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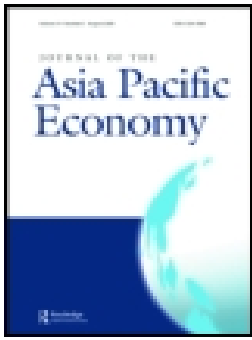
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Two New Lessons from the Asian Miracles

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ABSTRACT *Four Asian economies – Hong Kong, Singapore, Korea and Taiwan – have grown at spectacular speeds adopting different strategies. Past debates focused on their growth takeoff. The present paper studies their future outlook. As an economy matures, sustaining economic performance requires innovation and technology upgrading. Hong Kong, under a minimalist administration, is now critically deficient in technology. Singapore, dependent on foreign multinationals, is struggling to become a creator and not just a user of technology. We seek to explain why Hong Kong and Singapore are so much less innovative than Korea and Taiwan.*

KEY WORDS: Asian miracle, free market, public policy, indigenous industries, R&D

JEL CLASSIFICATIONS: O14, O38, O57.

Introduction

After all that has been said and debated about the ‘Asian miracles’, which refer to some East Asian growth performances since the 1960s, there are two new lessons yet to learn about them. The main point of this paper is that sustaining growth for a country that has made a takeoff requires building up an indigenous R&D capability. The state needs to intervene, because R&D is fraught with externalities. These lessons are emerging as Singapore, Hong Kong, the Republic of Korea (henceforth Korea) and Chinese Taiwan (Taiwan) gradually mature.

The past debate focused on how they grew, especially how they took off so spectacularly. There can be no questions, no matter how some berate the Asian high savings and low productivity, that all four economies left the poor third world and joined the rich first world in an amazingly short time. To deny the huge jumps in their standard of living is not possible.

But how to make a miracle? These countries have showed us more ways than one. The 1993 World Bank Report, entitled *The East Asian Miracle*, insisted that the neoclassical free market model was superior to the interventionist government to promote economic growth. This view now appears frivolous; for after all, each

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of the four economies put up stunning growth performances. For other third-world nations eager to learn from the Asian four, there must be more pertinent lessons than distinguishing the winners from the runner-ups, given that all four broke world records as far as growth takeoff is concerned.¹

Perkins (1994) suggested that there are three models of Asian development – Hong Kong and Singapore’s free market model, Korea and Taiwan’s Japanese model, and a third consisting of resource-rich countries such as Indonesia, Malaysia and Thailand. However, we find it more illuminating to put just the four economies into three growth categories. Doing so suggests three policy options, and we shall discuss the pitfalls and promises of each policy choice. Hong Kong has long adopted an extreme version of *laissez faire*, refusing to interfere with the free market system wherever feasible. Singapore is distinguished by her heavy reliance on foreign direct investment (FDI). Korea and Taiwan did it differently from Singapore and Hong Kong. Like Japan, Korea and Taiwan put their faith in the indigenous business conglomerates, and deliberately avoided courting the multinational corporations (MNCs) for FDI. This ‘four countries – three models’ framework demonstrates the following two lessons vividly.

The first lesson relates to Hong Kong, which is probably the freest economy in the world.² The question is not whether the free market helped Hong Kong grow: it did. Just for the record, in constant 1995 prices using the *World Development Indicator*, in 1960 Hong Kong’s GDP per capita was merely 32 percent of the United Kingdom’s and 23 percent of the United States’. In 1987, Hong Kong began to surpass the UK. In 2003 Hong Kong achieved per capita GDP 12 percent higher than the UK, and only 19 percent below the US.

What few have noticed, however, is that the Hong Kong economy now stands at a crossroads. The total absence of any public policy to promote its indigenous R&D capacity has meant that Hong Kong, contrary to Korea and Taiwan, is now seriously deficient on research and technology. Some may think that only the developed countries need research, the less developed just soak up the spillovers effortlessly. This is wrong. Cohen & Levinthal (1989) pointed out that absorption also needs R&D because spillovers are not free. Mansfield *et al.* (1981) showed that imitation cost could be as high as 60 percent of the innovation cost. Hong Kong, in any case, has long passed the imitative stage of her development. Given the already hollowed technological base, it is hard to see how she can maintain strong economic growth into the future.³

Accordingly, our first hypothesis is that a minimalist state cannot sustain long term growth, though it has a proven record in growth takeoff. It is important to distinguish a *laissez faire* government from a minimalist state. While *laissez faire* relies on the free market to allocate resources, it intervenes where the market fails, providing public goods when the market refuses to do so. Knowledge is a public good. Western governments, many of whom are ardent believers of the *laissez faire* doctrine, aggressively subsidize research and development activities. The minimalist government in Hong Kong has always been aloof and hesitant in supporting R&D.

We will argue that this failure to upgrade technology is putting Hong Kong's long term future in jeopardy.

Our second lesson is Singapore, which we contrast sharply with Korea and Taiwan. Perkins reminded us that Korea and Taiwan were influenced by their Japanese colonial history. Singapore, Korea and Taiwan grew under considerable government interventions, and all three put up tremendous growth performances. The difference, however, is that the paths they traveled have led each to distinct structural conditions, leading to divergent future growth prospects.

One of the most striking characteristics of Singapore is her reliance on FDI. From 1970 to 2000, as the percentage of gross capital formation, Singapore's annual FDI inflow was 59.5 times Korea's, 10.7 times Taiwan's, 853.8 times Japan's, 7.3 times the high income OECD country-average, and 6 times the middle income country-average.⁴ The MNCs launched Singapore's takeoff, but they also inadvertently prevented the formation of a vibrant, local manufacturing and technology base. As Singapore matures, she increasingly finds her indigenous creativity and innovativeness wanting. Hewlett Packard, Siemens, Maxtor, Sony and many other MNCs have been in Singapore for decades, but they have not shared their technologies completely selflessly with Singapore. Creativity takes time to nourish and to cultivate. Having built her economy on the back of FDI, Singapore is finding it hard to shake off her dependence on the big multinationals, and start competing with them.

All aspiring countries have a real choice to make on how much to rely on FDI to develop their economies. We shall argue that over-reliance on FDI is detrimental to indigenous businesses, and it harms the local R&D capability. This lesson is made more pertinent by the World Bank's and the United Nations Conference on Trade and Development's (UNCTAD) enthusiastic embrace of FDI as a conduit to growth. Growth strategies, such as the reliance on FDI and the MNCs, develop momentums that are increasingly difficult to turn back.

We substantiate these claims in a case study involving the four economies.⁵ Case studies are inductive, allowing specific insights rather than generalizations. We acknowledge that our two lessons may not apply equally to all developing nations. Each country has different needs and complexities. It is precisely these specificities, however, that led Lipsey & Sjöholm (2005, pp. 40–41) to conclude that 'the search for universal relationships [between growth and FDI] is futile, [. . . and that] case studies can be most valuable'.

The four Asian economies, we should emphasize, are not case studies like any others. They have been widely studied in the past two decades, becoming a focal point of the growth debate. With the emerging China and India, they are offering hope and inspirations to the less developed world. The Young (1992, 1995) and Krugman (1994) total factor productivity debate helped put the spotlight on Hong Kong and Singapore. Against this backdrop of familiarity and global attention, the four economies have become almost the prototypes of how backward countries can catch up. Correct understanding of their experience is therefore of particular importance.

Our plan is as follows. The next section examines Hong Kong, while the third section compares Singapore with Korea and Taiwan. The fourth section concludes and evaluates the two lessons.

Hong Kong: Minimalism versus Economic Maturity

Hong Kong often receives more accolades than the other ‘miracle’ economies. Milton Friedman (1980, p. 34) fondly called Hong Kong the ‘modern exemplar of free markets and limited government’. Young (1992, 1995) and Krugman (1996) praised Hong Kong’s free market system just as enthusiastically as they chided Singapore’s paternalistic state (see Note 1 below). In that vein, the World Bank’s *East Asian Miracle* (World Bank, 1993, p. 31, our emphasis) concluded that ‘promotion of specific industries *generally did not work*’, and ‘getting the fundamentals right was essential’ (World Bank, 1993, p. 32). The first ‘fundamental’ was competitive markets, for which Hong Kong is well known. They were critical of Singapore, Korea and Taiwan for deliberately targeting growth industries such as electronics, plastic, shipbuilding and steel.

The World Bank view was erroneous on two counts. First, Hong Kong’s minimalist state went much further than the traditional *laissez faire*, and we must realize that it failed to correct basic market failures such as in R&D. Second, as far as growth takeoff is concerned, not only did the promotion of specific industries generally work, but Hong Kong’s long term growth rate has lagged behind the other three. In the 1960s, Hong Kong’s per capita GDP was four times Taiwan’s and three times Korea’s; by the end of the 1990s the ratio had decreased to only 1.7 times of both Taiwan’s and Korea’s. Recently, Singapore has caught up with Hong Kong’s GDP per capita. All four economies took off successfully. Less developed countries should not be misled into believing that *laissez faire* worked and deliberate policy did not, or the other way round.

To see what truly hurts growth we should look instead at an example of failure. A neighboring and in many ways comparable economy that has failed is the Philippines. The Philippines failed because of rampant corruption at multiple levels of government and businesses. She did not fail because of the lack of free markets, and judging by Hong Kong’s success, neither did the Philippines fail because of the absence of a deliberate growth policy. A recent advertisement put up on the streets of Hong Kong by the *Independent Commission against Corruption*⁶ asks, ‘What would Hong Kong have become if not for the ICAC?’ The short answer I would suggest is ‘the Philippines’. Singapore, and to a lesser extent Taiwan and Korea, have relatively clean and efficient governments. The curbing of corruption is, as the World Bank Report correctly pointed out, a first precondition for growth takeoff.

Beyond basic preconditions, growth strategies begin to make a difference. To demonstrate how a minimalist state hampers sustained growth, we next exhibit three pieces of evidence from Hong Kong – her neglect for research and development

Table 1. R&D intensity and GDP per capita of 23 countries, 1996–2000

	(1) Research and development expenditure as % of GDP, averaged over 1996–2000	(2) Year 2000 GDP per capita at 1995 US\$	(3) Ranking of column (1)	(4) Ranking of column (2)
Australia	1.6	23543	15	13
Brazil	0.8	4626	21	20
Canada	1.8	22981	13	14
China	0.8	825	22	23
Denmark	2.0	38482	10	3
Finland	2.9	31983	3	5
France	2.2	30094	9	9
Germany	2.4	32678	8	4
Hong Kong	0.4	25230	24	12
India	1.2	463	18	24
Ireland	1.3	28106	17	11
Israel	3.2	17067	2	17
Italy	1.0	20868	19	16
Japan	2.9	44775	4	2
Korea, Rep.	2.6	13199	6	18
Netherlands	2.0	31217	11	8
Poland	0.7	3678	23	21
Russian Fed.	1.0	2471	20	22
Singapore	1.6	28295	16	10
Sweden	3.7	31338	1	7
Switzerland	2.7	46777	5	1
Taiwan	2.0	12876	12	19
United Kingdom	1.8	22237	14	15
United States	2.6	31843	7	6

Source: *World Development Indicator*, the World Bank, and *Taiwan National Statistics* at <http://www.stat.gov.tw/main.htm>

(R&D), her ultra-competitive industrial structure, and her service-only economy. Each of these poses a threat to her future performance.

R&D and Small Firm Size

Backward countries learn by imitating new technology, which requires some, although not a great deal of R&D. As an economy matures it must build up its research capabilities. Table 1 shows 23 countries' R&D expenditures as percentages of GDP. Columns 3 and 4 of the table show the rankings of R&D intensity, as well as the rankings of per capita GDP at 2000. In general, a richer country conducts R&D more intensively, and the correlation between the GDP ranking and the R&D ranking is a strong 0.65.

Hong Kong has glaringly neglected research. Her R&D intensity is the lowest of the 23 countries, even though she is the 12th richest among them. Hong Kong's R&D intensity of 0.4 percent GDP is 1/4 of Singapore's, even though Singapore's is only 2/3 of the United States'. In addition (not shown in Table 1), Hong Kong's R&D intensity is only 2/3 that of an average 'middle income country' as defined by the World Bank, although Hong Kong's per capita income is 13 times higher. Hong Kong's R&D intensity is only 17 percent that of an OECD country, even though her per capita income is 84 percent of the OECD's.

Hong Kong is an open, trade-intensive economy. Averaging over the 1990s, Hong Kong's high-tech exports such as aerospace, computers, pharmaceuticals, scientific instruments and electrical machinery is only 3.4 percent of her GDP. By comparison, Singapore's high-tech export is 18 times higher at 63.2 percent of GDP. Hong Kong's neglect for research is worsening.

Compared with the other countries, the primary contributing factor of Hong Kong's neglect for R&D is her minimalist economic policy. R&D has spillover externalities. Even a *laissez faire* government protects intellectual property rights, a duty which the Hong Kong government has failed to discharge, or discharged only half-heartedly. Intellectual piracy has remained rampant in Hong Kong to this day. For instance, pirated movie video disks are frequently put on sale even before the films begin showing on the big screen.

Advanced countries devote resources to R&D either through government subsidies, or through large corporations having sufficient scales to cover the R&D fixed cost. The only consistent policy that the Hong Kong administration has maintained, ironically, is not to have any R&D policies.

One of the reasons why private businesses in Hong Kong do not care about innovation is that they are too small. Small company size is both a cause and a consequence of the high intensity of business competition in Hong Kong. With intense competition, manufacturing firms in Hong Kong had to stay small and be nimble to cope with rapid changes in market conditions. As an 'exemplary free market' system, Hong Kong resembles the textbook example of perfect competition, with infinitely many atomistic companies sharing a similar technology, producing almost identical commodities. The average Hong Kong manufacturing concern employed only 15 workers in 1990, and even that shrank to merely 11 workers per firm in 2000.⁷

Such an ultra-competitive business environment cannot afford any meaningful R&D. The strength of Hong Kong's free market is that it relentlessly invigorates the enterprising spirit, and everyone is forever ready to pound on short term profit opportunities. Hong Kong's 1960s were the days of plastic flowers and toys, when thousands of small companies started using labor intensive, commonly accessible technology. When plastics reached the end of its product life cycle, competition led Hong Kong not to pursue technology upgrading, but to equally low-tech, labor intensive lines such as garment, and simple electronics such as transistor radios. Hong Kong companies were too small to bother about R&D, and the pace of competitive

business was too fast for the entrepreneurs to invest in projects that do not make immediate profits. R&D and technology upgrading are long term undertakings, which is alien to Hong Kong's ultra-competitive environment. The free market system and the intense competition worked together to perpetuate the market failure in R&D, stagnating Hong Kong's technology for many decades.

Some may object to our assertion that Hong Kong is super-competitive, since the business community is dominated by a few mega tycoons such as Li Ka Shing, Henry Fok and Gordon Wu. This point is valid, though it only strengthens our argument. The non-interventionist policy gives the monopoly power unhindered free play in Hong Kong. Talk to any small businessmen in Hong Kong, and they will tell you how their government habitually favors the tycoons, and how uneven are the economic playing field. The tycoons, of course, cleverly courted the fancy of Her Majesty's colonial government, as well as their new masters in Beijing. Unfortunately, pure monopolies are never energetic sponsors of research activities. It is well documented in the Industrial Organization literature, that innovative activities are the lowest when the market structure is either very competitive, or very concentrated. Most of Hong Kong's tycoons built their fortunes on property development and on speculation, needing little technology, making them nonchalant about technology upgrading.

Another factor contributing to the neglect of technology is the virtual annihilation of the manufacturing sector in Hong Kong. To that we now turn.

An All-service Economy

As technology stagnates and the firm size shrinks, Hong Kong's manufacturing sector begins to disappear. It shrank from 23.7 percent of GDP in 1980 to a mere 6.2 percent in 1998 – a 6.9 percent annual reduction for two decades. The decrease was gathering pace, recording 11.8 percent annual reduction in the 1990s, compared to only 2.1 percent during the 1980s. Nowhere did manufacturing shrink as fast, and as completely as in Hong Kong. By comparison, Singapore's manufacturing sector expanded its share of GDP from 23.1 percent in the 1980s to 24.7 percent in the 1990s.

The services sector, the allure of finance and banking notwithstanding, cannot match manufacturing's technological progress in the long run. The literature on the relative listlessness of the services sector dates back to Baumol's (1967) 'cost disease'. Baumol *et al.* (1985) provided estimates of productivity progress rates for the United States from 1947–1976. They found that US manufacturing had between 2.5 to 3.2 percent productivity growth per year, finance and insurance had only 0.5 percent, and general services only 0.93 percent. Computer and information technology improved banking and other service productivity at the point of computerization, but service remains labor intensive, and productivity cannot progress at the same rate as manufacturing. Imai (2001) estimated the sectoral productivity growth for Hong Kong, and found

manufacturing productivity grew at 2 percent per year from 1981–1997, and banking and other service productivity grew at only 0.7 percent per year.

Thus, the shift of economic activities from manufacturing to banking had an income-level effect, yielding a one-time benefit by raising the profit margin. Hong Kong enjoyed that benefit during the 1980s and the 1990s. Thereafter, per capita GDP growth relies increasingly on the unprogressive service sector, which is set to retard Hong Kong's future growth. The misgivings of free competition and a non-interventionist policy were hard to see when growth took off, but it is increasingly apparent during economic maturity. Hong Kong has always been proud of her free wheeling, enterprising way of life. This has served her well during the takeoff stage. The British colonial government established a stable political structure and an efficient administrative bureaucracy. Hong Kong's population was educated up to the secondary school level – enough to supply the low-tech, labor intensive manufacturing industries such as textile, garment, plastic, toys, watches and jewelry. They were very competitive and agile, and the free enterprising spirit propelled growth takeoff without difficulties. Then the market fails, especially in innovation and in property rights, and that becomes critical when the economy gradually matures.

Another factor that contributes to Hong Kong's predicament is her peripheral relations with the political masters at the centre. Hong Kong has always played a peripheral role, first to the British colonial power for more than a century, then to China after 1997. It is easy to understand why an external political master is apathetic towards the periphery's interests. For instance, despite the great growth takeoff, Hong Kong had only two small universities until the late 1980s. The British government had no problems seeing Hong Kong's youngsters going to universities in Britain, where they paid the high foreign student fees. They saw no long term needs to build up the tertiary education in Hong Kong. The Chinese Handover in 1997 renewed this centre-peripheral relationship. By then the neglect of research and development was entrenched. The new masters in Beijing were more concerned with maintaining the status quo, minimizing change, than with promoting inventions and new technology.

The industrialization in China presented Hong Kong with new opportunities. Ironically, that only helped erode Hong Kong's technological base more rapidly. After Hong Kong's rapid growth takeoff, wages rose, which would normally drive companies to adopt two strategies. One is to upgrade by committing to R&D, for which Singapore, Korea and Taiwan required and received substantial helps from the state. The other is to stay low-tech, shifting production to lower-wage countries. Japan and the other OECD countries practice both strategies – keeping R&D and high-tech production at home, and shifting low-tech production abroad. Singapore, Taiwan and Korea rely more on technology upgrading than on outward FDI.

Hong Kong is the exception. She exported her labor-intensive production abroad, but never moved up the technology ladder at home. When China opened her doors to FDI in 1978, Hong Kong manufacturers stampeded to flee the escalating cost at

home by entering China. The government stood idly by, happily watching the free market complete its course of action. The rapid outward FDI provided an escape route during the 1980s, only to perpetuate Hong Kong's neglect of research and technology. By 2000, manufacturing had virtually hollowed out, making it pointless to engage in R&D, as there was little manufacturing left to upgrade. Initially, the majority of the low-tech and labor intensive manufacturing in the Pearl River Delta was owned and run by Hong Kong companies. Two decades later, the mainlanders have mastered the operations themselves, diluting Hong Kong's comparative advantage. When the Chinese manufacturing begins to move up the technology ladder, few of their success stories owe significant contributions from Hong Kong. Many Hong Kong expatriates in China are now getting retrenched, or having to accept large pay cuts to keep their employment.

As Hong Kong moves towards banking and finance, it seems in some ways to resemble small vibrant economies such as Switzerland, and one may wonder why we worry for Hong Kong but not for the Swiss. This analogy however is misleading. Despite Switzerland's emphasis on banking and finance, she spent during the 1990s an annual 2.7 percent of her GDP on R&D, compared to Hong Kong's 0.4 percent. Switzerland had 4698 researchers and technicians in R&D per million people, compared with Hong Kong's 1145.⁸ The Swiss manufacturing sector is in a much better shape than that of Hong Kong.⁹

Others may also object to our interpretation, citing New York as a counter example. Both Hong Kong and New York have a great manufacturing hinterland, which allows New York to prosper by specializing in financial and management services. It is true that, in the short run, Hong Kong would have suffered a great deal more if not for the Chinese phenomenal growth. We must remember, however, for several decades after 1997, Hong Kong will remain an economic entity separate from China. Unlike New York, Hong Kong has her own monetary, financial and tax systems, and there is no free movement of capital and labor between Hong Kong and the hinterland. Even mainland tourists visiting Hong Kong need visas from the Chinese authority, who relaxed such restrictions recently, only out of pity for the hardship in Hong Kong.

The key factor is comparative advantage, and Shanghai as a business center is rapidly gaining over Hong Kong. One such advantage is, surprisingly, the language. Cantonese – Hong Kong's dialect – was popular in China at the beginning of the Chinese reform, but it quickly lost its glitter when Shanghai and other Chinese cities began to eclipse Hong Kong. Hong Kong's level of Mandarin – the mainland dialect – is far inferior to that in China. The level of English is rapidly improving in Shanghai and in Beijing, and deteriorating nearly as swiftly in Hong Kong. The counter example of New York is imperfect at best. Hong Kong had the opportunity to spearhead China's manufacturing revolution by introducing, managing and upgrading manufacturing technology, which New York does to its hinterland. This opportunity was lost because of the longstanding commitment to non-intervention by her minimalist government.

Singapore: How Good is FDI?

Now we leave Hong Kong, and turn to two other models of economic growth. One comprises Korea and Taiwan, who nurtured their indigenous businesses. The other is Singapore, which relied on FDI and the MNCs. Korea and Taiwan shared a great deal in common because of their Japanese colonial past. Korea's *chaebol* and Taiwan's *guanxi qiye* (related enterprises or big business clans) inherited many characteristics of the Japanese *zaibatsu* (renamed *keiretsu* after the Second World War). Their governments supported these business conglomerates, and the state protection continues long after the conglomerates have grown into international giants.

Korea and Taiwan are inward-looking compared with Singapore, in the sense that the *chaebol* and *guanxi qiye* propelled economic growth on the back of an indigenous business community. By contrast, Singapore relied on FDI and the MNCs, with the local small and medium-sized enterprises (SMEs) at best playing a subsidiary role in economic development. At times, the SMEs appeared downright burdensome because of their technological backwardness, paling in comparison with the power and the dominance of the multinational heavyweights.

Apart from the FDI and the MNCs, Singapore also has many Government-linked Companies (GLCs). But they chose to involve in investment holdings (Temasek Holdings), telecommunications and other services (SingTel), which enjoy a high degree of local monopoly. The Korean and the Taiwanese governments, by contrast, were keen to promote manufacturing such as semiconductors, shipbuilding, automobile, and steel. The *chaebol* and the *guanxi qiye* were urged to compete internationally.

Growth is learning. Everyone must learn, though they do it under different conditions. Workers learn through training and experience, companies learn via production and R&D, managers and entrepreneurs learn by managing and competing internationally. Over the decades, Singapore and Singaporeans have lived in a close symbiotic relation with FDI and the MNCs. Generations have learned how to serve and to depend on the multinationals, rather than to compete with them. Many in Singapore believe that they cannot do without the MNCs, although the MNCs can survive without Singapore. In what follows, we discuss this symbiotic relation and its impact on the society, on R&D, and on sustained growth.

FDI

There has been a worldwide upsurge of FDI since the 1970s. Using UNCTAD's FDI database, world FDI inflows increased by an impressive annual 24.3 percent from 1970 to 2000. The developed countries' FDI inflow has increased by 28 percent per year, and the developing countries increased by 20.2 percent per year. Among the public and the political commentaries, successfully attracting FDI is frequently construed as a prerequisite for economic development.

Singapore has been an undisputed front-runner in hosting FDI. The Singapore government set up the Economic Development Board (EDB) in 1961, armed with 100

million Singapore dollars, and a mission of ‘convincing foreign investors that Singapore was a good place for business’.¹⁰ Throughout the 1990s, Singapore consistently ranked among the world’s top five best FDI destinations according to the UNCTAD ‘Inward FDI Potential Index’.

The contrast with Korea and Taiwan is striking. From 1970–2003, the average annual FDI inflow as a percentage of GDP was 46 percent for Singapore, but only 2 percent for Korea and 4 percent for Taiwan. For the same period, the average FDI inward stock as a percentage of GDP was 99 for Singapore, but only 5 for Korea and 8 for Taiwan.¹¹

The consequences of Singapore’s pro-FDI and Korea/Taiwan’s pro-indigenous policies are fundamental and far-reaching. Not only have generations grown up serving the MNCs, but the conscious decision to lure FDI with various concessions has crowded out local enterprises, and stifled the local entrepreneurial spirit. In Singapore, success is more often measured by the position one holds in a big multinational company, than by the glory of building up a successful enterprise, and there are very few of them anyway. Many university graduates prefer working for the MNCs to the local SMEs. Some Singaporean entrepreneurs find it easier to operate outside Singapore, away from the strong arms of the foreign corporations and the government.

To be fair, Singapore courted the MNCs in the 1960s precisely because the local entrepreneurs could not provide enough employment opportunities. The Shanghai business community fleeing communism in 1949 landed in Hong Kong, not Singapore. A negative spiral then developed: the dominance of FDI makes local businesses harder to succeed, which in turn deepens the foreign dependence. A development policy once engaged tends to develop its own momentum, becoming increasingly difficult to turn back.

The last point also applies to the sharply contrasting policies of Korea and Taiwan, who chose to support and promote local conglomerates, and to keep out FDI and the MNCs. Like the Japanese *zaibatsu* or *keiretsu*, the Korean *chaebol* and the Taiwanese *guanxi qiye* soon became so prominent in their economies that their governments cannot but continue supporting them. The lesson for aspiring developing countries is that although there are many ways to growth takeoff, the initial policy determines the nation’s fate for many years to come. Economists call this state-dependent or multiple equilibria. The contrast of destiny is revealed nowhere more clearly than in the area of R&D.

R&D

We argued earlier that R&D is increasingly important as an economy matures. Singapore used to spend substantially less on R&D than Korea and Taiwan. According to the *World Development Indicator*, in 1996 Singapore spent 1.4 percent of GDP on research, well below Korea’s 2.6 percent and Taiwan’s 1.8 percent. However,

in 2001 Singapore was spending 2.1 percent, compared with Korea's 3 percent and Taiwan's 2.2 percent. Singapore seems to be fast catching up in recent years.

These percentages, however, exaggerate Singapore's research effort since they do not distinguish between local and foreign R&D. Industrial technology is proprietary, and research conducted by foreign MNCs is not the same as research done by indigenous companies. This term 'indigenous' remains relevant even in the face of globalization and the internationalization of businesses. True enough, Toyota now employs a large number of people in its overseas subsidiaries, and over 50 percent of Samsung's shareholders are foreign investors. What remains critical, however, is that Toyota carries more weight in the Japanese economy than in any other economy, and Korea's fortune is tied more closely to that of Samsung than any other economy. When Samsung makes profits, Korea benefits more than any other individual country. When Samsung advances its technology, even if some of the discoveries are made in its research subsidiary in Singapore, Korea stands to benefit much more than Singapore especially during the long run.

The difference was clearly demonstrated in the following example. In 2003, Western Digital, Maxtor and Seagate pulled their disk drive manufacturing operations from Singapore, moving them to Malaysia, Thailand and China. They took with them all their technology, which resulted in thousands of job losses, and ended Singapore's position as a worldwide disk drive manufacturing centre, which she held for two decades. The disk drive manufacturing process used frontline technology, but Maxtor and Seagate mainly hired unskilled workers in Singapore. The years of being a leading disk drive centre did not create an indigenous Singapore company capable of competing with the MNCs. Maxtor and Seagate conducted some R&D in Singapore, but it is hard to see what was left for Singapore once they had gone. The EDB has been very successful creating jobs, but not so impressive in igniting a technological and entrepreneurial revolution in Singapore.

We should distinguish between a totally foreign owned subsidiary, and an equity joint venture. From the host country's perspective, a 100 percent foreign-owned company is more willing to bring in the most advanced technology than a joint-venture company, but less willing to transfer the technology to the host. A 100 percent foreign research laboratory has complete ownership of its discoveries, and technology spills over much less than in an equity joint venture. Unlike Korea and Taiwan, Singapore does not favor joint ventures over the wholly foreign-owned subsidiaries. A large percentage of high-technology manufacturing firms in Singapore are MNCs, and an even larger percentage of MNCs are 100 percent foreign-owned. This limits technology spillover, and helps explain why Singapore's manufacturing technology has not advanced very rapidly. Mahmood & Singh (2003) studied the number of patents filed by the four Asian economies, and concluded that Taiwan and Korea are 'far ahead' of Singapore and Hong Kong in innovation and technology.

The records of R&D spending tell a similar story. In Singapore, MNCs were responsible for 33 percent of total national R&D spending.¹² In sharp contrast, foreign

companies performed a negligible 0.02 percent of total R&D in Taiwan, and 0.07 percent in Korea.¹³ If we count only indigenous R&D, Singapore in 2001 spent only 0.7 percent of GDP (0.33 of 2.1 percents) on R&D, a far cry from Korea's 3 percent and Taiwan's 2.2 percent.

A related difficulty facing Singapore is the small size of her indigenous companies. R&D is a fixed cost, and local companies in Singapore are too small to conduct research. Korea and Taiwan overcame this scale restriction, because of their governments' policies to nurture the *chaebol* and the *guanxi qiye*. Korea's Daewoo, Hyundai, Samsung and Goldstar, and Taiwan's Formosa Plastics, China Trust, Linden International and Shin Kong have acquired the scale and depth unmatched by the domestic enterprises in Singapore.

The Singapore SMEs often operate as supporting industries to the MNCs. That may seem a convenient arrangement, but it also keeps them as servants and underdogs, rather than rising to compete with the MNCs. The multinationals in Singapore are technologically advanced and financially powerful. Their presence has provided employment opportunities in Singapore, but they may also have prevented local companies from maturing and succeeding in the competitive global environment.

Conclusions

The four Asian economies have not only raised the well-being of their citizens, but they have offered hopes for rapidly eradicating economic backwardness, inviting other countries to emulate their examples. Each economy is unique, and the four have succeeded in different ways. The two lessons offered in this paper are not universal generalizations, but universal generalizations are not even desirable given the uniqueness of countries and conditions. The four Asian economies have been widely studied in the literature. Their familiarity, coupled with the novelty of our insights, has made this inductive exercise worth undertaking. Hong Kong demonstrated that the free market, together with a clean and benevolent government, is a potent agent for growth takeoff. Singapore, Korea and Taiwan showed that deliberate growth policies are equally able to propel the initial rapid development.

Our first conclusion is that some government interventions are required to sustain long run growth, especially in the area of technology upgrading. When the free market fails to build up indigenous R&D capability, the government must step in and intervene. Hong Kong wrongly adhered to a minimalist ideology, failing to recognize that the free market is a poor conduit to research, development, and technology. When technology stagnates, long term growth will also stall. Modern theory has shown that knowledge lies at the heart of growth and prosperity. Knowledge is a public good that requires government interventions. The minimalist system can deliver the initial growth takeoff, but it is far less capable to sustain long term growth.

The experience of Singapore exposes a separate issue: that we cannot rely on FDI to sustain long term growth. Less-developed countries need more than just the

capital and the machinery from the foreign investors. More importantly, they need the foreigner's knowledge and their advanced technology. An appropriate institutional setting is required to transfer knowledge efficiently. There is, again, a distinction between growth takeoff and longer term economic maturity. Singapore has relied too heavily on foreign MNCs. Judging by the examples of Korea and Taiwan, Singapore should have discriminated against the wholly foreign-owned MNC, in favor of joint ventures which are more conducive to technology spillovers. The wholly foreign MNCs may bring in the most advanced machines, but they have neither the incentive nor the obligation to diffuse the technology locally. At worst, they may even crowd out local businesses, to the detriment of the host country's sustained development.

An important question left unanswered is what role democratic freedom plays in development (see Islam & Chowdhury, 2000). This question is relevant because during takeoff, none of the four Asian economies had any Western-styled, liberal democracy. Korea and Taiwan were under military rule, Hong Kong was a British colony, and Singapore was essentially a one-party polity. All four economies took off successfully. This suggests that a multi-party liberal democracy was not a prerequisite for growth takeoff.

Again, sustained development may need something drastically different from take-off. Democratic freedom, including the freedom of speech and to challenge the status quo, could be a crucial ingredient for sustained growth. Let us briefly consider Singapore as a case in point. Singaporeans had lived comfortably under a dominating political leader for more than three decades. As Lee Kuan Yew puts it, 'what a country needs . . . is discipline more than democracy. The exuberance of democracy leads to indiscipline and disorderly conduct which are inimical to development' (see *Economist*, 27 August 1994). However, a well-disciplined people may soon learn that life is more livable if they do not ask the unconventional questions, not only when it comes to politics, but also in non-political areas. Innovativeness and entrepreneurship requires the opposite: an aptitude that is anything but conventional. The successful inventor and entrepreneur beg to differ from the average crowd. If a culture stifles dissent, it also inculcates mediocrity. Liberal democracy, free speech, and probably human rights, together they nurture the ability and the spirit to challenge the existing norm. The same free spirit drives innovation and enterprise. The demise of this spirit will hurt the sustained long term growth.

Notes

1. The past debate had two focal points. The first was the 1993 World Bank Report which elicited widespread criticisms – see Amsden (1994), Kwon (1994), Lall (1994), and Yanagihara (1994). The second was the total factor productivity (see Young, 1992, 1995; and Krugman, 1994). Stiglitz (2001, p. 512) recently summed it up this way: 'In a sense, the total factor productivity debate is much ado about nothing'. Stiglitz reasoned that the methodology of estimating the TFP growth is highly unreliable: 'it is as if the distance between Newark and New York were to be determined by using a 12-inch rule to measure the distance between New York and Los Angeles and Newark and Los Angeles, and subtracting the difference' (Stiglitz, 2001, pp. 511–512).

2. Indicators such as the *Economic Freedom of the World* (see <http://www.freetheworld.org/>) consistently rank Hong Kong top.
3. Some may object to this grim projection of Hong Kong, due to the strong backing she receives from the booming China. This indeed is a good fortune bestowed on Hong Kong, as China is eager to keep Hong Kong afloat if only to show to Taiwan the virtue of Deng Xiaoping's 'One country-two systems'. Despite Beijing's favors, Hong Kong has experienced prolonged unemployment and sluggish growth in recent years. We shall further discuss the China connection later.
4. From the *World Development Indicator* on-line, UNCTAD, and Taiwan's government statistics.
5. For brevity, only essential statistics are reported here. More detailed statistical tables and a longer version of this paper are available upon request from the author.
6. Locally known as the ICAC, set up by the British colonial government in 1974.
7. *Survey of Industrial Production*, Census and Statistics Department, Hong Kong, various years.
8. World Development Indicator on-line.
9. I am grateful to Professor Ronald Findlay for an interesting discussion concerning Switzerland. My view, however, does not necessarily concur with his.
10. See http://www.sedb.com/edbcorp/sg/en_uk/index/about_edb/vision_mission_history/1960s.html.
11. UNCTAD FDI Database and Taiwan Statistical Yearbook 2003.
12. *National Survey of R&D in Singapore 2002* (Table 3.4), Singapore government's Agency for Science, Technology and Research.
13. *Taiwan Statistical Yearbook 2003*, Table 53, p. 97, and Korean Ministry of Science and Technology, http://www.most.go.kr/most/english/activities_01_2.jsp.

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