapidly. The growing importance of human capital in the Korean economy will therefore raise the price of educational services in general.

On the other hand, a major factor contributing to the decrease in tuition fees is demographic change. The declining birth rate and the aging of the population will continue to cause the size of the school-age population in Korea to contract, cutting the number of high-school graduates by 30 percent between 2010 and 2030.[1] In particular, the number of places available at higher education institutions will begin to outnumber high-school graduates by around 2020. As a result, the Korean government has recently announced a plan to reduce the number of available places at higher education institutions by at least 160,000 by 2023, and/or by 40,000 by 2017 at least. Assuming the cost of education per capita remains the same, the drastic decrease in the number of students will ultimately help reduce the demand for government spending on higher education.

Taking these likely changes and trends into account, this study makes

1) Subcommittee on Education of National Fiscal Management Plan(2014), p. 98.

long-term forecasts of the total amount of higher education expenses, and also of the necessary government spending. While the government, in principle, pays the entire cost of primary and secondary education in Korea, it pays only part of the cost of higher education. The amount of government spending on higher education will therefore vary depending on the policy choices made in the future. In this study, we will estimate and evaluate how different policy alternatives affect the fiscal estimates and forecasts, and also how such policy alternatives will affect the stability and sustainability of fiscal management in the long run.

The remainder of this study is divided into four sections. Section II provides a summary of the composition, characteristics, and fiscal support with respect to the cost of higher education in Korea, while Section III provides estimates of future costs of higher education. Section IV provides an overview and forecasts of government spending on higher education. Finally, Section V summarizes the forecasts and discusses policy implications.

Ⅱ

Higher Education Cost Today: Composition, Characteristics, and Fiscal Support

1 Composition of the higher education cost

[Figure II-1] shows who pays the cost of higher education in Korea and the channels by which the government spending is delivered to students in the form of educational services.

The main parties required to bear the cost of higher education in Korea include students and parents, central and local governments and their agencies, and other private organizations and institutions. Students and parents pay tuition fees in exchange for educational services. Yet they do not pay the entire amount of the expenses; the government and other public agencies pay a share as well. An et al.(2012) has argued that such fiscal support is necessary for higher education because higher education is a valuable investment good, capable of generating positive externalities, and opportunities thereof should be provided to all citizens equally.[2] In order to provide such fiscal support, the government uses taxpayers' money. The government and other agencies of public service provide fiscal support in two ways: by providing such support for higher education institutions themselves and also for the consumers of education in the forms of scholarships and student aid. Throughout the remainder of this

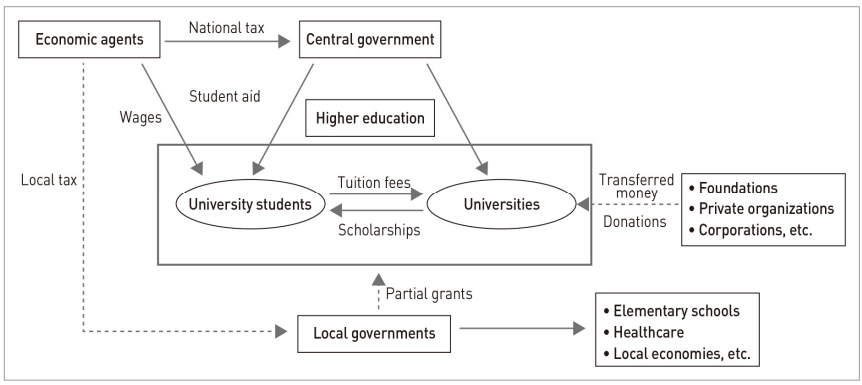
2) An et al.(2012), p. 70.

study, the term “fiscal support” will be used to refer to all forms of financial support provided by the government and its agencies, whether for universities or students.

Private organizations, besides consumers of education and the government, also bear part of the higher education cost. Examples include school foundations and other scholarship organizations. School foundations generate income by investing and managing the assets and properties under their charge and then spend that income on school operations. There may also be other private organizations willing to donate financial resources to higher education, whether via schools or directly to students themselves.

Higher education institutions earn revenue in the forms of tuition fees paid by consumers of education, grants, and subsidies from central and local government organizations, money transferred from school foundations and private organizations, and donations. In turn, these schools spend this revenue on providing educational services for students, using part of it to give students scholarships and financial aid. For the purposes of this study, we shall understand the term “higher education cost” as referring to the net cost that higher education institutions spend on the education of students, excluding the money exchanged among consumers of education, government organizations, school foundations, and private organizations.

[Figure II-1] **Higher Education Cost Flow**



Source: Lee et al.(2011), p. 20.

Universities manage accounts categorized according to the sources and purposes of the money they contain. Therefore, national and public universities that derive their revenue mainly from the national treasury and private universities that derive their revenue from tuition fees and other forms of private-sector support manage different accounting systems.

The accounting system of national and public universities includes the general account (running on national treasury resources) and others, such as the school association account, industrial-academic cooperation group account, school development account, consumers' cooperative account, and the like. The tuition fees that students and parents pay to national and public universities are deposited in the general account, which pays for general expenses, such as the wages of faculty and administration employees. The school association account receives school association fees paid by students and parents that are not put in to the general account. The money in this account is used mainly to improve the learning atmosphere and environment of the respective university. The industrial-academic cooperation group account supports the activities of the industrial-academic cooperation group at each university. The school development account derives its resources from donations, and the consumers' cooperative account is used to support and improve students' welfare.

〈Table II-1〉 **Public University Accounting System**

	General account	School association account	Industrial–academic cooperation group account	School development account	Consumers' cooperative account
Purpose	To pay general expenses	To improve learning environment and atmosphere.	To support activities of industrial–academic cooperation.	To provide research/education grants and scholarships.	To support and improve students' welfare.
Main payer and recipient	State	School association	Industrial–academic cooperation group (IACG)	School development fund	Consumers' cooperative
Accounting standard	Government accounting	Government accounting	IACG/school corporation accounting	Public–service corporation accounting	Corporate accounting

〈Table II-1〉 **Continue**

	General account	School association account	Industrial–academic cooperation group account	School development account	Consumers' cooperative account
Legal grounds	National Finance Act and National Accounting Act	Directive on the Non–Treasury Financial Management of National Universities	Promotion of Industrial Education and Industry–Academic Cooperation Act and Industry–Academic Cooperation Foundation accounting principle)	Act on the Establishment and Operation of Public Service Corporations	Corporate Accounting Standard
Accounting type	Single–entry booking	Single–entry booking	Double–entry booking	Double–entry booking	Double–entry booking
Accounting term/year	January 1 to December 31	March 1 to February 28	January 1 to December 31	January 1 to December 31	January 1 to December 31
Budget documents	Required for each project	Required for each expenditure	Required for each expenditure	Required for each expenditure	Required for each expenditure
Settlement documents	Budget settlement	Budget settlement	Financial settlement	Financial settlement	Financial settlement

Source: Park(2008), requoted in Lee et al.(2011), p. 17.

Private universities are school corporations founded in accordance with the Private School Act. Their accounting systems include the general expense account, school and business account, school expense account, hospital account, and the IACG account. The school and business account concerns the financial ins and outs of the school corporation's for-profit activities. The school corporation spends its funds on educational services via the school expense account and/or the affiliated hospital account.

The university education cost in this context refers to the net amount of financial resources spent on the education of enrolled students, excluding the money transferred among various the accounts.

〈Table II-2〉 **Private University Accounting System**

	School expense account	General account	IACG account	School and business account	Hospital account
Main payer and recipient	Private university	School corporation	IACG	School corporation	Private university
Accounting standard	School accounting	Corporate accounting	IACG accounting	Corporate accounting	School accounting
Legal grounds	Special Rules on Financial Accounting at Private Learning Institutions	Special Rules on Financial Accounting at Private Learning Institutions	Rules on IACG Accounting	Rules on School and Business Accounting	Rules on Medical Institution Accounting
Accounting type	Double-entry booking	Double-entry booking	Double-entry booking	Double-entry booking	Double-entry booking
Accounting term/year	March 1 to February 28	March 1 to February 28	March 1 to February 28	March 1 to February 28	March 1 to February 28

Source: Park(2008), requoted in Lee et al.(2011), p. 18.

2 Higher education cost

The government website, "Higher Education in Korea" (http://www.academyinfo.go.kr), lists specific details on the financial status and education expenses of all universities in Korea. Based on this list, <Table II-3> provides a summary of the distribution of different types of higher education costs and expenses, as of 2012. The concept of higher education institutions encompasses not only universities, vocational colleges, and graduate universities, but also technical colleges, correspondence colleges, and other various institutions providing postsecondary education and training. Given the gaps in available statistics, however, <Table II-3> shows the aggregate amounts of education expenses at universities, vocational colleges, and graduate schools only. These three types of institutions together accounted for 86 percent of all students enrolled in post-secondary courses in Korea in 2012.[3)]

There are 57 national universities/colleges and 375 private universities/colleges whose information is listed on Higher Education in Korea. Of the 57 national institutions, only nine are vocational colleges, while 47 are universities and one is a graduate university. On the other hand, of the 375 private institutions, 159 are vocational colleges and 175 are universities. National institutions together accommodated 600,000 students, and private institutions, 1.97 million students. In other words, 77 percent of 258 university and college students in Korea were enrolled at private institutions. The number of students enrolled at vocational colleges—both national and private—amounted to 500,000, about 19.7 percent of all students, and the remaining 2.06 million were enrolled at universities. The graduate universities together had 7,395 students, accounting for 0.3 percent of all college and university students.[4)]

〈Table II-3〉 **Higher Education Costs(2012)**

		Number of schools	Total cost (KRW 1,000,000)	Number of students	Cost per student (KRW 1,000)
National and public	Vocational colleges	9	95,578	9,006	10,613
	Universities	47	5,558,104	594,193	9,354
	Graduate universities	1	419	259	1,618
	Subtotal	57	5,654,101	603,458	9,370
Private	Vocational colleges	159	3,781,797	497,514	7,601
	Universities	175	17,084,036	1,466,966	11,646
	Graduate universities	41	117,850	7,136	16,515
	Subtotal	375	20,983,683	1,971,616	10,643
Total		432	26,637,784	2,575,074	10,344

Source: Higher Education in Korea (http://www.academyinfo.go.kr).

3) *Education Statistics Yearbook*(2011).

4) The number of students associated with the colleges, universities, and graduate schools listed on Higher Education in Korea amounts to about 80 percent of the total number of postsecondary students listed in the *Education Statistics Yearbook*, published by the Ministry of Education and the Korean Educational Development Institute (KEDI).

Vocational colleges, universities, and graduate universities in Korea together cost KRW 26.6 trillion in total, with private vocational colleges, universities, and graduate universities claiming KRW 20.9 trillion, or 78.8 percent, of the aggregate cost. Vocational colleges of both private and public types cost KRW 3.9 trillion (14.6 percent) in total, while universities cost KRW 22.6 trillion (85 percent) and graduate universities, KRW 117.9 billion (0.4 percent).

The average annual education cost per student is KRW 10.34 million. However, at national and public institutions that figure drops to KRW 9.37 million, while it rises slightly to KRW 10.64 million at private institutions. More specifically, the average annual costs per student are KRW 7.6 million, KRW 11.65 million, and KRW 16.52 million for private vocational colleges, universities, and graduate universities, respectively, rising with the level of education. This pattern is reversed at national and public institutions, with the average annual costs per student starting at KRW 10.61 million for vocational colleges, and dropping to KRW 9.35 million and KRW 1.62 million for universities and graduate universities, respectively. Of the nine national and public vocational colleges, six schools (i.e., Gangwon Provincial College, Gyeongbuk Provincial College, Chungnam Provincial Cheongyang College, Chungnam State University, Korea National College of Agriculture and Fisheries, and Korea National University of Welfare) show far greater costs per student than those at national and public universities.

Abandon the public-private distinction, and we can see that the annual education cost per student at vocational colleges of both types is KRW 7.65 million, on average, while those at universities and graduate schools rise to KRW 10.99 million and KRW 15.99 million, respectively. The average annual tuition fees listed on Higher Education in Korea are KRW 5.13 million, KRW 6.04 million, and KRW 4.05 million for vocational colleges, universities, and graduate universities, respectively. In other words, the education costs per student are about 1.5 times greater than the tuition fee at vocational colleges and 1.8 times greater than the tuition fee at universities. The gap widens to 3.9 times in the case of graduate universities.[5)]

5) This is a rather simplistic comparison. We should keep in mind that the cost per student is a weighted

<Table II-4> shows the distribution of the aggregate education cost by account. In the case of private institutions, the respective makeup of the general account and IACG account varies greatly from school to school, but the former makes up 82.8 percent while the latter, 17.2 percent, on average. The share of the IACG account, on the other hand, drops to 9.1 percent at vocational colleges and further to 3.1 percent at graduate universities.

〈Table II-4〉 **Education Cost Distribution by Account**

(Unit: %)

		General account	School association account	School development account	IACG account	Total cost
National and public	Vocational colleges	64.5	11.5	0.1	23.9	100.0
	Universities	45.6	28.5	1.2	24.7	100.0
	Graduate universities	100.0	0.0	0.0	0.0	100.0
	Subtotal	45.9	28.2	1.2	24.7	100.0
Private	Vocational colleges	90.9			9.1	100.0
	Universities	82.8			17.2	100.0
	Graduate universities	96.9			3.1	100.0
	Subtotal	84.3			15.7	100.0

Source: Compiled by the author, on the basis of the listings on Higher Education in Korea (http://www.academyinfo.go.kr).

The shares of the IACG account at national/public vocational colleges and universities remain similar, at 23.9 percent and 24.7 percent, respectively, and are significantly larger than their counterparts at private institutions. At national and public schools, the general account claims 45.9 percent of the education cost; the school association account, 28.2 percent; and the school development account, 1.2 percent, together sharing 75.3 percent, which is about nine percentage points lower than the non-IACG share of the education cost at private institutions.

average, taking into account the number of students. The tuition fee, on the other hand, is a simple average for each school.

3 International comparison

<Table II-5> makes three different comparisons of the higher education cost in Korea to those of other member states of the Organization for Economic Cooperation and Development(OECD). The first three columns are about the education cost per student; the next three columns, the ratio of the education cost per student to the GDP per capita; and the last three, the ratio of the total education cost to the GDP.

As the first three columns show, the education costs per student in Korea in 2011 were USD 5,692 at vocational colleges and USD 11,230 at universities and graduate schools, or USD 9,927 on average. This is only 71.4 percent of the average OECD education cost per student of USD 13,958. Of OECD member states, 10 have lower education costs per student than Korea—namely, Chile, Czech Republic, Estonia, Hungary, Iceland, Mexico, Poland, Portugal, Slovenia, and Turkey. In most other member states with advanced economies, such as Australia, Belgium, Canada, Denmark, France, Germany, Ireland, Japan, the Netherlands, Norway, Sweden, Switzerland, and the United States, the figure hovers well above USD 15,000.

The middle three columns of the table show that, the greater the GDP, the higher the education cost per student. Much of the education cost consists of wages and other expenses that tend to rise in proportion to the growing income level. In addition, the more educated a society, the greater its demand for higher education and better quality education, thus leading to greater investment in education. Therefore, the education cost per student tends to grow more quickly than the GDP per capita.

[Figure II-2] summarizes the correlation between the education cost per student and the GDP per capita, based on data from 2010. The graphs show that the increase in the GDP per capita led directly to increases in the education costs per student at all levels of education, whether primary, secondary, or postsecondary. The regression lines between the two variables indicate that the correlation between them is linear with respect to primary and secondary education. In other words, the increases in the primary and secondary education costs per student are in proportion to the increases in the GDP per capita. Korea

stays above the regression line in both cases, suggesting that both the education cost and spending has increased in the country in proportion to the increases in the GDP per capita.

〈Table II-5〉 **Higher Education Cost Comparison: OECD-Wide (2011)**

(Units: USD ppp, %, %)

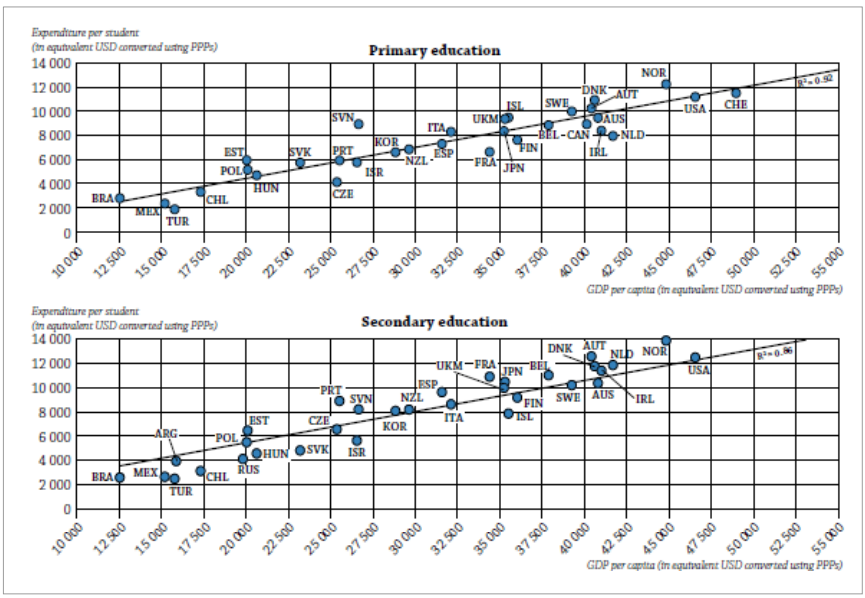
	Education cost per student			Education cost per student/GDP per capita			Education cost/GDP		
	B-type	A-type and specialized research programs	Total	B-type	A-type and specialized research programs	Total	B-type	A-type and specialized research programs	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Australia	8,495	18,038	16,267	20	42	38	0.2	1.4	1.6
Austria	6,944	14,967	14,895	16	35	35	n	1.5	1.5
Belgium	x(9)	x(9)	15,420	x(9)	x(9)	38	x(6)	x(6)	1.4
Canada	15,729	27,373	23,226	42	73	62	0.9	1.9	2.8
Chile	5,045	11,082	8,333	23	52	39	0.7	1.8	2.4
Czech R.	3,350	9,856	9,392	12	36	35	n	1.4	1.4
Denmark	x(9)	x(9)	21,254	x(9)	x(9)	51	x(6)	x(6)	1.9
Estonia	6,628	8,450	7,868	29	37	34	0.5	1.2	1.7
Finland	n	18,002	18,002	n	47	47	n	1.9	1.9
France	12,554	16,328	15,375	34	45	42	0.3	1.2	1.5
Germany	8,891	18,348	16,723	22	45	41	0.1	1.2	1.3
Hungary	5,213	9,521	9,210	23	42	41	n	0.9	1.0
Iceland	x(9)	x(9)	8,612	x(9)	x(9)	23	x(6)	1.2	1.2
Ireland	x(9)	x(9)	16,095	x(9)	x(9)	37	x(6)	x(6)	1.5
Israel	6,474	12,711	11,554	21	42	38	0.3	1.4	1.7
Italy	9,134	9,993	9,990	27	30	29	n	1.0	1.0
Japan	10,181	18,110	16,446	29	52	48	0.2	1.3	1.6
Korea	5,692	11,230	9,927	20	39	34	0.3	2.3	2.6
Mexico	x(9)	x(9)	7,889	x(9)	x(9)	46	x(6)	x(6)	1.3
Netherlands	10,208	17,561	17,549	24	41	41	n	1.8	1.8
New Zealand	8,863	10,995	10,582	28	35	34	0.2	1.3	1.5
Norway	x(9)	x(9)	18,840	x(9)	x(9)	40	x(6)	x(6)	1.7
Poland	6,851	9,686	9,659	31	45	44	n	1.3	1.3
Portugal	x(9)	x(9)	9,640	x(9)	x(9)	38	x(6)	x(6)	1.4
Slovak R.	x(4)	8,177	8,177	x(4)	33	33	x(4)	1.0	1.0
Slovenia	x(9)	x(9)	10,413	x(9)	x(9)	37	x(6)	x(6)	1.3
Spain	10,042	13,933	13,173	31	43	41	0.2	1.1	1.3

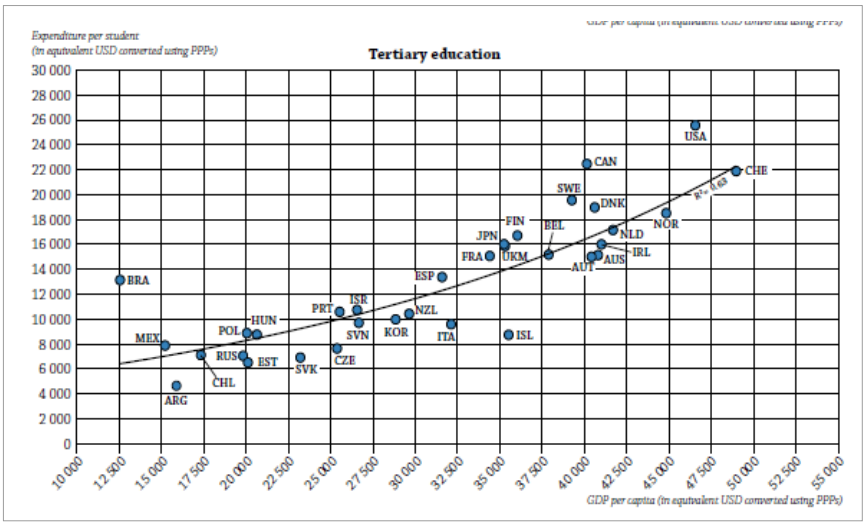
〈Table II-5〉 **Continue**

	Education cost per student			Education cost per student/GDP per capita			Education cost/GDP		
	B-type	A-type and specialized research programs	Total	B-type	A-type and specialized research programs	Total	B-type	A-type and specialized research programs	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sweden	6,604	22,090	20,818	16	53	50	x(6)	x(6)	1.7
Switzerland	6,371	24,287	22,882	12	47	44	n	1.2	1.3
Turkey	x(9)	x(9)	8,193	x(9)	x(9)	46	x(6)	x(6)	1.3
U.K.	x(9)	x(9)	14,223	x(9)	x(9)	42	x(6)	x(6)	1.2
U.S.	x(9)	x(9)	26,021	x(9)	x(9)	53	x(6)	x(6)	2.7
OECD avg.	~	~	13,958	23	43	41	0.2	1.4	1.6
EU21 avg.	~	~	13,572	22	41	39	0.1	1.3	1.4

Note: Two member states (Greece and Luxembourg) were not included in the comparison for failing to provide any information on of the required items.
Source: OECD(2014).

[Figure II-2] **GDP per Capita and Education Cost per Student at Different Levels of Education (2010)**





Source: OECD(2013), p. 169.

On the other hand, the regression line for postsecondary (tertiary) education is curved slightly upward, indicating that the education cost per student grows more quickly than the GDP per capita. This suggests that the demand for higher education rises more rapidly as people's income level begins to grow. Unlike in the cases of primary and secondary education, Korea falls below the regression line here, suggesting that the higher education cost per student in Korea is lower than the nation's income level, and also that the higher education cost per student will begin to rise at an accelerated pace as the nation's income level rises in the future. As of 2011, the higher education costs per student at vocational colleges and universities in Korea amounted to 20 percent and 39 percent of the nation's GDP (34 percent of the nation's GDP overall), which are still several percentage points below the OECD averages of 23 percent, 43 percent, and 41 percent. There are only two other OECD member states ranked lower than Korea in this regard, i.e., Iceland and Italy. The average ratios in Austria, the Czech Republic, Estonia, New Zealand, and Slovakia range between 33 and 35 percent. In 17 other member states, the education cost per student hovers above 40 percent of the GDP per capita.

The last three columns of <Table II-5> show the ratio of the total education

cost to the GDP. Unlike in the previous two areas, the total education costs of vocational colleges and universities in Korea made up 0.3 percent and 2.3 percent of the country's GDP (2.6 percent overall), which are significantly higher than the OECD averages of 0.2 percent, 1.4 percent, and 1.6 percent. How is this possible when the education cost per student in Korea is lower than the OECD average? The reason is that a great number of high-school graduates go on to enroll at colleges and universities in Korea, making Korea one of the world's fastest-growing higher education markets.

In summary, Korea spends a greater share of its GDP on higher education than do other comparable countries, mainly because its postsecondary education enrollment rate is much higher than in those other countries. Nevertheless, the education cost per students and its ratio to the GDP per capita—key indicators of the quality of higher education—are relatively lower in Korea than in other countries. Even when compared to other countries at similar income levels, these figures are lower in Korea than elsewhere.

4 Fiscal support for higher education

<Table II-6> summarizes the distribution of fiscal support for higher education in Korea by source, particularly concerning the Ministry of Education (MOE) and other agencies, in 2012. The other agencies include the ministries and departments of the central government other than the MOE as well as local governments and their agencies. In 2012, the Korean government spent a total of KRW 9.45 trillion on higher education, making up 35.5 percent of the total higher education cost of KRW 26.64 trillion, as shown in <Table II-3>. Of the fiscal support, 83.6 percent, or KRW 7.90 trillion, was made via the MOE.

More specifically, 46.6 percent of the fiscal support, or KRW 4.41 trillion, was spent on general support projects; 31.1 percent, or KRW 2.94 trillion, on ordinary operating expenses for national and public schools; and 22.2 percent, or KRW 2.10 trillion, on student loans and aid. Whereas the MOE provides support for all three types of projects, support from other agencies tends to be concentrated on general support projects (95.1 percent). On the other hand,

the MOE channeled 37.1 percent, 26 percent, and 36.8 percent, respectively, of its fiscal support to the higher education budget for the three types of projects.

〈Table II-6〉 **Distribution of Fiscal Support for Higher Education by Source (2012)**

(Units: KRW 1,000,000, %)

	General support projects	Student loans and aid	Ordinary operating expenses for national/public schools	Total	Fiscal support/total higher education cost
MOE	2,935,215	2,056,987	2,910,042	7,902,244	29.7
Other agencies	1,471,837	45,314	30,812	1,547,963	5.8
Total	4,407,052	2,102,301	2,940,854	9,450,207	35.5

Source: Database on Fiscal Support for Higher Education (https://hiedupport.kedi.re.kr).

〈Table II-7〉 **Fiscal Support for Higher Education by Source and Type (2012)**

(Unit: KRW 1,000,000, %)

		General support projects	Student loans and aid	Ordinary operating expenses for national/public schools	Total
By source	MOE	66.6	97.8	99.0	83.6
	Other agencies	33.4	2.2	1.0	16.4
	Total	100.0	100.0	100.0	100.0
By type	MOE	37.1	26.0	36.8	100.0
	Other agencies	95.1	2.9	2.0	100.0
	Total	46.6	22.2	31.1	100.0

Source: Database on Fiscal Support for Higher Education (https://hiedupport.kedi.re.kr).

The amount of fiscal support for student loans and aid increased dramatically in 2013 and 2014, thanks to the expansion of the scope of government scholarships—a decision made in 2012—for students from low- to middle-income households. By contrast, the amount of support for national and public school operating expenses took a dip. In 2014, the MOE's budget for

higher education included KRW 3.87 trillion for developing the basis of customized government scholarship programs, about 1.6 times the KRW 2.3646 trillion set aside for national and public school operating expenses.

〈Table II-8〉 **The MOE's Budget for Higher Education**

(Unit: KRW 1,000,000)

Item	2010	2011	2012	2013	2014	Increase/decrease (2010 to 2014)
Enhancing higher education capability	1,117,797	1,189,960	1,341,848	1,420,078	1,490,451	372,654
Enhancing academic research capability	276,035	298,854	304,978	310,537	668,886	392,851
Promoting research on Korean history	24,925	24,198	27,153	27,030	27,060	2,135
Developing basis for customized government scholarship	997,141	713,593	2,083,319	3,163,440	3,866,724	2,869,583
National/public school operating expenses	2,320,507	2,463,265	2,213,984	2,400,029	2,364,604	44,097
Other	318,390	323,225	261,098	317,914	299,519	−18,871
Total (higher education)	5,054,795	5,013,095	6,232,380	7,639,028	8,717,244	3,662,449

Source: Korea Higher Education Institute (KHEI) (2014), p. 7.

<Table II-9> summarizes the respective shares of the public and private sector in the total higher education costs of OECD member states. As of 2000, the government and its fiscal resources handled 23.3 percent of the total higher education cost in Korea, but that share has kept growing since, reaching 27 percent by 2011. As <Table II-8> shows, the Korean government's share of the higher education cost has continued to increase since 2011, under the half-tuition program and other measures. Its share of the total higher education cost in 2014 is therefore likely to be significantly greater than that listed in <Table II-9>.

Households (i.e., consumers of education—that is, students and parents) and other private-sector organizations handle the remaining 73 percent of the higher education cost in Korea. The sources of private payments include donations from private organizations and money transferred by private school foundations. Households in Korea account for 44.1 percent of the total education cost, and

other private organizations, 28.9 percent. Therefore, among OECD member states, Korea has the second-highest burden on its private sector in terms of higher education, next only to Chile (75.8 percent). Other countries that impose over 60-percent education cost burdens on their private sectors include the United Kingdom (69.8 percent), Japan (65.5 percent), and the United States (65.2 percent). The greater the private sector's share of the total higher education cost, the greater the burden on households. Accordingly, in Chile, 68.3 percent of the higher education cost is borne by households, while that figure is 60.7 percent in the United Kingdom; 50.9 percent in Japan; 47.8 percent in the United States; 44.1 percent in Korea; and 39 percent in Australia. Nevertheless, in the United Kingdom, the government also handles a significant portion (39.9 percent) of the total higher education cost.

〈Table II-9〉 **Public and Private Shares of Total Higher Education Cost**

(Unit: %)

	2011					2000	
	Fiscal support (public)	Private			Government subsidies for private organizations	Fiscal support (public)	Private
		House holds	Other private organizations	Private total			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Australia	45.6	39.0	15.4	54.4	0.5	49.9	50.1
Austria	86.9	2.7	10.5	13.1	8.2	96.3	3.7
Belgium	90.1	4.9	5.1	9.9	4.5	91.5	8.5
Canada	57.4	20.0	22.6	42.6	1.1	61.0	39.0
Chile	24.2	68.3	7.5	75.8	8.1	m	m
Czech Republic	81.1	7.8	11.2	18.9	n	85.4	14.6
Denmark	94.5	x(14)	x(14)	5.5	n	97.6	2.4
Estonia	80.4	15.6	4.0	19.6	m	m	m
Finland	95.9	x(14)	x(14)	4.1	0.2	97.2	2.8
France	80.8	10.4	8.8	19.2	2.6	84.4	15.6
Germany	84.7	x(14)	x(14)	15.3	m	88.2	11.8
Greece	m	m	m	m	m	99.7	0.3
Iceland	90.6	8.7	0.7	9.4	a	91.8	8.2
Ireland	80.5	16.6	2.9	19.5	n	79.2	20.8
Israel	49.0	30.9	20.1	51.0	5.3	58.5	41.5

〈Table II-9〉 **Continue**

	2011					2000	
	Fiscal support (public)	Private			Government subsidies for private organizations	Fiscal support (public)	Private
		House holds	Other private organizations	Private total			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Italy	66.5	25.3	8.2	33.5	9.1	77.5	22.5
Japan	34.5	50.9	14.6	65.5	m	38.5	61.5
Korea	27.0	44.1	28.9	73.0	1.2	23.3	76.7
Mexico	67.1	32.6	0.4	32.9	1.9	79.4	20.6
Netherlands	70.8	15.2	14.1	29.2	0.3	76.5	23.5
New Zealand	64.5	35.5	x(12)	35.5	m	m	m
Norway	95.9	3.4	0.7	4.1	m	96.3	3.7
Poland	75.5	22.6	1.9	24.5	n	66.6	33.4
Portugal	68.6	22.3	9.2	31.4	m	92.5	7.5
Slovak Republic	76.9	15.4	7.7	23.1	3.8	91.2	8.8
Slovenia	85.2	9.9	4.9	14.8	n	m	m
Spain	77.5	18.7	3.8	22.5	1.7	74.4	25.6
Sweden	89.5	0.2	10.3	10.5	n	91.3	8.7
Turkey	m	m	m	m	m	95.4	4.6
United Kingdom	30.2	60.7	9.1	69.8	39.9	67.7	32.3
United States	34.8	47.8	17.4	65.2	m	37.4	62.6
OECD avg.	69.2	~	~	30.8	3.8	77.4	22.6
EU21 avg.	78.6	~	~	21.4	4.4	85.7	14.3

Note: Two member states (Greece and Luxembourg) were not included in the comparison for failing to provide any information on the required items.
Source: OECD (2014), p. 245.

Ⅲ

Forecasts of Higher Education Costs

1 Literature survey

Few studies provide detailed forecasts of future changes in Korea's higher education cost. Perhaps the one that bears the greatest resemblance to the current study is Lee (2011), which forecasts changes in the higher education cost using the ratio of the education cost to the GDP, and draws implications for policy decisions regarding fiscal support for higher education. The education cost-to-GDP ratio can be broken down as follows:

$$\left(\frac{Education\,\mathrm{cost}}{GDP}\right)=\left(\frac{Education\,\mathrm{cost}}{Number\ of\ students}\right)\times\left(\frac{Number\ of\ students}{College-age\ population}\right)$$
$$\times\left(\frac{College-age\ population}{Total population}\right)\times\left(\frac{Total population}{GDP}\right)$$

As for the variable included on the right side of this equation, Lee(2011) made the following hypotheses:

(1) The education cost per student will increase at a rate of 2.68 percent from year to year (2.68 percent being the average annual growth rate from 1997 to 2007).
(2) The number of students will increase according to one of the two following scenarios:

Scenario 1: The college enrollment rate is kept at 78 percent, with the ceiling on the graduate enrollment rate fixed at 23 percent.
Scenario 2: The college enrollment rate is kept at 73 percent, with the ceiling on the graduate enrollment rate fixed at 15 percent.

(3) The sizes of the total population and the college-age population will change according to the formula the author applied to a previous research project commissioned by the MOE.
(4) The GDP per capita (i.e., GDP/total population) will increase at a rate of 3.75 percent from year to year (3.75 percent being the average annual growth rate from 1997 to 2007).

Apply Scenario 1 to a forecast of the number of students, and the total number of students will reach its peak at two million in 2010, before dropping by 12 percent to 1.71 million by 2020, and then by a further 34 percent to 1.25 million by 2030. The number of students enrolled at universities will likely decrease by six percent, from 1.5 million in 2010 to 1.37 million by 2020, and by a further 27 percent to 1.04 million by 2030. The number of students enrolled at vocational colleges will take a 30-percent dip, from 0.49 million in 2010 to 0.34 million by 2020, and drop by a further 54 percent to 0.22 million by 2030. By contrast, the number of graduate students will increase from 0.17 million in 2010 to 0.46 million by 2020, before dropping to 0.32 million by 2030.

In Scenario 2, the total number of students will reach two million in 2010, before dropping by 18 percent to 1.64 million by 2020, and by a further 38 percent to 1.23 million by 2030. The number of students enrolled at universities will likely decrease by 12 percent, from 1.5 million in 2010 to 1.32 million by 2020, and by an additional 32 percent to 1.02 million by 2030. The number of students enrolled at vocational colleges will decrease by 34 percent, from 0.49 million in 2010 to 0.32 million by 2020, and drop another 57 percent to 0.21 million by 2030. By contrast the number of graduate students will rise from 0.17 million in 2010 to 0.30 million by 2020, before dropping to 0.21 million by 2030. In general, Scenario 2 predicts that the number of students for each type of institution will decrease by three to seven percentage points more than Scenario 1.

According to the two scenarios, <Table III-1> summarizes the forecasts of how the ratio of the education cost to the GDP in Korea will likely change, as well as how the government's fiscal support for higher education will change by 2030. The forecasts assume that government spending on higher education will start at 0.6 percent of the GDP in 2010, and grow by 0.1 percentage point every year, reaching 1.0 percent in 2012 and remaining constant at that level afterward. The one-percent-of-the-GDP level is equivalent to the OECD average.

These forecasts lead to the conclusion that the Korean government's budget for higher education needs increase to KRW 7 trillion in 2011, KRW 8.5 trillion in 2012, and KRW 10 trillion in 2013. These changes will increase the government's share of the total higher education cost from 25 percent in 2010 to 45 to 48 percent by 2020 and 66 to 71 percent by 2030. Why would the government's share of the cost keep increasing even though the ratio of the government's investment is fixed to one percent of the GDP? The reason is that the number of students is expected to decrease drastically over the next few decades.

Other empirical studies on the forecasts of education costs in Korea pertinent to our purpose include Choi et al.(2005), Park(2005), and Ban(2011). The main focus of these studies, however, is the evaluation and determination of the appropriate level of government spending on higher education, given Korea's GDP, rather than making forecasts of long-term changes in the education cost. We may summarize the findings of these studies, as discussed in Lee et al. (2011), as follows.

Choi et al.(2005) provides a function that explains the changes in the public education cost per student. Assuming that the public education cost per student increases more rapidly than does the GDP per capita, this study uses the education cost per student as its dependent variable and the GDP per capita and its square as its explanatory variables. The cross-sectional analysis of the OECD data this study provides reveals no statistically significant correlations among the estimation coefficients. This study applies the same function to the time series data from Korea, and concludes that the Korean government spends comparatively smaller amounts of money on higher education than the Korean GDP could afford.

〈Table III-1〉 **Forecasts of Higher Education Cost: Ratio of Fiscal Support to GDP (Lee, 2011)**

Year	Fiscal support / GDP (%)	Fiscal support / total higher education cost (%)		Higher education budget (KRW 1 tn.)	Total budget (KRW 1 tn.)	Total population (1,000)	GDP
		Scenario 1	Scenario 2				
2008	0.60	26	27	6.19	289.00	48,607	1,032
2009	0.60	25	27	6.44	300.68	48,747	1,074
2010	0.60	25	26	6.70	312.74	48,875	1,117
2011	0.60	23	25	6.97	325.19	48,989	1,161
2012	0.70	27	29	8.45	338.01	49,083	1,207
2013	0.80	30	33	10.03	351.22	49,163	1,254
2014	0.90	34	37	11.73	364.83	49,227	1,303
2015	1.00	39	41	13.53	378.86	49,277	1,353
2016	1.00	39	42	14.05	393.30	49,312	1,405
2017	1.00	40	43	14.58	408.18	49,332	1,458
2018	1.00	41	43	15.13	423.52	49,340	1,513
2019	1.00	42	45	15.69	439.34	49,338	1,569
2020	1.00	45	48	16.27	455.65	49,326	1,627
2021	1.00	48	51	16.87	472.45	49,300	1,687
2022	1.00	51	55	17.49	489.75	49,263	1,749
2023	1.00	55	59	18.13	507.61	49,219	1,813
2024	1.00	57	61	18.79	526.05	49,168	1,879
2025	1.00	59	63	19.47	545.06	49,108	1,947
2026	1.00	60	65	20.17	564.65	49,039	2,017
2027	1.00	61	65	20.89	584.81	48,959	2,089
2028	1.00	61	66	21.63	605.53	48,866	2,163
2029	1.00	64	68	22.39	626.80	48,758	2,239
2030	1.00	66	71	23.16	648.59	48,635	2,316

Source: Lee (2011), re-quoted in Ahn et al. (2013), p. 135.

Park(2005) forecasts likely changes in the education cost per student on the basis of changes in the GDP per capita, as estimated using the OECD data from 1993 and onward. Ban(2011), using the OECD data, also uses the education cost per student as his dependent variable, and the GDP per capita as his

independent variable.

It is important to note that all three studies focus on the correlation between the education cost per student and the GDP per capita. While factors other than the GDP per capita may affect the education cost per student, such as the availability and ratio of private schools, all three studies focus solely on the correlation between the education cost and the GDP, given the dearth of data on the other possible factors.

An et al.(2012) also uses the GDP per capita as an explanatory variable in its function of the education cost per student. An et al.(2006) uses population density and the private sector's share of the education cost as two other explanatory variables.[6] Furthermore, An et al.(2006) provides a cross-sectional analysis of the data available from OECD member states, concluding that population density is not a significant factor effecting changes in the education cost per student, while the private sector's share of the education cost does bear a positive correlation to the education cost per student. There are two possible reasons for this correlation. First, as the demand for education keeps growing at an exponential rate in a given country, students and parents are forced to bear certain substantial increases in the price of education. Second, the amount of fiscal support from the government increases more slowly than the share of the private sector due to the legal restraints on budget increases.

2 Method for forecasting changes in the higher education cost

Now, as was done in Lee(2011), we shall estimate the changing ratio of the total education cost to the GDP using multiple variables, including the education cost per student, proportion of university- or college-enrolled students of the total school-age population, proportion of the college-age population of the total population, and GDP per capita, applying pertinent assumptions and hypotheses to each.

6) An et al. (2012), p. 121, and An et al. (2006), p. 253.

$$\left(\frac{Education\,\text{cost}}{GDP}\right)=\left(\frac{Education\,\text{cost}}{Number\ of\ students}\right)\times\left(\frac{Number\ of\ students}{College-age\ population}\right)$$
$$\times\left(\frac{College-age\ population}{Total population}\right)\times\left(\frac{Total population}{GDP}\right) \quad (1)$$

In other words, the ratio of the education cost to the GDP is obtained by first estimating the ratio of the number of college-enrolled students to the total population, and by dividing that ratio by the GDP per capita. The ratio of the college-enrolled population to the total population, in turn, can be expressed as a multiple of the ratio of the college-age population to the total population and the ratio of college-enrolled students to the college-age population.

As for the GDP per capita, the size of the population at each age, and the total population, we apply the same forecasts made in the Ministry of Strategy and Finance (MSF)'s long-term fiscal projections from 2014. Using the forecasts of the size of the population at each age and the total population, we forecast the ratio of the college-age population to the total population, and then use that to estimate the number of students and the education cost per student.

3 Forecasts of the number of students

Lee(2011) defines the college-age population as the number of young people aged 18 to 21. Based on the ratios of the number of college-enrolled students to the total college-age population from 2000 to 2010, Lee comes up with two different scenarios for the ratio (78 percent for Scenario 1 and 73 percent for Scenario 2) and also for the graduate school enrollment rate (23 percent for Scenario 1 and 15 percent for Scenario 2).

This study, by contrast, broadens the definition of the college-age population to include young people aged 18 to 25. As such, the scope of higher education institutions subject to our analysis is far wider (including universities, vocational colleges, graduate schools, and correspondence colleges, among others), and we need to consider the fact that many male college-enrolled students take leaves of absence to serve in the military, and also that many students of both sexes

take gap years, thereby postponing their graduation. As a matter of fact, 95 percent of college-enrolled students in Korea today fall into the age group between 18 and 25.[7] The OECD uses the ages 25 and 30 as the thresholds for entering universities and graduate schools, respectively.[8]

Now, we need to observe the changes in the ratio of college-enrolled population to the college-age population from 2000 to 2013. The data on the number of students were obtained from KEDI's educational statistics database (kess.kedi.re.kr), and combine the numbers of students enrolled at all types of higher education institutions, including universities, educational colleges, industrial colleges, graduate schools, vocational colleges, and others. Here, "others" includes correspondence colleges, polytechnic colleges, postsecondary trade schools, cyber and online universities, corporate universities, technical colleges, and specialized colleges. The concept of "graduate schools" here encompasses graduate schools affiliated with universities, general graduate schools, professional graduate schools, specialized graduate schools, and graduate universities.

The total number of students increased from 3.36 million in 2000 to 3.71 million in 2013. As for the different types of institutions, the number of students enrolled at universities changed from 1.67 million to 2.12 million; at graduate schools, from 0.23 million to 0.33 million; at industrial colleges, from 0.17 million to 0.08 million; and at vocational colleges, from 0.91 million to 0.76 million. The drop in the number of students at industrial colleges reflects the fact that a large number of these colleges were converted into four-year universities during this 13-year period, and the drop in the number of students at vocational colleges appears to be related to the decrease in the size of the overall college-age population. On the contrary, the number of students enrolled at other institutions increased from 0.36 million to 0.41 million, suggesting that there was growing demand for higher education services via diverse channels, including correspondence colleges, cyber universities, and polytechnic colleges, among others.

7) MOE and KEDI(2013).

8) OECD(2013), p. 300.

〈Table III-2〉 **Number of Students by Institution Type**

(Unit: number of students)

Year	Total	Universities	Educational colleges	Industrial colleges	Graduate schools	Vocational colleges	Others
2001	3,500,560	1,729,638	21,418	180,068	243,270	952,649	373,517
2002	3,577,447	1,771,738	23,259	187,040	262,867	963,129	369,414
2003	3,558,111	1,808,539	23,552	191,455	272,331	925,963	336,271
2004	3,555,115	1,836,649	23,335	189,035	276,918	897,589	331,589
2005	3,548,728	1,859,639	25,141	188,753	282,225	853,089	339,881
2006	3,545,774	1,888,436	25,881	180,435	290,029	817,994	342,999
2007	3,558,711	1,919,504	25,834	169,862	296,576	795,519	351,416
2008	3,562,844	1,943,437	24,116	161,876	301,412	771,854	360,149
2009	3,591,088	1,984,043	22,879	143,368	306,471	760,929	373,398
2010	3,644,158	2,028,841	21,618	133,736	316,633	767,087	376,243
2011	3,735,706	2,065,451	20,241	122,916	329,933	776,738	420,427
2012	3,728,802	2,103,958	18,789	95,533	329,544	769,888	411,090
2013	3,709,734	2,120,296	17,500	76,377	329,822	757,721	408,018

Notes: 1. Higher education institutions include universities, educational colleges, industrial colleges, graduate schools, vocational colleges, correspondence colleges, polytechnic colleges, postsecondary trade schools, cyber and online universities, corporate universities, technical colleges, and specialized colleges.
2. Graduate schools here include graduate schools affiliated with universities, general graduate schools, professional graduate schools, specialized graduate schools, and graduate universities.
3. The "others" category includes correspondence colleges, polytechnic colleges, postsecondary trade schools, cyber and online universities, corporate universities, technical colleges, and specialized colleges.
4. The figures also include the number of students enrolled at schools that were closed in the years surveyed.

Source: Educational Statistics Service(kess.kedi.re.kr)

The size of the college-age population was forecast using the Resident-Registered Population data from Statistics Korea and the population-by-age forecasts included in the MSF's long-term fiscal projections of 2014.[9] The MSF's projections provide estimates of the changes in the population of each age group since 2010. The population of the 18-to-25 age group used in these

9) Statistics Korea's National Statistics Portal (http://www.kosis.kr).

projections is about 0.64 percent larger than that estimated in Statistics Korea's survey. This study uses the population size of the 18-to-25 age group indicated by the Resident-Registered Population data, times 1.0064, for the period from 2000 to 2009, as well as the forecasts made in the MSF's fiscal projections, without modification, for the period from 2010 onward.

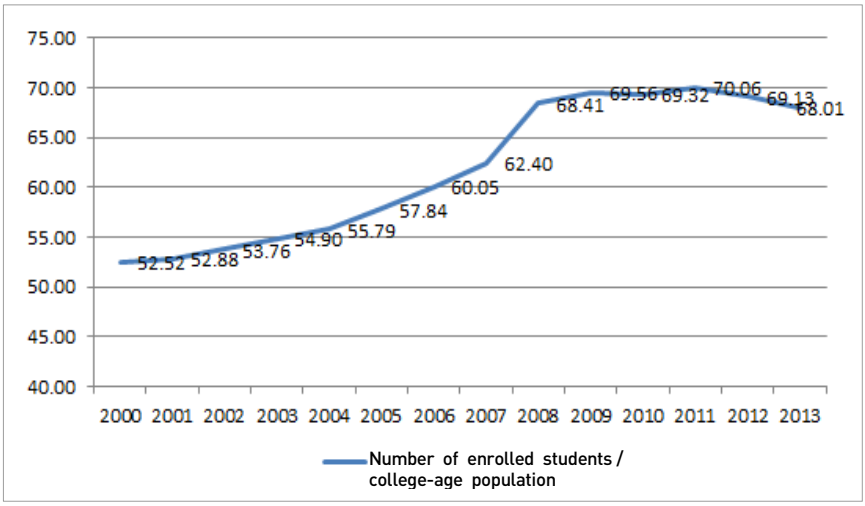
[Figure III-1] illustrates the likely trend in the changing ratios of students enrolled at different types of higher education institutions to the total college-age population since 2000. The ratio, which stood at 52.52 percent in 2000, rose steadily to exceed 60 percent by 2006, reaching 68.4 percent by 2008. The pace of growth slowed down somewhat in the years afterward until 2011, but continued to increase nonetheless. Having reached 70.06 percent in 2011, however, the ratio begins to decline gradually.

The ratio of the number of enrolled students to the college-age population used in this study may not be amenable to direct comparison with the cases in other countries. Nevertheless, the existing studies in this regard indicate that Korea has one of the highest such ratios among OECD member states, hovering a good 20 to 30 percentage points above the OECD average. In 2012, the Type-B admission rate (i.e., into vocational colleges) among the appropriate-age population in Korea was 32 percent, as opposed to the OECD average of 12 percent, while the Type-A admission rate (i.e., into universities) in Korea was 57 percent, as opposed to the OECD average of 48 percent. Also, the graduate school admission rate in Korea was 1.3 percent, while the OECD average was 1.6 percent. Overall, the higher education enrollment rate in Korea reached as high as 90.3 percent, as opposed to the OECD average of 61.6 percent.[10] As of 2011, the ratio of the Korean population aged 25 to 34 with higher-education degrees or diplomas was 66 percent, vastly higher than the OECD average of 39 percent.[11]

10) OECD (2014), p. 339.
11) OECD (2014), p. 44.

[Figure III-1] **Trend in the Ratio of Enrolled Students to College-Age Population**

(Unit: %)



Based on the foregoing, this study assumes the following three scenarios regarding the likely long-term changes in the ratio of enrolled students to the college-age population.

Scenario 1 assumes that the ratio has maintained its average (69.08 percent) over the last six years (2008 to 2013), when the ratio reached and remained at its peak. In other words, the signs of decrease over the last two years (2012 and 2013) are overlooked in this scenario. The number of enrolled students kept growing rapidly until 2007, but remained relatively stable from 2008 to 2013.

Scenario 2 assumes that the ratio will decrease by 1.48 percent every year on average, considering the fact that the ratio did drop by 1.48 percent a year on average in 2012 and 2013. This scenario, however, also assumes that the decline will stop once it reaches 61.76 percent, which was the average from 2000 to 2013, and will remain steady at that level. In other words, the ratio will continue to decline over the next seven years until it reaches 61.76 percent in 2020, and will then remain stable afterward. An et al. (2012) has suggested that the increasing oversupply of college- and university-graduates in the future would cause the employment rate among these graduates to decline

consistently.[12] If the recent decline in the ratio reflects structural changes in the market involving the oversupply of college- and university-graduates, the decline will likely persist for the time being. The ratio of 61.76 percent is similar to the ratio observed in 2007 and 2008.

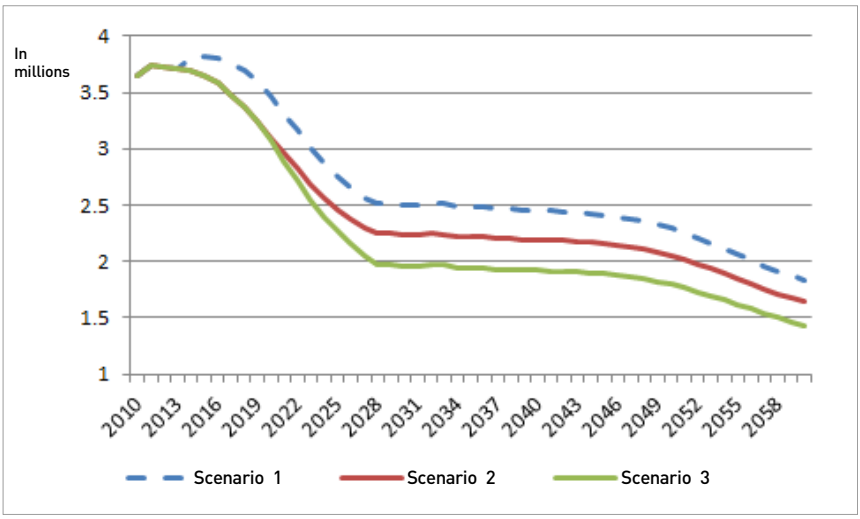
Scenario 3 assumes that the ratio will continue to decline until it reaches 54.08 percent, about 15 percentage points lower than the average of 69.08 percent over the last six years. In other words, the decline will persist for 16 years until it reaches 54.08 percent in 2029, and remain steady afterward. Based on the higher education completion rate of people at each age level as of 2011, the OECD(2013) forecasts that approximately 40 percent of young people in member states will graduate from Type-A institutions and 11 percent from Type-B institutions. Combining the two produces a higher education completion rate reaching 51 percent. However, as of 2011, the respective figures in Korea were 64 percent and 25 percent, for a combined total of 89 percent. Scenario 3, therefore, assumes that the enrollment rate in Korea will continuously drop until it nears the OECD average.

[Figure III-2] illustrates the results of the intermediate-level forecasts of the changes in the ratio under the three scenarios. The graph extending from 2010 to 2013 indicates the actual statistics, and the subsequent parts of the graphs indicate forecasts. For the specific forecasts and statistics involved in creating this and other graphs contained in this study, see the Appendix.

According to Scenario 1, which assumes the ratio will maintain the average of the last six years, at 69.08 percent, the number of enrolled students will continue to increase from 3.71 million in 2013 to 3.82 million in 2015, but decrease afterward due to the shrinking of the overall college-age population. The number of students will decrease relatively quickly until 2028, reaching 2.51 million, which is about 67.8 percent of the number observed in 2013. The pace of decline will slow somewhat until the early 2050s, before picking up again toward the latter 2050s. By 2060, the number of students will drop to 1.83 million, about half the figure observed in 2013.

12) Ahn et al.(2012), pp. 64–66.

[Figure III-2] **Change in the Number of Enrolled Students by Scenario**



Note: See Table A-1 in the Appendix to this report.

In Scenario 2, the number of students will drop radically over the next 25 years, reaching 2.25 million (60.6 percent of what it was in 2013) by 2028. As in Scenario 1, the pace of decline will slow somewhat until the early 2050s, when it will accelerate again toward the latter 2050s. In this case, the number of enrolled students will reach 1.64 million by 2060, 44 percent of what it was in 2013. In Scenario 3, the number of students will drop to 1.98 million by 2028 (53.3 percent of what it was in 2013), dropping further to 1.44 million by 2060 (38.7 percent of what it was in 2013).

Of the three scenarios, the second one is the most realistic. The chronic shortage of jobs for college and university graduates in Korea over the last several years has led the enrollment rate to decline noticeably, thus making it unrealistic for us to assume that the peak enrollment rate will remain unchanged in the years to come. Nevertheless, Koreans boast incomparable zeal for education, and the Korean economy depends crucially on the strength of its human resources. Even after the ratio drops to a stable low in the future, it will still remain well above the OECD average. In the following, we shall forecast

the education cost per student, the total education cost, and the fiscal support for higher education based on the ratio estimated in Scenario 2.

4 Forecasts of the education cost per student

<Table III-3> compares the education cost per student in Korea to the OECD average, as indicated in *Education at a Glance 2013* and *2014*. The education cost per student decreased slightly from USD 9,972 in 2010 to USD 9,927 in 2011, while its share of the GDP per capita was 35 percent in 2010 and 34 percent in 2011. The OECD average ratio of the education cost per student to the GDP per capita was 41 percent in both 2010 and 2011, significantly higher than the case in Korea. Nevertheless, the education cost per student in Korea grew by 7.1 percent annually from 2000 to 2010, while the rate of growth of the OECD average was 3.37 percent a year.

〈Table III-3〉 **Education Cost per Student in Korea and Comparison to OECD Average**

(Units: USD ppp, %)

	Education cost per student	Education cost per student / GDP per capita		Annual rate of growth in education cost per student (2000 to 2010)	
		Korea	OECD avg.	Korea	OECD avg.
2010	9,972	35	41	7.10	3.37
2011	9,927	34	41		

Sources: OECD(2013 and 2014).

Now, based on the foregoing, we need to forecast the likely changes in the education cost per student in Korea. Before we proceed, however, we need to define the education cost per student target amount. It is undoubtedly subject to the influence of policies at individual schools and also of the government. If schools decide to raise their tuition fees in order to improve the quality of the education they provide, the education cost per student will rise concomitantly. The same will be the case if the government decides to increase the scale of its fiscal support for higher education. In other words, the education cost per

student changes in accordance with the changing social consensus on the importance and quality of higher education. Therefore, in order to forecast likely changes in the education cost per student, we need to first identify the attainable amount or level of such cost under the changing social consensus, and then figure out ways to reach that level.

The education cost consists of: tuition fees, which change in proportion to the number of students; and other factors that are not as sensitive to changes in the number of students, such as fiscal support, money transferred from or into school foundations or corporations, and donations from private organizations. Given this composition of the education cost, we can assume that the education cost per student will increase over time as the number of students decreases, unless special measures or actions are taken. Once we identify the target level of the education cost per student, we then need to estimate the likely changes in the education cost per student depending on the changes in the number of students, and compare these estimates to our target level. If we can reach the target level through changes in the number of students only, we will not need to take additional policy measures. However, if we cannot reach the target level, we will need certain policy changes.

In the next subsection, we will identify the target level of the education cost per student, and then forecast likely changes in the education cost per student according to changes in the number of students. Following that, we will discuss the possible policy solutions that will likely be required to reach that target level.

A. Identifying target level of education cost per student

First, we may hope that the education cost per student grows in proportion to the annual inflation rate, thereby allowing the real value of higher education to remain constant into the future—that is, equivalent to the real value observed in 2012. This hope, however, depends upon a lack of *substantial* growth in the education cost per student, which would be unrealistic.

Accepting that, we may then hope that the education cost per student grows in proportion to the rise in real income, so that the ratio of the education cost

per student to the GDP per capita remains constant, e.g., at 34.5 percent, which was the average ratio observed in 2011 and 2012. This hope, however, may equally be unrealistic. The Korean government has been investing heavily in the expansion and qualitative improvement of primary and secondary education as well as in the expansion of higher education in Korea. However, policymakers have also begun to recognize the need to improve the *quality* of higher education as well. The education cost per student in Korea has thus been growing at an annual rate of 7.01 percent on average during the decade from 2000 to 2010, which is far higher than the OECD average of 3.37 percent. Yet, as of 2011, the ratio of the education cost per student to the GDP per capita in Korea was 34 percent, significantly lower than the OECD average of 41 percent. Given these facts, it is clear that there will be increasing pressure to increase the ratio substantially in the long term.

Therefore, we need to estimate by how much the ratio of the education cost per student to the GDP per capita is to grow, and at what pace. The Korean government typically sets its fiscal goals and targets in light of comparable OECD averages. Thus, we may hope to increase the ratio to the OECD average of 41 percent relatively rapidly, and let the ratio remain constant at that level afterward.

On the other hand, we may also aspire to emulate the average of other advanced economies with income levels comparable to ours. Earlier studies on government spending on higher education in Korea, such as An et al.(2012), Lee et al.(2011), Choi et al.(2005), Park(2005), and Ban(2011), all provide regression analyses comparing Korea to other countries with similar income levels. These studies all come to the same conclusion—that despite the parity of income levels of the compared countries, the education cost per student in Korea still hovers below its counterparts in these other countries, and that the education cost in Korea therefore needs to be increased in order to achieve genuine improvement in the quality of higher education in the country.

In order to estimate the average education cost per student in other countries with comparable income levels, we first need to establish a function that explains the education cost per student in these countries. According to Lee et al.(2011), the education cost per student bears a positive correlation to the time trend, and therefore increases as time goes by. In other words, even if we held the

income level constant, the higher education cost per student would continue to increase over time. At first, it may seem counterintuitive that the education cost per student grows even when the income level is fixed. The only possible explanation appears to be that the popular preference for the level of quality in higher education changes over time. In other words, we may assume that the public, which previously thought of higher education as relatively unimportant, may come to demand more opportunities and better quality of higher education over time after learning about its positive impact on the national economy. Lee et al.(2011) thus provides the following estimation equation:

$$EP = 52.024 - 9.748 In(GDP/POP) + 0.536(In(GDP/POP))^2 + 0.018t + \epsilon$$

(Standard deviation) (11.720) (2.341) (0.017) (0.005)

$$R^2 = 0.752$$

Here, *EP* stands for the education cost per student; *GDP/POP*, the GDP per capita; and *t*, the time trend.

Choi et al.(2005), Park(2005), and Ban(2011) also provide functions of their own to explain the changes in the higher education cost per student in Korea, all using the GDP per capita as their explanatory variable, whether in a linear or quadratic function. An et al.(2012) also presents a function that explains the education cost per student using the GDP per capita, while An et al.(2006) also uses population density and the burden of education on the private sector as two other explanatory variables.[13)]

While there are studies on the same topic using other explanatory variables, this study sticks with the GDP per capita as its main explanatory variable, as the purpose of this study is to forecast likely fiscal changes in the long term. This study conducts the forecasting process using three different functions —linear, quadratic, and log-linear—and the panel data on the member states, including Korea, found in the OECD database spanning the period between 1997 and 2011. Assuming nation-specific idiosyncrasies, this study also provides a fixed effects analysis that takes into account possible variables among the

13) Ahn et al.(2012), p. 121 and Ahn et al.(2006), p. 253.

member states. <Table III-4> lists the results of the forecasts obtained using the three functions.

〈Table III-4〉 **Functions Explaining the Education Cost per Student**

	Linear function	Quadratic function	Log-linear function
Dependent variable	Exp/Stu	Exp/Stu	log (Exp/Stu)
Constant	1515.096***	−1572.738*	−0.3013531
(t-value)	(3.91)	(−1.85)	(−0.95)
GDP/Pop	0.3610685***	0.5640298***	
	(28.61)	(10.95)	
$(GDP/Pop)^2$		−2.98e−0.6***	
		(−4.06)	
log(GDP/Pop)			0.9406008***
			(30.21)
R^2(overall)	0.7153	0.7124	0.7901

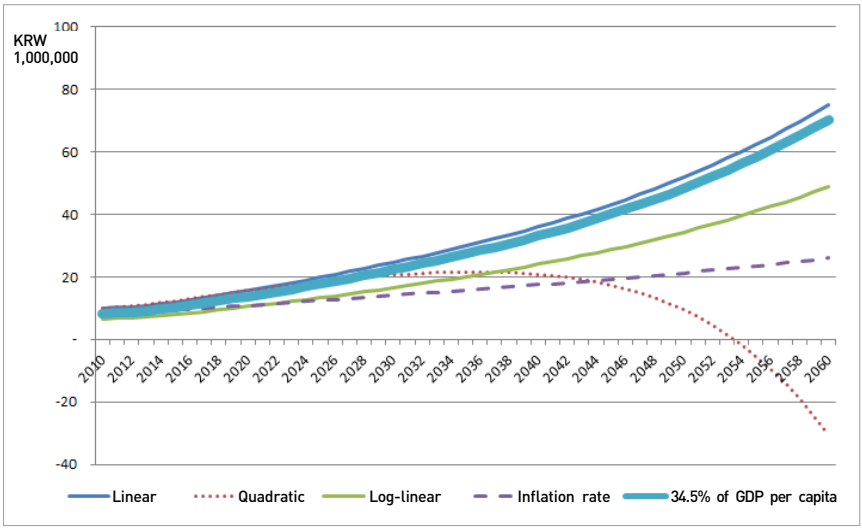
Notes: Exp/Stu = education cost per student, GDP/Pop = GDP per capita.
Significance levels: * = 10 percent, ** = five percent, *** = one percent.

[Figure III-3] is a graph showing the likely, future trends in the education cost per student in Korea based on the GDP per capita estimates and the three functions. Please see the Appendix for the specific estimates used to create this graph. The "inflation rate" curve shows the estimates of the absolute increases in the education cost per student while taking into account the rising inflation rate (and, henceforth, producing no difference in the real value of the education cost). The thick-line curve ("34.5% of GDP per capita") shows the trend in the education cost per student if the average ratio of the cost per student to the GDP per capita of 2010/2012 were to be retained. The curves labeled "Linear," "Quadratic," and "Log-linear" indicate the trends estimated using the three different functions, as indicated in <Table III-4>.

The linear and quadratic curves show that the education cost per student in 2012 was 1.26 times and 1.3 times the actual value of the education cost observed in 2012, respectively, meaning that the education cost per student in Korea is at least 20 to 25 percent lower than the average in other countries

with comparable income levels. The log-linear curve, on the contrary, shows the education cost per student in Korea to be at least 20 percent higher than the average in other countries.

[Figure III-3] **Trends in the Education Cost per Student**



Note: See Table A-2 in the Appendix.

The long-term forecasts made using the quadratic function show that the rate of increase in the education cost per student in Korea will begin to slow in the 2030s, and the absolute amount of the cost itself will also decrease towards the end of that decade. Afterward, the pace of decline will accelerate, dropping below zero by the late 2050s. These results indicate that the quadratic function is not suited to the task of long-term forecasting.

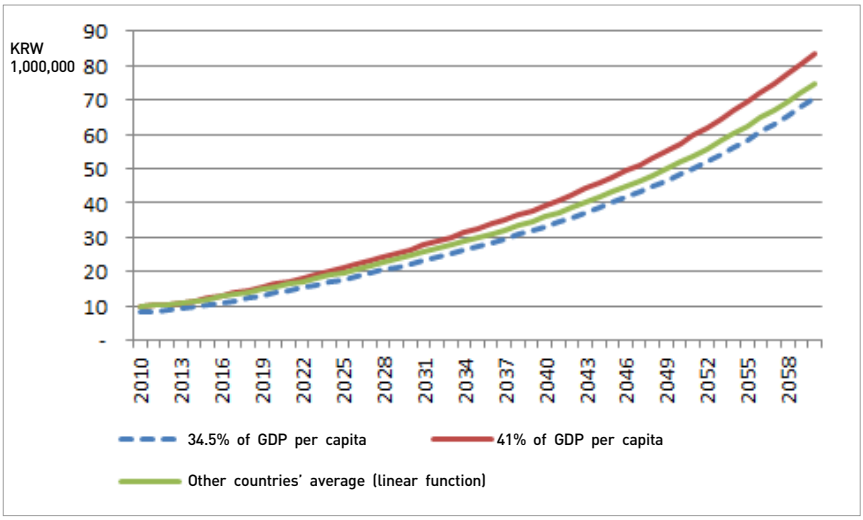
The results of the log-linear function, on the other hand, show the forecasts to be lower than the actual value at lower levels of income. However, as the income level rises, the education cost per student also begins to grow at an accelerated pace, thus exceeding the inflation-rate-based forecast by 2016 and beyond, and continues to grow at a pace faster than the inflation rate afterward. Nevertheless, the rate of increase in the education cost in this function stays

below the rate of increase in the GDP per capita, thus rendering the forecasts of the education cost per student lower than would be the case if the rate of increase in the education cost per student were fixed to the rate of increase in the GDP per capita. If the ratio of the education cost per student to the GDP per capita were to be kept constant, the education cost per student would rise to become 8.5 times greater than would be the case if the real value of the cost had been kept constant (by applying the inflation rate) by 2060. However, applying the log-linear function would narrow that gap to 5.9 times. Considering the real-life phenomenon that the higher education cost per student grows faster than the GDP per capita, the log-linear function is also found to be unsuited to our long-term forecasting task.

The curve based on the linear function, however, steadily hovers above the two that use the inflation rate and the constant ratio of the education cost per student to the GDP per capita, and therefore appears to present an appropriate rate of increase in the education cost per student—one that we should attempt to achieve in Korea. Therefore, in the following, we shall use the linear function, with the education cost per student as the dependent variable and the GDP per capita as the explanatory variable, to estimate the average education cost per student in other countries with income levels comparable to Korea's.

[Figure III-4] compares the linear-function forecasts of the education cost per student in other countries with comparable income levels to the forecasts based on the assumption that the ratio of that cost to the GDP per capita remains the same, either at 34.5 percent (which was Korea's average in 2011) or 41 percent (which was the OECD average in 2011). Based on the 41-percent-GDP assumption, the curve for Korea remains slightly below that of the other countries in 2012 and 2013 (by 0.6 percent and 0.1 percent, respectively), but begins to rise above the other countries' curves afterward, with the gap widening as Korea's GDP per capita continues to grow. By 2054, the average education cost per student in other countries with comparable income levels would be about 90 percent of that in Korea, applying the OECD average ratio of 41 percent.

[Figure III-4] **Comparison of Target Levels for Education Cost per Student**



Note: See Table A-2 of the Appendix.

B. Forecasts of the education cost per student and change in the number of students

Policy decisions, the exogenous variables, are not the only factors affecting the education cost per student. The change in the number of students is an endogenous variable that also affects the cost. Recall that the education cost per student is a concept that encompasses fiscal support, money transferred from school foundations or corporations, donations from private organizations, and the tuition fees paid by students and parents themselves. Assuming that the three foregoing sources of the cost remain constant, irrespective of the number of students, a decrease in the number of students would ultimately increase the education cost per student, as the amount of tuition fees paid by students and parents will also decrease in the long term.

In order to forecast the likely increases in the education cost per student resulting from the decreasing number of students, we need to first determine the share of individual tuition fees of the education cost. However, it is difficult

to find adequate and reliable data showing this share. According to the OECD database, the private sector (including households) handled 73 percent of the higher education cost in Korea as of 2011.[14] This figure is misleading, though, as it includes not only individual tuition fees but also money transferred from private school foundations and donations from private organizations.

We may thus refer to the listings of the average tuition fees of vocational colleges, universities, and graduate universities on Higher Education in Korea. As of 2012, the average tuition fees at these three types of institutions were KRW 5.13 million, KRW 6.04 million, and KRW 4.05 million, respectively. By multiplying each average tuition fee by the number of students enrolled at each type of institution and adding up the totals, we obtain KRW 14.54 trillion as the aggregate amount of individual tuition fees in Korea. For the total number of students at each type of institution, please refer to <Table II-3>. We can then estimate the share of individual tuition fees of the total education cost by dividing the aggregate tuition fees by the aggregate education costs at the three types of institutions, as indicated in <Table II-3>. By doing so, we find that, as of 2012, the share amounted to 54.8 percent.

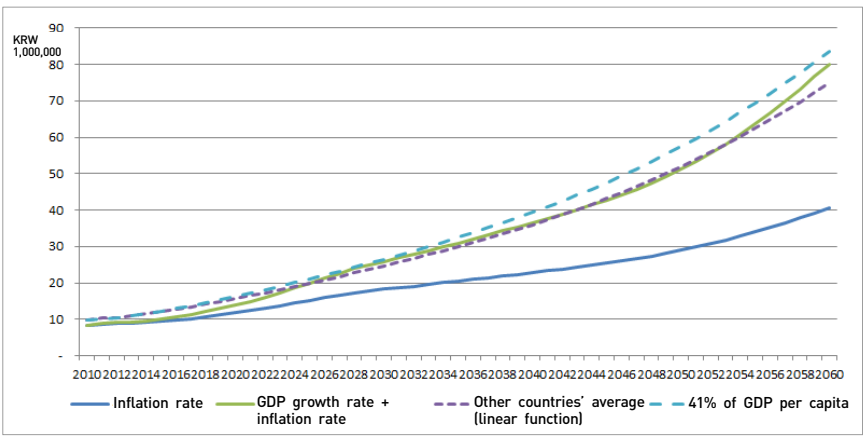
Using this ratio, we can now estimate the likely changes in the amount of tuition fees that will occur in response to the changes in the number of students, with the rest of the education cost remaining indifferent to the changes in the number of students. Then we divide the forecasts of the tuition fees by the likely number of students in order to obtain the tuition fee amount per student. The curve labeled “inflation rate” in [Figure III-5] shows the trend in the education cost per student in Korea based on the changes in the tuition fees and the amount of the indifferent portion of the education cost, which would remain unchanged in terms of the real value, as we assume that this remaining portion will increase at the same rate as the inflation rate. The curve labeled “GDP growth rate + inflation rate” is based on the assumption that the indifferent part of the education cost consistently make up 1.2 percent of the GDP (i.e., at the average rate of 2010 to 2012), while the level of the tuition fees per student continues to increase at the inflation rate. The curves labeled “Other

14) OECD(2014), p. 245.

countries' average (linear function)" and "41% of GDP per capita" are the same as the ones in [Figure III-4].

If the two parts of the education cost—the tuition fees and the non-tuition part—were to keep growing at the inflation rate while the number of students continues to decrease, the education cost per student would keep rising. The reason for this is that 48 percent of the total education cost remains constant even when the total amount of tuition fees paid by students decreases in proportion to the decrease in the number of students. However, the rate of increase in the education cost per student would remain marginal in this case, with the gap between the curves based on other countries' average and the 41%-GDP assumption widening over time. In 2011, the inflation rate-based education cost per student amounted to 84 percent and 85 percent of these two other curves, respectively. The ratio, however, is likely to drop to the 70-percent range after 2015, and continue to decline to the 60-percent range by the 2030s.

[Figure III-5] **Forecasts of the Education Cost per Student Based on Decreasing Numbers of Students**



Note: See Table A-2 of the Appendix to this report.

If we assume that the total amount of fiscal support, money transferred from school corporations, and donations from private organizations remains at a constant level, i.e., 1.2 percent of the GDP, the education cost per student will

rise steeply, even if the amount of individual tuition fees increases at the inflation rate. The forecasts based on this assumption, amounting to 85 percent of other countries' average in 2011, take a slight dip to 84 percent from 2014 to 2016, but begin to increase rapidly afterward, soon catching up with the average of other countries by 2025. In this case, the education cost per student in Korea would remain above the average of other countries for about two decades before dropping again, but not much lower than other countries' average.

However, if we switch to the 41%-GDP assumption and apply both the GDP growth rate and the inflation rate to our forecasts, the education cost per student in Korea never catches up with the average of other countries throughout the period of time subject to our forecast. The closest approximations would be achieved in the years 2027 to 2030, when the education cost per student makes up 40 percent of the GDP per capita in Korea. Afterward, the ratio begins to decline, reaching 36.5 percent by 2049, from which it will rise again.

C. Scenarios for rises in tuition fees

These forecasts are replete with important policy implications. As the size of the student population will inevitably decrease in the future, the education cost per student will necessarily rise, even without radical increases in tuition fees. However, the education cost per student in Korea is already low as it is, and it will take Korea some time to catch up with other countries with comparable income levels. Even if all the non-tuition portions of the education cost were to increase in proportion to the increases in the GDP, insofar as we fix the increases of the tuition fee to the inflation rate, it will not be until 2025 at the earliest that the education cost per student in Korea catches up with its counterparts in other countries with comparable income levels. Moreover, in this scenario, the education cost per student in Korea will never catch up with the OECD average of 41 percent of the GDP per capita by 2060. Once we assume that the non-tuition portions of the education cost will also rise according to the inflation rate, the gaps between Korea and other countries with comparable income levels or other OECD member states widen even further.

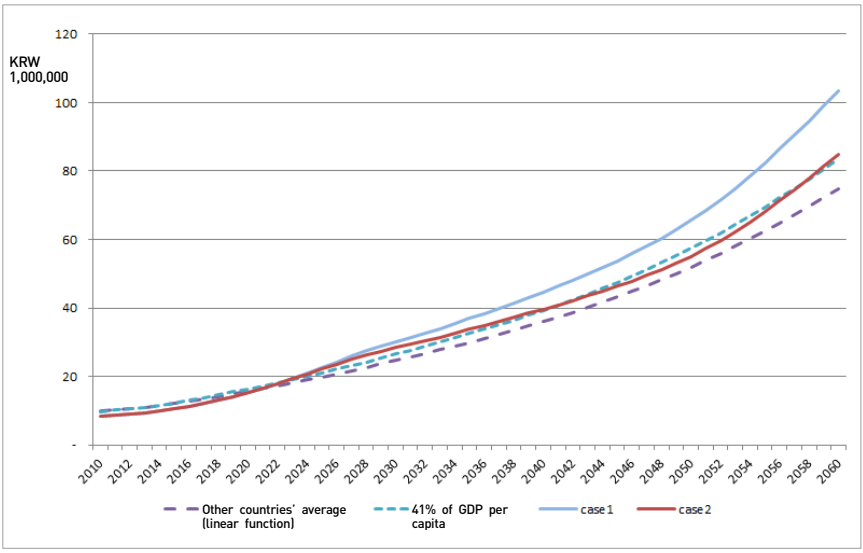
Considering the inevitable decrease in the student population, we need to

raise the tuition fees and other non-tuition portions of the education cost at a rate higher than the inflation rate if we want to accelerate our approach to the target ratio (of the education cost per student to the GDP per capita) or with the OECD average, at least. One way to achieve this may be to raise the tuition fees in proportion to the rise in the GDP per capita each year. The curve labeled "Case 1" in [Figure III-6] shows the trend based on these forecasts. The tuition fee per student amounted to 19 percent of the GDP per capita from 2010 to 2012, and Case 1 assumes that this ratio will remain constant. Here, the rate of increase in the tuition fee per student is quite high, allowing Korea to catch up with other countries with comparable income levels by 2021, and also with the OECD average of 41 percent of the GDP per capita by 2023. However, if the tuition fees were to increase at the same rate even after Korea hits these milestones, the education cost per student would begin to grow at an accelerated rate due to the drop in the number of students, thus placing Korea above other countries and the OECD average in the end.

Therefore, once we reach our target levels, we need to readjust the rate of increase of our tuition fees. The curve labeled "Case 2," in [Figure III-6], assumes that the tuition fee will rise at the same rate as the GDP growth rate until 2023, when the education cost per student reaches 41 percent of the GDP per capita in Korea. It then assumes that, afterward, the tuition fees will rise only at the inflation rate. According to Case 2, the education cost per student increases at a higher rate than the GDP per capita when the rate of increase in the tuition fee is the same as the rate of increase in the GDP per capita. Once we fix the tuition increase rate to the inflation rate, however, the pace of growth of the education cost per student begins to slow, and becomes similar to the pace of growth of the GDP per capita, as fiscal spending on higher education will constantly make up 1.2 percent of the GDP irrespective of the decreasing number of students, while the ratio of the tuition fee per student to the GDP per capita begins to decline. Therefore, Case 2 forecasts that, once the education cost per student reaches 41.68 percent of the GDP per capita in Korea by 2023, it will increase further to 44.5 percent by 2028 as the number of students begins to decrease. As the decrease in the student population slows down somewhat and the rate of increase in the tuition fees is lowered, the ratio will fall again to 39.3 to 41.5 percent by 2040 and afterward. In the remainder

of this section, we forecast changes in the education cost and fiscal spending on higher education using the assumptions and forecasts of Case 2.

[Figure III-6] **Education Cost per Student: Changes in the Number of Students and Tuition Levels**



Note: See Table A-3 of the Appendix to this report.

5 Forecasts of higher education cost

Let us return to and summarize the basic assumptions of our forecasts before we proceed onto forecasting the total education cost and its ratio to the GDP.

First, regarding the likely changes in the population, GDP growth rate, and inflation rate, we use the same forecasts as those made by the MSF in its long-term fiscal projections. The MSF long-term fiscal projections include forecasts at all levels—high, middle, and low—but this study uses the middle-level forecasts only.

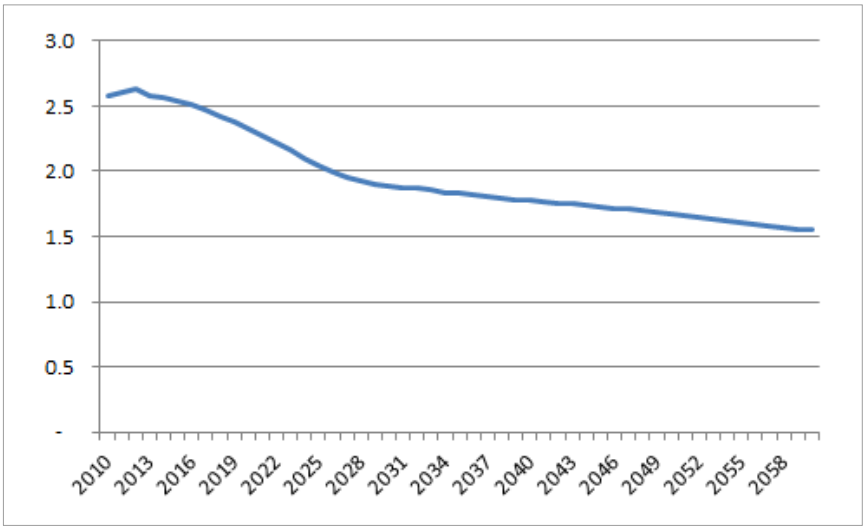
Second, as for the change in the number of students, we use the second of the three scenarios we discussed earlier. In other words, we assume that the ratio of the number of students to the college-age population, aged 18 to 25, will decrease at a rate of 1.48 percent each year (based on the average rate of decrease over the last two years) until it reaches 61.76 percent (the average ratio between the years 2000 and 2013), and will remain at that level afterward. Accordingly, we assume that the ratio of the number of enrolled students to the college-age population will continue to decline over the next seven years until it reaches 61.76 percent in 2020, and will remain constant afterward.

Third, our target ratio for the education cost per student to the GDP per capita is the OECD average from 2011, i.e., 41 percent. We thus assume that the tuition fee per student will rise at the same rate as the rate of growth in the GDP per capita until we reach our target ratio. Afterward, the rate of increase in the tuition fee will drop to the inflation rate, thus freezing the real value of tuition fees. In the meantime, the non-tuition portions of the education cost, including fiscal support, money transferred from school corporations, and donations from private organizations, will consistently make up 1.2 percent of the GDP throughout the forecast period. Thus, we project that the rise in tuition fees at the GDP-per-capita growth rate will continue until 2023.

Under all of these assumptions, we forecast likely changes in the education cost and its ratio to the GDP, the results of which are charted in [Figure III-7]. (See the Appendix to this report for specific figures and estimates.) The ratio of the education cost to the GDP is estimated to be 2.63 percent in 2013, but the ratio continues to decrease afterward due to the decrease in the number of students. The rate of decline will be high until the 2020s or so, as the number of students keeps decreasing rapidly. The rate of decline will then slow down somewhat afterward. However, the ratio keeps dropping, even as we assume that all the other non-tuition portions of the education cost will consistently make up 1.2 percent of the GDP, because the total amount of tuition fees will decline due to the drop in the number of students.

[Figure III-7] **Higher Education Cost/GDP Forecasts**

(Unit: %)

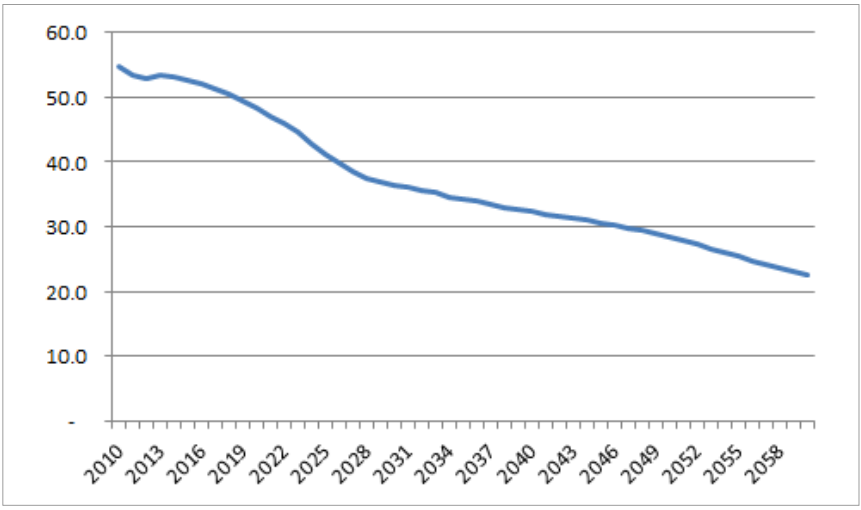


Note: See Table A-4 of the Appendix.

Notwithstanding the decrease in the ratio of the total education cost to the GDP, the ratio of the education cost per student to the GDP per capita will continue rising. However, the rate of growth, dependent solely on the natural decrease in the number of students, will be insufficient to enable us to catch up with the average ratio of other countries with comparable income levels or the OECD average within the projection period. Therefore, assuming that we aspire to catch up with the OECD average, we need to raise the tuition fees at the same rate as the rate of increase of the GDP per capita until we reach our target level, and then lower the rate of increase of the tuition fees to the inflation rate afterward. Based on these assumptions, [Figure III-8] shows the changing proportion of the tuition fees in the total education cost. The ratio will steadily decline from 55 percent in 2010 to 50.5 percent by 2018, and drop further to 39.9 percent by 2026. By 2045 and afterward, tuition fees will make up some 30 percent of the total education cost.

[Figure III-8] **Tuition Fee/Higher Education Cost Forecasts**

(Unit: %)



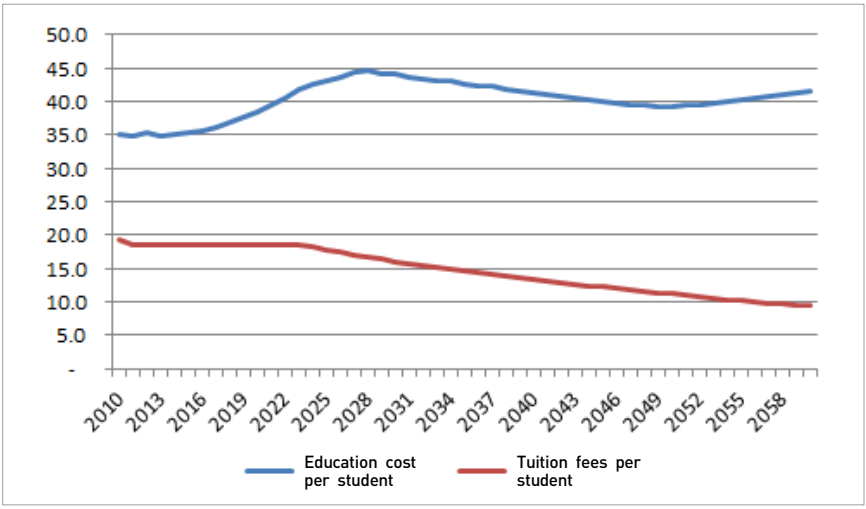
Note: See Table A-4 of the Appendix to this report.

[Figure III-9] shows the change in the ratio of the education cost per student to the GDP per capita, as well as in the ratio of the tuition fee per student to the GDP per capita. According to our scenario, we will be able to reach the target ratio of the education cost per student to the GDP per capita, or 41 percent, by the early 2020s. Afterward, we may decide to freeze the real value of tuition fees, but the number of students will continue its downward trend, causing the ratio to increase further to 44.5 percent by 2028. The ratio will drop somewhat afterward, but will remain in the 39 to 41 percent range until 2060 or so.

In the meantime, the ratio of tuition fees per student to the GDP per capita will remain at 19 percent until we reach our target in 2023, after which it will begin to decline, dropping to 15 percent in 2032 and further to 10 percent by 2054, making up a quarter or so of the education cost per student. Insofar as the Korean government insists on its half-tuition policy until then, it will pay half the tuition fee, thus requiring students to pay only 12 to 13 percent of the actual cost of their education.

[Figure III-9] **Ratio of the Education Cost and Tuition Fees per Student to the GDP per Capita**

(Unit: %)



Note: See Table A-4 of the Appendix.

Ⅳ

Forecasts of Fiscal Support for Higher Education

The Korean government's fiscal support for higher education can be mainly divided into three types: support for general programs, student loans and aid, and support for ordinary operating expenses at national and public universities. The government provides the last type of support because it is effectively the founder and administrator of national and public schools. The government also provides student loans and aid directly to consumers of education in order to help alleviate the financial burden of education. The remaining forms of fiscal support constitute the first type, and mainly involve support for various policy projects and programs.

<Table IV-1> shows that the support for general programs and ordinary operating expenses of national and public universities made up 47 percent and 46 percent, respectively, of all fiscal support for higher education in Korea in 2010, with student loans and aid claiming a meager seven percent. In 2011, the fiscal support for general programs spiked to 57 percent, while the support for ordinary operating expenses dropped to 35 percent and the student loans and aid increased their share slightly to eight percent. The reason for these changes is the fact that the additional KRW 2 trillion the government decided to provide for higher education in 2011, for the most part, went to general policy projects and programs. As such, the amount of fiscal support for ordinary operating expenses will remain more or less constant, unless the numbers of schools on support or the number of students change abruptly.

In 2012, the Korean government introduced a customized government scholarship system, allocating to it an additional KRW 1.5 trillion and radically

increasing the share of student loans and aid to 21.7 percent of the total fiscal support. The scale of student loans and aid has been steadily increasing ever since, with the MOE's budget for the customized government scholarships exceeding KRW 3 trillion by 2013, and rising further to KRW 3.68 trillion in 2014 and KRW 3.85 trillion in 2015. Of the total amount of student loans and aid provided by the Korean government, the MOE's budget for customized scholarships made up 92 percent in 2012 and 96 percent in 2014.

〈Table IV-1〉 **Changing Makeup of Fiscal Support for Higher Education: By Account**

(Units: KRW 100 million, %)

	General support		Student loans and aid		Ordinary operating expenses at national/public schools		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
2010	28,091	46.9	4,262	7.1	27,540	46.0	59,893	100.0
2011	49,548	57.1	6,982	8.1	30,187	34.8	86,716	100.0
2012	46,568	48.0	21,023	21.7	29,409	30.3	97,000	100.0

Source: Higher Education Fiscal Support Information System (https://hiedupport.kedi.re.kr).

The makeup of fiscal support for higher education can change dramatically according to the policy choices made. The amount of fiscal support for ordinary operating expenses of national and public schools is directly correlated to the education cost per student and the number of students. These last two variables, however, do not change dramatically from year to year, which explains the relative constancy of fiscal support for ordinary operating expenses. Fiscal support for general projects, on the other hand, is mostly spent on specific research and academic projects and programs encouraged for policy purposes, such as BK21, the Local University Specialization Program, and other projects aimed at showing off the education and research capabilities of universities. The amount of fiscal support in this regard, therefore, fluctuates significantly depending on the introduction, abolition, and expansion of policy projects. In the meantime, the Korean government has also significantly increased the amount of fiscal support for student loans and aid, from KRW 400 billion in 2010 and

KRW 700 billion in 2011 to over KRW 2 trillion in 2012, by introducing customized scholarships. In 2013, the MOE alone was given a budget of over KRW 3 trillion. Its budget for 2015, now standing at KRW 3.85 trillion, is 9.5 times larger than it was five years ago.

It is therefore unfeasible and unwise to attempt to forecast long-term changes in fiscal support for higher education when those changes occur as results of often unpredictable policy choices. Therefore, in this section, we narrow down and specify the scope of our fiscal support forecasts and analysis, and find policy implications accordingly.

First, we will look into the ratio of fiscal support to the total higher education cost, assuming that the current level of fiscal support will be maintained into the future. As of 2011, 73 percent of the higher education cost was handled by the private sector and households. Add to this already high ratio of private burden the prevalent social belief that everyone needs a college or university degree, and Korean households are, as a result, struggling with mounting financial burdens brought on by the need to secure higher education for their children. There is, therefore, a growing consensus in Korea on the need to alleviate the financial burdens of higher education on households, leading the government and schools to introduce diverse student loan and aid programs. The Korean government thus launched its campaign under the "half-tuition" slogan. The education community has long been demanding that the amount of fiscal support for higher education, currently at 0.7 percent of the GDP (as of 2011), should be increased to at least one percent of the GDP. The changing public opinion and increasing social pressure will therefore shape policy choices on fiscal support in the future.

Second, we will try to forecast the changes in the amounts of fiscal support required for government scholarships. Since 2012, the Korean government has been working on halving the tuition burden on students and parents by freezing the tuition levels, increasing university scholarships, and introducing new and higher-value government scholarships. By 2015, the real value of the tuition burden on households in Korea will be equivalent to half of what it was in 2011. However, it is unrealistic to assume that this tuition freeze will persist long into the future. Therefore, we need to forecast the likely changes in the fiscal support for government scholarships on the basis of the changes in the

tuition levels and the numbers of students.

1 Forecasts of the ratio of fiscal support to the education cost

A. Keeping the current fiscal support-to-GDP ratio constant

<Table IV-2> compares the budgets of the MOE and other agencies of the central government for supporting higher education in Korea and their respective ratios to the GDP. The data from 2008 to 2012 are available from the MOE. The budget of the Ministry of Education and Science Technology (MEST), the predecessor of the current MOE and MSIP before the latter two were separated and launched anew independently, was divided between education and non-education expenses so that only the former would be counted as part of the current MOE's spending. The MOE budget for 2013/2014 has been approved by the National Assembly, and its budget for 2015 is based on a draft submitted by the Cabinet in 2014. The budgets for higher education at other ministries and agencies, for the years 2013 to 2015, were estimated on the basis of the assumption that their ratio to the GDP would remain at 0.3 percent as well as on the GDP data made available by the MSF's long-term fiscal projections.

The latest data, from 2012, show that fiscal support for higher education makes up 0.8 percent of the GDP in Korea. Fiscal support here encompasses all programs and projects of higher-education spending by the MOE and other ministries and agencies of the central government as well as local government organizations. In 2012, of the KRW 3.72 trillion in total spent on higher education by government agencies other than the MOE, KRW 3.46 trillion (92 percent) came from the central government and its agencies. On the other hand, higher education support from the MOE alone makes up 0.5 percent of the GDP, with the MOE handling 62.1 percent of all fiscal support for higher education in Korea.

〈Table IV-2〉 **Distribution of Fiscal Support for Higher Education by Source**

(Units: KRW 100 million, %)

	2008	2009	2010	2011	2012	2013	2014	2015	Annual increase rate
MOE budget	33,623	43,916	42,792	51,018	61,801	75,647	86,520	105,341	
(Increase rate)		(30.6)	(–2.6)	(19.2)	(21.1)	(22.4)	(14.4)	(21.8)	(17.8)
Other agencies	22,126	24,452	28,371	36,101	37,722	39,350	41,914	44,694	
(Increase rate)		(10.5)	(16.0)	(27.2)	(4.5)	(4.3)	(6.5)	(6.6)	(10.6)
Total	57,739	68,368	71,163	87,119	99,523	114,997	128,434	150,035	
(Increase rate)		(18.4)	(4.1)	(22.4)	(14.2)	(15.6)	(11.7)	(16.8)	(14.6)
GDP			11,730,809	12,346,711	12,720,562	13,269,611	14,134,181	15,071,641	
MOE/total	58.2	64.2	60.1	58.6	62.1	65.8	67.4	70.2	
Fiscal support/GDP			0.6	0.7	0.8	0.9	0.9	1.0	
MOE budget/GDP			0.4	0.4	0.5	0.6	0.6	0.7	
Other agencies/GDP			0.2	0.3	0.3	0.3	0.3	0.3	

Note: The ratios to the GDP for years 2013 to 2015 were estimated based on the MSF's long-term fiscal projections.
Sources: MOE (2014a), p. 10 and MOE (2014b), pp. 2 and 6.

These figures alone, however, are not enough to support our long-term forecasting task, because the introduction of customized scholarships and other support measures in 2012 and afterward have radically increased the amount of higher education support provided by the MOE. The MOE's budget for higher education thus increased rapidly from KRW 6.2 trillion in 2012, KRW 7.6 trillion in 2013, to KRW 8.6 trillion in 2014, and will likely reach as high as KRW 10.5 trillion in 2015. The dramatic increase in the MOE's budget will also likely exert significant impact on the respective ratios of fiscal support from different types of government agencies to the GDP. We should not disregard these recent changes and commit the error of basing our long-term projections on the data as of 2012 only. In this study, we therefore estimate the likely changes in the amounts of fiscal support from agencies other than the MOE for the years 2013

to 2015, based on the data from 2012, and forecast the ratio of total fiscal support to the GDP in 2015 for forecasts concerning the years afterward.

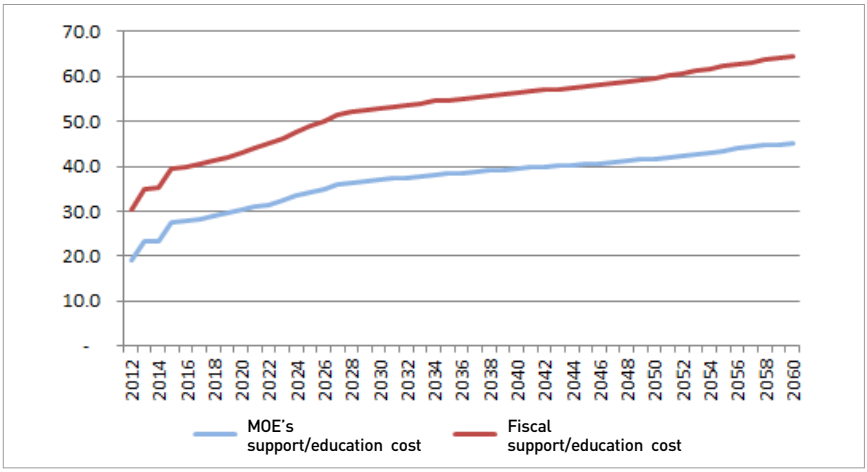
From 2013 to 2015, the MOE's budget is forecast to increase by 22.4 percent in 2013, 14.4 percent in 2014, and 21.8 percent in 2015, with the fiscal support it provides for higher education almost doubling from KRW 6.18 trillion in 2012 to KRW 10.53 trillion in 2015. The ratio of the MOE's higher education support to the GDP will accordingly rise from 0.5 percent in 2012 to 0.6 percent in 2013 and 0.7 percent in 2015. Assuming that the fiscal support for higher education from other agencies of the government remains constant at 0.3 percent of the GDP or so, the total amount of fiscal support will increase its share of the GDP from 0.8 percent in 2012 to 0.9 percent in 2013 and one percent in 2015.

Having reached this forecast, we now need to project how the ratio of fiscal support to the total higher education cost will change in the future, insofar as the MOE's contribution makes up 0.7 percent of the GDP and other agencies' contribution, 0.3 percent. In this scenario, we assume that the MOE will be the source of 70.2 percent of all fiscal support for higher education, about 8.1 percent higher than the 62.1 percent of 2012.

[Figure IV-1] shows that the share of fiscal support of the higher education cost has been increasing quite rapidly in recent years, from 26.8 percent in 2011 to 30.5 percent in 2012 and 35 percent in 2013. The share is likely to grow further at an even more accelerated pace in the near future. As the number of students decreases and the ratio of fiscal support to the GDP is maintained at one percent, the education cost-to-GDP ratio will drop even further, while the ratio of fiscal support to the education cost will keep rising. By the mid-2020s, fiscal support will account for 50 percent of the higher education cost, reaching over 60 percent by the early 2050s. In the meantime, the MOE will also increase its share of fiscal support for higher education, from 23.3 percent in 2013 to over 30 percent by 2020, over 35 percent by 2026, and finally over 40 percent by the early 2040s.

[Figure IV-1] **Share of Fiscal Support of the Education Cost: at a Constant Fiscal Support/GDP Ratio**

(Unit: %)



Note: See Table A-5 of the Appendix to this report.

B. Raising the MOE's support-to-GDP ratio to one percent

Now, let us try a different scenario, in which we raise the ratio of the MOE's support for higher education to the GDP to one percent, and determine how much more of the MOE budget this change will require, and how this change will affect the total share of fiscal support of the higher education cost. The education community has long been demanding that the share of the fiscal support for higher education of the GDP be raised to at least one percent, perhaps on a par with the OECD average as of 2011. As we have seen in <Table IV-2>, however, we can easily meet this target as early as 2015, thanks to the support for higher education not only from the MOE, but also from other agencies of the government. [Figure IV-1] shows how this rise in the ratio to the GDP will affect the share of fiscal support in the education cost in the long run.

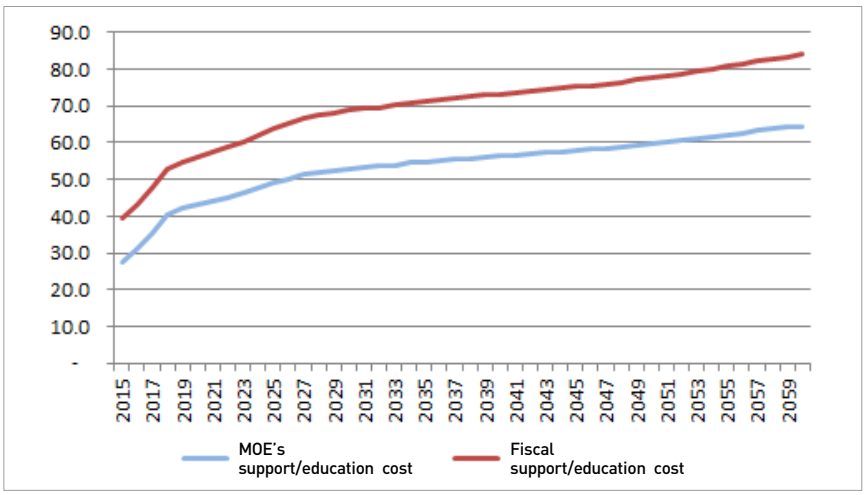
In the following section, we will forecast how raising the MOE's share of fiscal support to one percent of the GDP will affect the total amount of fiscal support for higher education and its share of the higher education cost. The

amount of higher education support from the MOE has been increasing sharply since 2011, and its ratio to the GDP is thus likely to increase from 0.4 percent in 2011 to 0.7 percent by 2015.

According to <Table IV-2>, the ratio of the MOE's budget for higher education to the GDP increased 1.75 times from 2010 to 2015, from 0.4 percent to 0.7 percent. The budget has been growing at a rate of 17.8 percent each year. Assuming this growth rate will persist, we can forecast that the MOE's budget for higher education will make up at least one percent of Korea's GDP by 2019. In the following scenario, we assume that this ratio will remain constant afterward, and forecast how this will change the ratio of total fiscal support for higher education to the GDP ([Figure IV-2]). The ratio of the MOE's support to the total higher education cost will keep growing rapidly to 40 percent in 2018, 45 percent in 2022, and 50 percent in 2026. This contrasts with the scenario used in [Figure IV-1], which predicted that the ratio will reach 35 percent by 2026. In the current scenario, the ratio will keep rising, eventually reaching 55 percent in 2036 and exceeding 60 percent by 2050.

[Figure IV-2] **Share of Fiscal Support of the Education Cost: Raising the MOE Support-to-GDP Ratio to One Percent**

(Unit: %)



Note: See Table A-6 of the Appendix to this report.

As the MOE's share of the education cost keeps rising rapidly, the share of total fiscal support of the education cost will similarly increase dramatically, from 39.4 percent in 2015 to over 70 percent by the 2030s and 80 percent by the 2050s. The OECD average in 2011 was 69.2 percent.

2 Student loans and aid: government scholarships

A. Government scholarships today

Public student aid can be mainly divided between government scholarships and student loans. In this section, our focus is on the former and how it will affect fiscal support for higher education in the future. Student loans, in principle, require recipients to return the principal and interest of their debt to the government. The government, however, may incur some bad debts due to student defaults. The Korean government deals with this risk by administering and enhancing a sustainable student loan system via the Korea Student Aid Foundation (KOSAF), commissioning numerous studies on the analysis and projections of the demand for loans and repayments. This matter will therefore not be discussed further in this study.

There are five ministries of the central government providing 11 government scholarship programs today in Korea. These ministries include the MOE, MSIP, Ministry of Reunification, Ministry of Patriots and Veteran Affairs (MPVA), and Ministry of National Defense (MND) (<Table IV-3>). More specifically, the MOE's programs include the Government Scholarships, Government Scholarships for Meritorious Students, Work Scholarships, and Ladder of Hope (scholarships encouraging small and medium enterprises (SMEs) to hire young people). The MSIP's programs include the Government Scholarships for Excellent Students (showing significant achievements in the sciences and engineering or winning presidential orders of merit). The MPVA's programs include student aid for veterans and former soldiers and the Veterans' Family Scholarships. The Ministry of Reunification oversees the Student Aid for North Korean Refugees, and the MND provides Scholarships for Children of Military Officers and Scholarships for Military Officers' Education.

The MOE alone provided KRW 2.9 trillion in scholarships in 2013, while all other ministries accounted for a mere KRW 156 billion in scholarships. This makes the MOE the source of 94.9 percent of all government scholarships. The total budget for government scholarships across the ministries grew from KRW 620.2 billion in 2011 to KRW 2.0154 trillion in 2012, KRW 3.0984 trillion in 2013, and KRW 3.8298 trillion in 2014(<Tabel IV-4>).

〈Table IV-3〉 **Government Scholarships by Ministry**

Ministry	Program		Targets/eligibility	Amounts provided
MOE	Government Scholarships	Type I	Students in 8th income decile and below, having obtained 12 credits or more, and maintaining an average score of 80/100 or higher.	Amount differs from income decile to decile (up to KRW 4.5 million).
		Type II	Students in 8th income decile and below, having obtained 12 credits or more, and maintaining an average score of 80/100 or higher.	Amount differs and determined by universities.
	Government Scholarships for Meritorious Students	Government Scholars (Humanities)	New candidates: university admission test scores. Continuing candidates: 12 credits and score of 87/100 minimum.	All tuition fees + KRW 1.8 million for living expenses per term.
		Dream Scholars	Students from poor and near-poverty households, scheduled to enter universities abroad or excelling at universities abroad.	Candidates: KRW 1 million/month. Students abroad: up to USD 50K/year.
	Work Scholarships		Students in 7th income decile and below, having maintained an average score of 70/100 or higher.	On campus: KRW 8,000/hour. Off-campus: KRW 9,500/hour.
	Ladder of Hope		Students set to work at SMEs, with an average score of 70/100 or higher, and having completed minimum credits.	All tuition fees + KRW 2 million in employment grant per term.

〈Table IV-3〉 **Continue**

Ministry	Program		Targets/eligibility	Amounts provided
MSIP	Government Scholarships for Excellent Students	Government Scholars (science and engineering)	New candidates: university admission test scores. Continuing candidates: 12 credits and score of 87/100 minimum.	All tuition fees + KRW 1.8 million for living expenses per term.
		Winners of presidential orders of merit	Students studying science/engineering either in Korea or abroad. New candidates: document screening and interviews. Continuing candidates: 12 credits and score of 87/100 minimum.	In Korea: all tuition fees and others. Abroad: Up to USD 50,000.
MPVA	Student Aid for Veterans		National Heroes and veterans and their descendants, based on income documents and with a score of 70/100 minimum.	50% of tuition fees at private schools (or 100% of tuition fees at public schools).
	Student Aid for Former Soldiers		Soldiers who have left the military after long service periods (minimum 10 years).	50% of tuition fees.
	Veterans' Family Scholarships		Children and offspring of soldiers and policemen fallen during the Korean War; Income quantiles 4 to 12; Minimum score of 70/100.	KRW 900,000 for four-year university; KRW 700,000 for vocational college.
Ministry of Reunification	Scholarships for North Korean Refugees		Persons eligible for veterans' disability benefits and their children; minimum score of 70/100.	50% of tuition fees at private schools (or 100% of tuition fees at public schools).
MND	Scholarships for the Children of Military Officers		College-admitted children of current soldiers and military employees.	KRW 1,000,000.
	Scholarships for Military Officers' Education		Separate screening process.	All tuition fees.

Source: Han et al. (2014), requoted in Subcommittee on Education of National Fiscal Management Plan (2014), p.123.

The introduction of customized government scholarships has rapidly increased the amount of fiscal support for student aid since 2012. The total amount of these scholarships increasing significantly from KRW 331.3 billion in 2011 to KRW 1.75 trillion, KRW 2.78 trillion, and KRW 3.46 trillion in 2012, 2013,

and 2014, respectively. The 2015 budget sets aside KRW 3.6 trillion for government scholarships of both Types I and II and also for scholarships for families with three or more children each. Add to this the Work Scholarships, Government Scholarships for Meritorious Students, Dream Scholarships, and Ladder of Hope Scholarships, and the amount of government scholarships handled by the MOE alone grew exponentially from KRW 438.8 billion in 2011 to KRW 1.85 trillion in 2012, KRW 2.94 trillion in 2013, and KRW 3.67 trillion in 2014. The 2015 draft budget sets aside KRW 3.85 trillion. The MOE thus claimed 95.7 percent of all government scholarships in 2014. This figure appears to be lower than the figure observed in 2012 as the government scholarships for meritorious students in engineering and science were transferred to the MSIP in 2012.

〈Table IV-4〉 **Budgets for Government Scholarships by Ministry**

(Unit: KRW 100 million)

Type	Ministry	Program	Account	2011	2012	2013	2014
Scholarships	MOE	Work Scholarships	General	810	810	1,431	1,943
		Government Scholarships for Meritorious Students		265	199	139	135
		Government Scholarships (Types I and II)		3,313	17,500	27,750	34,575
		Ladder of Hope		–	–	100	100
	MSIP	Government Scholarships for Excellent Students		831	731	664	664
	Ministry of Reunification	Scholarships for North Korean Refugees		23	29	35	39
	MPVA	Scholarships for Veterans		572	502	455	433
		Scholarships for Former Soldiers		1	1	1	1
		Veterans' Family Scholarships	PVA Fund	2	2	2	2
	MND	Scholarships for the Children of Military Officers	Military Welfare Fund	47	52	46	46
		Scholarships for Military Officers' Education	General	338	328	361	356
	Total (11)			6,202	20,154	30,984	38,294

Source: Han et al. (2014), requoted in Subcommittee on Education of National Fiscal Management Plan (2014), p.123.

Government Scholarships of Types I and II occupy by far the greatest share of all government scholarship budgets and are provided in amounts according to rates that differ by income decile. Type-I Government Scholarships provide KRW 4.5 million in tuition fees for each recipient receiving benefits from the National Basic Livelihood Security Program (NBLSP) or in the first or second income decile. Recipients in the third, fourth, fifth, sixth, and seventh/eighth deciles are paid 75 percent, 55 percent, 35 percent, 25 percent, and 15 percent of that amount, respectively. Until 2012, only students up to the third income decile were given these scholarships. In 2013, the scope was expanded to provide all tuition fees for students in the first income decile and below and differential amounts for students in the next seven deciles. The amounts of government scholarships for all income deciles were increased in 2014. Type-II scholarships are provided according to each university's own criteria.

〈Table IV-5〉 **Government Scholarships Provided (2014)**

(Units: KRW 10,000, %)

Type	Income decile	Maximum/student/year	Ratio[1)]
I	NBLSP recipients	450	100
	1[2)]	450	100
	2	450	100
	3	337.5	75
	4	247.5	55
	5	157.5	35
	6	112.5	25
	7 and 8	67.5	15
II	Provided according to each university's own criteria for evaluating the effort and performance of students.		

Notes: 1) Of the full amount of KRW 4.5 million.
2) Students who submit proof of their near-poverty status are regarded to fall into the first income quantile.
Source: KOSAF (www.kosaf.go.kr).

<Table IV-6> summaries the types and decile-dependent amounts of Government Scholarships provided for the first semester of 2013. Of the total of KRW 1.24 trillion, 87 percent, or KRW 1.08 trillion, was provided as Type-I

scholarships, and 13 percent, or KRW 162.5 billion, as Type-II scholarships. Almost 93 percent of NBLSP recipients and students in the first income quantile depend on the Type-I scholarships. The higher the decile, the lower the dependency rate on Type I, with only 75 percent of students in the eighth decile depending on Type I and 25 percent on Type II. The number of students on Type-I scholarships makes up 99.8 to 99.9 percent of all scholarship recipients in all income deciles, suggesting that Type-II recipients also receive Type-I scholarships.

<Table IV-7> shows how the financial burden of higher education on each income decile decreased from 2011 to 2013. The total amount of tuition fees in 2011 amounted to KRW 14.03 trillion, of which 19.64 percent, or KRW 2.78 trillion, were paid for with government scholarships in 2013. Thanks to the tuition-lowering policies and the availability of other scholarships and donations, the total amount was further reduced by KW 5.73 trillion, with the rate of relief amounting to 40.9 percent in total. The tuition fee amount is unlikely to change dramatically in 2014 and 2015, thanks to the government's efforts to inhibit tuition increases.

〈Table IV-6〉 **Government Scholarship Distribution by Type and Income Decile**

(Units: number of students, KRW 1,000,000)

Income decile		Total		Type I		Type II	
		Students	Amount	Students	Amount	Students	Amount
2013 Semester 1	Total	977,083	1,243,708	976,093	1,081,170	632,305	162,538
	NBLSP	51,362	116,424	51,268	107,946	19,496	8,479
	1	190,498	432,852	190,291	400,733	102,845	32,119
	2	195,063	296,754	194,879	258,574	135,629	38,180
	3	138,646	150,401	138,518	123,616	100,319	26,785
	4	87,054	73,452	86,958	58,360	61,567	15,092
	5	77,274	55,277	77,196	43,231	53,757	12,046
	6	78,677	46,199	78,606	35,289	53,871	10,910
	7	74,278	34,500	74,215	25,035	50,072	9,465
	8	84,231	37,850	84,162	28,387	54,749	9,462

Source: Kim et al.(2013), p. 28.

〈Table IV-7〉 **Estimates of Tuition Relief Effects by Income Decile (2013)**

(Units: KRW 1,000,000, %)

Income decile	Total in 2011 (A)	Government scholarships (B)	Tuition cuts (C)	Other scholarships (D)	Sum (E = B + C + D)	Rate of relief (E / A)
NBLSP recipients	571,566	259,739	26,864	93,640	380,243	66.5%
1	2,122,068	965,679	99,737	347,661	1,413,077	66.6%
2	2,180,071	662,048	102,463	357,164	1,121,676	51.5%
3	1,549,570	335,540	72,830	253,868	662,238	42.7%
Subtotal	6,423,275	2,223,007	301,894	1,052,334	3,577,234	55.7%
4	972,048	163,868	45,686	159,252	368,807	37.9%
5	860,002	123,321	40,420	140,895	304,637	35.4%
6	874,212	103,068	41,088	143,223	287,380	32.9%
7	821,816	76,968	38,625	134,639	250,232	30.4%
8	918,128	84,442	43,152	150,418	278,012	30.3%
Subtotal	10,869,481	2,774,674	510,865	1,780,762	5,066,301	46.6%
9	1,220,934	152	57,384	200,027	257,563	21.1%
10	1,939,475	174	91,155	317,747	409,076	21.1%
Total	14,029,890	2,775,000	659,404	2,298,536	5,732,940	40.9%

Source: KOSAF (2013), re-quoted in Subcommittee on Education of National Fiscal Management Plan (2014), p. 140.

The margin by which government scholarships will relieve households of the financial burden of higher education will be 24.6 percent in 2014 and 25.7 percent in 2015. Assuming that the amounts of other scholarships and tuition fees remain constant, the total rates of relief from tuition burdens will be 46 percent in 2014 and 47 percent in 2015. Student aid from the MOE other than government scholarships makes up three percent of the tuition fees. Therefore, by 2015, the tuition burden on students and households will have been almost halved, thanks to the scholarships from the MOE and other ministries, other scholarships, and universities' efforts to lower tuition fees. The MOE thus estimates that the Korean government will achieve its half-tuition goal by 2015.

B. Forecasts of government scholarships and the government scholarship/ tuition ratio

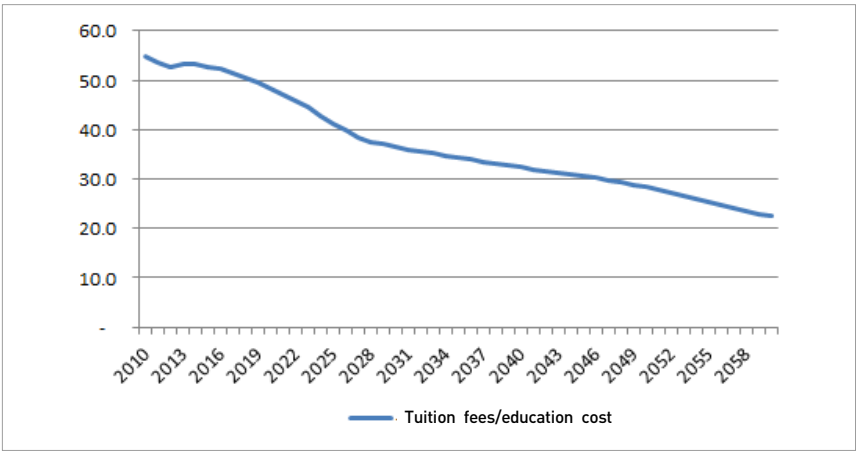
The total amount of government scholarships can be broken down into a multiple of the ratio of government scholarships to tuition fees, the ratio of tuition fees to the total education cost, and the total education cost.

$$Government\ scholarships = \left(\frac{Government\ scholarships}{Tuition\ fees}\right) \times \left(\frac{Tuition\ fees}{Total\ education\ cost}\right) \times Total\ education\ cost$$

We have estimated the total amount of the education cost, the education cost per student, and the tuition fees per student. Using our forecasts of the education cost and tuition fees per student, we can estimate the ratio of tuition fees to the total education cost, as shown in [Figure IV-3]. The ratio, almost as high as 55 percent, is likely to decrease steadily thanks to the increase in fiscal support and the decrease in the number of students, thus reaching 50 percent by 2018-2019, 40 percent by 2026, and 30 percent by 2045.

[Figure IV-3] **Tuition Fee/Education Cost Forecasts**

(Unit: %)



Note: See Table A-7 of the Appendix to this report.

Given this likely consistent decline in the tuition fee-to-education cost ratio, the ratio of government scholarships to tuition fees will keep growing even when the amount of government scholarships is fixed to the current level, i.e., increasing at the same rate as the inflation rate.

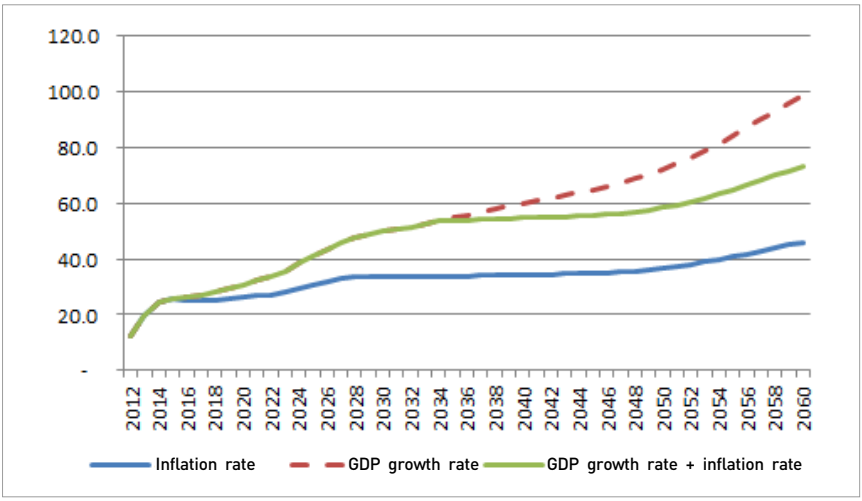
[Figure IV-4] shows forecasts of the extent to which government scholarships will help relieve Korean households of the burden of the higher education cost in the future. The total amount of tuition fees that the MOE seeks to halve is KRW 14.03 trillion, from 2011. The total amount of tuition fees providing the baseline for the forecasts in this study, however, is KRW 17.26 trillion, also as of 2011. This is because the MOE's half-tuition policy targets universities and vocational colleges only, while this study is concerned with the entire range of diverse higher education institutions in Korea. As the half-tuition policy specifically aims to mitigate the financial burden on young students admitted into colleges and universities, [Figure IV-4] charts forecasts of the cuts made to university and vocational college tuition fees only, excluding other types of higher education institutions.

Thanks to the Korean government's efforts to halve the tuition burden since 2012, the tuition fee levels themselves have been significantly lowered at universities and colleges. Nevertheless, the same baseline of KRW 14.03 trillion from 2011 will be used for the years until 2015. We therefore assume that the same baseline will remain intact until 2015, and also that the ratio of this baseline to the entire amount of tuition fees at all types of higher education institutions (i.e., KRW 20.19 trillion), as measured in 2014, will also remain intact for years to come.

[Figure IV-4] shows three curves. The one at the bottom charts the changing ratio of government scholarships to tuition fees resulting from the increases in government scholarships at the inflation rate each year. The segment of the curve until the year 2015 shows actually observed values, while the remainder charts forecasts. The ratio was estimated to be 25.7 percent in 2015, and forecast to decline somewhat over the subsequent three years.

[Figure IV-4] **Government Scholarships/Tuition Fees Ratio**

(Unit: %)



Note: See Table A-7 of the Appendix to this report.

The amount of tuition fees will change due to two main factors: namely, the increase in the education cost per student and the decrease in the number of students. Earlier, we concluded that, in order to increase the education cost per student and its value, the tuition fee will have to rise at a rate higher than the inflation rate for some time, i.e., at least at the same rate as the rate of growth of the GDP per capita. Only then will the rise in the tuition fees per student overwhelm the rapid decrease in the number of students, allowing the total amount of tuition fees to keep growing at a rate above the inflation rate. Then the ratio of government scholarships—which is growing at the inflation rate—to tuition fees will naturally drop. Beginning in 2019 and afterward, however, even such a rate of tuition fee increase will be unable to offset the radical decrease in the number of students, and the increase in the total amount of tuition fees will slow accordingly, while the ratio of government scholarships to tuition fees will consequently increase. The scholarship-to-fees ratio will thus reach 30 percent by 2025 and keep growing upward thereafter, but at a relatively slow pace for the following 20 years. Following that, however, the ratio will

rise at an accelerated pace, reaching 40 percent by 2055 and 50 percent by 2060.

The curve at the top charts the movement of the government scholarship-to-tuition fees ratio based on the assumption that the government scholarships will increase in proportion to the GDP. Government scholarships made up 0.14 percent of the GDP in 2012 and grew to 0.21 percent in 2013 and 0.24 percent in 2014 and 2015. We thus assume that the same ratio of 0.24 percent will apply to 2016 and persist afterward, and estimate the changes in the amount of government scholarships accordingly. In this scenario, the ratio of government scholarships to tuition fees will grow from 25.7 percent in 2015 to 26.2 percent in 2016 and 27.1 percent in 2017, reaching 30 percent by 2020. Even after that, the ratio will keep growing rapidly, reaching 40 percent by 2025 and 50 percent by 2030.

With the ratio of government scholarships to the GDP fixed at a certain level, the decrease in the number of students will cause the ratio of government scholarships to tuition fees to rise dramatically, making the former replace much of the latter. Some, therefore, might object to this prospect as an unlikely and unrealistic forecast.

This highlights the need to modify our assumption and let the ratio of government scholarships to the GDP begin to drop slightly once the ratio of government scholarships to tuition fees reaches a certain level. The middle curve in [Figure IV-4] charts the forecasts based on this assumption. The curve assumes that, once the ratio of scholarships to fees reaches 54 percent in 2034, the rate of increase in government scholarships will fall to the inflation rate so that the real value of government scholarships becomes frozen. According to this graph, the rate of relief from tuition fees provided by non-government scholarships was 16.5 percent in 2011. Combine this rate to the rate of relief provided by government scholarships, and approximately 70 percent of tuition fees will be covered by government and non-government scholarships by 2034 and afterward. This rate of relief will continue to increase after 2034, but at a slower pace. Therefore, at some point afterward, we may need to find policy measures to inhibit the growth of government scholarships in nominal value as well.

V

Summary and Policy Implications

This study makes long-term forecasts of the future changes in the higher education cost in Korea in the light of the anticipated changes in Korea's demographic structure and economic growth rate. Based on these forecasts, we also estimate likely changes in the amount of fiscal support for higher education in the country. As for the forecasts of likely changes in the demographic structure and economic growth, we use the same forecasts and indicators used in the MSF's long-term fiscal projections at the middle level.

First, regarding the forecasts of the number of students, we define the "college-age population" as the population of young people aged 18 to 25. We then assume that the ratio of the number of enrolled students to the college-age population, which stood at 68.01 percent in 2013, will decline by 1.48 percent (the average rate of 2012/2013) annually afterward, stopping its decline once it reaches 61.76 percent, which was the average ratio from the year 2000 to 2013. According to this assumption, the number of students enrolled at higher education institutions in Korea, which amounted to 3.71 million in 2013, will begin to plummet abruptly, hitting 2.25 million by 2028. We forecast that the rate of decline will slow somewhat afterward.

We then forecast the changes in the education cost per student. To this end, we first needed to identify the preferred target level of the education cost per student. As this cost can change dramatically depending on policy choices, we hypothesized certain policy goals, and estimated how long it would take for the education cost per student to satisfy those goals by attaining the target level. We used two different target levels in this study: the OECD average of 2011,

which was 41 percent of the GDP per capita (Korea's was 34 percent in 2011), and the average of other countries with income levels comparable to Korea's. Next, we performed a regression analysis using a linear function that expresses the changes in the education cost per student as a function of the GDP per capita, and estimated the average education cost per student in other countries with comparable income levels. This process revealed that the education cost per student in Korea in the year 2010/2011 amounted to 84 to 85 percent of the average in other countries with comparable income levels.

If the tuition fees per student and all the non-tuition portions of the higher education cost in Korea were to continue increasing at the inflation rate, the education cost per student would nonetheless keep rising over time due to the continued decrease in the number of students. However, the rate of increase will be quite slow, making it impossible for Korea to reach either of its target levels during the projection period, and even causing the gap between Korea and other countries to widen further over time.

On the other hand, if we let the tuition fees per student rise at the inflation rate and the non-tuition portions of the education cost rise as a certain percentage of the GDP (i.e., 1.2 percent, which was the average of 2011/2012), the education cost per student would increase more quickly, allowing Korea to catch up with other countries of comparable income levels by 2025. Nevertheless, Korea would still fail to catch up with the OECD average of 41 percent of the GDP per capita at any point in the projection period.

Therefore, in order to prompt the education cost per student in Korea to rise more quickly and catch up with either of the two target levels, we need to keep the tuition fees rising at a rate above the inflation rate, while keeping the non-tuition portions of the education cost growing as a certain percentage of the GDP (i.e., 1.2 percent). Once we allow the tuition fees per student to rise at the same rate as the rate of growth of the GDP per capita, we will be able to catch up with other countries of comparable income levels by 2021 and even with the OECD average by 2023.

In this final scenario, the non-tuition portions of the education cost are assumed to grow at a fixed rate, i.e., 1.2 percent of the GDP, while the tuition fees per student are assumed to grow at the same rate as the rate of growth of the GDP per capita until 2023 and at the inflation rate thereafter. Our forecasts

of the education cost-to-GDP ratio then reveals that the ratio will continue its decline, from 2.6 percent in 2013 to below two percent by 2025 and 1.5 percent by 2060. The ratio of tuition fees to the total education cost will similarly decrease in the long run, from 55 percent in 2010 to 45 percent by 2026 and 30 percent by 2045.

In the meantime, the ratio of fiscal support to the total higher education cost will maintain its upward trend at a rapid pace, increasing from 27 percent in 2011 to upwards of 50 percent by the late 2020s. The MOE's share of the total higher education cost will also rise from 23.2 percent in 2013 to over 30 percent by 2020 and 35 percent by 2026.

If we allow the amount of fiscal support from the MOE to keep rising at a rate of 11.8 percent each year (based on the annual average from 2010 to 2015) until it becomes one percent of the GDP, we will cross the one-percent-of-GDP threshold by 2019. Keeping the MOE's share of fiscal support at one percent of the GDP afterward, the Ministry's share of the total higher education cost will rise rapidly to 40 percent in 2018, 50 percent by 2026, and even exceed 60 percent by 2050 or so.

We also made forecasts regarding the extent to which government scholarships will help relieve Korean households of the burden of the cost of higher education. Assuming that a fixed ratio of the GDP will be spent on government scholarships for decades to come, the ratio of government scholarships to tuition fees will keep growing, from 25.7 percent in 2015 to 26.2 percent in 2016 and 27.1 percent in 2017, reaching the 30-percent level by 2020. The ratio will continue rising afterward, reaching 40 percent by 2025 and 50 percent by 2030. All else being equal, the ratio may continue to rise indefinitely. With the inevitable decrease in the number of students, we need to question whether it would be appropriate for the Korean government to continue providing government scholarships as a fixed percentage of the GDP in the decades to come.

These forecasts carry important implications for future policymaking. First, we have seen that the education cost per student naturally rises with the decrease in the number of students over time. However, if we use the education cost per student as a main indicator of the quality of higher education available in our country and decide to raise that cost as soon as possible, we need to do more than just wait for the number of students to drop. In other words, we need to

make conscious efforts to keep the education cost rising at a rate above the inflation rate. Fixing the rate of increase of the education cost per student to the inflation rate or below will make it impossible for Korea to catch up with other countries with comparable income levels or the OECD average by 2060.

Second, our forecasts show us that, even without rapidly increasing the amount of government scholarships, their share of tuition fees will naturally increase over time due to the decrease in the number of students, and, by implication, in the total amount of tuition fees. Even if we were to let the tuition fees per student keep growing at the same rate as that of the increase in the GDP per capita for some amount time, the ratio of government scholarships to tuition fees would keep rising. In the meantime, the share of tuition fees of the total education cost would steadily decline, thus leaving the government with much of the burden of the higher education cost in the end. If we let the amount of government scholarships keep growing as a fixed percentage of the GDP for a certain amount of time, and let it grow at the inflation rate afterward, consumers of education will handle only 10 percent of the total education cost in Korea by 2034. Therefore, we need more debate on the proper proportion of the total education cost to be handled by students and parents, and readjust our government scholarship schemes accordingly.

Third, these forecasts imply that we need to maintain a flexible stance regarding fiscal support for higher education in the long run. Our forecasts show that, even without conscious policy efforts, the government's share of the total education cost will continue to rise in the future. We need more debate on whether this phenomenon is desirable or appropriate. With the continuous decrease in the number of students, the government may need to avoid letting its fiscal support for higher education keep rising of its own accord, as a fixed percentage of the GDP or at other rates.

There is growing demand for the government to take up a greater share of the higher education cost in Korea, as the government and its agencies currently account for only 27 percent of the cost, which appears to be significantly lower than that of other comparable countries. However, our forecasts show that, insofar as we maintain the current level of fiscal support, the government's share of the cost will naturally and dramatically increase in the long term.

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〈Table A-1〉 **Forecasts of the Number of Students (for Figure III-2)**

(Units: number of students, %)

Year	College-age population	Number of students / college-age population			Number of students		
		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
2010	5,256,739	69.32	69.32	69.32	3,644,158	3,644,158	3,644,158
2011	5,331,821	70.06	70.06	70.06	3,735,706	3,735,706	3,735,706
2012	5,393,994	69.13	69.13	69.13	3,728,802	3,728,802	3,728,802
2013	5,454,859	68.01	68.01	68.01	3,709,734	3,709,734	3,709,734
2014	5,504,038	69.08	67.00	67.00	3,802,339	3,687,781	3,687,781
2015	5,524,846	69.08	66.01	66.01	3,816,714	3,646,937	3,646,937
2016	5,503,235	69.08	65.03	65.03	3,801,784	3,578,908	3,578,908
2017	5,437,168	69.08	64.07	64.07	3,756,143	3,483,611	3,483,611
2018	5,337,449	69.08	63.12	63.12	3,687,255	3,369,108	3,369,108
2019	5,213,003	69.08	62.19	62.19	3,601,284	3,241,855	3,241,855
2020	5,013,991	69.08	61.76	61.27	3,463,801	3,096,653	3,071,946
2021	4,790,353	69.08	61.76	60.36	3,309,306	2,958,533	2,891,492
2022	4,581,432	69.08	61.76	59.47	3,164,978	2,829,503	2,724,458
2023	4,358,889	69.08	61.76	58.59	3,011,239	2,692,060	2,553,754
2024	4,150,181	69.08	61.76	57.72	2,867,058	2,563,162	2,395,492
2025	3,980,609	69.08	61.76	56.87	2,749,913	2,458,434	2,263,610
2026	3,851,838	69.08	61.76	56.02	2,660,954	2,378,904	2,157,965
2027	3,707,950	69.08	61.76	55.20	2,561,552	2,290,039	2,046,608
2028	3,639,464	69.08	61.76	54.38	2,514,240	2,247,742	1,979,077
2029	3,641,204	69.08	61.76	54.08	2,515,443	2,248,816	1,969,262
2030	3,615,034	69.08	61.76	54.08	2,497,364	2,232,654	1,955,108
2031	3,623,475	69.08	61.76	54.08	2,503,195	2,237,867	1,959,674
2032	3,639,366	69.08	61.76	54.08	2,514,173	2,247,681	1,968,268
2033	3,631,782	69.08	61.76	54.08	2,508,934	2,242,997	1,964,166
2034	3,596,852	69.08	61.76	54.08	2,484,803	2,221,424	1,945,275
2035	3,597,163	69.08	61.76	54.08	2,485,018	2,221,616	1,945,443
2036	3,602,228	69.08	61.76	54.08	2,488,517	2,224,745	1,948,183
2037	3,569,390	69.08	61.76	54.08	2,465,831	2,204,464	1,930,423
2038	3,563,060	69.08	61.76	54.08	2,461,459	2,200,554	1,927,000

〈Table A-1〉 **Continue**

Year	College-age population	Number of students / college-age population			Number of students		
		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
2039	3,555,624	69.08	61.76	54.08	2,456,322	2,195,962	1,922,978
2040	3,548,228	69.08	61.76	54.08	2,451,212	2,191,394	1,918,978
2041	3,541,916	69.08	61.76	54.08	2,446,852	2,187,496	1,915,564
2042	3,534,192	69.08	61.76	54.08	2,441,516	2,182,725	1,911,387
2043	3,524,303	69.08	61.76	54.08	2,434,684	2,176,618	1,906,039
2044	3,510,176	69.08	61.76	54.08	2,424,925	2,167,893	1,898,398
2045	3,490,723	69.08	61.76	54.08	2,411,486	2,155,879	1,887,878
2046	3,468,504	69.08	61.76	54.08	2,396,137	2,142,156	1,875,861
2047	3,441,896	69.08	61.76	54.08	2,377,755	2,125,723	1,861,471
2048	3,409,162	69.08	61.76	54.08	2,355,142	2,105,507	1,843,767
2049	3,368,756	69.08	61.76	54.08	2,327,228	2,080,552	1,821,915
2050	3,319,738	69.08	61.76	54.08	2,293,365	2,050,278	1,795,404
2051	3,261,902	69.08	61.76	54.08	2,253,410	2,014,558	1,764,125
2052	3,199,792	69.08	61.76	54.08	2,210,503	1,976,199	1,730,534
2053	3,134,557	69.08	61.76	54.08	2,165,437	1,935,910	1,695,253
2054	3,063,847	69.08	61.76	54.08	2,116,589	1,892,239	1,657,012
2055	2,989,889	69.08	61.76	54.08	2,065,496	1,846,563	1,617,013
2056	2,915,193	69.08	61.76	54.08	2,013,894	1,800,430	1,576,615
2057	2,842,255	69.08	61.76	54.08	1,963,507	1,755,383	1,537,169
2058	2,773,275	69.08	61.76	54.08	1,915,854	1,712,781	1,499,862
2059	2,709,936	69.08	61.76	54.08	1,872,097	1,673,663	1,465,607
2060	2,653,408	69.08	61.76	54.08	1,833,046	1,638,751	1,435,035

〈Table A-2〉 **Forcases for Education cost per Students[for Figures III-5 and 6]**

(Unit: KRW, %)

Year	Applying inflation rates	34.5% of GDP per capita	Applying other countries' average			41% of GDP per capita	GDP growth rate +inflation rate[1)]
			Linear function	Quadratic function	Log-linear function		
2010	8,310	8,310	9,848	10,072	6,454	9,734	8,310
2011	8,433	8,433	10,250	10,500	6,731	10,169	8,746
2012	8,776	8,776	10,497	10,759	6,898	10,430	9,070
2013	8,891	9,116	10,841	11,129	7,145	10,833	9,195
2014	9,096	9,671	11,421	11,732	7,554	11,493	9,615
2015	9,369	10,273	12,051	12,366	7,995	12,208	10,125
2016	9,650	10,914	12,723	13,018	8,464	12,970	10,710
2017	9,939	11,592	13,433	13,682	8,958	13,777	11,381
2018	10,234	12,300	14,173	14,345	9,471	14,617	12,137
2019	10,535	13,025	14,932	14,995	9,995	15,479	12,977
2020	10,841	13,765	15,707	15,627	10,529	16,359	13,931
2021	11,152	14,513	16,489	16,232	11,066	17,247	14,948
2022	11,469	15,279	17,291	16,819	11,614	18,158	16,032
2023	11,791	16,074	18,123	17,392	12,182	19,103	17,258
2024	12,117	16,896	18,983	17,945	12,767	20,079	18,578
2025	12,446	17,740	19,866	18,472	13,366	21,082	19,908
2026	12,778	18,612	20,779	18,973	13,983	22,119	21,208
2027	13,112	19,503	21,712	19,439	14,612	23,178	22,662
2028	13,447	20,418	22,669	19,869	15,256	24,265	23,886
2029	13,783	21,351	23,646	20,258	15,911	25,374	24,824
2030	14,118	22,301	24,640	20,601	16,576	26,503	25,908
2031	14,454	23,263	25,647	20,895	17,247	27,646	26,825
2032	14,787	24,247	26,676	21,140	17,932	28,815	27,708
2033	15,120	25,263	27,740	21,333	18,638	30,023	28,732
2034	15,454	26,297	28,822	21,468	19,355	31,252	29,927
2035	15,787	27,352	29,926	21,542	20,085	32,506	30,926
2036	16,119	28,441	31,066	21,550	20,836	33,799	31,909
2037	16,452	29,556	32,233	21,486	21,603	35,124	33,150

〈Table A-2〉 **Continue**

Year	Applying inflation rates	34.5% of GDP per capita	Applying other countries' average			41% of GDP per capita	GDP growth rate +inflation rate[1)]
			Linear function	Quadratic function	Log-linear function		
2038	16,785	30,704	33,434	21,345	22,392	36,489	34,235
2039	17,121	31,890	34,675	21,118	23,204	37,898	35,349
2040	17,463	33,117	35,959	20,797	24,043	39,356	36,486
2041	17,813	34,390	37,292	20,371	24,912	40,870	37,641
2042	18,169	35,715	38,678	19,828	25,813	42,443	38,837
2043	18,532	37,092	40,120	19,154	26,748	44,080	40,081
2044	18,903	38,523	41,617	18,337	27,718	45,781	41,391
2045	19,281	40,005	43,168	17,365	28,720	47,542	42,781
2046	19,667	41,541	44,776	16,222	29,756	49,368	44,235
2047	20,060	43,137	46,446	14,889	30,830	51,264	45,775
2048	20,461	44,805	48,192	13,336	31,950	53,246	47,434
2049	20,870	46,540	50,008	11,549	33,113	55,309	49,236
2050	21,288	48,345	51,897	9,504	34,319	57,453	51,206
2051	21,714	50,216	53,855	7,183	35,567	59,676	53,365
2052	22,148	52,158	55,888	4,558	36,859	61,985	55,684
2053	22,591	54,185	58,009	1,584	38,205	64,394	58,167
2054	23,043	56,289	60,211	− 1,757	39,599	66,894	60,862
2055	23,503	58,457	62,480	− 5,471	41,032	69,471	63,750
2056	23,974	60,690	64,817	− 9,582	42,505	72,125	66,805
2057	24,453	62,992	67,226	−14,125	44,019	74,860	69,995
2058	24,942	65,368	69,713	−19,138	45,579	77,684	73,281
2059	25,441	67,823	72,282	−24,662	47,187	80,601	76,615
2060	25,950	70,347	74,923	−30,709	48,837	83,600	79,946

Notes: 1. The inflation rate and the rate of growth of GDP are applied to the increase in the tuition fees and other expenditures, respectively.

〈Table A-3〉 **Forecasts of the Education Cost per Student Based on the Changes in the Number of Students and Level of Tuition Fees (for Figure IV-8)**

(Unit: KRW 1,000)

Year	Case 1		Case 2		Other countries' average (linear)	Applying 41% of GDP per capita
	Tuition per student	Education cost per student	Tuition per student	Education cost per student	Education cost per student	Education cost per student
2010	4,554	8,310	4,554	8,310	9,848	9,734
2011	4,620	8,630	4,620	8,630	10,250	10,169
2012	4,730	8,960	4,730	8,960	10,497	10,430
2013	4,913	9,205	4,913	9,205	10,841	10,833
2014	5,212	9,811	5,212	9,811	11,421	11,493
2015	5,536	10,495	5,536	10,495	12,051	12,208
2016	5,882	11,270	5,882	11,270	12,723	12,970
2017	6,247	12,148	6,247	12,148	13,433	13,777
2018	6,629	13,123	6,629	13,123	14,173	14,617
2019	7,019	14,187	7,019	14,187	14,932	15,479
2020	7,418	15,371	7,418	15,371	15,707	16,359
2021	7,821	16,619	7,821	16,619	16,489	17,247
2022	8,234	17,942	8,234	17,942	17,291	18,158
2023	8,663	19,419	8,663	19,419	18,123	19,103
2024	9,105	21,002	8,902	20,799	18,983	20,079
2025	9,560	22,605	9,144	22,189	19,866	21,082
2026	10,030	24,193	9,388	23,550	20,779	22,119
2027	10,511	25,942	9,633	25,065	21,712	23,178
2028	11,004	27,475	9,879	26,351	22,669	24,265
2029	11,507	28,730	10,126	27,350	23,646	25,374
2030	12,019	30,141	10,373	28,495	24,640	26,503
2031	12,537	31,392	10,619	29,474	25,647	27,646
2032	13,067	32,621	10,864	30,418	26,676	28,815
2033	13,615	34,009	11,108	31,503	27,740	30,023
2034	14,172	35,577	11,354	32,759	28,822	31,252
2035	14,741	36,961	11,599	33,819	29,926	32,506
2036	15,327	38,348	11,843	34,863	31,066	33,799

〈Table A-3〉 **Continue**

Year	Case 1		Case 2		Other countries' average (linear)	Applying 41% of GDP per capita
	Tuition per student	Education cost per student	Tuition per student	Education cost per student	Education cost per student	Education cost per student
2037	15,928	40,006	12,088	36,165	32,233	35,124
2038	16,547	41,526	12,332	37,312	33,434	36,489
2039	17,186	43,094	12,579	38,487	34,675	37,898
2040	17,847	44,703	12,830	39,686	35,959	39,356
2041	18,534	46,353	13,087	40,906	37,292	40,870
2042	19,247	48,065	13,349	42,167	38,678	42,443
2043	19,989	49,851	13,616	43,477	40,120	44,080
2044	20,761	51,728	13,888	44,855	41,617	45,781
2045	21,559	53,708	14,166	46,315	43,168	47,542
2046	22,387	55,777	14,449	47,839	44,776	49,368
2047	23,247	57,961	14,738	49,452	46,446	51,264
2048	24,146	60,297	15,033	51,183	48,192	53,246
2049	25,081	62,808	15,333	53,060	50,008	55,309
2050	26,054	65,521	15,640	55,107	51,897	57,453
2051	27,062	68,454	15,953	57,345	53,855	59,676
2052	28,109	71,580	16,272	59,743	55,888	61,985
2053	29,201	74,911	16,597	62,307	58,009	64,394
2054	30,335	78,490	16,929	65,085	60,211	66,894
2055	31,503	82,292	17,268	68,057	62,480	69,471
2056	32,707	86,293	17,613	71,199	64,817	72,125
2057	33,948	90,459	17,966	74,477	67,226	74,860
2058	35,228	94,755	18,325	77,852	69,713	77,684
2059	36,551	99,136	18,691	81,277	72,282	80,601
2060	37,911	103,547	19,065	84,702	74,923	83,600

Notes: 1. The rate of growth of the GDP per capita is applied to the increase in the tuition fees per student.
2. The tuition fees per student are to rise at the rate of growth of the GDP per capita as of 2013, and at the inflation rate afterward.

〈Table A-4〉 **Forecasts of the Higher Education Cost and Tuition Fees (for Figures III-7, 8, and 9)**

(Units: KRW 1 billion, %, KRW 1,000)

	Total education cost		Total tuition fees		Cost per student		Fees per student	
	Amount	% of GDP	Amount	% of education cost	Amount	% of GDP per capita	Amount	% of GDP per capita
2010	30,281	2.6	16,594	54.8	8,310	35	4,554	19
2011	32,240	2.6	17,258	53.5	8,630	35	4,620	19
2012	33,410	2.6	17,636	52.8	8,960	35	4,730	19
2013	34,149	2.6	18,225	53.4	9,205	35	4,913	19
2014	36,180	2.6	19,219	53.1	9,811	35	5,212	19
2015	38,276	2.5	20,190	52.7	10,495	35	5,536	19
2016	40,335	2.5	21,050	52.2	11,270	36	5,882	19
2017	42,318	2.5	21,763	51.4	12,148	36	6,247	19
2018	44,212	2.4	22,332	50.5	13,123	37	6,629	19
2019	45,993	2.4	22,755	49.5	14,187	38	7,019	19
2020	47,599	2.3	22,972	48.3	15,371	39	7,418	19
2021	49,169	2.3	23,139	47.1	16,619	40	7,821	19
2022	50,767	2.2	23,299	45.9	17,942	41	8,234	19
2023	52,277	2.2	23,320	44.6	19,419	42	8,663	19
2024	53,311	2.1	22,818	42.8	20,799	42	8,902	18
2025	54,549	2.0	22,480	41.2	22,189	43	9,144	18
2026	56,023	2.0	22,333	39.9	23,550	44	9,388	17
2027	57,400	1.9	22,061	38.4	25,065	44	9,633	17
2028	59,230	1.9	22,206	37.5	26,351	45	9,879	17
2029	61,504	1.9	22,771	37.0	27,350	44	10,126	16
2030	63,619	1.9	23,159	36.4	28,495	44	10,373	16
2031	65,958	1.9	23,764	36.0	29,474	44	10,619	16
2032	68,370	1.9	24,418	35.7	30,418	43	10,864	15
2033	70,661	1.9	24,916	35.3	31,503	43	11,108	15
2034	72,772	1.8	25,222	34.7	32,759	43	11,354	15
2035	75,134	1.8	25,768	34.3	33,819	43	11,599	15
2036	77,562	1.8	26,347	34.0	34,863	42	11,843	14

〈Table A-4〉 **Continue**

	Total education cost		Total tuition fees		Cost per student		Fees per student	
	Amount	% of GDP	Amount	% of education cost	Amount	% of GDP per capita	Amount	% of GDP per capita
2037	79,725	1.8	26,646	33.4	36,165	42	12,088	14
2038	82,106	1.8	27,138	33.1	37,312	42	12,332	14
2039	84,515	1.8	27,622	32.7	38,487	42	12,579	14
2040	86,968	1.8	28,116	32.3	39,686	41	12,830	13
2041	89,481	1.8	28,628	32.0	40,906	41	13,087	13
2042	92,039	1.8	29,137	31.7	42,167	41	13,349	13
2043	94,634	1.7	29,636	31.3	43,477	40	13,616	13
2044	97,241	1.7	30,108	31.0	44,855	40	13,888	12
2045	99,849	1.7	30,540	30.6	46,315	40	14,166	12
2046	102,479	1.7	30,952	30.2	47,839	40	14,449	12
2047	105,120	1.7	31,329	29.8	49,452	40	14,738	12
2048	107,767	1.7	31,652	29.4	51,183	39	15,033	12
2049	110,395	1.7	31,902	28.9	53,060	39	15,333	11
2050	112,985	1.7	32,067	28.4	55,107	39	15,640	11
2051	115,524	1.7	32,138	27.8	57,345	39	15,953	11
2052	118,064	1.6	32,157	27.2	59,743	40	16,272	11
2053	120,621	1.6	32,131	26.6	62,307	40	16,597	11
2054	123,155	1.6	32,034	26.0	65,085	40	16,929	10
2055	125,671	1.6	31,886	25.4	68,057	40	17,268	10
2056	128,189	1.6	31,712	24.7	71,199	40	17,613	10
2057	130,735	1.6	31,536	24.1	74,477	41	17,966	10
2058	133,343	1.6	31,387	23.5	77,852	41	18,325	10
2059	136,031	1.6	31,283	23.0	81,277	41	18,691	10
2060	138,805	1.5	31,243	22.5	84,702	42	19,065	9

〈Table A-5〉 **Ratio of Fiscal Support to the Education Cost: At a Fixed Fiscal Support-to-GDP Ratio (for Figure IV-1)**

(Units: KRW 1 billion, %)

	Fiscal support			Fiscal support/education cost		
	MOE	Other agencies	Total	MOE	Other agencies	Total
2011	4,939	3,704	8,643	15.3	11.5	26.8
2012	6,360	3,816	10,176	19.0	11.4	30.5
2013	7,962	3,981	11,943	23.3	11.7	35.0
2014	8,481	4,240	12,721	23.4	11.7	35.2
2015	10,550	4,521	15,072	27.6	11.8	39.4
2016	11,250	4,821	16,071	27.9	12.0	39.8
2017	11,990	5,139	17,129	28.3	12.1	40.5
2018	12,763	5,470	18,233	28.9	12.4	41.2
2019	13,555	5,809	19,365	29.5	12.6	42.1
2020	14,366	6,157	20,523	30.2	12.9	43.1
2021	15,184	6,508	21,692	30.9	13.2	44.1
2022	16,023	6,867	22,890	31.6	13.5	45.1
2023	16,891	7,239	24,130	32.3	13.8	46.2
2024	17,788	7,623	25,411	33.4	14.3	47.7
2025	18,707	8,017	26,724	34.3	14.7	49.0
2026	19,653	8,423	28,076	35.1	15.0	50.1
2027	20,615	8,835	29,449	35.9	15.4	51.3
2028	21,597	9,256	30,853	36.5	15.6	52.1
2029	22,594	9,683	32,277	36.7	15.7	52.5
2030	23,602	10,115	33,717	37.1	15.9	53.0
2031	24,613	10,549	35,162	37.3	16.0	53.3
2032	25,639	10,988	36,627	37.5	16.1	53.6
2033	26,685	11,436	38,121	37.8	16.2	53.9
2034	27,738	11,888	39,625	38.1	16.3	54.5
2035	28,797	12,341	41,138	38.3	16.4	54.8
2036	29,875	12,804	42,679	38.5	16.5	55.0
2037	30,963	13,270	44,232	38.8	16.6	55.5
2038	32,065	13,742	45,807	39.1	16.7	55.8

〈Table A-5〉 **Continue**

	Fiscal support			Fiscal support/education cost		
	MOE	Other agencies	Total	MOE	Other agencies	Total
2039	33,187	14,223	47,411	39.3	16.8	56.1
2040	34,330	14,713	49,043	39.5	16.9	56.4
2041	35,498	15,213	50,712	39.7	17.0	56.7
2042	36,693	15,726	52,418	39.9	17.1	57.0
2043	37,915	16,249	54,165	40.1	17.2	57.2
2044	39,161	16,783	55,944	40.3	17.3	57.5
2045	40,431	17,327	57,758	40.5	17.4	57.8
2046	41,724	17,882	59,606	40.7	17.4	58.2
2047	43,045	18,448	61,493	40.9	17.5	58.5
2048	44,401	19,029	63,430	41.2	17.7	58.9
2049	45,788	19,623	65,411	41.5	17.8	59.3
2050	47,202	20,230	67,432	41.8	17.9	59.7
2051	48,642	20,847	69,488	42.1	18.0	60.2
2052	50,113	21,477	71,590	42.4	18.2	60.6
2053	51,619	22,122	73,741	42.8	18.3	61.1
2054	53,154	22,780	75,934	43.2	18.5	61.7
2055	54,708	23,446	78,154	43.5	18.7	62.2
2056	56,278	24,119	80,398	43.9	18.8	62.7
2057	57,866	24,800	82,665	44.3	19.0	63.2
2058	59,474	25,489	84,964	44.6	19.1	63.7
2059	61,103	26,187	87,290	44.9	19.3	64.2
2060	62,744	26,890	89,635	45.2	19.4	64.6

〈Table A-6〉 **Ratio of Fiscal Support to the Education Cost: With the Fiscal Support-to-GDP Ratio Increased to One Percent (for Figure IV-2)**

(Units: KRW 1 billion, %)

	Fiscal support			Fiscal support/education cost		
	MOE	Other agencies	Total	MOE	Other agencies	Total
2015	10,550	4,521	15,072	27.6	11.8	39.4
2016	12,577	4,821	17,398	31.2	12.0	43.1
2017	14,987	5,139	20,125	35.4	12.1	47.6
2018	17,835	5,470	23,305	40.3	12.4	52.7
2019	19,365	5,809	25,174	42.1	12.6	54.7
2020	20,523	6,157	26,679	43.1	12.9	56.0
2021	21,692	6,508	28,199	44.1	13.2	57.4
2022	22,890	6,867	29,757	45.1	13.5	58.6
2023	24,130	7,239	31,370	46.2	13.8	60.0
2024	25,411	7,623	33,034	47.7	14.3	62.0
2025	26,724	8,017	34,741	49.0	14.7	63.7
2026	28,076	8,423	36,498	50.1	15.0	65.1
2027	29,449	8,835	38,284	51.3	15.4	66.7
2028	30,853	9,256	40,109	52.1	15.6	67.7
2029	32,277	9,683	41,960	52.5	15.7	68.2
2030	33,717	10,115	43,832	53.0	15.9	68.9
2031	35,162	10,549	45,710	53.3	16.0	69.3
2032	36,627	10,988	47,615	53.6	16.1	69.6
2033	38,121	11,436	49,558	53.9	16.2	70.1
2034	39,625	11,888	51,513	54.5	16.3	70.8
2035	41,138	12,341	53,480	54.8	16.4	71.2
2036	42,679	12,804	55,482	55.0	16.5	71.5
2037	44,232	13,270	57,502	55.5	16.6	72.1
2038	45,807	13,742	59,549	55.8	16.7	72.5
2039	47,411	14,223	61,634	56.1	16.8	72.9
2040	49,043	14,713	63,756	56.4	16.9	73.3
2041	50,712	15,213	65,925	56.7	17.0	73.7
2042	52,418	15,726	68,144	57.0	17.1	74.0

〈Table A-6〉 **Continue**

	Fiscal support			Fiscal support/education cost		
	MOE	Other agencies	Total	MOE	Other agencies	Total
2043	54,165	16,249	70,414	57.2	17.2	74.4
2044	55,944	16,783	72,728	57.5	17.3	74.8
2045	57,758	17,327	75,086	57.8	17.4	75.2
2046	59,606	17,882	77,487	58.2	17.4	75.6
2047	61,493	18,448	79,941	58.5	17.5	76.0
2048	63,430	19,029	82,458	58.9	17.7	76.5
2049	65,411	19,623	85,034	59.3	17.8	77.0
2050	67,432	20,230	87,662	59.7	17.9	77.6
2051	69,488	20,847	90,335	60.2	18.0	78.2
2052	71,590	21,477	93,067	60.6	18.2	78.8
2053	73,741	22,122	95,864	61.1	18.3	79.5
2054	75,934	22,780	98,714	61.7	18.5	80.2
2055	78,154	23,446	101,600	62.2	18.7	80.8
2056	80,398	24,119	104,517	62.7	18.8	81.5
2057	82,665	24,800	107,465	63.2	19.0	82.2
2058	84,964	25,489	110,453	63.7	19.1	82.8
2059	87,290	26,187	113,477	64.2	19.3	83.4
2060	89,635	26,890	116,525	64.6	19.4	83.9

〈Table A-7〉 **Forecasts of Tuition Fees and Government Scholarships (For Figures IV-3 and 4)**

	Tuition fees/education cost	Government scholarships/tuition fees		
		Applying inflation rate	Applying GDP growth rate	GDP growth rate + inflation rate
2011	53.5	2.4	2.4	2.4
2012	52.8	12.5	12.5	12.5
2013	53.4	19.8	19.8	19.8
2014	53.1	24.6	24.6	24.6
2015	52.7	25.7	25.7	25.7
2016	52.2	25.3	26.2	26.2
2017	51.4	25.3	27.1	27.1
2018	50.5	25.3	28.1	28.1
2019	49.5	25.6	29.3	29.3
2020	48.3	26.1	30.7	30.7
2021	47.1	26.7	32.2	32.2
2022	45.9	27.2	33.8	33.8
2023	44.6	28.0	35.6	35.6
2024	42.8	29.4	38.3	38.3
2025	41.2	30.6	40.9	40.9
2026	39.9	31.6	43.2	43.2
2027	38.4	32.9	45.9	45.9
2028	37.5	33.5	47.8	47.8
2029	37.0	33.5	48.7	48.7
2030	36.4	33.7	50.0	50.0
2031	36.0	33.6	50.9	50.9
2032	35.7	33.5	51.6	51.6
2033	35.3	33.6	52.6	52.6
2034	34.7	33.9	54.0	54.0
2035	34.3	33.9	54.9	54.0
2036	34.0	33.8	55.7	53.9
2037	33.4	34.1	57.1	54.4
2038	33.1	34.2	58.0	54.5
2039	32.7	34.3	59.0	54.6

〈Table A-7〉 **Continue**

	Tuition fees/education cost	Government scholarships/tuition fees		
		Applying inflation rate	Applying GDP growth rate	GDP growth rate + inflation rate
2040	32.3	34.3	60.0	54.7
2041	32.0	34.4	60.9	54.8
2042	31.7	34.5	61.8	55.0
2043	31.3	34.6	62.8	55.1
2044	31.0	34.7	63.9	55.3
2045	30.6	34.9	65.0	55.6
2046	30.2	35.1	66.2	56.0
2047	29.8	35.4	67.5	56.4
2048	29.4	35.7	68.9	57.0
2049	28.9	36.2	70.5	57.7
2050	28.4	36.7	72.3	58.5
2051	27.8	37.4	74.3	59.5
2052	27.2	38.1	76.5	60.7
2053	26.6	38.9	78.9	62.0
2054	26.0	39.8	81.5	63.4
2055	25.4	40.8	84.2	65.0
2056	24.7	41.8	87.1	66.6
2057	24.1	42.9	90.1	68.3
2058	23.5	43.9	93.0	70.0
2059	23.0	45.0	95.9	71.7
2060	22.5	45.9	98.6	73.2