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THE ROLE OF THE INDUSTRIAL SECTOR IN KOREA'S TRANSITION TO
ECONOMIC MATURITY

Gustav Ranis

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The Role of the Industrial Sector in Korea's Transition to
Economic Maturity

Gustav Ranis*

Any really useful examination of the role of Korea's industrial sector during the recent past, with an eye on the future, requires placing that role in the context of the overall pattern of Korean development, while keeping a sensitive eye on the historical time dimension. The analysis, moreover, must recognize that Korea belongs to a particular family of developing countries, which realization affects in a very marked fashion both the theoretically "ideal" role to be played by the industrial sector in such a context as well as any judgment about its actual performance in this particular case.

Korea belongs to the group of small, therefore open, labor surplus dualistic economies, characterized by relative natural resources poverty and abundance of unskilled labor at the outset. When contrasted with the other types or sub-families of developing countries, e.g. large labor surplus dualistic countries like India, where trade plays a relatively minor role, or land surplus countries like Nigeria, where natural resources are relatively abundant, this LDC family is subject to a number of specifiable initial conditions and idealized rules of growth over time which need to be understood if the actual pattern of Korean industrial development is to be usefully contrasted with it. In Section I we will briefly define the "ideal" growth pattern for the open

*The author is currently engaged in a broader related research effort, supported by the Agency for International Development, also involving Professor John Fei of Yale and Professors Sung Hwan Jo of Korea and Chi-Mu Huang of Taiwan. He wishes to acknowledge their substantial contributions to this paper, which should be viewed as preliminary and tentative in nature, especially with respect to the precision of the empirical data presented.

dualistic labor surplus economy, based on a number of growth theoretic principles which will themselves not be dealt with in any detail in the course of this paper.¹

As we then turn to a review of the actual Korean experience relative to this ideal, we will find it useful to contrast Korean performance with that of two other countries belonging to the same family, i.e. Japan, historically, and (especially) Taiwan in the post-war period. Such contrast of actual behavior in this type of an economy, including that of the industrial sector, will permit us a much sharper focus on the Korean case. Sections II and III are devoted to this comparison, both as to the initial conditions and the similarities and differences of the transition process in the two countries. Finally, in Section IV, we attempt to pull together the implications of our analysis for further research and policy.

I

The main structural characteristics of the labor surplus open dualistic economy may be summarized as follows:

- (a) the coexistence of a relatively large agricultural subsistence sector with a relatively small non-agricultural or commercialized sector at the outset. A distinguishing characteristic of the agricultural sector is that workers are compensated according to institutional or familial rules above their marginal productivity. (This sector includes not only subsistence agriculture per se but also substantial "soft" portions of the non-agricultural sector

¹See, however, Development of the Labor Surplus Economy: Theory and Policy (with J.C.H. Fei), Homewood: Richard D. Irwin, 1964; and "Development and Employment in the Open Dualistic Economy," (with J.C.H. Fei), paper presented to the Conference on Manpower Problems in East and Southeast Asia, Singapore, May 22-28, 1971.

located in urban areas.) The "hard" non-agricultural or commercialized sector is characterized by the prevalence of the well-known neo-classical conditions for the compensation of the labor force, i.e. people are compensated according to their marginal product. (This sector includes most of industry, portions of the service sector, including public utilities, transportation and financial intermediaries.)

- (b) A land/labor ratio in agriculture sufficiently unfavorable so that diminishing returns have brought the marginal product of labor to a low level (below the institutional wage);
- (c) Population pressures at the margin tending to render the unfavorable natural resource base even less favorable over time. (This population growth may be viewed as adding to the pool of redundant or disguisedly unemployed.);
- (d) An overall shortage of capital for investment, especially in the non-agricultural sector, plus fairly low levels of technology change in both sectors;
- (e) An economy, which may be characterized as basically agrarian in character, which trades with the rest of the world mainly via the exportation of traditional raw materials in exchange for a combination of investment goods (to permit the further exploration of the primary raw material export base) and a limited volume of consumer goods (to satisfy the entrepreneurial elite or the workers being gradually pulled out of the subsistence and into the export oriented agricultural sector).

The basic problem in such an economy, if it is to move in transition to a state of economic maturity as defined by Kuznets,¹ is to gradually shift its center of gravity from low productivity subsistence to the higher productivity non-subsistence or commercialized activities. This shift of the center of gravity, resulting from labor reallocation in excess of population growth, is, of course, only symptomatic, i.e. it represents the top of an iceberg which encompasses the successful performance of the entire system. The rest of the iceberg is descriptive of the real resources functions which each of the major production sectors and the foreign sector must play if the system as a whole is to successfully escape its initial underdeveloped condition and throw off consistent increases in per capita income without major negative side effects in terms of income distribution or unemployment.

If we wish to trace the workings of an LDC of the Korean type, over time, we know that the basic resources function of the preponderant agricultural sector is to release labor and to provide food, raw materials, and saving to the growing non-agricultural sector, either directly or through exports. Adequate performance here requires that agriculture be able to continuously generate a surplus, that is output in excess of the consumption requirements of those left in agriculture, and moreover, that this surplus can be preserved and channeled into productive activity in non-agriculture. The basic role of the non-agricultural sector, which we are mainly concerned with here, is the selection of the appropriate technology to provide employment opportunities which productively absorb the released labor force as well as to generate the additional fuel for the further development of the economy, again either directly or through the trade mechanism.

¹S. Kuznets, Modern Economic Growth: Rate, Structure, and Spread, New Haven, Conn.: Yale University Press, 1966.

It should be clear in this context that the open dualistic economy's total saving fund is composed of two kinds of domestic contributions, industrial profits and agricultural surplus, plus any surplus available from abroad, i.e. foreign capital. The total domestic saving fund must then be allocated, along with entrepreneurial energies, to the two sectors so as to increase agricultural productivity, on the one hand, thus freeing labor and yielding more agricultural surpluses, and to increase industrial labor productivity, on the other, thus creating a demand for the released labor and yielding new industrial profits for reinvestment. At the same time, given the consumer preferences of the typical worker in both sectors, the output generated in each must be such as to prevent either a shortage of food or of industrial goods, as would be indicated by a marked change in the intersectoral terms of trade. Allocation decisions taking into account both capital accumulation and technological change in each sector must thus proceed in a more or less balanced fashion so as to avoid the over-expansion of either sector in the course of labor reallocation and growth. In the open economy context the tyranny of domestic balanced growth in consumer goods is much less severe as domestic output imbalances can be corrected through trade.

Once such a process of synchronized growth requiring a balanced allocation of entrepreneurial energies as well as saving fund has proceeded long enough for the entire disguised unemployed labor force to have been "mopped up," a mature economy pattern following neoclassical growth rules emerges. This results from the rise of the marginal product of workers to the level of the institutional wage and the persistent growth in per capita income over time.

The chances that such "graduation" will, in fact, occur, and the speed with which it can be reached, however, has to do not only with the effort put in, but also with the aforementioned initial resource endowment, i.e. the

extent and size of the reserve army of the unemployed, the initial relative size of the two sectors, the size and quality of the productivity enhancing forces in both sectors, the precise commodity characteristics of the development process, and the quality of developmental financing. If the various links operate over time so as to create adequate productivity change in each sector, continuous labor reallocation, and clearance in output markets without marked changes in the inter-sectoral terms of trade, the process is a smooth one. Inevitable imbalances, i.e. too much productivity increase in one sector or another, leading to a temporary deterioration of the intersectoral terms of trade for or against one sector and/or an excess release or a shortage of workers, may cause difficulties in the short term, but the long run pattern is clear.

When we look at this transition to economic maturity as a process of several decades, we are, moreover, able, in this idealized case, to differentiate between an early and late sub-phase of the transition. The first sub-phase may be called the "first restructuring" of a previously agrarian economy. This is characterized by the so-called import substitution syndrome of policies which most LDC's, including the particular family to which Korea belongs, followed in the post-World War II period. As such a society emerges from a more or less stagnant colonial situation, it demands a drastic reallocation of its resources. Typically this is effected through assertion of government control over traditional export proceeds in order to prevent their continued reinvestment for the exclusive benefit of that same sector (or repatriation abroad). Instead the attempt is made to channel such resources into domestic non-agriculture, i.e. industry, overheads and services. Previously imported consumer goods are increasingly produced by the new and growing domestic industrial sector,

while efforts are simultaneously made to increase the interaction between the domestic food producing agricultural and non-agricultural sectors in a mutually reinforcing fashion. This import substitution policy syndrome usually includes not only direct controls over foreign exchange to permit reallocation to socially desirable sectors but often substantial government deficit financing accompanied by inflation and an increasingly overvalued exchange rate. Throughout the economy, but especially in the allocation of such critical resources as credit, foreign exchange, cement, steel, etc., quantitative restrictions coupled with administered prices are preferred--all in an effort to channel resources towards the import substituting industries and their ancillary overhead requirements.

The operation of this system and its deleterious effects on output generation, employment and other performance indicators is by now fairly well understood. But what is perhaps being lost sight of in the present mood of condemnation of these policies is that such aberrations from efficiency may be a necessary first step taken by newly independent governments in interposing themselves on behalf of the national development effort. Prices traditionally serve as stimulants and propellants; but if there exist institutional impediments, a shortage of overheads or of entrepreneurs, planners or policy makers may well have to set prices in such a way as to provide larger than normal profits to offset larger than normal risks, for a time.

The problem really is how much import substitution, and for how long. Once entrepreneurial capacity is enhanced via learning-by-doing processes, infrastructure is created and institutions are gradually transformed in directions which accommodate or facilitate change, such extra price margins or windfall profits would be expected to decline and disappear. The economy is then ready

to enter its second sub-phase of transition which we may call export substitution. While under import substitution public and large-scale private enterprise are the main beneficiaries, in response to the actual or assumed shortage of domestic entrepreneurship, once the hothouse temperature is lowered, a restructuring of the main relative prices, including the exchange rate and the interest rate, should take place, especially if agriculturists as well as medium and small scale industrialists are to be fully mobilized in the development effort. This cannot be accomplished either through direct ownership (except in the case of a socialist system) or through direct horizontal controls across the board, since it is physically impossible for government to reach the millions of dispersed economic agents effectively. Thus, as the economy typically moves into its export substitution sub-phase, the government's catalytic instead of its directly allocative role comes to the fore.

Returning to the idealized development path for our type of LDC, we would thus expect the initial pattern of traditional raw material and agricultural exports which finance the import substitution sub-phase to give way as changes in the underlying comparative advantage position of the economy occur in the course of transition. This change from land to labor-intensive production and exports is likely to be quite drastic, governed by relative productivity increases in the two domestic sectors and the domestic versus international terms of trade. It is ultimately likely to lead to the net importation of agricultural goods in the natural resources poor type of LDC--although it is difficult to predict ex ante when this is likely to occur. It should be noted that this reversal of comparative advantage from the net export to the net import of primary products is quite separate from the switch from import substitution to export substitution which will occur in the course of the transition. Export substitution,

for example, (as in the case of Taiwan) may well include new labor intensive agricultural products as well as new labor intensive industrial products.

Development in the open dualistic labor surplus economy will thus inevitably be characterized by a concentration on the exportation of first land intensive, then labor, and finally skill and capital intensive goods in order to acquire the needed capital and raw materials. This holds for Japan historically as well as for Korea and Taiwan, if we take a long enough historical view. But the question before us at the moment is how the growth experience of such economies should be analyzed in the shorter term as they move towards this relatively inevitable long run pattern. In other words, while the progression in the idealized case is from land intensive exports, in the agrarian import substitution sub-phase, to labor intensive exports and from there to skill and capital intensive exports during export substitution, differences will emerge in the course of this transition as between countries even of this particular type. It is these differences which are instructive, not only from the point of view of growth theory generally, but also from the point of view of relevant analysis and policy respecting any particular member of the group. As we will try to demonstrate, our understanding of the industrial sector's role in Korean modernization is considerably advanced by comparison with the historical experience of Japan and that of Taiwan in recent decades.

II

As we have already noted, while large labor surplus dualistic economies must follow a relatively balanced intersectoral growth path, a small country of this type can utilize the opportunity of trade to follow a more unbalanced path. All three members of the family under discussion here share the basically poor natural resources base and therefore ultimately will probably need to

import food. The question before us, however, is whether or not existing reserves of productivity in agriculture are harnessed during the shorter term transition period en route to the final commercialization or "turning point," when the economy enters into mature growth. Substantial increases in agricultural productivity, especially during the import substitution sub-phase, can make the task much easier. Once such productivity increase peters out, as it inevitably will at some point, agriculture will have played its historical role, in terms of its contribution to foreign exchange resources, the economy's saving fund, and the continued availability of cheap labor.

Taking briefly the Japanese historical case first, we know that its import substitution sub-phase, which began roughly with the Meiji Restoration in 1868, was a relatively brief and mild one by contemporary standards. For one, possible excesses of protectionism vis-a-vis domestic industry were curbed by the extra-territoriality provisions of the unequal treaty systems imposed on Japan by her trading partners at the end of the Seclusion Period. For another, Hjalmar Schacht's primer on interventionism in the foreign exchange and other markets had not yet been written. Japan's decision, around 1890, to sell a substantial volume of her directly productive facilities initially in government hands more or less signalled the end of two decades of strongly paternalistic and directly interventionist action by the government. The switch from import to export substitution, indexed by the switch from raw silk to silk yarn exports, can be placed just before the turn of the century, by which time the main or primary consumer goods import substitution process had been completed.

During that period, moreover, we witness a major agricultural revolution in progress which has been much commented upon in the literature.¹ As a consequence, we observe only a slight deterioration of the industrial sector's terms of trade during the 19th century, but, because of the continued rapid industrialization which took place, followed by a petering out of the agricultural revolution, such deterioration did continue until about 1900. At about that point Japan turned from being a net exporter of primary materials and food to a net importer, and the terms of trade between agriculture and industry were kept from deteriorating further. This food, incidentally, was procured mainly from Japan's colonies in Taiwan and Korea.

Thanks to the burst in agricultural productivity, moreover, and given the unlimited supply of labor condition, the agricultural real wage did not increase very markedly during this early period, i.e. 1.7 percent annually between 1880 and 1908 while the industrial real wage increased by 2.2 percent. This is in marked contrast to wage increases of close to 4 percent for both sectors after World War I. In other words, the ability to, first, generate sustained domestic agricultural productivity increase, and, then, to import the necessary food and raw materials from her colonies permitted Japan to maintain a relatively modest increase in both agricultural and industrial wages while she was rapidly reallocating her labor force from agriculture to non-agriculture.

As a consequence of this moderate wage increase in both sectors, with industrial wages tied to those in agriculture, we also witness a much less pronounced industrial capital deepening process during the pre-World War I

¹See, for example, Bruce F. Johnston, "Agricultural Productivity and Economic Development of Japan," Journal of Political Economy, VII, 2 (November 1947); G. Ranis, "Financing Economic Development," Economic History Review, March 1959; and Kazushi Ohkawa and Henry Rosovsky, "The Role of Agriculture in Modern Japanese Economic Development," Economic Development and Cultural Change, IX, 1, Part 2 (October 1960).

period than in the post-war. In other words, both industrial technology as well as output mixes were relatively labor-using especially during the export substitution phase of Japanese development. Once the reserve army of the unemployed and underemployed had been absorbed, labor saving innovations were adopted in the post-World War I period, in response to the changing factor endowment.

In summary, Japan first switched from import substitution to export substitution (let us call that the "switching point") around 1890. About 10 years later she became a net food importer to keep the process of labor reallocation going and the industrial wage from rising "prematurely." Finally, around 1920 she reached the commercialization or turning point, defined as the termination of her labor surplus condition.¹

With respect to Korea and Taiwan, the common assumption is that both of these economies have been traveling down the same historical path previously trod by Japan, with Korea perhaps a few years behind Taiwan. By general agreement, Taiwan exhausted her primary (consumer goods) import substitution possibilities around 1959. Government policy changes, including devaluation, import liberalization and interest rate reform helped usher in the export substitution phase around that time. Once this second restructuring had substantially reduced the major distortions in relative prices of the previous import substitution sub-phase, the industrial sector was increasingly marked by major shifts in output mix towards labor intensive industrial exports, and increasingly labor using technologies for given output mixes, especially in textiles, electronics and food processing. Facilitated by the establishment of the Koahsiung Export

¹Ryoshin Minami, "Further Considerations on the Turning Point in the Japanese Economy," Parts I and II (Hitotsubashi Journal of Economics, Vol. 10, No. 2, February 1970 and Vol. 11, No. 1, June 1970) has challenged this as the appropriate date for the turning point, but we see no need to go into this controversy in the context of the present paper.

Processing Zone, a dramatic expansion of labor intensive industrial exports took place.

In 1952 rice and sugar constituted 78 percent of Taiwan's export earnings. By 1969 this had shrunk to 4.8 percent. On the other hand, non-traditional agricultural products including fresh and canned fruits and vegetables grew from negligible amounts to 10 percent of the total; but, most impressively, labor intensive manufactured goods including textiles, plywood products, and electronics grew from 5 percent to close to 70 percent of total exports. The full dimensions of this structural change are recognized when we note that total export earnings themselves were rising at rates of 30 percent on the average during the 60s.

Within the industrial sector, substantial capital saving or labor-saving innovations were in evidence, especially in fabricating as opposed to continuous processing industries. For example, one multi-national corporation engaged in plastics production reported that its capital-labor ratio was about the same as in the U.S. in its continuous processes, but only about one-half of that of the American plant in fabrication. In electronics assembly also the amount of labor used is at least 50 percent greater than in parent company plants in the U.S. Not only are capital-labor ratios lower, but they have been falling during the export substitution sub-phase. For example, the largest electronics factory in Taiwan has experienced an increase in her capital stock by 9 times along with an increase in employment by 16 times, between 1965 and 1969. The overall conclusion derived from plant visits is that, during this export substitution phase, the closer the production process to the finished product stage, i.e. the further removed from backward linkages, the greater are the possibilities for efficient labor using innovations.

As a consequence of all this, industrial labor absorption which grew at rates of 3 percent annually during the import substitution period, between 1952 and 1959 (see Table 1), accelerated to 8.1 percent annually in the 60s. If we divide non-agriculture into Kuznets' M and S sectors,¹ the rate of labor absorption grew from 4.8 percent annually in the 50s to 7.5 percent in the 60s, for the M sector; and from 3.2 percent to 6.5 percent for the same periods in the S sector. Equally significant is the fact that once the various reforms which facilitated the move to export substitution had been completed, this trend seems to have accelerated, i.e. during '64-'69 the rates of labor absorption were 8.7 percent for the M sector and 7.2 percent for the S sector, respectively. By the end of the decade, the "turning point" was apparently reached as a labor shortage set in and real wages began to rise markedly.

When we next turn to contemporary Korea, all the signs indicate a similar path as that followed by Taiwan, but with a slight delay. Devaluation in 1964 and a major interest rate reform in 1965 laid the basis here as well for the shift from import substitution to export substitution and for major changes in technology as well as output mix. Here also even more dramatic increases in total export volume (by close to 40 percent annually) were accompanied by major structural changes in the post-1962 export substitution sub-phase. Here also labor based light manufacturing, including plywood, electronics, cotton textiles and footwear accounted for close to 80 percent of total exports by 1968.

Once again, partly with the help of tariff free zones, capital stretching adaptations of imported technology can be cited, especially in textiles,

¹These data are from Harry Oshima, "Experience of Labour Absorption in Postwar Taiwan," a paper presented to the Conference on Manpower Problems in East and Southeast Asia in Singapore, May 22-28, 1971.

electronics and plywood production. In cotton weaving, for example, one Korean girl mans 3 looms as contrasted with 4 in Japan; in spinning the contrast is between 600 and 900 spindles. Moreover, Korean machinery is run for 3 eight-hour shifts daily as contrasted with only 2 such shifts in Japan. In the production of plywood what at first appear as production processes very similar to those carried on in the U.S., in fact, turn out to be quite flexible--interestingly enough mainly because of the greater machine speed combined with much more labor-intensive repair methods used. In the United States, defective pieces of lumber are cut out automatically by machine and discarded. In Japan, defective pieces of lumber are cut out by hand and the section is discarded. In Korea, defective sections are cut out by hand, the scraps saved, and the defect plugged manually. In this fashion lower quality raw material can be upgraded to an equivalent quality output through the application of cheap labor. Overall we found twice as many workers per unit of capital equipment in Korea, i.e. 123 workers are engaged per equivalent capital production line as contrasted with 72 in Japan; moreover, a Korean line is worked a 22-hour day as compared to 20 in Japan. At the same time between 10 and 15 percent more workers are engaged in inspection, repair and maintenance of both materials in process and the machinery in place. Finally, in electronics, machine-related labor-using innovations and adaptations are again prominent. In transistor assembly operations, for instance, given wage rates 10X lower than equivalent operators get in the U.S. (for the same firm), the machinery is run at physical full capacity, i.e. six days, three shifts a day which is 20 percent above the U.S. equivalent. The difference in speed of assembly on identical equipment can yield a 30 percent differential in output (from 68 units per machine hour to 85) and in a die mounting process it rises to more than 100 percent (from 113 units per hour to 240). Greater speeds of operation, either

due to faster machine or operator pacing, are here once again accompanied by putting additional girls into more intensive testing, inspection, maintenance and repair efforts than is encountered in Japan or the U.S.

As a consequence of this combination of changes in output mix and technology, Korea's industrial employment has been increasing in a rather sustained fashion during the 50s and 60s (see Table 2) even though the rates have not been quite as high as in Taiwan and the acceleration in the export substitution phase has not been as marked. More recently sustained wage increases have been noted and the current consensus is that Korea has reached the turning point and is entering into a labor shortage situation.

All in all, we would thus seem to have before us, in the cases of both Taiwan and Korea, two very similar contemporary success cases, both following rather closely the described idealized pattern in the open dualistic labor surplus economy. A rapid reallocation of labor, accompanied by a burst of export-oriented industrial activities, high overall growth rates, facilitated by government policies permitting the switch from import to export substitution, and culminating in a labor shortage at the end of the decade--these are the common features. However, as we shall see in a moment, this apparent virtually complete symmetry is deceptive and does not stand up to closer examination. Moreover, the divergence in the pattern of development followed by the two countries is significant and will help us to focus constructively on current problems facing Korea's policy makers.

III

For purposes of eliciting a more detailed useful comparison between these two economies in transition, let us first examine the initial conditions

for Taiwan in 1952-54 and for Korea in 1955-57,¹ and then contrast these with 1968-69 which is the common "terminal" period, i.e. as far as our statistics take us.

The first point to note is that, in spite of their shared Japanese colonial heritage, Taiwan and Korea, had in fact, at the outset, a very different agricultural infrastructure at their command. The much more favorable initial agricultural infrastructure in Taiwan is reflected in a much higher agricultural labor productivity, as shown in row 1, Table 3.² In fact, Korea's labor productivity at the beginning of the transition was only about 60 percent of that of Taiwan (see column 4). As to the significance of this difference in terms of the "ideal" transition case, a higher level of productivity, as in the case of Taiwan, permits a society to have a higher consumption standard, and/or to utilize the agricultural surplus to allocate more people out of agriculture, and/or to help finance the industrial sector by exporting agricultural products and thus enhance the economy's capacity to import capital goods. As row 2 of Table 3 indicates, the per capita consumption level of agricultural goods at the initial point was about the same in the two countries in spite of the substantially higher level of labor productivity in Taiwan. As we can see from rows 3 and 4, Taiwan instead used the differential to allocate a much larger fraction of its population out of agriculture and to support the transition process through trade. It is rather startling to note that the percentage of the total labor force already allocated to non-agriculture in Taiwan at the beginning was more than twice that of Korea (45 percent versus 22 percent). In other words, a larger

¹These base periods, coming a few years after the move from the Chinese Mainland, in the first case, and after the Korean War in the second, are considered appropriate initial post-war years.

²This has much to do with the Japanese effort to bring irrigation to Taiwan in order to assure the success of the cash crop, sugar, while being relatively less concerned with agricultural investments in Korea.

proportion of the total population had to be kept in agriculture in Korea in the early 50s in order to feed the total population because of her relative lower level of agricultural productivity. An even more startling contrast emerges from the data in row 4, which indicates that, while Korea was hardly able to do any net exporting of agricultural goods at that point, Taiwan was exporting at the rate of almost \$14.00 per capital.

This marked initial difference in agricultural productivity thus already provides a very broad hint as to very different roles played by the two sectors in the two countries under discussion. In the case of Taiwan, the surplus of agricultural goods already available at the outset could immediately be turned into a major contributor to the growth of the industrial sector during the import substitution sub-phase--both directly and indirectly (through trade). Moreover, this favorable initial infrastructural base could be built on to ensure the continued expansion of agricultural productivity, over time, during the transition process. In the case of Korea, not only did the agricultural sector provide hardly any exportable surplus to begin with but it remained relatively stagnant throughout the period under examination. This, as we will see, put a much heavier burden on the industrial sector and on foreign aid to finance the total development effort.

In continuing our comparative examination of the initial conditions in the two economies, we should also note that, as far as the industrial sector is concerned, which is our main focus of interest here, the non-agricultural real wage is substantially higher in Taiwan in the initial period (see row 6a, Table 3). In two predominantly agricultural economies, we can expect, and do in fact obtain, approximately the same parity in agricultural productivity (row 1), real wage (row 6) and per capita GDP (row 9). The higher industrial real wage in Taiwan would normally lead us to expect a higher capital-labor

ratio, and a higher average product of labor there. We find, however, (see rows 7 and 8) that, in fact, it is Korea which has a higher capital intensity and a higher productivity of industrial labor. This combination can only mean that there is a different "average" technology in use in the two countries, i.e. that Korea at the very outset is employing a more capital-using technology and/or output mix than Taiwan in her industrial sector. This again, as we shall see, has important implications for the transition paths the two economies have followed to date.

Other consequences flowing from the interrelated differences in the level of the non-agricultural wage (row 6a) and the per capita GDP (row 9) are differences in the industrial consumption standard and in the volume and structure of international trade. With respect to the industrial consumption standard, first, we should note that, since the internal terms of trade in the two countries are about the same (row 11) and since the agricultural real wage (row 6b) may be thought of as institutionally determined in the labor surplus economy, the fact that the two countries consume about the same amount of agricultural goods per head means that Korea initially consumes less industrial goods on a per capita basis (row 10).

As far as the volume of trade is concerned, the initially higher industrial wage and per capita GDP levels in Taiwan, given the basic similarity of the natural resources endowment, would lead one to expect a higher volume of trade in Taiwan. This is, in fact borne out by the information in row 12 showing total exports as a fraction of GDP, which indicates Korea's initial external orientation to be only one-third of Taiwan's.

With respect to the structure of trade, given the relatively more advanced state of agricultural development in Taiwan, the exports of Taiwan are initially dominated by traditional agricultural goods while, in the case of

Korea, from the very beginning, her relatively small volume of exports is composed of a mixture of traditional agricultural (including mining) and non-agricultural goods.

On the import side, the imports of both countries are, of course, dominated increasingly from the beginning, by development-oriented capital goods and raw materials. But we should again note a major difference, i.e. Taiwan's higher per capita income and requirements for a much larger volume of industrial consumer goods imports (row 13)--also consequently much larger scope for primary import substitution. Taiwan's agricultural exports were able to make a substantial contribution to the procurement of these imports and to the import substitution process (additional capital goods and raw materials) required to replace them over time.

The initial import substitution sub-phase of transition growth in Taiwan thus runs close to the "ideal" version. During this early period agricultural exports provide the main fuel for industrialization in terms of the enhanced capacity to import capital goods and raw materials. There thus exists a particular pattern of triangularism through which the agricultural sector produces an exportable surplus which, in turn, provides the import capacity for the needed industrial goods. Moreover, the incomes generated in the agricultural sector by these same agricultural exports provide a market for these same industrial consumer goods, first imported and later, as domestic capacity is built up, increasingly produced at home. Korea, in sharp contrast, was forced very early to become a net importer of food and to deploy foreign exchange obtained elsewhere, mainly from abroad, for its purchase. The stage is thus set for a much more bi-lateral interaction between the industrial sector and the foreign sector, as agriculture is relatively stagnant. It is the traditional industrial sector which contributes to the small exportable surplus from the beginning and

helps finance the (more limited) import substitution process, and it is the growing non-traditional industrial sector which is then saddled with the responsibility of diverting a portion of its import capacity to the filling of the food gap--a problem to which we shall be returning below.

Given the marked differences in initial structure which have thus become very apparent, let us now examine the two countries' growth performance during the transition period itself with the same care. This can be done most readily, in a comparative static sense, by examining the two countries' comparative structure in the terminal period. In both countries, to take the similarities first, a marked shift of the center of gravity from the agricultural to the non-agricultural sector must be noted (see Table 3, row 3) as between the initial and terminal periods. This major reallocation of labor in excess of population growth, and as a consequence of industrialization has by now led to a shift of more than 50 percent of the population out of agriculture, and in fact to an absolute decline of the agricultural population in both countries.

Secondly, we may note that both countries, under the pressure of the unlimited supply of labor condition, did not increase their per capita consumption standard for food very much (see row 2). This means that saving propensities increased substantially in both cases (see row 14) during the transition period. In Taiwan this moreover means that per capita agricultural exports could be sustained at about the same level (\$13 or \$14 per capita) in spite of population growth and a much smaller fraction of the total population in agriculture. In Korea the agricultural consumption standard was maintained only via increasing food imports.

The main point of contrast then is that Taiwan built on her initially favorable agricultural infrastructure with policies supporting the continuous expansion of agricultural labor productivity, growing at 6 percent annually. At the end of the decade the agricultural productivity parity had declined from .60 to .38. This meant that, even though Taiwan remains a natural resources poor country

and will ultimately probably have to import food, it is to this day a net exporter of agricultural goods. Her ability, in spite of population growth and labor reallocation, to continue to supply a large volume of traditional and non-traditional labor intensive agricultural exports substantially lessened the pressure on her industrial sector to fuel the entire development program.

Korea's initial agricultural infrastructure combined with the policies in vogue during the transition combined to yield a continuously relatively lagging agriculture (see row 1), coupled with rapid industrialization and labor reallocation. This combination inevitably led to the early emergence of an import food gap and put an extra heavy burden on the industrial sector as this gap had to be filled (to maintain the agricultural consumption standard), even if it meant the diversion of import capacity from other uses. Agriculture, instead of contributing to import capacity and the financing of the import substitution effort thus became a drag on it.

Seen in another light, the contrast can be summarized by looking at the saving performance once again, this time disaggregated by sector of origin (see rows 16-18). It should be noted (row 16) that, while agricultural saving contributed the lion's portion to a (low) domestic saving performance in Korea in the initial period (24.8 percent) this had fallen to 2.9 percent by the late 60s. Thus, in spite of the remarkable turn-around in the contribution of industrial saving reflected in row 17, the direct consequence of agricultural stagnation was a heavy reliance on foreign capital inflows. In contrast, Taiwan witnessed a balanced expansion of the contribution of agricultural and non-agricultural saving (from 18 percent to 21.8 percent and from 40 percent to 68.1 percent, respectively) accompanied by a marked diminution of the contribution of foreign saving (row 18), from 48 percent to 10.5 percent.

An even more dramatic summary of the contrast is obtained when we compare the cumulative contribution of the three types of saving to total investment over the entire transition period in the two countries (see Table 4). While agricultural saving contributed almost 26 percent of the total investment fund in Taiwan, this figure was only 9.4 percent in Korea. Even more startling is the fact that foreign capital (aid plus private investment) had to finance 73 percent of Korea's total investment program--as opposed to only 5.5 percent in Taiwan.

Turning now to the industrial sector, let us recall that once import substitution policies had done their job, i.e. the creation of the infrastructure and the maturation of industrial entrepreneurs, and once changes in that policy package were in a position to facilitate the move into the export substitution sub-phase, we could expect, and found, the combination of surplus labor and maturing entrepreneurs to yield a sustained increase in labor intensive industrial exports in both countries. While both countries increased the size and, given that domestic markets remained constrained by the unlimited supply of labor condition, the external orientation of their industrial sectors, Taiwan was, moreover, able to continue on her initially more labor intensive technology path. Korea, on the other hand, maintained relatively higher capital intensity in her industrial sector even though, by international standards, her technological flexibility was quite remarkable. While our data don't permit us to more than assert the point, we, moreover, suspect that the divergence here became more marked after 1968 when Korea appears to have reversed some of her earlier reforms and liberalization policies and to have pushed harder in the direction of the more capital intensive backward linkage and capital goods types of import substitution and export promotion. In other words, even though the remarkable success story of industrial output expansion coupled

with the spurt of industrial exports as the major growth promoting force continues to hold, a closer examination here also shows problems in the Korean case which have come to the fore increasingly of late and will become even more noticeable in the future in the absence of a reversal in policy.

To be a bit more specific, by 1960 the import substitution phase had done its historical, and perhaps inevitable, job in Taiwan, that is (1) it permitted the maturation of domestic entrepreneurs; (2) permitted the expansion of agricultural infrastructure and agricultural productivity enabling the industrial sector to acquire labor at fairly stable real wages for labor intensive industrial production and export; and (3) gradually exhausted the domestic market for industrial consumer goods, naturally leading to the need for a more external industrial orientation. The move from import substitution to export substitution was thus the natural consequence of growth, with maturing entrepreneurs taking advantage of the cheap indigenous labor supply and the accommodating policy changes of government.

In Korea, on the other hand, since there was relatively little consumer goods import substitution from the beginning, the switch to export substitution was not so much from land-based agricultural exports to labor-based industrial exports as that it represented an acceleration of the non-agricultural export phenomenon. As capital resources were being augmented more through foreign aid and industrial reinvestment than through the participation of agriculture, the same entrepreneurial maturation process, assisted by government policy re-orientation, led to a shift not so much from primary to industrial exports, as from traditional to non-traditional industrial exports. Given the absence of a solid and expanding agricultural base and without the contribution of agricultural exports, the pressure on import capacity and the balance of

payments became much more severe. It should be noted that Taiwan has recently become a net exporter of capital, while Korea remains a substantial importer, even though there has been a shift from aid to private investment.

IV

Summary and Conclusions

As we look at the development process in the open labor surplus type of economy, let us recall that we have identified three meaningful turning points during the transition. First, there is the point at which import substitution, fuelled mainly by traditional land-based exports, gives way to export substitution, fuelled by non-traditional labor-based exports (we have called this the "switching point"); second, there is the point at which the economy given its basically unfavorable natural resource endowment, becomes a net food importer; and third there is the so-called commercialization point when the basic conditions of labor surplus give way to labor scarcity. In the case of Japan, as we have seen, agriculture played its idealized historical role during the import substitution phase and the switching point was reached around 1890; Japan became a net food importer around the turn of the century; and the commercialization point was probably reached after World War I. In the case of Taiwan, import substitution gave way to export substitution around 1959. The productivity of the agricultural sector was such that Taiwan's industrialization could be fuelled in substantial part, directly or indirectly, by agricultural surpluses. But while Taiwan remains a net exporter of food to this day, the agricultural productivity increase is now finally running out of steam and we may expect Taiwan to become a food importer at some point in the future. The commercialization point marking the end of her labor surplus condition occurred around 1970.

In the case of Korea the agricultural sector has not yet, in our view, fulfilled its historical mission. Consequently throughout the import substitution phase, while industrial entrepreneurial maturation did take place, the essential fuel for the export substitution phase to follow was never generated. Consequently, a tremendous burden fell upon the export oriented industrial sector. Not only did it have to pay for its own continued expansion, but also for the food imports which began almost immediately and have grown prodigiously since. Net imports of food have risen from negligible amounts in the fifties to about \$250-300 million annually at present. Food deficits per head have risen from about \$1 in 1953 to almost \$9 currently.

It is this unusual burden on the industrial sector which has to "pull" a dragging agricultural sector along with it, rather than getting the benefit of an additional "push" from it, which has in turn led to certain distortions in the industrial growth pattern which most observers of the Korean scene are increasingly aware of. For example, the industrial export drive, which in recent years has probably gone beyond the point warranted by long-run comparative advantage and culminated in negative value added in some sub-sectors, can be laid at the doorstep of these exclusive and heavy demands made on the sector. While a disaggregation of industry is necessary to fully document our assertion¹ it is my impression that, given the relatively small scope for consumer goods import substitution, backward linkage import substitution cum export promotion which is both capital and technology intensive, were resorted to increasingly, especially after 1968, ahead of the economy's resource endowment. As has been clearly pointed out in recent policy discussion, the imported raw material component of exports as well as the capital intensity of exports has

¹Such research is currently under way.

been rising. Imports of export-destined raw materials have increased from \$7 million in 1964 to \$297 million in 1969. The production of intermediate goods, which used to be around 15 percent of total industrial output, is now approaching 20 percent; durable consumer goods production has increased from 1.8 percent of the total in 1963 to 6 percent in 1968; machinery from 3.9 percent to 5 percent. By this date these percentages have undoubtedly risen further. Similar indirect evidence exists on the export side, e.g. intermediate goods exports have jumped from 3.8 to 8.1 percent of domestic production. This is not to deny that non-durable consumer goods exports have been increasing even faster, but simply to reassert that a "good thing" may have been taken too far.

In order to keep the heat on the industrial exporting sector which has to carry such a heavy burden--for the reasons already referred to--large numbers of special incentives have been established.¹ This use of incentives for export promotion has been partly a response to an exchange rate which had once again become increasingly overvalued (at least partially adjusted by the devaluation of 1971) but has also been accompanied, especially since 1968, by substantial moves away from liberalization on the import side which is of equal importance for any efficient export substitution policy package.

In short, the agricultural sector's failure to play out its historical role to date has, in turn, affected the historical role of industry. Instead of moving first to labor intensive, then to skill intensive, and finally to capital intensive production and exports, Korea has been forced to attempt to

¹These include tariff reductions and exemptions for raw materials and capital goods; tax reductions and exemptions from indirect or direct taxes; raw material import wastage allowances; export/import linkage systems; deposit rate preferences; preferential interest rates to industrial exporters; subsidy of freight and electricity rates for exporters.

This subject is summarized in Kim Hwan Suk, "Export Promotion and Industrial Incentive Policy in Korea," January 1971 and is the subject of an extensive research effort under the direction of Bela Balassa.

move directly into at least some fairly technology intensive and capital intensive sectors. Moreover it has been forced to admit an unusually heavy inflow first of foreign aid, more recently of private foreign capital, to keep the process going.

In sharp contrast to Taiwan, Korea thus became a net food importer in the late 50s, long before she reached her switching point around 1963. Moreover, it is somewhat doubtful that recent wage increases really signal the end of Korea's labor surplus condition or the advent of the commercialization point; rather they may be traceable to a deterioration of the industrial sector's terms of trade as cheap P. L. 480 food imports are no longer completely able to avoid some signs of a food shortage. As labor continues to be pulled out of a recalcitrant agriculture instead of being pushed out by technology change what looks to this observer like an artificial or perhaps premature labor shortage is making itself felt.

If the above analysis isn't entirely off the mark it suggests a number of directions for fuller examination and policy. Obviously, the possible activation of the still relatively unexplored agricultural productivity reserves would seem to be of the highest order of priority. While we do not wish to offer specific armchair solutions, a shift from agricultural neglect and industrial stimulation to a more balanced set of policies seems warranted.

To those who remain skeptical about the inherent capacity of Korean agriculture to undergo even a mild version of the Green Revolution, one is tempted to pose the following points. First, given the admittedly inferior agricultural infrastructure left by the Japanese, the efforts by government to repair that infrastructure have clearly not been adequate to date. By infrastructure is meant not only irrigation, roads and other physical investments but the creation of a total environment conducive to productivity increase.

For example, it is our distinct impression--though admittedly based on inadequate research--that rural market and credit conditions still leave much to be desired. The marked contrast between the NACF which is basically a multi-purpose agency but mainly serving the Government, and Taiwan's Farmers' Associations, coupled with the JCRR structure, which mainly serve as the instrument of the farmers, is but a case in point. A second is Korea's agricultural price policies which are still, in this observer's view, directed more towards income redistribution after the annual production decisions have already been made rather than towards providing incentives for increased agricultural output. Thirdly, the testimony of agronomists and agricultural economists seems to be largely on the side of the existence of a substantial potential for future agricultural seed/fertilizer revolutions.

Finally, one should note the contrast between a relatively decentralized rural-oriented industrial sector (as in historical Japan and Taiwan) and Korea's urban-oriented counterpart. This is a subject of some importance not only for the conventional reasons of reducing industrial capital intensity but also because it may have substantial dynamic effects on farmers' incentives to accept new technology. Historical Japan and, if to a lesser extent, Taiwan, have been characterized by a good deal of industrial subcontracting, with medium and small scale firms reaching out into the countryside, while processes taking advantage of the economies of scale remained mainly in the urban centers. Korea, on the other hand, is marked by very little "connectivity" between the agricultural and non-agricultural sectors. Consequently industrialization has led to more displacement and less symbiosis between medium and large scale industry. This has had the effect of higher import and capital intensities, but also, and perhaps more importantly, adverse effects for agricultural productivity when the "distance" between the two sectors is substantial and

farmers cannot perceive investment opportunities outside of agriculture and are thus less interested in exploring the risks of new technology.

In brief, one would suggest more government intervention in agriculture and less on the industrial and trade side. The recent devaluation points in that general direction but should be complemented by a return to a larger measure of import liberalization and a dismantling of the various quantitative controls which give distorted signals to the kind of exports which are likely to be viable and efficient in terms of Korea's current and future capabilities.

This somewhat critical analysis of the Korean development story must, of course, be viewed in context. Compared with the performance of most developing countries over the past two decades, there can be no doubt that the success story label continues firmly attached. Korea did achieve a remarkable turn-around from complete stagnation in the fifties to extremely rapid growth in the sixties-- in spite of continuing population pressures on top of an initially unfavorable land-labor ratio. Korea has demonstrated impressive flexibility in her technology, and has been able to drastically restructure her output mixes as a consequence of maturing industrial entrepreneurs and favorable government policies as evidenced by the reforms of the early '60s.

But it is also clear to Korea's planners and policy makers as well as to outside observers that there exist problem areas, with roots in the past, which must be tackled in the future. The increasing import intensity of the industrial exporting sector, the continued heavy reliance on foreign capital, the growing food gap, are all symptoms of a marked deviation of the Korean plan from what we have called the idealized pattern for this type of an economy. If the industrial sector is to play its proper role as a flexible, efficient and dynamic growth propellant, the needed push from agriculture, as a contributor

to the saving fund, as an ameliorator of balance of payments pressures and as a supplier of relatively cheap labor for yet some years to come must be provided. Once the industrial sector is relieved of the pressure to run ever faster in order to pull the rest of the economy along, its own growth can be more flexibly in tune with the economy's changing resource endowment and help ensure smooth transition to modern growth without excessive reliance on foreign capital.

Table 1

Industrial Labor Absorption: Taiwan

<u>Year</u>	<u>Employed Industrial Labor Force</u> (annual)	<u>Employed Industrial Labor Force</u> (3 Year Moving Average)	<u>Annual Growth Rate</u>
1952	1,198		
1953	1,223	1,227	3.1% ('53-'59)
1954	1,261	1,258	
1955	1,291	1,285	
1956	1,304	1,320	
1957	1,366	1,363	
1958	1,418	1,422	
1959	1,481	1,478	
1960	1,536	1,538	8.1% ('60-'68)
1961	1,598	1,597	
1962	1,689	1,678	
1963	1,781	1,760	
1964	1,843	1,851	
1965	1,938	1,935	
1966	2,034	2,067	
1967	2,239	2,251	
1968	2,480	3,466	
1969	2,679		

Table 2

Industrial Labor Absorption: Korea

<u>Year</u>	<u>Employed Industrial Labor Force</u> (annual)	<u>Employed Industrial Labor Force</u> (3 Year Moving Average)	<u>Annual Growth Rate</u>
1952			
1953			
1954			
1955	1,789		
1956	2,223	2,242	5.5% ('56-'62)
1957	2,716	2,461	
1958	2,444	2,629	
1959	2,729	2,745	
1960	3,062	2,643	
1961	2,139	2,912	
1962	3,536	3,101	
1963	3,630	3,658	6.3% ('63-'66)
1964	3,809	3,879	
1965	4,199	4,106	
1966	4,312	4,397	
1967	4,680		
1968			
1969			

Table 3¹Korea and Taiwan: Comparative Structure and Performance

Index (1)	Initial Period			Terminal Period		
	'55-'57	'52-'54	Parity (2/3) (4)	Korea (5)	Taiwan (6)	Parity (5/6) (7)
	Korea (2)	Taiwan (3)				
1) Agricultural labor productivity	\$175.7	\$291.8	.60	\$250.1	\$653.0	.38
2) Consumption of agricultural goods per capita	\$33.7	\$31.8	1.06	38.2	37.9	1.01
3) Fraction of total labor force in non-agriculture	21.8%	45.2%	.46	44.8%	58.7%	.76
4) Agricultural exports per capita	\$.3	\$13.7	.02	.9	14.7	.06
5) Industrial exports per capita	\$ 2.8	\$ 1.1	2.35	20.6	50.9	.40
6a) Non-agricultural real wage	\$200.4	\$318.0	.63	263.2	505.3	.52
6b) Agricultural real wage	\$192.6	\$304.2	.63	215.9	416.1	.51
7) Non-agricultural capital/labor ratio	860.0	734.8	1.17	1900.	1608.2	1.18
8) Non-agricultural labor productivity	\$805.4	\$646.6	1.25	1650.4	1417.2	1.16
9) Per capita GDP	\$83.	\$140.	.60	171.	277.	.62
10) Consumption of non-agricultural goods per capita	\$48.3	\$71.8	.67	79.5	149.7	.53
11) Internal terms of trade (P_a/P_i)	96.1	95.5	1.01	103.3	100.9	1.02
12) External orientation (exports/GDP)	4.1%	11.2%	.37	18.6%	22.6%	.82
13) Non-agricultural consumer goods imports as fraction of total	6.8%	12.1%	.56	3.0%	25.4%	.12
14) Propensity to save	-3.9%	13.3%	17.2	14.9%	38.3%	2.57
15) Investment rate	14.9%	21.3%	1.43	28.1%	41.0%	1.46
16) Agricultural saving/total investment	24.8%	18.0%	.73	2.9%	21.4%	7.38
17) Industrial saving/total investment	-38.4%	40.0%	78.4	49.8%	68.1%	1.37
18) Foreign saving/total investment	113.6%	48.0%	.42	47.3%	10.5%	.22

¹These data are preliminary and subject to revision.

Table 4

Cumulative Contribution to Investment During Transition

		<u>Korea</u>	<u>Taiwan</u>
Agricultural Saving	$\frac{\epsilon_{s_a}}{\epsilon_I}$	9.4%	25.9%
Non-agricultural Saving	$\frac{\epsilon_{s_i}}{\epsilon_I}$	17.5%	68.6%
Foreign Saving	$\frac{\epsilon_{s_f}}{\epsilon_I}$	73.1%	5.5%