A Study of the Changes in the Structure of Manufacturing Industry and in the Trade Pattern of Manufactured Products in the East Asian Developing Countries

— With Major Concentration on Korea, Taiwan and Japan —

(Part I)

*by Won-Tack Hong**

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* The author is assistant professor of economics, University of Wisconsin. Because of its length, this article will be published in two parts. Part II is scheduled to appear in the September, 1966 issue.

CHAPTER I
INTRODUCTION

The main purpose of this dissertation is to study the changes in the structure of manufacturing industry and in the trade pattern of manufactured products in the East Asian developing countries, with major concentration on Korea, Taiwan, and Japan(1).

It has been shown that there are some general patterns of change in the structure of manufacturing industry, and in the composition of manufactured imports, which take place as the result of different rates of growth in the demand for and supply of the products of the various branches of manufacturing industry as the economic development of a country progresses.(2) Generally, however, the pattern of change in the structure of manufacturing industry and the pattern of change in the composition of manufactured imports are analyzed separately in this literature. In this dissertation I hope to add a little to the accumulating knowledge about changing patterns of the structure of manufacturing industry and imports

(1) The "changes in the structure of manufacturing industry" denotes the changes in the composition of manufactured output.

(2) W.G. Hoffman, *The Growth of Industrial Economies*(Manchester: Manchester University Press, 1958); A. Maizels, *Industrial Growth and World Trade*(London: Cambridge University Press, 1963); Colin Clark, *The Conditions of Economic Progress*(London: Macmillan, 1957) (which is mainly concerned with distribution of labor force over the three groups of industries——primary, secondary, and tertiary); H.B. Chenery,"Patterns of Industrial Growth," *American Economic Review*, Vol. 50, No. 4(September 1960), pp. 624-53; R.E. Baldwin, "The Commodity Composition of Trade: Selected Industrial Countries, 1900-54," *Review of Economics and Statistics*, Vol.,40, No.1, Part 2, Supplement (February 1958), pp. 50-71; H. Tyszynski, "World Trade and Manufactured Commodities, 1899-1950," *Manchester School of Economic and Social Studies*, Vol. 19, No. 3(September 1951), pp. 272-304; A. K. Cairncross, "World Trade in Manufactures Since 1900," *Economia Internazionale*, Vol. VIII, No. 4(November 1955), pp. 715-41; Ingvar Sevennilson, *Growth and Stagnation in the European Economy* (Geneva: United Nations, 1954); A. O. Hirschman, *National Power and the Structure of Foreign Trade*(University of California Press, 1945); and F. Hilgerdt, *Industrialization and Foreign Trade* (Geneva: League of Nations, 1945).

by attempting to relate them explicitly. Furthermore, there is no well-established pattern of manufactured exports for developing countries. It is one of the purposes of this dissertation to explore the pattern of manufactured exports in developing countries by means of a comparative study of some East Asian countries.

Chapter II deals with the theoretical background and the established normal pattern of changes in demand, industrial structure and the composition of trade. To make the comparison among countries more meaningful, Chapter III roughly delineates the level of industrialization of each East Asian country. Chapter IV examines the similarities and dissimilarities in the changing pattern of industrial structure and in the composition of manufactured imports among East Asian countries, together with the "normal" pattern. The succeeding chapters investigate the changing pattern of manufactured exports of developing countries, and its theoretical implications. The last chapter, Chapter VIII, summarizes the findings and conclusion of this dissertation.

CHAPTER II
THE THEORETICAL BACKGROUND

1. Changes in the Demand Pattern

It has been shown that in the experience of most developed countries, economic development brings a relatively rapid rise in the demand for capital goods, chemicals, and durable consumer goods, and a relatively slow expansion in the demand for food, beverage, tobacco, textiles, and clothing.(1)

The main factors which change the demand patterns of an economy as development proceeds may be classified as income effects, substitution effects, industrialization effects, changing tastes, and technology and external factors such as changes in foreign demand and supply.

Many empirical studies support the hypothesis that differences in demand for each consumer commodity are due mainly to differences in the level of total income or consumption, and that there are certain consistent patterns for the increase in final consumer demand for each manufactured product as real income grows.(2)

(1) A. Maizels, *Industrial Growth and World Trade*(London: Cambridge University Press, 1963), p.42.
(2) See H.S. Houthakker, "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law, *Econometrica*, Vol.XXV(October 1957), p.532; M.Gilbert and Associates, *Comparative National Products and Price Levels, A Study of Western Europe and the United States*(Paris: Organization for European Economic Cooperation, 1958); and T. Watanabe, "A Note on an International Comparison of Private Consumption Expenditure," *Weltwirtschaftliches Archiv*, LXXXVIII, 1962, pp. 145-49.

However, not only do the income effects change systematically as development proceeds, but to some extent substitution effects seem to be systematically related to economic development and feed back to affect the pattern of demand. For instance, there is often great technological advancement in a sector undergoing rapid expansion under the impetus of rising demand. This has sometimes led to a fall in the price of that sector's output and to a substitution effect which further stimulates output, the degree of substitution depending on the magnitude of the price elasticity of demand.[3] Furthermore, to the extent that technological change, which is responsible for many of the changes in relative prices, is systematically related to the pace and level of economic development, we can expect a systematic change in demand patterns on account of this substitution effect.

As the pattern of final consumer demand changes, the pattern of intermediate (or producer's) demand also changes, but not necessarily proportionately, since the input coefficients for an industry(the amount and kinds of inputs needed for a unit expansion of an industry's output) are often subject to changes with the scale of that industry's output as well as with the level of the over-all industrial production of an economy.[4] Thus as industrialization proceeds, the demand pattern for intermediate goods, such as raw materials, fuels, replacement parts, buildings, and machinery which serve to construct and maintain industrial plants, changes systematically, not only on account of changed final consumer demand, but also because of changed input coefficients. The changes in the composition of producer's demand induced by the changes in final demand can be regarded as a part of the income effect, and the changes in the composition of producer's demand induced by changes in the input coefficients as the level of industrial production of an

(3) Cf. ".....supply curves cannot be assumed to be infinitely elastic or inelastic to the same degree. This will be one factor causing relative prices to change as growth proceeds. Demand pattern will change in response to the inevitable changes in relative prices, so that cross elasticities also will be important in determining the directions in which consumers in a growing economy will spend their rising incomes." Dominguez and Pilvin, "The Process of Balanced Economic Growth," *Social Research*, 1954, quoted in L. Johansen, *A Multisectoral Study of Economic Growth* (Amsterdam: North-Holland Publishing Company, 1964), p. 7.

(4) Leontief divides the intermediate demand into two parts; i. e., $X_i - \sum_{k=1}^{m} a_{ik}X_k - \sum_{k=1}^{m} b_{ik}X_k = Y_i$, where X_i is the total demand for(and supply of) commodity i; the second left-hand term represents the demand for commodities "which serve the current production requirements of all the various sectors of the economy"; the third term represents the investment demand for commodities "which serve directly to satisfy the capital needs of all its various sectors," (these second and third left-hand terms compose total intermediate demand), and Y_i is the final demand. He regards the final demand as some known function of time. For further details, see W. Leontief and others, *Studies in the Structure of the American Economy* (New York: Oxford University Press, 1953), Part I.

economy changes may be called the industrialization effects.[5]

However, since the technologies available to a developing country are always changing, a latecomer, even if it is on the same level of industrialization as an old advanced country, may have a different pattern of changes in demand. For instance, owing to the great technological advance of the twentieth century, one would expect to find some differences between the pattern of change in demand of countries passing through the early phase of industrialization in the second half of the twentieth century and those which passed through this phase at the beginning of or before the twentieth century.

Another factor which is significant is changing tastes, because certain changes in preferences do take place over time. To some extent, tastes may tend to change in a similar way in countries at similar levels of industrialization, because some changes in tastes may take place gradually and at a fairly steady rate with changing economic environments. To the extent that this is true, tastes would have changed similarly in Japan during the 1900-19 period and in Korea during the 1945-64 period, if their level of industrialization at these corresponding periods were roughly the same. However, with such fantastic progress in the mass communication media, the tastes of people in one country are influenced greatly by the tastes of its neighbors(i.e., by the operation of what Duesenberry has called the "demonstration effect").[6] Hence, it is reasonable to expect that the

(5) An example will help to identify these effects: For the production of textiles, we need cotton as raw material for cotton fabrics, or synthetic fiber for fabrics of artificial fibers, and such different kinds of equipment as spindles, combs, shuttles, machines for spinning, twisting, knitting, washing, dyeing, dressing, etc. According to the level of industrialization, the raw materials for nylon textile, for example, could be (1) produced entirely domestically, or (2) imported in the form of fibers suitable for spinning, or (3) imported in the form of yarn, thread, etc. Accordingly, the kinds of plants and thus machinery required would be different; e.g., (1) a plant producing PVA(polyvinyl alcohol), or a plant producing PVA-line synthetic fiber using imported PVA, (2) a plant processing filament fiber into yarn, or processing filament yarn into stretch yarn, or(and) (3) a plant processing yarn into cloth, or knitting mills using yarn to produce socks, stockings, gloves, etc.

The demand for machinery and equipment will be met largely by imports at first. But the domestic production of some of the textile machinery, such as looms, shuttles, circular knitting machines, sewing machines, etc., may emerge soon. The technical knowledge for the production of these machines may be obtained by the mere handling and repairing of imported machinery or by direct technical cooperation with foreign companies. Then the machine-making industries themselves create more demand for various capital goods for their own requirements. Therefore, the pattern of demand for intermediate good may vary with the level of industrialization, even if there is no change in final demand.

(6) Since the demonstration effect also influences the types of modern technology adopted in a developing country, its effects on the production side(as well as the consumption side) is also emphasized. See C.P. Kindleberger, *Economic Development*, Second Edition(New York: McGraw-Hill, 1965), pp. 143, 246 and 250.

tastes of one people may change differently from those of another, even when these countries are at a similar stage of industrialization. Moreover, a large number of other factors may affect tastes from moment to moment, and there is also a basic and unpredictable element of randomness in the human mind.(7)

Even if real functional relationships exist between economic development on the one hand and income effects, substitution effect, industrialization effects, and changes in tastes and technologies on the other, the intrusion of stochastic elements (e.g., other changes in tastes, technology, or foreign demand and supply, which are not endogeneous to the development process of an economy) requires us to consider, to some extent, the specific demand pattern of an economy at a specific moment in historical time as a sample observation on the "normal" pattern, subject to error, and estimates of the parameters of the "normal" pattern have to be made according to the rules of sampling theory.

2. Changes in the Structure of Manufacturing Industry

Many empirical studies show that not only is an increase in per capita income normally accompanied by a rise in the share of manufactured output in total output, but that there exist significantly different growth patterns for the various branches of industry.(8) Since the demand for the products of each industrial sector changes as growth proceeds, since factor supplies are altered, and since the proportions in which labor, capital, and skills can be combined vary from sector to sector, each branch of industry has a different growth path.(9) The flows of investment and new labor are not allocated proportionately to all manufacturing industries, and even the existing quantities of capital and labor may be reallocated during an industrialization process.

Hoffmann's study of the experiences of developed countries has led him to the conclusion that the pattern of industrialization has been characterized by a steady increase in the share of the capital goods industries in total manufacturing indus-

(7) See "The Role of Demand in the Economic Structure," by J.S. Duesenberry and Helen Kistin in Leontief and others, *op. cit.*, pp. 451-82.

(8) S. Kuznets, "Quantitative Aspects of the Economic Growth of Nations: II. Industrial Distribution of National Product and Labor Force, "*Economic Development and Cultural Change*(July, 1957), suppl.; A. Maizels, *op. cit.*, Chapter 1 and 2; and H.B. Chenery, "Patterns of Industrial Growth," *American Economic Review*, Vol. 50, No. 4(September, 1960), pp. 624-53.

(9) Cf. H.B. Chenery, *loc. cit.*, p. 625. Natural resource endowments, the scale properties of the production functions, and international trade, as well as changing factor supplies and non-homogeneous consumption functions, are listed as the elements which would lead to persistent differences in sector growth rates.

try. More specifically, the food, textile, clothing, leather, and furniture industries, which he defines as consumer goods industries, develop first during the process of industrization. But the metal-working, vehicle building, engineering, and chemical industries—the capital goods industries—soon overtake the first group. "Consequently the ratio of the net output(value added) of the consumer goods industries continuously declines as compared with the net output of the capital goods industries."(10)

Hoffmann says that the main reasons consumer goods industries develop first are that (1) it is for consumer goods such as food and clothing that mass demand arises first, and that (2) expansion of capital goods industries requires large amounts of capital and advanced techniques of production as well as a skilled labor force.(11) He also has made a strong statement about the uniformity in patterns of growth: "Whatever the relative amounts of the factors of production, whatever the location factors, whatever the state of technology, the structure of manufacturing sector of the economy has always followed a uniform pattern.(12)

The expectation of some degree of uniformity in patterns of growth is based on the existence of certain similarities in supply and demand conditions in all countries.(13) The main factors identified as making the pattern of change in industrial structure broadly similar in developing countries at similar levels of industrialization are that pattern of demand tends to change in a similar way and the production capacity tends to be restricted by the degree of industrialization.

(10) W.G. Hoffmann, *The Growth of Industrial Economies*(Manchester: Manchester University Press, 1958), pp. 2-8. 16, 17, 31 and 38. Hoffmann's analysis is concentrated mainly on these eight groups of industries which, according to his definition, can be identified as capital goods or consumer goods industries. His justification for doing this is that, not only is the share of the excluded industries in total output small, but that many of the excluded industries are closely linked with the eight industries included, and for this reason there is a tendency for the net output ratio in the excluded industries to change in the same direction as the changes in the output ratio of the selected industries.(pp. 16-17)

Hoffmann defines the four stages of economic development in terms of the net output ratio of consumer goods and capital goods: Stage I has a ratio of 5(±1):1, Stage II has a ratio of 2.5(±1): 1, Stage III has a ratio of 1(±1):ŧ, and the fourth stage has a still lower ratio. (pp. 2-3) "The dominant industries have, in general, been the food and textile industries during the first two stages of development and the iron, steel and engineering industries during the third stage of development."(p. 4)

(11) *Ibid.*, pp. 3 and 38.

(12) *Ibid.*, p. 2.

(13) "The universal factors are common technological knowledge, similar human wants, access to the same markets for imports and exports, the accumulation of capital as the level of income increases, the increase of skills, broadly defined, as income increases, etc. From the similarities of the first three universal factors it follows that differences in production cost and commodity prices are determined by differences in factor prices." H.B. Chenery, *loc. cit.*, p. 626. Chenery assumes that these elements are much the same for all countries in his analysis on patterns of industrial growth.

A typical pattern of structural change in the manufacturing industry has also been derived from time-series regressions by Maizels:

> ..... a fairly sharp fall in the relative importance of food processing and textiles in the earlier stages of growth of the present industrial countries(from $100–$250 real product per head), with a continued, though reduced, rate of decline thereafter. Metals and metal products show the reverse movement, with a declining rate of relative growth as the later stages of development are reached. Chemicals show an uninterrupted rise, while the miscellaneous group first rise (up to about $250–$500 per head) and then tends to fall slowly in relative importance.(14)

An analysis with a further detailed classification of manufacturing industries has been made by Chenery on the basis of cross-country regression.(15) The existence of uniform growth patterns, similar to those of Maizels', is also confirmed by the high correlation coefficients and low standard errors for almost all industries.

3. Changes in the Composition of Manufactured Imports

In developing countries, the levels of skill, the size of markets, available capital supply, and organizational ability set limits on the type of industrial process that can be undertaken. The existing demand for manufactured products in any specific time period cannot be satisfied wholly by domestic production. Moreover, the changes in demand pattern are not always accompanied immediately by changes in production capacities.(16)

Thus, changes in the pattern of import structure in the developing countries are largely dominated by the divergences between prevailing demand for modern industrial products and the productive capacity of their industries.(17) The gap must

(14) A. Maizels, *op. cit.*, pp. 54-55.

(15) H.B. Chenery, *loc. cit.*, pp. 624-53.

(16) In this sense, supply and demand in developing countries are always unbalanced. The so-called balanced growth theory, which argues that for a growth process to be started and continued, it is necessary that the composition of the changing production be balanced with respect to demand, does not make much sense with respect to developing countries, unless we assume that the developing country has the capacity to balance its production immediately with respect to demand while, at the same time, it has no capacity at all to adjust its external trade pattern with respect to its demand pattern. In a developing country, the balancing process itself is a developing process. The failure of some sectors of the economy to be balanced for a time never means that the country cannot develop further, being chained in a "vicious circle." See R. Nurkse, *Problems of Capital Formation in Underdeveloped Countries* (Oxford:Basil Blackwell, 1953), pp.11-12; J.M. Fleming, "External Economies and the Doctrine of Balanced Growth," *The Economic Journal* (June, 1955), pp. 241—56; and A.O. Hirschman, *The Strategy of Economic Development* (New Haven: Yale University Press, 1958), Chapter 3 and 4.

(17) The absolute amount of imports (not the changes) is likely to depend a great deal upon the size of the country. "Small countries are likely to be more dependent on imports than large ones, both because their range of natural resources available for industrial development is likely to be more restricted, and because they may have too small a home market for the efficient operation of optimum sized plants. In general, it seems that the import-content is inversely associated with population size in countries in a similar stage of economic development." A. Maizels, *op. cit.* p. 13.

be filled by imports.

As development proceeds, the possibility of transformation increases, and the industrial structure becomes more adapted to meet the demand.[18] Thus, reduced imports of some commodities occur for this reason. If there is a uniform pattern of change in demand as development proceeds, and if there is a uniform pattern of change in industrial structure, there must also be some uniformity in the import pattern.

Underdeveloped countries with relatively abundant natural resources may undergo less "pressure" (defined in Chapter IV) to substitute domestic consumer goods for imports than those with scarce resources and even less pressure regarding capital goods. Underdeveloped countries with poor natural resources are likely to be forced to assume a quickened pace of import substitution in regard to consumption goods and to develop export industries to finance the import of capital goods and raw materials. However, it seems reasonable to expect some similarities in the import patterns of developing countries at similar levels of industrialization and with similar natural resource endowments.

Generally, many of the consumer goods and textiles are imported at the beginning of industrialization because the domestic industries are still not developed enough to meet the demand for these products. Then the industries which can be easily developed, such as textiles and other light consumer goods industries, emerge as leading industries in the early stages of industrial development, and, accordingly, imports of such products decreases. However, as industrialization proceeds, the demand for capital equipment and intermediate goods for the construction and operation of new industry increases. Lack of domestic production capacity for capital and intermediate goods results at first in increased imports of these products. As industrialization proceeds, the imported parts and components of capital goods or semi-processed goods (such as yarn) come to be produced domestically, due to the linkage effects.[19] And in the later stages of industriali-

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(18) The production capacity of an economy, e.g., level of technology applied in production, amount of capital stock, organizational ability, etc., can be improved through the process of simple reproduction or expansion in scale of the same production. However, it is a well-known fact that imports have an important role in improving the productive capacity of an economy. For instance, not only do the imports of capital goods enhance the physical production capacity of the economy immediately, but new knowledge is obtained by the handling of imported machinery. Acquisition of new skills by the workers results in a fall in the relative costs of skilled labor, and the changes in relative costs will tend to reinforce the changes in industrial structure that would occur as a result of changes in demand alone. Cf. A.O. Hirschman, *op. cit.*, Chapter 7.

(19) *Ibid.*, Chapters 6 and 7.

zation, large-scale production of capital goods becomes possible. Therefore, even if we assumed that the demand patterns remain constant, we would expect the import pattern to change systematically as industrialization progresses because of the changing production capacities of domestic industries.

Chenery says that there exists a fairly uniform pattern of change in imports of manufactured products as income rises, although the effects of the size of a country are more pronounced than in the case of production.

> The regression of value added on income and population also gives a reasonably good fit for almost all sectors . . . A similar result was found for the import regressions, where the median R^2 is .68. Except for the three sectors (food, clothing, printing) in which imports are a very small fraction of total supply, equation (log $M_i = \log a_{i0} + a_{i1} \log Y + a_{i2} \log N$) therefore gives almost as good an explanation of imports as of production.(20)

Table 1: Regression of imports on income and size

Sector	a_{i1}	a_{i2}	Sector	a_{i1}	a_{i2}
Machinery	.964	−.367	Textiles	.555	−.536
Transport Eq.	.790	−.507	Printing	1.444	−.331
Metals	1.192	−.228	Leather	1.143	−.470
Non Metallic	.853	−.478	Clothing	.866	−.757
Wood, etc.	1.320	−.406	Food, Beverage		
Paper	1.118	−.380	& Tobacco	1.003	−.374
Petroleum	1.007	−.438			
Rubber	.578	−.540	All Imports (incl. non-manufactured		
Chemicals	.956	−.407	products)	.987	−.281

Source: H.B. Chenery, *loc. cit.*, p. 634.

However, a close examination of Chenery's results gives a somewhat puzzling picture; the import of machinery is rising 0.96 times as fast as the real per capita income, while the ratio for textiles is 0.56, a positive association between per capita income and per capita textile imports. These rates of increase seem to be opposite from what we may be likely to expect from the analysis of preceding sections, i.e., a rapid rise in the import of machinery and a sharp fall in the import of textiles as income rises.

(20) Chenery calculated "growth elasticities" (a_{i1}) and "size elasticities" (a_{i2}) from a linear logarithmic regression equation in which per capita import value(or value added) depends on per capita income and population. (Y is per capita income and N is size of population.) The size effects are more pronounced in the case of imports than in the case of production; i.e., "the scale variable explains about a quarter of the variation in production levels, but about half that in imports." H.B. Chenery, *loc. cit.*, p. 639.

This might have resulted from the shortcomings of the cross-section analysis itself which assumes constant conditions of technology, trade, etc. Or it might be the result of the fact that Chenery used 63 developed and developing countries all together as samples, whereas the separation of developed and developing countries may result in less misleading representation. For instance, the growth elasticities shown in Table 1 are average coefficients, while the growth elasticities may not, in fact, be the same at all levels of income, and averaging the coefficient may be less meaningful.

Maizels later made separate calculations of growth coefficients (without size coefficients) for the industrial and semi-industrial countries. The regression analysis was based on a time series for imports of manufactures into industrial and semi-industrial countries. This separation gave results more nearly consistent with the basic hypothesis for import structure. In semi-industrial countries, imports of

Table 2. Growth coefficients for imports of manufactures: 1899-1955

Sector	Industrial Countries		Semi-Industrial Countries	
	Growth Coefficient	R^2	Gowth Coefficient	R^2
Machinery	1.47 (±0.13)	0.71	1.43 (±0.28)	0.52
Transport Eq.[a]	2.48 (±0.19)	0.81	1.55 (±0.30)	0.50
Metals	0.79 (±0.16)	0.32	0.07 (±0.27)	0.00
Other Metal Goods	0.06 (±0.17)	0.00	1.41 (±0.34)	0.40
Chemicals	1.48 (±0.14)	0.71	1.19 (±0.28)	0.41
Textiles[b]	−0.22 (±0.19)	0.03	−1.98 (±0.45)	0.36
Other Manufactures	0.27 (±0.14)	0.07	−1.33 (±0.35)	0.32
Total	1.01 (±0.09)	0.69	0.22 (±0.25)	0.02

Source: A.Maizels, *op.cit.*, p. 181
[a]Excluding other passenger road vehicles.
[b]Including clothing.

machinery have risen 1.4 times as fast as real per capita income, while the ratio for textiles and clothing was −2.0. Maizels states that "the results support the view that economic growth is associated with a drastic shift in the pattern of imports, (as well as of demand and output)"; but in view of the results of the time regression, Chenery's results on textiles and machinery must be "regarded as a misleading representation of how imports change with economic growth individual countries.[21]

Another study by Baldwin on the commodity composition of imports for the

(21) A. Maizels, *op. cit.*, pp. 181-183.

developed countries during the 1900-1954 period shows that the share of machinery and transport equipment increased, metals increased in relative importance, chemicals declined somewhat, and miscellaneous manufactures and textiles declined in per-centage terms.[22]

All these empirical studies show that the pattern of imports of manufactured products tends to change systematically with industrialization, although it is still highly variable.

4. Changes in the Composition of Manufactured Exports

The Heckscher-Ohlin theorem states that under certain circumstances a country will tend to export those commodities that are relatively intensive in the factors of production which are plentiful there in comparison with the factor endowments of other countries. One limitation of this theorem is that a developing country does not import manufactured products simply because they are capital-intensive or export manufactured products simply because they are labor-intensive; thus, although we may be able to arrange all the products in the world in the order of factor intensity, we have no idea which or how many a developing country will actually import or export. Linder's theorem of "representative demand" may be regarded as an attempt to remove much of this shortcoming of the Heckscher-Ohlin theorem by emphasizing the role of demand.[23]

Linder says that the moving force behind trade in primary products is price differences caused by differences in relative endowments of natural resources. On the other hand, the forces creating trade in manufactured products (i.e., the forces giving rise to comparative advantage) between countries of similar per capita incomes, are same forces that give rise to trade within each of the countries, such as advantage in the processing of raw materials in ample supply, technological superiority, managerial skills and economies of scale. Concerning the forces creating trade in manufactures between countries with different per capita incomes, the same kind of process will be going on. One difference, however, is that the number of goods for which the "representative demand" overlaps, and thus in which trade can be conducted, will be fewer.[24] Within this range of overlapping

(22) R.E. Baldwin, "The Commodity Composition of Trade: Selected Industrial Countries, 1900-54," *Review of Economics and Statistics*, Vol. 40, No. 1, Part. 2, Supplement (February, 1958), pp. 50-71.

(23) Staffan Burenstam Linder, *An Essay on Trade and Transformation* (Stockholm: Almqvist & Wiksells, 1961).

(24) For the concept of "representative demand", see *Ibid.*, pp. 87, 95, 100, 103, 105 and 108.

representative demands the difference in factor proportions, as well as other forces which give rise to trade within a country, will decide the trade pattern. Therefore we can predict the pattern of trade if we can predict which goods are representative of the demand structure at a given per capita income level.

Unfortunately Linder could not clearly define the concept of "representative demand," but the following example gives some idea of what he has in mind when he discusses it. Linder says that Japan, for instance, might have been "in a position where bicycles were exported and cars imported as the demand for cars was less representative than that for bicycles at the ruling per capita income level. The cars would be imported from countries where the demand for them is more representative, and the bicycles exported to countries where the demand for them is less representative.(25) As Japan's per capita income increases, the demand structure will change. As a consequence, the range of potential and actual exports will change. Thus Japan might, within a decade, export cars and import bicycles.

However, since some significant portion of demand for manufactured products in a developing country is met by imports, the term "representative demand" is rather confusing. Linder seems to be saying that the demand for a commodity is representative if there is a significant demand for it and also if the country has the capacity to produce the commodity.(26) If so, the mere introduction of changes in production capacity itself can do the whole task of lessening the vagueness of the Heckscher-Ohlin theorem. And it seems that it is the "external demand" rather than domestic demand which deserves more emphasis in the case of exports.

That is, as industrialization of a country proceeds, the potential productive capacity, and thus its potential exportable products, changes systematically. Then, according to the conditions of external demand for the products for which a developing country has actual or potential capacity and the price differences caused by differences in relative factor supplies, the actual export pattern will be decided.

In other words, industrialization implies changing absolute factor supplies and

(25) *Ibid.*, pp. 105—106.

(26) Cf. " . . . a particular good will not be produced at a comparative advantage unless there is a domestic market for the good . . . an entrepreneur will (never) think of satisfying a need that does not exist at home; . . . even if this alien need was seen, the basically correct product to fill it might not be conceived of; . . . even if the basically correct product was conceived of, it is still improbable that the product could be finally adapted to unfamiliar conditions without prohibitive costs being occurred. In all, what our arguments amount to is the proposition that production functions are not identical in all countries; but that the production functions of goods demanded at home are the relatively most advantageous ones." *Ibid.*, p. 90.

industrial structure. If there is a uniform pattern of change in absolute factor supplies and industrial structure as development proceeds, and if the factor endowments of the rest of the world remain more nearly constant, not only does the export pattern of a developing country have to change systematically as a result of changing relative factor endowments, but most of the developing countries with similar natural resource endowments will also have very similar export patterns as their industrialization proceeds. However, the external demand conditions and the factor endowments of the rest of the world might be different for each developing country, according to the time period when the country is undergoing the industrialization process, and there will be some difference in the changing patterns of the export structure of countries which are passing through the early phase of industrialization now and those which passed through this stage in 1900.

Baldwin's study of the export pattern of manufactured products in seven industrialized European countries during the 1900-1954 period shows machinery and vehicles to be the most rapidly expanding items, metals and chemicals to be comparatively stable, and miscellaneous manufactures and textiles to be contracting in percentage terms.[27]

Although there have been some attempts to relate the import pattern of manufactures with the per capita income level, or, more broadly, with industrialization, there has been no attempt to relate the export pattern of manufactures with something like income level or industrialization. The export pattern looks too diverse to furnish any systematic relationship to, say, per capita income. Because of the great diversity in export patterns, the changing patterns are generally stated in terms of large categories, such as primary and industrial products.

Thus, Maizels shows that, in countries with less than $15 per capita production of manufactures, the export of manufactured products is negligible or nonexistent. In countries producing a per capita net value of manufactures between $30 and $75, the export of manufactures is under one-tenth of total export. In countries producing over $75 but not more than $150 per capita, the export of manufactures accounts for under 15 per cent of total export. On the other hand, in all of those industrially advanced countries of Western Europe and the United States, which are producing at least $150 worth of manufactured products per head, manufactured products comprise over one-sixth (more often over one-third) of the total exports.[28]

(27) R.E. Baldwin, *loc. cit.*

(28) A. Maizels, *op. cit.*, pp. 60-63

Japan and India are the only developing countries exporting significant amounts of manufactured products in Maizels' sample countries, and they are classified as exceptions to his broad generalization because primary products typically comprise over 90 per cent of the exports of countries with less than $75 per capita of manufactured products.

Tyszynski investigated the changes in the world demand for manufactured exports and the changes in the competitive position of the leading manufacturing nations (the degree of adaptability to the process of changing world demand). He found that in world trade the relative importance of machinery, iron and steel expanded during the 1899-1950 peirod; the relative importance of chemicals, non-ferrous metals, and non-metallic minerals remained more or less the same; and that of drink and tobacco, textiles, apparel, railways, ships and metal manufactures declined. However, he found examples of rapid export growth by initially small exporters, based on declining or stable groups: Japan with textiles and Canada with non-ferrous metals. This led Tyszynski to conclude that it is possible for a country to "gain considerably in relative importance in world trade without closely following changes in the composition of world trade," i.e., that "changes in the relative position of countries in world trade not so much due to structural shifts in world demand for exports as to each country's ability to compete in markets for individual groups of commodities."[29]

CHAPTER III

THE STANDARD OF COMPARISON AND COMPARABLE PERIODS

The analysis of changes in industrial structure and trade patterns in this dissertation goes back to the early 1900's and before 1900 for Korea, Taiwan and Japan: the Korean analysis covers 1910—1964; Taiwan, 1896—1964; and Japan, 1868 to 1964. The analysis of other East Asian countries is limited mainly to the post World War II period because of the lack of data for the pre-War period.

Since the East Asian countries are not all under the same conditions (for example, in terms of natural resource endowment), a comparison of changing patterns in each country together with the "normal" patterns presented in Chapter II will be made to see whether the patterns of some East Asian countries have any significant peculiarities which can be called exceptions. Practically, however,

(29) H. Tyszynski, "World Trade and Manufactured Commodities, 1899-1950," *Manchester School of Economic and Social Studies*, Vol. 19, No. 3 (September, 1951), pp. 272-304.

the time-series analysis is limited mainly to Korea, Taiwan and Japan; the other East Asian developing countries are examined more or less on a cross-sectional basis.

Because a comparison among countries would be more meaningful if we were to compare the changing patterns of each country during periods of similar stages of development, a rough approximation of development stages is attempted in this chapter. Since it is a very well established fact that economic development is closely correlated with the increasing share of manufacturing industry and rising per capita income in all countries, the percentage share of manufacturing industry in total national products and per capita income levels are used as indexes for measuring the level of economic development.

1. Early Phase of Industrialization

All of the East Asian countries, except Japan, Thailand and mainland China, were colonies until the end of Second World War.[1] All the East Asian countries, except Japan, seem to have been at an early phase of industrialization before World War II in the sense that the share of manufacturing production in GNP is less than 10 per cent and per capita income was usually less than $100.

Since only Korea, Taiwan, and Japan have somewhat detailed industrial and trade data for per-World War II period, the analysis for this early period of industrialization concentrates on these three countries.

Ohkawa estimated per capita income of Japan since 1878. However, no one has yet attempted to estimate per capita income of Korea and Taiwan for the pre-World War II period. Since the only available production data for Korea and Taiwan during this period are the gross production values of agriculture, forestry, fishery, mining and manufacturing industry, rather crude assumptions are made when computing per capita income of Korea and Taiwan. It is assumed that the net value (value added) of agricultural, forestry and mining production is 80 per cent of their gross production value; that the net value of mining production is 50 per cent of its gross value of production, and that the net value of manufacturing production is 30 per cent of its gross production value throughout the period. These assumptions are based on Ohkawa's estimates of the ratio between gross and net production value in the case of Japanese production before World

(1) Korea was a colony of Japan during 1910-45, and Taiwan was Japan's colony during 1896-1945.

Table 3 : Estimates of per capita national product of Korea, Taiwan and Japan

Dollars[a]

Annual Average	Japan	Korea	Taiwan
1881—1885	42.6		
1886—1890	56.5		
1891—1895	66.9		
1896—1900	80.6		
1901—1905	86.8		43.4[b]
1906—1910	95.5		44.4
1911—1915	112.4	39.1	55.2
1916—1920	122.0	42.5	61.2
1921—1925	147.7	50.8	68.9
1926—1930	182.7	66.0	95.1
1931—1935	218.1	79.0	105.2
1936—1940	248.8	91.4[c]	105.3
1951—1955	193.0	112.0[d]	95.0[d]
1956—1960	272.0	117.0	105.0
1961—1965	379.0[e]	122.0[f]	121.0[f]

Source: For the pre-World War II period: Kazushi Ohkawa, *op.cit.*; Hyoe Ouchi, ed., *Japan Economic Statistics for Meiji, Taisho, and Showa Eras* (Nihon Keizai Tokei Shu), (Tokyo: Nihon Tokei Kenkyu-jo, 1958): and Chosen Government General, *Annual Statistical Report of Chosen Government General* (Chosen Sotokufu Tokei Nenpo), (Seoul: Chosen Government General, annual) for data on Korean agricultural product. (Note: The figures for Taiwan's mining production of 1926 and 1937-40 are missing in Ouchi's data. The average of 1925-27 was used for 1926, and the 1936 production figure was used for 1937-40. Considering the share of mining output in Taiwan's national product before the World War II, the margin of error arising from this procedure is unlikely to be more than $2 per capita.)

For the post-World War II period: The Bank of Korea, *National Income of Korea:* 1953-63 (Seoul: The Bank of Korea, 1965); Industry of Free China Publishing Committee, *Industry of Free China* (Taipei, monthly); Council for International Economic Cooperation and Development, Executive Yuan, Republic of China, *Taiwan Statistical Data Book* (Taipei, annual); and Statistical Bureau, Prime Minister's Office, Japan, *Japan Statistical Yearbook* (Tokyo, annual).

[a] All of the current "yen" values for pre-1940 figures were converted into 1928-32 average prices and then converted to 1951 dollar values by multiplying by 1.066. This multiplication by 1.066 is based on Chenery's estimation as $113 of Japanese per capita income in 1914 when the 1928-32 "yen" value was 107. (Refer to H.B. Chenery, S. Shishido, and T.Watanabe, "The Patterns of Japanese Growth, 1914-1954," *Econometrica*, XXX, 1, January, 1962).

The level of per capita income of Taiwan during the 1953-1963 period is obtained by converting the per capita income in terms of "New Taiwan Dollars" (at 1962 constant price) to "dollars" by applying the official exchange rate in 1962 of 40.03:1.

The level of per capita income of Japan during the 1951-1962 period is obtained by converting the per capita income in terms of "yen"(at 1934-1936 average price) to 1951 dollar values by multiplying by 0.9099. The multiplication by 0.9099 is based on Chenery's estimation as $192 of Japanese per capita income in 1954 when the 1934-1936 "yen" value was 211. (Refer to *ibid.*)

The level of per capita income of Korea during the 1953-1963 period is obtained by converting the per capita income in terms of "won" (at 1960 constant price) to "dollars" by applying the official ex-

change rate in 1960 of 65 won to 1 dollar. However, it is argued that, since the official rate of 65:1 is lower than the (somewhat vaguely assumed) "real rate," the application of 65:1 ratio inflates the real income in dollar terms. The following figures are those computed by the Bank of Korea and United Nations. (For the method used in the computation, refer to The Bank of Korea, *Monthly Statistical Review*, March 1965.)

1960 dollars

Year	B.O.K.	U.N.	Year	B.O.K.	U.N.
1953	66.6	77.0	1959	78.6	..
1954	67.5	..	1960	77.6	..
1955	71.2	..	1961	80.3	..
1956	72.5	..	1962	79.2	110.0
1957	76.9	..	1963	82.9	..
1958	79.1	103.0	1964	88.0	..

Source: The Bank of Korea, *op. cit.*

(The per capita incomes of Korea and Taiwan during 1953-63, which are expressed in terms of 1960 and 1962 dollar prices in Table 3, are not converted into 1951 dollar prices because there was a relatively small change in the price level in the U.S. between 1951 and 1962. The wholesale price index on a 1957-59 base rose from 96.7 in 1951 to 100.6 in 1962. See Government of the U.S., Dept. of Labor, Bureau of Labor Statistics; monthly and annual reports, *Wholesale Prices and Price Indexes.*)

(b) Average of 1900-1905

(c) 1936 figure.

(d) Average of 1953-1955.

(e) Average of 1961 and 1962.

(f) Average of 1961-1963.

War II.[2] It is also assumed that the share of tertiary industry in the total national product of Korea and Taiwan was 30 per cent throughout the period.[3] The construction industry is simply neglected in the cases of Korea and Taiwan. Apart from these crude assumptions, the accuracy of those basic production data on agriculture, forestry, fishery, mining and manufacturing industry of Korea and Taiwan during the period cannot be appraised. Therefore we should not expect accuracy in each of these per capita product figures in Table 3.

(2) Ohkawa's estimate of the net income ratio for agriculture and forestry is about 78-89 per cent (about 80 per cent on the average) during 1878-1920, and 72-81 per cent during 1921-42 in Japan; the ratio for fisheries 54 per cent; the ratio for mining about 71-81 per cent during 1930-40 (a flat ratio of 80 per cent was used for the period of 1897-1929); and the estimate of net income ratio for factory manufactures (domestic manufactures are ignored in the cases of Korea and Taiwan) is about 26-39 per cent during 1878-1940 (usually 29 per cent during 1878-1910 and 30 per cent during 1910-40). Kazushi Ohkawa, *The Growth Rate of the Japanese Economy Since 1878* (Tokyo: Kinokuniya Bookstore Co., 1957), pp. 64, 69, 74, 79, 80 and 97.

(3) Ohkawa's estimate of the share of tertiary industry in Japan's national product was about 30 per cent before 1910 and 35-50 per cent during 1900-40. *Ibid.*, p. 247.

My only intention in computing these per capita figures is to show approximate amounts and trends in the changes of per capita product. Because of the crudeness in estimation of per capita income, the simple ratio of net manufacturing output to net agricultural output (A/B in Table 4) is supplemented as an index of economic development.

The per capita income of Korea increased from about $40 to $90 (at 1951 dollar price) during the 1911-1940 period, and that of Taiwan from about $45 to $105 during the 1902-1940 period. This corresponds to Japan's 1881-1910 period when her per capita income increased from about $40 to $95. The ratio of net manufacturing output to net agricultural output in Korea increased from about 0.05 to 0.28 during 1911-1940; in Taiwan, from about 0.07 to 0.32 during 1902-1940; and in Japan, from about 0.09 to 0.26 during 1881-1910. Comparing these three countries on the basis of these two indicators, it seems reasonable to draw a parallel and assume they were roughly at the same stage of economic development during the respective periods.

During these periods, Korea, Taiwan and Japan achieved remarkable growth in total national output, especially in manufacturing outputs. In Korea, per capita income increased about 2.3 times during the 30 year span of 1911-1940; per capita agricultural output, 1.8 times; per capita manufactured output, 11 times; and population by about 50 per cent. During this period gross production value of manufacturing industry increased by about $850 million, and that of agriculture by about $800 million (i.e., manufacturing industry contributed a little bit more to the growth of total output than did agricultural industry).

In Taiwan, per capita income increased about 2.7 times during the 40 year span of 1902-1940; per capita agricultural output, 1.9 times; per capita manufactured output, 8 times; and population by about 80 per cent. During this period gross

Table 4: Gross and net value (value added) of manufacturing and agricultural production: Korea, Taiwan and Japan

Dollars[a]

Annual Average	Gross Value of Manufacturing Production ($million)	Gross Value of Agricultural Production ($million)	Population	Per Capita Net Value of Manufacturing Production: (A)	Per Capita Net Value of Agricultural Production: (B)	(A)/(B)
Korea						
1911—15	54	448	15.3	1.1	23.4	0.05
1916—20	106	540	17.0	1.9	25.4	0.07
1921—25	174	660	18.1	2.9	29.2	0.10
1926—30	294	901	19.6	4.5	36.8	0.12
1931—35	448	1,103	21.1	6.4	41.7	0.15

1936—40	906[b]	1,230[b]	22.8	11.9	43.1	0.28
1953[c]	193[d]	893[d]	20.2	10.0	44.0	0.23
1958	377	1,078	23.3	16.0	46.0	0.35
1963	566	1,125	26.9	21.0	42.0	0.50
Taiwan						
1902—05	20	103	3.1	2.0	26.9	0.07
1906—10	38	105	3.2	3.6	26.0	0.14
1911—15	68	133	3.5	5.8	30.5	0.20
1916—20	144	129	3.7	11.8	28.1	0.42
1921—25	129	166	4.0	9.8	33.5	0.29
1926—30	194	259	4.4	13.1	46.7	0.29
1931—35	274	318	5.0	16.3	50.4	0.32
1936—40	304	354	5.7	15.9	49.6	0.32
1954	182[d]	314[d]	8.8	21.0	36.0	0.58
1957	255	360	10.0	26.3	37.2	0.71
1963	403	421	11.9	34.0	35.0	0.97
Japan						
1881—85	240	963	37.9	1.9	20.4	0.09
1886—90	454	1,219	39.4	3.5	24.8	0.14
1891—95	656	1,576	41.1	4.8	30.7	0.20
1896—00	1,011	1,785	43.2	7.0	33.0	0.21
1901—05	1,120	1,963	45.8	7.3	34.3	0.21
1906—10	1,477	2,119	48.5	9.1	35.0	0.26
1911—15	2,270	2,568	51.9	13.3	39.6	0.34
1916—20	3,505	2,569	55.0	19.1	37.4	0.51
1921—25	4,289	2,807	58.4	22.1	38.5	0.57
1926—30	6,293	2,996	62.3	30.3	38.5	0.79
1931—35	9,363	3,025	67.3	41.8	36.0	1.16
1936—40	15,288	3,627	72.0	63.8	40.3	1.58
1953	4,104[d]	2,768[d]	87.0	47.0	32.0	1.47
1958	6,027	3,161	91.7	66.0	34.0	1.94
1962	11,165	3,641	95.1	117.0	38.0	3.08

Source: K. Ohkawa, *op. cit.*; H. Ouchi, *op. cit.*; Chosen Government General, *op. cit.*; The Bank of Korea, *National Income of Korea: 1953—63* (Seoul, 1965); Industry of Free China Publishing Committee, *op, cit.*; and Statistical Bureau, Prime Minister's Office, Japan, *op. cit.*

(a) 1952 dollar prices for the pre-World War II figures; current dollar prices for the post-World War II figures. (Refer to footnote (a) of Table 3).

(b) Average of 1936 and 1940.

(c) South Korea only.

(d) Value added for post-World War II period.

Note: The value of manufacturing production includes only those products from establishments which regularly employ more than five workers or have capacity to employ more than five workers.

It is assumed that the net value (value added) of manufacturing production is 30 per cent of its gross production value and that the net value of agricultural production is 80 per cent of its gross production value throughout the period of pre-World War II. This is based on Ohkawa's estimation.

Table 5: Percentage share of manufactured products in GNP: Japan

Percent

Year		Year		Year	
1878	2.74	1905	9.62	1935	23.06
1880	3.00	1910	10.88	1940	31.99
1885	4.19	1915	14.14	1951	24.87
1890	4.70	1920	15.63	1955	23.30
1895	7.12	1925	14.63	1960	30.40
1900	8.10	1930	18.13	1962	30.69

Source: K. Ohkawa, *op. cit.*

production value of manufacturing industry increased by about $ 300 million, and that of agriculture by about $ 250 million; manufacturing industry also contributed a little more to the growth of total output than did agricultural industry.

In Japan, per capita income increased about 2.3 times during the 30 year span of 1881-1910; per capita agricultural output, 1.8 times; per capita manufacuring output, about 5 times; and population by about 30 per cent. During this period gross production value of manufacturing industry increased by about $ 1,250 milion, and that of agriculture by about $ 1,150; manufacturing industry again contributed a little more to the growth of total output than did agricultural industry.

The growth rates of per capita income in all three countries during the respective periods are higher than a compound rate of 3 per cent a year. If the data used in this compution is correct, then these rates would rank among the highest overall rates of growth observed in the world during the early stages of economic development. The growth rates might tend to be overstated because of a possibly limited scope of census in the earlier part of the periods. However, even with these possible deficiences in the data, it does not seem unreasonable to compare Korea's 1911-1940 period, Taiwan's 1902-1940 period and Japan's 1881-1910 period(when the share of manufactured output in GNP was less than 10 per cent) in an analysis of the changing pattern of industrial structure and trade.

2. A Transitional Stage

Converted at the official exchange rate, the per capita income of Korea has risen from approximately $ 109 in 1953 to $ 126 in 1963. The per capita income of Taiwan was $ 94 in 1953 and $ 126 in 1963. These per capita income ranges correspond to the first half of Japan's 1900-1940 period(i.e., up to about 1924).[4]

In Korea, despite substantial industrialization before the Second World War,

(4) Refer to Tables 3 and 4 as well as footnotes to those Tables for the sources of data and method of computing per capita income.

because of the separation of the northern part from the southern and the heavy damage inflicted by the Korean War, manufacturing industry comprised only about 8 per cent of South Korea's GNP in 1953; this figure became 14.5 per cent in 1963.[5] In Taiwan, manufacturing industry was about 14.3 per cent of GNP in 1953 and had risen to 21.8 per cent by 1963.

During 1900-1940, Japan's per capita income level rose from about $90 to $250 (from about $90 to $120 during 1900-20, and from $120 to $250 during 1920-40) and the share of manufacturing industry in GNP expanded from 8 to 32 per cent(from 8 to 16 per cent during 1900-20, and from 16 to 32 per cent during 1920-40). Thus, the developmental stage of Korea and Taiwan during the 1953-1963 period seems to correspond to Japan's from 1900 to 1940; Korea roughly to first half(1900-1920) and Taiwan, being a little more advanced than Korea, to the middle(roughly 1910-1930).

According to Rostow, Japan went through take-off and arrived at maturity during the 1900-1940 period. Surely neither Korea nor Taiwan has arrived at Japan's 1940 stage of development. However, it does not seem absurd to assume that Korea and Taiwan will arrive at the maturity stage within a decade or two from 1966. In this sense, I would like to call this period a transitional stage for these countries.[6]

(5) Korean industry was paralyzed by the artificial separation of the northern part, where heavy industries were concentrated, from the south, where light industries and agriculture prevailed. The already crippled South Korean industry was shattered by the Korean War.

Value of Industrial Production, North & South Korea: 1940

	million yen	North	South		million yen	North	South
Light Industry	923	26%	74%	Heavy Industry	951	86%	14%
Textiles	232	26%	74%	Metals	130	85%	15%
Machines	77	30%	70%	Chemicals	699	88%	12%
Lumber	35	30%	70%	Non-Metallic	62	70%	30%
Printing	19	10%	90%	Gas & Electric	60	70%	30%
Food	373	35%	65%				
Misc.	187	24%	76%	Total	1,874	54%	46%

Major Food Crops, North & South Korea: 1944(In suk=5.12 bu.) imillion

Rice	16.1	36%	64%	Other Grains	20.2	37%	73%

Source: G.M. McCune, *Korea Today*, (Cambridge: Harvard University Press, 1950), p. 31.

(6) If Japan can be said to have had a very high rate of growth during the 1878-1910 period, the same can be said of Korea and Taiwan during their colonial period. If Japan finished its take-off

3. Other East Asian Countries

Table 6: Estimates of per capita gross domestic products and percentage share of manufactured products in GNP: East Asian countries

Country	Per Capita Gross Domestic Products($)[a]			Percentage Share of Manufactured Products in GNP		
	1953	1958	1962	1953	1958	1962
Japan	217	337	551	24.3	25.9	30.7
Hong Kong	130	142	188	..	33.0[b]	..
Taiwan	78	97	121	14.3	17.5	18.8
Philippines	90	113	125	11.9	17.8	18.7
Burma	42	55	57	10.2	13.3	14.5
Korea	77	103	110	8.0	11.9	13.4
Pakistan	56	64	74	9.7[c]	12.2	14.2
India	65	70	73	15.9[d]	16.1	18.7
Thailand	91	84	106	11.5	12.3	12.1
Fed. of Malaya	..	186	207	5.2[e]	5.4	8.5
Indonesia	60	73	73	8.6	8.0	..
Ceylon	108	122	137	4.8	4.5	5.3
Cambodia	52	65	68	..	..	..
Laos	57	65	68	..	..	..
Viet-Nam	..	59	68	:	..	..

Source: United Nations, *Yearbook of National Accounts Statistics:* 1963 and *The Growth of World Industry: 1938-1961.*

[a] At current price.

[b] The percentage share is for 1954-55. Source: E. Szczepanik, *The Economic Growth of Hong Kong* (London: Oxford University Press, 1958), p. 178.

[c] Includes electricity, gas and water. 9.7 is the 1954 figure.

[d] Includes gas, electricity and construction. If we can assume that India and Pakistan have similar industrial structure, percentage share of gas, electricity and construction in GNP would be less than 4 per cent in India in 1962, and the share of manufactured output in India's GNP in 1962 would be roughly 15 per cent.

[e] Includes construction. 5.2 is the 1955 figure

[f] Includes electricity and gas.

by 1900 or 1914, there is no reason why Korea and Taiwan could not have finished their take-off by 1940. (Rostow considers that the period when Japan finished take-off may be somewhere between 1900 and 1914; he prefers the earlier date. See, W.W. Rostow, *The Stages of Economic Growth*, Cambridge University Press, 1960, p. 38.) The drastic social and economic changes experienced by Korea and Taiwan during colonization period cannot be less in magnitude than those of Japan during 1878-1900(or 1914) period. The only big difference is the presence or absence of a country's own initiative(which might cause differences in the direction of change) during its take-off stage. Possibly this difference is big enough to explain the significant differences in structural change during this period from the normal pattern an independent economy is expected to follow. (This is discussed in Chapter 4.)

If we extend the somewhat arbitrary method of classifying an economy as at its early phase of industrialization if per capita income is less than $ 100 to other East Asian countries shown in Table 6, then Burma, Pakistan, India, Indonesia, Cambodia, Laos and Vietnam would be classified as being at their early phase of industrialization. If we use the percentage share of manufacturing in GNP as an index of economic development instead of per capita income, then the Federation of Malaya, Indonesia, Ceylon, Cambodia, Laos and Vietnam would be classified as being at their early phase of industrialization. If we use both indicators as indexes of economic development, India, Pakistan, Burma, Federation of Malaya and Ceylon cannot be classified at either of the two stages. However, since it does not seem plausible to regard post World War II period India and Pakistan as being at their early phase of industrialization, I prefer to use the percentage share of manufactured output in GNP as the index of economic development, and to classify the post World War II period of the Federation of Malaya, Indonesia, Ceylon, Cambodia, Laos and Vietnam as the early phase of industrialization for each economy, and the post World War II period of India, the Philippines, Pakistan, Burma and Thailand as the subsequent transitional phase of their economic development.[7]

CHAPTER IV

CHANGES IN THE STRUCTURE OF MANUFACTURING INDUSTRY AND IN THE IMPORT PATTERN OF MANUFACTURED PRODUCTS

1. The Colonial Pattern of Development in Korea and Taiwan: A Comparison with the Early Phase of Japanese Industrialization

If we regard, somewhat arbitrarily, 1911, 1902, and 1881 as the starting points of industrialization in Korea, Taiwan and Japan, respectively, their starting points have some similarities: per capita income was about $ 40, and per capita manufactured product was about $ 2. Since then, there has been a marked growth

(7) This is neither because I believe that such countries as Burma and Thailand have finished Rostow's take-off stage and will arrive at maturity soon, nor because I accept Rostow's theory. The naming of stages is simply for the sake of brevity, and not much significance is given to their names. Approximations of development stages have an arbitrary element in any case, being made for the convenience of analysis.

in national income and a relatively rapid growth in manufacturing industries in each country. With these similarities in mind, we may also expect some similar patterns of development.

This section investigates the similarity and dissimilarity in the pattern of changes in the composition of manufactured outputs and imports among Korea, Taiwan and Japan during their respective early phases of industrialization. It covers roughly the 1911-37 period for Korea, the 1902-36 period for Taiwan (when these countries were colonies of Japan), and the 1878—1910 period for Japan. The pattern of some other East Asian developing countries will be briefly examined at the end of the section.

The Japanese pattern is used as a standard of comparison here as well as in the following section: Chenery compared Japan's 1914 and 1935 structure to his normal pattern of production and import; he found that in 1914 and 1935 Japan's structure was not very dissimilar to present-day developing countries at the corresponding income level, and that the deviations of Japanese patterns from his normal patterns were no greater than in a country chosen at random. One apparent exception was the abnormally large amount of textile production in Japan due to the large amount of Japanese textile export, but his study suggests that, except the case of textiles, any peculiarities of Japan's economic structure, if they exist, might have developed since 1935 or after World War II.[1]

First, it is attempted, as shown in Table 7, to provide some crude approxima-

(1) "With few exceptions, the comparison of output in individual industrial sectors shows quite a normal pattern . . . . The comparison of these levels to the standard output shows values above standard in six sectors and below standard in six, with the total for all manufacturing being 26 per cent above normal. These variations are consistent with the hypothesis that Japan had a normal economic structure for her size and income level in 1914, since only one industry deviates from normality by more than one standard deviation and none by more than two . . . . the relatively high values of output in textiles and paper result from exports of these products. They become normal when the effect of export is removed . . . . In marked contrast to later years, Japan in 1914 imported chemicals, paper, and metals in excess of the quantities that would be standard today . . . . The composition of Japanese imports in 1914 was therefore fairly normal for her income level." " . . . . on the whole the productive structure in that year showed deviations from the standard similar to 1914. The development of textiles was much more pronounced because of the export boom resulting from devaluation. Machinery and transport equipment were maintained at relatively high levels by military preparations (much of the transport equipment is naval shipbuilding). The substantial development of other sectors such as metals, building materials, petroleum, and chemicals is shown to be quite normal for this income level. The import pattern also remained much the same in 1953 as in 1914 . . . ." H.B. Chenery, Shishido, and T. Watanabe, "The Pattern of Japanese Growth, 1914—1954," *Econometrica*, XXX, 1, (January, 1962), pp. 98—129.

tion of the demand pattern of Korea, Taiwan and Japan in their early phase of industrialization. The demand is defined as the sum of domestic production and imports minus exports. The method used for the classification of industries is explained in the appendix to this chapter. Due to some inconsistency in classification among trade data and industrial production data and changes in the method of classifying industrial production, the figures are inaccurate. For instance, the recorded export of metals is greater than domestic production in Taiwan in 1922. This is probably because some metal products are classified as

Table 7 : Changes in the composition of demand for manufactured products: Korea, Taiwan and Japan

Percent[a]

Korea	1911	1920	1930	1935
A. Machinery & Transport Equipment	6.0	6.1	7.5	7.9
B. Metals	8.2	5.6	8.8	6.4
C. Building Materials	6.3	6.2	4.9	5.0
D. Chemicals, Paper, etc.	7.7	10.5	13.3	18.5
E. Textiles	35.0	29.3	19.5	18.2
F. Food and Kindred	28.7[b]	28.6[b]	37.0	35.4

Taiwan	1914	1922	1930	1935
A. Machinery & Transport Equipment	3.2	9.4	9.5	9.8
B. Metals	6.5	8.3	7.7	8.7
C. Building Materials	11.7	14.4	13.8	12.6
D. Chemicals, Paper, etc.	19.6	27.8	24.9	27.2
E. Textiles	14.7	11.3	11.6	11.7
F. Food and Kindred	37.1	20.0	23.9	22.0

Japan	1881	1891	1901	1911
A. Machinery & Transport Equipment	0.6	2.3	5.8	14.1
B. Metals	7.7	2.4	6.7	9.4
C. Building Materials	2.0	5.1	4.4	4.3
D. Chemicals, Paper, etc.	5.5	9.9	10.7	11.0
E. Textiles	19.7	33.4	24.8	28.6
F. Food and Kindred	62.6	41.7	42.2	27.9

Source: Table A1, A2, A4, A5, A7, A8, A12-17, A19-24 in Appendix, and K. Ohkawa, *The Growth Rate of Japanese Economy Since 1878* (Tokyo: Kinokuniya, 1957).

[a]Percentage share of demand for each manufactured product in total demand for manufactured product.

[b]Figures for the demand for food and kindred products are underestimated because of the exclusion of the production value of the rice cleaning industry before 1924.

mining rather than manufacturing products. The least accurate part of the data seems to be Korea's pre-1924 period, and Taiwan's pre-1920 period. The share of each manufactured output in the total manufactured outputs of Korea and of Taiwan for these periods was computed on the basis of the value of the principal manufactured products instead of the production value of each industrial establishment, and obviously, we can expect some lack of continuity with the production data of the later periods which are classified by each major industry. Although the absolute accuracy of the data used in this dissertation cannot be claimed in any case, it can be said that, lacking any good alternative, I have tried to use the best data available, and the figures shown in Table 7, for example, are useful for a rough approximation of the changes in demand pattern of Korea, Taiwan and Japan. However, the deficiency in data limits the scope of this section to the mere identification of rough changing patterns and similarity and dissimilarity among these countries.

If we examine the figures in Table 7, we can get some impression of expanding tendency in the share of demand for machinery and chemicals, and declining tendency in the share of demand for textiles and food products within the total demand for manufactured products. But it is less easy to identify consistent and uniform changes in the patterns of demand for each manufactured product among Korea, Taiwan and Japan.

The demand for textiles in Taiwan was relatively small, which might be attributable to the fact that the average temperature of Taiwan is about 70° F, while that of Korea and Japan is about 50° F; and the demand for chemicals and building materials in Taiwan was relatively large compared to Korea and Japan. Thus Korea and Japan seem to have had a more similar demand pattern with each other than with Taiwan. One notable fact is the relatively small demand for machinery in Japan before 1900, possibly due to the different conditions of technological availability before 1900.

Since there were some similarities in the changes in demand pattern, notably between Korea and Japan, it is natural to expect some similar pattern of changes in the composition of manufactured outputs as well as manufactured imports in each country: a rapid rise in textile industries, and an increase in the share of other industries in the later period. However, underlying the similarities in the changes in per capita income, demand patterns, and rapid growth in manufactured outputs in all these countries, there were substantial dissimilarities in the structural changes among them.

Table 8 : Changes in the composition of manufactured output and import: Korea, Taiwan and Japan

Percent[a]

	Domestic Production				Import			
Korea	1911	1920	1930	1937	1911	1920	1930	1935
A. Machinery	1.9	1.8	0.9	1.1	8.9	12.0	11.9	14.0
B. Metals	3.8	5.2	5.9	4.9	11.2	10.6	12.1	15.4
C. Building Mat.	5.4	6.2	5.9	5.1	7.0	5.8	5.4	6.1
D. Chemicals	2.3	7.4	9.6	28.8	12.2	18.1	19.6	20.7
E. Textiles	16.7	8.9	13.2	13.2	46.2	36.9	31.5	25.8
F. Food	51.0	36.6	59.2	42.4	9.3	9.8	8.8	5.2
Taiwan	1914	1922	1930	1938	1914	1922	1930	1935
A. Machinery	..	2.5	2.3	3.5	4.7	8.1	11.0	11.8
B. Metals	1.3	1.5	1.8	5.4	7.7	11.4	9.1	15.9[b]
C. Building Mat.	3.4	5.0	6.4	4.3	12.6	9.1	7.3	10.3
D. Chemicals	2.6	7.9	6.7	10.3	29.1	25.3	29.6	30.5
E. Textiles	0.4	1.8	1.0	1.6	22.3	14.2	19.1	16.6
F. Food	88.7	75.7	76.4	69.0	18.2	24.6	15.5	15.3
Japan	1881	1891	1901	1911	1881	1891	1901	1911
A. Machinery	0.3	0.6	2.0	9.4	2.2	5.7	12.8	17.7
B. Metals	6.3	2.0	4.2	5.0	7.8	12.8	17.9	27.9
C. Building Mat.	2.8	5.4	4.5	4.7	0.9	1.1	1.6	1.9
D. Chemicals	4.5	6.6	6.8	6.5	8.9	19.0	20.8	26.1
E. Textiles	15.8	42.8	42.5	41.4	61.1	35.5	17.2	16.5
F. Food	68.3	37.2	34.0	25.9	15.5	20.5	26.0	6.2

Source: Table A1, A2, A4, A5, A7, A8, and A 12-17 in Appendix.

[a]Percentage share of each manufactured product in total manufactured output (or import).

[b]1934 figure.

The most dissimilar pattern was in the textile industry. As we can see in Table 8, the share of textiles in total Korean manufactured output was less than 17 per cent throughout the period of its early phase of industrialization. In Taiwan, the share of textiles never exceeded 2.2 per cent throughout the period. On the other hand, in Japan, the textile industry expanded from about 15 per cent to more than 40 per cent of total manufactured output during its early phase of industrialization. In Korea, we can detect a tendency toward expansion of the textile industry after 1931, but its rate of growth does not allow the assertion that the textile industry played the most significant role as a leading

industry in the industrialization of Korea during this period.[2]

The import patterns in Korea and Taiwan reflect the absence of a rapid expansion of the textile industry. In Korea, the import of textiles accounted for about 40 to 50 per cent of total manufactured imports during the first half of the period; its share was reduced somewhat to less than 30 per cent thereafter, which seems to be the result of both relatively reduced domestic demand for and slightly increased production of textiles in the later period. In Taiwan, textile imports fluctuated around 20 per cent of total manufactured imports throughout the period; there was not much change in the share of demand for, production and import of textiles in Taiwan during the whole period of its early phase of industrialization. On the other hand, in Japan, the share of textile imports was reduced from more than 60 per cent to less than 20 per cent during the period. Although the share of textile imports in Japan was fairly high during this period, the rate of reduction was rapid, reflecting the quick rise of the domestic textile industry. It may, perhaps, be inferred that the textile industry in Korea and Taiwan was a victim of the colonial economy, whose textile demand was deliberately designed to be met by the Japanese supply.[3]

The abrupt increase in the shares of the food industry in Korea, from about 40 per cent level during the 1911-24 period to 60 per cent by 1930, results from an underestimation of the value of food production before 1924 by exclusion of the production value of the rice cleaning industry. However, if we examine the post-1930 pattern, Korea and Japan show some similarities. In 1930, the share of the food industry was about 60 per cent in Korea; this was reduced to about 40 per cent by 1937. In Japan, the share of the food industry was about 60 per cent in the beginning of its early phase of industrialization, 40 per cent in 1890, and fell to less than 30 per cent at the end of the period. In Taiwan, however, although there was a tendency to decrease from the 90 per cent level of the earlier period, the share of the food industry was extremely large, about 70 to 80 per cent, until the end of the period. The consistently high share of the food industry in Taiwan occurred because more than half of the total manufactured

(2) For the figures which are cited in this section but not shown in Table 8, refer to detailed Tables in Appendix. (Table A1, A2, A4, A5, A7, A8, and A12-17.)

(3) Korea and Taiwan were designed to supply primary products to Japan and to be supplied by Japan with industrial products. The trade of Korea and Taiwan depended heavily on Japan: Taiwan imported 80 per cent of its total imports from Japan and 93 per cent of its total exports went to Japan proper in 1933. Eighty-five per cent of Korea's total imports were from Japan and 86 per cent of its total exports were to Japan in 1933. *Foreign Trade of Japan: A Statistical Survey*(Tokyo: Oriental Economist Inc., 1935).

products was from sugar refining, which had been developed vigorously by the Japanese. Notable, too, is the constancy of the import share of food products in all three countries. There was no explicit upward or downward trend.

A further dissimilarity is that while the share of the chemical industry in Japan and Taiwan during the period remained stable around the 5 to 10 per cent range, it expanded from 2 to about 30 per cent in Korea. In Japan, the chemical industry expanded from 11 per cent in 1914 to 18 per cent in 1937. The rapid expansion of the chemical industry in Korea seems to be due to the availability of improved technology in producing chemical fertilizers in the 1930's and the Japanese efforts to make Korea, Japan's main rice supplier, self-sufficient in producing fertilizers.[4]

The stagnant and relatively insignificant share of the chemical industry in Taiwan is reflected in its constantly high rate of importation of chemicals(about 30 per cent of total manufactured imports). Despite the sharp increase in production of chemical fertilizers in Korea after 1930, the share of chemicals in total manufactured imports remained about 15 to 20 per cent, with a slightly rising tendency until the end of the period. In Japan, too, the share of chemical imports increased steadily from about 10 to 30 per cent during the period. These phenomena suggest the difficulty of expanding the chemical industry in the earlier period of industrialization despite the relatively high and rapidly increasing demand for chemicals.

(4) Out of the total of 25 million yen worth of chemical products, only 2 million yen were fertilizers in 1930 in Korea. However, by 1935, 47 million yen out of 118 million yen of total chemical products were fertilizers. (In the pre-World War II data, paper, rubber, and petroleum were included under the heading of "chemicals.") Chosen Government General, *Annual Statistical Report of Chosen Government General*(Chosen Sotokufu Tokei Nenpo.)

Korea had been Japan's main rice supplier; exporting nearly half of its total rice production to Japan in the late 1930's.

Total Rice Production and Amount of Rice Export to Japan: Korea

Annual Average	Total Rice Production	Exports to Japan
1915 — 1919	14.1(million suk)	1.9(million suk)
1920 — 1924	12.7(〃)	1.8(〃)
1925 — 1929	13.2(〃)	4.4(〃)
1930 — 1934	19.2(〃)	5.2(〃)
1935 — 1939	17.9(〃)	8.4(〃)

Source: H. Ouchi, ed., *Japan Economic Statistics for Meiji, Taisho, and Showa Eras* (Tokyo: Nihon Tokei Kenkyujo, 1958).

The shortage of rice arising from such mass exports(Korean people usually prefer to use the term "confiscation" or "exploitation" instead of "export.") to Japan was made up by imports of low grade coarse staples such as millet from Manchuria.

The share of the metal industry fluctuated around 5 per cent in Korea and Japan. The share remained at about 2 per cent in Taiwan until 1930, but there was an expansion in the share of metals to about 5 per cent thereafter. In Korea and Taiwan, the share of metal imports expanded from about 10 to 15 per cent during the period. The share of imports of metals in Japan also expanded steadily during the period, reaching its peak of 60 per cent of total imports of manufactures in 1917.

More similarities are shown in the pattern of machinery industries. The share of the machinery industry in total manufactured output remained negligible throughout the period in all three countries(usually less than 3 per cent). There was some expansion in the share of the machinery industry in Japan after 1900.[5] The import share of machinery expanded steadily in all three countries, reaching about 15 per cent of total manufactured imports at the end of the period. Excluding the period of 1901-10 in Japan when the share of the machinery industry was expanding a little, the domestic production and import pattern of machinery was very similar in Korea, Taiwan and Japan. The machinery industry did not develop rapidly, and the domestic demand for machinery was met mostly by imports in all these countries during the period of their early phase of industrialization.

During the early phase of industrialization in Japan, industrialization was mainly due to rapid import substitution as well as to exports of textiles in large quantity. In Korea and Taiwan, the textile industry was partly or completely deprived of its role as a leading industry. But even without the leadership of the textile industry, these two countries managed to achieve a rapid rise in agricultural and manufacturing production. In Korea, the chemical industry played a significant role at the end of the period, and in Taiwan, sugar refining was dominant throughout its early phase of industrialization. In this respect, it seems that the established relationships between growth and structural changes, which might

(5) The expansion of machinery industry in Japan in 1900's seems to be partly due to armaments. Cf. "... the Japanese Government after the Russo-Japanese War(1904-1905) had given priority to armaments expansion over capital accumulation.... It is true the shipbuilding, machine manufacturing and wooden manufacturing industries, being particularly favored by military demand, made great progress during the war... they promoted the military and naval arsenals and the government-managed iron works to introduce technical improvements so as to improve the ability of the domestic economy to supply arms. This advanced technique gradually flowed into the private factories and helped to develop our heavy industry." M. Ohkawa, "The Armament Expansion Budgets and the Japanese Economy after the Russo-Japanese War," *Hitotsubashi Journal of Economics*, Vol. 5, No. 2(January, 1965), pp. 81-83.

normally be expected to exist in an independent economy, cannot be safely applied to a colonial economy which is deprived of such advantages of sovereignty as independence in tariff, foreign exchange policy, and development policy.

Other East Asian Countries

In 1962, about 60 per cent of Ceylon's total manufactured output was from the food industry, and the shares of textile and machinery output were so small that they do not appear in the production data.[6] This negligible share of textile output makes Ceylon's pattern similar to that of Taiwan. Like Taiwan, moreover, there have been no definite upward or downward trends in the share of each manufactured product in Ceylon's total manufactured imports during 1925-1963. The share of metal imports in total manufactured imports fluctuated at around 5-10 per cent; building materials, about 5 per cent; chemicals, 20-30 per cent; textiles, 15-20 per cent; and food products about 25 per cent, with a declining tendency after World War II. The share of machinery and transport equipment in total manufactured imports fluctuated within a 5-10 per cent range until the end of the Second World War; since the war, there has been an increasing trend in its share. Because of the sharply increased shares of food and textiles in total manufactured imports during the 1940-1950 period, there was a relative fall in the share of chemicals, metals and machinery during this period. Although there was an expanding tendency in the share of machinery and a declining tendency in food and textile imports after the Second World War, on the whole, there was not much struc-tural change in Ceylon's imports.

The share of textiles' in total manufactured output in both Indonesia (7 per cent in 1958) and the Federation of Malaya (0.4 per cent in 1959) is also insignificant, while textiles share in imports is large (28 per cent of total manufactured imports in Indonesia, and 7 per cent in Malaya.)

In India, although the share of textiles in total manufactured imports was large before World War II, textiles' share in imports declined from about 70 per cent in 1899 to 35 per cent in 1937. The textile industry contributed more than a

(6) The share of textiles in total manufacturing output of Ceylon seems to be about 2 per cent. "The Census of Industrial Production carried out in the second half of 1952 revealed that... of the gross production of Rs. 610 million , 1.8 per cent (was produced by textile industry)...." E. Gunewardena, *External Trade and the Economic Structure of Ceylon: 1900-1955*(Colombo: Central Bank of Ceylon, 1965), p. 167.

quarter of the total value added by manufacturing industry in 1925.

Therefore, it seems that only in Japan and India, and, not in Korea, Taiwan, Ceylon, Malaya or Indonesia, were textiles a leading industry in the early phase of the industrialization process.

Table 9 : Composition of manufactured outputs and imports: other East Asian countries

Percent[a]

	Ceylon					
	Output (1962)	Import (1925)	Import (1935)	Import (1945)	Import (1955)	Import (1963)
A. Machinery	—	9.3	10.2	5.5	16.3	21.5
B. Metals	2.9	10.4	7.4	5.0	8.6	9.7
C. Building Mat.	6.6	2.7	2.5	1.1	4.9	4.5
D. Chemicals	20.3	24.8	29.4	25.7	28.3	28.6
E. Textiles	—	19.5	15.7	24.8	14.1	9.2
F. Food & Kindred	56.5	23.4	25.3	30.7	21.0	22.5

	India				
	Output (1925)	Import (1899)	Import (1913)	Import (1929)	Import (1937)
A. Machinery	4.8	7.9	11.9	24.3	23.6
B. Metals	2.7	11.5	18.3	17.0	17.0
C. Buliding Mat.	—	—	—	—	—
D. Chemicals	4.1	3.5	4.3	7.6	8.4
E. Textiles	25.2	68.3	57.4	39.3	35.1
F. Food & Kindred	19.1	—	—	—	—

	Indonesia[b]		Malaya	
	Output (1958)	Import (1958)	Output (1962)	Import (1962)
A. Machinery	10.9	25.2	2.6	29.0
B. Metals	—	15.1	4.7	12.2
C. Building Mat.	5.4	2.8	17.5	3.3
D. Chemicals	28.3	25.0	18.4	23.3
E. Textiles	6.9	27.7	0.4[b]	7.0
F. Food & Kindred	38.0	4.0	44.6	17.5

Source: Central Bank of Ceylon, *Annual Report (of the Monetary Board to the Minister of Finance) for the Year 1964*; Department of Commerce, Ceylon, *Thirty Years Trade Statistics of Ceylon: 1925-1954* (Colombo, 1955); Federation of Malaya, Department of Statistics, *Survey of Manufacturing Industries*; United Nations, *Commodity Trade Statistics*, *Yearbook of International Trade Statistics*, and *The Growth of World Industry: 1938-1961*; and for India, W.G. Hoffman, *The Growth of Industrial Economies* (Manchester University Press, 1958), p. 161, and A. Maizels, *Industrial Growth and World Trade* (Cambridge University Press, 1963), p. 459.

[a] Percentage share of each manufactured product in total manufactured output (or import).

[b] From United Nations, *The Growth of World Industry: 1938-1961*.

2. The Pattern of Changes in the Composition of Manufactured Outputs and Imports in the Transitional Stage: Similarity and Dissimilarity among Korea, Taiwan and Japan

It was stated in the preceding section that the deviation from the normal pattern of changes in the composition of manufactured outputs of Korea and Taiwan during their early phase of industrialization might be attributed to the absence of sovereignty in these countries. If the absence of sovereignty is really the only principal cause of such a deviation, there is no apparent reason why these countries should not follow the normal pattern after World War II.

This section investigates the similarity and dissimilarity among Korea, Taiwan and Japan. It covers the period after 1953 for Korea and Taiwan, and 1900-40 for Japan. The pattern of other East Asian developing countries will be briefly examined.

There was a consistent increase in the share of manufactured output in GNP in Korea, Taiwan and Japan during the periods covered here: Korea, from 8 to 14 per cent (1953-64), Taiwan from 14 to 20 per cent (1953-63); and Japan, from 8 to 16 per cent during the first half of the period (1900-20), and from 16 to 32 per cent during the second half (1920-40). Underlying the consistent increase in the share of manufactured output in GNP was a substantial change in the composition of demand for and output of each manufactured product.

As shown in Table 10, the share of demand for machinery (except Korea), electrical machinery, metals, paper products and chemicals in total demand for manufactured products expanded while the share of demand for textiles and consumer goods (including food products) declined in all of Korea, Taiwan and Japan. This direction of changes in the composition of demand accords well with the "normal pattern" derived from the experience of developed countries, i.e., a relatively rapid rise in the demand for machinery, metals, and chemicals, and a relatively slow expansion in the demand for textiles, food and other consumer goods. However, the direction of changes in the share of transport equipment, building materials and rubber products shows lack of uniformity among those countries.

Both Chenery and Maizels conducted regression analysis using per capita income as an independent variable. They called the resulting coefficients "growth" elasticities (instead of "income" elasticities) because, to the extent that rising income is correlated with changes in the demand pattern and factor supply, the coefficients show how the industrial or trade pattern changes with economic

Table 10 : Changes in the composition of demand for manufactured products: Korea, Taiwan and Japan

Percent[a]

	Korea		Taiwan		Japan			
	1955	1964	1953	1963	1909	1919	1929	1936
A. Machinery and Transport Equipment								
1. Machinery	3.3	2.9	3.5	6.9	5.3	5.6	6.1	8.3
2. Electrical	2.4	3.3	2.4	4.1	1.8	2.2	3.0	3.2
3. Transport	4.0	3.6	2.6	2.5	3.7	7.2	3.6	3.5
Sub-Total	9.7	9.8	8.5	13.5	10.8	15.0	12.7	15.0
B. Metals								
4. Basic Metals	2.0	4.9	6.5	6.2	—	—	10.5	18.6
5. Metal Product	1.7	1.8	1.8	2.7	—	—	3.0	2.8
Sub-Total	3.7	6.7	8.3	8.9	5.2	11.4	13.5	21.4
C. Building Materials								
6. Non-Metallic	5.3	4.5	2.9	5.5	3.2	2.5	2.8	2.5
7. Wood Product	3.8	1.4	3.6	3.4	2.1	2.6	3.8	2.7
Sub-Total	9.1	5.9	6.5	8.9	5.3	5.1	6.6	5.2
D. Chemicals, Paper, etc., Products								
8. Paper Product	1.9	3.1	3.8	4.3	3.2	2.1	3.7	3.9
9. Petroleum	2.4	4.4	5.8	5.7	—	—	—	—
10. Rubber	2.7	4.2	1.9	1.3	—	—	1.2	1.3
11. Chemicals	10.1	11.6	13.6	14.8	14.4	12.8	15.9	20.0
Sub-Total	17.1	23.3	25.1	26.1	17.6	14.9	20.8	25.2
E. Textiles	23.9	20.5	23.2	15.5	30.9	36.7	24.9	18.0
F. Consumer Goods Other Than Food								
13. Furniture	1.2	0.4	—	—	0.1	0.1	0.2	0.2
14. Printing	2.3	2.7	—	2.0	2.5	1.2	2.9	2.1
15. Leather	1.3	0.9	0.5	0.2	1.5	0.6	0.6	0.2
16. Wearing App.	4.3	3.1	—	1.7	—	—	—	—
Sub-Total	9.1	7.1	—	3.9	4.1	1.9	3.7	2.5
G. Food & Kindred	28.8	25.7	26.1	22.3	22.3	13.9	16.6	10.9
Mnf/GNP	10.2	14.3	14.3	20.2	9.1	15.0	18.1	23.4

Source: Table A2, A5, A7, A13, A15, A16, A19, A22, and A24 in Appendix.

[a]Percentage share of demand for each manufactured product in total demand for manufactured product.

development in general, rather than simply with changes in income.[7] However, the regressions in Table 11 and Table 13 are conducted using the percentage share of manufacturing in GNP as an index of industrialization (or, more broadly, economic development) instead of per capita income. The justification is

(7) See H.B. Chenery, "Patterns of Industrial Growth," *American Economic Review*, Vol. 50, No. 4 (September, 1960), p. 631.

that, if the proportions in which various factors can be combined vary from sector to sector, if the demand for the products of each industrial sector changes as growth proceeds, and therefore, if each branch of industry has a different growth path, the changing industrial structure (the percentage share of manufacturing in GNP, in this case) would be a more direct index than per capita income in reflecting the changing factor supply and demand patterns. If we understand industrialization (or, more broadly, economic development), as a process of continuous change in demand patterns and factor supply, the percentage share of manufacturing in GNP may be a very good index of industrialization and economic development. Another advantage in using the percentage share of manufacturing outputs in GNP is that we can avoid many possible errors arising from the process of converting national currency into dollars in a multi-country comparison. The resulting coefficients are called "industrialization" elasticities. This regression analysis is simply to show how the percentage share of each manufacturing industry changes with changes in the share of manufacturing output in GNP. Logarithmic values are used simply because they fit better, and not much significance is given to the word "elasticity."

The result of regression analysis is summarized in Table 11. All sectors which had expanding demand for their output have positive coefficients while the sectors which had declining demand have negative coefficients. These results suggest the continuous adjustment of industrial structure to changing demand patterns in all these countries. Although the demand pattern for transport equipment showed lack of uniformity, all these countries show positive coefficients. The changing pattern of building materials still lacks uniformity among these countries, but we can get an impression of expanding tendency in the share of non-metallic mineral products and declining tendency of wood products with the increase in the share of manufactured products in GNP. The important fact is the similarity in the direction of structural changes among these countries.

Maizels' regression analysis shows a fairly sharp fall in the relative importance of textiles in total manufactured output when per capita income rises from $100 to $250 (from 26 to 18 percent; "growth" elasticity from cross-country regression is 0.93 and that from time-series regression is 0.59.)[8] However, the

(8) A. Maizels, *op. cit.*, pp. 53-54. The "growth" elasticity from Chenery's cross-country regression is greater than that of Maizels, (1.444), and the share of textiles rather increases a little when per capita income rises from $100 to $300 (from 8.4 to 8.5 per cent). H.B. Chenery, *loc. cit.*, pp. 633 and 639. Refer to the comment made by Maizels about the result of Chenery's cross-section regression on textile imports in Chapter II, Section 3, p. 19.

Table 11 : Regression of percentage share of each manufactured output in total manufactured output on the percentage share of total manufactured output in GNP

	Industrialization Elasticities			
	Korea (1953—1964)	Taiwan (1953—1963)	Japan (1900—1920)	Japan (1921—1940)
A. Machinery and Transport Equipment				
1. Machinery	−1.21*	+2.28*	..	+2.00*
2. Electrical	+2.41*	+3.75	..	+0.54*
3. Transport	+0.27	+2.85	..	+0.65*
Sub-Total	+0.24	+3.19*	+1.57	+1.26*
B. Metals				
4. Basic Metals	+1.97*	+0.79	..	+1.81*
5. Metal Product	−0.14	+2.33	..	+0.69*
Sub-Total	+1.06*	+1.25*	+0.10	+2.10*
C. Building Materials				
6. Non-Metallic	+1.16*	+2.40*	+0.26	−0.21
7. Wood Product	−1.10*	+0.75	−0.21	−0.14
Sub-Total	−0.06	+1.61*	−0.11	−0.17
D. Chemicals				
8. Paper	+1.08*	+0.65	..	+0.68*
9. Petroleum	+2.06*	−0.01	..	..
10. Rubber	+0.20	−0.17	..	+0.53*
11. Chemicals	+0.48	+0.63	..	+0.87*
Sub-Total	+0.70*	+0.40	+0.65*	+0.90*
E. Textiles	−0.12	−1.15	+0.06	−1.28*
F. Consumer Goods Other Than Food				
13. Furniture	−1.96*	..	..	+0.19
14. Printing	−0.10	..	+0.49	+0.66*
15. Leather	−0.85*	−0.54	..	−0.47*
16. Wearing App.	−0.20	..	..	−0.79*
Sub-Total	−0.42*	..	0.05[a]	−0.61*
G. Food	−0.33*	−0.93*	−0.81*	−0.90*

Source: Table A 28, A 29, and A 30 in Appendix.

[a]Consumer goods other than food is the sum of printing and miscellaneous manufactured products for the 1900-20 period of Japan.

*Statistically significant at 0.05 level.

decline in the share of textiles in Korea and Taiwan was not so sharp; from 23.8 to 23.0 per cent in Korea and from 20.8 to 17.4 per cent in Taiwan. The regression coefficient has a negative sign, but it is not statistically significant. On the other hand, Japan has a positive coefficient for textiles for the 1900-20

period, but the coefficient for the 1921-40 period became negative and there was a sharp fall in the share of textiles, from 44 per cent in 1921 to 17 per cent by 1940. The experiences of Korea, Taiwan and Japan suggest that the share of textiles in total manufactured output might decline at a much slower rate in the early period of the transitional stage (at, for example, the $100-$150 level of per capita income), and that a sharp fall in the share of textiles might occur a little later in the transitional stage.

I have also attempted to measure the effect of import substitution and of expansion in demand on imports of each manufactured product and to compare the results for each country. Table 12 is made according to the method used by Maizels.[9] The change in imports from a base to the current year can be written as $dM=m_1S_1-m_0S_0$ where m represents the import content of supplies, S. The change can be divided into two elements, as follows: $dM=S_1(m_1-m_0)+m_0(S_1-S_0)$ where the first term is called gross import substitution, and the second is the expansion in imports due to an increase in home demand. The growth of home industry does not, on this definition, count as import substituting unless it results in a falling share of imports in home consumption. In the case when m_1 is larger than m_0 (Cf. the case of Korea in the import of machinery), it gives a result of "positive" import substitution (i.e., positive S_1 (m_1-m_0). If we use Korean machinery import case as an example, this result can be explained in the following way: The increase in production capacity tends to reduce the import content, but the change in the internal structure of the machinery industry as well as the sophistication of the country's industry may sometimes have the effect of increasing the import content because of an increased demand for more sophisticated machinery.

Import substitution of such manufactured products as non-metallic mineral products, petroleum and coal products, rubber products, textiles and consumer goods was very rapid in all these countries; and the import content in total supply of each of these products, as well as the share of each product in total manufactured imports, has declined. There was also significant import substitution in electrical machinery, transport equipment, paper products, and a significant reduction in import content. But often because of a great increase in demand for them, these products are still imported in large quantity, and the direction of changes in their share in total manufactured imports is not always negative and lacks uniformity among these countries. Despite significant import substitution in metals and chem-

(9) A. Maizels, *op. cit.* pp. 150-151.

Table 12 : Effect of import substitution and of expansion in demand on imports of each manufactured products between selected years: Korea (1955-64), Taiwan (1953-63) and Japan (1909-19, 1919-29, & 1929-39)

Million dollars*

	Total Supply S_0	Import Content m_0	Total Supply S_1	Import Content m_1	Changes in Import Due to: Import Substitution	Changes in Import Due to: Expansion in Demand	Changes in Import Due to: Total (M_1-M_0)
1. Machinery							
Korea	35	.53	61	.62	+ 6	+ 14	+ 20
Taiwan	15	.80	61	.75	− 3	+ 37	+ 34
Japan I	54	.52	184	.29	− 48	+ 72	+ 24
Japan II	184	.29	341	.31	+ 6	+ 46	+ 52
Japan III	341	.31	862	.11	− 168	+ 159	− 9
2. Electrical Machinery							
Korea	26	.83	70	.28	− 39	+ 37	− 2
Taiwan	10	.69	36	.42	− 10	+ 18	+ 8
Japan I	18	.45	71	.06	− 27	+ 24	− 3
Japan II	71	.06	168	.08	+ 4	+ 6	+ 10
Japan III	168	.08	336	.01	− 25	+ 14	− 11
3. Transport Equipment							
Korea	42	.41	75	.16	− 19	+ 13	− 6
Taiwan	11	.75	22	.55	− 4	+ 8	+ 4
Japan I	37	.23	238	.06	− 42	+ 47	+ 5
Japan II	238	.06	204	.16	+ 17	− 2	+ 15
Japan III	204	.16	369	.12	− 17	+ 26	+ 9
4. Basis Metal							
Korea	21	.28	102	.19	− 9	+ 23	+ 14
Taiwan	28	.51	54	.56	+ 3	+ 14	+ 17
Japan I	..	..	..	..	..	..	..
Japan II[a]	376	.59	760	.25	− 258	+ 226	− 32
Japan III	592	.26	1,937	.12	− 277	+ 349	+ 72
5. Metal Products							
Korea	18	.06	37	.08	+ 1	+ 1	+ 2
Taiwan	8	.45	24	.20	− 6	+ 7	+ 1
Japan III	168	.22	296	.07	− 43	+ 28	− 15
6. Non-Metallic Mineral Products							
Korea	56	.06	94	.02	− 4	+ 2	− 2
Taiwan	13	.12	48	.02	− 5	+ 4	− 1
Japan I	32	.17	81	.03	− 11	+ 8	− 3
Japan II	81	.03	157	.06	+ 4	+ 3	+ 7
Japan III	157	.06	255	.02	− 10	+ 6	− 4

7. Wood Products										
Korea	40	.01	30	.01	−	0	−	0	−	0
Taiwan	16	.01	30	.00	−	0	+	0	−	0
Japan I	21	.08	85	.08	−	0	+	5	+	5
Japan II	85	.08	216	.36	+	60	+	11	+	71
Japan III	216	.36	276	.20	−	44	+	22	−	22
8. Paper Products										
Korea	20	.46	65	.17	−	19	+	21	+	2
Taiwan	17	.15	38	.15	+	0	+	3	+	3
Japan I	32	.50	70	.27	−	16	+	19	+	3
Japan II	70	.27	207	.12	−	32	+	37	+	5
Japan III	207	.12	403	.21	+	37	+	24	+	61
9. Petroleum and Coal Products										
Korea	25	.59	93	.14	−	42	+	40	−	2
Taiwan	25	.13	51	.06	−	3	−	3	−	0
10. Rubber Products										
Korea	29	.03	89	.00	−	2	+	2	−	0
Taiwan	8	.23	12	.05	−	2	+	1	−	1
Japan III	66	.09	39	.01	−	11	+	6	−	5
11. Chemicals										
Korea	107	.56	243	.37	−	45	+	76	+	31
Taiwan	59	.44	131	.35	−	12	+	32	+	10
Japan I[(b)]	146	.49	421	.23	−	110	+	134	+	24
Japan II[(b)]	421	.23	962	.26	+	31	+	123	+	154
Japan III[(c)]	962	.26	2,804	.21	−	130	+	331	+	201
12. Textiles										
Korea	253	.14	430	.05	−	39	+	24	−	15
Taiwan	100	.12	137	.08	−	6	+	5	−	1
Japan I	312	.20	1,206	.02	−	207	+	175	−	32
Japan II	1,206	.02	1,401	.04	+	26	+	5	+	31
Japan III	1,401	.04	1,961	.02	−	50	+	24	−	26
13. Furniture										
Korea	13	.01	8	.02	+	0	−	0	+	0
14. Printing and Publishing										
Korea	25	.00	57	.02		..		..		..
Japan I	25	.04	40	.02	−	0	+	0	−	0
Japan II	40	.02	163	.02	−	0	+	2	+	2
Japan III	163	.02	223	.01	−	1	+	1	+	0

15. Leather										
Korea	14	.00	19	.00	+	0	+	0	+	0
Taiwan	2	.50	2	.13	−	1	−	0	−	1
Japan I	16	.31	19	.19	−	2	+	1	−	1
Japan II	19	.19	33	.20	+	1	+	2	+	3
Japan III	33	.20	25	.22	+	1	−	2	−	1
16. Wearing Apparel										
Korea	46	.11	64	.00	−	7	+	2	−	5
17. Food and Kindred										
Korea	306	.06	538	.07	+	7	+	13	+	20
Taiwan	113	.11	198	.02	−	17	+	9	−	8
Japan I	225	.14	455	.10	−	16	+	31	+	15
Japan II	455	.05	932	.05	−	50	+	49	−	1
Japan III	932	.03	1.133	.03	−	21	+	10	−	11
Total Manufactured Products										
Korea	1,061	.20	2.096	.13	−	149	+	207	+	58
Taiwan	431	.26	884	.22	−	38	+	118	+	80
Japan I	1,009	.30	3,282	.15	−	492	+	688	+	196
Japan II	3,282	.15	5,626	.15	−	29	+	358	+	329
Japan III	5,626	.15	10,420	.10	−	467	+	708	+	241

Source: Table A 2, A 5, A 7, A 13, A 15, A 16, A 19, A 22, and A 24 in Appendix.

(a) Includes metal products.

(b) Includes petroleum and rubber products.

(c) Includes petroleum products.

*Korea, at 1960 price; Taiwan at current dollar price; and Japan at 1951 dollar price.

Note: The period of comparison for Korea is 1955-64; Taiwan, 1953-63; and Japan, 1909-19 (Japan I), 1919-29(Japan II), and 1929-39(Japan III).

icals, the expansion in demand for them usually outweighs import substitution, and their share in total manufactured imports is still increasing in these countries. Usually the rapid increase in demand for and slow import substitution of machinery makes machinery imports ever-increasing.

As shown in Table 13, the declining tendency in the share of non-metallic mineral products, rubber products, textiles, and consumer goods as a whole in total manufactured imports was identified in all these countries. Expanding tencencies in the share of machinery and basic metals were also identified except in Japan during 1921-40. There was a substantial import substitution of machinery and metals in Japan in 1930's, and the share of machinery and basic metals in total manufactured imports declined slightly. The development of the machinery and basic metal industry is partly attributed to military preparations in Japan in the 1930's. The share of the electrical machinery, transport equipment, wood

Table 13 : Regression of the percentage share of each manufactured product in total manufactured import on the percentage share of total manufactured output in GNP

	Industrialization Elasticities			
	Korea (1955-1964)	Taiwan (1953-1963)	Japan (1900-1920)	Japan (1921-1940)
A. Machinery and Transport Equipment				
1. Machinery	+ 1.95*	+1.65*	+0.16	−0.01
2. Electrical	− 0.10	+1.41	−1.26*	−3.91
3. Transport	− 0.71	+0.06	−0.43	−0.11
Sub-Total	+ 0.83	+1.19*	−0.15	−0.35*
B. Metals				
4. Basic Metals	+ 2.88*	+0.65	+1.44*	−0.06
5. Metal Product	+ 3.44*	−1.05	+0.45*	−1.60*
Sub-Total	+ 2.95*	+0.38	+1.25*	−0.28
C. Building Materials				
6. Non-Metallic	− 1.87	−3.83*	−1.04*	−0.48
7. Wood Product	− 4.95	−3.92	+1.53*	−1.35*
Sub-Total	− 2.07	−3.83*	+0.26	−1.25
D. Chemicals				
8. Paper	− 0.93	+0.61	+0.12	+1.70
9. Petroleum	— 0.43	−1.54	−1.51*	+4.25
10. Rubber	— 3.91	−4.52*	−0.63*	−0.49
11. Chemicals	− 0.11	+0.05	+0.51*	+0.30
Sub-Total	− 0.24	−0.15	−0.03	+2.15*
E. Textiles	− 1.42	−2.59	−1.76*	−2.94*
F. Consumer Goods Other Than Food				
13. Furniture	− 2.50	+0.94	..	..
14. Printing	+ 0.67	−2.19*	−0.34	−0.35
15. Leather	− 1.01	−7.11	−0.87*	−1.21*
16. Wearing Apparel	−10.29*	−3.87	−1.81	−2.94*
Sub-Total	− 4.95*	−4.08*	−1.21*	−1.19*
G. Food & Kindred	− 1.06	−3.86*	−1.46*	−3.15*

Source: Table A 33, A 34, and A 35 in Appendix.

* Statistically significant at 0.05. level.

products and rubber products in total manufactured imports seems to be declining while that of paper products and chemicals seems to be expanding, but their direction of change is less certain.

On the whole, unlike the period of early phase of industrialization, the chang-

ing pattern of demand and the composition of manufactured outputs and imports in Korea, Taiwan and Japan in the transitional stage shows remarkable similarity.

Apart from the direction of changes, the absolute amount of production and import of each manufactured product is likely to be affected a great deal by the size of the country, sector—specific natural resource endowment, or export opportunity. Thus, despite the very similar demand patterns, there are some marked differences in production and import pattern among these countries.

In Korea and Taiwan, the share of the consumer goods industries declined from about a half to a third of a total manufactured output. It declined from a third to a sixth in Japan during 1900-20, and by 1940 its share was only one-tenth of total manufactured output. The share of texiles was about a fifth of total manufactured output, with some tendency to decline, in Korea and Taiwan, and nearly 40 per cent in Japan until the early 1930's. It seems that the consumer goods industry in Japan had a relatively small share and the textile industry had an abnormally large share (about twice as large as that indicated in Chenery's normal pattern). The abnormally large share of textiles in Japan is mainly due to the large quantity of textile exports, comprising more than one-third of total domestic products. Since it is argued that the proportion of small-scale production in Japan was higher than is now typical, the relatively small share of consumer products in Japan might be the result of the underestimation of food and kindred products by exclusion of non-factory small-scale food and kindred production. But since we do not have reliable data for hand production either of Japan or of other developing countries, it is still a conjecture.

The share of chemicals in total manufactured output in Korea (8.1 per cent in 1964), Taiwan (10.8 per cent in 1963), and Japan (9.5 per cent in 1920), were similar to each other in magnitude. However, the share of chemical imports in Korea (more than 30 per cent of total manufactured imports during 1953-64) and Taiwan (25-30 per cent during 1953-63) is almost twice as large as that of Japan during 1900-40 (about 10-15 per cent); this may be due to the current greatly increased demand for chemical fertilizers in developing countries.[10]

The share of machinery and transport equipment in total manufactured output was about 6-7 per cent in Korea and Taiwan in 1964. Its share in Japan was about 11 per cent in 1920.[11] There was a rapid expansion in the share of ma-

(10) The "chemicals" in Table 14 includes rubber products, paper products, and petroleum and coal products, as well as chemical products. For the figures of chemical products only, see Table A 13, A 15 and A 16 in Appendix.

(11) Electrical machinery production shows more similarity among these countries. Korea shows an

Table 14 : Changes in the composition of manufactured output and import: Korea, Taiwan and Japan

Percent*

	Korea				Taiwan			
	Output		Import		Output		Import	
	1953	1964	1955	1964	1953	1963	1953	1963
A. Machinery	5.8	7.1	26.9	25.8	2.1	5.5	24.8	38.1
B. Metals	4.6	6.6	3.2	8.2	4.4	6.2	15.8	18.5
C. Building Mat.	7.0	7.2	1.9	0.9	6.5	11.6	1.5	0.6
D. Chemicals	12.6	19.9	40.0	42.6	18.5	21.1	29.5	28.7
E. Textiles	23.8	23.0	16.2	7.3	20.8	17.4	11.0	5.7
F. Consumer Goods.	44.4	34.8	10.4	4.4[a]	47.1	37.8	12.7	3.0

	Japan					
	Output			Import		
	1900	1920	1940	1900	1920	1936
A. Machinery	5.3[b]	11.4[c]	23.9	8.5	15.1	13.0
B. Metals	5.4	5.5	19.8	21.5	39.2	23.0
C. Building Mat.	4.6	6.0	6.4	1.3	3.8	5.8
D. Chemicals	6.7	11.9	20.1	19.1	23.3	49.7
E. Textiles	44.6	41.7	17.0	28.9	8.2	3.1
F. Consumer Goods.	37.1	16.5	11.7	19.1	9.6	4.0

Source: Table A 2, A 5, A 7, A 13, A 15 and A 16 in Appendix, and H. Ouchi, *op. cit.*, p. 31.

* Percentage share of each manufactured product in total manufactured output(or import).

[a] 1963 figure

[b] 1909 figure.

[c] 1919 figure.

chinery and transport equipment as well as metals in total manufactured output of Japan in the late 1930's, largely attributable to the expansion of armaments.

More than a third of total manufactured imports in Korea and usually more than half of total maufactured imports in Taiwan and Japan was metals and machinery and transport equipment. One notable fact is that Japan imported much less machinery and transport equipment and imported much more metals than did Korea and Taiwan(or the amount indicated by Chenery's normal pattern).

increase from 0.7 to 2.8 per cent during 1953-64; Taiwan from 0.7 to 2.6 per cent during 1953-63. and Japan from 0.9 to 2.7 per cent during 1909-20. Neither Chenery nor Maizels breaks the machinery group into machinery and electrical machinery, and thus their analyses overlook what might be an important tendency in a developing economy, i.e., electrical machinery might be playing the major role in the expansion of the machinery group during the early period of transitional stage. (Cf. The share of electrical machinery in total manufactured output in the Philippines increased from 0.7 to 2.9 per cent during 1954-63; and in India, from 1.6 to 4.5 per cent during 1951-64.) See Table A 2, A 5, A 7, A 10 and A 11 in Appendix.

On the whole, even with these dissimilarities among these countries, their demand patterns, the composition of manufactured output and imports cannot be said to differ drastically from one another. Even the high degree of Japanese industrialization at a low per capita income level is not a strange phenomenon. It violates many of the generalizations concerning the relationship between income level and industrialization based on the experiences of old advanced countries. However, during the period when the above comparisons were made, the amount of manufactured products increased 1.9 times during a decade on the average in Japan, and 2.2 times in Korea (1955-64) and Taiwan (1953-63). These rates of increase suggest that the present developing countries, such as Korea and Taiwan, can do better, or not worse, than Japan did during the 1900-40 period.

Other East Asian Countries

The pattern of changes in India and the Philippines is similar to that of Korea, Taiwan and Japan. In India, as shown in Table 15, the share of machinery and transport equipment, metals, building materials and chemicals in total manufactured outputs increased, while that of textiles and food products declined, during the 10 year period of 1953-1962. In imports, the share of machinery and transport equipment, and metals in total manufactured imports expanded while that of textiles and food products declined. The sharp fall in the share of chemicals in India's total manufactured imports (from 45 to 22 per cent)seems to be contradictory to the trends identified in Korea, Taiwan and Japan, i.e., the share of chemicals in total manufactured imports being stable or increasing. However, among 45 per cent of chemicals' share in 1953, 27 per cent was pentroleum products and only 18 per cent was other chemical products.[12] In 1962, the share of petroleum was about 7 per cent and that of the others was 15 per cent, i.e., the reduction in the imports of other items was not so large (from 18 to 15 per cent).

In the Philippines, the share of machinery and transport equipment, metals, chemicals in its total manufactured output also expanded while that of building materials and food products declined during 1953-63. One exceptional trend

(12) The "chemicals" in Table 15 include rubber products, paper products, and petroleum and coal products as well as chemical products. For the figures cited in this section and not shown in Table 15, see United Nations, *Yearbook of International Trade Statistics: 1953 and 1963*; and Department of Commerce and Industry, Republic of the Philippines, *Foreign Trade Statistics of the Philippines: 1963*.

Table 15 : Composition of manufactured output and import: other East Asian countries & Chenery's normal pattern

Percent*

	Chenery's NP at Per Capita Income of[a]				India				Pakistan	
	Output		Import		Output[b]		Import		Output	Import
	$113	$192	$113	$192	1953	1962	1953	1962	1958	1962
Machinery	4.3	7.2	33.2	32.4	4.2	9.6	28.6	51.0	4.5	48.0
Metals	8.9	10.6	12.1	15.1	11.8	17.7	10.9	20.0	5.9	19.8
Building Mat.	8.7	9.0	2.9	3.3	2.7	4.5	..	0.6	3.3	2.0
Chemicals	11.6	13.4	24.0	24.4	9.3	16.1	45.0	21.9	16.3[c]	22.3
Textiles	23.5	25.2	14.3	10.8	53.1	36.1	6.3	2.0	34.3	2.4
Food & Kindred	40.9	30.0	13.2	13.7	18.3	15.6	6.6	1.6	20.2	2.1
Manuf/Total Im.			59.2	40.5			56.2	72.4		81.6
Manuf. Ind/GNP	11.4	16.9			15.9[d]	18.7[d]			12.2	

	Philippines				Thailand		Burma	
	Output		Import		Output	Import	Output	Import
	1953	1963	1953	1963	1956	1958	1958	1962
Machinery	2.4	9.0	19.6	38.2	4.3	24.4	0.8	21.0
Metals	2.2	7.4	12.7	17.9	0.3	15.2	3.6	12.9
Building Mat.	7.0	5.8	1.6	1.6	7.6	2.1	8.6	3.2
Chemicals	18.8	21.5	26.8	17.3	9.7	27.2	23.3	20.2
Textiles	6.8	9.4	19.4	4.1	1.1	17.1	13.3	27.2
Food & Kindred	54.2	32.1	14.0	8.3	63.8	7.5	44.3	9.5
Manuf/Total Im.			85.1	83.0		87.4		87.4
Manuf. Ind/GNP	11.9	18.7			12.1		14.8	

Source: Department of Statistics, Central Statistical Organization, Cabinet Secretariat, Government of India, *Monthly Statistics of the Production of Selected Industries of India*, January 1965; Government of Pakistan, Central Statistical Office, Ministry of Economic Affairs, *Pakistan Statistical Yearbook & Census of Manufacturing Industries: 1958*; The Revolutionary Government of the Union of Burma, *Annual Survey of Manufactures: 1960-61*; Thailand, Office of the National Economic Development Board, Bundhit Kantabutra, *The Economy and National Income of Thailand;* Central Bank of the Philippines, *Annual Report: 1964*; Bureau of the Census and Statistics, Department of Commerce and Industry, Republic of the Philippines, *Foreign Trade Statistics of the Philippines: 1963*; and United Nations, *Commodity Trade Statistics, Yearbook of International Trade Statistics*, and *The Growth of World Industry: 1938-1961.*

*Percentage share of each manufactured product in total manufactured output (or import).

[a] The percentage shares for Chenery's normal pattern(NP) are computed using per capita income of $113 with a population size of 52.6 million and per capita income of $192 with a population size of 69.2 million. These somewhat arbitrary figures are selected in order to utilize those figures compiled in H.B. Chenery, S. Shishido, and T. Watanabe, "The Patterns of Japanese Growth, 1914-1954." *Econometrica*, XXX, 1. January, 1962. The share of each manufacturing industry is computed on the basis of value added.

[b] Based on value added.

[c] From *The Growth of World Industry: 1938-1961.* (Percentage shares computed on the base of value added.)

[d] Includes gas, electricity and construction.

might be the increasing tendency in the share of textile products (from 7 to 9 per cent). However, this increasing tendency of textiles is understandable if we consider the magnitude of its share, 7 per cent, in the beginning of the 1953-63 period, which is less than a third of a normal share. In imports, the share of machinery and transport equipment and metals in total manufactured imports increased while that of textiles and food products declined. As in the case of India, the share of chemicals in total manufactured imports fell significantly, i.e., from 27 to 17 per cent, in the Philippines during the period. And as in India, the decline in the share of chemicals group was mainly caused by sharply reduced imports of petroleum products. In 1953, 9 per cent of the total manufactured imports was petroleum products and 14 per cent was other chemicals. In 1963, 2 per cent was petroleum products and 15 per cent was other chemicals. Thus the share of other chemicals (i.e., paper products, rubber products and chemical products) increased slightly. Therefore, on the whole, the changing pattern of India and the Philippines was quite similar to that of Korea, Taiwan and Japan.

Lack of data on the industrial structure of other East Asian countries prevents a comparison among selected years. If we examine the single year data on Pakistan, Burma and Thailand, the pattern of Pakistan is similar to the pattern of Korea, Taiwan, and Japan discussed in the preceding pages. There are, however, some significant differences in the pattern of Burma and Thailand.

Although the share of manufactured output in GNP in Burma and Thailand was more than 12 per cent in 1961 and 1956, the share of textiles in total manufactured output was negligible in Thailand and relatively small in Burma (13 per cent), and both are importing large amounts of textiles(17-27 per cent of total manufactured imports). This seems to reflect a lack of pressure for rapid import substitution. (Chapter VI will deal with the "pressure.")

APPENDIX TO CHAPTER IV
CLASSIFICATION OF MANUFACTURING INDUSTRIES

The Statistical Office of the United Nations published *Classification of the Commodities by Industrial Origin* in 1964 to show the relationships between ISIC (International Standard Industrial Classification) and SITC(Standard International Trade Classification). In this chapter, classification of manufactured products by industrial origin, whether exported, imported or domestically produced, was made, whenever possible, on the basis of the United Nations classification.

In order to compare trade data classified according to SITC with production

data classified according to ISIC, gross production values instead of value added are used for the production data. However, this procedure inflates the importance of some industries such as metals and textiles, where materials are costly, relative to wages and overhead, and reduces the importance of such industries as machinery and transport equipment.(1) This fact is frequently called to mind by showing the share of some important processed agricultural or mineral products in total manufactured products, exported, imported and produced.

The United Nations classification is designed to show for each SITC commodity the last industry which physically transferred the commodity, and this is often not the industry which contributed the most to its value. For instance, raw silk is classified as a manufactured product of the textile industry by the United Nations. Raw silk, it is true, cannot be regarded strictly as an agricultural product, nor is it exported in quantity until converted into yarn by the silk filatures. But it is closer to an agricultural product since cocoon growing normally comprises 70 per cent of the cost of raw silk, since it is a farm occupation directly associated with the growing of mulberry leaves for silkworm feeding, and since the processing work is carried on usually by handicrafts methods in the home.(2)

There are many other borderline cases, especially in food products.(3) If we

(1) **Comparison of the Share of Each Manufactured Product in the Total Manufacturing Outputs Based on Production Value and Value Added**

Percent

	Machinery	Metals	Build. Mat.	Chemicals	Textile	Consumer
Korea(1963)						
Production Value	7.6	8.5	6.9	18.1	21.5	36.9
Value Added	8.7	5.7	6.9	14.7	18.4	43.7
Taiwan(1963)						
Production Value	5.5	6.2	11.6	21.1	17.4	37.7
Value Added	6.4	6.9	12.0	20.3	15.2	38.1
Japan(1962)						
Production Value	27.0	17.4	7.2	16.4	9.9	18.1
Value Added	32.0	14.4	8.0	16.2	8.5	16.6

Source: Table A 2, A 3, A 5, A 6, A 8 and A 9 in Appendix.

(2) W.W. Lockwood, *The Economic Development of Japan* (Princeton: Princeton University Press, 1955) pp. 356-57.

(3) Another similar example is tea. Tea leaves are usually processed to black or green tea before export.(At least the tea leaves have to be refined, cleaned and sorted to secure large amounts of uniform quality for export, and the green tea is usually processed up to the ready-to-serve point before export.) But tea is still closer to an agricultural product and in most analyses on commodity

classify them as belonging to either manufactured or agricultural (or mineral) products, this is based on a somewhat arbitrary, in any case.

Often, the detailed production data is not available, especially for the pre-World War II period, and, when it is available, there are often differences in classification. For instance, in the production data of Korea during 1931-37, wood products include furniture products, and chemicals include petroleum and coal products, rubber products, paper and leather. But paper products and leather products are included in miscellaneous products.

The manufactured products are classified into seventeen groups, which, in turn (excluding miscellaneous products), are regrouped in seven larger categories: (1) Machinery and Transport Equipment (machinery other than electrical machinery, electrical machinery, apparatus and appliance, and transport equipment); (2) Metals (basic metals, and metal products); (3) Building Materials (non-metallic mineral products and wood products); (4) Chemicals, Paper, etc., Products (paper and paper products, rubber products, petroleum and coal products and chemicals); (5) Textiles; (6) Consumer Goods Other Than Food Products (furniture and fixtures, printing and publishing, leather and leather products, and footwear and wearing apparel); and Food and Kindred Products (food, beverage and tobacco products).

Sector Classification

Sector	U.N. I.S.I.C.	U.N. S.I.T.C.
A. Machinery and Transport Equipment		
1. Machinery Other Than Electrical	36	71
2. Electrical Machinery & Appliances	37	72
3. Transport Equipment	38	73
B. Metals		
4. Basic Metals	34	67 & 68
5. Metal Products	35	69
C. Building Materials		
6. Non-Metallic Mineral Products	33	66[a]
7. Wood Products	25	63[b]
D. Chemicals, Paper, etc., Products		
8. Paper and Paper Products	27	64 & 251
9. Petroleum and Coal Products		332[c]
10. Rubber Products	30	62

composition of trade, tea is regarded as an agricultural product. However, following the United Nations classification, tea remained classified as a manufactured product in this dissertation. The justification rests on the importance of tea in everyday life of East Asian countries as a principal beverage, rather than on the significance of the value added proportion in its gross production value.

11. Chemicals	31	5[d] & 266
E. Textiles	23	65 & 261[e]
F. Consumer Goods Other Than Food		
12. Furniture and Fixtures	26	82
13. Printing and Publishing	28	892
14. Leather and Leather Products	29	61
15. Footwear, Wearing Apparel and Finished Textile Goods	24	84 & 85
G. Food and Kindred Products	20, 21, 22	—[f]
H. Industry, n.e.s.	39	81, 83, 86, & 89[g]

Based on *Classification of Commodities by Industrial Origin* (United Nations, 11 September 1964).

Note: Some SITC items not included in the above table which require very detailed sub-division to achieve complete correspondence to the individual groups of the ISIC are excluded and are regarded as non-manufactured products.

An example: 031.1 (fish, fresh or simply preserved)

SITC 031.1a—ISIC 041	SITC 031.1b—ISIC 204	SITC 031.1c—ISIC 042
SITC 031.2a—ISIC 204	SITC 031.2b—ISIC 042	SITC 031.2c—ISIC 041
SITC 031.3a—ISIC 041	SITC 031.3b—ISIC 204	SITC 031.3c—ISIC 042

In this case the item 031.1 is regarded as a non-manufactured product.

[a] 667 (pearls and precious and semi-precious stones unworked or worked) are excluded.

[b] 243 (wood, shaped or simply worked) is also classified as a manufactured product of the wood industry by the U.N., but regarded as a non-manufactured product by the writer.

[c] 341.2 (gas, manufactured) is sometimes included.

[d] 42 (fixed vegetable oils and fats) excluding 421.5 (olive oil) and 43 (animal and vegetable oils and fats, processed, and waxes of animal or vegetable origin) excluding 431.4a (crude waxes) are classified as manufactured products of the chemical industry by the U.N. but are regarded as non-manufactured products by the writer.

[e] 261.1 & 261.2a (silk worm cocoons) are excluded.

[f] 011 (meat, fresh, chilled or frozen), 012 (meat, dried, salted or smoked) and 052 (dried fruit) are classified as manufactured products of food industry by the U.N., but are regarded as non-manufactured products by the writer. The following items are classified as manufactured products of food and kindreds industry by the writer:

013 meat in airtight containers, n.e.s. and meat preparations, whether or not in airtight containers
022 milk and cream (excluding 0.22.3a, wholemilk, fresh, unpasteurized or not otherwise treated)
023 butter
024 cheese and curd
032 fish, in airtight containers, n.e.s. and fish preparations
046 meal and flour of wheat or of meslin
047 meal and flour of cereals
048 cereal preparations and preparations of flour and starch of fruits and vegetables
053 fruit, preserved and fruit preparations
055 vegetables, roots and tubes, preserved or prepared, n.e.s.
06 sugar, sugar preparations and honey (excluding 061.6a natural honey in the comb)
073 chocolate and other food preparations containing cocoa or chocolate, n.e.s.
074.1 tea
09 miscellaneous food preparations
11 beverages
122 tobacco manufactures

[g] Excluding 892 (printed matter).