

**Brain Drain and Economic Development  
in the Context of U.S.-Korea Alliance**

*Sunwoong Kim*  
*University of Wisconsin*

*Ju-Ho Lee*  
*Korea Development Institute, Korea*

**I. Introduction**

Most people would acknowledge that the military and economic alliance between the U.S. and South Korea (Korea hereafter) has played a very important role in shaping the modern history in Korea. Among other things, many have pointed out that Korea's savings in military spending in order to deal with the North Korean threat since the Korean War is one of the major benefits of the strong alliance, because the savings that should have been diverted to military expense could be invested for improved economic development.<sup>1</sup> Also, under this security arrangement, Korea has successfully implemented the strategy of export-as-an-engine-for-economic-growth by borrowing heavily from the international financial market. Without the U.S.'s security guarantee, international borrowing would have been much more costly. Another important aspect of the strong alliance is that the U.S. has been the major market for Korean exports for several decades.<sup>2</sup>

In explaining Korea's successful economic development experience since 1960, economists usually point to several reasons. The rapid expansion of production capacity through heavy investment in capital goods and social infrastructure, stable governments, high domestic savings rates, a disciplined Confucian work ethic, and well-timed government-led economic policies have been often cited as the major determinants of Korea's high growth rates.<sup>3</sup> However, the accumulation of Korea's human capital has been mostly ignored in discussions of Korea's successful economic development process. This article, focuses on the role of human resources, particularly highly trained professionals, which will be referred to as "brains" hereafter, in the economic development process from the perspective of the U.S.-Korea alliance.

## **II. Role of Human Resources in the Rapid Economic Development of Korea**

Many scholars date Chung-Hee Park's industrial policy of export promotion as the beginning of Korea's success story. However, one often overlooked fact is that when Park started to implement this policy, Korea was already prepared with quite substantial human resources as a result of more than a decade of intensive human capital investment by the previous administration. Immediately after independence, the Rhee administration pushed for universal primary school education under the guidance of American education planners.<sup>4</sup> Although seriously jeopardized by the outbreak of the Korean War, the successful post-war implementation of universal primary schooling increased the primary school enrollment from 1.37 million students in 1945 to 2.27 million in 1947 to 4.94 million in 1965. Despite substantial foreign aid provided by the U.S., Rhee's government failed to establish a peaceful and prosperous economy, mainly due to widespread corruption among its political elite. But, its legacy of expanding universal education paid off handsomely several years later. The number of teachers increased from 20,000 in 1945 to 79,000 in 1965. By 1965, the goal of universal primary school education had been more or less achieved, and the human resources for Park's export promotion policies were already in place.<sup>5</sup>

The second important aspect of human capital resources in that era was the availability of brains that assumed leadership roles in Korean economy. Most of these people received advanced degrees in the U.S. As the U.S. was heavily in the Korean War and the reconstruction efforts afterwards, many Korean brains went to the U.S. for advanced study. Although the Korean government did not pursue the systematic policy of "learning from the West" that the Meiji government of Japan adopted in the middle of the nineteenth century, substantial numbers of brains came to the U.S. to pursue further education and training by taking advantage of the patron-client relationship between the U.S. and Korea.<sup>6</sup> Also, a strong alliance between the two countries enabled many others to come to the U.S. with private funding after the war. In any case, by the early 1960s, there was a substantial number of U.S.-educated and trained brains that could be tapped by the government, universities and the private sector.

It has been widely recognized that the cooperation between

the government technocrats in the Korea Economic Planning Board, and the government-sponsored think tank, Korea Development Institute, successfully charted a roadmap of economic transformation to transform Korea from a poor, backward, agrarian economy to a productive industrial one.<sup>7</sup> Most of the intellectual group that led this initiative had been trained in the U.S., and had extensive contacts in the U.S. These American contacts also contributed to successful economic development planning.<sup>8</sup> And this successful cooperation by Korean technocrats and American experts has been a direct result of the strong U.S.-Korea alliance under the Park administration.

### **III. Influx of Korean Students to the U.S.: Brain Drain or Import of Graduate Education?**

Throughout the history of the Republic of Korea, domestic education opportunities have expanded. Compared to the dire condition immediately after independence, the current educational situation is nothing short of a miracle. In 1945, the enrollment rate for primary school was less than 60%, and less than 3% of college-aged children attended higher education establishments. As of 2003, schooling through grade 9 has become free and mandatory, high school (grades 10-12) is more-or-less universally attended with modest fees, and about 70% of high school graduates advance to higher education institutions. In terms of the number of college students to their age cohort, Korea ranked the first in the world in 2003.<sup>9</sup>

Unfortunately, the rapid expansion of educational opportunities in Korea has not been accompanied by quality improvements. Even though government's expenditure on primary and secondary schools has increased tremendously over the years, dissatisfaction over the high cost of private tutoring and fierce competition to enter universities have been a perennial social problems.<sup>10</sup> The lack of improvement in quality has been particularly evident in higher education which relies least on government funds. When the Park administration implemented the equalization policies that eliminated competitive student selection by primary and secondary schools in exchange for government subsidies, the Korean government had to increase its support for public funding for primary and secondary education substantially. As the government put more resources into primary and secondary

education, the higher education sector had to rely heavily on private finances. While competitive student selection procedures to primary and secondary schools have been eliminated, universities have maintained competitive entrance examinations. Because of the strong demand for higher education, Korean universities have no strong incentives to improve the quality of instruction in order to attract more students. Also, as its revenue relies heavily on students' tuition payments, the universities have been more interested in increasing the number of students. There is no strong incentive to invest in research activities that are costly and do not yield immediate return to the university. In short, the Korean higher education system is characterized by high levels of college attendance, private funding, low quality instruction, and fierce entrance examinations. At the same time, the primary and secondary schooling system can be characterized as mediocre, supplemented with costly but effective for-the-exam, private tutoring activities.<sup>11</sup>

In particular, the quality of graduate education in Korea has not improved very much over the last several decades. Since the 1960s, more and more faculty positions, particularly in science, engineering, and business disciplines are filled by returning students with foreign Ph.D.s, a majority of whom are from the U.S. Following their favorite professors' advice, the brightest students who aspire to obtain advanced degrees go abroad, and the U.S. has been the most popular destination. The strong U.S.-Korea economic and intellectual alliance helps to sustain this cycle.

Table 1 shows the dramatic increase in the number of Ph.D.s received by Korean students since 1975. Notice that most of this increase is due to the increase of students with temporary visas (student or exchange scholar visas). The bonanza of obtaining U.S. Ph.D.s culminated in 1993-94. In those years, more than 6% of the total Ph.D.s granted in U.S. institutions were awarded to Koreans. Since then, it has started to decline quite rapidly. In the year 2000, the number of science and engineering Ph.D.s received by Koreans has decreased by a third compared to the peak years.<sup>12</sup> Natural science and engineering disciplines traditionally had the largest share, and the share of social sciences has decreased substantially since 1985, while that of the humanities and professional studies has increased. It is quite clear that more and more students have been supported by personal means since 1985.<sup>13</sup>

**Table 1. Statistical Profiles of Korean Doctorates Received in the US.**

<b>Classification</b>	<b>1975</b>	<b>1980</b>	<b>1985</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>
<b>Total number of Ph.Ds earned</b>	<b>190</b>	<b>158</b>	<b>392</b>	<b>1,259</b>	<b>1,306</b>	<b>1,048</b>
<b>Natural Science and Engineering (%)</b>	<b>59.5</b>	<b>55.0</b>	<b>64.2</b>	<b>60.9</b>	<b>52.4</b>	<b>53.2</b>
<b>Social Science including Psychology (%)</b>	<b>21.6</b>	<b>28.5</b>	<b>18.7</b>	<b>16.9</b>	<b>24.6</b>	<b>18.0</b>
<b>Humanities, Education, and Professional (%)</b>	<b>18.9</b>	<b>16.5</b>	<b>17.1</b>	<b>22.2</b>	<b>23.0</b>	<b>28.8</b>
<b>Some personal financial support (%)</b>	<b>44.2</b>	<b>53.8</b>	<b>79.7</b>	<b>72.4</b>	<b>74.1</b>	<b>96.5</b>
<b>With permanent visa (%)</b>	<b>36.3</b>	<b>21.5</b>	<b>12.0</b>	<b>5.6</b>	<b>10.0</b>	<b>9.7</b>
<b>Intend to stay in the U.S.(%)</b>	<b>46.8</b>	<b>48.5</b>	<b>33.5</b>	<b>31.5</b>	<b>38.7</b>	<b>64.1</b>
<b>Firm Plans to Stay in the U.S. (%)</b>	<b>37.7</b>	<b>40.9</b>	<b>25.8</b>	<b>23.0</b>	<b>20.9</b>	<b>42.9</b>

Source: Jean M. Johnson, *Statistical Profiles of Foreign Doctoral Recipients in Science and Engineering: Plans to Stay in the United States*, NSF-99304, Arlington, VA: National Science Foundation, 1998. Year 2000 is from unpublished special tabulation. Note: Only for science and engineering (including social sciences).

Because of substantial living standard differences between the U.S. and Korea, there was a substantial brain drain during this period. Many bright Korean students who finished their advanced degree in the U.S. ended up settling down in the U.S. This phenomenon was particularly keen in the science and engineering fields, where scholarships for graduate students and employment opportunities for graduates were abundant. At the same time, quite

a few medical doctors migrated to the U.S. during the 1960s and 1970s after the Kennedy administration started to accept the immigration of foreign doctors. The brain drain of professionals from low income countries to high income countries has been widely observed in many countries.<sup>4</sup> According to a U.S. National Science Foundation report, 63% of foreign-born students who earned science and engineering doctorates from U.S. institutions between 1988 and 1996 said they planned to locate in the U.S. Two-thirds of those who planned to stay had firm plans for further study or employment.<sup>15</sup> The number was substantially lower for Koreans: among the science and engineering doctoral recipients during the period of 1988-96, about a third wanted to stay in the U.S., and about two thirds of them had firm plans to stay (see Figure 1).

**Figure 1. Plans of Korean Science and Engineering Doctoral Recipients at Degree Conferral: 1988-1996**

<b>Permanent visa</b> 8.1%			<b>Firm plan to stay in the U.S.</b> 63%	<b>Post-doc</b> 47.1%
<b>Non-permanent visa</b> 91.9%				<b>Employment</b> 15.6%
				<b>Post-doc</b> 23.5%
				<b>Employment</b> 12.6%
<b>Total number of Ph.D.s</b> 8,851	<b>Plans to stay in the U.S.</b> 36.1%	<b>Seeking to stay in the U.S.</b> 37%	<b>No plans to stay in the U.S.</b> 63.9%	

Source: Jean M. Johnson, *op. cit.*

In the case of Korea, the concern over the brain drain turned out to be brain savings to some extent. As economic opportunities for Korean talents, particularly in business and engineering, expanded in Korea during the 1980s and 1990s, a substantial number of those who settled in the U.S. returned to Korea. Even if they did not return to the U.S. permanently, many served as resource persons in academia and industry, when such

Korean organizations sought occasional help for technical expertise.

Until the early 1990s, despite a large gap in earning potential between the U.S. and Korea, many U.S.-educated brains gladly chose a career in Korea because the jobs there tended to be higher in status with more responsibility. Korean jobs also tended to be more stressful and with longer hours, but they could be more fulfilling as they came with more responsibility. Between 1965 and 1995, the Korean economy grew rapidly, and there was a strong demand for such brains in leadership positions. Most of the U.S. educated brains were able to take up such positions.

Therefore, it is safe to conclude that until the mid-1990s, Korea did relatively well in minimizing the brain drain. Compared to other Asian countries such as China and India, the percentage of brains who intended to stay in the U.S. was substantially lower. In this regard, the large influx of Korean students during this period can be regarded as an effective mechanism for training high level human resources without much domestic investment, and the strong alliance between the U.S. and Korea was one of the most important determinants of this success story.

#### **IV. Role of U.S.-Educated Ph.D.s in Korea**

Currently in Korea, the U.S. educated Ph.D.s are the major component of high level human resources. In 1999, 40.1 percent of full time faculty in Korean universities had earned Ph.D.s from abroad, with 67.2% of them from the U.S.<sup>16</sup> This ratio would undoubtedly be higher among younger faculty members. Among the 22,133 foreign doctoral recipients registered in the Korea Research Foundation in 2001, 12,824 (about 58%) had received their degrees from the U.S. In the top ranking research universities, such as Seoul National University, Yonsei University, Korea University, Korea Advanced Institute of Science and Technology (KAIST), and Pohang University of Science and Technology (POSTECH), most faculty had received their Ph.D.s from major U.S. universities.

Most university students in the 1970s and 1980s recognized the high rewards for U.S. Ph.D.s. Consequently, much talent came to the U.S. for higher degrees, and a majority returned to Korea. However, the process could not be sustained in the long run. In the Korean labor market, an advanced degree has been regarded as more of a credential, and the credential has been more important

than the performance of an individual worker in determining the labor market outcome. For example, professors are granted de facto tenure when they are hired, and the determination of salaries and promotions is hardly affected by individual performances after the hire. Even in private firms, loyalty and the length of the job tenure are regarded as more important in determining the fate of the worker. However, as enrollment in higher education in Korea increased dramatically and foreign Ph.D.s grew dramatically, the return to college and post-graduate education started to decrease substantially.<sup>17</sup> The Korean system, relying that on credentials rather than competitive pressure for resource allocation, created an increasing excess supply of talents and wasteful rent-seeking activities over time.

**Table 2. Doctoral Degrees awarded in Korea**

Year	Number of Ph.D.s	Ratio (%)*
1970	407	n.a.
1975	994	19.1
1980	528	29.9
1985	1,400	28.0
1990	2,747	45.8
1995	4,469	29.5
2000	6,558	13.9
2002	7,623	n.a

Source: Number of Ph.D.s - Korea Ministry of Education and Human Resources, *Education Statistics Yearbook*, various years.

Ratio of U.S. Ph.D.s to Korean Ph.D.s in percent is calculated by authors, n.a.: not available

During the late 1980s and early 1990s, it became evident that the job prospect for U.S.-educated Ph.D.s had dimmed as the number of U.S.-educated Ph.D.s grew rapidly. More graduate students then wanted to stay in Korea for their Ph.D. in order not to



lose contact with the professors who could be helpful in securing teaching positions. Also, the quality of faculty and graduate education in Korea improved substantially, thanks to the quality of the new faculty and the establishment of graduate and research-oriented universities. Consequently, the relative attractiveness of pursuing a Ph.D. in Korea increased substantially over time. At the same time, the Korean government provided military service exemptions to those pursuing graduate education in Korea. Because of all these factors, the number of graduate students and Ph.D.s awarded in Korea rose rapidly after 1985. As shown in Table 2, the number of Ph.D.s awarded in Korea was only about 400 in 1970. In 2002, the number of Ph.D.s awarded in Korea was 7,623, quite high compared to other nations. The last column in the Table is the ratio of number of Ph.D.s awarded in the U.S. to the number of Ph.D.s awarded in Korea for that year. Between 1975 and 1990, the ratio has increased rapidly, but decreased suddenly after 1990, reflecting both the desire of graduate students to pursue Ph.D.s in Korea and the rise and fall of the popularity of the U.S. Ph.D.s.

The glut of Ph.D.s produced domestically and abroad has made the job market for Ph.D.s extremely tight. It has been reported that one third of the Ph.D.s do not have meaningful employment, and the situation is likely to become worse. A peculiar trap for this excess supply Ph.D.s is the under-employed "part-time instructor". Most Korean universities, particularly private universities under strong incentives to reduce expenditures for teaching personnel, have relied heavily on cheap part-time instructors.<sup>1</sup> The number of part-time instructors in 2003 is estimated at more than 50,000, and is more than the number of full time instructors. After investing so many years earning their Ph.D.s, part-time instructors struggle with low earnings for many years, hoping eventually to secure full time teaching positions.<sup>19</sup> Because of the slow turnover of the regular professorial positions and the sluggish expansion of new positions, the wait becomes longer every year.

Although there have been examples of world class research universities (e.g., KAIST and POSTECH), most of the Ph.D. programs in Korean universities remain weak. As Korea enters into a more knowledge-based economy, the role of research and development becomes more important. Consequently, there has been a rising concern related to the quality of university education

in Korea. For example, Korea ranks almost at the bottom of all major countries ranked by the IMD criteria as to whether the university system meets the needs of a competitive economy.<sup>20</sup> However, it is fair to say that the effort to upgrade Korea's higher education system emphasizing the supply side has not been very successful, while the labor demand for brain in Korean economy has not grown substantially.

#### **V. Increasing Supply and Decreasing Demand of Talents in Korea: Large Scale Brain Drain?**

According to a recent study done by the Korea Trade Association, the number of Korean students seeking degrees or language training abroad is about 350,000. The amount they spent in one year has been estimated at about 4.6 billion U.S. dollars, which is about a quarter of the budget of the Korea Ministry of Education and Human Resources.<sup>21</sup> There has been a steep increase in these numbers. Currently, there are about 150,000 Korean students enrolled in higher learning institutions abroad. Out of these students, about 60,000 (40%) are in the U.S. Other popular destinations are other English speaking countries, such as Canada and Australia, which take an additional 30,000 students.

In 2002, there were about 500,000 foreign students in U.S. higher education institutions.<sup>22</sup> Korea ranks third in total numbers, following China and India. Roughly speaking, Korean students make up about 10% of the total of foreign students in the U.S. Since India and China have much bigger populations than Korea, Korea's presence in American universities is quite substantial. With the educational opportunity in Korea improving substantially, why are so many Korean students choosing to study in the U.S. and other countries? As this article indicates, the answer is primarily related to job market conditions in Korea.

Since the late 1980s, the composition of students going abroad to study has changed substantially. Instead of graduate students, more and more undergraduate students have gone to the U.S. The phenomenon has been driven by the following factors. One is that rising incomes have enabled middle class students without any outside scholarship to attend foreign universities. The second factor is that the emerging global economy in Korea has awarded additional benefits to job applicants with better foreign language skills (particularly English). Many college students have

taken a semester or even a year off, and headed for study abroad to sharpen their language skills. The third reason is that the search for exchange at the secondary school level has been compromised by the goal of equality in education.

Besides the brain drain that started in the 1970s, (i.e., Korean nationals who receive advanced degrees in the U.S. staying in the States), there are new trends of even more extensive brain drains out of Korea. Many professionals who returned to Korea in earlier years, have migrated back (return-return-migration) to the U.S. for various reasons (unsuccessful career development in Korea, family problems such as difficulties in raising children, and so on). However, the current economic difficulty in Korea, rising nationalism (and anti-Americanism), and security uncertainty created by the North Korean nuclear weapons program are also major contributing factors to this return. Moreover, more and more talented Koreans who are already out of Korea wish to stay out of Korea.<sup>23</sup> The earlier wisdom that they can lead more fulfilling professional careers in Korea is no longer accepted. As the senior positions in Korean government, university teaching positions, and private sectors for expatriates has shrunk, the prospects for such jobs in Korea has also.

The shifting paradigm of personnel policies since the financial crisis of 1997-98 has contributed to a new brain drain. Many Korean professionals have started to view jobs in Korea as no longer life-time employment. Most mid-career workers have begun to think that, unless they upgrade themselves continuously, they face the danger of losing their jobs. For career development purposes, therefore, many young professionals have viewed American and other foreign jobs that have emphasized individual performance and improvement as more suitable than Korean jobs that have emphasized organizational harmony and loyalty.<sup>24</sup> There has been an additional social consideration for younger workers. Unlike their older colleagues who grew up in tougher economic situations, the new generation has enjoyed more comfortable material lives, and has tended to be more individualistic and value quality of family life over a more fulfilling career. Many of these people have viewed the high pressure of working conditions in Korea less favorably than the American situations.

At the same time, the number of primary and secondary school students who have gone abroad to study has grown rapidly.

The number in 2001 was estimated at about 16,000. Most of these students have been children of upper-middle- and upper- income households with strong ties to foreign countries, such as professionals who had studied in the U.S. earlier, or cultivated business affiliations abroad. Quite often, the burden of private tutoring, the pressure of college entrance examinations, and the poor quality of schools in Korea have been cited as the major reasons for study abroad. It is likely that the students who have left Korea at a young age will be more likely to work and stay abroad in the future.

#### **VI. Exit or Voice? The Choice of the Korean Brains**

One may wonder why the anti-U.S. sentiment, particularly among young people, is growing in Korea while the number of Koreans who come to the U.S. to study is also growing more rapidly than ever. Common expectations, as expressed by U.S. State Department officials are that the more foreign students experience American culture, the more favorable their impressions will be towards the U.S. Several factors would seem to contribute to this phenomenon. Some are directly related to American foreign policy toward the two Koreas, while others are purely domestic in nature. First, the young generation has not experienced the uncertainties of the Korean War. Consequently, their security concerns about North Korea are much weaker than that of older generation. Also, the young people have grown up in a more affluent environment in which Korea is portrayed as a sizable factor in the international arena (member of OECD, successful sponsor for international events such as Olympic Games and World Cup, and so on). In this regard, young people would like to assert their national pride, and the assertion is sometimes expressed as more independence from the U.S. in various areas, including military, political, diplomatic, economic, and social spheres.

Second, the political coalition that successfully elected President Rho was based on resistance to people in power including big corporations, conservative opinion leaders in the mass media, universities, and government bureaucracies. Because the democratization of Korean politics put these forces into the main stream, the movements are beginning to be considered as a force for political freedom for oppressed minorities. As the Rho government is reluctant to discourage its political supporters, these opinions (e.g., anti-U.S. slogans) expressed in mass rallies have been

accepted as the major opinion.

Third, the North Korean government has successfully played an important role in driving a wedge between the nationalistic movement sponsored by Rho government and anti-North Korean political forces. For years, North Korea openly criticized the Grand National Party and the conservative media (Chosun Daily Newspaper in particular) as U.S. puppets and a betrayer of the Korean people against unification. A recent example is that the anti-North Korea rally by conservative civic organizations that included the burning of the North Korean flag and Kim Jong H's portrait caused the North Korean team not to attend the 22<sup>nd</sup> Universiade Games in Daegu. However, North Korea reversed its decision after President Rho expressed regret about the incident. Though it is not clear how divided younger generations are dealing with North Korea, people with strong nationalist sentiments are clearly more vocal under the current administration.

Fourth, the wave of strong labor activities and North Korea's nuclear threat have been major stumbling blocks to foreign investment in Korea. Despite strong efforts to promote foreign investments by the Kim Dae Jung and Rho Moo Hyun governments, the current political and economic environment is regarded as not hospitable to active direct foreign investment. The lack of growth in employment in the midst of the continuing supply of college graduates in Korea has created a tight job market for college graduates and young professionals. Recent college graduates have been frustrated by this tight job market, as the dream of social mobility and secure jobs through more education have not been realized. With newly found national pride in the young generation, this frustration is often directed at the U.S.

The inability to create jobs, particularly high paying professional jobs, is the major weakness of the current Korean economy. For the last three decades of economic growth, the Korean economy has relied on the manufacturing sector. Although several manufacturing industries, including ship building, automobile, and electronics, are strong in Korea, the manufacturing sector in general is not likely to create a great number of jobs. Moreover, there is a serious mismatch between current job openings and the emerging labor force. Although labor shortages and high wages are reported in manufacturing and blue collar jobs, college-

educated workers are not willing to take such jobs. This tendency is likely to continue in the future.

Given this serious mismatch between the demand and supply of labor, it seems that a stronger U.S.-Korea alliance could create more professional jobs in Korea. Currently, almost one-half of employment opportunities in Korea are in the informal sector. Although most of these informal sector jobs are in services, they tend to be low-paying-low-productivity-dead-end jobs. As the Korean economy matures, it is quite likely that professional service sector jobs could be the engine of economic growth of Korea in the coming decades.

A common response to the ineffective education system and tight professional job market is that talented younger brains are leaving Korea. They are typically children of upper class and middle class parents with professional jobs. Many of them are educated in the U.S., and some were born as American citizens. In the case of males, most took advantage of the exemption of mandatory Korean military service. More and more resources are being devoted to educating these children, and unless the U.S.-Korea alliance becomes stronger, they are unlikely to return to Korea for meaningful careers. In this regard, this brain drain will likely be permanent.

In our view, the effect of the eroding U.S.-Korea alliance on bi-lateral trade will not be very significant as long as both parties have something to gain by the trade. Even if trade sanctions are imposed for political reasons, they will likely be removed quickly, as the competing political party or the interest groups losing because of the sanctions will vigorously oppose them. Even with the ardent anti-U.S. sentiment, Korea will continue to import American aircraft and food, while the U.S. will import cell phones and semi-conductors from Korea. However, an eroding alliance will deter direct U.S. investment in Korea, which is vital to job creation in the professional service sector and to the transfer of competitive management skills and technologies. Moreover, it will increase the brain drain from Korea to the U.S., resulting in the reduction of the growth potential in the future Korean economy. It is ironic that the younger generation which has been most vocal against the U.S. in recent years will be the biggest victim of the eroding U.S.-Korea alliance.

## Notes

1. In 2003, Korea spends less than 3% of GDP for military purposes, whereas North Korea is estimated to spend about 25% of its GDP in the same category. Although the short run economic impact of defense spending is controversial, the heavy burden on military spending surely has a negative effect on long term economic growth. See Addur Chowdhury, "A Causal Analysis of Defense Spending and Economic Growth," *Journal of Conflict Resolution* 35, 80-97; Saadet Deger, "Human Resources, Government Education Expenditure, and the Military Burden in Less Developed Countries," *Journal of Developing Areas* 20, 37-48; Emil Benoit, *Defense and Economic Growth in Developing Countries*, Lexington, MA: Lexington Books, 1973; and James E. Payne and Sahu P. Anandi, *Defense Spending and Economic Growth*, Boulder, CO: Westview Press, 1993.
2. U.S. has been the number one trading partner for the Korean economy until 1999 (IMF, *Direction of Trade Statistics*, various years).
3. See, for example, Alice H. Amsden, *Asia's Next Giant: South Korea and Late Industrialization*, New York: Oxford University Press, 1989; or Byung-Nak Song, *The Rise of the Korean Economy*, New York, NY: Oxford University Press, 1997.
4. Noel F. McGinn, et al., *Education and Development in Korea*, Cambridge, MA: Harvard University Press, 1980.
5. See Korean Ministry of Education, *50 Years of Education History* (in Korean), 1998, for detailed descriptions of Korean education policies.
6. For example, a substantial number of brains came to the U.S. under the auspicious of Fulbright Scholarship Programs, East-West Center Fellowship Programs, Minnesota-Seoul National University Exchange Scholars Program, Ford Foundation, U.S. International Cooperation Administration, and so on.
7. For a critical evaluation of recent roles of U.S. trained Korean economists in the economic policy makings, see Alice H. Amsden, "The Specter of Anglo-Saxonization is Haunting South Korea," in *Korea's Political Economy: An Institutional Perspective*, edited by Lee-Jay Cho and Yoon-Hyun Kim, Boulder, CO: Westview Press, 1994.
8. In Yung Chung, *Economic Brains in the Hongnung Forest* (in Korean), Seoul: KDI Press, 2002.
9. Sunwoong Kim and Ju-Ho Lee, "Changing Facets of Higher Education in Korea: Market Competition and the Role of the State," paper presented in the Workshop on Upgrading Korean Education in the Age of Knowledge Economy: Context and Issues, sponsored by Korea Development Institute and the World Bank, October 16- 17, 2002, Seoul, Korea.
10. For more detailed information on current problems and issues, consult Se-U Park, et al., editors, *Transition of Primary and Secondary Education in Korea: Enhancing Autonomy and Accountability* (in Korean), Seoul: Korea Development Institute, 2002.

11. Ju-Ho Lee and Sunwoong Kim, "Economic Analysis of School Policy and Private Tutoring (in Korean)," *Economic Analysis of Korean Economy* (in Korean) 2(2), 2002.
12. Susan T. Hill, *Science and Engineering Doctorate Awards: 2000*, NSF 01-314, Arlington, VA: N.S.F., 2001.
13. These figures include any partial support by the University or the government.
14. See Vinod B. Agarwal, "Immigration of Engineers, Scientists, and Physician and the U.S. High Technology Renaissance - A comment," *Social Science Quarterly* 1| (1), 196-98.
15. Jean M. Johnson, *Statistical Profiles of Foreign Doctoral Recipients in Science and Engineering: Plans to Stay in the United States*, NSF-99304, Arlington, VA: National Science Foundation, 1998.
16. Korean Council for University Education Council, *University Education* (in Korean), Jan-Feb, 2000.
17. Kang-Shik Choi, "The Impact of Shifts in Supply of College Graduates: Repercussion of Educational Reform in Korea," *Economics of Education Review* 15, 1996, 1-9.
18. Most "part-time" instructors do not have other meaningful occupations, but teach several courses, sometimes in several schools simultaneously.
19. The plight of part-time instructors has been intensified by the suicide of a long time part-time instructor at Seoul National University in June 2003. There has been an effort to organize a labor union for part-time instructors recently. For more information, visit [www.kangno.com](http://www.kangno.com).
20. IMD, *World Competitiveness Yearbook - 2003*.
21. Hankyoreh Daily Newspaper, [www.hani.co.kr](http://www.hani.co.kr). February 19, 2003.
22. For more information, visit U.S. National Center for Education Statistics, [www.nces.ed.gov](http://www.nces.ed.gov).
23. Similar concern was expressed by the Germans, who contribute the largest number of post-docs to the U.S. in Europe. See Center for Research on Innovation and Society, *German Scientists in the United States: Challenges for Higher Education and Science Policies*, 2001, German Federal Ministry of Education and Research.
24. On the other hand, the breakdown, of the long-term employment system of major private companies also increased the demand for U.S. educated Koreans for their mid-manager or manager positions. In particular, those who obtained MBAs in the U.S. have been in high demands from Korean private companies after the financial crisis.