

Industrial Policy Dilemmas: Entry Barriers and Cyclical Adjustments

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Introduction

Through its three decades of industrialization, the Korean economy has transformed into a heavily industrialized economy. In this transformation, one of the most dramatic developments was Korea's entrance into heavy industrialization due to the government's policy of HCI(Heavy and Chemical Industrialization). (Yotopoulos 1999; Amsden 1989)

Heavy industrialization poses great challenges to developing economies which have capital and entry barrier requirements(Bain 1956; Singleton 1997; Seabright 1996; Ziss 1987), while most developing countries have sought such industrialization as one of their developmental goals. Challenges these sectors face range from the hurdles of technological barriers to MOS(Minimum Optimum Scale) or economies of scale to entry. While much has been discussed on the existence of such economies of scale and technological barriers, the Korean case is a clear one that shows the salience of the challenges as they are contested in the political economy.

This paper, among the challenges, focuses on the entry barriers related to the scale economies of the heavy industries. The reason the Korean case is invaluable is that it presents two rounds of structural adjustments related to the economies of scale, reflecting the specific situation of the Korean economy. Also this case shows the implications which might be involved when developing economies decide to undertake heavy industrialization.(Kim, Junmo 1999a)

The specific contexts of the Korean HCI policy are centered around entry barriers and government regulation in reducing the number of firms that desire to enter the sectors, where only a limited number of firms can survive due to their economies of scale. Different from its appearance, however, this problem has been used as a persistent source for the structural adjustment of the Korean economy. In the following, this paper addresses theoretical issues related to the topic, and then continues on about policy analysis within a macro perspective, followed by the case of the auto industry. Finally, this paper discusses the future directions of the industrial policy of Korea.

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Theoretical Review: Origins of the Dilemma

Entry Barriers in an Oligopolistic Market

Disciplines of economics and management have suggested that several factors may function as entry barriers.(Bain 1956; Singleton 1997; Seabright 1996; Steffen 1987; Ziss 1987) An entry barrier is “anything that requires an expenditure by a new entrant into an industry, but imposes no equivalent cost upon an incumbent” or in other words on the existing firm. In this conceptualization, a barrier does not completely and necessarily prevent entry, but a generalization we can deduce is that high entry barrier costs that new entrant(s) should pay are high enough to deter some from entering, since the level of costs are assumed to be high enough to undermine competitiveness of the new entrants.

Economy of Scale

Economy of Scale is a state in which the optimal capacity of a firm or a plant is achieved at a reduced average production cost. To refine the definition, the following point can be presented. Economies of scale exist when a firm's average cost of production falls as the production capacity of the firm increases, assuming that all possible adaptations have been accomplished to have production as efficient as possible at each output scale and also assuming that the technology level and factor prices are held constant.(Varian 1992)

A forerunner of conceptualizing entry barriers, Joe Bains, pointed out that economies of scale effect operates when the size of a firm, with at least minimum optimal scale (MOS), represents a significant percentage of the total capacity of the industry.(Bain 1956) In addition, he added that unit costs rise steeply if the scale of the firm falls short of the MOS. Bain's MOS is a sufficiently large portion of capacity in an industry that the increase of capacity by a new entry firm with MOS would cause existing firms to cut-back their production, unless they lower their prices.

In the auto industry, it has been said that until the 1980s, on average, the minimum optimal scale of a single passenger car model had been 300,000 units per year(ICI Korea 1992), while global mega-mergers increased the MOS even more than the previous figure. The problem with the MOS argument, however, is that estimating MOS in the real world poses difficulties to researchers, although one can admit its usefulness. The MOS estimate in auto industry contains design costs, costs for purchasing & updating production facilities & equipment, costs for training workers, management costs, and research and development costs.

We can elaborate about scale economies if we consider various technical coefficients of production. Economies of scale can be found in the size of a plant or a firm when there exists a threshold of size or number of machines and facilities. In the auto industry, a plant size that is large enough to displace different kinds of jobs, machines, and facilities is functional to scale

economies. For example, a firm should be large enough to make returns on investment with large production units; in addition, work flow from one part of the assembly to the final assembly would also require a scale economy factor.

Absolute Cost Advantages of the Existing Firms

In addition to the purely technological side of advantages coming from scale requirements, existing firms in an industry have lower costs vis-a-vis new entrants because of the following reasons. First, the existence of patents and legal restrictions impose costs to new comers. Second, scarce factors such as skilled personnel would also be a cost to a new comer. Third, costs related to mobilizing capital would act as a barrier. If a new entrant, to meet the MOS capacity, should mobilize a huge sum of capital, it would be a great disadvantage to the new prospective entrant. This burden can be aggravated when tight financial markets impose higher interest rates.

Other Barriers

In addition to scale economies and the absolute cost disadvantages to new firms, the existence of market demand is an entry barrier. In the case of Korea's auto industry, if a prospective entrant can foresee the increase of future demands and if other conditions are well prepared, then the firm's entry would lead to a success. In comparison, if the market demand is not there to absorb the increased production capacity of a new entrant due to new entry, then the lack of demand would be a barrier for market entrance.

The availability of technology would also be included in the list of entry barriers. A prospective entrant would seek a source or sources from which it can rely on for necessary technologies either by purchasing or by licensing.(Dunning 1988) In the auto industry, a widely used practice is to establish technical ties between firms or to allow equities to other firms that will provide such technologies.(Kim, L 1997)

Government Regulation and Overlapping Investments

As discussed in the preceding section, economic and technological barriers do exist in starting a new business. Also in existence are the economies of scale requirements specific to a country's context which add additional constraints to investment decisions. Regarding this point, there have been unique Korean industrial policy dilemmas, namely overinvestment and overlapping investments, which are quite distant from their meanings in economics and business literature as we know it.

Overinvestment in the Korean Context

Overinvestment has widely been used to explain business cycles. In theory, investors are so

optimistic during periods of boom that they are inclined to invest beyond the optimal level in the industrial sector. After some time, they realize their decision errors, which tend to be linked to changes in their future investment decisions. They decide either to cancel or postpone future investments, which, in turn, lead to a recession. This dynamic of overinvestment widely understood in academic circles is not an adequate grasp of the "overinvestment" phenomenon in Korea. While overinvestment in traditional business and economic literature is related to business cycle aspects of a capitalist economy, the Korean case is closer to the structural aspects of an economy. That is, in the traditional business cycle perspective, idle facilities, due to traditional overinvestment, can easily be utilized as the next economic boom arrives. However, in the Korean case, this is not true.

The structural aspect of the Korean case means that the scale of investment far exceeds the effective demands of the foreseeable future for a specific industrial sector, which leads to an idling of facilities for a relatively long period with little possibility of being fully engaged in production as in the traditional business cycle. The long term idle state of the facilities creates social costs, including opportunity costs, since opportunities to invest the capital are lost. It should be noted that especially, the characteristics of the facilities in heavy industrial areas feature little flexibility in changing their design purposes, which further increases the social costs.(Sakong 1987; Galbraith & Kim 1998; Leipziger 1987)

Therefore, the overinvestment phenomenon in the Korean context denotes a situation in which multiple firms invest in an identical sector where a higher level of investment is required to meet the minimum scale of the economies. This is exactly another dimension of the Korean overinvestment phenomenon, the "overlapping investment". A consequence of this is that usually has been the existence of several entrants that are all under the minimum scale economies. This, in turn, is interpreted as higher production costs and lower international competitiveness.

Difference Between Perfect Market Competition and the Korean Case: The Dynamic of Overlapping Investment

In theory, the closer a market comes to achieving perfect competition, the more such competition allows the self-adjusting mechanism of the price system to resolve overinvestment and overlapping investment problems. Theoretical argument behind this is based on an assumption that every firm in an identical sector has different production cost functions.(Varian 1992) With this assumption, firms with less efficient production functions will be abolished from the market.

Policy Dilemma

In reality, however, perfect market conditions do not exist. In addition to imperfect market conditions, there are several unique environments that characterize the Korean context. First, the

Korean overlapping investment phenomenon was observed in the heavy industrial sectors where economies of scale requirements are extremely important. In these sectors, monopoly or duopoly would have the "right" number of entrants in the sector, given a domestic market size which new entrants should concentrate on. Here a policy dilemma enters into the scene. From both theory and practice, it is well known that monopoly is not beneficial to the economic welfare of a society, especially for consumers' rights.(Galbraith 1967) From the policy makers' point of view, considering the small domestic market and limited investment resources, accomplishing efficiency in investment becomes crucial, and this can be accomplished by observing the economies of scale principle.

Especially in a developing country, where investment capital is rationed by the central government(Yotopoulos 1999; Rhee 1987), it is likely that the government would think that only one or two firms would serve as the optimum number of firms in a given heavy industrial sector. As every government regulation has its justification, this case is not an exception. In most countries, where government subsidies exist, there are benefits. This dynamic is even stronger in the developing world, since in a society where access to capital itself is a scarce resource, getting government assisted loans is a favor. Similarly, where the number of entrants is limited, getting a license to enter the market is a policy favor. In the Korean case, these two factors are intertwined.

Heavy industries require great capital. With Korea being a capital-scare society, this restricts the number of firms that can enter the market. At the same time, knowing the high risks for entering heavy industrial sectors, the government guaranteed lower interest rates bearing long term loans to the entrants into the heavy industrial sectors.(Galbraith & Kim 1998) Therefore, as long as a firm gets a government licence, the firm acquires privileges. This goes to show how the industrial policy and regulation issue has been mingled.

As the economy grows, the Korean government tended to ease its regulation of limiting the number of entrants into each heavy and chemical industrial sector, while large conglomerates called chaebols desired to enter the HCI sectors.(Kim, J. 1999a) The Korean government, as other governments would do, seemed to have a vision that as long as the market size increases, it is rational to ease its entry regulation to produce advantages from competition.(Lee 1996) Thus, until another economic crisis came, entrants into the heavy industrial sectors increased in both the 1970s and 1980s-90s.

Corporate Dynamics in the Overinvestment

Previously, this paper presented a general discussion on the behavior of corporations in making investment decisions. In adapting our argument to the real world case and especially to the Korean case, it is important to notice the unique corporate financial mechanism that sustained the firms' appetite to enter the new heavy industrial sectors. First, for large businesses, or Chaebols in Korea, profit maximization has not been the superior goal in management. Rather, they were

inclined to expand their market shares and sales volume, something which can be seen in Japanese firms as when compared to U.S. firms.(Dertouzos et al. 1989; Porter 1991)

Second, it is important to focus on the Chaebol's control on capital markets.(Cho & Cole 1985; Jwa 1998) With their hands deep in the financial markets by owning investment and securities firms, they could self finance their subsidiaries(Automotive News Oct. 1997); this mechanism provided them with a great leverage vis-a-vis non-Chaebol style firms. Furthermore, established practice in Korea has been that subsidiaries of Chaebols could mutually underwrite for themselves, and thereby total credit lines which each Chaebol could utilize expanded significantly.(Suh 1998) Under this circumstance, it became rational for a private firm to make preemptive strategic moves into lucrative markets and new business areas.(Economist 1997) In doing so, rivalry among Chaebols also worked. Overinvestment in specific industrial sectors and overlapping investment given limited market segments resulted from exactly this.

Third, We should mention the moral hazards involved in business investment strategies. Since the 1960s, so far as the firms' strategies were in line with the government's policy, the government intervened into each and every corporate financial crises.(Yotopoulos 1999; Far Eastern Economic Review Nov. 6th,1997) This tendency was clearer the larger the firm. This practice could have given an impression to Chaebols that the size of a firm or a business group is important in that it increases its bargaining power vis-a-vis the government, since the government does not want to increase unemployment sharply by allowing the company to go bankrupt. As one would imagine, the bargaining power increases as the size of the firm increases.(Berger 1981) Since this has been a practice in Korea, firms would have thought that at least some portion of their failures could be covered by the social costs guaranteed by the government. This context also presents why and how firms lobbied to the government. The weaker a firm is, the more urgent need it has in lobbying to the government. This moral hazard has been one of the clues that explains why Chaebols maintained their expansion-oriented investment strategies.(Jwa 1998)

Fourth, as mentioned briefly regarding the second dynamic that resulted in overinvestment, rivalry relationships do exist among Chaebols. In a conventional business practice, options opened to firms in crisis range from an exit to merger and acquisition. In the Korean case, however, business group structure together with "pride" and rivalry, worked as a shield that guarded weak firms by distributing their losses widely in the Chaebol structure.

Policy Cases

Cyclical Adjustments

The context described in the preceding section has exact relevance to the Korean case. As

shown in the earlier part of this paper, after the government's deep involvement in the 1970s, it reduced its regulation to limit the number of firms in each HCI sector. Unfortunately, by the late 1970s, many macro economic situations went bad, and this led to a different line of policy in the early 1980s to reduce the preferential policy favors given to the HCI.(Lee 1996) This was expressed as the reduction of interest rate differentials between HCI and Non-HCI sectors. At the same time, however, a different regulation policy was implemented by adjusting and regulating the number of entrants in each HCI sector for nearly 5 years. From automobiles, shipbuilding, and power-generation equipment to the aerospace sector, the Korean industrial landscape has experienced cyclical explosions of overlapping investment by private firms and regulation and de-regulation by the government. This phenomenon is closely tied to the structure of private sector enterprises, namely the big business Chaebols that have had financial capabilities. Understanding this micro level change provides a clue to approaching the problems which eventually led Korea to its 1997-1998 economic crisis.

As mentioned earlier, shortly after the big push investment in the 1970s, government regulation was eased, which resulted in multiple entries into major HCI areas. In a capitalist economy, as markets expand, governments lose their rationale in regulating entry numbers, while this change has potential problems unless the disadvantages of the market size and technology are resolved. With macro economic downturns in the late 1970s and early 1980s, the government made its intervention into the market(Leipzieger 1987;Sakong 1987), adjusting the number of entries in each HCI sector. For example, in the automobile industry, firms were given divided market segments; Daewoo and Hyundai could produce passenger cars, while Kia was prohibited. Instead Kia was given a monopoly status in small truck production(ICI Korea 1992), which ironically brought great revenues to the firm. Similarly, in the engine production and power generation equipment business, government initiatives were to divide the market so that economies of scale could be attained. This policy was implemented for 5 years until the mid-1980s. Table 1 summarizes this policy.

From the mid-1980s on, the Chaebols re-entered the markets they lost in the HCI sectors. As they recovered their financial capability, overlapping investment caused similar concerns in the 1990s. This offers a contact point to understand the current economic crisis and its recovery that started in December 1997. Analyzing both adjustments suggests that the two share common elements described in the above. First, all the sectors were crowded with an excessive number of firms. This is compared to the domestic and international demands the Korean industry was treating. Second, the industry-government dynamic of entry regulation was identically observed. Third, it was not by private initiatives but by government initiation that structural adjustments were proposed and carried out. Fourth, in the 1980 adjustment, exited firms eventually returned to their territories, and similar patterns may be repeated after the 1998/ 1999 adjustment, unless fundamentals are changed in industrial financing practices.

An interesting observation is that between the two adjustments, the Korean government has

〈Table 1〉 Structural Adjustment Policy of 1980

Sector	Policy Content	producers
Automobile	Specialization by dividing market segments: Hyundai and Daewoo were specialized for passenger cars, while Kia was forbidden to produce passenger cars. Kia was given monopoly for small trucks, instead. Other types of auto companies were free to produce, except for Asia and Dong-A's duopoly for special vehicles.	4 producers Hyundai, Kia, Daewoo, Asia, Dong-A GM Korea was Purchased by Daewoo.
Telephone operating Equipment	Specialization by dividing regional markets. OPC (Oriental Precision Corp) was given rural area monopoly, while other firms were competing in metropolitan areas.	4 producers Daewoo, Samsung, Kum Sung(former LG), OPC
Power Generation Equipment	Monopoly by the Korea Heavy Industrial company(KHIC)	Previously competition between KHIC and Halla Group
Transformer	Dividing the market by capacity of transformers; Hyosung was to specialize in heavier sized transformers, while Ichon electrical com. was to produce small sized ones.	2 producers
Diesel Engines	Dividing the market by capacity of engines; Hyundai was given large sized marine engines, while Ssang Yong was given small and medium marine engines. Daewoo was to monopolize diesel engines for automobiles.	3 producers Hyundai, Ssangyong, Daewoo

〈Table 2〉 Structural Adjustment Policy of 1998 1999

Sector	Policy Content	Remaining Producers
Semiconductor	Hyundai acquired LG	2 (Samsung, Hyundai)
Automobile	Hyundai acquired Kia; Samsung remains to be cleared or acquired	3 (Hyundai, Kia, Daewoo) Kia is owned by Hyundai
Power Generation Equipment/Maritime Engine	Hyundai and Samsung are absorbed by the Korea Heavy Industrial Corp.(KHIC)	2 (KHIC Ssangyong)
Aerospace	Samsung, Daewoo, and Hyundai are jointly establishing a firm.	2 (The new firm and Korean Air) Korean Air is a minor player that did not join the new firm.
Railroad cars & Equipment	Daewoo, Hyundai and Hanjin jointly established a new firm.	1 (Han-Jin is the founding group of Korean Airlines)
PetroChemical	Hyundai and Samsung decided to do a joint business with Mitsui of Japan	Mitsui's restriction of exports is a hurdle.
Oil Refinery	Hyundai acquired Han-hwa.	4 (SK, Hyundai, Ssangyong, LG)

been engaged in the policy dilemma of choosing between monopoly and multiple entries at all times. Knowing that industrial policy often leads to a situation in which the government is a prisoner (Berger 1981; Boltho 1985; Krugman 1983), as in bail-out cases, it was critical to know whether an industry can accommodate more than one firm, and thereby reduce the hazards of monopoly. At the same time, however, the dilemma was extended to invent a middle ground proposal to avoid cyclical overinvestment. In the petrochemical sector in 1990s, for example, the government was interested in adjusting the total capacity of the sector. The government's preference was to rely on private sector negotiations among the participating firms, which produced futile results. The outcome was that over capacity resulted from the overlapping of overinvestment, which eventually led this sector to be included into government's 1998/1999 adjustment menu.

Policy Case : Automobile Industry

In the preceding section, this paper reviewed the theoretical foundations and uniquely Korean contexts that produced overinvestment and cyclical adjustments. This section presents an in-depth case analysis of cyclical adjustments using the auto industry in Korea as an example.

Early Years

The automobile industry in Korea was initiated in the 1960s, during the second economic development plan launched by the government (EPB 1971). During the first 5 year plan (1962-1966), the government mainly emphasized light industries and import substitution industries (Haggard 1988). Investments in the auto industry occurred only after establishing the light industries including the textile and footwear industries as export industries.

The first auto production in Korea consisted of simply assembling imported parts. The first case was the assembly of Toyota passenger cars in 1966 by a new firm named Shin-Jin (literally meaning new progress). (ICI Korea 1992; Kim, J. 1994) As is the case in many other countries, the first and the most conspicuous problem the industry had faced was the insufficient demand for cars (Industrial Bank of Korea, various years). The Toyota project was aimed at meeting a special demand for taxis for the Asian film festival that year (1966), and therefore production was halted after producing a small number of vehicles. (ICI Korea 1992)

From the late 1960s to the early 1970s, new firms with technical licensing ties to foreign firms entered the auto industry. In 1968, Hyundai Motor Inc formed technical agreement with Ford, and established its facility at Ulsan, where its production base has been located since. Hyundai produced Ford's European models, including the "Cortina" and "Mark" series. (ICI Korea 1992) Asia Motor Company established its production base in Kwangju with ties to Fiat. Kia, which is one of the three largest auto manufacturers, started by producing bicycles and motor-

cycles from the early 1930s and began producing cars in conjunction with Mazda in Japan. Shin-Jin, which participated in the 1966 Toyota project, formed a partnership with General Motors in 1972 and changed its name into "GM Korea". With these entries, the auto industry in Korea took shape as an oligopolistic market.

During the 1970s, the government put into practice its policy of promoting the heavy and chemical industries. The range of affected heavy industries included shipbuilding, automobiles, industrial turbines, construction equipment, and other general machinery.(EPB 1973) Key characteristics of the government's policy, in terms of its technology promotion component, in this period in these industries contained the following: First, the government planned to increase the localization of parts production, which was intended to overcome the earlier practice of simply assembling imported parts; Second, the parts industries were linked to the assembly industries. (Kim, J. 1999b); Third, firms began exporting their models overseas on a smaller scale than they do today, following export-oriented promotion ideas sponsored by the government. The primary export markets were in countries in the Middle East, Asia, and Central America countries.

Starting in the late 1960s, the government began providing promotional laws that offer tax reductions and offering lower interest bearing loans to heavy industries, including the auto industry.(Sakong, 1987) With this promotional wave, firms developed their indigenous models of passenger cars; Hyundai's Pony I and II, Kia's Brisa, and Saehan(GM Korea's new name)'s Camina were their indigenous models. Although Korean firms attempted to develop their own models, their models existed only at the entry level of the car market; The markets for large sedans, trucks, and other vehicles were filled by Japanese and other foreign models that were matured in their "life-cycles". Foreign influences were evidenced by the models produced by domestic firms. Hyundai's first trucks were based on Ford models in Europe, while GM Korea's truck models were based on ISUZU models, since ISUZU had a relationship with GM.

The First Structural Adjustment

In the late 1970s, the government designated the auto industry as one of its 10 strategic export industries. Throughout the 1970s, Korea's limited pool of industrial capital was primarily invested in the heavy and chemical industries, leaving insufficient capital for other sectors such as the light and service industries.(Galbraith & Kim 1998) The oil shock caused a recession in the overall economy, and the overinvested heavy industries suffered the most. This recession had devastating consequences in the auto industry. Added to the insufficient domestic demand for cars, the recession brought an even lower operations rate;(Leipziger 1987) None of the firms had economies of scale.

The recession brought with it a government policy called "rationalization measures", which divided up the business areas of each auto firm for 5 years. Rationalization measures for the auto industry meant that firms had to follow the government's decision to divide the market.(Rhee

1987; ICI Korea 1992; Kim, J. 1994) Hyundai Motors Inc., which had technical ties with Ford from the late 1960s and became independent in the 1970s, specialized in the production of passenger cars and large trucks. Saehan Motors Inc., which had technical ties with GM, specialized in passenger cars, trucks and buses. This firm was later purchased by Daewoo, due to its financial problems. Kia Motors Inc. was only allowed to produce small sized trucks in the class between 1 to 5 tons. The other two minor firms, Dong-a and Asia Motors Inc.(which is mainly owned by Kia), were only allowed to produce special purpose vehicles such as fire engines.

After the First Adjustment: A New Wave of Influx

In the middle of the 1980s, these rationalization measures were lifted. Government regulation gave Hyundai Motors Inc. and Daewoo Motors Inc. a virtual duopoly in the passenger car market, while Kia was rewarded with a monopoly for small size trucks. Only Daewoo and Kia's subsidiary, Asia Motors Inc, was allowed to produce buses. After the 5 year regulation was lifted, all existing firms, Kia, Hyundai, and Daewoo, could expand to regain their production lines to cover all types of cars. As discussed in the earlier section, problems regarding the industrial policy returned. Firms had great interests in re-entering the market.

Existing firms attempted to increase their domestic market shares and continued to make technological progress. Hyundai continued its efforts to develop indigenous models, including the "Excel" that entered the U.S. market in 1986. Daewoo, which purchased Saehan(formerly GM Korea), maintained its ties with General Motors by participating in GM's "World Car Project". (Kim, L 1997) Through this project, GM provided a design from its European subsidiary "Opel", with which Daewoo produced a car named "Le mans", aimed at export markets. Kia, through its technical relationship with Mazda, received matured models like 626, 929, and 121, which were no longer produced in Japan.

Through the middle of the 1980s, Korea's auto industry benefited from a favorable domestic market with steady growth, reflecting people's growing purchasing power. In addition, export markets allowed the firms with more strength to achieve minimum economies of scale.(Kim, J. 1994) Despite waves of up and down market factors, total car production and exports in Korea showed a continuous and steady growth(Industrial Bank of Korea various years), establishing Korea as one of the major car producing nations in the world in terms of production volume.

Challenge to Market and Regulation: Samsung's Entry Dilemma

The 1990s saw another wave of new entrants in the automobile industry. In the early 1990s, Daewoo Heavy Industries Shipbuilding Division entered the auto industry by producing compact cars in the engine class under 1.0 liter in 1991 as an effort for the shipbuilder to utilize portfolio diversification to buffer shipbuilding business cycles by transferring some of its workers to

car production lines. Similarly, Hyundai Precision Inc., a maker of rail cars and construction equipment, began producing four-wheel drive vehicles with technical co-operation from Mitsubishi of Japan by introducing the Montero models. Also in the early 1990s, Korea's fifth auto maker, Ssangyong established technical ties with Mercedes Benz to produce vehicles.(Industrial Bank of Korea various years)

A more controversial event came later in the mid 1990s with Samsung's efforts to enter the auto industry with technical ties to Nissan Motors of Japan. With these entries, the Korean auto market has become more competitive both from the industry's and consumers' points of view. With a global trend of creating mega mergers between firms in the auto industry, new entries in the market produced concerns regarding the future of the Korean auto industry.(US News & World Report May 1998; Automotive News July 1999) Samsung's strategy in entering the market was to start truck assembly projects in order to minimize opposition from the existing firms. (Kim, J. 1994; Korea Economic Daily July 15th, 1996) Existing firms also objected to the government's approval to lift entry regulations into truck assembly for Samsung on the point that it would lead to over capacity problems which the industry has experienced. The government's rationale in allowing Samsung into the truck assembly business was to cope with a temporary shortage in the heavy truck market in the 1990s.²⁾ For Samsung, it could be a foothold from which it could launch its production of automobile.

For observers both in and out of the business, Samsung had to show its merits in joining the automobile industry. To review the theoretical arguments stated earlier, the economies of scale issue was not easy to resolve, since Samsung's initial plan was to start with a modest scale of 20,000 to 30,000 units of cars per year. As a hindsight, it turned out that the company's expectation was far from reality. Despite the advantages of the Chaebol structure that provided industrial capital in building its facility, there still existed an economies of scale problem. With the given domestic market size and foreseeable growth pattern inside and outside Korea, its market potentials were indeed limited from the beginning.

Meanwhile, through the 1990s, the position of the auto industry relative to the manufacturing sectors was enhanced. The auto industry absorbed 4.74% of manufacturing workers in 1988, and this figure increased to 5.83% in 1990, and to 6.27% in 1991 (Korea Industrial Bank, various years). In 1994, the number of firms participating in the auto industry was 2,815, of which 97.5% of the firms were relatively small, employing 300 or fewer.

The Second Structural Adjustment 1998-1999

With its economic boom, Korean auto makers showed a period of growth marked by capacity expansion and technological upgrading. With quantitative growth, however, the industry faced

2) Government expected that truck supply shortage would last about 3 years.

more fundamental problems which plagued the industry since its earlier years. The problem was related to the "size" that would make auto makers viable by international standards. A critical issue within the size problem was that the MOS(minimum optimum scale) had increased due to the initiation of big producers such as GM and Chrysler, which led international mergers and strategic alliances.(Korea Economic Daily,Nov.12th, 1998) With this change, the MOS in the auto industry had to have at least a 2 million unit capacity in order to maintain itself as a viable producer.

This tendency became visible through out the 1990s. For example, Saab of Sweden, which was suffering from scale problems together with its low financial performance, was purchased by General Motors Inc. Also, Chrysler and Mercedes merged into one company in order to create synergy in the lower and luxury car markets.(Korea Economic Daily,Nov.12th, 1998) Because these changes were felt by the korean auto industry also, the Korean industry was faced with another round of structural adjustment.

Even before the 1997 economic crisis hit the Korean economy, the auto industry was experiencing a wave of structural change per se. Ssangyong motors Inc, which was producing four-wheel-drive vehicles merged with Daewoo Motors, due to the financial weakness of the former. Another remarkable change which became one of the contributing factors to the 1997 economic crisis was the status of Kia Motors Inc. It is noteworthy that Samsung's entry and expansion in the auto business was implemented in this period of turmoil. The two auto makers Kia and Samsung, whose chances for survival were low, became hot potatoes to the industry and government. As mentioned, multiple entry into a small market, from the early moments, gave hints to another structural adjustment per se and this phenomenon served as an unique development of the Korean business-government dynamic.(Kim, J. 1999a)

Another Policy Dilemma: Plans for the Future

With the structural adjustment of the 1990s, the Korean auto industry is about to become a duopoly, assuming that Samsung will be a minor facility that will be sold to one of the other companies, not excluding the possibility of an acquisition by a foreign firm. It is expected that with this adjustment, firms in the duopoly will be more focused in the auto business than before.

Thinking about the contributions and deficiencies of the past policies and the industrial dynamic, it is worthwhile to assess the double-sided characteristics of the Chaebols in the auto industry and heavy industrialization in general, especially with regard to the acquisition of technology from a developing country's point of view.(Kim, L 1997) In understanding Korea's technological learning or development in a broader context, Schumpeterian vision offers a relevant

framework. Especially his later understanding of technological change within big enterprises shows some resemblance to the Korean case. According to Schumpeter, the driving force in the development of capitalism is technological innovation, carried out by a few gifted entrepreneurs. They continuously attempt innovations in order to increase the profits of their firms in today's competitive market society. Innovation, in this context, refers to the pursuit and research of such things as new technologies, new products, new management techniques, and new markets that would contribute to the profitability of the entrepreneur. The innovation process carried out in the Schumpeterian world, finds expression in the phrase "creative destruction", which flavors the competitive character of capitalism(Schumpeter, 1942, 1976 chapter7).

In understanding Schumpeter's ideas, it is possible to find that his ideas have remarkable relevance to modern economic context. Schumpeter considers that, in carrying out innovations, the monopolistic and oligopolistic structure of big firms are superior to smaller firms. His preference for big firms and disdain for the classical free competition world, where small firms are the actors, reflects his theoretical position on economic efficiency. He clearly counterpoises the static optimal allocation of resources of perfect competition in favor of the dynamic efficiency of a monopolistic structure.

Embodied Technology and Big Business

Then why would Schumpeterian vision work in Korea's situation? An answer to that comes from understanding the nature of technologies used in industrialization, namely "embodied technology". Embodied technology means that technology is desolved in facilities that an industry or a firm utilizes. Since most of Korea's industrialization efforts were carried out by importing and improving their existing technologies(Amsden 1989) until the 1990s, purchasing facilities would naturally bring technologies. It is not difficult to imagine that this tendency was even greater in the heavy industrial sectors, in which process Chaebol structures were functional in adapting and improving existing but technologies requiring high capital. In addition, the very controversial element of the Chaebols' corporate governance structure, i.e., their control of the financial sector, holds a key to understand how these corporate entities contributed to the technological upgrading of the Korean economy.

A New Dilemma

With structural and environmental changes within the business environment, most importantly regulations and restrictions on self-financing and mutual underwriting capability among subsidiaries of the Chaebols, dynamics of industrial investment would become significantly different in times to come. As has been the case before, the Korean economy, with its limited market size

and high dependence on foreign markets, has an industrial policy dilemma on how to ensure technology absorption.

As discussed in the previous section, practices of the past had advantages in the acquisition of technology. Thus, to highlight the nature of the policy dilemma, it would be meaningful to emphasize what “liberalization” of the economy, ie. opening its financial markets, would mean from a developing country’s point of view regarding technology development.

In a typical developing country’s case, upon opening its financial markets, changes in the interest rate will bring about dual effects to the host country, which are quite opposite in nature. For the industries with standard technology, which does not change much over time, there are positive gains from this trade effect. For the knowledge intensive sectors, the impact of opening the financial markets can be disastrous. Although opening the market is expected to bring a lowering of interest rates according to conventional thinking, let’s assume the opposite case. If however domestic interest rates increase, domestic production of the knowledge intensive sectors will decrease, thereby reducing the chances for incorporating new knowledge-based technologies that require a learning-by-doing time horizon.(Kohn and Marion 1992) This would eventually lead to short term prosperity, with existing technologies, at the expense of future welfare reduction due to a reduced learning of new technologies.

Policy Implications

Policy implications from the above argument can be distilled as follows. If Korea’s heavy industrial sectors can be considered as utilizing standard technology, opening the financial market would hurt them less than one would be concerned about. In this case, a more concerned sector would be industries that require knowledge intensive technologies. On the other hand, if Korea’s heavy sectors are not competitive enough, then the new corporate governance structure would reduce technological learning capabilities at least for some period.

In fact, there is evidence supporting both sides as to whether the heavy sectors in Korea are competitive enough to withstand new changes. In this case, it would be reasonable to assume that Korea’s heavy industrial sectors are becoming competitive, yet leaving much technology to be desired. With this background, financial opening leaves yet another dimension uncovered, the technology intensive sectors. These areas call attention to the government policy of technological development.

Future Directions for Policy

Following the previous section of this paper, I will now presents two policy directions which should be followed in the future.

Considering Industry Mix

It is reasonable to assume that every country has a different industrial mix in constituting an economic entity. Also, historically every society has experienced a transition of the industry mix. An implication from this fact is that helping a society to have an adequate industry mix should be an industrial policy goal. In the specific Korean case, rapid industrialization has brought about the tendency that the industrial policy goal of a given decade or a period is generally single minded, i.e. targeting only one kind of sector each time. As the heavy industrial sectors were the prime target industries of the past, a new emerging trend may make it obsolete faster than it should be.

While new sectors, for example those related to information technology, are important, in the Korean case, it is worthwhile to take advantage of those heavy industrial sectors which have already been invested in and are about to be matured technologically. These sectors are gaining technological learning as well as are capable of making synergy effects with new emerging sectors in the times to come. In this context the industry mix should be an important constraint in designing our future industrial policy.

Thus, considering an industrial mix is to apply to the "portfolio" concept in our industrial policy, and thereby distributing risks associated with one way.(Kim, J. 1999b) Regarding the current venture capital policy for technology development, an identical suggestion can be presented. While agreeing on its necessity, it would not be wise for a country to over-invest in venture capital industries only, since it would be another mis-channeling of resources, as blamed by economists during the heavy industrial drive in the 1970s.

Rethinking Limitations of Industrial Policy : Economic Consequences of Industrial Policy

Industrial policy, by nature, favors some sectors over others. Thus, its acceptability should be weighed seriously. Even in developing countries, industrial policy measures, even if they are successful, are made at the expense of other sectors. This suggests a more careful use of the policy in more developed economies, since the legacy of industrial policy, which shapes the geography of industries, persists. Once political consensus to implement industrial policy is formed, knowing the discriminating nature of industrial policy vis-a-vis non-targeting industries, it is crucial to know the right moment to stop. In reality, there is no way of knowing the cut-off points.(Kim, J. 1997) Furthermore, industries would lobby fiercely to maintain continued assistance.(Berger 1981)

The second issue related to economic consequences comes from the purely economic merit of the industrial policy. Even when industrial policy succeeds in promoting a promising industrial sector in the world market, it could still fail to be cost-effective in exact economic terms. (Krugman 1983). Thus, it is reasonable to conclude that industrial policy is better suited to developing countries, where industrial promotion can be performed with more than a purely eco-

conomic consideration. In other words, developing countries need to have patience for a longer perspective, one which is not necessary for industrialized countries. A clear and prime example is the Korean case. The HCI, aimed both at security concerns to boost defense industries and pure economic upgrading, had a longer term feasibility.

Therefore, the conduct of the industrial policy for the future should be focused on its merits regarding technology development and upgrading, while minimizing structural adjustments in the markets.

Conclusion

This paper has reviewed industrial policy dilemmas specific to the Korean contexts. Especially, this paper focused on issues related to entry barriers, including economies of scale and entry regulation. Barriers of scale economies and technological nature, added to a developing country's contexts to rely on major firms have created dilemmas of cyclical adjustments in Korea. Also, this paper has presented how difficult an industrial policy dilemma is to be resolved within the Korean auto industry case. With the understanding from theoretical parts and a case analysis, this paper has presented directions for our future industrial policy. The essence of which are to keep an eye on the concept of an industrial mix rather than concentrating on one type of industry promotion, and to rethink about economic consequences of industrial policy so that economic distortions can be minimized.

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