

Substituting and Complementing Models of Economic Development in East Asia

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ABSTRACT *This paper assesses the relative merits and demerits of different East Asian models by placing them in a historical perspective. It re-interprets Gerschenkron's model of late industrialization, and extends it to compare East Asian economies in view of substituting and complementing models. It then explains divergent performances among East Asian economies from the late 1990s by examining the different challenges they faced as their economies became mature and more fully open to forces of globalization. In conclusion, the paper discusses the applicability of the East Asian models for today's developing countries.*

KEY WORDS: East Asia, Korea, Taiwan, Singapore, globalization, institutional transition, catching-up strategy

Introduction

Since the Asian financial crisis of 1997, we have witnessed a sea of change in perceptions about the East Asian economic development model. A model of miracle has suddenly been turned into a model of crisis, and those same elements attributed to the miracle are often considered the causes of the crisis. For instance, Frankel (1998) contends that a major feature of the model is “relationship banking”, which has led East Asian economies to “crony capitalism” with “excessive leverage”, while the close relationship among the state, banks, and corporations was often regarded as a major source of the East Asian economic miracle.¹ This reversed view of the East Asian model was shared by many mainstream economists and adopted by international organizations such as the International Monetary Funds (IMFs) and the World Bank in their rescue packages for crisis-hit countries.²

There has been, of course, considerable criticism of this conventional assessment of the East Asian model.³ It seems, however, that the controversy has been far from resolved and divergent views are likely to be sustained in the future. This paper contributes to this ongoing debate on the East Asian model. It aims to re-assess the East Asian model by putting it in a historical perspective and thereby provide a more balanced explanation of miracle and crisis in East Asia.

This paper starts with the fact that the East Asian model was, from the beginning, heterogeneous—Japan was by far the pioneer of the economic miracle in East Asia

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and its success was followed by the first-tier Newly Industrializing Economies (NIEs) such as South Korea (henceforth, Korea), Taiwan, Singapore and Hong Kong. The second-tier NIEs such as Malaysia, Thailand, Indonesia and China followed suit. There is no doubt that Japan provided a model for the East Asian latecomers to emulate, but it set itself apart from them and other developing countries in the post-war period by having had already accumulated substantial industrial capabilities before the end of World War II. In terms of developmental stages, its catching-up process in the post-war period was more comparable to that by Western European countries than to those of developing countries.⁴

However, the supposed miracle in the second-tier NIEs, especially for the south-east Asian countries, has not been clearly established. Their economic spurts became visible only from the 1990s but many of them fell into financial crises in the late 1990s. It is still a little too early to include them in the same league as the “miracle” countries. It seems that the miracle of the first-tier NIEs is both clearly established and more comparable with other developing countries in the post-war period. The focus of this paper will, thus, be on the first-tier NIEs.

It will be argued that even among the first-tier NIEs, there were basically two different models of catching-up—the substituting model and the complementing model—in terms of strategy and supporting institutional arrangements. The former model is geared towards growing by competing directly with its forerunners and was adopted by Korea, which followed the Japanese model most closely. The latter model is geared towards developing economies by establishing complementary relations with its forerunners, and was taken up by Singapore and Taiwan.⁵ What should be noted is that, among the first-tier NIEs, the financial crisis only hit the country that adopted the substituting model, while those countries that employed the complementing model were left largely unscathed. Viewed in this way, the evaluation of the East Asian model boils down to questions of why the substituting model has become vulnerable to a financial shock, and whether the model should still be recommendable to developing countries.

This paper investigates these questions by re-interpreting Gerschenkron’s (1962, 1968, 1970) model of late industrialization, and extending it to compare the substituting and complementing models of catching-up in East Asia. It then explains the divergent performances of the two models, especially since the 1990s, by examining the different challenges they faced as they matured and became more fully open to forces of globalization. In conclusion, it discusses the applicability of the East Asian models in today’s developing countries.

Gerschenkron’s “Patterns of Industrialization”

Gerschenkron is probably the first scholar to have provided a systematic framework through which the catching-up process can be viewed in a historical and comparative perspective.⁶ Due to its uniqueness, his work became a major reference point for those scholars who subsequently studied late industrialization.⁷ It also seems profitable for our discussion to start from his model because it does not simply explain the genesis and working of the substituting model, which was his main concern, but also helps us in understanding how the complementing model became important for East Asian industrialization in the latter half of the twentieth century.

Gerschenkron's model is mainly derived from the experiences of Britain, Germany and Russia in the nineteenth century. Gerschenkron notes that these countries had different timings for industrialization—Britain was the forerunner that pioneered the Industrial Revolution, Germany took part in modern industrialization from the middle of the nineteenth century as a “moderately backward country”, and Russia started its industrialization only in the late nineteenth century as an “extremely backward country”. Gerschenkron (1962, pp. 353–354) then relates their differences in degree of backwardness to strategies and institutions for catching-up.

First, he notices the unbalanced growth strategy of the latecomers, which focused their catching-up efforts on heavy industries. He says: “The more backward a country's economy, the greater was the stress upon producers' goods as against consumers' goods”. Second, he observes an emphasis by the latecomers on the “bigness” of plants. He says: “The more backward a country's economy, the more pronounced was the stress in its industrialization on bigness of both plant and enterprise”. Third, he identifies distinctive institutions spearheading industrialization. In Britain, accumulated private wealth was a major source of finance and individual entrepreneurs played a central role in industrialization; in Germany, “the universal banks” played a major role in financing industrialization and organizing the private sector; and in Russia, the state directly mobilized financial resources and created new industries. Gerschenkron then makes a sweeping generalization: “The more backward a country's economy, the greater was the part played by special institutional factors...[and] the more pronounced was the coerciveness and comprehensiveness of those factors”.

This pattern of European industrialization was basically a combined consequence of: (1) different degrees of backwardness; (2) the technological trend of the day; and (3) the necessity and willingness on the side of the latecomers to directly compete with their forerunners.

Unbalanced growth is desirable for the latecomers because they cannot simply compete with the forerunners in every industry (or sector). A characteristic feature of the latecomers is a relative lack of resources and, given this situation, their chances of surviving competition from the forerunners is increased if they concentrate their resources on certain industries/sectors. In choosing strategic industries (or sectors), they have a better chance of achieving higher economic growth rate if they focus on the technologically dynamic ones of the day.

In the later half of the nineteenth century during which Germany and Russia embarked on industrial catching-up, heavy industries were the most technologically dynamic and technologies in these industries were moving towards “increases in the optimal size of plant”. In this technological trend, the latecomers had a better chance of winning over their forerunners if they employed the most modern technologies, which required building “bigger and bigger” plants. This is because the latecomers could build the most modern plants and exploit economies of scale fully by starting from scratch, while the forerunners were at a disadvantage in employing this option since they had already built their plants with old technologies. Gerschenkron (1962, p. 9) argues in this regard: “it was largely by application of the most modern and efficient techniques that backward countries could hope to achieve success, particularly if their industrialization proceeded in the face of competition from the advanced country”. Gerschenkron detected that the strategy employed by the

European latecomers was to leapfrog the forerunners in terms of size of plant and enterprise.⁸

Differing institutional patterns across countries were a result of this catching-up strategy and the technological trend of the day. British industrialists were forerunners in industrialization and did not face strong international competition. The technological trend in the First Industrial Revolution was also not so much geared towards increasing capital–output ratios. Thus, it was sufficient for British commercial banks to provide industrialists only with operating capital. Germany and Russia, however, required special institutions to mobilize resources and concentrate them on high-growth sectors. The universal banks carried out this role in Germany, a moderately backward country, because the banking sector had already developed to a certain level even though the country was far behind Britain with regard to industrialization. In Russia, an extremely backward country where “the standards of honesty in business were so disastrously low...[and] fraudulent bankruptcy had been almost elevated to the rank of a general business practice” (1962, pp. 19–20), there was little to expect from the private sector. The Russian state took over the entire role of devising and implementing the catching-up strategy.

It should be noted that a main driver in Gerschenkron’s schema is competition among nations. If Germany and Russia had been content to remain in a dependent status, they would not have needed to adopt this strategy, which was bound to exert great strain in their societies. The strategy was taken because they wanted and needed to compete with Britain in terms of industrial and military might.⁹ Gerschenkron’s central concept of “substitutes” was derived from this competition for supremacy among the European powers. Those different strategies and institutions adopted by the latecomers were substitutes for the lack of supposed “prerequisites” of development, such as capital, technology, skilled engineers or well-functioning financial intermediaries, which were present in the forerunners. In this respect, we may name this Gerschenkronian catching-up model a “substituting model”.

It is, however, possible that some countries can proceed with industrialization with little urgent need for direct competition with their forerunners. A case in point acknowledged by Gerschenkron (1962, p. 16), as an exception to his model, is Denmark. This country did not have “sudden spurts of industrialization” or any “peculiar emphasis on heavy industries” because it had “great opportunities for agricultural improvement that were inherent in the proximity of the English market”. Gerschenkron does not give much importance to this kind of complementary development because he conceived of late industrialization mainly as competition between the latecomers and the forerunners.

Gerschenkron’s focus on the substituting model may be justifiable in the latter half of the nineteenth century in Europe, where Denmark-type international specialization was evident only in trade between manufactured and agricultural products. In the latter half of the twentieth century, however, during which East Asian economies took part in late industrialization, a pronounced trend in the world economy was the ever-increasing process of globalization, which gave room for the latecomers to grow by utilizing international specialization in the manufacturing sector. This brought about the emergence of “complementing models” in technologically dynamic industries.

A major factor behind this growing importance of the complementing model is the growth of multinational corporations (MNCs). MNCs have been present in the world economy from the late nineteenth century, but it was in the 1950s and the 1960s that their global operation took off. Since then, MNCs have played an ever-important role in shaping the world economy (refer to Teichova *et al.*, 1989; Dicken, 1998; Dunning, 1997; Julius, 1990; Ernst, 2002; Crafts, 2000). The spread of global production networks by MNCs substantially enlarged developmental space for developing countries to grow by taking part in MNCs' operations as subcontractors.

In relation to this, the emergence of the electronics industry as a new technologically dynamic industry in the latter half of the twentieth century has been crucial to the growth of the complementing model. The characteristics of products and production processes in the electronics industry are quite different from those of heavy and chemical industries, the old technologically dynamic industries. While heavy and chemical goods are bulky and costly to ship around the globe, electronic goods are light and easy to move around. In heavy and chemical industries, the integration of production processes is a major source of productivity increase. This is why economies of scale are important in these industries. But economies of scale are not always important in the electronics industry and, in many segments of this industry, production processes can be spatially separated without harming productivity.

In the initial phase of globalization of the electronics industry in the 1960s, MNCs only shifted their assembly processes to developing countries as these could be performed by unskilled labor. Later, they upgraded and broadened their operations in developing countries to include production processes, which require more skilled labor and even R&D capability. Many East Asian economies took part in the electronics industry by jumping on to this new avenue of industrialization. They started their electronics industries mostly as "export platforms" of MNCs and, subsequently, deepened and broadened their participation in the global production networks of the electronics industry (refer to Henderson, 1989; Grunwald & Flamm, 1985; Ernst & O'Connor, 1989).

In the next section, the cases of Korea, Singapore and Taiwan will be examined in view of the Gerschenkronian substituting model and the newly emerging complementing model. By looking at their strategies and institutions for catching-up and subsequent economic structures, it will be analyzed why they were successful in their own ways, and why the substituting model of Korea later became more vulnerable to financial shock than the complementing models of Singapore and Taiwan.

Substituting Model of South Korea

Among the East Asian NIEs, Korea followed Gerschenkron's pattern of catching-up most closely. In terms of its development strategy, the country attempted a leapfrogging in technologically dynamic industries in a bid to directly compete with its forerunners. The basic theme of Korea's economic policy during its developmental period led by President Park Chung Hee (1961–1979) was to construct an "independent economy" that would, in the future, not only be economically independent from Japan and the US—its major forerunners—but also politically independent from the US, which had provided the country with a

military shield against communist North Korea but had often interfered in South Korea's domestic politics and international relations.¹⁰ For this purpose, Korea carried out bold heavy and chemical industrialization (HCI) in the 1970s. It promoted heavy and chemical industries, old technologically dynamic industries and the electronics industry—a new technologically dynamic industry that had emerged in the latter half of the twentieth century.

In promoting these technologically dynamic industries, Korea emphasized economies of scale, just as the Gerschenkronian latecomers had done in the nineteenth century. For instance, the White Paper in 1968 states that “it is needless to say that the attainment or otherwise of efficient scale of production is the most fundamental determinant of productivity” (quoted in Chang, 1994, p. 153). The state-initiated or state-subsidized mergers in the 1970s and 1980s were often implemented for this purpose (Chang, 1994; Amsden, 1989).

This emphasis on economies of scale generally led to the pursuit of establishing plants of a bigger size because an exact calculation of efficient scale was almost impossible.¹¹ An example in this regard is the case of POSCO (Pohang Iron and Steel Co. Ltd.), currently one of the most efficient steel producers in the world. The earlier stage of its establishment may be described as a struggle for attaining a bigger plant (refer to POSCO, 1989; Amsden, 1989; Juhn, 1991; Shin, 1996). Korea's push for economies of scale has been applied to many other industries and, as a result, the country had “the largest textile plant, the largest plywood plant, the largest shipyard, the largest cement plant, and the largest heavy machinery plant in the world” by the end of the 1970s (Kim, 1993, p. 367). In the electronics industry, Korea was initially engaged in consumer electronics, where its mass production capability was its main competitive edge. When it later entered the semiconductor industry in a move to upgrade its electronics industry, the country focused its catching-up effort on DRAMs (Dynamic Random Access Memories)—the most capital-intensive segment of the industry—and outperformed its forerunners in the race for continuous R&D and facility investments (for details, refer to Yoon, 1990; Shin, 1996; Mathews & Cho, 2000).

Korea's pattern of institutional solutions to the problems of backwardness was also similar to Gerschenkron's schema. As an “extremely backward” country, the Korean state undertook the role of resource mobilization when the country earnestly began industrialization in the 1960s because of the relative underdevelopment of its private sector. It nationalized commercial banks and used its financial system extensively for financing its ambitious industrialization programs. The *chaebols*, the Korean version of family-owned conglomerates, were the children of this state-led industrialization. The state designated strategic industries and picked companies or business groups to undertake the task of building these new industries while providing them with subsidies and protections. The main focus of government policies was placed on making its local companies internationally competitive. The “state–bank–*chaebol*” nexus was the institutional underpinning of Korean catching-up.

In Korea, foreign direct investment (FDI) was generally discouraged in the pursuit of building an “independent economy”. The country, therefore, financed its industrialization largely through domestic resource mobilization and foreign loans. The share of FDI to gross fixed capital formation in Korea remained the lowest among the East Asian NIEs, at only 1.1% from 1962–1990 (EDB, 1981).

A consequence of this nationalistic development was a heavy reliance on debt. The debt–equity ratio of the manufacturing sector in Korea reached nearly 500% in the early 1980s (Figure 1). Korean companies were thereafter able to substantially reduce their debt–equity ratios thanks mainly to the success in HCI, although the level remained relatively high when compared to those of other countries.

Korea also maintained a relatively high level of foreign debt. Taiwan and Singapore had less need of foreign loans because, on the one hand, they did not participate in HCI on as large a scale as Korea and, on the other hand, they were more willing to attract equity investments from MNCs. Korea, however, had to draw large-scale foreign debts for importing capital equipment and advanced technologies in the process of building new industries while securing their ownership in the hands of locals. Therefore, the period of HCI was characterized not only by a jump in the corporate debt–equity ratio but also by a sharp increase in foreign debt.¹²

The growth of the *chaebols* as a successful consequence of this industrialization program, however, should be given particular attention. From the 1980s, they rapidly began to take the initiative for new, large-scale projects. For instance, the *chaebols*' foray into the semiconductor industry in the 1980s can be better understood as a result of oligopolistic competition among themselves in spite of the initial reluctance of the government to support the endeavor (Yoon, 1990; Shin, 1996). The pace of *chaebol* expansion was partly reflected in the phenomenal growth of R&D expenditure in the private sector, which increased 128 times from 21.7 billion won (US\$24.6 million; US\$1 = 850 won) in 1976 to 2,698.8 billion won (US\$3,175.0 million) in 1990. The public sector share of R&D dropped from 64% in 1976 to 19% in 1990, similar to that of Japan in the 1990s (Shin, 1996). The *chaebols* successfully established themselves as the main bearer of high-risk projects in Korea in the 1980s.

The Complementing Models of Singapore and Taiwan

In contrast with Korea, which adopted a nationalistic catching-up model, Singapore chose an internationalist model. Singapore developed mainly by attracting and upgrading MNC investments by providing them with “complementary assets” such as infrastructure, human capital, fiscal incentives and so on. From the beginning, its

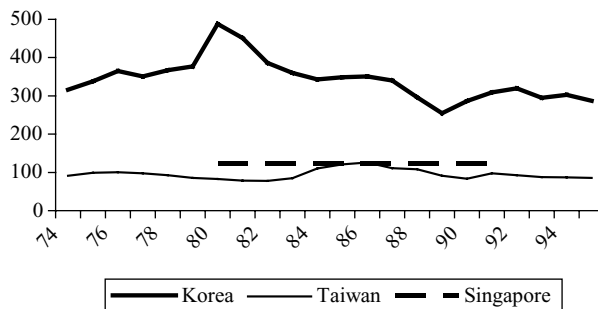


Figure 1. Debt–equity ratio of manufacturing firms in East Asia (%). *Source:* BOK (website), Fields (1995, p. 108, table 4-5), Bank of China in Taiwan, quoted in BOK (1999). Singapore’s figure is 123.3% on average during 1980–1991 (Demigruc-Kunt & Maksimovic, 1996).

strategic focus was placed on exploiting complementary relations with advanced countries for its own benefit, rather than establishing local industries to be in competition with them (Mirza, 1986; Huff, 1994; Low, 1998; Lee, 2000).

The irony is that, while Korea chose a nationalistic substituting model in order to build an independent economy, Singapore opted for an internationalist complementing model so as to be independent from its hostile neighbors. Lee Kwan Yew (2000, pp. 57–58), the first prime minister of Singapore (1959–1990), notes the following in his memoirs:

I gradually . . . settled on a two-pronged strategy to overcome our disadvantages. The first was to leapfrog the region, as the Israeli had done. . . . Since our neighbors were out to reduce their ties with us, we had to link up with the developed world—America, Europe, and Japan—and attract their manufacturers to produce in Singapore and export their products to the developed countries. . . . The second part of my strategy was to create a First World oasis in a Third World region. . . . If Singapore could establish First World standards in public and personal security, health, education, telecommunications, transportation, and services, it would become a base camp for entrepreneurs, engineers, managers, and other professionals who had business to do in the region.

When Singapore started its complementary development in the 1960s, many developing countries also received MNC investments as MNCs expanded their global operations. The overall sentiment among developing countries, however, was that they should deal with MNCs with great care and caution. In turn, MNCs also accepted it as a norm that they should operate in developing countries under heavy regulation. Even when developing countries allowed MNCs greater freedom of play, it was mainly by setting up “free-trade zones” within their regulated economies rather than letting MNCs become a major engine of economic growth. In this respect, Singapore is a pioneering country in the world in that it implemented the complementing strategy fully at the level of the national economy.

Since its industrialization was spearheaded by MNCs, which already had their own financial and technical resources, Singapore did not face any pressing need to build institutions to mobilize financial resources on a large scale or to invest heavily in the local innovative capacity. Instead, its developmental effort was mainly focused on providing MNCs with competitive complementary assets and continuously upgrading these as the level of production costs in the country rose with economic development. Government-linked companies (GLCs), that is, public enterprises in Singapore, also filled up those areas that MNCs were not interested in but which the Singaporean government regarded as strategic to the country’s development. These areas included shipbuilding, steel-making, and so on. Local small and medium sized enterprises (SMEs) also grew, mainly as subcontractors to MNCs or GLCs.

As a reflection of Singapore’s less urgent need to develop local technological capabilities, the country’s expenditure on R&D investment had been very low even until the early 1990s, when it reached the advanced country status. Singapore’s gross expenditure on R&D (GERD) was 0.21% in 1981 and increased only to 0.84% in 1990. In the same period, the figure for Korea jumped from 0.65% to 1.95%, while for

Taiwan it rose from 0.84% to 1.66% (Wong, 2001; Hou & Gee, 1993). Singapore began to seriously invest in its R&D capability only from the 1990s, when it became necessary to complement MNCs' activities with higher-end capabilities in order to continue attracting MNC investments.

Although Singapore's complementing model is different from Korea's substituting model, as described earlier, it shares some of the features of Gerschenkron's model. First, it is based on an unbalanced growth process. Singapore focused its catching-up efforts on the new technologically dynamic industry of the day, the electronics industry, and the latter's share of its total manufacturing output was about 50% in the 1990s. From the late 1990s, Singapore shifted its focus to the biomedical industry. Second, the Singaporean state played a leading role in the country's industrialization, mainly as a pro-active provider of complementary assets to attract MNC investment and also as the actual undertaker of industrial projects through the GLCs.

Compared with Korea and Singapore, the Taiwanese model can be understood as a semi-internationalist complementing model: Taiwan promoted the development of its local enterprises, but not as aggressively as did Korea. Taiwan formed international alliances of equity partnership, especially for the high-tech industries, but not as much as Singapore. A characteristic feature of the Taiwanese system has been a balanced mixture of local and foreign companies.

Unlike Korea but like Singapore, Taiwan did not utilize its banking sector extensively for the purposes of industrialization. One reason has to do with the Kuomintang's bitter experience with hyperinflation when it had ruled the mainland. So as not to repeat its failure, the Kuomintang government maintained a strong anti-inflation policy and gave little support to its industries in terms of monetary measures.¹³ The other reason would be that Taiwan did not take part in the heavy and chemical industries as much as Korea, and did not require such large-scale financing as did Korea. The Taiwanese government, instead, supported its industries mostly through fiscal measures, technical assistance from public research institutes, coordinating (sometimes initiating) the re-organization of industries and so on.

The Taiwanese economy thus built consists of the four main actors: public enterprises, SMEs, the *guanxiqiye* (local business groups), and MNCs. The role of public enterprises was the most pronounced in Taiwan among the three economies in our comparison, reflecting its peculiar history and social composition. Since the advent of the Kuomintang government in 1947, Taiwan has been a heterogeneous society with a deep schism between the minority mainlanders and the majority local Taiwanese, with the former maintaining political domination over the latter by repressive measures.¹⁴ Fearing the possibility that the local Taiwanese might politically challenge the mainlanders' domination, the Kuomintang government restrained the growth of big businesses in the private sector, and developed heavy and chemical industries related to national security through public enterprises whose top echelon was filled by mainlanders. Public enterprises contributed significantly to capital formation in the country, with their share of total fixed capital formation being the highest among the East Asian NIEs and "from the 1950s to the 1970s Taiwan had one of the largest public enterprise sectors outside the Communist bloc and sub-Saharan Africa" (Whitley, 1992, p. 58).

However, the private sector economy was mostly run by local Taiwanese in the form of SMEs and *guanxiqiye*. SMEs were major private actors in the Taiwanese economy. During the period 1966–1976, the number of manufacturing firms increased by 250% while the number of employees per firm increased by only 29%. The Taiwanese economy grew through an increase in the number of firms, rather than in their size, reflecting the importance of SMEs in the growth of the economy. This is in contrast to the Korean case, where the number of manufacturing firms increased by only 10% while the number of employees per firm doubled during the same period (Wade, 1990, p. 67).

Despite the importance of SMEs in the Taiwanese economy, the role of the *guanxiqiye* cannot be ignored. They were “handicapped initially by their lack of access to the Nationalist regime and persistent Nationalist suspicions of their political aspirations” (Fields, 1995, p. 69), and were much smaller in size and scope of business compared to the Korean *chaebols*. They were, however, able to establish themselves as a pillar of the Taiwanese economy.

Taiwan also allowed MNCs to play a bigger role than did Korea, although it similarly applied several regulations on FDI, including limits to foreign shareholding, and local content regulations. MNCs, therefore, accounted for 20% of exports from 1974 to 1982, and for 16% of those employed in manufacturing in 1975 in Taiwan (Wade, 1990, p. 149). This was higher than the share in Korea but lower than that in Singapore.

These differences in economic institutions and political economy were reflected in the way in which Taiwan shifted its economy to technologically dynamic industries, which was different from either Korea or Singapore. Korea promoted heavy and chemical industries, including the electronics industry, by strengthening the domestic nexus among the state, banks and the *chaebols*. Singapore upgraded its industries by inviting higher-end investments from MNCs. In contrast, Taiwan moved to high-tech industries by actively forming joint ventures between local firms and MNCs. For instance, Chung-Hua Picture Tube, currently the second largest monitor manufacturer in the world, was formed in 1970 as a joint venture between major local television manufacturers and the US’ RCA. TSMC, currently the largest semiconductor foundry in the world with US\$5.3 billion in sales in 2000, was set up in 1987 as a joint venture between the Taiwanese government (48%), Phillips (27%), and local private investors (25%) (Lim & Pan, 1991).

It should be noted that, like the Korean state, the Taiwanese state stepped up intervention in the transition of its economy towards high-tech industries. For instance, it initiated the formation of Chung-Hua Picture Tube in 1970 in an attempt to solve the bottleneck it faced in achieving a higher level of local content in television assembly. In the case of the semiconductor industry, the state initially wanted existing local electronics companies like Tatung and Sampo to enter the higher-end chip manufacturing business, which “opted not to enter the semiconductor market” in the 1970s because of high risk in the industry (Mody, 1990, p. 299). In response to this, a public research institute, Industrial Technology Research Institute (ITRI), assumed a leading role in developing new technologies and spinning off new firms. Taiwan’s major semiconductor manufacturers that emerged in the 1980s were all spin-offs of ITRI, and they relied heavily on ITRI as a source of new technologies (Mathews & Cho, 2000; Hou & Gee, 1993; Mody, 1990).

The major factors behind the emergence of the Taiwanese or Singaporean complementing models were, as discussed earlier, the acceleration of globalization and the emergence of the electronics industry as a new technologically dynamic industry in the latter half of the twentieth century. The beginning of the electronics industry in Taiwan and Singapore in the 1960s can be attributed to the relocation of labor-intensive production segments to developing countries by MNCs (Henderson, 1989; Chen *et al.*, 2000). These countries initially provided MNCs mainly with low-wage labor as a complementary asset; however, they upgraded and diversified their complementary assets so that the MNCs would continue to deepen and expand investments within their territories.

The differences in strategy and institutions described earlier resulted in different strengths and weaknesses among the three East Asian NIEs. In terms of financial risk, the substituting model adopted by Korea is inherently a higher-risk system while the complementing models built by Singapore and Taiwan hold less risk. Korean firms' reliance on debt was much higher than their counterparts in Singapore or Taiwan. For instance, from 1974 to 1995, the average corporate debt–equity ratio for the Korean manufacturing sector was 342.2%, while it was 95.1% for their Taiwanese counterpart during the same period. In Demigruc-Kunt and Maksimovic's (1996) study, which covered the period 1980–1991, the debt–equity ratio of Singapore firms was 123.3% while that of Korean firms was 366.2% (Figure 1).¹⁵ Korea also relied much more heavily on foreign debt than Taiwan or Singapore. Korea's foreign debt to gross domestic product (GDP) ratio shot up to over 500% at the height of the HCI, while Singapore's figures swam at around the 100–200% levels and Taiwan's figures were even lower (Table 1).¹⁶

However, Korea was ahead of Taiwan and Singapore in risk-taking capability. This is partly reflected in the trend of R&D expenditure. Korea constantly recorded a higher GERD over GDP than did Taiwan or Singapore. In the 1990s, Korea's GERD/GDP was 2.34% on average, while the corresponding figures for Taiwan and Singapore were 1.80% and 1.26%, respectively (Figure 2). This gap is even bigger in private sector R&D expenditure. The private R&D expenditure to GDP ratio in Korea was 1.85% on average in the 1990s, and the corresponding figures were 0.98% for Taiwan and 0.78% for Singapore (Figure 3). This is mainly because in Taiwan and Singapore, the governments played a leading role in R&D investment to compensate for the relative lack of local big businesses and risk-taking capability in their private sectors.

In relation to differences in local technological capability, the Korean system was stronger in building its own marketing networks. In Korea, the *chaebol*-owned general trading companies (GTCs) played a pivotal role in the country's export

Table 1. External debt to GDP ratios of Korea, Taiwan, and Singapore (% , selected years)

	1976	1982	1985	1993	1996	1997
Korea	36.7	52.0	52.1	12.7	20.2	25.5
Taiwan	13.6	12.8	14.5	7.6	8.0	9.3
Singapore	—	22.0	22.8	9.5	10.7	16.5

Source: BOK (various years), OECD (1986, 1999, website), IMF (1998).

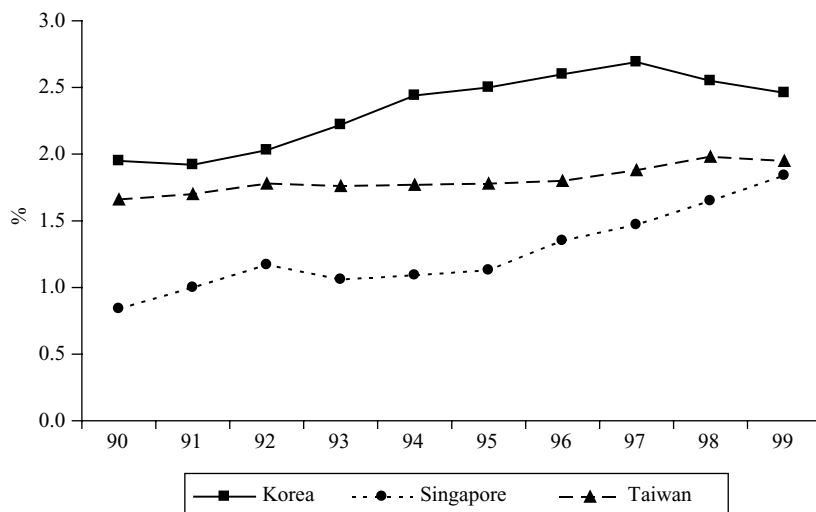


Figure 2. Trend of GERD/GDP among Korea, Taiwan, and Singapore. *Source:* STEPI (website). National Survey of R&D in Singapore, National Statistics of Taiwan, Republic of China.

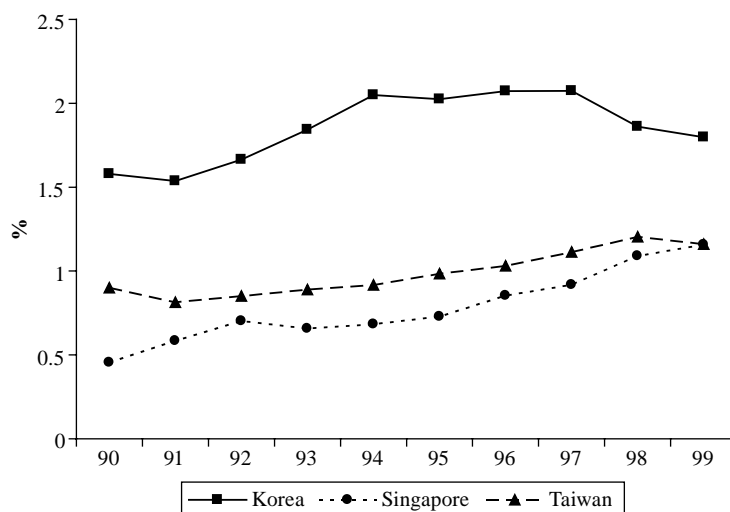


Figure 3. Trend of private R&D expenditure to GDP ratios in Korea, Taiwan and Singapore. *Source:* STEPI (website), NSTB (various years), Bureau of Statistics of Taiwan (various years).

expansion. The Korean GTCs increased their share of total exports from 14.0% in 1975 to 47.9% in 1982, while the share of the *sogo shosha* (Japanese GTCs) decreased from 15.6% in 1976 to 7.9% in 1982 (Cho, 1986; Fields, 1995). In contrast, Singapore's exports depended predominantly on MNCs' marketing networks, reflecting the country's reliance on MNCs for production activities. In Taiwan, local trading companies accounted for only around 20% of Taiwan's total trade in the

1980s, while the Japanese *sogo shosha* kept its central role as the country's international trading channel, harnessing 50% of the total trade (Fields, 1995; Whitley, 1992).

Maturity, Globalization, and Institutional Transition

In this paper the economic development of East Asian NIEs have been explained by classifying them into different types of catching-up models: the substituting model aspires to catch up with its forerunners by building a system with which it can directly compete with its forerunners, while the complementing model attempts to narrow the gap with forerunners by establishing a system to exploit cooperative relations between forerunners and latecomers.

One irony of the catching-up system is that, as it becomes successful, it faces challenges from within. Being successful in catching-up means that the gap with the forerunners is narrowed, and this puts pressure for change in the system. For instance, the latecomers will need to move more towards innovating capabilities of their own rather than simply importing technologies from the forerunners and adapting them. The economic systems of the latecomers also become more complex with the growth of their private sector institutions. By its nature, the catching-up system is transitory and requires continual change as the economy matures.

For East Asian NIEs, these challenges form economic maturity coincided with the acceleration of globalization. The pace of globalization experienced decisive acceleration in the 1980s and the 1990s, during which the East Asian economies established themselves as successful catching-up countries. Anglo-American countries like the US and the UK initiated fuller liberalization of their domestic economies and pushed for the liberalization of international trade and finance from the 1980s. The wave of liberalization has spread to other developed countries and also to developing countries.

Despite the fact that the three East Asian NIEs were equally successful in their industrialization process until the 1980s, the challenges from increasing maturity and the acceleration of globalization they faced were uneven. I will now deal with the sources for these differences under the following headings: (1) the domestic relation among the state, the financial sector and the industrial sector; (2) the relation between local companies with MNCs; (3) the financial risk management system.

First, differences in state–finance–industry relations among the three East Asian NIEs brought about different requirements for institutional adjustment. In Taiwan and Singapore, that is, those economies that adopted complementing models, the financial sector was not extensively mobilized for industrial financing. Taiwan required less capital from the banking sector due to the dominance of SMEs and partnerships with MNCs when moving towards high-tech industries. The Taiwanese state also gave less support to its industries in terms of monetary policies, but introduced fiscal policies in the form of tax breaks and high depreciation allowances, as discussed earlier. In Singapore, the role of the state was focused on attracting and upgrading MNCs' investments by providing them with complementary assets, with less involvement in direct industrial financing.

Therefore, the relation between the financial sector and the industrial sector did not need a great transformation as these countries' economies matured. The financial

sectors of Taiwan and Singapore had already been characterized by extreme conservatism and their lending decisions were more autonomous than in Korea. As their economies grew and became more complex, what was required of them was an overall upgrading of their capabilities, not a radical adjustment in their relations with the industrial sector. Likewise, the relations between the state and the private industrial sector in these countries did not need to undergo extensive adjustments. Their local capitalists, dominated by SMEs, remained relatively weak and the role of the state still lay basically in promoting them. The states of Taiwan and Singapore even strengthened their promotional role in new high-risk industries. In this milieu, there was little possibility of conflict between the state and local private companies.

By contrast, Korea faced greater strains in the state–bank–*chaebol* nexus as its economy matured. Its financial system was extensively mobilized for industrial expansion, resulting in a high proportion of policy loans to total loans of commercial banks.¹⁷ As the interaction between finance and industry became more complex with the maturing of the economy, Korean commercial banks needed to gain more autonomy in their decisions on loan provisions. The state was also required to relinquish much of its previously direct control over the financial sector while maintaining and, in part, strengthening its financial supervisory role.

State–*chaebol* relations also needed a transformation. After pervasive intervention by the Korean state in the 1970s, during which it established the heavy and chemical industries, the *chaebols* began playing a leading role in undertaking risky industrial projects from the 1980s. The Korean state was then required to play a double role: it had to maintain some form of a promotional role since its economy was still in a catching-up stage, and it also needed to regulate the increasing dominance of the *chaebols* within the domestic economy. The Korean state, therefore, strengthened anti-trust regulations from the early 1980s, and conflicts between the state and the *chaebols* ensued thereafter.

Secondly, the differences in local firms' relations with MNCs in the three East Asian NIEs brought about different challenges from the acceleration of globalization. With the acceleration in the pace of globalization, those companies that adopted a substituting strategy had a more urgent need than those adopting a complementary strategy to transform themselves into full-fledged MNCs. On the one hand, they were required to carry out heavy investments to protect their local markets from the entry of competing MNCs; on the other hand, they had to penetrate foreign markets to capture new, emerging opportunities. The Korean *chaebols*' active investments in the mid-1990s, which have been often criticized as "over-investment" following the financial crisis in 1997, can be understood in this context. With the acceleration of globalization, they were on a head-to-head collision course with major MNCs. They had to raise more money for global investment competition and, given the fact that their retained earnings fell far short of meeting investment demands, external funding was to be increased. This weakened their financial position, at least in the short run. The latecomer firms that adopted the complementing strategy in Taiwan and Singapore were also required to restructure their operations in line with the restructuring and changing needs of their partnering MNCs, but their task was not as tough as that of those firms pursuing the substituting strategy.

Moreover, there were differences in the difficulties faced by the three economies in the overall system transition following globalization. Globalization is a process of diminishing distinctions between domestic and foreign markets, and those between domestic and foreign capital. If the economic management system of a country is already amenable to the forces of globalization, it faces less transition costs. Singapore, which had already maintained an internationalist model for industrial catching-up, did not have a pressing need for a system overhaul. Globalization simply pressured Singapore to accelerate its effort at upgrading its infrastructure and industrial structure, which was what it had been doing all along. Taiwan, which adopted a semi-internationalist route for catching-up, had more problems in system transition than Singapore, but much less than what Korea experienced. Taiwan's overall industrial structure was more complementary than competitive to major MNCs in developed countries, although it had its own MNCs such as Acer, Tatung and so on, which had grown big during its previous catching-up period.

In contrast, the economic management system of Korea was based on the state-bank-*chaebol* nexus, which functioned through close interactions among the locals. With the acceleration of globalization, Korea was to open up this nexus to foreigners, though not in full. This was not simply an opening up of individual components of the system but required adjustments to the whole system. System transition involves the tasks of setting out a new vision and a new consensus, and often brings about new conflicts. This task seemed more complicated in Korea than in Taiwan and Singapore.

Thirdly, there were differences among the three economies in managing financial risks arising from accelerated financial globalization. Korea had proportionally larger foreign and corporate debts than Taiwan and Singapore. It was able to maintain the relatively high level of debt through the government's control of cross-border capital flows and commercial banks' willingness to keep providing the corporate sector with loans. Financial globalization, however, weakened the government's capacity to control capital flows. The reliance on "patient money" was also reduced as local firms became more broadly exposed to international financial markets.

In this new financial environment, Korea was at a relative disadvantage because it needed to build a new financial risk management system. In the 1980s, during which Latin American countries faced debt crises, Korea was already the only country among the East Asian NIEs that was worried about a debt crisis.¹⁸ Financial liberalization in a country with relatively high exposure to foreign debt had to be paralleled with the building of a system to manage the level and structure of debts, as well as to protect the economy from the volatility of international capital flows. In the 1990s, this imperative coincided with the Korean firms' increasing demand for investment funds for global competition. In contrast, the relatively low level of foreign debt and corporate debt in Singapore and Taiwan was a factor that made them less vulnerable to financial shocks.

There were certainly other factors that may explain why Korea fell into a financial crisis in 1997 while Taiwan and Singapore remained largely unscathed. If we compare the different catching-up models adopted by these economies, what may be noted are the greater challenges to the substituting model from the growing maturity of the economy and the acceleration of globalization. This does not in the least argue that

the financial crisis was an inevitable consequence of the substituting model. There is no such thing as necessity in history. The previous discussion no more than points out the fact that, at some historical junctures, some economies are at a relative disadvantage in coping with new challenges as opposed to others. Bigger challenges should be countered by greater creativity, but Korea somehow failed to surmount these challenges.

Conclusions

There is no doubt that, if we look back on the East Asian development experience, the complementing model has gained greater importance while the substituting model has faced greater challenges for adjustment as the pace of globalization was accelerated. This does not, however, necessarily mean that the substituting model has lost its utility and that the complementing model is free from its own set of problems.

First, there are areas of business in which MNCs are not interested in relocation or outsourcing but the latecomers may find great potential for their own growth. In the case of the electronics or textile industries, in which the spatial division of labor did occur more easily, MNCs have an incentive to shift part of their production process to developing countries. In those industries whose competitiveness is crucially dependent on the close integration of production process and the resulting economies of scale, such as chemicals, steel, microprocessors, DRAMs and so on, however, the latecomers may not find any available complementary assets for attracting MNCs to part with their production processes or technologies.

The strength of the Korean substituting model lay in developing these industries. Its economic recovery after the financial crisis was led by vigorous exports of these industries. Even Singapore, a city-state with just over four million people, needed GLCs to take on a great role in developing non-complementary business areas. If a developing country today wants to develop these industries, the Korean-style strategy of building “bigger and bigger” plants and institutions for mobilizing large-scale financial resources would still be required.

Secondly, there are now more developing countries competing to attract MNC investments than there were before. In the 1960s and 1970s, when import-substituting industrialization was a norm for economic development, the Singaporean way of growing by inviting MNC investments was an exception among developing countries. Taiwan also adopted a strategy of forming alliances with MNCs relatively earlier than other developing countries. Therefore, they rarely faced serious competition in attracting FDI from other developing countries. In a sense, their successes were relatively easier because they were pioneers of complementing models.

Today's developing countries, however, have to compete intensely with one another to attract MNC investments by providing various incentives. It is, of course, a matter of empirical investigation whether MNCs' supply of FDI has grown large enough to ease the demand-side competition for FDI from the developing countries of today. It seems that the overall supply of FDI has not grown as much as has demand from the developing world, and the distribution of FDI has remained uneven. For instance, recent FDI inflow to developing countries has been concentrated heavily in China. If we exclude China, FDI inflow to developing countries dropped 27% from US\$148.9 billion in 1997 to US\$109.4 billion in 2002, while FDI inflow to China increased by

19% from US\$44.2 billion to US\$52.7 billion, and the total FDI inflow in the world economy increased 35% from US\$481.9 billion to US\$651.2 in the same period (UNCTAD, 2003). An important policy question for those developing countries starved of FDI is whether they should keep attempting to attract FDI by offering MNCs better complementary assets, or whether they should steer their developmental models towards developing industries that are based more on local resources.

Therefore, a crucial question for the developing countries of today is to find out how sufficiently specialization in complementary areas will meet their needs for economic growth. The answer will be ultimately determined by the size of the market created by the international subcontracting network at any given time. The size of the countries concerned will also be a factor. For bigger countries, engaging only in the complementary areas may not be sufficient in attaining a desirable rate of economic growth. For smaller countries, it should be relatively easier to achieve a desirable rate of economic growth by specializing in limited areas. As the cases of Singapore and Taiwan show, this scope has been expanded greatly with the acceleration of globalization. It remains to be seen, however, whether the same will work for bigger developing countries.

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Notes

¹ For the latter view, refer to Amsden (1989), Wade (1990), Chang (1994).

² Refer to Krugman (1998), Yellen (1998), Roubini *et al.* (1998), Corsetti *et al.* (1998), IMF (1998), Fisher (1998), Lane *et al.* (1999).

³ Refer to Radelet and Sachs (1998), Furman and Stiglitz (1998), Chang (1998, 2000).

⁴ Japan had already built aircraft, battle ships, submarines and so on with its own technologies during World War II. The number of R&D laboratories also increased from 349 in 1930 to 711 in 1942 while expenditure on R&D reached 1% of gross national product (GNP) in 1942, jumping from 0.22% of GNP in 1930 (Odagiri & Goto, 1993).

⁵ I regard the case of Hong Kong, one of four East Asian NIEs, as an exception and do not include it in the comparison here. This is mainly because the city-state has never been a nation-state and has experienced rapid de-industrialization since the 1980s due to its special condition of integration into Mainland China. The manufacturing sector's share in GDP was reduced from 23.6% in 1980 to 17.5% in 1990, 8.3% in 1995, and 4.5% in 2002 (Hong Kong Census and Statistics Department, website). Industrialization is still a principal mode for economic growth in developing countries and it is hardly possible for a developing country to sustain a high growth rate while, as in Hong Kong, experiencing de-industrialization rather than an upgrading of its industrial sector.

⁶ For instance, Rosovsky (1965, p. 273) argues: "...there are only two modern historical models that depict the pattern of... industrialization... One would be the Gerschenkron model... and the other is Rostow's *Stages of Economic Growth*". Considering that Rostow's model is about the general growth process of countries and is not a comparison between forerunners and latecomers, Gerschenkron's model was the only one at that time about catching up—if we trust Rosovsky's contention. It seems to me that, even to date, no comparable historical-comparative model has been advanced by other scholars.

⁷ For instance, refer to Hirschman (1958, 1968), Rosovsky (1961, 1972), Amsden (1989).

⁸ This argument should not be confused with the issue of factor intensity at the level of the national economy. By definition, the latecomers—which have less capital than the forerunners—cannot leapfrog

- over the latter in capital–output ratio at the economy level. It is, however, possible that they can achieve higher capital–output ratios in some plants and enterprises if they concentrate their resources on them.
- ⁹ Therefore, the economic rationale of focusing on heavy industries and “leapfrogging” explained earlier was intertwined with the military needs of Germany and Russia.
- ¹⁰ Various Five-Year Plan documents, various issues of the Economic White Paper, and speeches of President Park Chung Hee produced during this period were full of emphases on an independent economy and/or an increase in self-sufficiency (refer to Table 8.1. of Song, 1997; Chang, 1994; JoongAng Daily, 1998).
- ¹¹ For a general account of the difficulties in calculating optimal economies of scale, see Streeten (1959).
- ¹² The ratio of foreign debt to GDP in Korea rose from 10.7% in 1966 to 33.9% in 1972, and further to 52.0% in 1982 (BOK, website).
- ¹³ Of course, it allocated policy loans, but they “were broadly targeted to support exports or anti-inflationary import package . . . and industry-specific loans were rare”, as Cheng (1993, p. 56) points out.
- ¹⁴ The country was, thus, ruled by martial law until 1986.
- ¹⁵ Singapore’s figure should be discounted because most of the bank loans were drawn by MNCs with their own credit from international financial institutions.
- ¹⁶ Here again, MNCs bore most of the burden of Singapore’s foreign debt, and the Singaporean government did not regard it as its obligation. Considering this fact, it cannot be said that Singapore has been exposed to higher external financial risks than Taiwan.
- ¹⁷ In Korea, therefore, policy loans constituted more than 40% of total domestic loans even in 1993, when the country had already begun opening up its financial markets (World Bank, 1993, p. 309).
- ¹⁸ Korea, in fact, underwent a debt crisis in the early 1980s, although on a smaller scale (Chang & Yoo, 2000).

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