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**Export Growth and Industrial Policy:
Lessons from the East Asian Miracle experience**

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Introduction

The lessons from the high growth or 'Miracle' experience of the newly industrialized economies (NIEs) have been discussed extensively. This paper focuses on a particular and controversial aspect of this story – role of export growth and industrial policy – with the latter defined broadly to cover a range of interventions to change the structure and raise the growth of exports. It asks what are the lessons for today's policy-makers in the East Asian region from this experience. The international environment is now very different from the early 1960's, when the rapid growth of manufactured exports from the first tier NIEs started to arrive on world markets. Forces of globalization of both trade and capital flows are now much stronger, intra-regional trade is now far more significant and transnational firms have now established elaborate production networks, both globally and within the region. The rules and dispute procedures governing international trade have been strengthened by the emergence of the World Trade Organization (WTO). Also ideas relating to economic policy and the most effective means of stimulating economic development are now very different with a greater awareness of the potential costs of interventions to control or over-ride markets. Nonetheless the paper suggests there are some policy lessons from this look at recent economic history, which are different for economies at different stages of development.

Although the distinction between least developed and other developing or emerging economies is somewhat arbitrary, it does reflect differences in broad industrial structure. In the lower income group exports tend to be dominated by primary products and industrialization has proceeded only very slowly. The different needs of today's least developed economies, and those with low incomes that do not fall exactly into this category, are recognized by their differential treatment in the WTO. For this group the policy lesson is that some of the measures of industrial policy used successfully in the NIEs– like export subsidies and measure to support new producers– still have a role to play at a relatively early stage of industrialization and can be used effectively to encourage a diversification of exports and the expansion of new manufactures. These do not contravene WTO regulations.

For higher income emerging economies, however, the agenda will differ and the objective will be to successfully upgrade the export structure and move up the ladder of comparative advantage. For these economies measures of old style industrial policy where governments attempt to 'second-guess' the private sector or create winners now have little relevance. Experience in the 1990's suggests strongly that here government initiatives to support the industrial sector will remain important, but should now focus principally on measures like infrastructure provision, particularly related to information communications technology, education and skill development and fostering innovation in frontier technologies. This is a challenging agenda, but quite different from that faced by industrial planners thirty years ago.

The paper commences with a survey of the evidence on export growth and industrial policy in the NIEs, before turning to lessons for contemporary policy.

Export growth and movements up the ladder of comparative advantage.

A vast literature has assessed causes of the East Asian Miracle (see, for example, World Bank 1993, Rodrik 1994, Leipziger 1997, Stiglitz and Yusuf 2001, Quibria 2002) with the general conclusion that simple single factor explanations for a diverse range of experience are not helpful. However, equally it is an obvious and outstanding fact that the Miracle economies experienced extremely rapid manufactured export growth, which can be seen as a critical variable in 'economic take-off' circa 1960 for the initial 'Gang of Four' NIEs (Republic of Korea, Taipei,China, Hong Kong, China, China and Singapore). Subsequent to this the

second tier NIEs (Malaysia, Thailand and Indonesia) also experienced rapid growth in the 1980's to be followed in the 1990's by PRC, and to a lesser extent Vietnam. For example, the share of the Gang of Four in world exports of manufactures rose from 1.5 % in 1965, to 5.3 % in 1980 and to 7.9% in 1990; the combined share of Malaysia, Thailand and Indonesia rose from 0.4% in 1980 to 1.5% a decade later (World Bank 1993, table 1.5).

As implied by the flying geese pattern, to some extent there is a broad similarity in the types of export industries in which countries specialized at comparable stages in their development. All countries started with a focus on technologically simple labor-intensive goods – clothing, sports goods, toys, processed foods and so forth. Although the speed of graduation from these has varied, moves into a range of more capital-intensive, technologically sophisticated items have always followed. This common pattern of initial specialization on labor-intensive or resource-intensive activities followed by a move up the ladder of comparative advantage, as relative resource endowments change, is precisely the sequence envisaged in the 'stages of comparative advantage' as set out many years ago by Balassa (1977).¹

Institutional mechanisms for this export growth have also varied – for example whether domestic or foreign firms were the key movers, whether EPZs were used, how far export required high subsidies and how far government intervention through directed credit was used to upgrade export structure. Table 1 summarizes the shifts in trade policy in the NIEs. The four first tier NIEs have vacated export markets, which have been filled by the second tier group. To illustrate these broad trends table 2 gives the share of total exports taken by particular product categories over the period from the mid-1960's to early 1990's.

Table 1: Timing of shifts in trade policy

Indonesia	Republic of Korea	Malaysia	Taipei,China	Thailand	Singapore
1948-66 Economic nationalism; nationalization of Dutch enterprises	1961-73 Initial export take-off	1950-70 Natural resource based exports	1953-57 Import substitution	1955-70 Natural resource based exports	1959-64 Labor-intensive import substitution
1967-73 Some trade liberalization	1973-79 Heavy and Chemical Industry Drive: selective promotion	1971-85 Import substitution and export promotion through EPZs	1958-72 Export promotion	1971-80 Import substitution	1967-73 Labor-intensive export promotion
1974-81 Oil and	1980-90 Gradual	1986- onwards	1973- 76 Industrial	1980- onwards	1973-84 Upgrading

¹ The move of the ladder of comparative advantage can be illustrated simply with data from Korea. In 1961 the single largest export item was iron ore (13% of total exports); in 1980 it was textiles and garments (29% of the total) and in 1989 it was electronics (also 29%) (Kim and Leipziger 1997 table 3.1).

commodity boom	trade liberalization and move to less selectivity	Gradual trade liberalization and export promotion	consolidation	Trade liberalization and export promotion	export structure
1986- onwards Gradual trade liberalization and export promotion	1990- onwards Trade liberalization and high-tech exports		1981 – onwards High tech industrialization		1985- onwards Export promotion of high tech and services

Source: adapted from World Bank (1993) table 3.5 and appendix 3.1

Table 2 Changing composition of exports: first and second tier NIEs (selected exports as % of total non-oil exports)

Republic of Korea	1965	1975	1985	1994
Food	17.5	14.1	4.4	2.8
Textiles, clothing, footwear	30.9	43.9	32.1	22.7
Wood and paper products	11.1	5.6	0.7	1.1
Non-electrical machinery	1.5	0.7	2.0	5.7
Electrical machinery	0.3	6.4	7.2	20.8
Chemicals and pharmaceuticals	0.2	1.6	3.6	7.1
Computer and office equipment	0	1.0	2.1	4.0
Communications equipment	0.9	3.0	5.7	6.7
Taipei, China	1965	1975	1985	1994
Food	53.0	16.6	6.2	4.0
Textiles, clothing, footwear	15.8	38.9	32.6	19.4
Wood and paper products	7.3	5.2	2.9	1.7
Non-electrical	1.4	2.8	4.5	8.2

machinery				
Electrical machinery	1.4	5.1	9.1	15.1
Chemicals and pharmaceuticals	4.9	2.0	2.9	6.1
Computer and office equipment	0	1.6	4.5	13.5
Communications equipment	1.3	9.0	7.7	6.6
Singapore	1965	1975	1985	1994
Food	21.2	11.8	7.6	4.8
Textiles, clothing, footwear	9.1	7.8	6.5	4.0
Wood and paper products	1.3	3.1	2.4	1.0
Non-electrical machinery	4.6	8.6	8.6	7.5
Electrical machinery	1.8	13.2	19.0	23.4
Chemicals and pharmaceuticals	5.7	6.0	8.7	6.9
Computer and office equipment	0.3	2.6	9.3	27.6
Communications equipment	0.5	4.9	8.6	10.4
Hong Kong, China	1965	1975	1985	1994
Food	4.7	1.9	2.1	2.9
Textiles, clothing, footwear	64.2	60.4	46.7	44.8
Wood and paper products	0.5	0.3	0.6	1.5
Non-electrical machinery	0.6	0.6	1.6	3.3
Electrical machinery	3.1	6.1	9.0	13.1
Chemicals and	1.3	0.9	1.1	4.0

pharmaceuticals				
Computer and office equipment	0	1.7	5.7	7.1
Communications equipment	3.6	7.0	6.9	4.5
Indonesia	1965	1975	1985	1994
Food	27.0	22.7	14.6	11.7
Textiles, clothing, footwear	0.2	0.3	6.1	24.7
Wood and paper products	0	0.1	10.0	17.3
Non-electrical machinery	2.5	0.8	0.2	0.6
Electrical machinery	0	0.6	0.8	2.1
Chemicals and pharmaceuticals	0.5	1.4	5.9	3.2
Computer and office equipment	0	0	0	0.9
Communications equipment	0	0.1	0	2.5
Malaysia	1965	1975	1985	1994
Food	6.9	7.7	6.1	3.6
Textiles, clothing, footwear	0.5	2.7	4.5	6.2
Wood and paper products	0.7	2.6	1.5	4.1
Non-electrical machinery	0.7	1.6	2.1	3.6
Electrical machinery	0.2	3.1	17.9	24.5
Chemicals and pharmaceuticals	1.1	1.0	1.6	3.1
Computer and office equipment	0	0.9	0.2	10.0
Communications equipment	0	0.6	3.3	13.8

	1965	1975	1985	1994
Thailand	1965	1975	1985	1994
Food	55.2	64.0	47.4	22.7
Textiles, clothing, footwear	0.5	6.6	16.7	20.4
Wood and paper products	0.1	1.3	1.3	1.1
Non-electrical machinery	0	0.2	1.8	3.7
Electrical machinery	0.1	1.0	6.3	12.7
Chemicals and pharmaceuticals	0.1	0.6	1.4	3.0
Computer and office equipment	0	0	0.8	9.5
Communications equipment	0	0.1	0.1	4.2

Source: UNCTAD (1996) table 33

The data in table 2 reveal a number of trends;

- (1) the decline for the first tier NIEs from the mid –1960's in the relative importance of primary product exports (principally food), which were important initially in all cases, except Hong Kong, China;
- (2) the initial importance and subsequent relative decline in textile, clothing and footwear exports from these economies;
- (3) the emergence during the 1980's from the first tier NIEs of substantial exports of more capital and technology-intensive goods, such as electrical machinery, chemicals and pharmaceuticals, computer and communications equipment; some of these goods embodied advanced, international best-practice technology;
- (4) a broadly similar pattern for the second tier NIEs with some differences of timing and content; textile, clothing and footwear exports became important as a proportion of exports approximately 20 years later than in the case of the first tier group, in the late 1980's rather than late 1960's (although they have not become of major importance in Malaysia);
- (5) an approximately similar 20 year lag for the second tier NIEs in the rise in the export share of some of the more skill-intensive and technology intensive products, like non-electrical machinery and chemicals and pharmaceuticals;
- (6) early and rapid strides in changing the composition of exports towards some technologically-intensive activities – principally computers and communication equipment- in both Malaysia and Thailand (but not Indonesia); these two categories were 24% of total non-oil exports in Malaysia and 14% in Thailand in 1994, compared with 11% in Republic of Korea, 20% in Taipei,China, 39% in Singapore and 12% in Hong Kong, China.

Moves into the high technology sectors during the 1990's in the second tier economies have been driven by FDI activities as international firms have shifted parts of their value chain to

low wage locations. Outputs of these sectors have been amongst some of the most dynamic products in world trade over the last two decades. However, reflecting the 'slicing' of the value chain, for the second tier economies much of their exports of these goods will cover low skill elements of the production process relating to assembly or simple fabrication of parts and components, for use elsewhere in the chain.

The data in table 2 can be extended by focusing on the classification of exports by broad technological categories. Table 3 shows the changing technological structure of exports from the NIEs in 1985 and 1998 using a well known form of technology classification.

Table 3 Manufacturing exports: composition by technological category 1985 and 1998. (%)

Country 1985	Resource-based	Low-tech	Medium-tech	High-tech
Republic of Korea	8.6 (3.5)	41.4 (27.2)	37.2	12.8
Taipei,China	9.9 (5.8)	52.9 (29.6)	21.1	16.2
Singapore	43.5 (8.0)	8.6 (4.0)	23.4	24.5
Malaysia	53.7 (46.4)	8.0 (5.4)	11.4	26.9
Thailand	37.9 (28.2)	35.4 (26.8)	22.0	4.7
Philippines	56.0 (43.1)	24.1 (14.5)	0.9	11.0
Indonesia	75.2 (43.8)	15.5 (13.1)	6.4	3.0
Hong Kong, China	3.2 (1.7)	63.0 (44.1)	19.1	14.8
Country 1998	Resource-based	Low-tech	Medium-tech	High-tech
Republic of Korea	10.7 (3.9)	21.0 (11.3)	38.5	29.8
Taipei,China	5.5 (2.6)	30.4 (13.5)	27.5	36.6
Singapore	14.1 (3.4)	7.0 (2.2)	18.7	60.2
Malaysia	16.7 (14.5)	11.0 (5.0)	20.3	52.1
Thailand	19.3 (12.4)	25.3 (15.2)	20.5	34.8
Philippines	7.2 (5.5)	14.5 (10.6)	10.9	67.4
Indonesia	38.8 (26.6)	33.0 (20.5)	18.5	9.7
Hong Kong, China	4.5 (2.9)	56.3 (47.8)	13.2	26.0

Source Lall (2000)

Notes:

Resource-based: figures in brackets are for agro-based manufactures including food products, alcohol and tobacco.

Low technology: figures in brackets are for textiles, garments and footwear.

By the late 1990's all of these economies had seen a major diversification of their exports and a move into increasingly sophisticated products lines (even if this was due their incorporation into global value chains at the assembly end of the chain).

Dynamic Role of Exports.

In most interpretations of the Miracle story this rapid growth of exports is seen as providing the key demand stimulus to set in train a cumulative process of high investment, high profits, high savings and high growth. What precisely constitutes export-led growth is ambiguous. Intuitively it can be thought of as a situation in which exports constitute a substantial proportion of incremental demand. Rodrik (1999) has questioned whether manufactured exports were a large enough share of total economic activity in Republic of Korea and Taipei, China for them to have played this type of role at the start of the high growth period in the early 1960's.² In his view the key growth spurt was due to a rise in investment, although even in this interpretation rising export demand could have provided part of the incentive for higher investment.³ In the smaller, more open, economies of Hong Kong, China and Singapore such qualifications are unnecessary given the large relative size of exports in GDP in the early 1960's. Also in the early 1980's at the start of their high growth periods in Indonesia, Thailand and Malaysia export to GDP ratios were much higher than in Republic of Korea and Taipei, China in the early 1960's, so that the macro impact of export expansion there would have been comparatively greater.

The precise mechanism through which countries commencing on a path of rapid growth can benefit from 'openness' to trade and rising exports has been the subject of much discussion. Several possible mechanisms have been identified;

- (1) First, there is the route of demand expansion noted above. The importance of this is that if economies can break into export markets they will be able to overcome the constraints on sales imposed by the absolute size and dynamism of the domestic market. In terms of manufactures it is often pointed out that there is an 'easy' stage of import substitution when domestic production can capture the market served initially by imports. Beyond this the expansion of sales will be determined by the growth of that domestic market, which may be relatively low.⁴ Insofar as increasing returns to scale in production are important this will reinforce the advantage of operating at higher output levels due to exporting and subsequent cost reductions due to specialization can lead to further cumulative gains in export market share.
- (2) Second, exporting, by exposing firms to foreign competition, technology and marketing, can lead to productivity gains that would not be obtainable from sales in the domestic market. Contacts with foreign buyers, for example in the clothing sector and more recently in branches of electronics, have meant that East Asian firms received access to foreign designs or technologies that allowed them to upgrade their production to international standards, thus enhancing productivity.⁵ Further, strong competitive pressure was exerted on domestic suppliers producing under contract to buyers abroad since to maintain their contracts they had to constantly monitor costs as foreign buyers were 'constantly seeking newer, lower cost sources' (Pack 2001:127).

² "Exports were less than 5% of GDP in South Korea around 1960 and barely over 10% in Taiwan. In a pure accounting sense exports could not have been responsible for more than a small fraction of the initial growth spurt in both countries, in view of the small base that they constituted" (Rodrik 1999:51).

³ For example, Quibria (2002:27) cites a study on Korea, which claims that in the 1960's domestic investment, on which Rodrik places a key emphasis in his explanation of Korean growth, only grew strongly after the shift to a greater export orientation.

⁴ Bhagwati has contrasted East Asian experience with that of India, where the growth of the domestic market was constrained by the expansion of agriculture, which cannot grow beyond 4% a year for any sustained period (cited in Quibria 2002:28).

⁵ This argument on the links between exports and productivity growth cannot be pushed too far however, since there is a substantial body of firm-level evidence that although exporting firms tend to have higher productivity levels than domestic oriented firms in many cases causation may run from high productivity to exporting rather than in the opposite direction.

- (3) Third, exports allow access to imports that can be purchased with the foreign exchange they generate. For individual producers gains from imports can be both static, if they cost less than competing domestic production, and dynamic where capital and intermediate imports embody superior technology that allows productivity gains. Consumer will also gain from access to new or cheaper products.⁶
- (4) Fourth, insofar as there is validity in the case that growth of manufacturing output is more valuable at the margin than the same growth of agriculture or services, due to externalities and dynamic increasing returns to scale, the shift in the composition of exports in the NIEs (particularly Malaysia, Thailand and Indonesia where primary exports were important initially) would in itself have had positive growth effects.
- (5) Fifth, if an export-oriented strategy attracted FDI that would not have come to the economy under an import substitution regime, and insofar as this FDI generated positive externalities for the domestic economy, there will be further benefits that go beyond the monetary value of increases in exports. The role of FDI in the region has been highly varied with some economies (Singapore, the Philippines, and Malaysia) relying very heavily on foreign owned firms for export growth and others (Republic of Korea, Thailand and Taipei,China) less so.⁷

Empirical studies to link export growth with growth of GDP have been plagued by problems of causality and endogeneity. Work on East Asia surveyed by Quibria (2002:26-32) tends to suggest an important independent causal role for high export growth, thus substantiating the a-priori arguments noted above. However, whilst in general high GDP growth tends to be associated with fast growth of foreign trade and exports, the reverse does not always hold, so that not all economies where exports are a rising share in total activity grow rapidly. For example, there were a number of least developed countries that experienced rising export to GDP ratios in the 1990's, which grew only slowly in per capita GDP terms (UNCTAD 2002:119). Hence what also appears to matter is the accompanying domestic policy environment and the composition of exports, with in general manufacturing exports offering more dynamic potential

The question of how rapid export growth was generated initially in the NIEs is of considerable interest to today's low-income economies of the region and this raises the question of whether there were in fact favorable preconditions. Two aspects in particular have received considerable attention – the education base and the domestic savings rate.

Role of Education.

It is a widely held view that having a relatively well trained and educated labor force was a critical element in the rapid export growth of these economies and that in general education plays critical role in growth.⁸ Education can provide a skilled and flexible work force and high growth raises the private returns to investments in education, encouraging private initiatives. The initial expansion of simple labor intensive activities may have required more labor market flexibility and discipline than high education attainment, but subsequent moves up the ladder

⁶ The role of imports, particularly of capital equipment, is the mechanism stressed by Rodrik (1999:27). Lawrence and Weinstein (2001) find support for this view in their analysis of Japan, although they stress the competitive impact of imports on productivity rather than the role of technology embodied in imported capital goods. Also from a theoretical point of view if openness to trade allows more rapid technological catch-up then in endogenous growth models openness can be shown to accelerate growth (Edwards 1992).

⁷ Hill and Athukorola (1998) cite estimates of the share of TNCs in manufactured exports for the late 1980's and early 1990's of 92% for Singapore (1991), 76% for Malaysia (1991), 58% for the Philippines (1983), as compared with 26% for Korea (1986), 33% for Thailand (1988) and 18% for Taipei,China (1989).

⁸ Use of an education variable in cross-country growth analyses is now standard. For example, Barro (1999:19-21) reports a positive and significant coefficient for the variable male secondary schooling, but not for male primary schooling nor for any female schooling variable. Also cross-country analyses of the impact of FDI on growth have found it only to be significant in a high education environment (Borenzstein et al 1998).

of comparative advantage clearly needed a strong education base. However whilst this is intuitively plausible, it is clearly not a simple case of high education attainments being a catalyst for strong export growth, since the Philippines, whose achievements in the education sphere are widely recognized has had the most disappointing growth performance of the region and has only experienced rapid export growth relatively recently; a similar point applies to Sri Lanka in South Asia. This implies that on its own in the absence of more direct measures to support export growth high education investment will be unlikely to be very effective. Hence education attainment can be seen as a critical facilitating mechanism where other appropriate stimuli are in operation.

One of the major initial advantages of the NIEs was their comparatively high education standards. Rodrik (1994) provides convincing evidence that relative to their income levels, both the first and second tier NIEs had high educational attainments in 1960. In all but the case of Hong Kong, China, primary enrollment was well above that predicted for the countries' income levels and for Hong Kong, China enrollment was already high. A similar pattern applied for secondary enrollment, with the exception that it was slightly below the predicted level for Indonesia, but well above for Republic of Korea and Singapore. However, even in the case of Indonesia the literacy rate was higher than predicted for the country's low-income level.

Government policy in the NIEs built on this initial advantage. Aggregate government expenditure on education in the NIEs relative to GDP did not differ significantly from the emerging economy average (Thomas and Wang 1997). However education expenditure per pupil rose in line with rapid GDP growth and due to the impact of a slowing of the population growth in East Asia as compared with other regions the 1980's saw a much lower increase in the number of children entering school in these economies, allowing rising expenditures per child.⁹

High savings and high investment in the export boom.

The role of high domestic savings, and as a natural concomitant high investment rates, in the high growth economies has also often been commented on. However, cultural explanations that focus on a natural sense of thrift in East Asia have been found not to match the facts, since rather than being a precondition for high growth, high domestic savings is more readily explained as an outcome of the high growth process. Low national savings rates at low income levels is a well established pattern empirically. From a theoretical point of view recent work has stressed that savings rates may be positively related to income growth as opposed to income level, and that in some circumstances reductions in risk may have a larger impact than on savings decisions than changes in real returns (Hoff and Stiglitz 1999). The link between savings and growth with causation running from the latter to the former has been established in recent empirical work, so that there is strong reason to believe that high savings are principally an outcome of the growth process rather an independent causal factor.¹⁰

⁹ The growth impact of the implied increase in human capital over this period (labor inputs adjusted for the change in quality of the workforce) has been approximated in growth accounting studies. One of the most authoritative of these by Bosworth and Collins (2000) shows that approximately 15% of the growth of output per worker in East Asia (1960-96) is accounted for by human capital inputs, with the bulk around 60% due to physical capital accumulation and the residual attributed to TFP growth.

¹⁰ World Bank (1993: 204) carried out formal tests for the direction of causation between savings and growth in the Miracle economies and concluded that income growth has been a strong predictor of savings in Indonesia, Korea, Thailand and Taipei, China. In Hong Kong, China and Malaysia the results are more ambiguous and causation could run either way. In Singapore income changes appear unrelated to the rapid rise in savings, which is explained principally by demographic factors. This latter effect arises when with falling birth rates the share of the working age population in total population rises. This factor was also at work in other countries. Bloom and

Table 4 summarizes the position over the high growth period showing the rising share of GDP taken by domestic savings.

Table 4 Gross Domestic Savings as a proportion of GDP in export boom periods (%).

Country	1960's	1970's	1980's	1993
Hong Kong, China	31	32	34	37
Taipei, China	14	27	31	28
Republic of Korea	9	22	31	35
Singapore	8	35	42	50
Malaysia	25	29	33	41
Thailand	22	26	26	35
Indonesia	7	19	33	34
Philippines	17	21	20	14

Source: Leipziger and Thomas (1997) Appendix.

It can be seen that in the early stages of the high growth period domestic savings rates averaged below 10% in Republic of Korea and Singapore. In 1960 they were 11% in Taipei, China (Dahlman and Sananikone 1997 table A.2.4). In terms of saving at the take-off period, the outlier of the Gang of Four is Hong Kong, China, where a well developed banking sector with a stable and convertible currency, at the time backed by sterling, may be the key explanation for the much higher savings rate. In the second tier NIEs savings rates were much higher at the onset of their export booms, but they nonetheless rose over the boom periods. The much lower savings rate in the slower growing Philippines is a clear contrast.

None the less the despite the bulk of causation running from growth to savings, Government policy may also have had some impact on both corporate and household savings through a variety of possible mechanisms. Volatile and negative real interest rates, a symptom of macro instability, can be expected to exert a negative impact on savings in a monetary form. In general, whilst real interest rates in the high growth economies were not uniformly positive, they tended to be more stable and less negative than in other regions.¹¹ A policy of 'financial restraint' by restricting competition between banks and lowering nominal interest rates paid to depositors, it has been argued, kept banking profitability up and rates charged to borrowers relatively low, thus raising corporate profits. As the marginal propensity to save for corporations was higher than for households and as the savings of the latter were interest inelastic, this raised the overall rate of savings, as well as contributing to higher growth (Stiglitz 2001:514-5). In addition, insofar as financial sectors were well regulated this would have lowered risk to depositors, although the extent to which such regulation took place effectively in more recent years can be questioned after the experiences of the 1997 Crisis.

Williamson (1999) have suggested that through its impact on savings and labor supplies the demographic transition could have added up to 2 percentage points to the annual growth rate in the NIEs from the early 1970's to early 1990's.

¹¹ Negative real interest rates are reported at certain times during the 1970's for Taipei, China, Korea and Indonesia, for example (Leipziger 1997).

Government postal-run savings schemes that lowered transaction costs for small savers and offered them relatively high levels of security have been identified as important mechanisms for tapping into savings of low income households in Republic of Korea, Malaysia, Singapore and Taipei, China. On the other hand, the role of mandatory savings schemes, in Singapore and Malaysia, has been questioned on the grounds that such savings may have simply substituted for voluntary savings (World Bank 1993). Restrictions on luxury consumption, such as tariffs on high value consumer imports, and restrictions on consumer financing may also have had some positive impact on savings.

Investment-Exports-Savings nexus

High domestic savings allowed the financing of high rates of domestic investment and recent interpretations of the Miracle experience have placed great emphasis on a high investment-high export-high savings nexus that drove the growth process (Rodrik 1999, Akyuz et al 1999). In this view all three elements interact to generate high growth. Domestic investment and exports thus combine to provide the demand stimulus, with domestic savings out of profits providing the bulk of the resources for investment. The key role of investment as a source of growth was also highlighted in studies that demonstrated the relatively modest role of efficiency gains as compared with factor accumulation (Krugman 1994).¹² The export market provides a key incentive for higher investment, but the link between higher exports and higher investment is not guaranteed, since there are many examples in recent experience of export booms failing to stimulate significantly higher domestic investment. Rodrik (1999:51) cites the examples of Turkey and Chile in the 1980's, but the illustrations can be extended to a number of countries undergoing structural adjustment reforms in the 1980's and 1990's where the export to GDP ratio rose, but private investment contracted or grew only sluggishly.¹³ From this perspective the key therefore in explaining the initial high growth phase in these economies is in establishing why high rates of domestic investment were sustained as part of the export expansion.

However, the high investment and savings levels do not appear to capture the full story. The growth of these economies was still higher than predicted from regression analysis that allows for their actual investment rates and other characteristics. For example, Nelson and Pack (1999) show this for the Gang of Four over the period 1960-89 with the deviation of actual from predicted GDP per capita growth as much as 4.7% annually for Taipei, China and 3.2% for Republic of Korea. This is put down to the process of technological catch-up or 'assimilation' as firms in these economies mastered, adapted and in some case improved upon foreign technologies, new to them, but not to the world. Nelson and Pack (1999) argue that conventional TFP estimates will not pick up accurately the impact of this assimilation process, so that this type of evidence understates the dynamism and efficiency of these economies. Closure of the technology gap with the developed economies was clearly a major part of the explanation for the high growth years in these economies, although as yet Malaysia, Thailand and Indonesia have much further to go in closing this gap than have the first tier NIEs. Successful diffusion and assimilation of foreign technology requires not just a transfer of knowledge in a passive sense, but also the active engagement of local firms in the mastery and adaptation of foreign technology (Matthews and Cho 2000:80). In the NIEs a variety of means were used to access foreign technology including technology licensing, various contracting arrangements with foreign firms such as sub-contracting and own

¹² Despite the uncertainty attached to various estimates of total factor productivity growth (TFP) there does appear to be a consensus emerging in the literature that whilst TFP rates may not have been as large as in the now developed economies at their peak growth periods in the first tier NIEs, they were none the less far higher than those recorded in economies in South Asia, Latin America and Africa (Crafts 1998). This work is controversial, however. For a discussion of the limitations of empirical estimates of TFP and the concept of an aggregate economy-wide production function, see Felipe (1999).

¹³ For example in their analysis of the effects of structural adjustment programs Corbo and Rojas (1992) report positive effects for the export to GDP ratio, but negative ones for the investment to GDP ratio; see Weiss (1995)

equipment manufacture, and joint ventures with foreign investors. As we discuss below, in Republic of Korea, Taipei, China and Singapore, rather more than in the second tier NIEs, the mastery of foreign technology and the development of local variants was helped by active state support.

Moving beyond initial take-off –the role of government.

Precisely how these economies moved beyond the stage of an initial spurt of exports, investment and GDP growth to a period of sustained expansion is one of the key policy questions of the Asian Miracle experience. The basic facts as set out above indicate clearly that they underwent a major process of export upgrading in a move up the ladder of comparative advantage away from labor and resource-intensive goods with mature technologies into more skill and knowledge intensive products, with more dynamic demand prospects. The initial Gang of Four economies were helped by the rapid expansion of world trade in the 1960's, but nonetheless the increase in their share in this trade was also impressive. Explaining the success of these economies is not simple since no single common pattern exists, however, some generalizations are possible.

A generally supportive environment for private investment, due to factors like support for property rights, macro stability, and general 'openness to trade', foreign investment and foreign technology has been stressed (Quibria 2002). However, the role of government in providing support for industrialization in the formative stages of export take-off must be recognized, although policy intervention took different forms in different economies. Apart from macro economic management that avoided serious imbalances, critical was intervention to create rents (that is super-normal profits) for exporters in the manufacturing sector, which provided the incentive for reinvestment and further export expansion. The creation of rents through a variety of mechanisms is normally termed 'industrial policy' and experience in East Asia is always referred to when interventionist solutions are discussed (UNIDO 2002). The precise range of interventions used to generate rents has varied considerably, as have the main types of recipients. Of the countries concerned aspects of industrial policy were found in all cases except Hong Kong, China, with the most extensive set of interventions in Republic of Korea and Taipei, China, the least in Singapore, with Thailand, Indonesia and Malaysia falling somewhere in-between. The result in all cases was that profitability in manufacturing was raised relative to services and in most cases also relative to agriculture. This is far from unusual, since it is the standard outcome under import substitution regimes. What differed in the region was the strong focus on exports with the beneficial results noted above.

What was the policy package for export growth?

In part drawing on the experience of the NIEs, there is now general agreement on the standard package recommended to countries wishing to raise their export growth. This is based on a combination of

- adequate price incentives, defined as a competitive real exchange rate and measures to ensure that levels of anti-export bias, arising from import protection, are kept low;
- access to imported inputs required for export production at world prices, either through measures such as the removal of import tariffs, the use of a drawback system or the establishment of duty-free EPZs (duty-free access to imports of capital goods are seen as particularly important in keeping down the cost of investment and allowing access to foreign technology);
- a sound base of physical infrastructure (ports, roads, power supplies), and social infrastructure (a well educated labor force)
- adequate finance for export trade credits and to support export production .

Policy advice based on this package is now common and these measures are widely recognized as broadly reflecting the situation in the NIEs during their export booms (Cooper 2001:11). However, there were also substantial national variations in the way exports were promoted and governments of the NIEs used a range of additional measures to raise the profitability of exporting and to encourage industrialization. These included

- selective import tariff protection for home market sales, the profits from which could be used to cross-subsidize exports (Republic of Korea, Taipei,China);
- access to credits for exporters either for investment or export trade financing at subsidized interest rates (all NIEs);
- tax concessions to investors in the form of tax holidays or accelerated depreciation allowances (all NIEs);
- where direct control systems were used, preferential allocation of licenses to exporters, for example for technology imports or investment (Republic of Korea, Taipei,China);
- directed finance to strengthen the position of selected and favored enterprises (Republic of Korea, Taipei,China);
- provision of subsidized infrastructure supplies and factory space, for example as part of EPZs (Malaysia, Thailand, Taipei,China);
- provision of R and D facilities in government institutes, as well as tax credits for private R and D initiatives (Republic of Korea, Taipei,China, Singapore);
- repression of real wages through restrictions on labor bargaining and union activity (Republic of Korea, Taipei,China, Malaysia) or subsidization of wages through public housing programs (Singapore).

Sometimes these interventions were 'functional', in the sense of being available to all firms or to all firms in a particular line of activity. In other cases they were explicitly selective with some firms out of a sector selected for special support. In other emerging economies experience with these types of measures has been disappointing with rent-seeking and high cost, uncompetitive producers often the outcome (Weiss 2002). Further as we discuss below within the group of first and second tier NIEs results from some of these policies appear to have been far much more favorable in Republic of Korea and Taipei,China than in the second-tier followers. Explanations for success single out two important aspects of the implementation of policy (with Republic of Korea normally taken as the exemplar around which a model of East Asian industrial policy is based). One is the time-bound nature of support, which was deliberately put forward as transitory to give firms an incentive to develop competitiveness over time. This is perhaps clearest in the case of special import tariff protection on infant industry grounds. This is in direct contrast with the blanket semi-permanent protection perceived to be on offer in import substitution programs applied elsewhere (Lall 1994). The other explanation relates to the idea that rents were not given without constraints, but had to be competed for through a series of 'contests' which mimicked a form of competition (World Bank 1993). The obvious example here is the export targeting system of Republic of Korea where rents through access to scarce licenses or concessional credit were given in return for the achievement of specific export sales figures. Contests, under the label of 'performance requirements' have been widely used in the region and elsewhere and what is singular about the Korean case (and also the Taiwanese) is its apparent success, although this raises questions about governance in these economies. The standard explanation for the success of bureaucratic intervention in these economies due to the calibre of the public bureaucracy and more generally the relative autonomy of the state from the influence of class and sectional interests, still leaves many questions unanswered (Rodrik 1994).

Economic analyses of this experience with export promotion have focused attention on the relative incentive structure generated by these incentives. In terms of the balance of incentives between tradables and non-tradables in several countries reference to a 'competitive exchange rate' can be interpreted as a deliberate policy of under-valuation (or

'exchange rate protection') to encourage non-traditional, that is manufactured, exports. This strategy was identified in Taipei, China and Republic of Korea in the 1980's, when both ran large current account surpluses, and in Indonesia in the late 1970's and early 1980's (World Bank 1993:125-126). Elsewhere whilst over-valued exchange rates were generally avoided and devaluations were used frequently, explicit attempts to manage the exchange rate to encourage manufactured exports through under-valuation were not followed. The degree of real exchange rate variability during the periods of high export growth appears to have varied significantly between countries being low in Republic of Korea, Thailand and Taipei, China and Malaysia, but relatively high in Indonesia and Hong Kong, China.¹⁴ In general, however, the main point is that significant real exchange rate over-valuation was avoided for most of the high growth period.¹⁵

Considerable emphasis has been placed in the literature on the avoidance in these economies of the problem of anti-export bias, which arises whenever the relative profitability of home market as opposed to export sales is raised as a result of policy intervention. In the presence of protection against imports such a bias will be inevitable, unless explicit measures of export subsidy are used.¹⁶ In general, such subsidies were used widely in these economies, since the international trade system at that time allowed a number of export promotion measures that would be judged to be trade distorting for all but least developed countries under contemporary WTO rules.

Detailed empirical work revealed that in Republic of Korea, Taipei, China and Singapore in the late 1960's on average within manufacturing, such a bias was absent due to a variety of export support measures; in fact in the first two of these economies there was a slight bias in favor of exports (Balassa 1982). Given the virtual absence of import protection in Hong Kong, China anti-export bias was never an issue there. It is this evidence that forms the basis for the frequently heard argument that neutrality of incentives was critical to export success in these economies and for the comparison that is often made with other regions such as Latin America and South Asia, where anti-export bias, by this definition, was widely prevalent. This view needs to be qualified however.

The ratios cited are averages, so that given the selective nature of policies in Republic of Korea and Taipei, China within the manufacturing sector it is likely that there were particular branches where relatively high domestic protection was not offset fully by subsidies to exporters. For example, Balassa (1982) reports estimates for the late 1960's which indicate that whilst protection in Taipei, China for manufacturing as whole was low it was relatively high for durable consumer goods and transport equipment, where there was an anti-export bias; (Weiss (1990) table 5.3). Hence even in the first tier NIEs in the 1960's and 1970's there was still a dual industrial structure with export oriented and import-competing branches. However despite an anti-export bias in some of these latter branches protected import-competing firms were 'encouraged' though a range of government pressures to break into export markets. Financially this was feasible due to the cross-subsidization of exports from the rents generated in the domestic market.¹⁷

¹⁴ These figures are based on the measure of real exchange rate divergence of Dollar (1992) rather than on conventional real effective exchange rates and cover the period 1986-95; see Rodrik (1994) table 5.

¹⁵ It is only in the mid-1990's that evidence of significant real over-valuation (principally in the case of Thailand) began to emerge. This problem arose in the face of a major depreciation of the yen viz-a-viz the dollar and thus relative to currencies pegged to the dollar. Bird and Rajan (2002:25) cite estimates that put the degree of over-valuation of the real effective exchange rate for Thailand in 1997 at "anywhere between 11% and 30% relative to some measure of 'equilibrium' real exchange rate"

¹⁶ A more formal definition of anti-export bias is where the effective rate of protection for importables exceeds the effective rate of subsidy for exportables. This is definition put forward by Bhagwati (1988) and is generally what is meant in discussions of neutrality of trade incentives. Balassa (1982) table 2.4 (cited in Weiss 1990) reported the original estimates for these economies that compared effective rates of import protection and export subsidy.

¹⁷ Westphal (1981) has suggested that the Korea practice of encouraging protected industries to export at an early stage and to cross-subsidize initially uncompetitive exports from sales made at higher prices in the protected

In the second tier NIEs the dualistic manufacturing structure was even more dominant with one segment serving the protected domestic market and the other driven by FDI, and often based in EPZs, serving the international market. In this fragmented structure the issue of anti-export bias was less significant, since switching of sales between the two segments was rare.¹⁸ Hence the type of cross-subsidization with sales in the protected domestic market partially subsidizing exports found in Republic of Korea and Taipei,China did not occur to any major extent in these economies.

The important general point as far as incentives are concerned is that the profitability of manufacturing was raised relative to that of other sectors through the array of incentives noted above, with different measures important in different economies and at different times. Hence whether the measures used were exchange rate under-valuation, tariff protection, subsidized credit, or access to the rents associated with licensing or other controls the consequence was higher profitability for manufacturing. This broad incentive effect combined with a general stimulus to exports, whether through financial incentives or direct 'encouragement,' yielded rapid growth.¹⁹

Country Experiences.

In considering experiences within the NIEs it is important to note country differences, particularly since not only did the measures used vary to some degree between countries, but so did the beneficiaries of the rents they created. In Republic of Korea the beneficiaries were the large conglomerates the chaebol, in Taipei,China small and medium national firms were the main recipients, and in Malaysia Malay-owned firms and to some extent TNCs were the main beneficiaries. In Indonesia, where cronyism was particularly rife, political and family connections determined access to rents. In Singapore foreign firms were the principal beneficiaries. Given this diversity it is not surprising that the use to which the rents themselves were put varied, as did their effectiveness in generating further exports and investment.

We commence a brief survey of experiences with a focus on Republic of Korea and Taipei,China and Singapore. In these countries, although industrial policy went through various phases and was wound down in the 1990's, there is clear evidence of not just a focus on exporting, but a systematic attempt to alter the pattern of specialization of the economy and to move up the ladder of comparative advantage. Some similarities are found in the other NIEs (apart from Hong Kong, China), but there policy intervention was both less systematic and less extensive.

In relation to Republic of Korea it is conventional to discuss industrial policy in terms of distinct phases (see table 1) (Kim and Leipziger 1997). Initial efforts at industrialization from

domestic market turned the conventional infant industry sequence on its head. The early competitive pressure from entering export markets is seen as a critical distinguishing feature of the Korean experience as compared with conventional import substitution activity; see also Westphal (1998).

¹⁸ This is the interpretation of export promotion policies in Malaysia in Jomo (1997:109). Evidence on the continued existence of anti-export bias in Malaysia, Indonesia and Thailand is given in World Bank (1993) figure 3.4, where effective rates of protection for import substitution activities are shown to be higher than those for 'export push' activities. However from the figure the divergence appears only modest. For Indonesia much higher estimates of anti-export bias are implied in Bhattacharya and Pangestu (1997), table 7.11 .

¹⁹ Weiss (1990) tables 5.4 and 5.5 which reports effective protection estimates for manufacturing and agriculture for the 1960's and 1970's. In all cases except Korea protection was higher for manufacturing. However these figures, which are from different original sources will normally be based on tariff rates and may not incorporate the full incentives available (for example the impact on value-added of access to licenses). This omission is more likely to be greater source of bias for manufacturing, hence the Korea data may not reflect the true picture at this period. More recent estimates for 1990 do indicate a much higher protection for agriculture in Korea, at nearly 200% (cited in Smith 2000).)

the early 1960's focused on building up and expanding manufacturing exports, principally in labor-intensive technologically simple goods, such as processed foods, clothing, footwear, sports goods, and toys (see tables 2 and 3 for the changing composition of exports). During this period there was protection of the domestic market and a quantitative control system for imports and foreign exchange allocation. Government direction of the banking sector also ensured that credit went to priority areas, of which exports became the most important. Export promotion measures included subsidized credit for working and investment capital, preferential access to licences for imports and foreign exchange, direct cash payments, and duty-free access to imported inputs used in exports (this latter facility was also extended to indirect exporters – that is local suppliers of inputs to exporters). From the mid-1960's onwards firms were set specific export targets and receipt of long-term credit was linked directly with past achievements in meeting these. This array of incentives was available for firms whose domestic sales were protected by import tariffs and as discussed above, this often offset the impact of import protection to avoid or reduce anti-export bias.²⁰ Even where more capital-intensive, import-competing industries had strong positive protection in the domestic market, there was government pressure for these import-competing firms to break into export markets. At this stage it was exports in general rather than particular firms or sectors that were being targeted, so that interventions were largely functional rather than selective.

From the late 1960's policy discussions in Republic of Korea shifted to a concern to broaden the industrial base of the country by moving into the production of industrial intermediates and capital-intensive industries in the Heavy and Chemical Industry Drive formalized in a Presidential decree of 1973. This was part of a move to diversify and radically upgrade the structure of exports. Six sectors were singled out for promotion – steel, petrochemicals, nonferrous metals, shipbuilding, electronics and machinery. These were given short-term export targets and official statements were clear that international competitiveness was expected within a brief ten-year period. At this stage government interventions became more selective than earlier, with individual chaebol promoted on the grounds that large firms were required to support production at a competitive scale.²⁰ Policy loans –the directed credit mechanism for channeling funds to priority sectors – were used extensively at this time and at their height in 1978 were just over half of all credit in the economy (Kim and Leipziger 1997:183). Loans for working capital at subsidized rates were available to any exporter, but only priority firms and sectors could obtain long-term funding at these rates. The deliberate measures to direct large groups into particular sectors and to support them financially if their projects ran into difficulties created the Too-Big-Too-Fail concept which was to play an important role in Republic of Korea in the 1997 Financial Crisis.²¹

Starting around 1980 the highly selective measures noted above came to be relaxed and a more functional, but none the less interventionist government strategy was followed. The Comprehensive Stabilization Program was announced at the time as the pursuit of a 'private-sector-led economy' (Smith 2000:93), although government involvement remained much higher than in many other economies. During the 1980's there was a gradual and staged process of import liberalization involving the phasing out of import licensing and the reduction

²⁰ Although the results of Balassa (1982) are always cited to support the absence of anti-export bias, other estimates give a different picture. Smith (2000) table 3.4 reports results, which show anti-export bias in Korea in 1975, 1980, 1985 and as 1990.

²¹ Amsden (1989:73) cites the cases of the Ssangyong group in cement, the state-owned Pohang Iron and Steel Company, the Hyundai group in shipbuilding and the Hyundai, Samsung and Daewoo groups in machinery, all of which received favorable treatment in comparison with smaller and sometimes more experienced competitors. Lim (2001) stresses that government guarantees of foreign borrowing by these large groups were a particularly important form of support at this time.

²² For example the government asked Daewoo, then a textile and trading company, to take over a machine tool manufacturer and a shipyard, as well as invest in automobile production. When Daewoo responded to these requests it was forced to borrow heavily (its debt-equity ratio reaching 900%) and when these loans could not be serviced the government had to bail it out (Lim 2001:14).

in import tariffs.²² Export incentives of the type used earlier were reduced, as was the bias in favor of priority activities and firms. The focus of fiscal incentives gradually shifted to a non-discriminatory basis aimed at specific types of investment, such as R and D expenditure. Emphasis on the latter was part of a drive in the 1980's to foster high technology activities, which became the new priority after the heavy and chemical industry phase. FDI restrictions were eased during the 1980's as a means of access to foreign technology. Bank credit allocation at this time was still influenced by government, although the role of policy loans was scaled down. Loans were still channeled to certain priority areas and firms however, although in the 1980's priorities shifted, with a new focus on small and medium enterprises, high technology activities and firms in need of restructuring. In the Industrial Development Law that became effective in 1986 the industries shipping, foreign construction, textiles, ferro-alloys, dyes and fertilizers were designated for rationalization. Packages available to such firms included subsidized credit for upgrading equipment and financing mergers, as well as the imposition of further entry restrictions into the sectors concerned.

It was not until the early 1990s that substantial government withdrawal from economic activity and the ending of 'old-style' industrial policy actually took place, although some of the measures undertaken after the 1997 Crisis, in forcing chaebol to give up certain lines of activity to concentrate on their core areas, demonstrate aspects of earlier industrial interventionism. Table 5 summarizes key features of industrial policy in Republic of Korea.

Table 5 Republic of Korea: Industrial Policy

Period	Priority activities	Main instruments
1960-73	Exports in general- key sectors labor-intensive manufactures	Import protection, export subsidies including duty drawbacks, subsidized credit allocations, export targeting.
1973-1980	Heavy and Chemical Industries – priority sectors steel, petrochemicals. nonferrous metals, shipbuilding, electronics and machinery; priority firms selected large enterprises	Import protection, export subsidies including duty drawbacks, subsidized credit allocations, export targeting. Widespread use of policy loans to channel funds to priority firms and sectors. Investment incentives through tax credits.
1980-90	Manufactured Exports, firms needed restructuring, small and medium enterprises. High technology activities now priority.	Phased import liberalization, ending of policy loans. Still government influence over allocation of credit. Investment incentives for R and D. Easing of restrictions on FDI.
1990 onwards	Private sector-led development; restructuring of chaebol after 1997 Crisis	Financial sector liberalization; open capital account;

Source: adapted from Kim and Leipziger (1997)

²³ The effective rate of protection remained very high for agriculture (estimated at nearly 200% in 1990) but for manufacturing it fell from 22% in 1980 to 11% in 1985 and 6% in 1990 (cited in Smith 1990).

If Republic of Korea, is often taken as the archetypal illustration of industrial policy there are many broad similarities with experiences in Taipei,China. In the latter there was also a strong focus on exports combined with early protection in the domestic market and subsequent measures by government to upgrade the industrial structure. The major difference is the relatively much greater role in Taipei,China of small and medium enterprises and public enterprises as opposed to large private conglomerates and a significant, but less dominant, role for directed lending in the form of policy loans. In Taipei,China most discussions of industrial policy suggest a sequence commencing with a short period of import substitution in the 1950's (1953-57) (Dahlman and Sananikone 1997). This involved the combination of quantitative import restrictions and import tariffs to protect the domestic market, as well as the use of a multiple exchange rate system with the value of foreign currency set differently for exports and imports, with the former penalized. The main beneficiaries were simple labor-intensive activities, such as textiles and clothing, wood and leather products.

In most interpretations, in the late 1950's a critical choice was made to shift towards greater export promotion; what has been termed an 'export substitution' phase (1958-72), in which the composition of exports shifted dramatically to labor-intensive manufactures.²³ Policy instruments used included a rebate system to allow duty-free access to imported inputs needed by exporters, subsidized loans available only to exporters, a unified and undervalued exchange rate, and for certain industries an export targeting system (although not as widespread as the practice in Republic of Korea). In addition, measures were taken to encourage export-oriented FDI including tax holidays and freedom to repatriate profits. However, local content requirements (up to a maximum of 70% of value-added) were imposed on foreign firms in some sectors to develop local linkages. In 1965 as part of this drive the statute setting up EPZs was passed. By 1970 these zones were already accounting for 10% of total exports. Export growth during this phase was still in relatively labor-intensive technologically simple goods but had broadened beyond textiles, garments and agro-processing activities to include simple consumer electronics, like radios and refrigerators, as well as goods like watches, clocks and toys. It appears that export promotion was generally functional rather than selective, although there was some selectivity in terms of credit allocations between sectors. However protection of the domestic market remained substantial, so that as in Republic of Korea a dualistic structure of exporting and import-competing firms emerged.²⁴

As in Republic of Korea during the 1970's the need for industrial upgrading was perceived as important by policy makers, which led to a phase of 'industrial consolidation' (1973-80). This involved a shift in strategy in what has been seen as a phase of 'secondary import substitution' with local production of industrial intermediates and capital goods – such as iron and steel, petrochemicals, machine tools and electrical machinery - for use by export industries. Given the capital-intensive nature of many of these activities public enterprises were given an important role. In addition, there was heavy public investment in large infrastructure projects (principally highways, railways, ports and airports). The subsidy element in loans to exporters was very high in the 1970's at around 20% of the value of exports in the mid 1970's falling to 5% in 1980 (Smith 2000 table 2.7). Although the previous export promotion measures from the 1960's remained in force, import protection and the use of directed credit were used to encourage import-competing activities.²⁵ Also at this time

²⁴ Generalizing from his work on Taipei,China Ranis (1985) has argued that this early shift away from import substitution into what he termed export substitution is a major factor explaining the different experiences in industrialization between Latin America and East Asia. In the former region early import substitution led on to secondary import substitution in intermediate and capital goods with the export substitution stage missed out.

²⁵ See Weiss (1990) table 5.3 for estimates of effective rates of protection for different groups of industries.

²⁶ The average nominal tariff in 1974 was as high as 55% falling to 39% in 1979 (cited in Smith 2000, table 2.2). Wade (1990:166-7) draws attention to the role of government directives to banks to lend in support of particular sectors (and firms within these). In the 1970's part of this lending bias was in favor of exporters, but part also was in favor of heavy industry.

government support for new high technology activities began; as manifested, for example, in the creation of public research institutions, like the Information Industry Institute.

The 1980's saw a gradual trade liberalization and with the emergence of low wage competition elsewhere the government, again as in Republic of Korea, targeted high technology activities as new export priorities. Strategic areas receiving priority support were information technology, machinery, precision instruments, biotechnology, electro-optics and environmental technology industries. Their identification was justified by a list of criteria, which included not just their high technological intensity, but also their low pollution levels, their low energy use, their high value added and their market potential (Dahlman and Sananikone 1997). This restructuring was encouraged by the use of preferential loans at subsidized interest rates available for broad categories of activity rather than individual firms.²⁶ In addition, support of domestic R and D came from a combination of tax credits for this form of expenditure, government investment in public laboratories and the establishment of science parks close to Universities and technical centers. Exporters in general continued to receive preferential access to credit during the 1980's, but the subsidy component in this financing declined substantially over the decade. However, they also continued to received tax credits unavailable for domestic sales.

As in Republic of Korea, the 1990's saw the end of most elements of selectivity in industrial policy. Import and foreign exchange liberalization was largely completed; the financial sector was largely liberalized with a decontrol of interest rates and an ending of directed credit; tax incentives were made neutral as between sectors being granted for generic activities such as R and D, pollution control and energy conservation, rather than for investment in particular sectors. Government support for high technology initiatives, in terms of public expenditure on new technologies and in the creation of new science parks became the focus of industrial policy.

Table 6 Key stages in industrial policy in Taipei, China.

Period	Priority activities	Main instruments
1953-57	Import substitutes- key sectors textiles, clothing and other labor-intensive manufactures	Import protection through tariffs and import quotas.
1958-72	Export promotion/substitution – key sectors labor-intensive manufactures particularly garments, consumer electronics. Some import substitution in intermediates –basic metals, chemicals	Unified competitive exchange rate; rebates of import duties; tax credits; subsidized loans; EPZs; encouragement to FDI; export targeting. Import protection through tariffs and import quotas.
1973-1980	Import substitution of intermediate and capital goods plus exports – key	Public investment in state enterprises; tax credits; policy loans; import tariff

²⁷ The subsidy rate defined as the difference between the rate on strategic loans and the prime rate was only around 1.75%-2.75% at this time. In fact it appears that these strategic loans were in fact relatively widely available for new investments and that only about one-third actually went to strategic industries (Smith 2000).

	sectors petrochemicals, steel, shipbuilding, automobiles, machine tools, electrical machinery, consumer electronics	rebates. Selected import protection
1981- 1990	High technology activities and exports – strategic sectors information technology, machinery, precision instruments, bio-technology, electro-optics, environmental technology	Trade liberalization; policy loans for strategic industries; tax credits; public investment in infrastructure and research facilities; science parks; encouragement to FDI.
1990 onwards	Private sector-led development	Financial liberalization – interest rate decontrol; ending of policy loans; public sector for science and technology; encouragement to FDI; education investment.

Source: adapted from Dahlman and Sananikone (1997)

As a small city-state with an historic entrepot function Singapore always had many distinctive features. Although it has been much more heavily dependent on FDI than either Republic of Korea or Taipei, China and has been virtually a free trade regime since the early 1970's there are some elements of similarity in the attempt of the government to alter the composition of exports and the pattern of comparative advantage. This has been pursued essentially by tax credits, which have been differentiated between sectors giving preference to skill and knowledge-based, higher technology activities. Directed and subsidized credit was not used widely as a policy instrument, although the Economic Development Board did establish a Venture Capital Fund to finance co-investments in new technology-intensive activities (Soon and Tan 1997:232).²⁷

In each of these three economies state support for technological upgrading through the development of 'national systems of innovation' has been highlighted as a key aspect of industrial policy. One crude indicator of the extent of such support is the ratio of R and D expenditure to GDP, and all three economies have had values for this ratio much higher than in other emerging economies.²⁸ Each reflects a slightly different approach to industrial policy for local technological development. In Republic of Korea the building of technological capability was concentrated in the chaebol. Public support was provided by subsidies for

²⁸ The provision of good public housing is seen as an important factor in keeping down labor costs at early stages of the export boom period in Singapore. Wage repression through direct intervention in the wage bargaining process was also an important factor chiefly in the 1970's (World Bank 1993).

²⁹ For the late 1990's the ratio of R and D expenditure to GDP is 2.9% for Korea, 1.9% for Taipei, China and 1.5% for Singapore, compared with 2.9% for Japan, 2.6% for the US and 1.5% for Singapore (Yusuf 2002 table 3). For Malaysia, Thailand and Indonesia the ratio is below 0.5%.

enterprises' own R and D, by the flow of knowledge and personnel between public sector research laboratories and these firms and by public education investment in applied technical subjects. For example, over the period from 1960 to the mid-1980s it is estimated that roughly two-thirds of private sector R and D was financed by state subsidized credit (Amsden 2001:244-5). Also, as a simple example of the degree of support from education investment when the national system of innovation was being created in the 1980's, the share of engineering students in the total population was four times higher in Republic of Korea than in Brazil, an emerging economy with which Republic of Korea has often been compared (Freeman 1995 table 4).

In Taipei, China the key private sector actors were small to medium enterprises, many of whom were successful in establishing market niches in high technology activities and in conducting R and D in relation to these.²⁹ Here public research institutions had a more active role in both the diffusion and adaptation of imported technology, and publicly owned pilot plants in new lines of activity played a catalytic role in the development of new local technologies, before these plants were later sold to the private sector. In the early years of semi-conductor industry it was public not private firms that entered into joint ventures with foreign partners like Motorola, Phillips and IBM.

Singapore offers a third distinct model. Here transnational firms have been the key private actors and the key role of government has been to induce these firms to conduct R and D and various technological adaptations in Singapore rather elsewhere in their global network. This has required a combination of heavy subsidies for R and D - for every dollar of private R and D expenditure it is estimated that the government has provided roughly 30 cents - heavy public investment in higher education and the establishment of high standard public research institutes that provided support services to the private sector laboratories. Much of the local R and D by transnationals has been production and market-oriented, rather than geared to the development of intellectual property through basic research, but none the less the success of the government in stimulating local R and D clearly differentiates Singapore from other economies with a strong FDI presence (Amsden et al 2001).³⁰

Elsewhere in the region, although industrial policy has been used extensively its impact is judged to be less impressive and lacking a clear economic rationale. Malaysia has used some aspects of industrial policy although observers suggest that this has not been in a systematic or coherent manner (Jomo 1997). There after a period in the 1960's in which industrial import substitution was the main focus, export promotion became the primary concern of industrial policy. To achieve this a range of incentives, including the establishment of EPZs, were used to attract foreign capital, so that since the 1970's foreign firms have dominated manufactured exports, particularly in electronics. At one time the allocation of rents from government intervention was closely linked with ethnic distributional issues, rather than economic efficiency, as the New Economic Policy of 1971 sought to alter the balance of wealth and economic power between the Malay and Chinese communities.³¹ This policy, which was largely abandoned in the mid-1980's, has been seen as interventionism without a clear economic rationale. Malaysia, in the early 1980's, also had its own equivalent of the Korean Heavy and Chemical Industry Drive with an attempt to deepen the industrial structure through import substitution in capital and intermediate goods and thus increase linkages

³⁰ Gee and Kuo (1998) compare the approaches to R and D in the electronics sector in Korea and Taipei, China and suggests that more flexible decentralized approach in the latter offers greater dynamism.

³¹ To illustrate these local initiatives Amsden et al (2001:8) cite the case of Hewlett-Packard Singapore, whose printing division was given operational autonomy from the US headquarters. It had "only moved into the most preliminary stage of applied research. It began to modify in a limited way the basic designs provided by Palo Alto in order to build and sell a differentiated product that was more cost-effective and suited to the Asian market (a low-end, portable jet printer)."

³² For example, under the Investment Coordination Act of 1975 an investment licensing system was introduced which was designed to implement the redistributional goals of the New Economic Policy which were to ensure that the Malay community owned a certain proportion of enterprises (Salleh and Meyanathan 1997).

within manufacturing between the exporting and import-competing sectors. This strategy involved chiefly public investments in iron and steel, cement, the Proton car project, motorcycle engines, petrochemicals and pulp and paper. Results here were generally much more disappointing than in Republic of Korea, with the public sector enterprises concerned experiencing financial losses and being slow to generate exports. Many of these were privatized in the 1990's (Jomo 1997).³² The current role of the Malaysian Investment Development Agency (MIDA) in promoting inward FDI in priority high value areas, such as electronics, and in creating geographical clusters of local suppliers around these foreign firms has been praised (UNIDO 2002:120). However, others have argued that despite the impressive growth of manufactured exports from Malaysia over the last 15 years lack of a sound industrial policy has created an excessive reliance on TNC-dominated electronics exports, a shallow industrial structure with few local linkages between the export sectors and the local economy and a weak national technological base (Lall 1995).

Thailand has also built its industrialization since around 1980 on export promotion with a heavy presence of TNCs. Whilst a competitive exchange rate policy and sound macro management appear to have fostered high export growth, industrial policy interventions have been described as marked by 'patronage and rent-seeking' rather than by a clear strategy for industrial upgrading (Christensen et al 1997). Various export incentives such as tax holidays, import-duty drawbacks and the establishment of EPZs have been used, but not apparently very selectively.³³ Subsidized credits were also available for exporters but not it appears on a large scale and not linked closely with performance criteria. Directed credit through policy loans to strategic sectors by commercial banks was also not quantitatively very significant. However, privileged access to licensing helped large local private groups to expand (Rock 1995, Jomo 1997).

Indonesia is perhaps the clearest case where selective policy interventions have been closely associated with 'cronyism' and rent seeking. Credit allocations were received by politically favored groups and efforts to upgrade technological capability, though investments in high technology activity – most notably the national aircraft project – have been judged by observers to be a high cost failure (Hill 1995).

For South East Asia in general then, even observers sympathetic to industrial policy concede a disappointment with its impact in these economies, as compared with the more positive results in Republic of Korea and Taipei, China.³⁴ They see industrialization in South East Asia as driven not by governments, but principally by decisions of firms in Japan, Republic of Korea and Taipei, China to relocate production there in response to exchange rate appreciation and rising labor costs in their own economies. In this view industrial policy interventions in these host economies – such as tax incentives and the establishment of EPZs – have played only a minor role and unlike Singapore, governments in Malaysia, Thailand and Indonesia, have not succeeded in inducing TNCs to upgrade their activities, because they have not provided a sufficiently supportive environment (Wade 1994).

³³ Some of these enterprises operated behind high protective barriers. The effective protection for the iron and steel complex is reported at 131% in 1987 (Jomo 1997: 102).

³⁴ In discussing approvingly the work of the Board of Investment (BOI) in Thailand Amsden (2001:26) notes in passing that "On average only 15% of applications were rejected, but only companies that fit BOI criteria tend to apply"

³⁵ Jomo (2001:473) suggests that "much state intervention in Southeast Asia has been for reasons other than industrial policy, mainly at the behest of politically influential business interests and interethnic redistribution). However he goes on to argue that this does not undermine the case for a rational efficiency- based industrial policy, since there have been some positive results from such interventions and whilst "There have been many instances of bad industrial policy, ...the existence of bad industrial policy is not proof that all industrial policy is bad" (Jomo 2001:489).

What has been the economic impact of industrial policy?

Can we be sure, however, that industrial policy interventions worked effectively in Republic of Korea, Taipei, China and Singapore, even if few claim significant success for these measures elsewhere? Rigorous attempts to assess the impact of industrial policy ask if it altered the efficiency and, by implication, the long-run growth prospects of industry. Detailed analyses are available principally for Republic of Korea and Taipei, China, which are the cases where anecdotal and descriptive evidence suggests that its effects have been most significant. Tests for the impact of industrial policy assess three main things – first, whether priority industries actually received the bulk of financial assistance from the government, second whether the industrial structure differed from that predicted for an economy's income and population level and third whether promoted industries experienced more rapid productivity growth than others (World Bank 1993, Smith 2000). None of these tests are actually conclusive. In terms of the allocation of preferential credits in Republic of Korea, it appears that certainly in the 1960's and 1970's these flowed to priority sectors – initially exporters in general and then heavy and chemical industries. In Taipei, China, however, data for the 1980's show that the so-called strategic industries (as defined above) did not actually receive the majority of funding which rather went to declining industries in need of restructuring. There by the effective rate of subsidy measure key priority activities such as machinery, information and electronics industries had low rates relative to other activities (Smith 2000:156). Comparisons of industrial structure between Republic of Korea and the norm derived from a regression model show a pattern of industrialization that is not very different from that expected for the population size and income level of Republic of Korea, with important exceptions being that the shares of textiles, garment and footwear and metal products and machinery were nearly three times as large as predicted. For Republic of Korea the former group was promoted strongly in the 1960's and the latter in the 1970's. The main surprise is that the share of the chemicals sector is exactly as predicted. Much weight is placed on the tests that link productivity growth with whether or not a sector was promoted. For both Republic of Korea (World Bank 1993) and Taipei, China (Smith 2000) studies have found that if the analysis is at the fairly aggregate 2-digit level, at which TFP estimates are available, there is no clear correlation between a sector's TFP growth and its status as a priority activity.

Critics have pointed out inherent limitations of these tests however (Rodrik 1994, Wade 1994). There is a basic problem with the data available. Aggregations of manufacturing (for example at the 2-digit level) will be too broad to capture the performance of promoted firms or branches, but too narrow to pick up the impact of economy-wide externalities. The use of cross-country norms that aggregate different types of economy in the control group is recognized as too crude to put a great deal of weight on the results. The implicit assumption in such comparisons is that Republic of Korea and Taipei, China would have reached their actual levels of income and their actual industrial structures, at the time they did, without government intervention; in other words it is assumed that there is no catch-up effect accelerated by government, which is the hypothesis to be tested. In relation to the productivity argument the test outlined above that contrasts productivity growth in promoted and non-promoted sectors is clearly conceptually inappropriate, since what is required is a comparison of the international competitiveness of an activity with and without government intervention. Although this will be influenced by the activity's own TFP growth its competitiveness relative to non-promoted domestic sectors is not relevant, since for traded goods manufactures the relevant test is competitiveness relative to international competitors and even then there is the added comparison of the without-intervention counterfactual.³⁵

³⁵ Assessing the counterfactual of competitiveness without intervention is the key problem. Estimates of changing international competitiveness of manufacturing are available; for example for Korea Lee (1997) reports 8 out of 12 infant industry sectors becoming competitive in the 1980's. Pack (2001) comes up with an approximate estimate that due to its impact on investment and productivity industrial policy in Korea might have added 0.5% annually to

For Singapore evidence on industrial policy has been provided at least indirectly by estimates of total factor productivity growth (TFP). Young (1992) argued for example that TFP was close to zero in Singapore (compared with positive TFP in Hong Kong, China, Republic of Korea and Taipei, China) with the implication that the economy moved too quickly up the ladder of comparative advantage through its targeting policies without fully realizing the benefits of learning at earlier stages. However such estimates are plagued by conceptual and empirical uncertainties and a number of subsequent studies have found positive TFP growth for Singapore (Felipe 1999). Further even if a particular figure can be agreed there is still the counterfactual problem of what TFP would have been achieved in the absence of interventionist targeting policies.

Given this empirical ambiguity advocates of industrial policy base their case on the simple association in these economies between government support of various kinds and subsequent exports from promoted activities (Westphal 1998). As Stiglitz (2001:519) puts it

“The fact that almost *all* of the economies of the region had industrial policies (with the exception of Hong Kong, China, which benefited from the industrial policies of its neighbor, mainland China) *suggests* that such policies were an important part of their growth strategies, whether or not the highly imperfect econometric techniques for quantifying such impacts succeeded in verifying such claims” (emphasis in the original).

In attempting to assess this debate the ability of policy to stimulate high private investment in new manufacturing, which subsequently led to productivity improvements and exports is perhaps the key. Individual promotional policies may have been misplaced and led to resource misuse in high cost production (for example not all of the investment in the Heavy and Chemical Industry Drive in Republic of Korea could be judged successful), but in these countries there was a strong stimulus to private manufacturing investment since regardless of the precise impact of such policies they would have raised the profitability of manufacturing relative to other sectors. Further, even if anti-export bias was not wholly removed, the export incentive measures that were introduced widely in the NIEs would have improved the relative profitability of exports as compared to the initial import substitution situation and created a different set of relative incentives to that available in other emerging economies at this time.³⁶

A further feature worth stressing is the flexible nature of industrial policy, in both Republic of Korea and Taipei, China, which meant that policy objectives and the instruments to achieve them were adapted over time to fit new sets of circumstances. The targeting of specific industries or firms in the 1960's and 1970's, for example, when the economies' industrial structures relatively simple, was replaced in the 1980's and 1990's by a more functional, less directive, approach more supportive of the decisions of individual firms, reflecting the growing diversity and technological complexity of manufacturing. The use of directed and subsidized credit to priority activities, which almost certainly had a major impact on industrial structure, was also phased out in the 1990's. At a relatively early stage of industrialization, when a certain regularity in demand patterns can be detected, it may make sense to target broad sectors, for example at the level of the two-digit ISIC classification, as

the growth rate; which he describes as “hardly trivial, but not the secret of success.” It is difficult to know how accurate such estimates are.

³⁷ Amsden (2001:28) in support of general industrial policy argues that all successful emerging economies had to pursue a version of this policy with a focus on “getting the job done” (i.e stimulating new investment) rather than on “getting the prices right”. In terms simply of raising levels of industrial investment probably all of the NIEs achieved this to some degree.

means of building up manufacturing capacity.³⁷ However, this argument loses its validity once an economy develops industries at the frontiers of international technology.

The role of the directed credit policy has been much debated. World Bank (1993:291) suggested that it had worked effectively in Republic of Korea, but not in Indonesia, Malaysia and Thailand, where by implication criteria other than efficiency determined allocations. Theory can also be brought to bear to explain why, due to market failures, modest levels of financial restraint combined with credit targeted at activities with externalities and dynamic increasing returns, may be a good policy. Recent models of multiple equilibria and co-ordination failures demonstrate that in an imperfect world government co-ordination of private investment, if well done, can put an economy on a higher growth path (Hoff and Stiglitz 2000). However, the key problem, as evidenced by experience in Republic of Korea in the 1990's, is that too intrusive a policy in terms of financial sector intervention can block the development of a system of financial intermediation that is more suited to the needs of a technologically sophisticated economy. Whilst directed credit may work effectively at certain stages of development, again it may become dated once investment priorities become more difficult to establish.³⁸ The charge against the Korean policy (and to a lesser extent that in Taipei,China) is that by intervening in the process of credit allocation the government delayed the important financial sector reforms needed for commercial banks to be able to allocate long-term funds in response to enterprises' own demand for capital based on their own perceptions of profit opportunities (Nam 2001). This is an argument, not that interventionist industrial policy based on a controlled credit market was wrong for its time, but that it was persisted with for too long.

What are the lessons for follower economies?

The world has changed since the heyday of industrial policy in the first-tier NIEs and many now feel that their experience with it has little to offer today's lower income and emerging economies.³⁹ Three types of argument are usually put forward to justify this position. First, that the efficient bureaucracy, sufficiently insulated from political pressure to withstanding rent-seeking and associated corruption, is absent in virtually all economies. Second, if countries accept WTO membership this will rule out many of the selective interventions applied in the past, such as quantitative import controls, export subsidies, preferential directed credit in favor of particular enterprises, the copying of foreign technology and local content agreements with foreign investors. Third, with growing technological sophistication the scope for even well informed and well-motivated bureaucrats to attempt to create winners is greatly reduced, since what are new dynamic activities has become very difficult for non-industry sources to spot.

There is truth in all of these points and for these reasons attempts to reproduce the Korean model of industrial policy of the 1960's and 1970's are likely to be misguided. However, East Asian experience of the last few decades does demonstrate the simple point that strong manufactured export growth combined with the absence of macro imbalances can generate a positive cumulative process of high exports- high profits- high savings- high investment – high exports. The most useful basic lesson of the East Asian experience is that

³⁸ Wade (1994:59) explains this point as follows “ .. because of these cross national regularities in changes in final demand and technology, it is not difficult for well-informed government officials to identify which families of industries will next have fast demand and productivity growth, and which ones will have increasing (static or dynamic) returns.”

³⁹ As evidence of the difficulty for planners in establishing priorities in an age of rapid technical change and in high technology activities, Smith (2000) Appendix D list the wide range of products identified as strategic in Taipei,China (199 by 1987), although less than half of these had actually asked for special assistance.

⁴⁰ See Perkins (2001), for example, who argues against such a policy for PRC and Viet Nam; see also Yusuf (2001) and Quibria (2002).

the creation of rents for manufacturing that are both contingent on export success and time-bound provides the environment for sustained competitiveness, since if rents are withdrawn and competitiveness is not attained, enterprises will be forced to look for other markets. Support for indirect exporters, also faces a market constraint, since if local suppliers fail to reach competitiveness quickly the exporters who use them will lose markets. Measures that have raised the profitability of manufacturing relative to other activities and encouraged exports have varied from specific involvement with individual firms to much more general measures like widely available tax credits for all R and D investment. All of this is part of industrial policy, broadly defined, and not all of these measures need be abandoned. Such measures will be most relevant for today's least developed and lower income economies of East Asia (such as Vietnam, Cambodia and Lao) wishing to embark on export-oriented industrialization.⁴⁰

For such economies WTO rules do not prohibit industrial policy interventions. The WTO is based on the broad principles of non-discrimination between imports, exports and domestic sales and between enterprises and sectors. Also the TRIPs agreement imposes developed economy standards for patent protection and restricts the scope for copying and reverse engineering. However for lower income economies these constraints are not binding. Export subsidies are allowable for least developed countries and those with incomes per capita below \$1000 in 1994 (adjusted for inflation). Also provided tariff rates are no more than the country's WTO maximum tariff binding, differential rates can be provided on infant industry grounds, although if tariffs are bound at modest levels the impact of this will in turn be modest; temporary safeguards for balance of payments purposes can also be invoked as a form of protection. For developing countries at higher income levels export subsidies of various types must be phased out. Specific subsidies that discriminate in favor of particular firms or sectors are now either prohibited or deemed actionable, that is challengeable under the WTO. However, developing countries with small shares in particular import markets or where significant harm to competitors cannot be shown will be exempt from retaliation against such measures. (Pangestu 2002).⁴¹ Also, in dealings with foreign investors, whilst the Trade Related Investment Measures (TRIMs) agreement prohibits the imposition of export or local content targets there have been many delays in the implementation of this agreement with a number of developing countries requesting extensions of the transition period (Bora 2002). In short, whilst by the terms of the WTO membership many aspects of industrial policy appear to have been prohibited formally, the scope for feasible interventions is greater than might be thought.

However before advocating this type of measure a number of familiar caveats have to be entered. Industrial policy in the current international environment will require a 'vision' or strategy for the manufacturing sector as a guide. This does not require the type of detailed benchmarking used when planners in Republic of Korea in the 1960's and 1970's took Japan's industrial structure as a model and attempted to sequence investment in industry to replicate this structure. It does require a view of how to diversify and upgrade exports; this will involve price incentives rather than directives, a model more akin to that of Singapore than of Republic of Korea. Without specifying the details of what should be produced, governments can attempt to encourage private investors to upgrade production either by

⁴¹ Viet Nam, Cambodia and Lao have all achieved high rates of manufactured export growth in the 1990's (garments dominate in all) using some of the measures applied by the NIEs, such as import duty exemptions on inputs used in export production and tax incentives to foreign investors. They have also benefited from the growth of intra-ASEAN trade and in the case of Cambodia, Thai firms have started to relocate their to take advantage of preferential market access offered to goods from Cambodia and the relatively lower labor costs (UNCTAD 2002:127). Import protection has been reduced in these economies and in the case of Viet Nam average tariffs for manufactures were only around 15% in the late-1990's (Hoekman et al 2002, table A.2).

⁴² Specific subsidies that differentiate support for R and D between firms became actionable in 1999 (English and Wulf 2002:168)

moving into higher value-added activities or by deepening the industrial structure through local linkages. At the stage of development of today's least developed economies the aim will be to build up export competitiveness in a number of broad categories of light manufacturing and agro-processing activities, such as garments, footwear, toys, sports goods and some food processing. In addition, it may be desirable to encourage local linkages to input suppliers, in areas like packaging and simple engineering and metal products. To achieve this some of the 'traditional' aspects of industrial policy may have a role.

Any financial support to manufacturers should be geared to creating competitiveness and diversifying the production. As experience in the NIEs indicates, it should be time bound and performance-related (even if formal export targets clearly contravene WTO arrangements). Specific measures aimed individual firms should be avoided, as should a large dispersion in effective rates of subsidy between sectors.⁴² It is well known from the theory of domestic distortions that even if support for new activities can be justified on 'infant' grounds import tariff protection is an inferior means of providing support, because of its higher by-product costs. In principle measures should be 'promotional' aimed at addressing directly a particular market failure – for example the provision of subsidized credit to compensate for a capital market failure or a subsidy linked with employment or labor training to compensate for employment externalities. In practice tariff protection has been used in many countries (and with apparent success in Republic of Korea and Taipei,China at least) because of its relative simplicity and because its costs are borne directly by consumers not governments (Corden 1974). The dual policy of support via import tariff or quota protection in the home market, combined with encouragement to export, that worked effectively in Republic of Korea and Taipei,China, has little relevance in economies with small domestic markets and hence does not provide a model to follow.

Experience in the NIEs and elsewhere shows that whilst linkages between exporters and local suppliers are important, premature linkages fostered by high import protection will penalize exporters and make it more difficult retain competitiveness. Indirect exporters need support and experience also shows that duty-free access to imported inputs can be important for them as well as direct exporters. Any differential infant tariff protection on the final output of indirect exporters, to encourage the development of these linkages, should be modest (probably a maximum of 25%) and temporary. Support measures (such as subsidized credit) that avoid imposing higher input prices on exporters are preferable, even though in principle the impact of such price increases could be offset by other incentives to exporters, so that the effective rate of subsidy is not affected.⁴³ Imports of mature foreign technology will be important, as they were in the NIEs, and inward FDI and location within global value chains will certainly be important for this purpose. In activities where relative labor costs are a dominant factor FDI tax incentives may help to divert investment from one location to another. Finance for export credits and export insurance schemes are also likely to be useful. Small and medium firms will probably need to be given some form of special encouragement, particularly as a seedbed for local entrepreneurs.

In the second-tier NIEs and higher income emerging economies the problem is now qualitatively different, being less one of creating a basic manufacturing competence but of upgrading the manufacturing export structure by moving up the ladder of comparative advantage. However, there still remains a concern over the lack of integration between some

⁴³ Mody (1999) draws attention to the fact that rent-seeking can be associated with export subsidies in the same way as with import protection. He cites evidence of over-invoicing of exports to maximize rents from these incentives.

⁴⁴ Insofar as exporters receive subsidies for their export sales any penalties imposed by temporary protection on inputs need not result in negative effective rates of subsidy; that is lower value added than would be achieved under free trade.

export sectors and local suppliers, as efficient backward linkages need to be established.⁴⁴ For economies at this more advanced stage public support for manufacturing and export upgrading is now usually seen in more indirect terms and WTO regulations, if applied rigorously, would seriously constrain the scope for more intrusive policies. Currently average import tariffs for manufacturing are low, being 11% in Indonesia, 15% in Thailand and 8% in Malaysia in the late-1990's (Hoekman et al 2002 table A.2). Rather than attempting to prompt or create private initiatives in technologically complex areas, about which bureaucrats may know little, the lesson from recent experience in the NIEs is that governments need to create the market environment, which will both encourage and allow this upgrading.

A major plank of new industrial initiatives is linked with questions of financial sector reform to allow the development of long-term sources of finance for industry (Asian Policy Forum 2000, 2001). However in addition to this and the continuation of sound macro economic policies three other dimensions have been stressed in the recent literature. One relates to the role of physical infrastructure. It is intuitively obvious that in a world characterized by greater international factor mobility the quality of immobile non-tradable factors will assume a greater significance both a means of attracting mobile capital and as an influence on long-run economic performance. With much greater private sector involvement in infrastructure financing new challenges of regulation by governments have arisen. However, even more than in the period of initial burst of high export growth in the 1960's and 1970's good quality infrastructure will be essential if knowledge-based industries at the frontiers of world technology, which require a strong telecommunications sector, are to dominate a country's export structure. In these frontier sectors it is clear that decisions on FDI location will be influenced much less by considerations of wage costs and tax incentives, as compared with the quality of infrastructure in competing host economies.

The second dimension extends the argument about infrastructure from the area of physical to that of social infrastructure. Export upgrading will require high levels skills in the workforce, which in turn implies appropriate levels of investment in education and training in both technical and scientific subjects. Republic of Korea and Singapore, in particular, of the first tier NIEs have made great progress in creating a higher education system capable of turning out high standard engineering students and this pattern needs to be repeated in the other NIEs. Close links between research institutes, universities and the laboratories of companies, as developed in Singapore, are needed to maximize the commercial application of technological breakthroughs. This leads to the third and most profound dimension of industrial policy - innovation. For the NIEs today success in higher value sectors will now require more than simply importing and adapting foreign technology. Although public support for R and D in established firms is an important aspect of this process, it is clearly far from the only one. In a number of high technology areas important product innovations have been developed by small start-up firms – Taipei, China provides illustrations of this and of the role of science parks that have successfully linked entrepreneurial initiative and international standard pure and applied research. One way in which public policy can stimulate the process is through the provision of risk capital for these new firms with venture capitalists to “perform the role of coaches, selecting, motivating and training budding entrepreneurs” (Yusuf 2002:12). A shortage of such individuals in East Asia is seen as an important constraint on future innovation, as are the obstacles to change posed by traditional corporate governance models based on tight family control. Innovation will be principally a private sector activity, but the role of new style industrial policy will be to create the environment in terms of macro-economic, trade, finance and technology policy that will allow dynamic and innovative firms to prosper. This means removing blatant market imperfections and enforcing appropriate regulatory standards in oligopolistic and monopolistic sectors, although in the area of competition policy what is best-practice remains uncertain.

⁴⁵ For example, Reinhardt (2000) comments on the lack of linkages in Malaysia and Thailand between export sectors and local SMEs as input suppliers.

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