THE ROLE OF EXPORT IN THE ECONOMIC DEVELOPMENT OF KOREA

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Abstract

Exporters in Korea did get an adequate export subsidy to reduce the trade bias from the existing protection provided to the majority of import competing industries. This is not true, however, in the case of few import competing industries, which received higher effective rate of protection in the domestic market. In turn, for those industries with relatively higher protection in the domestic market sales in the profitable domestic market was used as an incentive for an adequate export performance. The incentive structure also shows a higher variation among import-competing industries than exporting industries. The higher magnitude of variation in incentives among import competing industries also shows the presence of an industry bias. The industry bias among import competing industries, on the other hand, shows the dominant role of government intervention in the allocation of incentives among each industry group. In contrast, the lower variation of incentives among exporting industries shows the dominant role of the market mechanism, through export performance measure, in the allocation of incentives than government intervention.

Neutral incentive trade regime on average was established because higher incentives to few import-competing industries were offset by lower incentives to other import-competing industries. The presence of an aggregate neutral incentive trade regime in Korea in the early period of the export promotion strategy also shows that the promotion of few import-competing industries at a time through biased incentives did not

create a significant resource bias against exporters. The incentive structure, which increases the relative profitability to exports were also the main factor behind rapid export growth in Korea.

Higher rate of export growth through its beneficial impact on resource allocation, investment growth and productivity led to rapid economic growth in Korea. Economic development in Korea was made far more sustainable due to the presence of educated manpower to adopt improved foreign technology made accessible from competition in the international market.

Introduction

As Edwards (1993) explained it, open and outward oriented trade strategy get a higher acceptance on economic advisors and politicians beginning from 1980s. The reason for this policy shift was believed to be the marked performance differences of Latin American countries, which followed import substitution strategy, and East Asian countries, which followed export promotion strategy. In the period between 1965-89 the outward oriented East Asian countries achieved higher rate of economic growth than the inward oriented Latin American countries.

Economic researchers, however, variously interpreted the success of these four East Asian countries. As one of the successful East Asian economies, Korea's export promotion strategy was also variously interpreted. Neoclassical economists interpret Korea's trade regime in 1960s as neutral incentive between export and import competing industries and thereby give credit to the role of the price mechanism in the allocation of resources (Balassa 1985).

Revisionists on the other hand argued that there were biased incentives to promote exports and selected infant industries. Alam (1989) argued that the incentive structure being biased among export and import competing industries, it was government intervention that played the crucial role in the allocation of resources than the market mechanism (Alam 1989). In a different argument from the revisionists interpretation of the export promotion strategy Rodrick (1994) characterize Korea's economic development as investment led growth. He argued that growth of exports was the response of rapid import demand from rising investment. Thus, it was investment, which led to the rapid growth of exports rather than the other way round. Chapter one presents the neoclassical and revisionists definition of export promotion strategy.

To approve or disprove either neoclassical or revisionists view is a difficult task. But one can give his own interpretation of the incentive structure in Korea by examining the relative incentives given to each industry group or trade category. The incentive structure is the key factor behind the rapid export performance or the resulting rapid economic growth. Thus, knowledge about the incentive structure of Korea is important for developing countries, which introduce export promotion as their trade strategy.

Chapter two investigates the incentives among export and import competing industries and the variation in incentives among each industry group and trade categories.

Rapid export growth in Korea as a result of reduction in trade bias also led to efficient allocation of resources, higher growth of investment due to rapid growth of import of capital goods and inputs from higher foreign exchange earning made possible from exporting activity. In addition, export expansion led to rapid growth of saving by redistributing income from rural to urban sector and from wage earners to entrepreneurs were the saving ratio was higher. Furthermore, export expansion measures led to rapid productivity growth of labor intensive manufactured products. Industries with higher capital intensity and higher protection on the domestic market also experienced a decline in their cost of production overtime from competing in the international market and learning by doing. Chapter three discusses the impact of export expansion on economic performance of export and import competing industries.

The facts explained above on export and its beneficial impact on economic performance are also supported by trade theory. Export expansion will lead to efficiency in resource allocation, exploitation of economies of scale and rapid productivity growth from competing in the international market. Export performance by the protected import competing industries also led to rapid productivity growth overtime. The theory and actual facts, however, needs empirical support to be of significance for policy prescription. To test whether export performance was related to the average measure of export profitability, an econometric model is developed to test the relationship. Similarly, an econometric model is developed to test the relationship between export and growth rate of GNP. The empirical result proves that on average the incentive structure did played an important role for the rapid export growth. In turn, rapid economic growth was associated with rapid export performance. Chapter four explains these issues further in greater detail.

In Korea the export promotion strategy was instituted by introducing export subsidy measures to reduce the trade bias against exporters. This required on its part the presence of strong administrative bureaucracy to administer the incentive structure. In addition, the presence of strong government bureaucracy also ensures market determined wages so that exporters maintain their competitiveness in the international markets.

Furthermore, the presence of educated manpower helped the adoption of improved foreign technology made accessible from competition in the international markets. Chapter five discusses these favorable conditions that existed in Korea in 1960s as policy lessons to other developing countries. Finally, the summary of the main issues raised by the paper will be presented in the conclusion part.

CHAPTER ONE

1. What is export promotion strategy ?

The rapid growth of East Asian economies has been given a wider coverage in the development literature. Development researchers have also interpreted the growth performance of these countries in various ways. Some economists characterize it as investment led growth while others characterize it as export led growth. Still among those economist who characterize the East Asian countries growth performance as export led growth, there is a difference on the interpretation of the incentive structure. Neoclassical economists interpret the incentive structure, as neutral incentive among import competing and export industries while revisionists interpret the incentive structure as biased between export and import competing industries. Based on their interpretation of the incentive structure, they have also differences on the role played by the market forces and government intervention. In the next section, both neoclassical and revisionists interpretation of export promotion strategy will be presented in detail.

1.1. Neoclassical definition

According to Chantuniama and Murinde (1998), neoclassical economists give great emphasis to the role of the price mechanism and the benefits of competition in the efficient allocation of resources. They argue that under competition only efficient producers can pass the market test and the economies resources tends to flow from the inefficient producers to efficient ones-creating substitution in production. At the same time consumption of goods by consumers tends to follow the same pattern as those producers which are efficient are the ones that sale their products at a lower price – creating substitution in consumption. Trade in turn will enhance efficient allocation by the price mechanism by increasing market competition. In order not to interfere with the operation of the price mechanism, neoclassical economists advocate for minimal government intervention. According to them the government should provide only public goods, namely law and order, stable money and infrastructure activities which are essential for the proper function of the market mechanism.

Neoclassical economists argue that government intervention impede competition which is source of an inducement on exporters to improve their production processes, enterpreneurship, and quality of their products. They rather argue for free trade and

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dismantling of protection from the entire domestic market to foster efficiency through competition. They argue that protection is harmful to growth by preventing competition and worsening resource allocation, tying the economy to inefficient manufacturing industries and prevention of exploitation of economies scale.

They also argue that protection by raising the domestic resource cost of production will overvalue the exchange rate and hence affect international competitiveness. In addition, protection by making sales to the domestic market more profitable than export market, discourages export growth. Moreover, protection by turning the terms of trade in favor of industry and against agriculture, hinder the development of agriculture and leads to unequal distribution of income.

Neoclassical economists are also against protection because it gives rise to rent seeking activities, which further impose cost on the economy. Under protection, entrepreneurs try to make income by diverting resources in unproductive way to evade quantitative controls. These unproductive rent-seeking activities includes tariff evasion and lobbying or corrupt practices such as bribery, in order to get import and investment licenses. These activities are said to cause additional distortion in production and consumption and they are major source of economic inefficiency since these activities use real resources to seek out rights to quotas and other rent-bestowing licenses (Chanthunya and Murinde 1998).

According to Kruger(1990)-export promotion strategy which gives neutral incentive among domestic and export sales will lead to higher economic performance than import substitution strategy. Three factors are considered to be behind the performance differences between export promotion strategy and import substitution strategy: technological factors, economic behavior, and politico-economic factors. The technological factors relate to market size, indivisibilities and economies of scale, factor intensities, infant industry, and interdependence and quality. With respect to market size, export promotion strategy permits the expansion of domestic industries beyond the domestic market as long as they are efficient to compete in the international market. In contrast, import substitution strategy encourage industries only up to the size of domestic market and expansion beyond the domestic market is also seldom profitable.

With regard to indivisibilities and economies of scale, every activity requires minimum size of scale for efficient production. Under import substitution regime as industries are constrained to produce for the domestic market, they may not attain the efficient size of operation and hence they operate at short production run and higher variable costs. Under the export promotion strategy, firms are not constrained by the size of the domestic market and hence can operate under long production run and efficient scale of operation. And under export promotion strategy, producers in small developing country can obtain specialized inputs at internationally competitive prices whereas under import substitution strategy due to protection and licensing procedures there is delay in obtaining these inputs. As a result, exporters will be obliged to buy these inputs from high cost domestic producers.

In relation to factor intensities, export promotion strategy permits the rapid growth of value added and employment of unskilled labor in industry for the same rate of human and physical capital formation when there is significant difference in factor proportion among industries. Under an IS regime, once imports have been displaced the growth rate of the domestic economy puts an upper limit on the growth of these industries with sales limited to the domestic markets. Under the export oriented regime there is a potential of expansion of domestic industries, according to their comparative advantage, beyond the limits of domestic economy.

Restriction of infant industries to domestic sales will reduce the dynamic gains, if any, to far smaller magnitude than if these industries were induced to export. Inducing infant industries to compete in the international market will bring about large scale cost reductions than if firms were restricted to produce for the domestic market. Competitions in the international market induce firms to adopt low cost activities and greater economical and engineering efficiency.

Regarding economic factors, under import substitution strategy, due to protection the number of firms producing a given product in the domestic market tends to be small in number. Any policy, which encourages competition, will increase the number of firms and hence result in loss of scale economies. Moreover, if licensing mechanism allocates inputs according to capacity or output, this will lead to fairly rigid market share and lack

of competition. Together with the limited size of the domestic market change in market share tends to be slower than under competition.

The absence of competition in the domestic market further lead to a slack in efficiency because of lack of pressure on entrepreneurs to introduce low cost production technique. Moreover, lack of competition means higher cost firms tends to loose market shares more slowly than would be attained under competition and low cost firms tends to increase market share market share more slowly. Since industries growth is linked to the growth of the domestic economy, unless income elasticity of demand changes, changing shares come about more slowly than under competitive environment.

By contrast, under the export promotion strategy, firms will have an optimum size whatever the size of the domestic market. Raw material availability or the price elasticity of demand will not constrain the expansion of low cost firms. Market share tends to increase when firms profitably export than when they are constrained to the slowly growing domestic market. In addition, export promotion strategy by inducing firms to adopt lower cost activities will bring about greater engineering and economic efficiency. For any given distribution of cost within an industry exporting permits more rapidly changing market shares. Changing market share of industries in an industrial output can also lead to an increase in factor productivity and industrial sector.

With respect to politico-economic factor, it is argued that export promotion strategy constrain government action for variety of reasons. In the first instance, there is limited possibility for imposing quantitative restrictions. This is due to the fact that exporters need ready access to intermediate inputs from the international market which contradicts the imposition of restriction up on any imports. Secondly, export promotion is characterized by less variability of incentives in that reward depends on performance rather than discrimination. Finally, the feedback to policy makers signaling that mistakes may be being made is almost certainly much stronger under an export oriented policy stance than it is under import substitution strategy. For example, an overvalued exchange rate is more rapidly visible for policy makers due to lagging export performance under the export promotion strategy than would be evident through rising premiums for import licenses under import substitution. In contrast, under import substitution strategy, there is an incentive on the part of license holders to misrepresent their activities to induce more

receipt from import licenses and permissions where as under export promotion strategy the possibility for such kind of activity is far smaller (Kruger 1990).

Balassa (1985) in explaining the advantage of export oriented economies in adjusting to external demand shocks argued that export oriented economies are more flexible than inward oriented economies. Because export oriented economies are exposed to competition in foreign markets, they will acquire experience in changing their product composition in response to shifts in foreign demand. In contrast, under inward oriented trade strategy firms are exposed to limited competition in the confines of the domestic market and thus firms have little inducement to innovate.

According to Balassa export promotion strategy also enables to undertake efficient exporting and import substitution activity simultaneously. Lower degree of discrimination against primary activities and lower degree of variation in incentives characterize export promotion strategy which together with reduction in cost from exploitation of economies of scale enables efficient exporting and import substitution activities. In contrast, inward oriented economies are characterized by variability in incentives, which lead further import substitution to be costly, and in terms of foreign exchange saving to be subject to diminishing returns.

Regarding Korea's incentive structure, Balassa argued that on average similar incentives were provided to production for export and domestic markets. On average the incentive structure also did not discriminate between primary and manufacturing activities. The application of incentives to non-traditional exports in the form of preferential export credits, generous wastage allowances on imported inputs, reduction in indirect taxes, and preferential electricity and transportation rates did not result in any significant bias towards exports rather it established a neutral incentive system between export and import substitution industries.

Balassa also argued that the fulfillment of export targets by individual firms did not affect the free trade regime established to exporters. Because access to preferential credit were set according to predetermined rules and wastage allowances were set for products rather than for each firm. Although there were cases that successful exporters get favorable tax treatment and few cases where wastage allowances were renegotiated between the government and industry representatives simultaneously with export targets,

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in general the fulfillment of export targets did not affect the firm's access to export incentives.

In a reply to the statement that the incentive structure in Korea was biased in favor exports than import substitutes Kruger (1979) reply that the incentive structure discriminate between domestic and export sales that is discrimination arises at the point of sales not at the point of production. In addition, the export incentives do not favor one sort of export over another. Those who export will be eligible to incentives provided that they are also profitable. Since prices are one of the determinants of profitability and the incentives were effective only to the extent that profits were realized, a market test still retained importance in selecting appropriate export industries.

1.2 Revisionists definition

Revisionists on the other hand interpret the success of Korea and other East Asian countries to the pervasive government intervention to promote exports and selected infant industries. According to Alam (1989), rapid export growth in Korea was made possible by interventionist policies creating strong bias towards exports. The export bias was necessary for correcting market failure arising from export production and exporting activity; even if the export bias was excessive, the loss from resulting allocational inefficiencies may have been more than offset by the dynamic gains associated with a more rapidly growing volume of exports. Characterization of Korea's trade regime as neutral incentive was base on an aggregate measure and did not take in to account also the bias introduced by other non-market measures. In addition, he argues that more dynamic effect may still come from policy biases to promote selected infant industries. He also argued that there were other factors in addition to trade policy that contributed to the rapid economic growth in Korea. A brief explanation on each of the above factors will be given on the following paragraphs.

Regarding the biasedness of the incentive structure in Korea, Alam (1989) explained it in the following way: in Korea the examination of the incentive structure at the disagregated level shows significant bias toward exports and selected infant industries. A comparison of the effective subsidy rates for sales on the external and domestic markets in 1968 reveals a substantial export bias in several industries in which Korea is said to have comparative advantage. Industries with an export bias include intermediate

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product I with a subsidy rate of 73 percent, processed food 27 percent, beverage and tobacco 41 percent, and non-durable consumer goods 26 percent for export sales. At the same time there existed several industries with a substantial IS bias. For example, transport equipment, consumer durable and machinery receive -182, -36, and -26 percent respectively of ESRs for export sales.

An examination of ESRs for 1978 also reveals a general pattern of export bias in the established industries combined with IS bias toward infant industries. Industries with export biases includes processed food 61 percent, construction 34 percent, intermediate product I 62 percent, and mining and energy 37 percent ESRs for export sales. Similarly industries with an IS bias includes agriculture –61 percent, beverages and tobacco –15 percent, non consumer durable goods –14 percent, consumer durables –93 percent, machinery –23 percent, and transport equipment –109 percent ESRs for export sales.

As the aggregation of industries gets more broader and broader, the biases of ESRs tends to decline as the opposite biases across industries tends to cancel each other. For example, aggregation of ESRs for the manufacturing sector for both 1968 and 1978 shows a non-negligible bias toward exports. The ESRs for external and domestic sales in 1968 were 12 and –9 percent and similarly the figures for 1978 were 22.8 and 5.3 respectively. However, when the measure of effective subsidy rate is aggregated over the whole industry, the trade bias disappears altogether for 1968 and showed a bias toward domestic sales for the period 1978. Thus, such use of economy wide ESRs and EPRs tends to conceal substantial trade biases.

Alam (1989) also argues that there are inaccuracies in the estimated ESRs and EPRs which tend to understate the bias towards export. First, there is a problem of underestimation of the subsidy value of credit preferences to exporters. The interest subsidy has been estimated by taking the difference between the interest paid by exporters under preferential rates to the non-preferential ordinary bank loans. The non-preferential rates on ordinary bank loans, however, were also under government control and were often set unrealistically low. The other inaccuracy concerns omitted incentives conferred by non-market instruments, that is import entitlements linked to exports, cartelization among producers in most exporting activities, and the linking of sales in the more profitable domestic markets to export activity.

There are also non-quantifiable informal preferences to exporters and an allocative bias introduced by export targeting which are not taken in to account by the measures of ESRs (or EPRs). These includes expeditious attention to export problems, especially at the monthly export promotion meetings, permission to work with foreign firms, import technology, hire foreign consultants, and send employees abroad for training, leniency in tax assessment, and so on. To these preferences must also be added the annual prestigious national awards to outstanding exporters in a multitude of categories. Export targets were not also a mere projection as sample surveys of firms showed increased production by firms to full fill targets. Correcting the ESRs for all ommisions and inaccuracies and the allocative effects of direct interventions would make the magnitude of export bias higher that it would be hard to describe Korea's incentive structure neutral between export and domestic sales.

Alam (1989) also argues that the presence of initial transaction and set up costs associated with exporting and the presence of externality supports the view that there should be an export bias. The presence of initial transaction and set up costs of entry creates a wedge between export and import price making entry to the export market improbable. Overtime these costs may fell but perspective exporters are likely to underestimate such costs. In addition investment in export oriented industries may be subject to higher degree of risk than in the domestic market oriented sectors largely because of lack of information about foreign demand for export products. Unable to assess this accurately and responding to foreign news and information, domestic financial markets could amplify the risk involved in exportation. In such circumstances an export bias in the form of provision of subsidized credit, state trading companies, encouragement of the merger of small trading companies and so on might be required.

Externality in the export market may also calls for an export bias. Externality in exporting may arise from demonstration effects such as dissemination of information on shipping, customs regulations, and specific clients. It may also arise from rapid flow and adoption of new technology as a result of increased exporting activity. Frequent contact in the international market and the pressure for price and quality competition will induce exporters to adopt latest developments in the product design and technology, which latter

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also benefits local producers through the transfer of workers employed in the export sector.

The presence of externalities, market imperfections, dynamic internal economies and dynamic external economies may also calls for an intervention to promote selected infant industries through biased incentives. Realization of dynamic internal economies is not merely a function of time but requires certain complementary measures in addition to offering protection to attain the rapid maturation of infant industries. These measures includes guidance in the choice of appropriate scale and technology, fostering competitive pressure within the domestic economy, provision of research and technical services, encouraging early entry in to the export markets and timely provision of infrastructure. If such complementary interventions are missing, the productivity of infant industries may stagnate or decline overtime. The implementation of the above complementary measures, however, may lead to a reduction of cost up to ten percent annually for the first five to ten years.

The longer the time the dynamic economies take to lead to significant cost reductions, the more myopic will be individual investors toward these projects. Thus, the discounting of risks associated with dynamic internal economies will be higher by private investors than the rate applied by the society. This will lead individuals to underestimate the cost reductions associated with dynamic internal economies. Under this condition government agencies might be well informed to implement policies aimed at inducing more rapid cost reductions.

With respect to dynamic external economies, it is not only labor training but also investments in acquiring and assimilating information (regarding markets, technologies, and inputs) may also lead to externality. The first firm to enter an activity will reduce cost to the subsequent entrants, in the same and related activities, on information regarding technology, markets for outputs, and sources of inputs. These externalities would support the use of subsides or other interventions for bringing about socially optimal investments by private agents in the search for products, technologies, markets, and sources of inputs.

There is also another market failure, which arises from imperfect information. When the quality of the product is known through test, the case mostly in durable goods, it will be difficult for domestic firms to enter markets even though the former might be

competitive in cost and quality. In such a case it may be necessary to sell the product at a lower initial price or incur cost in advertising to switch consumers to the domestic product. In either case, these costs may be sufficiently high to prohibit entry- a situation that calls for a temporary subsidy on domestic production. In the case when the foreign product enjoys a strong appeal because of its brand name, it may well be necessary to offset this advantage with long lasting tariffs on its import. Once a domestic firm establishes a reputation on product quality cost to other firms will decline because of the reputation already established. However, new entrants may reduce the industry's reputation by introducing low quality products, in such cases it may be necessary to introduce penalties for lapses in quality of export goods.

The market for technologies is characterized by informational asymmetries favoring the seller. The seller is always in a position to gain from the rivalry among prospective buyers. These bargaining cost can be reduced if the government intervenes to select a single buyer or if technological capability is used as a criteria to select domestic firms, this will induce the contestants to improve their technological capability to increase their chances of selection. The terms of contract may also be imposed by the government's refusal to validate, say certain types of restrictions on the use of technology or inputs.

Alam (1989) also argues that in addition to trade policy there are also several other factors which contributed to the rapid growth of Korea. The supply of labor at market determined wage rate to exporters is one factor. Government intervention has acted well in repressing wages to achieve market determined wage rate. Market determined wage rate in Korea were achieved through a deliberate government policy which makes unions weak, minimum wages irrelevant, let public sector follow wage setting in the private sector. As a result of these, the differential between manufacturing and agriculture wage was only 20 percent. However, if wage differential had been forced to 100 percent as a result of labor union action or government policy it would have been difficult to Korea to compete in the international market.

Export promotion strategy in Korea also benefited from two favorable external conditions created in 1960: easing of foreign trade restrictions in developed market economies and the growth of commercial lending to developing countries. Although

these opportunity were available to all other countries, Korea benefited because of its trade policy. In addition, Korea also benefited from its proximity to Japan and its strategic importance to the United States. These conditions create privilege access to developed country markets.

One other factor which contribute to the rapid economic growth in Korea was the timely provision and maintenance of public inputs including physical infrastructure, an appropriate legal frame work, as well as education, health and research. In addition to increased provision of public inputs Korea inherited from its colonial ruler, the Korean government also contributed later after independence through efficient provision of infrastructure by directing investment where return is greatest and by maintaining investment properly (Alam 1989).

In a slightly different view from other revisionists, Rodrick (1994) also argues that relative export profitability in Korea was insignificant to account for rapid export growth and exports were relatively small in the early 1960s to account for rapid economic growth. He argued that it was investment growth, which led to rapid economic growth of Korea. Two initial conditions also contributed for the growth of investment. One is the presence of educated manpower which increase the relative return on capital and the other is effective government intervention which makes the return to investment high by subsidizing and coordinating investment. Export growth was the consequence of demand for imported capital goods. The existence of equity in income and wealth helped government intervention effective and free of rent seeking.

Although subsides were expanded after 1961, the relative profitability to exporters were higher in 1959-60 than after 1960 when the export boom began. This is due to two main reasons, first, the receipt to exporters from the export import link system was higher in 1959-60 when the gap between the official and parallel exchange rate was wide. Second, inflation has eroded many of the export incentives between 1961 and 1964 and the devaluation in 1964 could offset the gap only partially. Thus, the relative profitability to exporters as measured by the real effective exchange rate did not attain the level of 1959-60 until 1970 but export-GDP ratio was 10 times higher in the mid 1970s than early 1960s. This indicates that the export boom was not associated with export profitability.

The share of export as percentage of GDP was less than 5 percent in 1960. The contribution of such low percentage of exports could not account for the rapid economic growth. The share of manufactured exports in total exports were also very small constituting only for a quarter or less, it is unlikely that this will lead to cumulative productivity spillover, if any, to the rest of the economy or to set off an aggregate growth in motion.

Export orientation could not also lead to an increase in investment demand rather it is investment, which led to export growth. Export orientation affect the relative profitability of sales on domestic and international market but its effect on investment demand is indeterminate. Moreover, according to the theory of relative factor endowments and the Stopler-Samuelson theorem, in capital poor countries like Korea in early 1960s the rise in export prices must lead to a decline in a return to capital and hence reduced investment. On the other hand the rise in the profitability of investment will lead to a rise in investment and in capital poor country like Korea, import has to rise along with investment. To pay for imports, exports have to rise also if there is unlimited access to international borrowing. Thus it is investment which led to export growth not the reverse.

Investment profitability in turn requires the presence of certain initial condition – minimizing coordination failure. Coordination failure arises when the economy is characterized by traditional and modern sector where modern sector has also certain features: (i) it requires educated workers to be profitable; (ii) they have scale economies; and (iii) they can not be perfectly traded in the international market. In the presence of scale economies, it is large scale movements of resources which is profitable, thus from an individual point of view it will not pay to invest unless others also doing the same as well. Two other conditions are also necessary for the modern sector to be profitable: the simultaneous presence of specialized inputs and the presence of demand from the preexisting modern sector. When production and investment requires such interrelated factors, coordination failure arises.

The Korean government played an important role in minimizing coordination failure through credit subsides, tax incentives, administrative guidance, and public investment. To internalize some of the coordination failure, credit allocation favors

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established firms, the chaebol in particular, characterized by domestic linkages and scale economies. Socialization of investment risk in selected sectors was another form of investment subsidy in Korea. This was done by giving implicit guarantee by the government to those entrepreneurs who invest in a desirable area that they would be bail out if profitability of investment get at risk. In addition to providing subsides, the Korean government played a much more hands on role by organizing private entrepreneurs in to investments that they may have not otherwise made. By ensuring local supply of inputs for private producers downstream, public enterprises played a very important role in enhancing the profitability of investment.

Two factors contribute to the effective implementation of government intervention. The first factor relates to the presence of highly educated labor force. The presence of highly educated labor force and low endowment of physical capital in developing country like Korea in 1960s implies higher return for coordinated investment. Thus, government policy of coordination investment will have a successful result.

The second condition relates to the presence of high degree of equality in income. The presence of exceptionally high degree of equality in income and wealth helped to undertake institutional reforms insulated from pressure group politics. Due to these the government was able to undertake institutional reforms such as centralization of functions previously distributed to multitude of ministries and agencies and the creation of new bureaucracies with little pressure from daily politics. Little pressure from the organized groups also enable technocrat elite to write economic laws and regulations with little concern to their effect on other groups.

The absence of large-scale inequities also helped the government to focus on growth related policies. Regimes, which inherit large scale inequities, are constantly under pressure to implement growth retarding policies. One example could be populist policies, which engender high inflation and low growth. The top political leaders were free to focus on economic goals that they could supervise the bureaucracy closely and will be able to root out rent seeking (Rodrick 1994).

It is difficult to approve or disprove either neoclassical or revisionists account of Korea's export promotion strategy. But one can make his own judgment by examining the facts regarding the incentive structure and the impact created by the incentive

structure on economic performance. In the following chapter, I will present my own judgment regarding Korea's incentive structure.

CHAPTER TWO

2. Getting the facts right: Export orientation in Korea

Before 1961, although exporters benefit from the multiple exchange rate which allows exporters to exchange their receipts under free market rate, it is unknown by how much it offset the bias against exporters from the overvaluation of the exchange rate and quantitative restrictions (Westphal and Kim 1982). As it is shown in table 2, the exchange rate premium as the percentage of official exchange rate was as high as 128 and 165 percent between 1958-60. The overvaluation of the exchange rate can be seen in table 1 in that the real exchange rate in 1955 was only half the real exchange that prevailed in 1953. As it is also indicated in table 2, actual tariff and tariff equivalents as a percentage of the official exchange rate were 28.8 percent in 1958 further increasing to 65.6 percent in 1959 and to 60.3 percent in 1960. Kruger (1979) argue that given tariff and tariff equivalents constitute such a higher magnitude than the official exchange rate, the role of the exchange rate in resource allocation among tradable and non tradable goods tends to be very low. On the other hand, subsides to exporters as a percentage of official exchange rate were less than 3 percent until 1960 as it is indicated in table 2.

As the measure of the effective exchange rate presented in table 2 does not include the incentive from quantitative restrictions, it can not show us the exact picture by how much the incentive structure reduce the bias against exporters before 1961. After 1960 tariff and tariff equivalents were reduced. For example, tariff and tariff equivalents as a percentage of the official exchange rate was reduced from 60.3 in 1960 to 15.3 in 1961. On the other hand the magnitude of export subsidy as a percentage of the official exchange rate has increased from 0.8 percent in 1960 to 8.7 percent in 1961. Until 1975 the export subsides further increased while that of tariff and tariff equivalents show a decreasing trend. The reduction of tariffs and tariff equivalents and the provision of export subsidy measures reduce the bias against exports starting from 1961.

It has to be made clear that the above measure is a broad aggregate measure. Tariffs and export subsides do vary among individual industries and trade sectors. The effective protection and effective subsides given to each individual industry and sectors sometimes show a very wide marginal difference. The measures of effective protection

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and effective subsidy are also more appropriate measures in that they take in to account all incentive measures as they are based on domestic and world price differences. The question is how it was made possible to have an overall neutral incentive trade strategy while at the same time giving biased incentives to certain import-competing industries. An aggregate measure of the incentive structure is also an important indicator of the over all resource bias created by the incentive structure among import competing and exporting industries.

Table1, Nominal and real exchange rates, 1954-1957

	Official rate	Real rate
Dec. 15, 1953	18.0	152.5
Nov. 10, 1954	18.0	104.0
Dec. 13, 1954	18.0	101.0
Jan. 10, 1955	18.0	76.3
April. 18, 1955	18.0	74.6
Aug. 15, 1955	50.0	154.8
Average 1956	50.0	136.6
Average 1957	50.0	117.6

Source Kruger(1979). The development of the foreign sector and aid table 9 page 44

Neutral incentive trade strategy in Korea was established not only through the provision of export subsides but also by making the number of infant industries promoted through higher protective measures relatively small at a time. Thus, Koreas export promotion strategy was characterized by neutral incentive trade strategy along with biased incentives to selected infant industries. In addition, there were certain initial conditions which facilitates the success of the export promotion strategy. Among these factors, the presence of strong government ensures not only effective administration of the export incentives introduced to promote exports but also ensures market determined wage rate so that exporters compete successfully in the international market. Furthermore, Korea had educated labor force by the time the export promotion strategy was launched that enables effective adoption of foreign technology.

Before I continue to explain the incentive structure that existed in Korea from 1961 on wards, let me clear my point how theoretically it is possible to establish neutral incentive trade regime while at the same time promoting certain few import substitute industries. An overall neutral incentive trade regime indicates that the resource bias against exporting industries created by the promotion of few import-competing industries

through the provision of higher effective protection than the rest of industries were very low.

What is neutral incentive trade strategy? Trade theory says that when there is protection domestic sales in the domestic market tends to be profitable relative to export sales as protection raises the price of goods sold in the domestic market. The relative profitability of import substitutes goods as shown by the rise of their relative price will result in the transfer of resources from the export sector to the protected import substitute industries. This in turn will lead to a reduction in the production and export from the export sector while production of import substitute goods increases. In other words protection creates a bias against exports by directing the economy's resources towards import competing sector. Creation of neutral incentive trade regime requires either removal of the source of bias, in this case protection, or either the provision of an equivalent export subsidy to exporters to compensate for the relative profitability of domestic import substitute goods. Thus, under neutral incentive trade strategy, efficiency in production rather than artificially created price distortion determines the allocation of resources.

Under neutral incentive trade regime resource allocation will be determined by the price mechanism. Producers with lower cost of production will grow faster while producers with higher cost of production will leave the market as they can not compete with the efficient producers. In addition, under neutral incentive trade regime, those industries with comparative cost advantage after satisfying the needs of the domestic market tend to export their product to the international market.

If protection creates a bias against exporters, how can it be possible to promote exports as long as there are also protected import substitute industries? This was made possible in Korea through the provision of export subsidy to the majority of industries and making the number of import substitute industries that received higher protection with out an equivalent subsidy small at a time. The incentive measure being an average measure among import competing and exporting industries, the industry bias among import competing industries tend to be offset by the lower level of protection to other import competing industries. However, when I say small, it does not attach to any specific number rather their number relative to the whole industry. When I say also there

was in general neutral incentive, I mean to say to the broader aggregate measure that is taking in to account all export and import competing industries. The incentives given to export industries through various export subsidy measures and the incentives given to import competing industries in the form of protection or other preferences were approximately equal to offset the resource bias. This does not mean, however, that there was no variation in incentives. Especially few import competing industries received a higher level of protection than the rest of import competing industries with out an equivalent export subsidy.

As it is indicated in table 2, the aggregate measure of incentives given to exporters and domestic import competing industries as measured by the ratio of real effective exchange rate for export and real effective exchange rate for import shows the presence of neutral incentive trade regime. The measure of real effective exchange rate differs from the other measures of incentives, that I will discuss later, in that it includes the incentives provided to exporters by the adjustment of the official exchange rate to prevent overvaluation of the exchange rate.

Exchange rate overvaluation by lowering the relative prices of treadables goods to that of the non-tradable goods discourage exporting activity. The exchange rate adjustment measure can also be seen from the continuous growth of the official exchange rate beginning from 1961. The exchange rate devaluation in 1961 raise the official exchange rate by more than 100 percent from 62.5 won per dollar in 1960 to 127.5 won per dollar in 1961. Frequent adjustment of the official exchange rate adjustment after wards also led to the continuous rise of the official exchange rate from 127.5 in 1961 to 485 won per dollar in 1975.

The trade bias measure of the ratio of the real effective exchange rate for export and import before 1961 could not give us the true picture as the effective exchange rate for import does not reflect the effect of import control. Or in another way export subsides were low to offset the bias against exporters created by import controls. The ratio of the real effective exchange rate for export and import after 1961 shows the presence of neutral incentive trade regime. This estimate show us only the general flow of incentives toward export and import competing industries in that there was no bias among both

industries taken as a whole. But it does not show the relative variation of incentives among industries.

Neutral incentive trade strategy also requires that intra-industrial variation in incentive to be low as higher intra-industrial variation in incentives demand a substantial export subsidy to offset the resource bias. Thus, the relatively favored industries through higher protection in the domestic market have to be small so as not to lead to resource bias. This is what we can see from Korea's experience. As it will be shown in the following tables incentives do vary among individual industries especially for import competing industries but those import competing industries that received higher effective protection with out an adequate export subsidy are very few.

Table 2 Korea: effective exchange rate for exports and Imports, 1958-75

		Components of the effective exchange rate as percentage of the official exchange rate				Real effective exchange rate		Ratio of REER
		For export			For import	For export (gross)	For import	for import to export
Year	Official exchange	Exchange rate premiums plus direct cash subsides	Direct tax plus direct cash subsides	Indirect tax and tariff exemption	Actual tariff and tariff equivalents			
1958	50.0	128.0	2.4	0.0	28.8	279.6	156.5	0.56
1959	50.0	169.4	2.6	n.a.	65.6	324.9	197.9	0.61
1960	62.5	134.2	2.0	n.a.	60.3	320.1	217.4	0.68
1961	127.5	17.3	0.8	n.a.	15.3	289.3	282.2	0.98
1962	130.0	7.9	1.1	7.6	12.6	264.2	255.5	0.97
1963	130.0	33.8	2.8	9.1	13.9	276.1	215.9	0.78
1964	214.3	19.9	3.2	8.2	15.3	305.3	268.0	0.88
1965	265.4	0.0	3.7	11.1	10.4	304.6	293.1	0.96
1966	271.3	0.0	4.6	14.4	9.3	305.1	280.4	0.92
1967	270.7	0.0	7.4	15.7	9.4	298.8	265.4	0.89
1968	276.6	0.0	6.6	21.5	9.4	298.7	255.0	0.85
1969	288.2	0.0	5.1	22.7	8.5	299.4	254.5	0.85
1970	310.7	0.0	6.7	21.7	8.3	307.9	260.0	0.84
1971	347.7	0.0	6.5	23.1	6.3	328.6	269.7	0.82
1972	391.8	0.0	3.2	23.7	6.0	348.9	290.2	0.83
1973	398.3	0.0	2.2	21.5	4.9	396.5	332.5	0.84
1974	407.0	0.0	2.1	19.1	4.5	338.4	288.1	0.85
1975	485.0	0.0	2.7	14.0	5.1	320.9	286.6	0.89

Source: Westphal and Kim(1982). "Korea" in Bela Belassa. Development strategies in developing countries. Table 8.3 page 218

Table 3 shows the nominal and effective protective and subsidy rates by trade category. Export industries followed by the non-import competing industries received lower average nominal protection on domestic sales while import competing and export and import competing industries on average received higher effective subsidy and effective rate of protection for domestic sales. The export industries also received negative effective rate of protection on domestic sales. Exporters actually benefit when the effective rate of protection is negative on domestic sales because of higher tax on inputs (exporters are exempted from indirect tax and tariffs on imported inputs) than final goods. Lower level of nominal protection to exporters on domestic market in addition to export subsidy measure tends to encourage exporters. Nominal rate of protection is the price difference between domestic and world markets, as the percentage of the latter while effective rate of protection is the percentage excess of domestic-price value added over world price value added. There will be more explanation on the relative incentives to each sector later on this chapter.

Table 3 Korea: nominal protection, effective rate of protection, and effective subsidy rates, by trade category, 1968

Trade category		Nominal protection		Effective rate of protection ✓		Effective subsidy	
		Legal average	Nominal average	export	domestic	Export	domestic
Export industries	Primary	1	-8	-13	-14	-9	-21
	manufacturing ✓	54	5	5	-18	13	-26
	total	51	5	1	-18	9	-26
Export & import competing industries	Primary	1	8	-1	13	3	17
	Manufacturing	46	23	-2	73	9	55
	total	44	23	-2	68	8	52
Import competing industries	Primary	23	46	0	68	5	76
	manufacturing	55	32	-9	93	35	91
	total	47	35	-7	80	31	83
Non-import competing industries	primary	36	13	1	13	9	17
	manufacturing	64	5	-1	-16	6	-24
	total	49	9	0	4	7	4
All industries	Primary	34	16	-8	18	-3	21
	manufacturing	59	11	3	-1	12	-7
	total	49	13	0	11	9	10

Source: Westphal and Kim (1982). "Korea" table 8.8, pp. 231

As table 4 and 5 shows, the variation in incentives among individual import competing-industries were very high indicating the presence of an industry bias. As table 4 shows, the dispersion of effective rate of protection and effective subsidy measures were higher on domestic import competing industries than exporting industries. The frequency distribution of the effective rate of protection as measured by the coefficient of variation shows a 5.2 percent dispersion for the export industries while the corresponding figure for import competing industries were 23.2 percent. Similarly, coefficient of variation of effective subsidy for export industries is 9.1 percent as compared to 13.9 percent for import competing industries.

As table 5 also indicates, the effective subsidy for export sales shows the least dispersion from the four sectors. The dispersion of effective subsidy for import competing industries, however, shows the higher dispersion as measured by standard deviation of effective subsidy. The rate of dispersion of effective subsidy as measured by standard deviation for export industries is 63.72 in contrast to 2182 for import competing industries. In general, one can suspect from observation at table 4 and 5 that there were import competing industries that received higher effective subsidy than the rest of import competing industries.

Table 4. Korea: frequency distribution of incentive measures, 1968

Value		Legal tariff average	Nominal tariff average	Effective protection		Effective subsidy	
Greater than or equal to	Less than			Export	Domestic	Export	Domestic
-infinity	-100			1	6	2	7
1000	infinity				3		3
500	1000				5	1	4
200	500	1			5	2	6
150	200				3		4
100	150	12	2		8	1	6
90	100	9	2		2	6	1
80	90	10	1		1	1	3
70	80	10	3	1	1	1	3
60	70	9	1		4	2	3
50	60	12	8		4	1	1
40	50	16	8		2	2	4
30	40	13	7	1	4	2	2
20	30	21	19	2	6	12	5
10	20	6	25	2	11	16	10
1	10	18	31	16	13	41	16
-1	1	13	39	17	1	13	1
-10	-1			87	21	26	9
-20	-10		1	13	20	13	21
-30	-20		1	2	14	4	16
-40	-30		1	2	5	1	11
-50	-40		1	4	6	2	6
-60	-50				3		3
-70	-60			1	1		3
-80	-70					1	1
-90	-80						
-100	-90			1	1		1
Over entire set	Simple average	55.8	18.1	-3.5		10.5	-115.4
	Coefficient of variation	0.7	1.4	5.2	23.2	9.1	13.9

Table 5. Korea: Dispersion of effective subsidy rates, by trade category, 1968

Trade category	Over entire set		
	No.	Average	Standard deviation
Export industries	27	5.9	63.72
Export & import competing industries	18	64.4	180.32
Import competing industries	38	-218.2	2182
Non-import- competing industries	67	37.8	215.46

Source: Westphal and Kim (1982). "Korea," table page 233-236

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To give specific example as to the relative distribution of incentives among import competing industries, table 6 presents the relative distribution of incentives among import competing and export industries in 1968. As it can be seen from the table transport equipment received 159 percent effective subsidy while other import competing industries listed on the table received from negative up to 38 percent effective subsidy which indicates the existence of variation in incentives among import competing industries.

As table 7 indicates, the variation in incentive among import-competing industries were aggravated in 1978. The number of import competing industries that received higher effective rate of protection than the rest of industries have increased. consumer durables a transport equipment received higher effective rate of protection of 131.1 and 135.4 percent exceeding the next highest rate of effective protection more than two times. Most of the exporting industries also did not received an equivalent export subsidy to reduce the resource the bias from the existing protection to the import-competing industries.

If we take a broader aggregate measure of the distribution of incentives among import competing and exporting industries, we can see that in 1968 all exporting industries received 9 percent effective subsidy while import competing industries received an average of 10 percent effective subsidy. Thus, we can say that on average in 1968 the incentive structure produce a neutral incentive trade regime. Neutral incentive trade regime does not mean, however, there was no bias in the incentive structure. There was bias in incentive especially for selected import competing industries but on aggregate this did not result in a significant resource bias against exporters as it is shown by neutral incentive among import-competing and exporting industries.

The aggregate measure of the incentive structure for 1978, however, shows a slight bias toward import competing industries. In 1978, all export industries received an average rate of effective subsidy of 18 percent while import competing industries received an average effective protection of 31 percent. This also indicates that the variation in incentives among import competing industries were aggravated in 1978. The industry bias in 1978 as shown by the higher variation of the incentives in 1978 also resulted in resource bias against exporting industries.

In general, we can interpret table 6 and table 7 in the following way. First, taking an average measure of the incentive structure for import competing and exporting industries, it will produce neutral incentive trade regime as the very high level of effective protection given to certain import competing industries will cancel out with extremely low level of effective rate of protection given to other import substitute industries. Second, those import competing industries with extreme level of effective protection tends to be very few, 1 in 1968 and 2 in 1978, to create a significant resource bias to the exporting industries. Furthermore, it is only in the exporting activity that performance were used in allocating incentives as it is indicated in table 4 and 5 by the lower variation in incentives among exporting industries.

This is not true, however, in the case of import competing industries where some other criteria was used by the government to allocate incentives among individual industries as it is indicated in table 4, 5, 6, and 7 by the higher level of variation in incentives among import competing industries. Thus, Korea's export promotion strategy can not be attributed to market forces alone as neoclassical economists used to say. The role of market forces in allocating resources were limited only to the exporting activity. On the other hand, there was government intervention to promote selected infant industries through biased incentives.

Table 6. Korea: nominal protection, effective protection, and effective subsidy rates, by industry group, 1968

Industry group	Nominal protection		Effective protection		Effective subsidy	
	Average legal tariff	Average nominal	export	domestic	export	domestic
Agriculture, forestry & fishing	36	17	-16	19	-10	23
Mining &energy	10	7	-1	4	3	5
Primary activities	34	16	-8	18	-3	22
Processed food	57	3	-3	-18	2	-25
Beverage & tobacco	135	2	-2	-19	15	-26
Construction materials	31	4	-5	-11	6	-17
Intermediate product I	31	4	31	-25	43	-30
Intermediate products I I	53	19	0	26	17	20
Non-durable consumer good	68	9	-2	-11	5	-21
Consumer durables	78	31	-5	64	2	38
Machinery	49	28	-13	44	5	31
Transport equipment	62	54	-53	163	-23	159
Manufacturing	59	11	3	-1	12	9
All industries	49	13	0	11	9	10

Source: Westphal and Kim (1982). "Korea" pp.230
Other factors also help to create an average neutral incentive trade strategy while at the same time maintaining higher protection to a relatively few infant industries. In addition to various export subsidy measures, exporters also benefit from negative effective rate of protection, as it is shown on table 3, on sales in the domestic market. Second, as it is also indicated in table 3, exporters were given lower nominal rate of protection on domestic sales. These measures along with the promotion of relatively small number of infant industries at a time and the low level of effective protection to the majority of industries means cost in the form transfer of resources from the export industries to the promoted industries tends to be small.

Table 7, relative incentive rates for export and domestic sales in 1978

Industry group	Effective subsidy rates for export sales	Effective protection rate for domestic sales	Effective incentive rate for total sales
Agriculture forestry & fishing	15.9	77.1	72.6
Mining & energy	11.4	-25.7	-23.8
Primary production total	15.3	61.9	58.6
Processed food	31.7	-29.4	-23
Beverages & tobacco	13.2	28.0	27.8
Construction material	19.1	-15.0	-10.5
Intermediate products I	23.6	-37.9	-31.4
Intermediate product II	26.3	7.9	12
Non-durable consumer goods	17.3	31.5	24
Consumer durables	38	131.2	83.2
Machinery	24.4	47.4	43.2
Transport equipment	26.1	135.4	87.2
Manufacturing, total	22.8	5.3	9.7
All industries	17.9	30.6	27.8

Source Nam(1980), trade and industrial policies and the structure of protection in Korea. Page 206
As it is indicated in table 3, export and import competing, and import competing industries received higher effective subsidy to domestic sales. However, as it is indicated also in table 8, export and import competing industries shows a higher export performance. The share of export in the production of export and import competing industries in 1968 was only 7 percent lower from the share of export in the production of exporting industries and only 4 percent lower in the export of manufactured products. As I will explain later also in the case of POSCO (the first integrated still mill of Korea) and the electronics industry, industries first established as import competing industry tend to

have higher export performance either immediately or some time latter after they start operation. This will lead us to suspect some kind of mechanism used to generate higher export performance from those industries, which received higher effective subsidy on domestic sales.

Table 8, structure of commodity production and trade by trade category, 1960 and 1968

Trade category	Production growth rates 1960-68	Trade share			
		Exports in production		Imports in domestic demand	
		1960	1968	1960	1968
Export industries	15.3	11.4	39.4	8.6	5.1
Primary	7.4	79.3	77.8	10.6	24.8
Manufacturing	15.8	5.9	37.7	8.6	4.7
Export & import competing industries	14.4	4.3	32.5	28.3	52.6
Primary	10.9	19.5	20.7	2.5	23.1
Manufacturing	14.7	2.7	33.5	30	54.4
Import competing industries	14.5	3.1	1.4	35.1	46.9
Primary	4.4	3	0.2	4.3	11.6
Manufacturing	21.7	3.3	1.8	53.3	53.6
Non-1mport competing industries	11.9	1.6	1.5	10.7	8.2
Primary	8.8	1.9	1.1	8.7	10.4
Manufacturing	15.3	1.1	1.8	13.3	6.3
All industries	12.8	3.2	8.3	15.9	20.5

Source Westphal and Kim. In Bela Belassa, ed., "Korea," Development Strategies in Developing Countries. Pp-254

As Westphal and Kim explained it, differential monopoly pricing technique was implemented to generate sufficient export performance from those industries that received higher effective subsidy on domestic sales. To implement differential pricing export targets were apportioned among firms through negotiation between the government and exporters associations. Exporters in some industries acting through manufacturers association acted as a cartel to restrict sales in the domestic market. Export performance was in turn required to have access to import licenses, credit and preferential income tax assessment. And in certain cases, export performance was also required to import raw materials, which are indispensable to produce for domestic sales (Westphal and Kim 1982). In other words sales in the domestic market was used as a subsidy to exporters. Thus the export promotion strategy in Korea was characterized by neutral incentive among export and import competing industries along with industry bias to

promote selected infant industries which also joins the export market not through an offsetting export subsidy but through institutional mechanism.

Before I proceed to explain through specific examples how promotion of selected infant industries and their subsequent entry in to the international market through an export activity led to reduction in production cost over time, let me recapture my argument. Until now I have explained the incentive structure that Korea's incentive structure allow exporters to sell their products under neutral trade regime while at the same time there was an industry bias to promote few selected infant industries. Two mechanisms were employed in Korea to promote exports. First, expansion of exports of labor intensive manufactured products, which immediately enter international market working under neutral incentive trade regime. Second, promotion of selected infant industries under protective measure, which later joins international market not through the mechanism of incentives but through institutional mechanism- discriminatory monopoly pricing. These infant industries are also characterized by sophisticated technology. Having said so much on the incentive structure, let me explain the impact of promotion of labor intensive manufactured exports on economic growth.

CHAPTER THREE

3. Export expansion and economic performance

3.1. Export expansion and its beneficial impact on resource allocation, saving, investment and productivity

The export promotion strategy in Korea has contributed to efficiency in resource allocation, greater capacity utilization, and rapid productivity growth. The export promotion strategy also led to rapid export growth, which in turn enables further importation of capital goods to fuel rapid investment growth. In Korea export expansion also resulted in the transfer of income from rural to urban and from workers to corporate sector where the saving propensity is higher.

As Westphal and Kim (1982) argues, one evidence on efficiency in resource allocation could be that overtime Korea's manufactured good exports become labor intensive in which Korea is undoubtedly endowed with during the early period of export promotion strategy. In 1960, direct factor requirement as shown by labor-capital ratio of the manufactured exports were 2.72 which were lower than domestic output but higher than imports but in 1968 labor-capital ratio of the manufactured exports were 3.55 which were higher than 2.64 for domestic output and 2.33 for import competing products. Primary product exports and total exports were, however, more capital intensive than imports due to the continued importation of agricultural products and the greater share of mineral exports in primary exports. The above explanation also holds true in terms of total factor requirement (Westphal and Kim1982)

As it is also explained by Hong (1987), the reduction in trade bias to exporters after 1961 has led to rapid export growth. The rapid growth of manufactured exports in Korea also led to the rapid growth of domestic investment by reducing the foreign exchange constraint to import inputs and capital goods, which are indispensable for further industrialization. Exports as a ratio of GNP rose from 1.1 percent in 1953-61 to 25.9 percent in 1977-79. Commodity imports as a ratio of GNP increased from 10.6 percent in 1953-61 to 30 percent in 1977-79. Along with the increased commodity imports, gross domestic investment also increased from 12.4 percent in 1953-61 to 31.5 percent of GNP in 1977-79 (Hong1987).

Moreover, the rapid growth manufactured exports giving an assurance as to debt repayment capability of Korea led to an in increase in the inflow of commercial loan. Commercial loan which was nil in 1959-61 rose to 175.6 million US dollar accounting for 57 percent of the total foreign loan inflow (Amsden 1989). Together with the foreign exchange earning, the flow of foreign loan fueled investment growth by enabling greater importation of inputs and capital goods.

Park (1981) also argues that rapid export growth in Korea led to increased saving by hastening rapid structural transformation and by redistributing income towards a sector with high propensity to save. Structural transformation, as shown by the growth of the relative size of the urban sector where the saving ratio was higher than the rural sector, was hastened by the rapid export growth. Export growth also led to a redistribution of incomes from households to corporate sector where saving ratio was higher. Corporate saving was increased from a rising share of profits in the export sector. The rapid growth of profit in turn arises from much faster growth of labor productivity relative to wages and the steady improvement of terms of trade. Between 1960 and 1968, real wages increased at a compound rate of 2.7 percent whereas labor productivity rose by more than 4.5 percent a year during 1963-68. The import prices of fuels and raw materials rose more slowly than export prices, and with a high import content of export, this led to rising profits in the export sector. In addition, profit was also augmented by various government subsides to exporters. As a result, corporate savings rose from an average of 6 percent in 1960s to an average of 10 percent in 1970s. In contrast, household savings, which include the savings of unincorporated business firms, underwent wide fluctuations in the 1960s, from a negative of proportion in 1960-62 to as high as 7 percent in 1969 (Park 1981)

Estimation of TFP growth in Korea by Westphal and Kim (1982) also shows the correlation between increased competitiveness in the international market and the rise in TFP growth in Korea. Total factor productivity of labor and capital in Korea for manufactured industries doubled between 1960 and 1973, representing an annual average increase of more than 5 percent. This productivity change is assumed to arise from changes both in industrial composition and increased factor productivity at the firm level. The former constitutes increased factor utilization as well as pure productivity change,

which in turn may be due to changes in techniques and scale of production, or to technological progress at the firm level. However, no significant investigation is undertaken to separate these productivity changes in Korea.

Similarly, estimation of capacity utilization in Korea by Westphal and Kim (1982), based on electricity use and assuming 100 percent utilization as plant operation 24 hours a day and 365 day a year, show an increase in capacity utilization from 17.7 percent in 1962 to 31.9 percent in 1971 through a compound rate increase of 7.2 percent annually. Although it is difficult to separate the contribution of export expansion to capacity utilization, it is little doubtful that it played a significant role. (Westphal and Kim 1982)

Industry level studies also shows that labor productivity and TFP changes were the main factors in changing comparative advantage and growth of exports in Korea. Dollar and Sokoloff use both the Heckscher-Ohlin (HO) and Ricardian trade theory to explain the relationship between changing comparative advantage and labor productivity growth. According to HO theory the rise in capital-labor ratio, as the supply of natural resources do not change much, leads to changing comparative advantage. The rise in capital-labor ratio, assuming the existence of competitive labor market, raise average productivity in every industry, but it raises it more in heavy industries than in light industries.

Similarly, the Ricardian theory predicts that industries with relatively high technology will have higher export growth. Thus changing comparative advantage arises from technological changes that is industries with rapid technological change will exhibit rapid productivity growth and hence declining relative costs. Both trade models imply that changing comparative advantage is linked to differential rates of labor productivity growth across industries; specifically they imply that exports should be shifting towards industries with rapid productivity growth.

In Korea comparative advantage has evolved over time from light industries to medium and heavy industries as predicted by HO and Ricardian theory. In 1970 the share of light industries in total exports in Korea had been almost 80 percent, but this figure has declined to 53 percent in 1983. The share of heavy and medium industries, however, rises from 4.8 and 3.9 respectively in 1970 to 13.1 and 26.1 percent respectively in 1983. Dollar and Sokoloff (1998) estimated labor productivity (value added per worker) arising from changes in capital intensity and TFP change for 14 Korean manufacturing industries

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between 1963-79. Their finding shows that changes in export share are explained by labor productivity and TFP changes occurred in the study period. For the period 1963-79 medium industries have the highest average labor productivity growth of 14.5 percent followed by heavy industries 12.4 percent while the light industries experience the slower average productivity growth of 11.3 percent. Although capital intensity was high in the heavy industries, TFP was also low. On the other hand TFP has been higher in medium and light industries as compared to heavy industries. Also, correlation analysis across 14 industries of the share of exports with the growth of labor productivity, capital intensity, and TFP shows a high correlation (.76) between increased export share and labor productivity growth, 0.33 between export share and TFP growth and 0.30 between export share and capital deepening. Overall the result shows that changing comparative advantage is associated with growth in labor productivity (Dollar and Sokoloff 1998)

As I have explained earlier export was also generated from the protected infant industries not through the provision of incentives but also through institutional mechanism. Although, there is many disagreement on this issue, the promotion of few infant industries which later joins international competition through exporting, are also part of Korea's success story. The promoted infant industries attain rapid productivity growth as a result of their exporting activity and learning by doing.

3.2. Acquiring efficiency from the promotion of infant industries through export performance measure and learning by doing

Now to come back on my second argument, there was protection with out an equivalent export subsidy to promote few selected infant industries in Korea. To induce efficiency in the promoted industries, they were directed to compete in the international market through various institutional mechanisms which links domestic sales to satisfactory export performance. They were also provided with other form of subsidy measures to have the rapid maturation of infant industries. Although initially they have a higher cost, technological mastery though experience along with competition in the international market has led to greater efficiency overtime. I will discuss few specific example to show how efficiency in these industries were later acquired.

As it is explained by Amsden (1989), POSCO (Korea's first integrated steel mill) was initially established as import substitution industry. To achieve rapid maturation of

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the industry in addition to government subsidy in the form of foreign loan, POSCO was provided with infrastuctural subsidy to construct port, water facilities and electricity generation as well as subsidy in the form of discount rate for government provided services. The total amount of subsidy to infrastructural subsides were about 13.3 billion won. POSCO was also provided with protection level of 25 percent duty for its product. In spite of excess demand on the domestic market POSCO started exporting from its initial year of operation. POSCO's export between 1973-84 amounted on average to 28 percent annually. Even taking in to account its infrastructural subsidy, POSCO was also one of the profitable venture among the major steel producers in the world.

Comparison of cost of producing cold-rolled iron in an efficient integrated steel firms of five countries in 1985 shows that POSCO was one of the least cost producing industry next to Japan. To produce one tone of finished product requires US$347 in Japan, US$ 362 in South Korea, US$ 446 in US, US$364 in West-Germany, and US$ 384 in Brazil. As table 9 also indicates, yield, which shows out put per unit of inputs as a result of the performance of labor and capital and the quality of raw materials, in POSCO was the second highest among the five countries (Amsden 1989).

Table 9, efficiency measures of steel making, 1985

Efficiency measures	United States	West Germany	Japan	Korea	Brazil
Man hour per ton	5.75	5.85	5.35	8.20	9.00
Yield to finished product (percent)	78	80	89	82	80
Iron ore per ton of finished product	1.67	1.81	1.81	1.92	1.92

Source Amsden(1989) Asia's next giant page 300 table 12.3

As a study by Enos and Park (1988) also shows, one other benefit from the promotion of infant industries includes rapid technological mastery when the initial firm extends on a similar line of activity. This is observed from the experience of Ulsan petrochemical plant when it extends its activity by establishing petrochemical plant at Yeocheon. The number of foreign engineers required at the second plant were only half from the number of foreign engineers required at the initial plant at Ulsan. This shows that previously acquired knowledge from previous experience benefits in the subsequent establishment of similar line of activity.

Not only competition in the international market but also learning by doing could lead to significant cost reduction overtime. Estimation of direct and indirect benefits accruing to Hanyang's Ulsan petrochemical plant from 1973 to 1976 shows also greater reduction in the cost of production from various improvements in production undertaken by the firm and expansion of output from the existing plants. Reduction in the usage of raw materials, various improvements in the design and operation to save energy and localization of supply alone resulted in saving of $ 2568810 or in the reduction in cost per unit out put of 3.71 percent. Expansion of output from the existing plant and increase in the value of by-products contribute in the reduction of average cost per unit of output of 5.98 percent. Totally, in the four-year period from all sources approximately $ 6700000 were saved or a reduction of 10 percent in average cost per unit of output was achieved (Enos and Park1988).

Table 10, benefits of direct and indirect technical change accruing to Hanyangs Ulsan petrochemical plant from 1973-1976.

Annual savings over 1973 costs				
Direct	Inputs	Means of achievement	Amounts (US$ in 1976 prices)	Percentage reduction over four years, in average cost per unit of output
	Raw materials	Reduction in usage of ethylene for LDPE	$ 485,000	
		For VCM	167000	
		Reduction in usage of EDC for VCM	350000	
		Localization of supply	185600	
		Sub total	1,187,000	1.71
	Energy	Various improvements in design and operation	1087000	1.57
	Capital	Localization of input supply	294810	0.43
Indirect	Outputs Main products: LDPE and VCM	Expansion of output LDPE	27.53%	
		From existing plants VCM	1.13%	
		Average (weighted)	19.62%	5.92
	By products	Increase in value	40000	006
Total			Approximately 6700000	9.69

Source: Enos and Park (1988). The adoption and diffusion of foreign technology. The case of Korea. Page 110

To give another example on the role of export from infant industries and the associated increase in productivity, I will also briefly explain about the electronics industry. As Kim (1980) explained it, in the electronics industry local technical personnel and local scientific and engineering personnel played an important role in the adoption, diffusion, and improvement of foreign technology. The local electronics industry initially established as import competing industry under protective measure through the importation of foreign technology. Once the electronics industry was established and general production technology was diffused and accumulated, export markets become not only source of stimuli for the development of industry but also source of stimulus for product diversification.

Promotion of the electronics industry to the export market through the industry promotion law led to the rapid increase in productivity by imitating sophisticated foreign technology and through exploitation of economies of scale. For example, TV production increased from 10000 sets in 1966 to over 1million sets in 1975, the percentage of exports to the total TV production rose from 2 percent in 1968 to over 50 percent in 1975. Similarly, for electronics industry the average production unit increased almost four times from US$ 5.8 million in 1970 to US$ 22.4 million in 1975. Productivity per worker also increased about 2.3 times from US$ 3600 in 1970 to US$ 8430 in 1975 (Linsu Kim 1980)

3.3 Review of existing empirical studies on Korea

Most of the studies on export and growth in Korea use demand side analysis to estimate the contribution of export expansion, domestic demand and import substitution. This demand side analysis, however, does not take in to account all the indirect effects from export expansion. Among these indirect contributions includes increased production made possible by foreign exchange earned and saved and the multiplier effect due to expenditure out of additional income generated by the rise in production. The magnitude of initial import substitution also determines the magnitude of subsequent import substitution. If the initial ratio is higher, the subsequent import substitution tends to be lower.

To site some of the papers, Westphal and Kim (1982) by using the input output technique decompose output growth in to domestic demand, export, and import substitution. They found higher contribution of exports to aggregate output than import substitution for the period 1963-68. Export expansion contributed 31.4 percent in 1963-66 and 21.3 percent to output growth in 1968 while import substitution contributed 8.9 in 1963-66 and –6.6 percent to output growth in1966-68 . They also found that backward linkages from exports contributed for nearly a tenth of manufactured output and more than 15% of growth of primary output where as import substitution led to negative backward linkage effects that is it has increased the demand for intermediate input from abroad.

Using similar demand side analysis, Hong (1976) also found higher contribution of export expansion than import substitution. The contribution of export expansion to output growth was found to be 2 percent for the period 1960-63, 11 percent for 1963-66, 7 percent for 1966-68 and 4 percent for 1968-70. The contribution of import substitution was found to be nil for the period 1960-66 and –10 percent for the period 1966-68 and 10 percent for the period 1968-70.

Rodrik (1993) argue that demand side analysis does not show the mechanism, if any, that relates export growth to GDP growth. Unless it is an increase caused by an external terms of trade improvement, in a fully employed small open economy with marginal productivity equalized among different activities, an increase in export can not increase output. However, terms of trade movements can not account for any significant part of Korea's success. It is difficult, however, to characterize Korea as an open economy because a significant portion of domestic industry is protected from competition. Thus under this condition, one may expect differing marginal productivity among sectors and a rise in income due to a rise in exports.

Kim (1975) classifying Korean manufacturing industries at the four digit level in to three categories; export, import substitution and domestic demand, he measured the productivity of each sector. At the aggregate level he found that export industries contribute less than import substitutes. At the industry level, however, textiles, leather products, metal products, electrical machinery and apparatus and other manufacturing has shown a remarkable productivity growth between 1966-72. Kim's analysis, however,

does not indicate the channels how export expansion and import substitution lead to rapid productivity growth.

Most cross country analysis do not test for causality between exports and GDP growth as the growth of the latter may also lead to a higher growth of exports. Graves and Holman(1995) employing data from 1953 to 1990 for Korea found two way causation between export and GDP growth and from this they concluded that there is a considerable confidence that export-promoting policies will enhance growth.

4. Theory, model specification, data sources and empirical results

4.1. Theory on export and economic growth

Korea's rapid economic growth is achieved not only through the promotion of exports under neutral trade incentives but also by protecting certain infant industries which later joins international competition not through the provision of an offsetting subsidy but through institutional mechanism that links sales to the protected domestic market to sufficient export performance. Furthermore, the export promotion strategy was made far more productive and efficient because of the presence of highly educated manpower. In this section, I will present the theory how export growth combined with educated manpower led to rapid productivity growth. There is also theoretical explanation how productivity of protected infant industries were further enhanced through export performance.

Traditional trade theory says that when a country opens up to trade with another country, it exports the goods in which it has comparative cost advantage and imports goods in which it has comparative disadvantage. This leads to a one-time or static gain from free trade through efficiency in resource allocation. Traditional trade theory, however, is short of explaining the real world with a multitude of protection nor the sustainable growth of countries for a long time. These phenomena changed the focus of researchers towards dynamic explanations of trade and growth.

As most Balassa (1978) argue, the rapid and sustainable growth of outward oriented East Asian economies is attributed to the productivity changes associated with a widening of markets, more rapid growth of exports, exploitation of economies of scale and technological improvements in response to competition from abroad. Unlike, the static gains from trade reform, productivity gains from export promotion strategy are more dynamic and can explain the long-run growth of countries (Balassa 1978)

As World Bank (1993) also explained it, still a more dynamic explanation for the sustainable growth of the outward economies is the adoption and mastery of international best practice technology from their exporting activity. The adoption, adaptation, and mastery of international best practice technology at firm level in turn requires the

presence of high labor force cognitive skills. Thus exports and human capital interact to provide a rapid phase of productivity catch up.

Human capital accumulation and the inflow of international best practice technology supplement and reinforce each other to generate rapid productivity growth. Without highly skilled domestic engineers and workers it is doubtful that the HPAE could have made use of foreign knowledge and imported capital. Conversely, it is unlikely that total factor productivity growth would have been as large with out foreign knowledge. In fact it is possible to improve the productivity of existing capital stock with internal innovation through the efforts of highly skilled managers and workers but this would not lead to the rapid phase of productivity catch up with out an accompanying foreign knowledge.

It is likely that the move to higher production function may happen before the growth in exports that is TFP growth may lead to higher export growth rather than the reverse. Even if export growth have been derived from domestic efforts to raise productivity, this is unlikely to lead to cumulative productivity growth. The cumulative TFP growth in East Asian countries were able to outstrip TFP growth in industrial countries during their rapid growth periods because the first were able to tap world technology as a result of their exporting activity (World Bank 1993).

In Korea as I have explained it earlier infant industries were also promoted under various protective measures. However, these industries were induced to compete in the international market through various mechanisms. Export performance by the protected infant industries also led to rapid productivity growth. In the next section, I will present the theory how protected infant industry could attain rapid productivity through export performance.

4.2. Acquiring efficiency from the promotion of infant industries through export performance and learning by doing

Westphal (1982) gave a detailed explanation on how protected infant industries later became productive through learning by doing and export performance measures based on the experiences of many countries especially Korea. The following theoretical explanation is an extract from his detailed account of an infant industry argument. An infant industry is a new established type of activity for which the economy's existing

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endowment of skills and human capital does not provide immediate technological mastery. Technological mastery here implies command in technological knowledge reflected in its effective application. Promotion of infant industries is evaluated on the relative costs and benefits associated with starting a new activity. The benefits are improvement in the employment of the economy's resources due to increased productivity derived from the newly acquired technological mastery. Costs include, above and over the price paid for imported technology; the indigenous effort needed to assimilate technology.

Indigenous effort in the assimilation of technology is required because technology has peculiar features, which makes its initial application difficult and costly. These features include tacitness in the elements of technology, difficulties in imitation and teaching, and uncertainty regarding what modification will work and what will not. To adopt the important elements of technology to a particular situation requires an indigenous effort to modify the existing technological knowledge. Modification passes through various interative processes in problem solving; experimentation in refining and as the original concept is refined to put it in to practice. This process which is central to acquisition of technological mastery continues indefinitely and produces technological change that increases productivity.

Firms either in their own technological strategies aimed at specific long-term objectives or reacting defensively to changes in their circumstances or to obvious need to adopt imported technology, have been found to undertake substantial technological effort in order to achieve a wide variety of technological changes. These changes includes stretching capacity through various adaptations, breaking bottlenecks in particular process, improving the use of by products, extending the life of the equipment, making accommodations to changes in raw material sources, and altering the product mix. The cumulative impact of sequential changes in technology on productivity with which the society's resources are allocated tends to be higher following the establishment of an activity than the initial establishment of an activity.

In addition to increased productivity derived from technological change, there are also spillover benefits to related activities. Technology assimilation in related activities will be effective because of more indigenous participation as a result of mastery of initial

technology. In general the economy's capacity to undertake independent technological efforts such as to replicate or adapt foreign technologies or to create new technologies will be enhanced with increased mastery gained through experience with previously introduced technologies. As a result of mastery of technology many semiindustrialized countries are also exporting technologies to developing countries.

The cost of infant industry is related with the experience needed to gain a technological mastery, which up on technological mastery is reflected in the decline in the domestic resource cost of production. A firm level research on technological change in developing countries shows that the domestic resource cost could initially be twice as high than the cost a decade latter. But this should not be interpreted as that experience leads to greater productivity; it depends on each individual firm's effort to gain technological mastery. Nor it should mean as that all infant industries depend on internal experience to get technological mastery or that all infant industries productivity is low relative to the productivity overtime.

Infant industries can also get technological mastery with out internal experience. This is possible through the transfer of mastery acquired in one activity to related activity. Thus, previous generation infant industries can augment the economy's technological mastery by providing benefits to succeeding generations. Using the existing technological mastery the newly promoted infant industries will increase their productivity and hence lower costs. Use of the know-how gained from previous experience on related activity lead the newly established activity to immediate technological mastery and international competitiveness from the beginning.

Though they are not first best measures, many governments employ direct and indirect selective policy measures to promote infant industries. These measures includes making access to credit on preferred terms to overcome imperfections in capital markets; use of public enterprises or the sanctioning of cartels .or monopolies as a means of ensuring that the returns from technological efforts are appropriable; and sharing in the costs of labor training and development as a means of promoting the direct outlays necessary to achieve socially optimal level of training etc.

Still the most common method employed by many governments to promote infant industries, however, is protection. It is not uncommon to find at least effective rate of

protection on the level of 20 to 30 percent granted to infant industries. The provision of initially high level of protection should not always be taken as deterrent to successful industrialization. The success of Korea in gaining international competitiveness was made possible through the promotion of infant industries at higher protection. Higher starting level of protection has also resulted in successful development of infant industries. This argument here is not to say that protection is an optimal means to promote infant industries nor it always works but rather to say that differential treatment and high level of protection may effectively be used to promote selected infant industries.

Promotion of selected infant industries at a time helps to attain efficiency in production at a shorter time than under the situation where many infant industries have been promoted. Economies of scale and linkages among interrelated activities can be achieved easily by concentrating scarce investment resources in one or few sectors at a time if import substitution is undertaken on selective basis. A sustained process of efficiency improvement through the acquisition of technological mastery can also be attained if we allow the concentration of scarce entrepreneurial resources and technical talent in selected industries. Thus the overall size of the economy and the availability of high level manpower of various types determines the degree of selectivity.

Adequate precaution should also be exercised on the relative incentives given to exporters while promoting selected infant industries. Lower level of effective protection should be provided for activities other than those being selectively promoted in order to avoid an anti export trade bias and thereby to ensure adequate export performance. In addition, we should guarantee exporters that they pay no more than world prices for tradable inputs, including those that they purchase from domestic producers which can easily be attained by providing them unrestricted access to and tariff exemptions on imported inputs. Thus, domestic producers of intermediate inputs and capital goods should be denied any protection against imports that would be used in production of exports. Protection for all industries including selectively promoted infant industries should be given, if at all, for only part of their output that is not sold for use for in the manufacture of exports.

Selectively promoted infant industries, however, should be given an absolute protection. Absolute protection here means whatever level of protection necessary to

secure an adequate market for the industries output as well as satisfactory return on investment. If a relatively small number of infant industries are promoted at any one time it provides a viable means of industrial development. However, to generate adequate export performance from selectively promoted infant industries requires an offsetting subsidy to reduce the bias introduced by absolute protection. However, this was not the case in Korea.

In Korea, although infant industries were not provided subsides to offset the absolute protection that is granted on non-export related sales, they begin exporting –both directly and indirectly at a very early stage, often at once. In Korea effective incentives for infant industries are far greater for non-export related sales than export sales. But other means have been employed in Korea that is these industries were either monopolized or operate as cartels that discriminatory monopoly practice may explain exported related sales.

The theory of discriminatory monopoly indicates that non-competitive firms may find it profitable to sale some of their products at lower prices in the world markets as long as they can compensate their loses by selling part of their output at higher price in the domestic market. The theory states that a monopoly or a cartel sales the same product in different markets by equating the marginal revenue in each market to one another and the marginal cost of production. Thus, price and elasticity of demand will have an inverse relationship; and assuming that the domestic price elasticity of demand is lower than that of the export related sales, the monopolist will charge higher price in the protected segment of the domestic market and lower price in the export related sales. On the assumption that protection enables the separation of export related sales and non- export related sales, the monopoly or cartel maximizes its total profit by adjusting sales in the export and domestic markets so that marginal revenue from these sales equals marginal cost of production.

The Korean government gave an approval to monopoly and cartels to induce export related sales from infant industries. The government used two other instruments to elicit exports from these non-competitive market structures. These include export targets and credit allocation to industries. Export targets are the main instruments inducing both direct and indirect exports jointly set by the government and various export associations.

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And subsides to export related sales are some times appear to have been jointly negotiated simultaneously with export targets. The other instrument is credit rationing. Because the government controls the banking system, access to credit for financing fixed investment as well as working capital has been used as an instrument in the promotion of new industrial activities.

Infant industry protection may impose a higher cost on domestic consumers at least on the short run. The cost to domestic consumers may increase further by discriminatory pricing of selected infant industries. This is usually true if we assume that economies of scale on non-export related sales are not substantial and selling part of the output in the export market will impose greater cost on domestic consumers by reducing the non-export related sales and hence raising price. However, developing countries sometimes establish industries before the non-export related sales have grown to such a size to exhaust economies of scale. Under such situation export related sales, even with discriminatory pricing, can lead to economies of scale and lower prices on domestic sales. Thus, export related sales, though on discriminatory basis, may lower costs imposed on domestic consumers by the promotion of infant industries.

Apart from this consideration, infant industry export activity may lead to rapid productivity improvement and efficiency gains through acceleration of technological mastery. As the cost of infant industry protection arises mainly from lack of mastery of technology, it will decline over time as technological mastery is acquired. In addition, other things which hastens technological mastery by the protected infant industries will also lead to a rapid pace of decline in the cost of infant industry protection. Even if infant industry protection initially impose additional costs by discriminatory pricing, overtime it will lead to rapid productivity and efficiency gains.

There are many ways that exporting activity by infant industry lead to faster technological changes. As long as rapid technological change and efficiency improvements are associated with experience in production and capacity expansion, export activity will necessarily lead to rapid technological change by increasing the volume of production overtime. The most important effect from exporting activity, however, arises from its ability to enforce and foster technological mastery. Exporting activity, directly or indirectly, will enforce technological mastery by requiring exporters

to meet word standards in matching specifications given by the type and quality of the product involved. To maintain and increase penetration in overseas markets exporters has to upgrade their product quality, thus exporting leading to fostering technological mastery (Westphal 1982).

Two main conclusions from the above discussions require an empirical test to ascertain their validity. First, it is necessary to test whether export performance is related to the underlying incentives given to export and import competing industries. To increase the relative profitability exports various export subsidy measures were introduced. On the aggregate the introduced export subsidy measures produce neutral incentive trade regime by reducing the trade bias against export industries. Export performance was also related to the incentive measures that increased the relative profitability of exports. To test this conclusion, an econometric model is developed in the next section.

The second conclusion again from the previous discussions was that rapid export growth through its beneficial impact on resource allocation, saving, investment and productivity had led to rapid economic growth. To support this conclusion with an empirical evidence, another econometric model has also been developed. The econometric model, however, is a general one in that it does not show the routes how the above mentioned benefits affect economic growth. It rather shows the impact of export growth on GNP growth.

4.3. Model specification to estimate the response of exports to the underling incentives

The econometric model will have the following form

$$\text{Log } X = \log \text{REERx} + \text{DD} + \text{dT}$$

Where X = real exports

REERx = real effective exchange rate for export

DD = domestic demand

d = dummy Variable

Similar model has been estimated by Rodrick to estimate the response of exports to the profitability introduced by the REERx. Unlike his model, however, in this model the dummy variable 'd' is included to take in to account the effect of trade liberalization measures on export performance.

The real effective exchange rate for export (REERx) is a broad measure of incentive, which accounts for the exchange rate management and the export subsidy measures applied to exporters. In Korea the trade reform of 1961, introduced export incentives with out significant import liberalization. Percentage of imports subject to licenses and prohibition amounted to 50.1 percent in 1977 and only late in 1988 was it reduced to 4.6 percent. Similarly, average tariff was also 24.8 percent in 1979 and reduced to approximately 10 percent late in 1988.

Exchange rate management helped to maintain exporters competitiveness through continual depreciation of the nominal exchange rate to more than offset the inflation differential between home and abroad, raising the REERx. In addition to exchange rate adjustment, export subsidy was given through a variety of channels. Exporters have been subsidized through (a) direct cash subsidy (until 1964) (b) direct tax reduction (until 1973), (c) interest preferences; (d) indirect tax reduction on intermediate inputs and (e) tariff exemptions to intermediate inputs Nam (1993). Being an aggregate measure of the exchange rate management and export subsidy, the REERx is the most appropriate measure of export profitability to have a significant impact on export performance.

Domestic demand (DD) is expected to have a negative relationship with export performance. Domestic demand is an aggregate measure, which includes consumption, investment and government expenditure. A rise in domestic demand due to a rise in income or a sudden change in tastes towards exports may reduce exports by increasing domestic consumption.

d is a dummy variable which will have a value of one starting the early 1980s and zero otherwise. The percentage of imports subject to licenses and prohibition has been reduced from 50.1 1n 1977 to 14.4 in 1984. At the same time tariff rate has been reduced from 30 percent in 1977 to 21 percent in 1984 (Edwards 1993). This variable is included to estimate the impact of import liberalization on export performance. Import liberalization by reducing the bias against exports will have a positive effect on export growth.

4.4 Model specification to estimate the role of exports to TFP growth

Until now a number of authors Balassa (1977, 1983) Kavoussi (1982), Feder (1983) and others have attempted to relate export and GDP growth using cross-country

data from many countries. Feder used a two-sector analysis of tradable and non-tradable sector. He tested whether there is a productivity differential between the export and the non-export sector and if there is also an externality from the export to the non-export sector. His model was an improvement over the earlier one sector model done by Kavoussi (1982), Moschos (1987), Balassa (1977) and others in that it shows the productivity differential between export and non-export sector. But these cross-country studies aggregated a number of countries which are at different stage of development and which also followed a varied trade policy. As Kavoussi (1982) and Moschos (1987) have found, however, the level of development of a country matters for export to have a beneficial effect on aggregate GDP.

Demand side analysis to separate the effect of exports, IS and domestic demand on aggregate GDP growth has been attempted by Westphal and Kim (!982) and others using the input output analysis technique. But this analysis does not seem to be based on a firm theoretical priori. It is also unlikely that demand side analysis will capture the whole impact of exports on economic growth. Instead I will use a model developed by Balassa and Kavoussi, with some improvement, to estimate the impact of export on economic growth of Korea.

Based on the assumption that export expansion leads to total factor productivity growth through exploitation of economies of scale and externalities that arise from export, Balassa (1978) and Kavoussi (1983) estimated the following equation derived from simple production function.

$$RY = a + bRK + cRL$$

Where

RY = growth rate of GNP,

RK = growth rate of capital stock,

RL = growth rate of labor force.

To estimate the model rate of technical change was assumed to be a linear function of the growth rate of exports (RX) rather than constant rate of technical change. Thus, the model was constructed as follows.

$$RY = a + bRK + cRL + dRX$$

Unlike Kavoussi and Balassa, I will include an interaction term between human capital and export in addition to the variables they have estimated. Chou (1995) utilized an interaction effect technique in the analysis of the role of exports in TFP growth for Taiwan (1953-1992). He used an interaction term between export and the other variables in the model, namely labor, physical capital and human capital to capture the productivity improvement from scale effect as a result of export expansion.

The inclusion of an interaction term between human capital and export growth to the basic regression analysis was also employed by world bank (1993) to capture the productivity improvement from export expansion and the presence of educated manpower to adopt foreign technology made accessible as a result of export expansion.

Unlike World Bank (1993) study, I will include the interaction term between human capital and export to the basic production function framework developed by Balassa (1978) and Kavoussi (1983). This model also differs from that of Chou (1995), who used an interaction term between labor, physical capital and human capital, in that I will include only the interaction term between human capital and export. Thus, the following model will be estimated using Korean data for the period 1964-1984.

$$RY = a + bRK + cRL + dHRX + e\,RX$$

Where

RY = growth rate of GNP,

RK = growth rate of capital,

RL = growth rate of labor,

HRX = interaction term between the growth rate of human capital and growth rate of export,

RX = growth rate of export.

4.5. Data sources

Data on the real effective exchange rate for export is taken from Nam (1993). The effective exchange rate for export includes exchange premiums due to multiple exchange rates, direct cash subsides, direct tax reductions, and interest subsides for dollar of

exports, but excludes indirect-tax and tariff exemption. Fiscal deficit was taken as a proxy for domestic demand expansion. Data on fiscal deficit is collected from professor Nam (KDI school). The fiscal deficit data was deflated by GDP deflator at 1990 factor cost. GDP deflator was taken from Kim and Hong (1997). Because import liberalization in Korea was accomplished through gradual step and I found no suitable proxy for import liberalization, it was dropped from the empirical analysis.

Net capital stock variable was taken from Hak K. Pyo (1998) on estimates of fixed capital reproducible tangible assets. Data on labor force and university students per thousand population was taken from Korean statistic year book. Chou (1995) used secondary school enrollment plus five times the university enrollment rate in the respective age cohorts as a proxy for human capital accumulation. Because of lack of data on the respective age cohorts for the university enrollment rate, I used rather growth rate of university students per thousand population as a proxy for human capital accumulation in Korea. Data on the real export growth rate was collected from Professor Eyusung Kim (KDI School).

4.6. Empirical results

4.6.1 The relationship between export performance and relative prices

As it is indicated in table 11, the regression analysis proved that export growth was associated with the relative profitability to exporters as captured by the real effective exchange rate for export. The coefficient of the log of real effective exchange rate for export was significantly positive at 5 percent level of significance. As expected the coefficient of fiscal deficit has a negative coefficient but it is insignificant. It should not be surprising to find an insignificant coefficient for the coefficient of fiscal deficit in Korea where a significant portion of government expenditure was directed toward supplying exporters with infrastructural facilities which overtime facilitates further export performance. The overall explanatory power of the model as indicated by R^2 value is also reasonably high.

Table 11, export and relative prices

| Independent variables	Dependent variable
	dX/GDP
constant	-443.63
	(-2.09)
Log of real effective exchange rate for export	72.48*
	(2.3)
Budget deficit/GDP	-9.3
	(-0.24)
Time	(-1.4)
	(-5.9)
DW-statistic	2.03
R^2	0.61
Time period 1964-1991	

Numbers in the brackets are t-ratios
* indicates that the coefficient is significant at 5 percent level of significance

4.6.2 The relationship between economic growth and export performance

In the regression presented in table 12, labor force, net capital stock, an interaction term between university students per thousand populations and export growth, and the growth of total exports has been regressed against the growth rate of GNP. The result shows that both the interaction term and the export growth variables have a positive significant impact on the growth rate of GNP. This shows the beneficial impact on economic growth from the presence of educated manpower to adopt improved foreign technology made accessible from competition in the international market, and to diversify exports according to foreign demand.

The coefficient of the labor force growth variable shows unexpected sign in the regression. I check for multicollineatity between the estimated variables and found higher correlation between the labor force growth and the interaction term. But dropping the interaction term or alternatively the export variable from the regression did not improve the result. Plotting the data for the labor force growth variable shows many cyclical fluctuations. As figure 1 shows, frequent cyclical fluctuations also did not allow us to test for structural breaks as the fluctuation occurred with in short time intervals. The observed cyclical fluctuation in the labor force growth variable is suspected to be the main factor behind the unexpected sign for the labor force growth variable. But it is difficult to associate the observed cyclical fluctuation to any specific event or to economic cycle.

Figure 1, labor force growth rate (in percentage), 1964-84
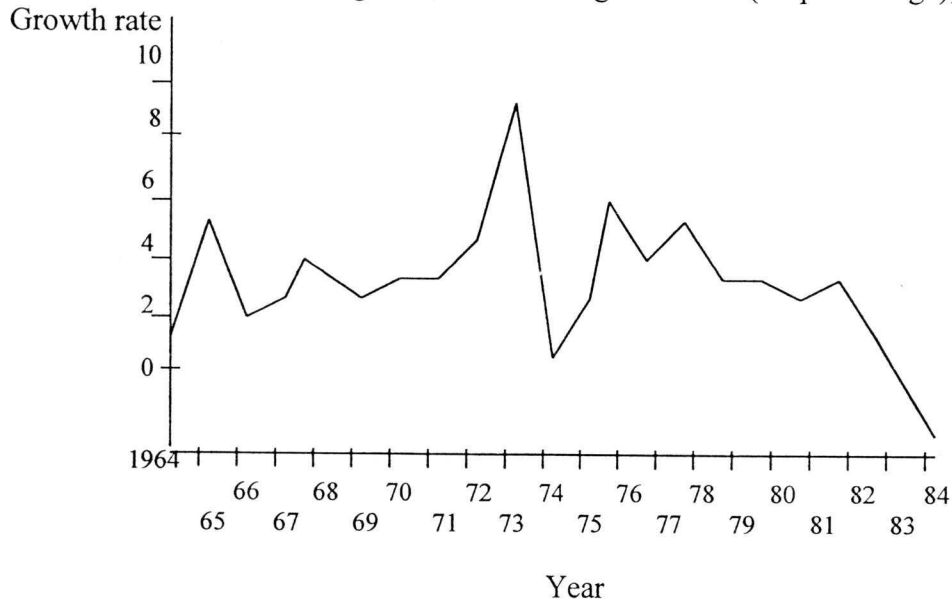
In general, from the regression analysis, we can make the following conclusion. Export promotion strategy leads to rapid economic growth. In addition, as it is indicated by the positive significant impact of the interaction term between human capital and export growth rate, export promotion strategy leads to more rapid and sustainable level of development when it is accompanied by the presence of educated manpower to adopt improved foreign technology. However, as similar empirical analysis done previously on export and economic growth, the difficulty of isolating empirically the channels through which export exerts its beneficial impact on economic growth is not also resolved in this paper. Finding the channels empirically how export expansion leads to rapid economic growth awaits further research.

Table 12, time series regression analysis on the growth rate of GNP

Constant	0.28 (0.11)
Labor force growth rate	-1.17* (-1.92)
Net capital stock growth rate	0.58** (2.78)
Interaction term between total export growth and university students per thousand population	0.0015* (1.82)
Growth rate of export	0.14** (2.14)
R -bar squared	0.31
DW-statistic	2.14
Time period 1964-84	

Numbers in the brackets are t-statistics
* shows that the coefficient is significant at 10 percent level of significance
** shows that the coefficient is significant at 5 percent level of significance

CHAPTER FIVE

5. Policy lessons to other developing countries

There were many favorable initial conditions for the success of export promotion strategy in Korea. These initial conditions are, however, partial explanations in that they may not apply to other developing countries. Among these initial conditions were the presence of strong government and educated manpower which facilitates the success of the export promotion strategy.

5.1. The role of government for the success of the export promotion strategy

In Korea neutral incentive trade regime to exporters were not established through outright import liberalization but by introducing export subsides to reduce the bias from the existing protective measures. The incentive structure was further complicated by the variability of incentives to import substitute industries. This complicated incentive structure requires on its part strong government for effective administration of the incentives to have successful results. It is beyond the scope of this paper to explain on the relative efficacy of authoritarian or democratic government or on the factors behind strong government. Rather, to say that administration of the incentive structure requires the presence of strong government to have maximum return from the introduced export subsides.

To see how the incentive structure demands strong administrative capacity let us see one example. Export-processing zones could not give the desired result if political sabotage result in inappropriate choice of location or in inadequate supply of utility, or if customs officials had to be bribed to permit tariff-free imports in to the zone. Similarly, tariff-rebates on imported inputs could not be appropriately implemented if there is delay and uncertainty in refund or if the authorities need bribes rather than actual imported coefficients (Alam 1989).

It is difficult to give quantitative measures on the administrative efficiency of the government toward implementation of export incentives. But we can infer its relative effectiveness from the failure of other economies, which introduced export incentives to expand exports. The introduction of export subsidy measures without the attendant strong

bureaucracy in Kenya in 1970s, and in Bolivia, Cotedivoire and Senegal during the 1980s was ineffective and was source of rent seeking (Rodrick 1994).

The other contribution of the Korean government lies in its ability to maintain the wage rate at the competitive level. Why maintaining the wage rate at the competitive level is important? Because in order to be competitive labor cost has to move in line with the level of labor productivity. To maintain the wage rate at the competitive level the Korean government used various institutional mechanisms to prevent the rise of the wage rate above the market level. Among these includes, setting the minimum wage below the market level, prevention of strike by labor unions, and setting wages in government services following private sector trends etc (Alam 1989).

As table 13 indicates, change in labor productivity and wage rate shows that percentage change in real wage with the exception of two periods was lower (some times negative) than the percentage change in productivity. For example, for the period 1965-73 percentage change in the real wage was about 9.8 while percentage change in labor productivity was about 13. As wage constitutes a higher percentage of cost of production, the movement of the wage rate relative to productivity is determeniental to the competitive position of any firm. To maintain market determined wage requires suppressing wage demands above the market rate, which in turn requires strong government intervention. Not only, effective administration of the incentive structure and market determined wage rate but also the existence of educated manpower has helped for the rapid growth of labor intensive manufactured products.

Table 13, percentage change in labor productivity and wages in manufacturing, 1965-84

Percent change									
	1965-1973	1974-1975	1976-1977	1978-1979	1980	1981	1982	1983	1984
Total wage nominal	21.6	31.2	34.3	35.6	19.1	20.0	14.7	11.3	8.2
real	9.8	5.1	19.5	19.2	-9.6	-1.3	7.5	7.9	5.9
Labor productivity	13.0	18.8	10.6	13.4	10.5	16.9	7.2	13.0	10.0

Source: Amsden (1989). Asia's next giant. Page 201

5.2. The presence of educated manpower for rapid technology absorption

Why educated manpower is important? Because effective absorption of foreign technology as a result of exporting activity requires human capital accumulation in

general and specific training. Workers may need to have basic knowledge of literacy and numeracy, technical and professional employees may need an engineering background, managerial employees may need a substantial general education plus exposure to a variety of specific jobs. In general, to acquire technological mastery three capabilities are required: (1) the capability to operate technology, for example to run and maintain a plant; (2) investment capability required to create new productive capacity; and (3) innovation capability that is required to modify and improve methods and products. These require different types and levels of skills and differing supporting institutions. On job training may suffice to acquire operational capability. Investment capability requires formal training to adapt not to replicate what is learned. Innovation can not be acquired though experiment only but it also requires some formal technical education and an imagination and a mental set always seeking a better ways (Stewart and Nihet 1987)

Korea in the early 1960s had higher human capital stock to adopt international best practice technology accessible as a result of its exporting activity. Educated manpower in Korea as measured by primary school and secondary school enrollment and literacy rate was high which was 94, 27, 71 percent respectively (Rodrick 1994). Comparison with other countries may give a more precise view on the level of human capital accumulation in Korea. One estimate shows that in 1954 the percentage of population in school was 17 percent in Korea while the comparable figure for Germany and England and Wales was 13 and 15 percent respectively (Amsden 1989). As it is indicated in table 14 also Korea had higher secondary school students as percent of secondary age population than Mexico and Turkey in 1965. Scientists in thousands per million population in late 1960s were also higher in Korea than Brazil, Mexico, and India. The presence of educated manpower will undoubtedly put Korea on competitive edge than other LDCs not only through faster adoption of foreign technology but also through diversifying its manufactured good exports.

Table 14, indicators of human capital in seven late industrializing countries

indicator	Year or period	Korea	Singapore	Argentina	Brazil	Mexico	Turkey	India	
				country					
Secondary students as percentage of secondary school population	1965	29.0	45.0	n.a.	n.a.	17.0	16.0	29.0	
Post secondary students as percentage of eligible post secondary students	1965	5.0	9.9	n.a.	n.a.	3.0	4.4	4.0	
Scientists and engineers in thousands per million population	Late 1960s	6.9	n.a.	12.8	5.6	6,6	n.a.	1.9	

Source Amsden (1989) Asia's next giant. table 9.2 page 218

6. Conclusion

Korea's economic success has been interpreted in many ways. Neoclassical economists give much emphasis to the export promotion strategy as the main factor that led to the rapid economic growth. According to them, Korea's export promotion strategy which gives neutral incentive among export and import competing industries led to efficiency in resource allocation, exploitation of economies of scale from selling to wider international market and adoption of improved foreign technology made accessible as a result of their exporting activity. Based on their interpretation of Korea's trade regime as neutral incentive, they attribute resource allocation to market forces than government intervention.

Revisionists on the other hand argued that not only the incentive structure in Korea was biased to promote exports and selected infant industries. As it is also argued by Rodrick (1994) the share of export in GNP was very low to lead to rapid economic growth. It was the rise of investment as a result of profitability to investment made possible from various government subsidy measures that removed coordination failure and generate rapid economic growth. Export growth was the consequence of rapid growth of imports which in turn follows rapid investment growth.

Rodrick (1994) also claim that there was government intervention to remove coordination failure through various subsidy measures and by directing resources to large firms mainly Chaebols. Government intervention was far more successful because of the presence of educated manpower which increase the return for capital and government intervention far more successful. In addition, to the presence of educated manpower, the presence of lower income inequality helped the government to introduce far reaching reform measures and intervention to be free of rent seeking activities.

Examination of Korea's incentive structure reveals that there was neutral incentive trade strategy. Neutral incentive trade strategy was established not only through the provision of export subsidy measures but also by keeping the number of promoted infant industries through higher protective measures small at a time. I have presented two measures of the incentive structure. The real effective exchange rate and effective protection and effective subsidy measures. The real effective exchange rate measures

includes not only the incentive measures from export subsidy and effective protection but also the incentive from the adjustment of the official exchange rate.

The aggregate measure of the real effective exchange rate for export and import and effective protection and effective subsidy measures when aggregated to the whole industry groups in fact produce neutral incentive among export and import competing industries. One of the reason in addition to the export subsidy measures is that the number of infant industries which received a higher effective rate of protection tends to be small at a time. I have shown on the relative variation of the incentive structure on import substitution and export industries. As it is shown on the data, the relative variation of the incentive structure on import substitute industries tends to be higher than for export industries.

I have also tried to separate those industries with relatively higher incentives than the rest of industries. Based on the data presented on the paper we can say that neutral incentive trade strategy was established in Korea not only because of the export subsidy measures but also because import substitution at higher protection was not such wide spread to create a resource bias. From the discussion presented on the paper, we can also conclude that performance measures were used only in the allocation of resources in the exporting industries. In the case of import competing industries there was an industry bias which indicates also the presence of government intervention in directing resources where Korea is supposed to have comparative advantage.

Export expansion as a result of neutral incentive trade regime in Korea also resulted in efficient allocation of resources, exploitation of economies of scale and rapid productivity growth. It was also possible to generate exports from the protected infant industries through institutional mechanism. As a result of competition in the international market and reduction in cost of production through learning by doing, these protected infant industries was also acquired efficiency and productivity growth. I have sited some specific examples of industries which latter acquired efficiency through the above mentioned methods.

In general, attributing Korea's export promotion strategy to market forces alone is far from the truth. Market forces did played a role in the allocation of resources only in the exporting industries. When we come to import competing industries, there is

government intervention to direct resources to certain favored industries. Effective implementation of the whole incentive structure was also made possible as a result of government intervention. Many countries have failed to promote exports with out strong government bureaucracy. The presence of educated manpower has also contributed in the adoption of improved foreign technology.

From the empirical evidence, we have also found that the incentive structure do play a significant positive impact for the rapid growth of exports. Export has also played positive role along with educated manpower to generate rapid productivity growth as it is proved by the regression analysis. The empirical analysis, however, did not show the channels how export promotion strategy lead to rapid economic growth which other researchers might continue with to solve the problem.

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