

Medium to Long-term



Labor Supply-Demand Forecast

Korea Employment
Information Service

KEIS 



Table of Contents



Chapter 1

Medium to Long-term Forecast Introduction and Method

1. Significance of Labor Supply–Demand Forecasting	2
2. Forecasting Procedure and Method	5
3. Statistical Data Used for Forecasting	9
4. Other Labor Supply–Demand Forecast Related Projects and Forecast Utilization Plans	12

Chapter 2

Major Results of the 2011–2020 Medium to Long-term Forecast

1. Labor Force Forecast	16
2. Employment Forecast by Industry	34
3. Employment Forecast by Occupation	49
4. New Entrant Supply–Demand Mismatch Forecast	69

Table

<Table 1-1> Statistical Material Used for Forecasting	10
<Table 2-1> Productive Population Trend & Forecast (by Age, 2000–2020)	21
<Table 2-2> Productive Population Trend & Forecast (by Gender, 2000–2020)	23
<Table 2-3> Productive Population Trend & Forecast (by Educational Attainment, 2000–2020)	25
<Table 2-4> Economically Active Population Trend & Forecast (by Gender, 1990–2020)	28
<Table 2-5> Economically Active Population Trend and Forecast (by Age, 1990–2020)	29
<Table 2-6> Economically Active Population Trend & Forecast (by Educational Attainment, 1990–2020)	33
<Table 2-7> Employment Forecast by Industry (Six Major Industries)	35
<Table 2-8> Employment Forecast by Industry (1-Digit Industrial Classification)	36
<Table 2-9> Employment Forecast for Agriculture, Forestry & Fishing/Mining & Quarrying (2-Digit Industry Classification)	41
<Table 2-10> Manufacturing Employment Forecast (2-Digit Industry Classification)	43
<Table 2-11> Services Industry Employment Forecast (2-Digit Industry Classification)	46
<Table 2-12> Employment Forecast by Occupation (Major Group)	50
<Table 2-13> Employment Forecast of Top 10 Employment Occupations (Sub-Major Group)	58
[Table 2-14] Top 20 Occupations in terms of Employment Size (Minor Group/3-Digit)	67

<Table 2–15> New Entrant Supply–Demand Mismatch Forecast by Educational Attainment	70
<Table 2–16> New Entrant Supply–Demand Mismatch by Field of Study or Major	73
<Table 2–17> New Entrant Supply–Demand Mismatch Forecast by Occupation	76

Figures

[Figure 2–1] Process for Aggregate Labor Supply Forecast	16
[Figure 2–2] Productive Population Structure Change by Gender, by Age	19
[Figure 2–3] Employment Share by Industry Forecast (1–Digit Industry Classification)	39
[Figure 2–4] Top 10 Annual Average Growth Rate Occupations (Sub–major Group/2–Digit)	53
[Figure 2–5] Bottom 10 Annual Average Growth Rate Occupations (Sub–Major Group/2–Digit)	53
[Figure 2–6] Top 10 Annual Average Employment Growth Occupations (Sub–Major Group/2–Digit)	56
[Figure 2–7] Top 10 Annual Average Employment Decrease Occupations (Sub–Major Group/2–Digit)	56
[Figure 2–8] Top 20 Occupations in Annual Average Employment Growth Rate (Minor Group/3–Digit)	61
[Figure 2–9] Bottom 20 Occupations in terms of Annual Average Employment Growth Rate (Minor Group/3–Digit)	62
[Figure 2–10] Top 20 Occupations in terms of Annual Average Employment Growth (Minor Group/3–Digit)	64
[Figure 2–11] Top 20 Occupations in terms of Annual Average Employment Decrease (Minor Group/3–Digit)	65



Chapter 1



Medium to Long-term Labor Supply–Demand Forecast Introduction and Method



Chapter 1



1. Significance of Labor Supply–Demand Forecasting

A labor supply-demand forecast acts as a signal that prevents and alleviates labor force supply-demand imbalances, over-education or job mismatches due to asymmetrical employment information between labor providers and employers. Through such a role, it aims to contribute to the efficient development and allocation of national human resources. Therefore, the labor supply-demand forecast performs both a policy function, by being used as basic data in establishing various government policies on employment, industry and education (human resource development), as well as an information function, as data are used for decision making on career or occupation selection and counseling. Through its information function, the forecast helps labor market entrants reach rational decisions, which



enhances the labor market's efficiency.

Even though labor supply-demand forecasts may serve different purposes in each country, national forecasts can be broadly divided into those that emphasize policy functions vs. those that emphasize information functions. Traditionally labor supply-demand forecasts originated from policy functions. However, they have been gradually expanding and reinforcing their information function. This is because the availability of information on employment forecasts or on changes in future occupational environments contributes to labor market efficiency by reducing employment seekers' job search costs and by alleviating labor force supply-demand imbalances.

To better achieve such purposes of labor forecasting in Korea, the national labor supply-demand forecasting system was reformed and a dedicated agency was designated. Under the new system, the Ministry of Employment and Labor has become the leading government ministry and is responsible for coordinating efforts with related government entities in conducting the medium to long-term labor supply-demand forecasting, which used to be conducted separately by various departments or individual researchers. To guarantee the forecast's reliability and congruence, organizations such as the Labor Supply-Demand Planning and Coordination Council, Labor Supply-Demand Advisory Committee and the Labor Supply-Demand Coordination Working Level Committee



Chapter 1



were formed and operated as part of the national forecasting system. In 2006, the Korea Employment Information Service was designated as the dedicated agency for national labor supply-demand forecasting. The medium to long-term forecast covers the next 10-year period and forecast results are updated every two years. The medium to long-term forecasting is conducted according to the National Labor Supply-Demand Forecasting System pursuant to the Employment Policy Basic Act (Article 16). The results are publicly announced by the Minister of Employment and Labor.

2. Forecasting Procedure and Method

The medium to long-term forecast consists of the labor supply forecast (labor force forecast), the labor demand forecast (employment forecast) and the new entrant supply-demand mismatch forecast. The labor force forecast can be further separated into a productive population forecast and an economically active population forecast by gender, by age and by educational attainment.

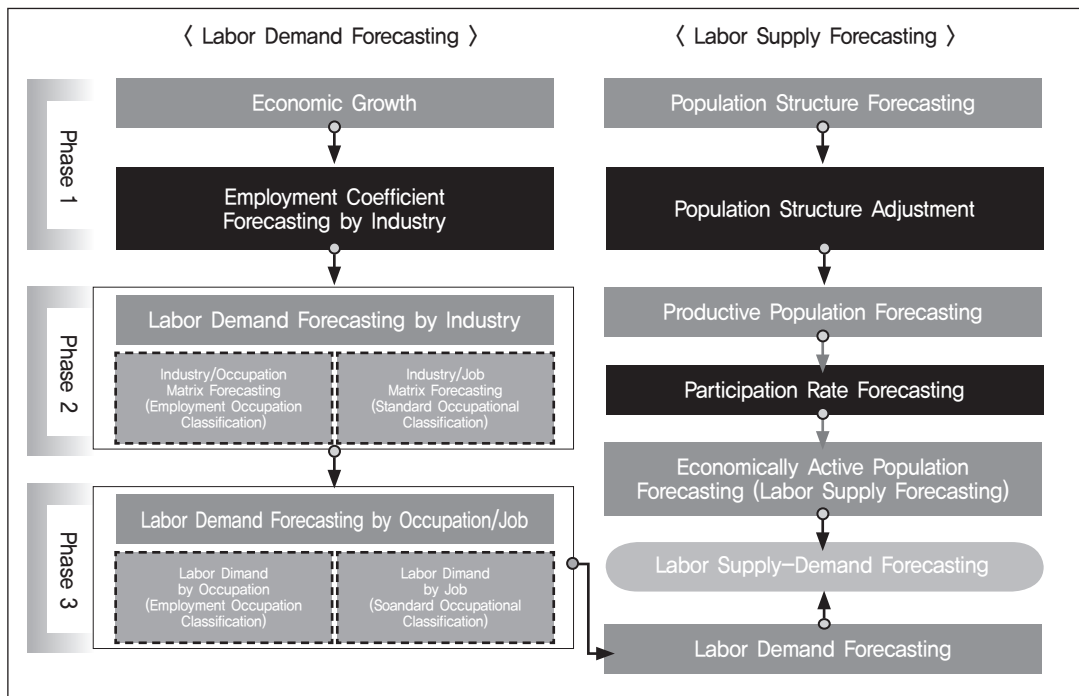
The employment forecast can be disaggregated by industry and by occupation. The new entrant supply-demand mismatch forecast includes expected entrant labor supply, entrant labor demand, as well as the supply-demand mismatch forecast by educational attainment, field of study/major and occupation.

Figure 1-1 shows the basic framework for medium to long-term labor supply-demand forecasting. It was created based on the forecasting system of the U.S. Bureau of Labor Statistics and adjusted to better fit Korea's conditions. (e.g. school system, military service, etc.) Based on population projections, the labor forecasting initially projects 1) the productive population (age 15 and older), 2) the participation rate, and 3) the economically active population. The scope of the labor forecast is the productive population and economically active population by gender (male or female), by age (age

Chapter 1

strata in five-year increments), and by educational attainment (middle school degree or less, high school degree, two-year college degree, four-year university degree or higher). The forecast period is 10 years.

[Figure 1-1] Basic Framework of Medium to Long-term Forecasting



The employment forecast calculates 1) the employment size in aggregate and by industry using industry growth rates and the employment coefficient

by industry. Next, 2) the employment by industry is converted to employment by occupation using the industry-occupation matrix. Finally, 3) the labor force forecast and employment forecast results are used to calculate the economy's total unemployment rate, participation rate and employment rate. The employment forecast is disaggregated by the 2-digit Korean Standard Industrial Classification (76 industries) as well as by 230 occupations that employ a minimum number of personnel among the 3-digit(149 occupations) and 4-digit (429 occupations) occupations in the Korean Standard Occupational Classification. The forecast horizon for the employment forecast is 10 years, the same as that for the labor force forecast.

The new entrant labor supply-demand mismatch forecasting consists of new entrant labor supply forecasting, new entrant labor demand forecasting and supply-demand mismatch forecasting. First, the new entrant labor supply forecast is conducted in three major steps: graduate forecasting, new entrant by field of study forecasting and new entrant supply by occupation forecasting. "Step 1: Graduate Forecasting" can be divided into forecasting based on the number of enrolled students or forecasting using trend lines. "Step 2: New Entrant Supply by Field of Study Forecasting" is conducted by first forecasting the aggregate new entrant supply and then the participation rate. Based on this information, the new entrant supply by field of study is forecasted. Lastly, Step 3 forecasts the new entrant supply by occupation using the field of study-occupation matrix



and the supply by field of study estimated in the previous stage.

The next area is new entrant demand forecasting, which consists of a growth demand forecast and a replacement demand forecast. Growth demand is estimated using the annual net increase of demand by occupation from the medium to long-term labor supply-demand forecast. The supply-demand mismatch forecast by education is limited to those with at least a two-year college degree. Therefore, the growth demand is adjusted to reflect the distribution of employment by education. Replacement demand is forecasted using the employment size by education and by occupation from the Economically Active Population Survey and the replacement demand projection methodology of the Research Centre for Education and the Labor Market (ROA). The ROA methodology consists of inflow-outflow pattern analysis, replacement rate estimation, replacement rate adjustment and replacement demand forecasting, etc. Lastly, the results of the new entrant supply forecast and demand forecast are used to calculate the mismatch size and excess supply (demand) ratio by education (two-year college, four-year college, graduate school), by field of study (humanities, social sciences, education, engineering, natural sciences, medicine, arts and sports) and by occupation (nine major groups according to the 1-digit occupational classification). The mismatch forecast period is 10 years.

3. Statistical Data Used for Forecasting

Basic statistical data used for forecasting includes the Bank of Korea’s national account, Statistics Korea’s Population Projections, Economically Active Population Survey, Local Area Labor Force Survey and other employment and mobility statistics from statistical agencies (Ministry of Employment and Labor, Korea Employment Information Service). Major statistics used in the medium to long-term forecasting are shown in Table 1-1.

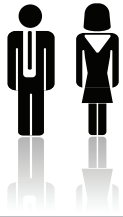
The labor forecast uses such statistical data as Statistics Korea’s Population Projections and the Economically Active Population Survey, etc. In particular, the population projection used for the forecast is based on the Population and Household Census by Statistics Korea. The productive population is estimated by comparing the 15 years and older population in the Population Projection with the 15 years and older population in the Economically Active Population Survey, and then, any institutionalized population (active duty military, public service agents, riotpolice, inmates with confirmed sentences, etc.) is excluded in order to identify the non-institutionalized population.

The employment forecast uses such input data as the real GDP from Bank of Korea’s national account, value-added by industry, Statistics Korea’s Economically Active

Chapter 1

(Table 1-1) Statistical Material Used for Forecasting

Material	Source	Prepared by	Comment
Population Projection	Population Projection	Statistics Korea	by gender/age
Productive Population	Economically Active Population Survey	Statistics Korea	by gender/age/ education
Economically Active Population	Economically Active Population Survey	Statistics Korea	by gender/age/ education
GDP by Industry	National Income	Bank of Korea	by industry
	Real Value-added by industry	KIET	by industry
Employment by Industry	Economically Active Population Survey	Statistics Korea	21 1-digit KSIC 76 2-digit KSIC
Employment by Occupation	Economically Active Population Survey	Statistics Korea	10 1-digit KSOC 52 3-digit KSOC
	Local Area Labor Force Survey	Statistics Korea	228 3-digit KSIC 426 4-digit KSOC
New Entrant Supply/Demand Mismatch	KLIPS	KLI KEIS	5th to 12th
	Higher Education Graduate Employment Survey	KEDI	by education/field of study
	Graduates Occupational Mobility Survey	KEIS	by education/field of study
	Graduate School Masters/ Doctorate Degree Economic Activity Follow-up Survey Census on Basic Characteristics of Establishments	KRIVET MOEL	2005 2008, 1H~2010, 1H



Population Survey and Local Area Labor Force Survey, etc. The economic growth outlook and value-added by industry outlook required for employment forecasting are obtained by commissioning an expert research institution (e.g. KIET) for both the economic growth rate and real value-added by industry projections. The Economically Active Population Survey is the basic source material for employment statistics by industry and by occupation. The forecasting by 3-digit industry classification or by the 3 or 4-digit occupational classification uses the Local Area Labor Force Survey and the Census on Basic Characteristics of Establishments.

New entrant supply-demand mismatch forecasting uses higher education graduate statistics from KEDI, the Korea Labor & Income Panel Survey (KLI, KEIS), the Graduates Occupational Mobility Survey (KEIS), the Economically Active Population Survey (Statistics Korea) as well as other labor mobility related statistics from other agencies.

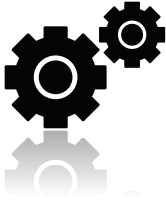


4. Other Labor Supply–Demand Forecast Related Projects and Forecast Utilization Plans

In addition to the medium to long-term forecast, the following are various projects with diverse focuses based on labor supply-demand forecast.

First, the labor supply and demand forecast by major industry or by occupation (theme forecast) is a detailed forecast for a specific industry or occupation that has great economic and social importance or has significant policy demands. The industries or occupations to be forecasted in detail as a theme forecast are determined by collecting the opinions of each ministry or related expert. Each year about eight themes are selected for detailed forecasting. The forecast period is five years. The theme forecasts are produced through joint research with related research institutions.

Next, local area labor supply-demand forecasting is prepared. The nation is divided into nine areas and labor force forecasts and employment forecasts are conducted for each area. Congruence with the national outlook in the medium to long-term forecast is guaranteed by adjusting the sum of all local forecasts to match the national forecast. The scope of the local forecasts is productive population and economically active population by gender, by age and by educational attainment. The local employment forecast is disaggregated to the 1-digit industry classification and 1-digit major group occupational



classification. The forecast period is 10 years with updates every two years. The local forecast is prepared through joint research with local researchers.

Surveys to identify short-term trends in the labor market are also conducted. A survey of major companies with 100 or more employees is conducted twice a year, once in the first half and again in the second half, to collect information such as the number of planned hires or type of available positions. In addition to such company surveys, groups at a disadvantage in terms of employment (women, seniors and youth, etc.) are surveyed separately about employment-seeking activities, preferred occupation or preferred pay level to capture any policy implications. The purpose of such surveys is to quickly catch employment trends and to provide relevant policy responses.

The forecast results are published in the form of various reports. The medium to long-term forecast is also published as a handbook for easy public understanding. All publications are posted on the Korea Employment Information Service’s website (www.keis.or.kr) for online access and also can be viewed through the “JobCast” smartphone application. The forecast results are provided to various employment centers and university employment support centers to be used for career guidance and job placements. Middle schools and high schools also use the forecast results for career education. Central and local governments use the forecast as basic data in employment

and industry policy making. The results are also referenced when planning university restructuring or curriculum reform.



Chapter 2

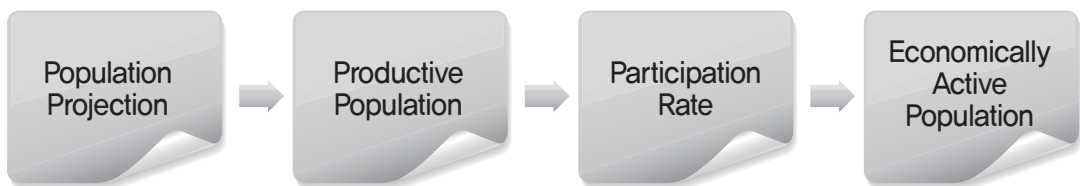


Major Results of the 2011–2020 Medium to Long-term Forecast

Chapter 2

1. Labor Force Forecast

Labor force is defined as the individuals among the total population who intend to participate in the labor market. Accordingly, future labor force forecasting is based on two major factors: population growth and change in the participation rate. The 2011-2012 labor force forecast was produced based on a population projection by gender and by age group provided by Statistics Korea, as well as the participation rate changes by gender, age group and educational attainment.



[Figure 2-1] Process for Aggregate Labor Supply Forecast

A. Productive Population Forecasting

Productive population refers to those individuals who have the qualifications and the ability to participate in economic activities. In Korea, the productive population is limited to those among the total population who are 15 years and older and are a part of the civilian non-institutionalized population, which excludes members of the military, riot police and prison inmates.

The productive population is estimated based on population statistics. The study uses the population projections by gender and by age based on the medium-level assumption population growth rate in the “Population Projections: 2010-2060” report released by Statistics Korea. Statistics Korea projects future population growth based on the results of the 2010 Population and Household Census. Birth rate, life expectancy at birth and net international migration, which considers population inflow and outflow, are the three factors that determine population growth. These three factors’ impact is differentiated into medium, high and low growth scenarios. Future population growth is projected for each scenario. Among the population projections by gender and by age according to each of the three scenarios, this study uses the population projection based on the medium growth scenario, which has the highest probability.



Chapter 2

Population Projection Assumptions : Medium Assumption (Statistics Korea, 2011)

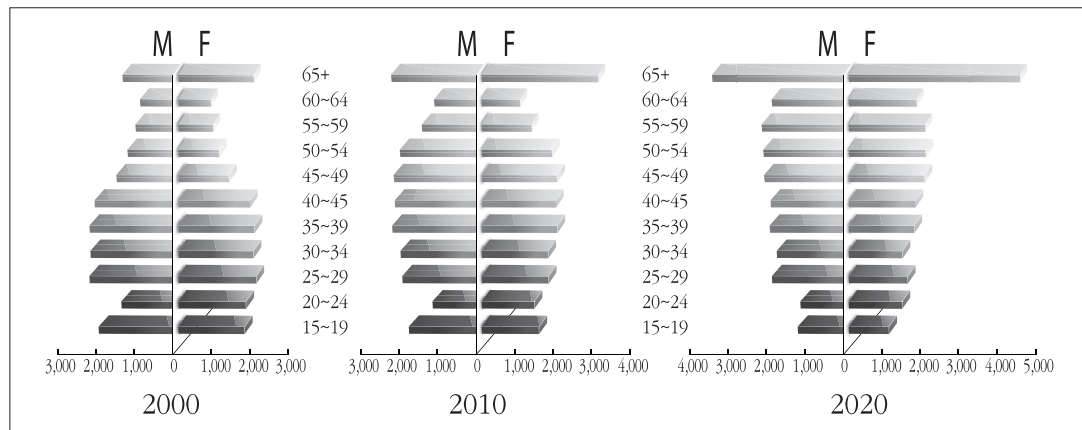
- 1) Total Fertility Rate: 1,23 (2010) → 1,35 (2020) → 1,41 (2030)
- 2) Male Life Expectancy at Birth: 77,2 (2010) → 79,3 (2020) → 81,4 (2030)
Female Life Expectancy at Birth: 84,1 (2010) → 85,7 (2020) → 87,0 (2030)
- 3) Net International Migration (per 1,000 population): 1,67 (2010) → 0,71 (2020) → 0,57 (2030)

The productive population refers to the population 15 years and older excluding the institutionalized population. Therefore, 1) the size of the institutionalized population, such as members of the armed forces, riot police and prison inmates, must be identified, and 2) the future size of the institutionalized population must be projected and excluded from the future population projection. In this research, the difference between the existing 15 years and older population statistics and the productive population is considered to be the size of the institutionalized population. The difference is analyzed and projected by gender and by age group and then deducted from the future population projection to predict the size of the future productive population. In this process, the source for past productive population by gender and by age group is the Economically Active Population Survey.

According to the forecast, the population growth rate will decline but the productive

population is expected to grow by an annual average of 1.0% during the first half and by 0.5% during the second half of the forecast period of 2011 to 2020. In terms of size, the productive population is expected to increase from 40.59 million in 2010 to 42.67 million in 2015 and then to 43.74 million in 2020. According to this projection, the productive population will grow by an average of 208,000 per year during the first five years and by an average of 107,000 a year in the latter five years.

[Figure 2–2] Productive Population Structure Change by Gender, by Age



By age group, the productive population closely reflects the trends of the overall population structure. The productive population in the youth group (ages 15-29) started to decrease from the 2000s. This trend continues in the 2010-2020 period, with the



Chapter 2

youth group decreasing by an annual average of 1.1% in the first half and decreasing more rapidly by an annual average of 1.6% in the second half. In terms of size, this is equivalent to an annual average decrease of 50,000 in the first half and an annual average decrease of 72,000 in the second half. The size of the major working age group of 30-54, which had been showing a continuous growth trend in the past, is expected to enter a declining trend during the forecast period. The size of the 30-54 age group is expected to decrease by an annual average of 0.2% in the first half and 1.1% in the second half, which is equivalent to an annual average decrease of 20,000 in the first half and a considerably larger annual average decrease of 110,000 in the second half. On the other hand, the senior group (age 55 and older) is expected to show high growth rates, with an annual average of 4.3% in the first half and an annual average of 4.0% in the second half. When this growth rate is converted into annual average size, the results are quite surprising. The senior group is expected to increase by an annual average of 278,000 during the first half of the forecast period and at an annual average of 288,000 in the second half, once again predicting a very rapid pace of population aging in Korea.



〈Table 2-1〉 Productive Population Trend & Forecast (by Age, 2000–2020)

(unit: 1,000 people, %)

		Total (15 and older)		15–29	30–54	55 and older
		15–64				
Productive Population (1,000)	2000	36,187	32,791	11,242	17,726	7,219
	2005	38,301	33,770	9,920	19,593	8,788
	2010	40,590	35,191	9,705	20,438	10,447
	2015	42,667	36,090	9,202	20,244	13,222
	2020	43,737	35,700	8,477	19,152	16,107
(%)	2000	100.0	90.6	31.1	49.0	19.9
	2005	100.0	88.2	25.9	51.2	22.9
	2010	100.0	86.7	23.9	50.4	25.7
	2015	100.0	84.6	21.6	47.4	31.0
	2020	100.0	81.6	19.4	43.8	36.8
Increase/ Decrease (1,000)	'01-'05	2,114	979	-1,322	1,867	1,569
	'06-'10	2,289	1,421	-215	845	1,659
	'11-'15	2,077	899	-503	-194	2,775
	'16-'20	1,070	-390	-724	-1,091	2,885
CAGR ¹ (%)	'01-'05	1.1	0.6	-2.5	2.0	4.0
	'06-'10	1.2	0.8	-0.4	0.8	3.5
	'11-'15	1.0	0.5	-1.1	-0.2	4.8
	'16-'20	0.5	-0.2	-1.6	-1.1	4.0

Note : 1) Complex average growth rate

When the productive population is limited to those age 64 and younger, the growth rate decreases to only an annual average of 0.5% in the first half of the forecast period and an annual average of negative 0.2% in the second half. When compared to the 1.0% and 0.5% growth seen in the productive population without an age cap in the first



and second halves, respectively, such figures show that the increase of the productive population in the 65 and older group is expected to be quite large. This is another indication of the rapid pace of Korea's population aging.

Forecasts on the productive population by gender predict that the productive population growth rate of men and women will be similar from 2011 to 2020. During the first half of the forecast period, both the male and female productive populations are expected to grow by an annual average of 1.0% and then by an annual average of 0.5% in the second half. In absolute size, the male productive population is expected to increase by an annual average of 102,000 and the female productive population by an average of 106,000 each year during the first half of the forecast period. According to the same forecasts, during the second half, the male productive population will grow by 48,000 and the female productive population by 59,000 each year. As a result, the male to female ratio in the productive population will change from 48.9% to 51.1% in 2010 to 48.8% and 51.2% in 2020.

〈Table 2-2〉 Productive Population Trend & Forecast (by Gender, 2000–2020)

(unit: 1,000 people, %)

		Total	Male	Female
Productive Population (1,000)	2000	36,187	17,522	18,665
	2005	38,301	18,618	19,683
	2010	40,590	19,850	20,740
	2015	42,667	20,865	21,802
	2020	43,737	21,348	22,389
(%)	2000	100.0	48.4	51.6
	2005	100.0	48.6	51.4
	2010	100.0	48.9	51.1
	2015	100.0	48.9	51.1
	2020	100.0	48.8	51.2
Increase/ Decrease (1,000)	'01-'05	2,114	1,096	1,018
	'06-'10	2,289	1,232	1,057
	'11-'15	2,077	1,015	1,062
	'16-'20	1,070	483	586
CAGR(%)	'01-'05	1.1	1.2	1.1
	'06-'10	1.2	1.3	1.1
	'11-'15	1.0	1.0	1.0
	'16-'20	0.5	0.5	0.5

The productive population by educational attainment clearly demonstrates Korea's trend of higher educational attainment. Just as the decrease in youths and increase in seniors were the dominating trends in the 2000s, a decrease in the less educated and an increase in the highly educated form the other prevailing trend. During the past decade,



Chapter 2

those with a middle school degree or less decreased by an annual average of 1.7% during 2001-2005 and by an annual average of 0.6% in 2006-2010. The number of high school graduates recorded only minor increases of 0.5% and 0.1%, respectively, in each period. On the other hand, those with two-year college or higher degrees increased by 7.0% and 4.8%, respectively, during each period, showing a clear contrasting trend. This trend is expected to continue even after 2010, resulting in an increase of two-year college or higher degree holders by an annual average of 3.6% in 2011-2015 and by an annual average of 2.9% in 2016-2020. On the other hand, the number of high school graduates is expected to grow by 1.0% and 0.8%, respectively, and the number of people with a middle school degree or less is expected to decrease by an annual average of 1.8% and 3.5%, respectively, during each period.

When the growth rates are translated into absolute size, the escalation of educational attainment becomes far more noticeable. During the first half of the forecast period, the number of two-year college or higher degree holders is expected to increase by an annual average of 240,000, while the number of high school graduates will increase by only 76,000, while the number of people with a middle school degree or less decreases by 108,000 each year. During the second half of the forecast period, the number of two-year college or higher degree holders is expected to increase by an annual average of 228,000, while the number of high school graduates increases by 68,000 and the number of people



with a middle school degree or less decreases by 184,000 each year.

〈Table 2-3〉 Productive Population Trend & Forecast (by Educational Attainment, 2000–2020) (unit: 1,000 people, %)

		Total	Middle School or less	High School Degree	College Degree or Higher ¹
Productive Population (1,000)	2000	36,187	13,957	15,197	7,031
	2005	38,301	12,838	15,613	9,848
	2010	40,590	12,471	15,669	12,450
	2015	42,667	11,390	16,428	14,849
	2020	43,737	9,551	17,055	17,130
(%)	2000	100.0	38.6	42.0	19.4
	2005	100.0	33.5	40.8	25.7
	2010	100.0	30.7	38.6	30.7
	2015	100.0	26.7	38.5	34.8
	2020	100.0	21.8	39.0	39.2
Increase/Decrease (1,000)	'01-'05	2,114	-1,119	416	2,816
	'06-'10	2,289	-368	56	2,602
	'11-'15	2,077	-1,080	759	2,399
	'16-'20	1,070	-1,839	627	2,282
Increase/Decrease (%P)	'01-'05	5.8	-8.0	2.7	40.1
	'06-'10	6.0	-2.9	0.4	26.4
	'11-'15	5.1	-8.7	4.8	19.3
	'16-'20	2.5	-16.1	3.8	15.4
CAGR(%)	'01-'05	1.1	-1.7	0.5	7.0
	'06-'10	1.2	-0.6	0.1	4.8
	'11-'15	1.0	-1.8	1.0	3.6
	'16-'20	0.5	-3.5	0.8	2.9

Note: 1) "College Degree or Higher" includes 2-year degrees.



In 2000, the proportion of two-year college or higher degree holders, high school graduates and individuals with a middle school education or less was 19.4%, 42.0% and 38.6%, respectively. In addition, the share of two-year college or higher degree holders in the total productive population was only half that of middle school degree or less holders. By contrast, in 2010 the proportion of the three groups was 30.7%, 38.6% and 30.7%, respectively. The share of two-year college or higher degree holders and middle school degree or less holders became similar. The share of two-year college or higher degree holders was still about 8% lower than that of high school or below graduates. However, in 2020 the share of the three groups are expected to rapidly change to 39.2%, 39.0% and 21.8%, respectively, which means that the share of two-year college or higher degree holders will become close to double that of middle school degree or less holders and will approach parity with that of high school graduates.

B. Economically Active Population Forecast

The forecast period's projected productive population and participation rate is used to forecast the economically active population, which is the total labor force supply. The most noticeable changes in Korea's labor force during the next decade are decreasing growth rates, aging and other changes in age composition and greater educational attainment. Such changes already started taking place socio-demographically in the

1990s and are the result of various factors, such as low fertility rates, population aging due to longer life expectancy at birth and the steady climb in college enrollment rates.

First, the labor force growth rate is decreasing. The decline in the population growth rate has led to lower labor force growth, which has continued to decline from the 1990s into the 2000s. This trend is expected to continue in the next 10 years.

Second, Korea's labor force is aging. Lower fertility rates have decreased the inflow of youth labor and the aging of the baby boomer generation born between 1955 and 1963 is another major factor behind the aging of the overall labor force. This trend is also expected to continue.

Third, Korea's labor force is becoming better educated. Korean's overwhelming pursuit of higher education has led to a rapid increase in two-year and four-year college graduates. In addition, many people with only middle school degrees or less who were unable to seek more education due to economic constraints have begun to age and retire out of the labor market. Due to these factors, a considerable portion of Korea's labor force is expected to be two-year college or higher degree holders.

The size of Korea's labor force was 24.75 million in 2010. It is expected to increase

Chapter 2

by 2.39 million in the following 10 years to reach 27.14 million in 2020. By age group, the additional 2.39 million workers can be divided into a 2.98 million gain in those ages 55 years and older, a decrease of 220,000 in those 15 to 29 years old and a decrease of 370,000 in those aged 30 to 54. The total decrease in those 54 and younger is 590,000.

〈Table 2-4〉 Economically Active Population Trend & Forecast (by Gender, 1990–2020)

(unit: 1,000 people, %)

		Total	Male	Female
Economically Active Population (1,000)	1990	18,539	11,030	7,509
	2000	22,135	13,034	9,101
	2010	24,748	14,492	10,256
	2015	26,312	15,323	10,988
	2020	27,141	15,760	11,381
(%)	1990	100.0	59.5	40.5
	2000	100.0	58.9	41.1
	2010	100.0	58.6	41.4
	2015	100.0	58.2	41.8
	2020	100.0	58.1	41.9
Increase/Decrease (1,000)	' 91- ' 00	3,596	2,004	1,592
	' 01- ' 10	2,613	1,458	1,155
	' 11- ' 20	2,393	1,268	1,125
	' 11- ' 15	1,564	831	732
	' 16- ' 20	829	437	393
Annual Average Growth Rate (%)	' 91- ' 00	1.8	1.7	1.9
	' 01- ' 10	1.1	1.1	1.2
	' 11- ' 20	0.9	0.8	1.0
	' 11- ' 15	1.2	1.1	1.4
	' 16- ' 20	0.6	0.6	0.7



While the size of the labor force aged 55 years and older increases significantly compared to that of 2010, the size of the labor force 54 years and younger decreases from that in 2010. The increase in the 55 years and older segment of the labor force is

〈Table 2-5〉 Economically Active Population Trend and Forecast (by Age, 1990–2020) (unit: 1,000, %)

		Total (15 and older)		15–29	30–54	55 and older
			15–64			
Economically Active Population (1,000)	1990	18,539	17,922	5,311	10,757	2,471
	2000	22,135	21,128	5,309	13,542	3,284
	2010	24,748	23,164	4,255	15,743	4,755
	2015	26,312	24,327	4,047	15,932	6,333
	2020	27,141	24,671	4,036	15,374	7,732
(%)	1990	100.0	96.7	28.6	58.0	13.3
	2000	100.0	95.5	24.0	61.2	14.8
	2010	100.0	93.6	17.2	63.6	19.2
	2015	100.0	92.5	15.4	60.6	24.1
	2020	100.0	90.9	14.9	56.6	28.5
Increase/ Decrease (1,000)	'91-'00	3,596	3,206	-2	2,785	813
	'01-'10	2,613	2,036	-1,054	2,201	1,471
	'11-'20	2,393	1,507	-219	-369	2,977
	'11-'15	1,564	1,163	-208	189	1,578
	'16-'20	829	344	-11	-559	1,399
CAGR (%)	'91-'00	1.8	1.7	0.0	2.3	2.9
	'01-'10	1.1	0.9	-2.2	1.5	3.8
	'11-'20	0.9	0.6	-0.5	-0.2	5.0
	'11-'15	1.2	1.0	-1.0	0.2	5.9
	'16-'20	0.6	0.3	-0.1	-0.7	4.1



due in part to longer average life expectancies and higher participation rates among the aged. However, the biggest single cause is the aging of the baby boomer generation. As a result, the 55 and older population is expected to increase by 63% from 4.76 million (2010) to 7.73 million (2020) and its share of the labor force is expected to increase from 14.8% (2000) to 19.2% (2010) and to 28.5% (2020), thus nearly doubling between 2000 and 2020.

When the total labor force older than age 15 is compared with the labor force between the ages of 15 and 64, the aging of Korea's labor market becomes more pronounced. The annual average growth rates of the 15 and older group and the 15 to 64 group in 1991-2000 were 1.8% and 1.7%, respectively, resulting in only a 0.1% difference. However, between 2001 and 2010, the annual average growth rates were 1.1% and 0.9%, respectively, widening the gap to 0.2%. In the next decade, the annual average growth rates are expected to be 0.9% and 0.6%, respectively, further widening the gap to 0.3%. In terms of the size of increase, in the 1990s, the 15 years and older labor force increased by 3.6 million and the 15 to 64 labor force increased by 3.21 million, which is a 390,000 difference. In the 2000s, the increase was 2.61 million and 2.04 million, respectively, with the difference increasing to 570,000. In the next 10 years, the increase is expected to be 2.39 million and 1.51 million, respectively, with the difference expanding to 880,000. With the 65 years and older labor force increasing significantly, a



key challenge for policymakers will be preparing plans for actively absorbing the rapidly increasing workers age 65 and older.

Reflecting Korea's aging population structure and higher level of educational attainment, the economically active population with a middle school or high school degree or less will decrease. On the other hand, due to rapidly increasing college enrollment rates, the share of those with a two-year college or higher degree in Korean society is expected to greatly increase. When the labor force increase between 2011 and 2020 is classified in terms of educational attainment, those with a two-year college or higher education increase by 3.71 million, and those with only a high school education increase by 830,000, while those with a school education or less decrease by 2.15 million. In fact, this trend has been occurring over the past two decades. However, one noticeable difference is that the growth in the labor force with high school degrees, which increased by 2.78 million from 1991 to 2000, rapidly slowed in the 2000s, which is the result of the sudden hike in university enrollment from the 1990s.

The labor force with a two-year college or higher education was 9.62 million in 2010. In 2020, the number is expected to reach 13.33 million, increasing by nearly 40%. Its share in the total labor force is expected to increase from 39% (2010) to 49% (2020), to comprise nearly half of the entire labor force. By contrast, the labor force with a middle



school degree or less is expected to decrease by 42% from 5.09 million (2010) to 2.94 million (2020). Its share of the total labor force is also expected to greatly decrease from 20.6% (2010) to 10.8% (2020). The number of high school graduates continues to grow even at a slow pace of an average 0.8% annually and will increase by 830,000 during the 10-year period. However, its share of the total labor force is expected to decrease from 40.6% (2010) to 40.0% (2020).

Even though it is not a striking change, the share of women in the labor force has gradually increased from 40.5% (1990) to 41.1% (2000) and then to 41.4% (2010). This is a result of a steady increase in women's social activities. The share of women in the labor force is expected to further increase to 41.9% in 2020. Women have been maintaining a higher growth rate than men as shown in the annual average growth rates, which were 1.7% and 1.1% in 1991-2000 and 2001-2010, respectively, for men, while those of women were increased by 1.9% and 1.2% during the same period, demonstrating 0.1% to 0.2% points higher growth rates. During the next 10 years, women in the labor force are expected to grow at an annual average of 1.0%, which is still faster than 0.8% for men.

〈Table 2–6〉 Economically Active Population Trend & Forecast (by Educational Attainment, 1990–2020) (unit: 1,000, %)

		Total	Middle School or Less	High School Graduate	College or Higher
Economically Active Population (1,000)	1990	18,539	8,896	7,054	2,589
	2000	22,135	6,866	9,830	5,439
	2010	24,748	5,089	10,038	9,621
	2015	26,312	4,282	10,493	11,538
	2020	27,141	2,944	10,865	13,332
(%)	1990	100.0	48.0	38.0	14.0
	2000	100.0	31.0	44.4	24.6
	2010	100.0	20.6	40.6	38.9
	2015	100.0	16.3	39.9	43.8
	2020	100.0	10.8	40.0	49.1
Increase (1,000)	'91-'00	3,596	-2,030	2,776	2,850
	'01-'10	2,613	-1,776	208	4,182
	'11-'20	2,393	-2,146	828	3,711
	'11-'15	1,564	-808	455	1,916
	'16-'20	829	-1,338	373	1,794
Annual Average Growth Rate (%)	'91-'00	1.8	-2.6	3.4	7.7
	'01-'10	1.1	-2.9	0.2	5.9
	'11-'20	0.9	-5.3	0.8	3.3
	'11-'15	1.2	-3.4	0.9	3.7
	'16-'20	0.6	-7.2	0.7	2.9



2. Employment Forecast by Industry

A. Employment Forecast by Industry

Employment forecasting by industry is possible by multiplying the real value-added forecast by industry with the projected employment coefficient by industry. During 2011-2020, the amount of employment in all industries is expected to increase by an annual average of 0.9% (an average 235,000 per year) to reach 26,177,000 by 2020. The annual average growth rate is expected to be 1.2% (an average of 299,000 per year) during the first half (2011-2015) and then an annual average of 0.7% (an average 170,000 per year) during the second half (2016-2020), indicating a decreased pace of employment growth as we approach the latter half of the forecast period.

When the employment forecast of the six major industries is compared, employment in “agriculture, forestry and fishing” is expected to decrease by an annual average of 3.0% (41,000) during the 10-year period. Employment in “mining and quarrying” as well as “manufacturing” is also expected to decrease by an annual average of 1.2% and 0.4% (14,000), respectively. On the other hand, employment in “electricity, gas, steam and water supply,” “construction” and in the service industries is projected to increase by 1.0%, 0.3% and 1.6% (an average annual increase of 284,000), respectively. This trend of decreasing employment in “agriculture, forestry and fishing” and “manufacturing”



as well as the increase of employment in the service industries indicates that the trends among industries that existed during the past decade will continue in the next decade. Most jobs will be created in the service industries while jobs in “agriculture, forestry and fishing” are likely to continue their downward trend. However, the pace of employment decreases in “manufacturing” is expected to slow.

〈Table 2-7〉 Employment Forecast by Industry (Six Major Industries)

(unit: 1,000, %)

	2010	2015	2020	Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
				'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Agriculture, forestry and fishing	1,566	1,366	1,157	-201	-209	-410	-2.7	-3.3	-3.0
Mining and quarrying	21	20	19	-1	-1	-2	-1.1	-1.3	-1.2
Manufacturing	4,028	3,976	3,887	-52	-89	-140	-0.3	-0.5	-0.4
Electricity, gas, steam and water supply	78	84	87	6	3	8	1.4	0.6	1.0
Construction	1,753	1,806	1,805	53	-1	52	0.6	0.0	0.3
Service	16,383	18,074	19,223	1,691	1,149	2,840	2.0	1.2	1.6
Total	23,829	25,325	26,177	1,496	852	2,348	1.2	0.7	0.9

The employment forecast by the 1-digit Standard Industrial Classification indicates that employment in the “human health and social work activities” industry and the

“sewage, waste management, materials recovery and remediation activities” industry would grow rapidly at an annual growth rate of 6.0%, followed by “business facilities management and business” at 4.3%, “arts, sports and recreation related services” at 4.1%, “professional, scientific and technical activities” at 3.8% and “information and communications” at 3.2%. This once again shows the high growth of employment in the service industries. By contrast, employment in “agriculture, forestry and fishing,” “mining and quarrying,” and “manufacturing” is expected to decrease. Finally, a very gradual increase in employment is expected in the “electricity, gas, steam and water supply” industry as well as in “construction.”

(Table 2-8) Employment Forecast by Industry (1-Digit Industrial Classification)

(unit: 1,000 people, %)

	2010	2015	2020	Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
				'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Agriculture, forestry and fishing	1,566	1,366	1,157	-201	-209	-410	-2.7	-3.3	-3.0
Mining and quarrying	21	20	19	-1	-1	-2	-1.1	-1.3	-1.2
Manufacturing	4,028	3,976	3,887	-52	-89	-140	-0.3	-0.5	-0.4
Electricity, gas, steam and water supply	78	84	87	6	3	8	1.4	0.6	1.0
Sewage, waste management, materials recovery and remediation activity	65	94	119	29	25	54	7.4	4.7	6.0

	2010	2015	2020	Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
				'11–'15	'16–'20	'11–'20	'11–'15	'16–'20	'11–'20
Construction	1,753	1,806	1,805	53	-1	52	0.6	0.0	0.3
Wholesale and retail trade	3,580	3,613	3,569	33	-45	-12	0.2	-0.2	0.0
Transportation	1,280	1,372	1,443	92	71	163	1.4	1.0	1.2
Accommodation and food service activities	1,889	1,809	1,708	-80	-100	-181	-0.9	-1.1	-1.0
Information and communications	668	808	921	141	112	253	3.8	2.6	3.2
Financial and insurance activities	808	895	956	87	62	149	2.0	1.3	1.7
Real estate activities and renting and leasing	517	530	554	14	24	37	0.5	0.9	0.7
Professional, scientific and technical activities	883	1,133	1,288	250	154	405	5.0	2.6	3.8
Business facilities management and business	1,023	1,365	1,569	342	204	546	5.8	2.8	4.3
Public administration and defense, compulsory social security	960	959	981	-1	22	21	0.0	0.5	0.2
Education	1,799	1,821	1,854	22	33	55	0.2	0.4	0.3
Human health and social work activities	1,153	1,659	2,106	507	446	953	7.3	4.8	6.0



Chapter 2

	2010	2015	2020	Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
				'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Arts, sports and recreation-related services	380	496	574	116	78	195	5.4	2.9	4.1
Membership organizations, repair and other personal services	1,216	1,365	1,452	149	87	236	2.3	1.2	1.8
Activities of households as employers; undifferentiated goods-and services-producing activities of households for own use	150	139	114	-11	-25	-36	-1.6	-3.9	-2.7
Activities of extraterritorial organizations and bodies	13	16	15	3	-1	2	3.7	-0.8	1.4
All Industries	23,829	25,325	26,177	1,496	852	2,348	1.2	0.7	0.9

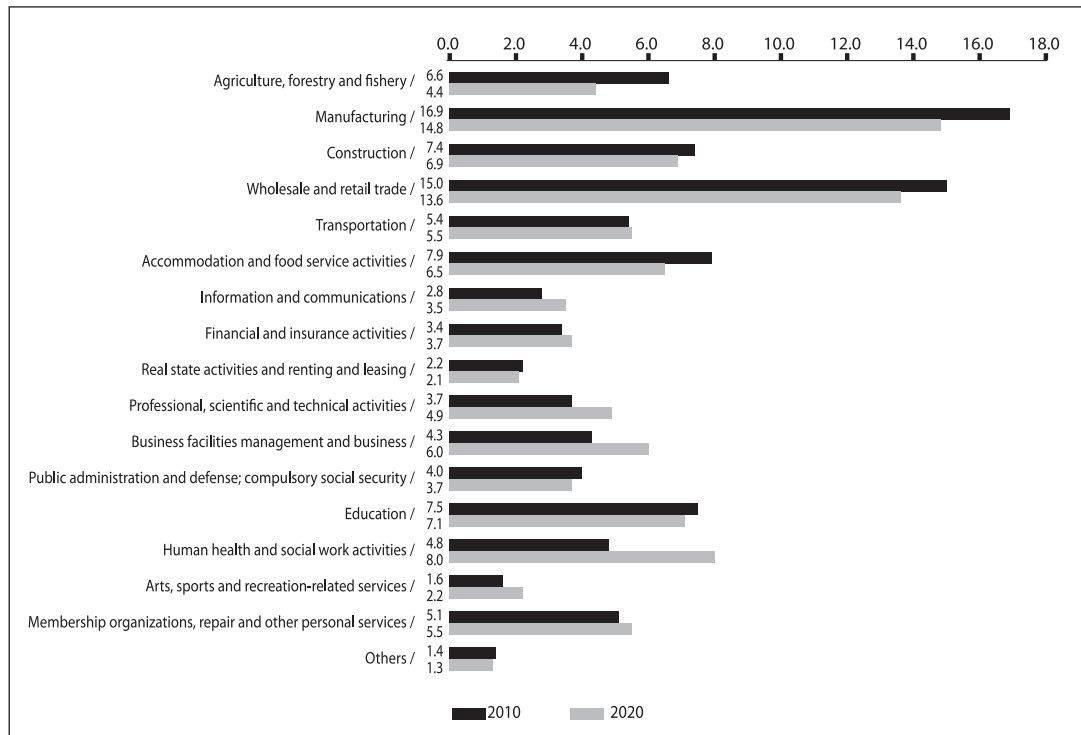
During the 2010 to 2020 period, the share of the “agriculture, forestry and fishing” industry in total employment is expected to decrease from 6.6% in 2010 to 4.4% in 2020, while the share of “manufacturing” should decrease from 16.9% to 14.8%, and that of



“construction” from 7.4% to 6.9%. By contrast, the share of the service industries in total employment is expected to increase from 68.8% to 73.4%, which indicates a greater shift towards the service industries. Within those industries, the shares of “wholesale and retail trade” (15.0% to 13.6%), “accommodation and food service activities” (7.9% to 6.5%),

[Figure 2–3] Employment Share by Industry Forecast (1-Digit Industry Classification)

(unit: %)





Chapter 2

“real estate activities and renting and leasing” (2.2% to 2.1%), “public administration and defense, compulsory social security” (4.0% to 3.7%), and “education” (7.5% to 7.1%) are expected to decrease. However, the shares of “transportation” (5.4% to 5.5%), “information and communications” (2.8% to 3.5%), “financial and insurance activities” (3.4% to 3.7%), “professional, scientific and technical activities” (3.7% to 4.9%), “business facilities management and business” (4.3% to 6.0%), “human health and social work activities” (4.8% to 8.0%), “arts, sports and recreation related services” (1.6% to 2.2%), and “membership organizations, repair and other personal services” (5.1% to 5.5%) are all expected to increase.

According to the employment forecast by the 2-digit Standard Industrial Classification, agriculture-related employment will decrease by an annual average of 3.2% (average of 40,000 per year) between 2011 and 2020, and employment in fishing will decrease by annual average of 4.6%. However, forestry employment is expected to increase by an annual average of 4.8%. Within the “mining and quarrying” industry, “mining of metal ores” and “mining of non-metallic minerals, except fuel” are expected to decrease by an annual average of 2.4% and 1.8%, respectively. However, employment in “mining support service activities” is expected to increase by an annual average of 2.8%.

〈Table 2–9〉 Employment Forecast for Agriculture, Forestry & Fishing/Mining & Quarrying(2-Digit Industry Classification)

(unit: 1,000 people, %)

	Employment (1,000)			Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
	2010	2015	2020	'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Agriculture	1,481	1,289	1,078	-191	-211	-402	-2.8	-3.6	-3.2
Forestry	25	29	40	5	10	15	3.7	6.0	4.8
Fishing	61	47	39	-14	-9	-23	-5.3	-4.0	-4.6
Mining of coal, crude petroleum and natural gas	3	2	1	-1	-1	-2	-6.9	-8.3	-7.6
Mining of metal ores	1	1	0	0	0	0	-1.9	-2.9	-2.4
Mining of non-metallic minerals, except fuel	13	12	11	-1	-1	-2	-2.0	-1.6	-1.8
Mining support service activities	4	5	6	1	0	1	4.1	1.5	2.8

In manufacturing, employment in low-technology industries, such as “manufacture of food products,” “manufacture of tobacco products,” “tanning and dressing of leather, manufacture of luggage and footwear” and “manufacture of rubber and plastic products,” is expected to grow. Growth is also expected in high-tech industries, such as “manufacture of medical, precision and optical instruments, watches and clocks,” “manufacture of electrical equipment,” and “manufacture of other machinery and equipment,” as well as in mid- to high-tech industries, including “manufacture of motor vehicles, trailers and semitrailers” and “manufacture of other transport equipment.” Other manufacturing industries are expected to witness a decline in employment with particularly large



decreases include the textiles, apparel, wood products and furniture sectors. On the other hand, in the high technology manufacturing sector, employment in the “manufacture of electronic components, computer, radio, television and communication equipment and apparatuses” industry is expected to decrease even though this is a high technology and high value-added industry (annual average real value-added growth rate of 7.2% during the next 10 years) because of rapid technology innovation.

Industries that are expected to record large employment increases are “manufacture of other machinery and equipment” (annual average increase of 7,000), “manufacture of motor vehicles, trailers and semitrailers” (7,000) and “manufacture of electrical equipment” (5,000). The industries expected to witness large employment decreases are “manufacture of wearing apparel, clothing accessories and fur articles” (annual average decrease of 15,000), “manufacture of textiles, except apparel” (-8,000), “manufacture of electronic components, computer, radio, television and communication equipment” (-7,000) and “manufacture of fabricated metal products” (-5,000).



〈Table 2–10〉 Manufacturing Employment Forecast (2-Digit Industry Classification)

(unit: 1,000 people, %)

	Employment (1,000)			Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
	2010	2015	2020	'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Manufacture of food products	346	377	391	31	14	45	1.7	0.7	1.2
Manufacture of beverages	31	40	45	9	5	13	4.9	2.3	3.6
Manufacture of tobacco products	0	1	1	1	0	1	42.2	-0.4	20.9
Manufacture of textiles, except apparel	170	127	95	-43	-32	-75	-5.8	-5.7	-5.8
Manufacture of wearing apparel, clothing accessories and fur articles	281	194	129	-88	-65	-152	-7.5	-8.1	-7.8
Tanning and dressing of leather, manufacture of luggage and footwear	61	54	62	-7	8	2	-2.4	2.9	0.3
Manufacture of wood and of products of wood and cork, except furniture	34	22	15	-12	-7	-19	-8.4	-7.9	-8.1
Manufacture of pulp, paper and paper products	71	71	66	-1	-5	-5	-0.2	-1.3	-0.7
Printing and reproduction of recorded media	88	83	75	-5	-8	-13	-1.2	-1.9	-1.6
Manufacture of coke, hard-coal and lignite fuel briquettes and refined petroleum products	11	10	9	-1	-1	-1	-1.4	-1.2	-1.3
Manufacture of chemicals and chemical products, except pharmaceuticals and medicinal chemicals	160	148	140	-12	-8	-19	-1.5	-1.1	-1.3
Manufacture of pharmaceuticals, medicinal chemicals and botanical products	56	52	44	-4	-8	-13	-1.7	-3.4	-2.5
Manufacture of rubber and plastic products	213	232	259	20	26	46	1.8	2.1	2.0
Manufacture of non-metallic mineral products	109	96	84	-12	-12	-25	-2.4	-2.7	-2.6
Manufacture of basic metal products	124	135	147	10	13	23	1.6	1.8	1.7

Chapter 2

	Employment (1,000)			Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
	2010	2015	2020	'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Manufacture of fabricated metal products, except machinery and furniture	333	308	279	-25	-29	-53	-1,6	-1,9	-1,8
Manufacture of electronic components, computer, radio, television and communication equipment and apparatuses	508	477	433	-31	-43	-74	-1,3	-1,9	-1,6
Manufacture of medical, precision and optical instruments, watches and clocks	94	112	119	18	7	25	3,5	1,2	2,4
Manufacture of electrical equipment	196	231	248	34	18	52	3,2	1,5	2,4
Manufacture of other machinery and equipment	384	431	458	47	26	74	2,3	1,2	1,8
Manufacture of motor vehicles, trailers and semitrailers	385	422	452	37	30	67	1,8	1,4	1,6
Manufacture of other transport equipment	181	193	206	12	14	25	1,2	1,4	1,3
Manufacture of furniture	85	68	53	-17	-16	-33	-4,5	-5,2	-4,8
Manufacture of other products	106	93	76	-13	-18	-31	-2,6	-4,2	-3,4

Lastly, employment is expected to grow in all services industries, except for “general construction,” “sale of motor vehicles and parts,” “retail trade, except motor vehicles and motorcycles,” “accommodation,” “food and beverage service activities,” “renting and leasing; except real estate,” and in activities of households as employers. In particular, employment in “remediation activities and other waste management services” (average annual growth rate of 16.7%), “social work activities” (7.5%), “business

facilities management and landscape services” (7.3%), “waste collection, disposal and materials recovery” (6.0%), “creative, arts and recreation-related services” (5.6%), “professional services” (4.8%), “human health” (4.8%) and “financial and insurance activities” (4.6%) is expected to grow considerably. The industries expected to record large employment increases are “social work activities” (average annual growth rate of 55,000), “human health” (41,000), “business support services” (37,000), “professional services” (23,000) and “wholesale trade and commission trade, except for motor vehicles and motorcycles” (22,000), while large employment decreases are expected in “retail trade” (annual average decrease of 23,000), “food and beverage service activities” (-17,000), “general construction” (-5,000) and in the activities of households as employers sector (-4,000).

Chapter 2

(Table 2-11) Services Industry Employment Forecast (2-Digit Industry Classification)

(unit: 1,000 people, %)

	Employment (1,000)			Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
	2010	2015	2020	'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Electricity, gas, steam and air conditioning supply	63	68	70	5	2	7	1.5	0.5	1.0
Water supply	15	16	17	1	1	2	0.8	1.1	1.0
Sewage, wastewater and human waste treatment services	15	19	22	4	3	7	4.1	3.3	3.7
Waste collection, disposal and materials recovery	48	69	86	22	17	39	7.6	4.4	6.0
Remediation activities and other waste management services	2	5	10	4	5	8	21.0	12.4	16.7
General construction	600	583	555	-17	-27	-45	-0.6	-1.0	-0.8
Special trade construction	1,153	1,224	1,250	71	26	97	1.2	0.4	0.8
Sale of motor vehicles and parts	137	133	131	-4	-1	-5	-0.6	-0.2	-0.4
Wholesale trade and commission trade, except of motor vehicles and motorcycles	1,301	1,414	1,522	113	108	221	1.7	1.5	1.6
Retail trade, except motor vehicles and motorcycles	2,142	2,066	1,915	-76	-151	-228	-0.7	-1.5	-1.1
Land transport, transport via pipelines	1,039	1,103	1,156	64	53	117	1.2	0.9	1.1
Water transport	30	33	31	3	-1	1	1.8	-0.9	0.4
Air transport	27	33	35	6	2	8	4.0	1.3	2.7
Storage and support activities for transportation	184	203	220	19	17	36	2.0	1.6	1.8
Accommodation	109	106	101	-3	-5	-8	-0.5	-1.0	-0.7
Food and beverage service activities	1,780	1,703	1,607	-78	-95	-173	-0.9	-1.2	-1.0
Publishing activities	245	296	358	51	62	113	3.8	3.8	3.8

	Employment (1,000)			Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
	2010	2015	2020	'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Motion picture, video and television program production, sound recording and music publishing activities	48	61	72	13	11	25	4.9	3.4	4.2
Broadcasting	38	49	55	11	6	17	5.0	2.2	3.6
Telecommunications	169	205	224	36	19	55	3.8	1.8	2.8
Computer programming, consultancy and related activities	132	158	169	25	11	36	3.5	1.3	2.4
Information service activities	35	40	43	5	3	8	2.4	1.4	1.9
Financial institutions, except insurance and pension funding	357	392	410	35	18	53	1.9	0.9	1.4
Insurance and pension funding	320	344	341	23	-3	20	1.4	-0.2	0.6
Activities auxiliary to financial service and insurance activities	130	159	206	29	47	76	4.0	5.2	4.6
Real estate activities	460	486	517	27	30	57	1.1	1.2	1.2
Renting and leasing; except real estate	57	44	38	-13	-7	-20	-5.1	-3.3	-4.2
Research and development	117	130	136	13	6	19	2.1	0.9	1.5
Professional services	382	515	616	133	101	234	6.0	3.6	4.8
Architectural, engineering and other scientific technical services	268	358	398	90	41	130	5.8	2.1	4.0
Professional, scientific and technical services, N.E.C.	117	131	138	14	7	21	2.3	1.0	1.7
Business facilities management and landscape services	165	266	340	101	74	175	9.6	4.9	7.3
Business support services	858	1,099	1,229	241	130	371	5.0	2.2	3.6
Public administration and defense; compulsory social security	960	959	981	-1	22	21	0.0	0.5	0.2

Chapter 2

	Employment (1,000)			Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
	2010	2015	2020	'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
Education	1,799	1,821	1,854	22	33	55	0.2	0.4	0.3
Human health	664	930	1,069	267	139	405	6.8	2.8	4.8
Social work activities	489	729	1,037	240	307	548	8.0	7.0	7.5
Creative, arts and recreation-related services	109	158	192	49	34	83	7.3	3.9	5.6
Sports activities and amusement activities	270	338	382	68	44	112	4.5	2.5	3.5
Membership organizations	240	263	283	24	20	43	1.9	1.4	1.7
Maintenance and repair services	384	440	477	56	37	93	2.7	1.6	2.2
Other personal services activities	593	662	693	69	30	100	2.2	0.9	1.6
Activities of households as employers	150	139	114	-11	-25	-36	-1.6	-3.9	-2.7
Activities of extraterritorial organizations and bodies	13	16	15	3	-1	2	3.7	-0.8	1.4



3. Employment Forecast by Occupation

A. Employment Forecast by Occupational Classification Major Group (1–digit)

Table 2-12 shows the employment forecast results for 2011 to 2020 for each of the nine major occupational classification groups (1-digit). The occupation expected to witness the greatest increase in employment during 2011 to 2020 is “professionals and related workers” (2). This classification is expected to increase from 4,571,000 workers in 2010 to 5,702,000 in 2020, or by an annual average of 113,000 each year. Even in terms of the employment growth rate, the “professionals and related workers” classification is expected to increase by an annual average of 2.2%, which is the steepest growth rate expected among all nine major groups.

Other occupations that are expected to see high employment growth rates include “clerks” (annual average growth rate of 1.4%), “managers” (1.3%), “elementary workers” (1.1%) and “service workers” (1.1%). By contrast, the employment of “skilled agricultural, forestry and fishery workers” (6) is expected to decrease by an annual average of 2.9% (annual average decrease of 37,000) and contract from a total of 1,441,000 workers in 2010 to 1,074,000 in 2020.

Chapter 2

〈Table 2-12〉 Employment Forecast by Occupation (Major Group)

(unit: 1,000, %)

Code (KSCO)	Occupation	Employment (1,000)			Period Increase/Decrease (1,000)			Annual Average Growth Rate (%)		
		2010	2015	2020	'11-'15	'16-'20	'11-'20	'11-'15	'16-'20	'11-'20
1	Managers	562	608	639	46	31	77	1.6	1.0	1.3
2	Professionals and Related Workers	4,571	5,215	5,702	644	486	1,130	2.6	1.8	2.2
3	Clerks	3,739	4,050	4,287	310	238	548	1.6	1.1	1.4
4	Service Workers	2,434	2,617	2,711	183	94	277	1.5	0.7	1.1
5	Sales Workers	2,934	2,980	2,928	46	-52	-6	0.3	-0.4	-0.0
6	Skilled Agricultural, Forestry and Fishery Workers	1,441	1,266	1,074	-176	-191	-367	-2.6	-3.3	-2.9
7	Craft and Related Trades Workers	2,238	2,322	2,348	85	26	110	0.7	0.2	0.5
8	Equipment, Machine Operating and Assembling Workers	2,695	2,820	2,906	125	86	211	0.9	0.6	0.8
9	Elementary Workers	3,215	3,448	3,582	233	134	367	1.4	0.8	1.1
	All Occupations	23,829	25,325	26,177	1,496	852	2,348	1.2	0.7	0.9

Note : Classification standards are according to the Korea Standard Classification of Occupations (KSCO) (6th version).

The number of “sales workers” (5) is also expected to decrease slightly during the 10-year period following 2010. On the other hand, occupations that are heavily employed in manufacturing, such as “craft and related trades workers” (7) and “equipment, machine operating and assembling workers” (8) are expected to see an increase of employment by 0.5% (annual average of 11,000) and 0.8% (annual average of 21,000), respectively.

The above forecast results can be summarized as follows. First, considering that the

total employment growth rate forecasted for 2011 to 2020 is an annual average of 0.9%, the employment growth in these five occupations: “managers,” “professionals and related workers,” “clerks,” “service workers,” and “elementary workers,” is expected to be greater than the average. On the other hand, the remaining four major groups, including “skilled agricultural, forestry and fishery workers,” are expected to see either a decrease in employment or, at most, a below average growth rate.

Second, an interesting result in the employment forecast by major occupational group is that considerably large employment growth is predicted in both highly-skilled occupations such as “managers” (1) and “professionals and related workers” (2), as well as low-skilled occupations, such as “elementary workers” (9). By contrast, job growth in middle-level skill occupations such as “craft and related trades workers” (7) and “equipment, machine operating and assembling workers” (8) is expected to slow. This indicates the high likelihood of job bipolarization during the next 10 years.

B. Employment Forecast by Occupational Classification Sub-major Group (2-digit)

1) According to Annual Average Employment Growth Rate

The employment sizes of the sub-major groups (51 occupations) are highly divergent. For example, as of 2010, the sub-major group occupation with the least employment was “skilled forestry occupations” with about 12,000 workers. On the other hand, the occupation with the most employment in 2010 was “administration and accounting-



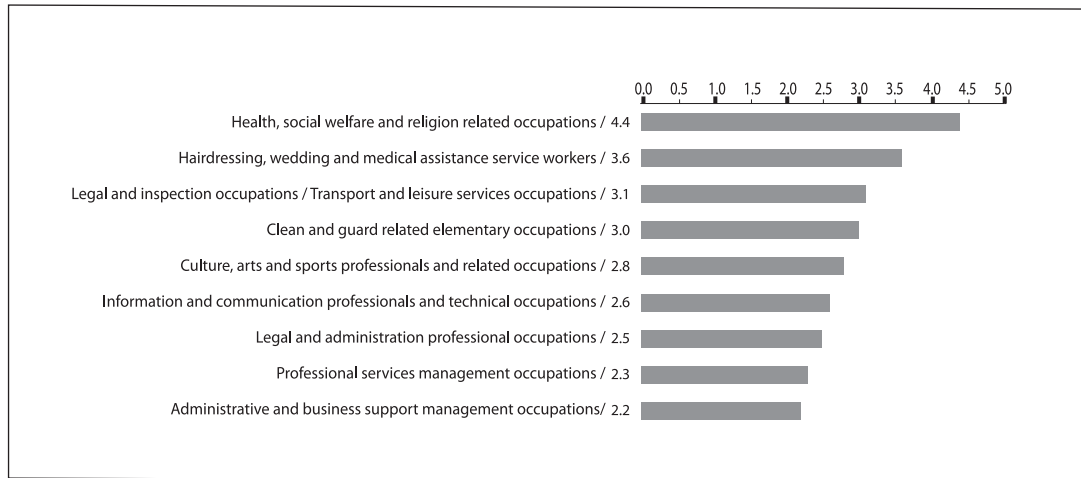
related occupations” with about 3,025,000 workers. Due to such size differences, to gain any meaningful insights, it is necessary to limit the scope of comparison to occupations with a minimum employment pool. Accordingly, the labor force demand changes will be compared only among occupations with at least 30,000 workers.

Among occupations with at least 30,000 workers as of 2010, the occupation classification with the highest expected employment growth was “health, social welfare and religion-related occupations,” which is expected to grow at an annual average of 4.4%. This is followed by “hairdressing, wedding and medical assistance service workers” (3.6%), “legal and inspection occupations” (3.1%), “transport and leisure services occupations” (3.0%) and “clean and guard-related elementary occupations” (2.9%). In addition, other occupations that are expected to record relatively high employment growth rates include “culture, arts and sports professionals and related occupations” (2.8%), “information and communication professionals and technical occupations” (2.6%) and “legal and administration professional occupations” (2.5%).

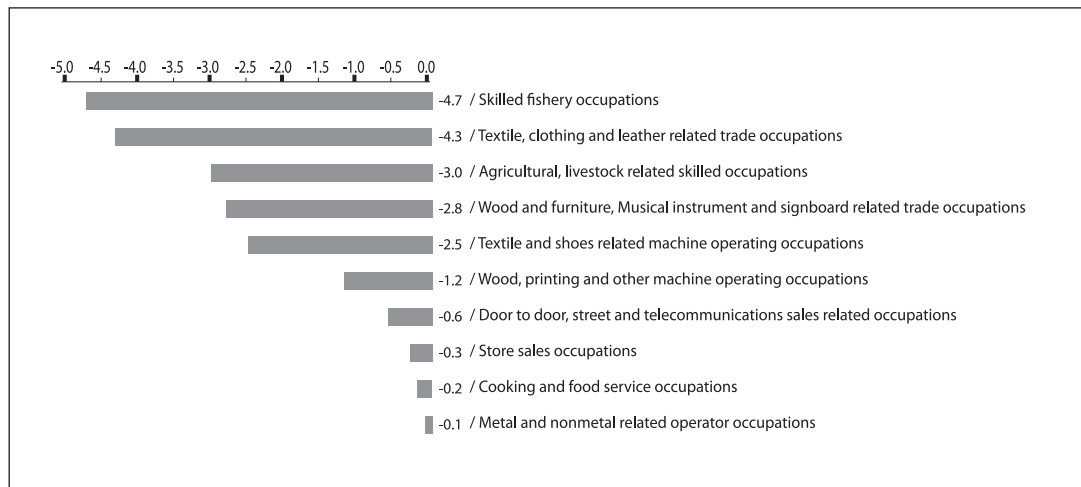
Of the top 10 sub-major occupational groups in terms of employment growth rates, four are professional occupations. In particular, employment is expected to rapidly grow among professionals related with health, social welfare, culture, arts, information and communication and legal services. In addition, certain occupations classified as “service workers,” like “hairdressing, wedding and medical assistance service workers,” or the



[Figure 2–4] Top 10 Annual Average Growth Rate Occupations (Sub-major Group/2-Digit) (unit: %)



[Figure 2–5] Bottom 10 Annual Average Growth Rate Occupations (Sub-Major Group/2-Digit) (unit: %)





Chapter 2

“legal and inspection occupations” (classified under “clerks”), “clean and guard-related elementary occupations” (classified under “elementary workers”), and “professional services management occupations” and “administrative and business support management occupations” (both are classified under “managers”), are all expected to record relatively fast employment growth.

On the other hand, among the bottom 10 occupations in terms of annual average employment growth rate, the sub-major group occupation expected to see the greatest decrease was “skilled fishery occupations” with an annual average drop of -4.7%, followed by “textile, clothing and leather related trade occupations” (-4.3%), “agricultural and livestock related skilled occupations” (-3.0%), “wood and furniture, musical instrument and signboard related trade occupations” (-2.8%) and “textile and shoes related machine operating occupations” (-2.5%). All of these occupations are expected to record annual average employment decreases of 2.5% or more. In addition, “wood, printing and other machine operating occupations” (-1.2%), “door to door, street and telecommunications sales related occupations” (-0.6%) and “store sales occupations” (-0.3%) are expected to experience decreases in employment from 2011 to 2020.

Decreases of employment in the above occupations appear to be related with the declining industrial trends where most of the workers are employed.

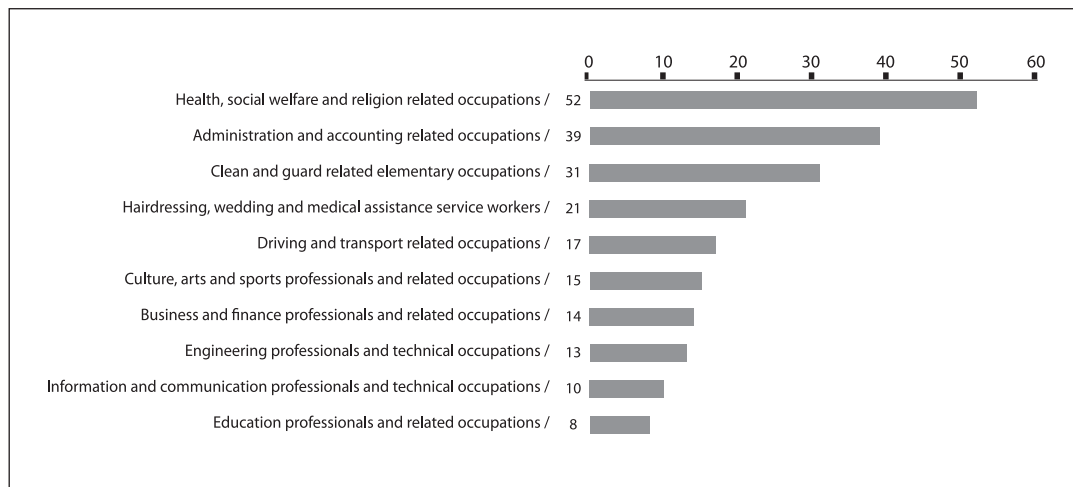
2) According to Annual Average Increase/Decrease Size

In terms of the size of annual average increase, the “health, social welfare and religion related occupations” group is expected to see the largest increase in employment, as was the case in annual average growth rates. During 2011 to 2020, employment in “health, social welfare and religion related occupations” is expected to grow by an annual average of 52,000, followed by “administration and accounting related occupations” (39,000), “clean and guard related elementary occupations” (31,000), “hairdressing, wedding and medical assistance service workers” (21,000) and “driving and transport related occupations” (17,000).

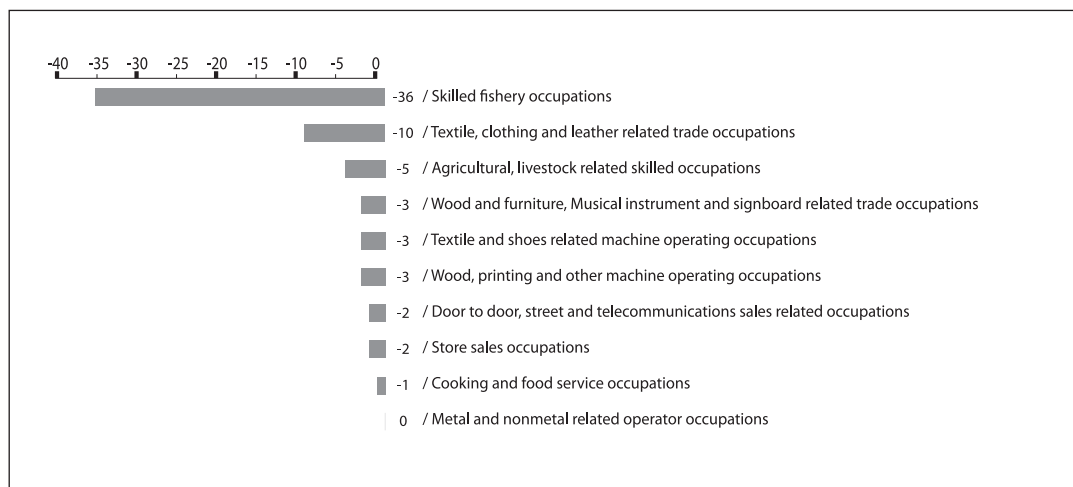
On the other hand, the sub-major occupational group expected to see the greatest decrease in employment during 2011 to 2020 is the agricultural and livestock-related skilled occupations group, which is expected to decrease by an annual average of 36,000. Other than agricultural and livestock-related skilled occupations, “textile, clothing and leather related trade occupations” (annual average of -10,000), “store sales occupations” (-5,000), “cooking and food service occupations” (-3,000) and “textile and shoes related machine operating occupations” (-3,000) are expected to record relatively large decreases in employment.

Chapter 2

[Figure 2-6] Top 10 Annual Average Employment Growth Occupations (Sub-Major Group/2-Digit) (unit: %)



[Figure 2-7] Top 10 Annual Average Employment Decrease Occupations (Sub-Major Group/2-Digit) (unit: %)



3) Occupational Forecast by Employment Size

The employment size of the sub-major occupational groups as of 2010 can be compared to identify the top 10 occupations in terms of employment size. An analysis of the employment size as of 2010 and employment size changes during 2011 to 2020 of the top 10 occupations show that as of 2010 the total employment of the top 10 sub-major occupational groups was 13,623,000, or about 57.2% of the total employment (23,829,000) of the same year.

The occupation with the largest employment size as of 2010 was “administration and accounting related occupations” (3,025,000). During the next 10 years, employment in this occupation is expected to increase by an annual average of 1.2% (annual average of 39,000) and is projected to reach 3,411,000 in 2020. Other occupations with large employment sizes were “store sales occupations” (1,855,000), “cooking and food service occupations” (1,528,000), “agricultural and livestock related skilled occupations” (1,381,000), “education professional and related occupations” (1,329,000), “driving and transport related occupations” (1,264,000), “health, social welfare and religion related occupations” (940,000), and “clean and guard related elementary occupations” (886,000).

Among the top 10 occupations with the highest employment size as of 2010, seven occupations, excluding “store sales occupations,” “cooking and food service

occupations,” and “agricultural, livestock related skilled occupations” are expected to see an increase in employment during the next 10 years.

Among the occupational groups that are expected to see a decrease in employment, “agricultural, livestock related skilled occupations” is expected to record an average

〈Table 2-13〉 Employment Forecast of Top 10 Employment Occupations (Sub-Major Group) (unit: 1,000, %)

Occupation	2010	2015	2020	Annual Average Increase/Decrease	Annual Average Growth Rate
Administration and accounting related occupations	3,025 (1)	3,242	3,411 [1]	39	1.2
Store sales occupations	1,855 (2)	1,866	1,804 [2]	-5	-0.3
Cooking and food service occupations	1,528 (3)	1,542	1,496 [3]	-3	-0.2
Agriculture, livestock related skilled occupations	1,381 (4)	1,213	1,023 [8]	-36	-3.0
Education professionals and related occupations	1,329 (5)	1,369	1,409 [6]	8	0.6
Driving and transport related occupations	1,264 (6)	1,364	1,433 [5]	17	1.3
Health, social welfare and religion related occupations	940 (7)	1,229	1,457 [4]	52	4.4
Clean and guard related elementary occupations	886 (8)	1,076	1,192 [7]	31	3.0
Engineering professionals and technical occupations	732 (9)	820	860 [9]	13	1.6
Household chores and cooking attendants and sales related elementary workers	683 (10)	698	699 [12]	2	0.2

Note : Numbers in parentheses and brackets refer to ranking in terms of employment size as of 2010 and 2020, respectively.



annual employment decrease of 3% (annual average of 36,000) and should record a relatively large drop from 1,381,000 in 2010 to 1,023,000 in 2020. As a result, this occupations group’s ranking in terms of employment size is expected to fall from fourth in 2010 to eighth in 2020.

In addition to the “agricultural, livestock related skilled occupations” occupations group, the “store sales occupations” and “cooking and food services occupations,” which are second and third, respectively, in terms of largest employment size as of 2010, are expected to see a gradual decrease in employment from 2011 to 2020. The decreases, however, are not expected to affect the groups’ occupational rankings.

By contrast, among the occupations expected to witness increased employment, the “health, social welfare and religion related occupations” group is expected to increase in employment size by an annual average of 4.4% (annual average of 52,000), reaching 1,457,000 in 2020 from 940,000 in 2010. Employment in the “clean and guard related elementary occupations” group is also expected to increase by an annual average of 3.0% (annual average of 31,000) during the same period, reaching 1,192,000 in 2020 from 886,000 in 2010. As a result of these increases, the rankings of “health, social welfare and religion related occupations” and “clean and guard related elementary occupations,” are expected to change from seventh and eighth in 2010, to fourth and seventh, respectively, in 2020.



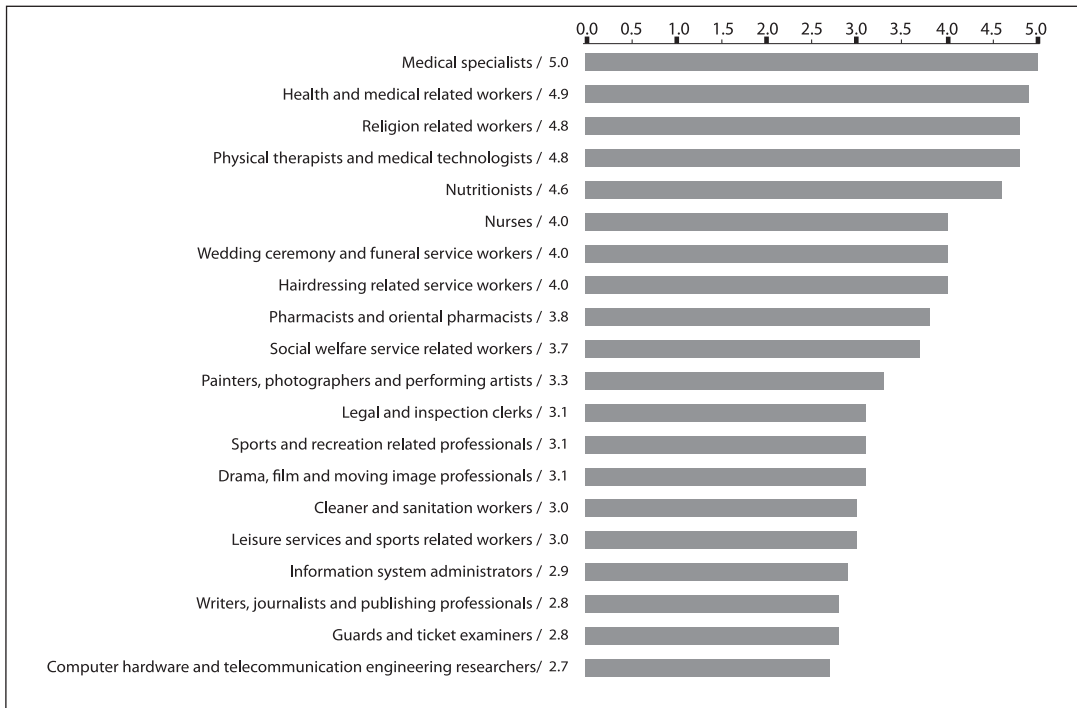
C. Employment Forecast by Minor Group(3-digit)

1) As of Employment Growth Rate

The minor groups (3-digit) in the occupational classification can be compared in terms of annual average employment growth rates. The 147 minor group occupations demonstrate a large divergence in terms of employment size. For example, among the minor group occupations, “environment and cleaning and protective service related managers” employs the smallest number, with only about 2,000 workers. On the other hand, the minor group occupation with the largest employment in 2010 was “store sales workers” with 1,830,000 workers. Therefore, for a meaningful comparison, it is necessary to limit the scope to occupations to a minimum employment size. Here, the changes in labor demand will be compared among occupations with an employment size of at least 20,000 as of 2010.

As of 2010, among occupations with at least 30,000 workers and excluding “other” occupations with uncertain occupational characteristics, the occupation expected to record the highest employment growth rate was “medical specialists,” which is expected to increase by an annual average of 5.0% during 2011 to 2020. “Health and medical related workers” (4.9%), “religion related workers” (4.8%), “physical therapists and medical technologists” (4.8%), “nutritionists” (4.1%) and “nurses” (4.0%) are also

[Figure 2–8] Top 20 Occupations in Annual Average Employment Growth Rate (Minor Group/3-Digit) (unit: %)



occupations that are expected to witness relatively high growth in employment, with annual averages of 4%.

Another nine occupations that range from “wedding ceremony and funeral service workers” (4.0%) to “cleaner and sanitation workers” (3.0%) are also expected to record annual average employment growth of 3% or more during the next 10 years.



Chapter 2

[Figure 2-9] Bottom 20 Occupations in terms of Annual Average Employment Growth Rate (Minor Group/3-Digit) (unit: %)

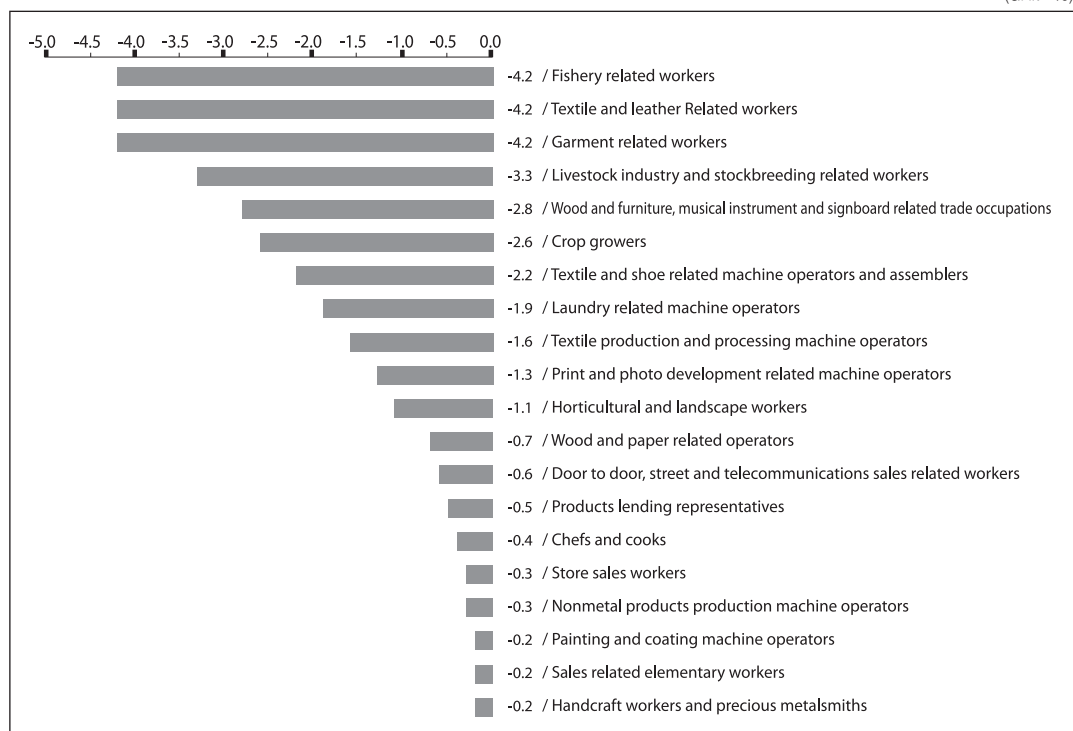


Figure 2-9 shows the bottom 20 minor groups in terms of the annual average employment growth rate. During 2011 to 2020, the occupation with the greatest employment decrease rate is expected to be “fishery related workers,” which is expected to witness an annual average employment decrease of 4.2% during 2011 to 2020. “Textile and leather related workers” (-4.4%), “garment related workers” (-4.4%) and “livestock

industry and stockbreeding related workers” are also expected to see annual average employment decreases of 3% or more.

2) As of Increase/decrease in Employment Size

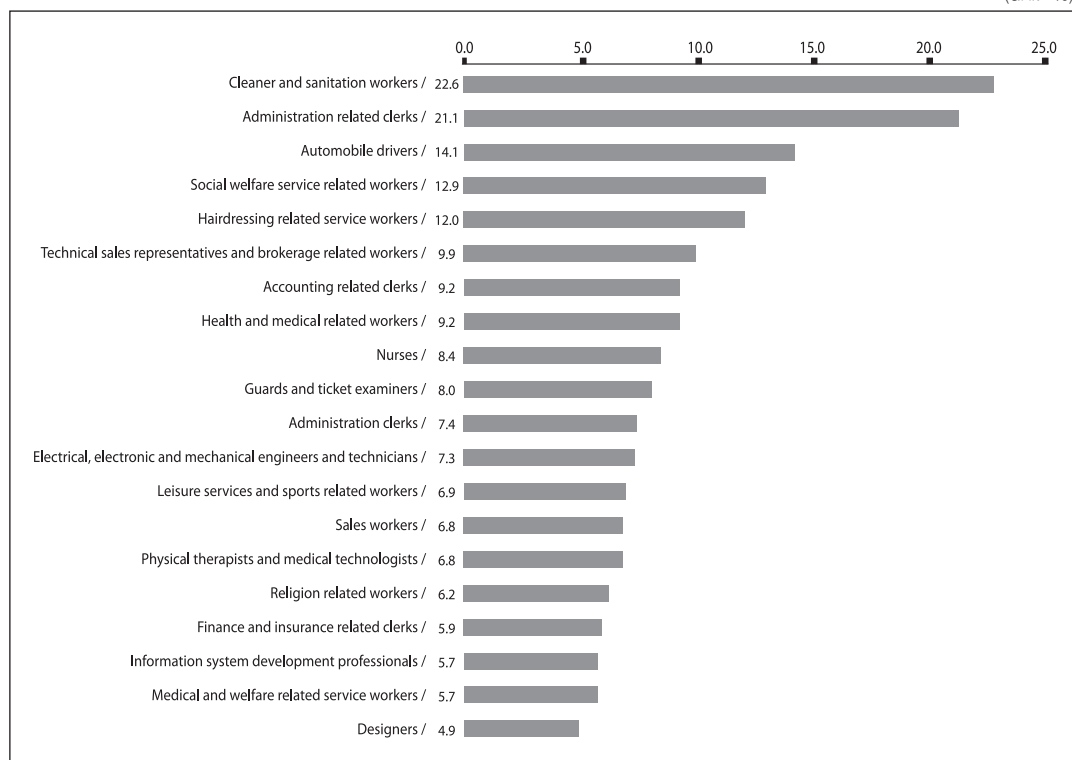
During 2011 to 2020, the occupation group that is expected to experience the largest increase in employment is “cleaner and sanitation workers,” which is expected to increase by an average of about 22,000 a year. “Administration related clerks” (annual average of 21,000), “automobile drivers” (14,000), “social welfare service related workers” (13,000) and “hairdressing related service workers” (12,000) are also expected to witness annual employment growth of at least 10,000 a year during the next 10 years.

The occupation expected to see the largest decrease in employment from 2011 to 2020 is “crop growers,” which is expected to decrease by an annual average of about 22,000 during this period. “Textile and leather related workers” (annual average of -7,000) and “store sales workers” (-6,000) are also occupations that are expected to experience relatively large decreases in employment.

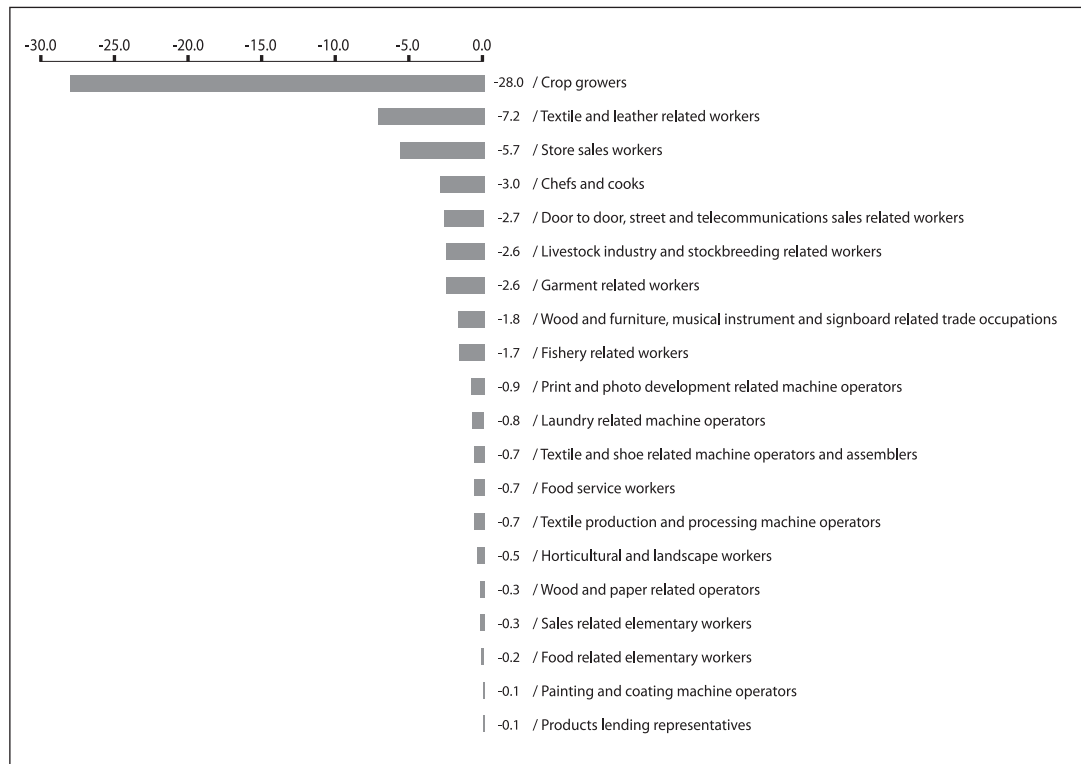


Chapter 2

[Figure 2-10] Top 20 Occupations in terms of Annual Average Employment Growth (Minor Group/3-Digit) (unit: %)



[Figure 2–11] Top 20 Occupations in terms of Annual Average Employment Decrease (Minor Group/3-Digit) (unit: %)



3) Occupational Forecast by Employment Size

The top 20 minor group occupations in terms of employment size as of 2010 were compared for employment size and employment size changes expected during 2011 to 2020. As of 2010, the top 20 minor group occupations had a total employment of 13,793,000 or about 57.9% of the total employment (23,829,000).



Chapter 2

As of 2010, the minor group occupation with the largest employment was “store sales workers” with 1,830,000. “Administration related clerks” (1,822,000), “crop growers” (1,241,000), “automobile drivers” (1,060,000), “chefs and cooks” (860,000) and “liberal arts, technical and arts instructors” (704,000) also had large worker pools.

According to the labor demand forecast by occupation, “store sales workers,” the occupation with the largest employment size, is expected to witness an average annual employment decrease of about 0.3% during 2011 to 2020 (annual average decrease of 5,700) to reach 1,773,000 in 2020. As a result, the ranking of “store sales workers” in 2020 in terms of employment size is expected to drop to second, in terms of largest occupation groups. The decrease in the “store sales workers” occupation appears to be due to factors such as an increase in internet commerce, consolidation and franchising of wholesale and retail trade and the resulting increase in bankruptcy and closing of smaller businesses.

As of 2010, among the minor group occupations with an employment size of 1,000,000 or more, employment in “administration related clerks” and “automobile drivers” is expected to increase by an annual average of 1.1% and 1.2%, respectively. On the other hand, employment as “crop growers” is expected to decrease significantly, reflecting the expected decline of the agricultural sector. Due to this anticipated decrease

[Table 2–14] Top 20 Occupations in terms of Employment Size (Minor Group/3–Digit)

(unit: 1,000, %)

Occupation	2010		2015		2020		Annual Average Increase/Decrease	Annual Average Growth Rate
Store sales workers	1,830	(1)	1,831	1,773	[2]	-5.7	-0.3	
Administration related clerks	1,822	(2)	1,928	2,033	[1]	21.1	1.1	
Crop growers	1,241	(3)	1,129	960	[4]	-28.0	-2.6	
Automobile drivers	1,060	(4)	1,142	1,201	[3]	14.1	1.2	
Chefs and cooks	860	(5)	853	830	[6]	-3.0	-0.4	
liberal arts, technical and arts instructors	704	(6)	720	740	[7]	3.5	0.5	
Food service workers	668	(7)	680	661	[10]	-0.7	-0.1	
Cleaner and sanitation workers	633	(8)	777	859	[5]	22.6	3.0	
Sales workers	629	(9)	670	697	[8]	6.8	1.0	
Accounting related clerks	591	(10)	648	683	[9]	9.2	1.4	
Production related elementary workers	563	(11)	573	564	[11]	0.1	0.0	
Technical sales representative and brokerage related workers	463	(12)	517	562	[12]	9.9	1.9	
Door to door, street, telecommunication sales related workers	449	(13)	438	422	[13]	-2.7	-0.6	
Teachers	394	(14)	405	418	[14]	2.4	0.6	
Food related elementary workers	339	(15)	340	337	[19]	-0.2	-0.1	
Administration clerks	329	(16)	382	403	[16]	7.4	2.0	
Finance and insurance related clerks	321	(17)	356	380	[17]	5.9	1.7	
Deliverers	303	(18)	309	317	[22]	1.5	0.5	
Construction finishing related technical workers	299	(19)	308	311	[24]	1.3	0.4	
Construction and mining elementary workers	296	(20)	312	314	[23]	1.8	0.6	

Note: Numbers in parentheses and brackets refer to ranking in terms of employment size as of 2010 and 2020, respectively.



Chapter 2

in the number of “crop growers,” the ranking of this occupation in terms of employment size is expected to drop from third in 2010 to fourth in 2020.

Other minor group occupations expected to witness a decrease in employment during 2011 to 2020 include “chefs and cooks” (annual average growth rate of -0.4%, -3,000), “food service related workers” (-0.1%, -700), “door to door, street and telecommunications sales related workers” (-0.6%, -2,700) and “food related elementary workers” (-0.1%, 200).

By contrast, occupations such as “cleaner and sanitation workers” (annual average growth rate of 3.0%, 22,600), “administration related clerks” (2.0%, 7,400), “technical sales representatives and brokerage related workers” (1.9%, 9,900) and “finance and insurance related clerks” (1.7%, 5,900) are expected to see large employment growth during the next 10 years.

4. New Entrant Supply–Demand Mismatch Forecast

A. Labor Force New Entrant Supply–Demand Mismatch Forecast by Educational Attainment

Until 2020, Korea’s new entrant labor market is expected to remain in a state of oversupply, i.e. an excess supply of entrants into the labor force outnumbers their demand. According to Table 2-15, during 2011 to 2020, there will be an oversupply of new entrants with a two-year college degree or higher by a total of 501,600, which is an annual average oversupply of 50,100. This translates to an excess supply ratio of 10.8%, which means that during the 10-year period ending in 2020, one out of every 10 people entering the labor market with a two-year college degree or higher education will fail to secure employment during the first year following graduation. It also means that such excess entrants would have to compete again against the following year’s new entrants for employment.

The excess supply ratio is particularly high among entrants with a two-year college education. During 2011 to 2020, a total of 219,800 graduates, or an annual average of 21,900, will become excess supply, resulting in an excess supply ratio of as much as 15.1%. Similar to those with two-year degrees, entrants with four years of college education are also expected to be in excess supply. The size of the excess supply for four-year university graduates is expected to be a total of 265,900 during 2011-2020,

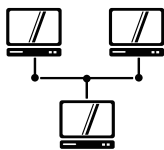
or an annual average of 26,500. This is equivalent to an excess supply rate of 11.4%, which is lower than that for entrants with two-year college degrees. New entrants with graduate school degrees are also expected to be in excess supply during the same period. However, the size of the oversupply (or the excess supply ratio) is considerably lower than those of two-year or four-year college graduates. The annual average excess supply of entrants with graduate school degrees is expected to be an annual average of 1,500 with an excess supply ratio of 1.8%.

〈Table 2-15〉 New Entrant Supply-Demand Mismatch Forecast by Educational Attainment (unit: 1,000 people, %)

	2011-2020						Excess Supply Ratio
	2011-2015		2016-2020				
Total	351.6	(100.0)	150.0	(100.0)	501.6	(100.0)	10.8
Two-year college	155.5	(44.2)	64.3	(42.9)	219.8	(43.8)	15.1
Four-year college	176.6	(50.2)	89.3	(59.5)	265.9	(53.0)	11.4
Graduate School	19.5	(5.6)	-3.6	-(2.4)	15.9	(3.2)	1.8

Note : 1) Excess supply ratio=excess supply/new supply.
 2) Numbers in parentheses refer to the percentage of the total

What trends do the new entrant supply-demand mismatch show during the forecast period? To analyze any change in the mismatch, the forecast period was divided into five-year blocks to compare the forecast results of the first half (2011-2015) with the second half (2016-2020). In conclusion, excess supply will continue during both the first



and second halves of the forecast period. However, the size of the excess is expected to greatly decrease over time. As shown in Table 2-15, the excess supply during the first half is expected to be 351,600, or an annual average of 70,300. The excess supply of the second half is 150,000 (annual average of 30,000), which is a more than 50% decrease when compared to the first half. Another way of looking at this trend is to note that 70.0% of the excess supply for the entire 2011 to 2020 period occurs during the first half (2011-2015) and only 30% appears during the second half. This change in the size of excess supply is also evident in the excess supply ratio. The excess supply ratio for entrants with two-year college or higher degrees is expected to be 14.9% during the first half but should decrease greatly to 6.5% during the second half of the forecast period.

Next, the new entrant supply-demand mismatch forecast by period can be compared in greater detail by disaggregating the results by education level. Although there is a difference in degree among different levels of educational attainment, overall, both the size and ratio of excess supply decrease greatly in the second half when compared to those of the first half. In particular, entrants with a graduate school education, who are expected to be in excess supply during the first half, are likely to be in short supply during the second half with demand exceeding supply. Accordingly, about 0.8% more entrants with graduate school degrees appear needed to satisfy the demand.



When the excess supply ratios of the first and second halves are compared across different levels of educational attainment, the excess supply ratio for entrants with two-year college degrees is expected to be as high as 20.1% during the first half. However, the excess supply ratio for this group is expected to drop to 9.4% in the second half, which is the largest decrease among all levels of educational attainment. The excess supply ratio for new entrants with four-year college degrees is expected to drop by about half from 15.1% in the first half to 7.6% in the second half. The excess supply ratio for new entrants with graduate school degrees is expected to drop from 4.7% in the first half to -0.8% in the second half. However, although entrants with two-year degrees are expected to record the greatest decrease in their excess supply ratio, this group will still continue to record excess supply ratios higher than that of new entrants with four-year college or graduate school degrees.

B. New Entrant Supply–Demand Mismatch by Field of Study or Major

The new entrant supply-demand mismatch forecast can be compared by different fields of study or major. In all seven fields of study or majors according to the major classification, an excess supply of new entrants is expected during 2011 to 2020. An excess supply is expected to exist in both the first half (2011-2015) and second half (2016-2020) of the forecast period.



<Table 2–16> New Entrant Supply–Demand Mismatch by Field of Study or Major (unit: 1,000, %)

	2011–2020						Excess Supply Ratio
	2011–2015		2016–2020				
Total	353.2	(100.0)	148.5	(100.0)	501.7	(100.0)	10.8
Humanities	44.1	(12.5)	5.2	(3.5)	49.3	(9.8)	11.7
Social Sciences	101.0	(28.6)	42.8	(28.8)	143.8	(28.7)	10.5
Education	26.8	(7.6)	22.0	(14.8)	48.8	(9.7)	12.9
Engineering	63.8	(18.1)	30.1	(20.2)	93.8	(18.7)	9.1
Natural Sciences	49.3	(14.0)	18.9	(12.7)	68.2	(13.6)	16.0
Medicine	25.2	(7.1)	8.0	(5.4)	33.2	(6.6)	7.2
Arts and Sports	43.0	(12.2)	21.6	(14.5)	64.5	(12.9)	11.2

Note : 1) Excess supply ratio=excess supply/new supply.
 2) Numbers in parentheses refer to the percentage of the total.

The excess supply appears to be greatest among social sciences majors. As shown in Table 2-16, a total of 143,800 (annual average of 14,300) in new entrants with social sciences majors will be in oversupply from 2011 to 2020, which is 28.7% of the total excess supply size. Although new entrants with social sciences majors account for a large part of the overall excess supply, this is mainly due to the large size of the new entrant supply. The excess supply ratio for social sciences majors is expected to be 10.5%, which is the lowest following medicine and engineering majors. The excess supply of engineering majors and natural sciences majors is expected to total 93,800 and 68,200, respectively. Just like the case for social sciences majors, new entrants with engineering majors are expected to record such a large excess supply mainly because



Chapter 2

of its large supply size. The excess supply ratio is 9.1%, which is lower than the total average. However, the excess supply ratio for natural sciences majors is expected to post a relatively high 16.0%. The excess supply of education majors is expected to reach about 48,800 (annual average of 4,800) during the same period, which is equivalent to an excess supply ratio of 12.9%. This represents the second highest ratio among majors following natural sciences majors. On the other hand, new entrants with medicine majors are expected to record the smallest excess supply with an annual average of 3,300 and the lowest excess supply ratio of 7.2%.

When the excess supply ratio by field of study or major is compared between the first and second halves of the forecast period, all seven majors are expected to experience a lower excess supply ratio in the second half compared to the first half even as the size and change patterns differ among fields of study. For example, the excess supply ratio for humanities majors, which is expected to reach as high as 19.9% during the first half, is expected to become 2.6% in the second half, as a result of a projected drop of about 17.3%. In addition, the excess supply ratio for natural sciences majors is also expected to fall by 13.8% from 22.7% to 9.0%. However, despite such significant decreases in the excess supply ratio in the second half, new entrants with natural sciences majors will still have the second highest excess supply ratio following new entrants with education majors in the second half of the forecast period, as well. New entrants with social

sciences, engineering, medicine or arts and sports majors are expected to see a drop in the excess supply ratio by about 6-8% in the second half. However, new entrants with education majors will experience the smallest drop, with a 3% change in the excess supply ratio between the first and second halves. As a result, this group is expected to have the highest excess supply ratio of 11.4% in the second half.

C. New Entrant Supply–Demand Mismatch Forecast by Occupation

Table 2-17 disaggregates the new entrant supply-demand mismatch forecast by occupation. According to this table, during 2010-2020, supply of entrants with two-year college or higher degrees is expected to be less than the demand in the case of management positions. The excess supply size and ratio are both considerable. An annual average of 1,700 additional managers would be necessary, which is equivalent to a -35.7% excess supply ratio. However, in all other occupations, excluding management positions, an excess supply is expected to be similar to the mismatch forecast by major. In particular, “skilled agricultural, forestry and fishery workers” show the highest expected excess supply rate of 64.0%, followed by “sales workers” with 30.0% and “equipment, machine operating and assembling workers” with 19.2%. By contrast, professionals are also expected to experience an excess supply. However, their excess supply ratio is

expected to be 7.2%, which is the lowest among occupations, except for management occupations.

〈Table 2-17〉 New Entrant Supply-Demand Mismatch Forecast by Occupation

(unit: 1,000, %)

	2011-2020						Excess Supply Ratio
	2011-2015		2016-2020				
Total	351.6	(100.0)	150.0	(100.0)	501.6	(100.0)	10.8
Managers	-5.0	(-1.4)	-12.8	(-8.5)	-17.8	(-3.5)	-35.7
Professionals and related workers	139.2	(39.6)	51.1	(34.0)	190.3	(37.9)	7.2
Clerks	110.6	(31.5)	51.6	(34.4)	162.2	(32.3)	13.8
Service workers	18.6	(5.3)	6.3	(4.2)	24.9	(5.0)	13.2
Sales workers	46.2	(13.1)	31.7	(21.1)	77.9	(15.5)	30.1
Skilled agriculture, forestry and fishery workers	4.3	(1.2)	4.4	(2.9)	8.6	(1.7)	64.0
Craft and related trades workers	13.1	(3.7)	4.7	(3.1)	17.8	(3.5)	14.5
Equipment, machine operating and assembling workers	15.3	(4.4)	8.3	(5.5)	23.6	(4.7)	19.2
Elementary workers	9.3	(2.6)	4.9	(3.3)	14.2	(2.8)	14.6

Note : 1) Excess supply ratio=excess supply/new supply.

2) Numbers in parentheses refer to the percentage of the total.

When the forecast by occupation is disaggregated by period, in all occupations except for “skilled agriculture, forestry and fishery workers,” the size of excess supply is expected to decrease in the second half (2016-2020) when compared to that of the



first half (2011-2015). In addition, when the change in each occupation’s share in the total excess supply is traced, the share of “professionals and related workers,” “service workers” and “craft and related trades workers” is expected to record a decreasing trend in the second half when compared to the first half. However, the share of “clerks,” “sales workers,” “skilled agricultural, forestry and fishery workers,” “equipment, machine operating and assembling workers” and “elementary workers” in the total excess supply is expected to show a rising trend.

When the excess supply ratio of the first half is compared to that of the second half, the excess supply ratio of most occupations is expected to be lower in the second half, except for “skilled agricultural, forestry and fishery workers,” whose excess supply ratio is expected to increase from 62.3% in the first half to an even higher 65.7% in the second half.

- Published in June, 2012
- Employment Market Forecasting Center
- Korea Employment Information Service
- 56, Mullaero 20-gil, Youngdeungpo-gu, Seoul, 150-093, Republic of Korea
- Tel : 82-2-2629-7371 , 82-2-2629-7350
- Fax : 82-2-2629-7399
- E-mail : bgwhite@keis.or.kr, kwh4130@keis.or.kr