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Industrial Policy and Economic Development: Korea's Experience

Jai S. Mah

The Korean economy has recorded rapid economic growth rates for the past four decades with the exception of the economic crisis in the late 1990s. As a result, per capita gross national product (GNP) increased from less than US\$100 in 1960 to more than US\$14,000 in 2004. The period of rapid economic growth was accompanied by active industrial policy by the government, especially in the early phase of economic development. According to Westphal (1990, 41) for instance, "Korea's government has selectively intervened to affect the allocation of resources among industrial activities." The government provided direct subsidies including fiscal and financial incentives as well as indirect support like the provision of infrastructure, to promote certain selected industries. The share of manufacturing output by heavy and chemical industries (HCI), which were promoted by the government especially in the 1970s, increased from 23 percent in 1960 to 54 percent in 1980 and to 79 percent in 2002.

Although the Korean government provided various kinds of taxation and financial incentives during this period, the current World Trade Organization (WTO) system regulates or even prohibits most governmental provisions or incentives to promote specific industries. Therefore, many of the promotional measures taken by the Korean government during the rapid economic growth period, cannot be used by developing countries now. This paper explains policy measures taken by the Korean government to promote certain industries during its economic development process, analyzes the strengths and weaknesses of Korea's industrial policy, and provides developing countries with implications for their economic development under the World Trade Organization's (WTO) system drawn from Korea's experiences with industrial policy.

The paper is structured so that the following section explains the tendencies of Korea's industrial policy since the 1960s. This is followed by a section describing

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incentives provided by the Korean government to promote certain industries. The fourth section evaluates the industrial policy in the sense of the appropriateness of governmental intervention and provides developing countries with implications based on Korea's experience. Conclusions are provided in the final section.

Evolution of the Industrial Policy of Korea

In the early 1960s, Korea's industrial policy was characterized by import substitution policy emphasizing the production of consumption goods. The Ministry of Commerce and Industry (MCI) regulated imports using the discretionary import licensing system. To relieve the shortage of foreign exchange and technologies, private companies tried to borrow from abroad; this was strictly controlled by the government. The Government Debt Guarantee Act promulgated in July 1962, guaranteed the private companies' debts borrowed from abroad (Oh 1996, Vol. 1). The MCI chose fertilizer, PVC, cement, and petroleum refineries as the main industries to develop in the early phase of economic development and constructed industrial estates equipped with the appropriate infrastructure. The government established the first integrated steel mill in Korea - Pohang Iron and Steel Company, Ltd. (POSCO), in the late 1960s - which became one of the best-performing steel companies in the world a few decades later.

Korea's industrial policy went hand in hand with export promotion policies especially from the 1960s through the early 1980s. Export promotion policies began to be pursued in 1964 with the slogan "Export Number One." The government increased the direct subsidy to export and emphasis was placed on exporting products produced by labor intensive Light Industries (LI) such as textiles and clothing, where the Korean economy had a comparative advantage (Oh 1996, Vol. 1; and Lee, Kim, and Han 1989). In the mid-1960s, various export promotion measures such as tax deductions and export finance schemes were introduced.

In addition to the various taxation and financial measures used to promote exports in the 1960s and to provide the infrastructure necessary for economic development, the government developed sites for industrial complexes and provided them inexpensively to firms entering the complex (Lee 1995). The government also established institutions relating to the promotion of exports - the Korea Trade and Investment Corporation (KOTRA), and the Korea International Trade Association (KITA). KOTRA supports international marketing and technology imports and KITA promotes exports by maintaining training programs, research activities, exhibitions and developing foreign markets. The government also expressed the desire to export; for example, since 1965 it has conducted monthly Export Promotion Meetings attended by the President; high ranking government officials, including the MCI; and leaders of the private sector. The MCI awarded commendation letters to firms showing good export performances on the Day of International Trade.

In the 1970s, the main focus of the industrial policy of Korea shifted from LI to the build-up of high value-added HCI. Rising wage levels that tended to undermine the price competitiveness of labor intensive LI, forced the government to

abandon it as the engine of growth. The HCI Promotion Plan was devised in 1971 and the President formally declared the HCI Drive in 1973 (Oh 1996, Vol. 4). The National Investment Fund (NIF) was established in 1974 to support the HCI Promotion Plan. The government chose six strategic industries – steel, shipbuilding, machinery, electronics, non-steel metal, petroleum and chemical industries – based on criteria such as forward and backward linkages, contribution to economic growth and foreign exchange earnings. The HCI promotion policies consisted of preferential policy loans, selective protection, entry regulations, and corporate tax deductions. The HCI sector grew rapidly with the promotion program and its share of the manufacturing sector as a whole increased from 39 percent in 1970 to 54 percent in 1980. Many products produced in the HCI sector were exported. As shown in Table 1, the rapid economic growth of Korea in the 1960s and 1970s was accompanied by an increase in export growth.

Table 1. Economic Growth, Exports and Exports/GDP in Korea

Years	Real GDP Growth Rate (%)	Export Value (US\$ billion)	Exports/GDP (%)
1962-1966	8.0	1	7.7
1967-1971	9.7	3	13.7
1972-1976	8.0	22	27.8
1977-1981	6.2	77	31.5
1982-1986	8.7	141	34.4
1987-1991	9.4	307	32.1
1992-1996	7.3	510	28.7
1997-2001	3.9	734	40.6
2002-2004	4.9	610	40.4

Source: IMF, *International Financial Statistics Yearbook 2003* and the Bank of Korea, *Economic Statistics Yearbook 2005* (in Korean)

As a result of excessive HCI promotion policies, the capacity utilization ratio of the HCI declined substantially in the late 1970s and early 1980s resulting in the real GDP (gross domestic product) growth rate dropping to a negative value in 1980. Therefore, the government took HCI Rationalization Measures from 1979 to 1981, which included the postponement or withholding of capacity expansion schedules with respect to diesel engines, tires, machinery, and shipbuilding (Lee, Kim, and Han 1989). The direction of industrial policy changed again in the first half of the 1980s. That is, in 1981, the government began to emphasize the importance of

research and development (R&D) in economic development. It reflected policymakers' recognition that it was necessary for the Korean economy to overcome the stage of imitating techniques developed by advanced countries. In this context, the government chose several strategic sectors which appeared to be important with respect to R&D and were expected to guarantee long term economic growth: semiconductors, automotives, shipbuilding, metal, and small-sized aircrafts. The government, in pursuing the fifth Five-Year Economic Development Plan for 1982 to 1986, also promised to continue the export-led growth strategy.

Since 1983, Korea's industrial policy shifted away from sector-oriented support such as the HCI Drive toward function-oriented support for R&D (Lee, Kim, and Han 1989). Policy changes were formalized by the Industrial Development Law approved in December 1985. Despite governmental efforts to strengthen the market mechanism, it still provided loans at preferential rates to large conglomerates heavily involved in shipbuilding and machinery, among others (Cho and Kim 1997). The government established the Five-Year Plan for Development of Cutting-Edge Industries in 1989 and was determined to support them by providing funding and investments in projects relating to cutting-edge industries. Beginning in 1995, various measures were introduced to promote Information Technology (IT) industries, where the share of R&D expenditures to total manufacturing costs – 2.03 percent as of 1995 – has been the highest among various manufacturing industries (Kang *et al.* 1998 and Kim *et al.* 1998, 110).

Considering the increasing importance of capital goods, the government decided to promote them in the late 1990s. Therefore, in 1995, the Capital Goods Industries Promotion Plan was announced, which was expected to promote the high value-added capital goods industries by supporting the development of new products and establishing them as the main export industries. Emphasis has also been placed on the development of small and medium enterprises (SMEs). Efforts to raise the technological capability to Organization for Economic Co-operation and Development (OECD) levels have included the enactment of the Special Law on Innovation of Science and Technology in 1997 and the formation of the Five-Year Plan for Science and Technology Innovation for the period 1997-2001 (WTO 2000, Ch. 3, para. 137). Governmental support of R&D expenditures was concentrated on the IT industry during the 1990s. Under the leadership of then President Kim Dae Jung, the share of governmental R&D expenditures on the IT industry increased to 42 percent of the total in 1998 (Korea Information Strategy Development Institute (KISDI) 2003).

Since 1998, the government has emphasized building a knowledge-based society and has chosen six technologies as promising next-generation technologies to promote, including IT and Biotechnology, among others.¹ Most of these have been granted tax benefits. Due to the emphasis on R&D, the ratio of R&D expenditures to sales in the manufacturing sector increased from 1.28 percent in 1997 to 1.56 percent in 2003 (Bank of Korea 2004). As of 2005, the Korean government continues to target the science and technology-based society and wishes to promote the IT industry further.

Table 2 shows that governmental expenditures on R&D increased from 180 billion won in 1980 to 651 billion won in 1990. It has also increased substantially since 1990; e.g. 3,452 billion won in 2000 to 5,268 billion won in 2003. In the meantime, private firms' expenditures on R&D have increased by leaps and bounds, from 103 billion won in 1980 to 2,699 billion won in 1990. Consequently, in the 1980s, despite the increase in governmental expenditures on R&D, its share of total R&D expenditures in Korea decreased significantly from 63.7 percent in 1980 to 19.4 percent in 1990. Since the 1990s, the ratio has increased gradually to 25.6 percent in 2003, reflecting the government's increased emphasis on R&D.

Governmental support of R&D activities gave rise to the development of the semi-conductor industry, which has been noteworthy for the past two decades. It has been actively promoted by the government since the late 1980s. The government began to promote the semi-conductor industry as a strategic industry by instituting the Semi-conductor Industry Development Plan in 1985. It provided as much as 12.5 billion won in research grants from 1986 to 1993 to promote the development of technology levels of semi-conductor producing companies (Kim *et al.* 1998, 225-230). The semi-conductor industry, which was developed in this way, has become Korea's leading export industry. Exports of semi-conductors increased from US\$4.0 billion in 1989 to US\$26.5 billion in 2004 – 10.4 percent of total exports. Besides support for R&D, the government currently promotes exports by supporting international marketing activities and exhibitions abroad. In addition to the indirect measures, a substantial amount of duty drawbacks is provided to exporters, since they are not prohibited in the WTO system.

Table 2. Expenditure on R&D Activities in Korea (unit: billion won, %)

Years	Government Expenditure (A)	Total Expenditure (B)	A/B (%)
1980	180	283	63.7
1985	306	1,237	24.8
1990	651	3,350	19.4
1995	1,781	9,441	18.9
2000	3,452	13,849	24.9
2003	5,268	19,069	27.6

Sources: Korea Ministry of Science and Technology, *Science and Technology Statistics Database 2005*.

Most East Asian and Latin American semi-industrialized countries initiated their development effort by moving into primary import substitution such as the labor-intensive garment industry. Korea together with Taiwan turned to unskilled-labor-based exports and then toward exports of more skilled labor technology, and capital-intensive goods in the 1970s (Ranis 1995, 169-176). The Korean R&D promotion experience shows the shift of policy attention toward more technology intensive industrialization.

Instruments of Industrial Policy

Fiscal Incentives

The tax system has been used to influence the industrial structure of Korea. The Tax Exemption and Reduction Control Law provided export firms with various tax deduction schemes.² Since 1973, as a measure of the HCI Drive, the HCI sector began to be exempt from domestic taxes such as profits tax during the first three years of establishment and for the next two years, half of their taxes were exempt. The Tax Exemption and Reduction Control Law amended in 1975 provided for five years of tax holidays, investment tax credits, and accelerated depreciation to designated key industries. Meanwhile, firms not belonging to those key industries faced higher taxes; for example, the commodity tax exemption previously available to all exporters was withdrawn (Bae 2001). That is, tax policy acted as a main instrument of Korea's industrial policy in the 1970s under the HCI Drive Program.

In the mid- to late 1970s, the effective rate of corporate taxes on products belonging to HCI declined sharply, while those belonging to LI increased, reflecting the HCI Drive. As a result, the gap was widened and persisted by 1981. It disappeared in 1982, due to the government's retreat from the HCI Drive (Kwak 1985; Bae 2001). Besides the tax benefits, the share of expenditures for HCI emphasized in the 1970s fell substantially in 1981 and continued to decrease (Bae 2001), which parallels the tendencies of the tax incentives.

With the revision of the tax law in 1981, the importance of tax deduction schemes in industrial policy decreased. Meanwhile, to develop SMEs, the government decided to exempt the full amount of profit and income tax from technology intensive SMEs for the first three years of establishment and 50 percent of those for the next two years. It also decided to exempt 50 percent of property taxes for the first five years of establishment.

Expenditures for science and technology have increased slightly since 1985. The government promoted science and technology by means of large national research projects. These expanded in the 1990s with a plan for Highly Advanced National (HAN) Projects, or the so-called "G7 projects," in recognition of its aim to propel Korea into the ranks of the world's top group of seven countries. Korea's G7 Planning Committee selected projects according to the criterion of how well they advanced strategic industries (Amsden 2000).³

As of 2005, tax benefits are provided mainly to R&D activities and foreign direct investment (FDI) inflows. For instance, in the case of foreign investors'

investment in areas designated as FDI regions, profits and income taxes are exempt for the first ten years of establishment. Tax deductions are provided on 50 percent (40 percent for large firms) of new R&D expenditures (Finance Forum 2003). Working expenses relating to R&D are fully exempt from taxation or redeemed up to five years (Son 2002). Consequently, the ratio of R&D expenditures to GDP increased from 2.0 percent in 1992 to 2.9 percent in 2002 (Ministry of Science and Technology 2003).

Together with generally applied tax incentives, the government has maintained a duty drawback system to promote export-related industries, which refund import duties paid to import raw materials or intermediate products to exporters at the moment of export. The government has used the duty drawback system to promote exports since 1975. The drawback rate, defined as the amount of duty drawback divided by export values, ranged from 0.1 percent to 3 percent as of June 2000 (WTO 2000, Ch. 3, para. 115).⁴ The amount of duty drawback increased from 0.1 trillion won, equivalent to US\$0.2 billion, in 1975, to 2.3 trillion won, equivalent to US\$1.8 billion in 2001, sharing as much as 38.4 percent of total tariff revenue. Duty drawbacks not exceeding the amount of duty actually levied on the imported product have been explicitly permitted by the relevant trade regulations in the General Agreement on Tariffs and Trade (GATT). The current WTO Agreement on Subsidies and Countervailing Measures (hereafter, the WTO Subsidies Code), does not prohibit duty drawbacks as export incentives in cases where they are not excessive.

Financial Incentives

In Korea, commercial banks were nationalized immediately following the military coup of 1961, and until the late 1990s, were strictly controlled by the Ministry of Finance. The annual budgets of commercial banks and appointments to top management became subject to the approval of the Finance Minister (Lee 1992, 190). From the early 1960s until the mid-1980s interest rates were regulated and lending was often directed toward specific industries or firms. Such financial subsidies were provided to specific - mainly export-related - industries especially during the 1960s and 1970s. As of 2005, a few types of financial incentives still contribute to export promotion.

During the 1970s, the HCI sector received policy loans at preferential rates. For instance, it attracted almost four fifths of the manufacturing investment between 1977 and 1979 (World Bank 1987). During 1973 and 1974, 66 percent of incremental credit allocation went to LI, where Korea had its comparative advantage due to low labor costs. During the 1975 to 1979 period, with the HCI Drive, this ratio was nearly reversed and 59 percent of new credit went to the HCI. This pattern of credit allocation contributed to an acceleration of structural change (Haggard 1990). Besides directed lending, by the end of 1988 most interest rates had been regulated by the government. It provided the strategic industries preferential access at substantially subsidized rates.⁵ Real interest rates were in general negative during the 1960s and 1970s, although they remained positive during the 1980s and 1990s.

The HCI sector had better access to capital under the HCI Promotion Plan, which acted as a very attractive incentive to investors in that sector during the period of liquidity constraint. In addition, it also enjoyed much lower average borrowing costs, especially in the second half of the 1970s. Its average borrowing cost began to fall sharply from 1975 until the late 1970s and the cost of borrowing for HCI averaged 36 percent lower than for LI.⁶ Although this disparity had begun to recede in the 1980s, the lending rates applied to HCI did not exceed those applied to LI until the 1990s. The average borrowing cost for export industries was lower than that of other industries throughout the 1970s, 1980, and 1990s with a few exceptions (Bae 2001).

In 1980, the government decided to reduce policy loans and restrictions on managerial autonomy of commercial banks, with the ultimate aim of privatization. Meanwhile, the speed of financial market liberalization and bank privatization was not satisfactory (Haggard and Collins 1994). Trade balance surpluses that started in 1986 and the pressure of economic liberalization from abroad propelled the government to officially liberalize most interest rates in December 1988; however, a few types were still regulated through various forms of administrative directions by the government. As a result, the liberalization ratio of interest rates reached 95.3 percent at the end of 1995 (Youn 1998).

Due to economic crisis and corporate failures, the government provided public funds to troubled companies in 1998 and 1999. Policy loans can now be found as loans to SMEs, among others. Beginning in January 2004, the Small Business Administration made loans to small firms at an interest rate of 5.9 percent for up to 1 billion won, which might be somewhat better than the rate for general bank loans (source: <http://www.smaba.go.kr>). The Korea Development Bank (KDB), established by the government in 1954 to provide long-term loans to large-scale projects also maintains policy loans. Its one-year lending rates as of November 2005 were 4.61 percent, which appear to be lower than market interest rates (source: Korea Development Bank, <http://www.kdb.co.kr>). The currently applied policy loans directed toward SMEs would not be regarded as prohibited subsidies under the WTO Subsidies Code.

Export finances have been provided in various stages of export-related activities and have received enormous interest rate subsidies. In August 1985, the government announced they would lend as much as was necessary to expand and strengthen the production capacity of export industries, which until then had been restricted to 80 percent of the total. The export finance system is still used as the export promotion measure in Korea. The Korea Export-Import Bank, which has been funded by the government, has made loans to export firms up to 90 percent of the contracted value of their exports, at the base plus an additional rate determined by their degree of creditworthiness, the length of the loan, and the amount of mortgages (Korea Export-Import Bank 2004). The average rate applicable to export finance was lower than the market average lending rate (WTO 2000, Ch. 3, para. 133). The provision of export finance by public bodies might be problematic in light of the WTO Subsidies Code, if it is provided at an interest rate lower than the market rate.

Together with the export finance system, the export insurance program of Korea, which started in 1969, has provided export-related incentives to exporters by protecting them against losses arising from commercial and political risks. The share of exports supported by export insurance remained at about 1.4 percent from 1981 to 1991. In general, the preferential effect of government subsidization in the form of export insurance was not significant until the early 1990s (Mah and Song 2001).⁷ It appears to be due to the lack of recognition of export insurance and the absence of specialized institutions.

The Korea Export Insurance Corporation (KEIC), an agency of the government, was established in 1992 as the exclusive provider of export insurance. With its establishment, the utilization ratio of export insurance increased abruptly. The annual average loss ratio also increased sharply to over 300 percent since 1995, indicating that the preferential effect of export insurance programs became substantial. With the economic crisis in 1997 and 1998, demand for export insurance increased abruptly in 1998 and 1999 and the utilization ratio has been higher than 20 percent since 2001. Thus, Korea has become the second heaviest user of the export insurance system.⁸ The Export Insurance Act stipulates that, if the KEIC should run a budget deficit, it should be financed by the government. Although the WTO Subsidies Code prohibits most export incentives, export insurances complying with the OECD Arrangement on Export Credits are not prohibited. Therefore, Export Insurance of Korea, which does not violate the regulations of the OECD Arrangement, is expected to continue as an important export promotion measure.

Evaluation of the Industrial Policy of Korea

Aware of the benefits of expansion of exports due to the restricted economic size of a small economy, the economic policymakers of Korea tried to promote exports since the 1960s. In the meantime, they tried to nurture industries with more value-added, given the increasing wage levels as a result of rapid economic growth. Therefore, the attention of the industrial policy of Korea was switched from LI to HCI in the 1970s and then to the technology intensive industries by R&D promotion beginning in the early to mid-1980s.

There has been a debate about the role of government in the economic development of Korea. Economists associated with the neoclassical tradition such as Balassa (1988) have downplayed the role of active government intervention. According to them, the HCI promotion period was seen as an aberration and source of instabilities (Saavedra-Rivano 1998, 179). According to the World Bank (1993, 84), East Asian economic development from the 1960s through the 1980s had little to do with government and “[t]he appropriate role of government in market friendly strategies is to ensure adequate investments in people, provision of a competitive climate for enterprise” and “beyond these goals, governments are likely to do more harm than good.” They emphasized the competition-promoting role of the government (Hosono 1998).

The dominant complaint on the World Bank (1993) was that the study gave insufficient attention to the role of the government in fomenting Asia's economic success and downplayed the role of industrial policy and other forms of selective intervention (Wade 1994; Stallings 1998, 59). Therefore, according to Kwon (1994, 643), the world "might have been better served had the World Bank allocated its resources to the study of positive roles for government." After the occurrence of the economic crisis, Chang, Park and Yoo (1998) attributed Korea's rapid economic growth from the 1960s through the 1980s to a decisive role of the government; meanwhile, Mah (2002) considered government intervention to be excessive in some cases.

Active governmental intervention in the market observed in the Korean experience can be said to have both strengths and weaknesses. Although the Korean economy still had a comparative advantage in the labor intensive LI such as the textiles and clothing industry, the government actively began to promote HCI in the early 1970s. Similarly, although the Korean economy was still finding its comparative advantage in HCI, the government tried to switch the direction of industrial policy from promotion of HCI to that of R&D activities. This shows that the government took one step beyond the level of economic development and what was then the prevailing comparative advantage.

The crucial turning points of industrial policy, e.g., the promotion of HCI in the early 1970s and the transition to IT industries based on R&D in the 1980s, were chosen and promoted by competent economic bureaucrats and well-trained economists working at the public economic research institutes.⁹ In Korea, there was a historically deep-rooted cultural background such as Confucianism where many bright members of the elite wished to become prestigious bureaucrats regardless of salary levels. In most developing countries where such culture is absent, institution building to attract such people to economic decision-making groups, such as bureaucrats and economic researchers, would be necessary in pursuing the appropriate industrial policy.

Many development economists working in academia and international organizations have praised the rapid economic growth of the Korean economy since the 1960s. For instance, most of them concluded that the benefits of selective intervention of industrial policy must have outweighed the cost (Westphal 1990). Korea experienced an economic crisis in 1997-1998. The high share of non-performing loans (NPLs) could be regarded as one of the causes of the Korean economic crisis. Together with the banks' practice of connected lending, the industrial policy of Korea was responsible for the high share of NPLs (Mah 2002; 2006).

As a means of active intervention in the banking sector during the 1960s-1980s, the Korean government from time to time directed lending to specific sectors and firms, mostly in HCI. In the meantime, it urged private banks to grant policy loans on very favorable conditions to certain enterprises. Consequently, most banks in Korea were obliged to lend to inefficient projects, resulting in NPLs. According to Park (1994, 156), policy loans amounted to 40.6 percent of all bank loans from 1974

to 1979 during the period of HCI promotion and accounted for 34.6 percent from 1985 to 1989. Policy loans directed to inefficient projects often resulted in NPLs; for instance, from 1989 to 1997 NPLs accounted for between 5 and 7 percent of the total loans extended by commercial banks (Chen and Ku 2000, 126; Krueger and Yoo 2002, 169-190).

Due to policy loans at preferential lending rates, private companies tried to borrow as much money as possible from commercial banks. As a result, the debt-equity ratio of private manufacturing firms in Korea reached 317 percent in 1996 (Chen and Ku 2000, 124). At the end of 1997, the average debt-equity ratio of the 30 largest conglomerates called *chaebols* that were the main beneficiaries of policy loans at preferential lending rates reached 518 percent (Lee 2000). A few *chaebols* including Hanbo Iron and Steel, and Sammi, which were two of the 30 largest *chaebols*, actually went bankrupt a few years before the economic crisis (Kim 2002, 129).

Contrasted with the Korean experience, Taiwan shunned the use of the financial system to target industries, relying primarily on tax benefits (Haggard 1990). Therefore, Taiwanese banks have had fewer NPLs (Chen and Ku 2000, 143). Due to the acceleration of capital account liberalization in the 1990s, the amount of foreign portfolio investment in Korea became much larger than that in Taiwan; for instance, in 1996, portfolio investment was 6.2 times greater than foreign direct investment in Korea, whereas the ratio was only 1.7 times in Taiwan (Chen and Ku 2000, 127). In the midst of the East Asian crisis, Taiwan was not scathed. It shows that unrestricted opening of short-term portfolio investment¹⁰ in addition to active industrial policy through government controlled private banks may result in the collapse of the banking sector.

Lessons of the Industrial Policy of Korea

The Korean experience of active industrial policy provides lessons for economic development of developing countries. Among others, during the process of rapid economic development, especially in its early stage, it is necessary for developing countries to establish institutions supporting industrial policies. For example, infrastructure such as highways and industrial estates, as well as export promoting institutions and long term lending institutions have been helpful in implementing Korea's industrial policies.

The Korean government provided export promotion measures such as export insurance and duty drawback which are not prohibited under the WTO system, as well as directed and subsidized lending through controlled banks and tax benefits. The government's control of banks resulted in a high ratio of NPLs, which became one of the causes of the Korean economic crisis due to bank failures. Therefore, such subsidization by controlled banks, if excessive, might be detrimental in the long run process of economic development, although appropriately designed loans may contribute to improvement of efficiencies of the economy through lowering the average cost of production by promotion of certain industries, assuming economies of scale in production.

If domestic savings are low, foreign savings are needed to sustain the economic development of developing countries, which would be made possible through external borrowing and/or foreign investment inflows. One way of attracting foreign capital is long-term inflows of foreign direct investment (FDI), which is different from short-term foreign portfolio investment. Since the latter is usually quite volatile, it would be important for authorities to control the proportion of short-term external debt and foreign portfolio investment. However, the Korean economy in the mid-1990s was vulnerable to sudden flows of foreign portfolio investment. That is, together with the high ratio of NPLs as a result of strict control of the banks, excessive dependency on short-term foreign capital was also an important cause of the economic crisis in 1997. For instance, short-term external debt rose from US\$40 billion in 1993 to US\$98 billion at the end of September 1997, representing 54 percent of total external liabilities (Chopra *et al.* 2002, 16). Therefore, when they were not rolled-over, it was quite likely the Korean economy would be driven to economic crisis.

Since the mid-1980s, the industrial policy of Korea switched its emphasis from industry-specific to function-oriented, i.e., R&D activities, which appear to be plausible in the sense that R&D expenditure may lead to better performances of an economy through externalities on various industries, as well as the improvement of productivities. The currently applied fiscal benefits provided to SMEs aim to lessen excessive influences by chaebols in the Korean economy, who were the main beneficiaries of the previous industrial policy until the 1980s. Developing countries with sound fiscal situations may develop and provide export insurance and duty drawback schemes as well as subsidies satisfying objective criteria such as those provided to the SMEs, which are regarded as the non-prohibited subsidies in the WTO.

Even if the fiscal situation can enable the concerned developing countries to provide subsidies such as financial and fiscal incentives to certain industries on private companies, the current WTO regulations prohibit or strictly regulate the provision of most of such incentives. As of 2005, after the phase-out of the transition period, there is actually little special and differential treatment of developing countries in the WTO system with respect to the provision of fiscal and financial benefits to specific industries. It would be necessary for developing countries as a group to request meaningful special and differential treatment provisions in light of industrial policy in the Agreement on Subsidies and Countervailing Measures in the WTO system, which governs subsidies relating to industrial policy. For instance, the WTO system may loosen its regulations regarding R&D subsidies provided by the governments of developing countries, which would be beneficial to their economic development in the sense of positive externalities, i.e., technological spillover, to the other sectors. In addition, it might be worthwhile to allow developing countries flexibility with respect to tax and financial benefits so they can utilize such incentives appropriately in their industrial policy.

Conclusion

The industrial policy of Korea changed from emphasis on LI to HCI in the early 1970s. In the meantime, the government used various export promotion measures including fiscal and financial incentives to promote export-related industries. In the early to mid-1980s, the government switched the direction of industrial policy from direct subsidization of selective industries toward function-oriented support, such as support for R&D activities that can be utilized generally. The transition from LI to HCI and then to IT industries where R&D expenditures are quite important in their development, gave rise to rapid economic growth and resulted in a higher value-added industrial structure.

Although the industrial policy of Korea contributed to the development of export-related industries, the accumulated non-performing loans of private banks as a result of preferential policy loans to promote such industries became one of the causes of the economic crisis in 1997-1998. The Korean experience shows that excessive subsidization by strictly controlled banks might be harmful in the long run process of economic development. Korea's current industrial policy, which focuses on support of R&D activities, benefits various industries through externalities and improvement of productivities.

Korea's experience of industrial policy gives the following lessons for developing countries. 1) Competent economic policymakers in Korea chose turning points in the industrial policy. 2) Institution building to recruit insightful elites as the economic policymakers would be necessary to implement appropriate industrial policy of developing countries. 3) Depending on the fiscal situation, developing countries may provide export insurance and duty drawback schemes, which are regarded as non-prohibited subsidies to promote export-related industries. 4) Provision of infrastructure, as well as generally applied tax and financial benefits may also be considered to promote strategic industries.

Even if the fiscal situation enables developing countries to provide fiscal and financial incentives, the current WTO regulations prohibit or strictly regulate the provision of most incentives. Since there is little special and differential treatment of developing countries in the current WTO system with respect to the provision of benefits to specific industries, it would be necessary to allow developing countries flexible applications of industrial policies.

Notes

1. The six technologies are: Information Technology, Biotechnology, Environment Technology, Culture Technology, Nano Technology, and Space Technology.
2. For instance, an 80 percent reduction in income tax and profit tax began to be provided to exporters since 1964. During the 1960s and early 1970s, export firms, regardless of the industries to which they belong, were able to depreciate machinery investments 30 percent more rapidly than normally allowed (Cooper 1994).
3. In addition to those projects, emphasis on science and technology in the 1990s involved more centralized coordination to avoid duplication by competing ministries, as well as the Special Law for the Promotion of Science and Technology Innovation enacted in 1997 to expedite R&D (Amsden 2000).

4. About two-thirds of exporting firms in Korea utilize the duty drawback system.
5. During the 1970s, preferential loans increased from less than 40 percent of total bank lending in 1971, to over 55 percent in 1976-1977, to almost 70 percent in 1978 (Haggard 1990).
6. Interest rates of the Machinery Industry Promotion Fund and NIF, which were designed to promote the HCI sector were three to five percent lower than those of general bank loans (Cho and Kim 1997).
7. The loss ratio, defined as claims paid divided by premium received, remained less than 100 percent in most of the years prior to 1991.
8. Japan has been the heaviest user of the export insurance system (Mah and Milner 2005).
9. The HCI promotion policy was headed by Wonchul Oh, the then chief adviser to the President, during the 1970s. He firmly believed the government had a beneficial role in the intervention in the market (Oh 1996, Vol. 1-4). Economic policymakers since the 1980s, such as Jae-Ick Kim, the chief economic adviser to the President in the early 1980s, believed in the superiority of market mechanisms in allocational efficiency, while they decided to intervene in the market quite often. We can hardly say that Korean economic policymakers were indoctrinated with free market theories. Most, if not all, economic bureaucrats were well aware of the various cases of market failure.
10. The author is grateful to an anonymous referee for pointing out this aspect.

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