PART III

Development Comparison: Resource Endowments and Domestic Market Size

5

Resource Endowments and Development Patterns

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I. Introduction

In their efforts to successfully achieve a transition of their economy from an early to middle or from middle to later stages of development, practically all developing countries undergo a process of industrialization. It is generally considered that the availability of abundant natural resources is a considerable advantage for the success of the industrialization process. Although it is difficult to question the validity of this proposition, it must also be acknowledged that some resource-rich countries are not living up to their expectation in terms of their growth performance, while some of the countries with very few resources are achieving one of the highest rates of economic growth among all the developing countries. Although the definite role played by resource availability in the process of development remains to be determined, previous studies have revealed interesting relationships between resource availability and the patterns of development. In this paper, I wish to review some of the results obtained on this issue from international comparative studies and to analyse possible causes that might have brought about the observed differences in development patterns and performance among countries with different endowments of resources.

II. Resource Endowments and Patterns of Development

In discussing the relationship between resource endowments and the patterns of development, it is first necessary to distinguish between resource-rich and resource-poor countries. Intuitively, such a distinction is obvious; we simply regard a country as resource-rich if she has a significant deposit or endowment of some particular

resources such as oil, other natural resources or agricultural resources including fertile land and favorable climatic conditions. Although this intuitive classification is adequate in many cases, its application becomes more difficult when a country possesses only a limited amount of some natural resource or small amounts of a variety of different resources. Hence, in order to consistently classify countries into resource-rich and resource-poor, we need to have some formal criterion which enables us to assess each country's resource availability on the basis of some aggregated magnitude.

One practical method for doing this was developed by Chenery and Taylor (1968) in their analysis of development patterns. Their idea is to use the relative composition of each country's exports and to classify countries according to their export orientation either toward resource-based primary products or toward other products mainly consisting of manufactured products. Thus, their approach is based on the realized export structure of each country. Indeed, resource-poor countries will be unable to export significant amounts of resource-based primary products, so that their exports will be bound to be biased toward other kinds of commodities. In contrast, resource-rich countries will be in a strong position to compete in the international market for the resources they have, so that their export structure will tend to be biased toward such resource-based commodities. Hence, the Chenery and Taylor classification of their sample countries into primary-oriented and industry-oriented countries can be interpreted as reflecting each country's resource availability. Obviously, since the classification is based on the realized export structure of some specific year, changes in the relative importance of exports of primary and manufactured goods over time may sometimes result in changes in some country's classification from one category to another. However, even though this possibility remains, the above classification scheme provides a useful tool for differentiating resource-rich countries from those not endowed with abundant natural resources.

In the specific approach adopted by Chenery and Taylor, an index called trade orientation index was defined and countries were classified according to the value of this index. In defining this index, they first estimated, on the basis of intercountry regression analysis, the standard shares of exports of primary and manufactured goods predicted at each country's levels of per capita income and population. They then compared these standard shares with the actual export shares to calculate the export orientation index. Basically, a country is classified as primary-oriented if the actual share of exports of primary commodities relative to that of manufactured goods is larger than the corresponding figure estimated from the intercountry regression, and industry-oriented if otherwise.[1]

Chenery and Taylor applied this classification to all of their sample countries, but they reported the results of classification only for small countries with a population of less than 1.5 million. This is because the classification of large countries (those exceeding a population of 1.5 million) into primary-oriented and industry-oriented countries was found to be unimportant for their analysis. A similar method

Table 1. CLASSIFICATION OF SEMI-INDUSTRIAL COUNTRIES BY TRADE ORIENTATION

Primary-Oriented Countries		Industry-Oriented Countries	
Country	Average GDP Growth Rate 1965 – 80 (%)	Country	Average GDP Growth Rate 1965 – 80 (%)
Algeria	7.5	Egypt	6.7
Argentina	3.4	Greece	5.6
Brazil	9.0	Hong Kong	8.5
Chile	1.9	Ireland	5.1
Colombia	5.7	Israel	6.8
Costa Rica	6.2	Japan	6.3
Dominican Rep.	7.3	Kenya	6.4
Eduador	8.7	Korea	9.5
Guatemala	5.9	Morocco	5.4
Iran	6.2	Norway	4.4
Iraq	—	Portugal	5.5
Ivory Coast	6.8	Spain	5.2
Malaysia	7.4	Singapore	10.4
Mexico	6.5	Taiwan	—
Peru	3.9	Yugoslavia	6.0
Philippines	5.9		
South Africa	4.0		
Syria	8.7		
Thailand	7.4		
Tunisia	6.6		
Turkey	6.3		
Uruguay	2.4		
Venezuela	5.2		

Source: Based on trade orientation index presented in Chenery and Syrquin (1986), Table 4.3. Countries with positive index value for 1975 are classified as primary-oriented, and those with negative values are classified as industry-oriented. Classification of Norway is based on Chenery and Syrquin (1975).

of classification was also adopted in later studies with some modification in methodology [Chenery and Syrquin (1975), Prakash and Robinson (1979), Kader (1985), and Chenery and Syrquin (1986)]. Here, we shall rely on the trade orientation index presented in Chenery and Syrquin (1986) for semi-industrialized countries in order to classify countries by resource availability. Table 1 shows the classification of countries into primary-oriented and industry-oriented based on their estimates for 1975.[2] Due to the differences in the underlying data and the slight modification in methodology, the classification of countries is somewhat different from the original classification by Chenery and Taylor (1968).[3] However, we shall rely on this classification in the following discussion because it is based on the latest available estimates.

In Table 1, we have also added average GDP growth rates for the 1965 – 80

period based on the World Development Report, 1988. This table shows that the growth performance has been diverse. Among primary-oriented countries, there are rapidly growing countries such as Brazil, Ecuador, Syria, Algeria, Thailand, and Dominican Republic (growth rate exceeding 7% per year), and slow growing countries such as Chile, Uruguay, Argentina, India, and Peru (growth rate less than 4%). Among the industry-oriented countries, some record a high growth rate such as Singapore, Korea, and Hong Kong (rate higher than 8% per year), while there are no countries that grew at a rate lower than 5% per year. Thus, at least based on these data, there is no evidence to assert that resource-rich primary-oriented countries are achieving a higher growth performance than the resource-poor countries.

The aim of Chenery and Taylor's (1968) analysis was to determine whether there are significant differences in the patterns of relative sectoral growth among different groups of countries. For this purpose, they first divided their sample into large and small countries in terms of population, and examined if there is an adequate statistical basis to claim that the patterns of development as viewed as a function of per capita income and population differ significantly between the two groups of countries. The results showed that the separation is statistically significant; that is, there is a significant difference in the patterns of sectoral development between large and small countries. Next, they turned their attention to the effects of resource endowments. Thus, they separated the large and small countries into primary-oriented and industry-oriented countries based on the trade orientation index described above, and applied the same statistical tests to determine whether resource availability induces significantly different development patterns among countries. The results showed that, although the separation of large countries into primary-oriented and industry-oriented countries does not entail a significant difference, the division of small countries into the two groups does bring out significantly different patterns of development. In fact, the effect of resource availability appears to delay the process of industrialization in small countries. That is, in small industry-oriented countries, the rate of decline of primary production and the relative expansion of industrial production are both very rapid, while in small primary-oriented countries, the timing of the rise of the industrial sector and the fall of the primary sector is considerably delayed, in terms of per capita income level used as an index of the general level of development. This tendency for delayed industrialization in primary-oriented countries has been repeatedly confirmed in the subsequent studies conducted by Chenery and Syrquin (1975), Prakash and Robinson (1979), and Kader (1985) on the basis of more recent data.

III. Sources of Growth and Development Patterns

As we have seen, past empirical research had revealed a significant difference in the development patterns among countries with and without abundant natural resources at least in the case of small countries. We should also note that, despite

the general expectation that resource-rich countries are in a favorable position to perform better in their development efforts, some of the resource-poor countries, such as Korea, Hong Kong, and Singapore, are the ones that have been achieving the fastest rate of growth during the past few decades. Then a natural question to ask is: What have been the underlying causes that brought about such differences in development patterns and development performance among resource-rich and resource-poor countries. We can look into this problem in two ways; one is the analysis of growth from the demand side and the other from the supply side. The demand side approach emphasizes the composition of demand for each sector's products. Naturally, goods are produced to cater to various needs, so that the change in sectoral production is closely related to the changes in various types of demand for the product. Thus, the demand side approach focuses its attention on the deliveries of commodities for various purposes. These deliveries include: (i) the delivery for domestic final demand including private consumption, government consumption, and investments; (ii) the delivery for exports; and (iii) the delivery for intermediate use. As imported goods comprise an alternative source of supply, the net demand for the domestically produced commodities consists of domestic final demand plus exports plus intermediate demand minus imports. Then, the changes in the level and composition of outputs in an economy should be accounted for by the changes in the level and composition of domestic final demand, the changes in the level and composition of exports, the replacement of formerly imported commodities by domestic products (import substitution), and by the changes in the pattern of intermediate input use due to changes in the technological combination of inputs in production. These factors which contribute to the changes in domestic production can be analysed using a decomposition equation that can be derived from a formal input-output model.[4] For the purpose of our analysis, we shall refer to the four factors as the effects of (i) domestic demand expansion, (ii) export expansion, (iii) import substitution, and (iv) the changes in input-output coefficients. Obviously the calculation of these magnitudes requires the availability of input-output data for each country. If the data are available, two alternative measures to analyse these effects can be utilized. One is to analyse the growth of sectoral production by focusing on the absolute change in sectoral outputs, and the other is to analyse the structural changes in production by focusing on the deviation of sectoral output from balanced growth, which is defined as the divergence of the actual sectoral output from the hypothetical output obtained by assuming a proportional growth of all sectors at the growth rate of national income. We shall use both measures in the following analysis.

The analysis of the sources of growth from the demand side was initiated by Chenery (1960) and Chenery, Shishido and Watanabe (1962), and followed by a number of subsequent studies. Among these is an international comparative study of the sources of growth from the demand side undertaken by a group of World Bank researchers, whose results are summarized in Kubo and Robinson (1984) and Kubo, de Melo and Robinson (1986) among others. This study is useful for our

discussion of the relationship between resource endowments and development patterns, since it includes some of the most rapidly growing resource-rich and resource-poor economies listed in Table 1. These are Korea, Taiwan, Japan, Israel, Norway, and Yugoslavia for the resource-poor economies, and Colombia, Mexico, and Turkey for the resource-rich countries. For the purpose of our discussion, we shall rely on the decomposition results presented in Kubo and Robinson (1984) and Kubo, de Melo and Robinson (1986), supplemented with background data.

In Tables 2 and 3, we have reproduced the sources of growth results for nine sample economies. The results in Table 2 summarize the changes in the structure of production observed in the nine economies and also the factors that brought about these changes.[5] The rate of growth of the manufacturing output was most rapid in Taiwan, Korea, Japan and Israel, with an average annual growth rate exceeding 12%, while in the other countries, the rate of growth was more moderate at 5 – 8% per annum. The second column presents the output deviation from balanced growth as percentage of the change in aggregate output of each economy. Hence, these figures should not be compared across countries but only within the respective sectors of the economy in each country. Recall that the output deviation figures in the second column are obtained by subtracting from the actual output figure the hypothetical output obtained by assuming that all sectors grow proportionately at the growth rate of national income. Hence, a positive entry in this column indicates that the sector in question has expanded relative to other sectors during the period, and a negative entry indicates that the sector in question has contracted. As we can see, in every country, the primary sector declined and the manufacturing sector expanded rapidly, with the services sector expanding or contracting depending on the cases.

The causes of this relative expansion and contraction are given in the last four columns. It is generally observed that the slower than average growth of the demand for primary products and the faster than average growth of the demand for manufactured products is one of the important factors underlying the relative contraction and expansion of the primary and the manufacturing sectors, respectively. In other words, one of the important reasons for the relative fall and rise of the primary and manufacturing sectors is the difference in the income elasticities of the demand for these products. In turn, in Israel, Japan, Korea, Norway, Turkey, Taiwan, and Yugoslavia, export increase was also an important factor behind the rapid expansion of the manufacturing sector. Indeed, in Israel, Korea, Norway, and Taiwan, contribution of this factor to the relative expansion of the manufacturing sector was more than 80%, while in Japan and Turkey, its effect was more modest at about 20%, with Yugoslavia falling in between at about 50%. In contrast, in Colombia, Mexico, and to a lesser extent, in Turkey, the combined effects of import substitution and the changes in input-output coefficients accounted for a large part of the expansion of the manufacturing sector, namely 83%, 67% and 48%, respectively. Thus, the manufacturing sector of the resource-poor countries in this sample can be said to have grown more by the increase in their

Table 2. SOURCES OF OUTPUT DEVIATION FROM BALANCE GROWTH

(%)

Production Category by Economy	Average Output Growth Rate	Output Deviation	Sources of Output Deviation			
			Domestic Demand Expansion	Export Expansion	Import Substitution	Change in Input Coefficients
Colombia (1953–70)						
Primary	4.5	−3.7	−7.9	3.8	0.3	0.1
Manufacturing	8.1	16.1	1.4	1.4	7.8	5.6
Services	5.5	1.9	−0.8	1.2	0.4	1.0
Mexico (1950–75)						
Primary	4.8	−5.8	−2.3	−2.6	−0.2	−0.7
Manufacturing	7.7	10.1	3.5	−0.2	4.3	2.5
Services	6.4	1.0	0.5	−0.5	0.6	0.5
Turkey (1953–73)						
Primary	2.5	−17.9	−11.4	−1.3	0.2	−5.4
Manufacturing	8.0	16.4	5.6	2.1	2.4	6.3
Services	6.7	9.1	3.8	1.8	0.2	3.3
Republic of Korea (1955–73)						
Primary	5.7	−11.3	−7.7	1.8	−2.3	−3.1
Manufacturing	15.8	27.5	4.7	21.1	1.4	0.2
Services	10.3	4.6	0.9	4.3	0.2	−0.7
Taiwan Province (1956–71)						
Primary	7.1	−7.6	−4.2	1.5	−2.7	−2.2
Manufacturing	16.2	28.2	0.7	20.1	3.5	3.9
Services	9.7	−2.0	−4.5	3.5	0.1	−1.2
Japan (1955–70)						
Primary	2.2	−7.6	−3.2	−0.2	−1.9	−2.4
Manufacturing	13.3	12.6	5.0	2.8	−1.2	5.9
Services	11.4	1.0	−1.0	1.2	−1.0	1.7
Israel (1958–72)						
Primary	6.4	−3.5	−4.2	1.6	−0.4	−0.5
Manufacturing	12.5	13.4	6.9	11.9	−10.1	4.8
Services	8.9	−4.4	−9.3	7.6	−1.9	−0.8
Norway (1953–69)						
Primary	2.5	−4.7	−3.1	0.1	−2.0	0.3
Manufacturing	5.2	7.7	−1.6	12.4	−9.2	6.0
Services	4.8	6.2	−0.8	9.3	−3.1	0.8
Yugoslavia (1962–72)						
Primary	2.6	−17.7	−10.3	1.8	−3.9	−5.4
Manufacturing	12.1	21.1	13.6	10.9	−10.1	6.8
Services	8.8	4.6	4.5	1.4	−1.5	0.3

Source: Kubo and Robinson (1984), updated by background data of Kubo, de Melo, and Robinson (1986).

exports, while that of the resource-rich countries tended to have grown more by import substitution and changes in the intermediate input technology.

In Table 3, the sources of growth of the manufacturing output are further analyzed for the available subperiods for each economy. Here, the decomposition was performed on the basis of the absolute change in the manufacturing output and the results are expressed as percentage of the output change. Hence, the entries in the last four columns add up to 100% except for rounding. This measure should be interpreted as reflecting the driving force of the manufacturing production. The most important point in this table is that in all countries except for Norway and Yugoslavia, there was a subperiod in which import substitution contributed significantly to the manufacturing output growth. This is particularly evident for Korea and Taiwan, and less for other countries. During these subperiods, the effects of the changes in input-output coefficients were also important for the growth of the manufacturing output, reflecting the effects of intermediate demand shifts toward manufactured products and the increased specialization in production processes. The combined effects of import substitution and the changes in input-output coefficients accounted for more than a quarter of the manufacturing output growth in Colombia, Japan, Mexico, Korea, and Taiwan, and 15 – 20% in Israel and Turkey.

Another point to note from this table is that the contribution of export expansion to the growth of the manufacturing output increased substantially in the subsequent periods in Korea, Taiwan, Japan, and Israel. Indeed, in Korea and Taiwan, about 60% of the change in the manufacturing output was due to export expansion during the final subperiod. In Israel, Norway and Yugoslavia, the contribution of export expansion was also substantial, but a part of this effect was offset by the large negative contribution of import substitution, indicating an increased reliance on some of the foreign produced manufactured products. In contrast, in Colombia and Mexico, we do not observe, as in other countries, a period in which export expansion contributed significantly to the growth of the manufacturing output after the import substitution period. Turkey, with her minor export contribution in the final period, is an intermediate case, but we may classify this country into this group.

The observations for the two groups of countries together suggest that, in resource-poor countries, the nurture of the domestic production capability during the import substitution period is an important step to develop alternative sources of exportable commodities, and the subsequent export expansion period reflects the period in which substitution of traditional exports by newly developed manufactured products is taking place. Thus, the experience gained in catering to the domestic market during the import substitution period appears to contribute to the development of competitiveness which is a prerequisite to a successful export drive. In a country where the existing source of foreign exchange are not very reliable or stable, some way of securing alternative sources of foreign exchange would certainly be needed to support the importation of advanced industrial products and other commodities. Hence, *early export substitution* in resource-poor countries

Table 3. SOURCES OF CHANGE IN MANUFACTURING PRODUCTION

(%)

Period for Each Economy	Average Annual Growth Rate	Sources of Change			
		Domestic Demand Expansion	Export Expansion	Import Substitution	Changes in Input Coefficients
Colombia					
1953 – 66	8.3	60.3	6.8	22.1	10.8
1966 – 70	7.4	75.5	4.7	4.3	15.5
Mexico					
1950 – 60	7.0	71.8	3.0	10.9	14.4
1960 – 70	8.6	86.1	4.0	11.0	– 1.0
1970 – 75	7.2	81.5	7.7	2.6	8.2
Turkey					
1953 – 63	6.4	81.0	2.2	9.1	7.7
1963 – 68	9.9	75.2	4.5	10.4	9.9
1968 – 73	9.4	76.2	10.4	– 1.6	15.0
Republic of Korea					
1955 – 63	10.4	57.3	11.5	42.2	– 11.0
1963 – 70	18.9	70.1	30.4	– 0.6	0.1
1970 – 73	23.8	39.0	61.6	– 2.5	1.8
Taiwan Province					
1956 – 61	11.2	34.8	27.5	25.4	12.3
1961 – 66	16.6	49.2	44.5	1.7	4.6
1966 – 71	21.1	34.9	57.0	3.8	4.3
Japan					
1914 – 35	5.5	69.9	33.6	4.7	– 8.2
1935 – 55	2.8	70.9	– 7.1	15.5	20.7
1955 – 60	12.6	76.2	11.9	– 3.4	15.2
1960 – 65	10.8	82.3	21.7	– 0.3	– 3.7
1965 – 70	16.5	74.2	17.6	– 1.4	9.6
Israel					
1958 – 65	13.6	57.1	26.5	11.6	4.8
1965 – 72	11.3	75.7	50.0	– 36.5	10.9
Norway					
1953 – 61	5.0	65.2	36.4	– 16.0	14.4
1961 – 69	5.3	50.9	58.2	– 19.3	10.2
Yugoslavia					
1962 – 66	16.6	73.7	24.8	– 5.0	6.6
1966 – 72	9.1	72.2	37.6	– 22.2	12.5

Source: Kubo, de Melo, and Robinson (1986), Table 6.6, supplemented by background data.

can be viewed from this perspective. On the other hand, resource-rich countries do not need to export-substitute what they are currently exporting unless the resources underlying these primary commodities are expected to be depleted in the near future. Hence, there would be less pressure for the newly developing domestic industries to export substantial amounts of their products for the purpose of earning foreign exchange. In other words, whether or not there is a strong need

for developing alternative sources of foreign exchange at an early stage of development is considered to be a crucial factor for explaining the observed differences in the patterns of development among countries with different endowments of resources.

To summarize, the sequencing of import substitution and export expansion periods in industry-oriented countries can be viewed as indicating the imperative need for export substitution from traditional exports to nontraditional manufactured products in countries without abundant natural resources. The early rise of the manufacturing sector and the expansion of manufactured exports are necessary for these countries to make up for the lack of natural resources and develop a reliable source of foreign exchange in order to finance the required imports of capital and intermediate goods to support their industrialization and modernization efforts. From this point of view, the well-known emphasis on export promotion policy in resource-poor economies such as Japan, Korea and Taiwan appears to be a natural policy to follow, while the inadequate emphasis placed on promotion of manufactured exports in resource-rich countries such as Colombia and Mexico can also be understood on a resource-endowment basis. Thus, both the policy and the development patterns can be considered to result from the resource-endowment conditions of each country.

IV. Productivity Growth and Development Performance

The above analysis suggests that an early need for developing alternative exportable commodities in resource-poor countries and the absence of such imperative need in resource-rich countries is a possible source of the difference in the development patterns observed among primary-oriented and industry-oriented countries. That is, the need for early export substitution of traditional exports by whatever possible kinds of nontraditional manufactured exports appears to be the important reason for the rapid industrial expansion observed in resource-poor countries, while the absence of such need seems to be the underlying reason for the tendency for delayed industrialization in resource-rich countries. However, not all resource-poor countries manage to achieve such a rapid industrial growth as observed in some resource-poor countries. What then could be the reason for such differences in development performance? Some findings based on the analysis of the sources of growth from the supply side can shed some light on this aspect.

When viewed from the supply side, output growth is restricted by the growth of various inputs into production. Abstracting from the intermediate inputs and raw materials, the net output from the production processes can be considered to arise from the amounts of capital and labor inputs used in the production and the level of technology applied to combine these inputs. Hence, the growth of net output is attributable to the growth in real capital input, growth in real labor input, and the remainder which includes all the other influences that affect the output growth. The remainder term is what is called the total factor productivity

growth. There has been a host of literature presenting the estimates of total factor productivity growth rate for a variety of countries. Here for our purpose, the international comparative study of total factor productivity growth by Christensen, Cummings and Jorgenson (1980) is particularly useful.[6] They applied a common method of analysis for nine countries, which include Japan and Korea along with seven other developed countries. Hence, from the estimates obtained for Japan and Korea and from the conclusions drawn from international comparisons, we may gain some insights into the factors which contributed to the rapid economic growth achieved by these two resource-poor countries.

We have reproduced the results obtained by Christensen, Cummings and Jorgenson for Japan and Korea in Table 4. In this table, the growth of real product is decomposed into real input growth and total factor productivity growth. The real input growth is in turn obtained as a weighted average of growth in real capital input and real labor input. In their method, the changes in the quality of capital and labor inputs are incorporated in the estimates of real capital and real labor inputs, so that the value shown as total factor productivity growth is really an unexplained residual; that is, it is the part of the real output growth that can not be explained by growth in real factor inputs, whether it is associated with technological change, economies of scale, measurement errors, or other factors.

Based on the comparison of the results obtained for the nine countries, Christensen, Cummings and Jorgenson have drawn several important conclusions. Among them, the following two conclusions are of interest to our discussion: (i) "variations in average growth rates of real product among countries during the period 1960 – 73 are associated with variations in growth rates of real factor input." (p. 634); and (ii) "for the period 1960 – 73, very high average growth rates in real product are associated with high average rates of growth of both capital and labor input, and that low average rates of growth in real product are associated with low average rates of growth of both inputs." (p. 637)

These conclusions are useful in evaluating the results obtained for Japan and Korea. As we can see from Table 4, the growth rate of real product had been very high in Japan and Korea during the 1960 – 73 period (achieving an average annual growth rate of 10.9% and 9.7%, respectively). The observations made by Christensen, Cummings and Jorgenson suggest that there is an association between rapid growth in real product and the high rates of growth in real factor inputs in the two countries (6.4% and 5.5%, respectively). Moreover, they suggest that there is an association between the rapid growth in real output and the high rates of growth of both real capital and real labor inputs in the two countries. Although the relative growth of real capital and real labor inputs is significantly biased toward capital input in Japan and more balanced in Korea, when combined, they bring about a comparable rate of growth of real factor input in the two countries.

The proposed association between high rates of growth of real product and high rates of growth of real factor input is an important finding from the development point of view. If this proposition is valid, a high rate of growth of real product can be hoped for by achieving a high rate of growth of real factor input, which

Table 4. GROWTH OF REAL PRODUCT, REAL FACTOR INPUT, TOTAL FACTOR PRODUCTIVITY, AND CHANGES IN INPUT QUALITY, 1960–73

(%)

	Japan	Korea
Real product	.109	.097
Real factor input	.064	.055
Total factor productivity	.045	.041
Real capital input	.115	.066
Real labor input	.027	.050
Quality of capital stock	.030	.027
Capital stock	.085	.039
Quality of hours worked	.006	.012
Hours worked	.022	.038

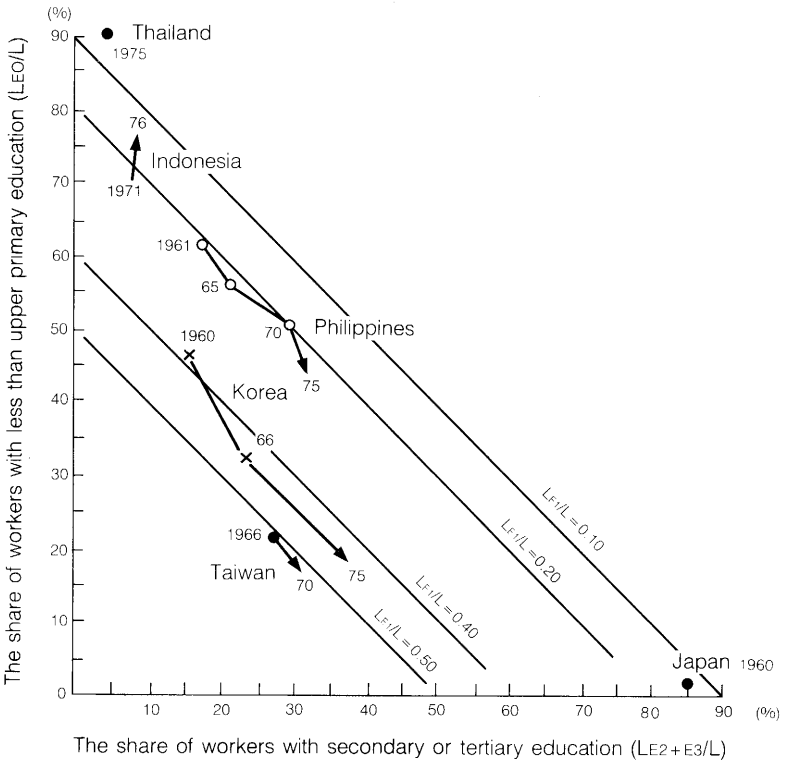
Source: Christensen, Cummings and Jorgenson (1980), Tables 11.11 and 11.13.

in turn can be achieved by realizing a high rate of growth of real capital input, or real labor input, or both. Hence, the factors affecting growth of these real inputs are essential for achieving a better growth performance. Christensen, Cummings and Jorgenson had decomposed the rate of growth of real capital and real labor inputs into the changes in the quantity and quality of these inputs. The results for Japan and Korea are also shown in Table 4. As we can see, both Japan and Korea had a rate of change of capital quality of about 3% during the 1960–73 period, which was found to be significantly higher than the rates observed in other countries. On the other hand, the rate of change of labor quality was very low in Japan (0.3%), but very high in Korea (1.2% per year). Thus, although the dominant factor contributing to the real input growth is the growth in the quantities of factor inputs, the change in the quality of capital was very important both in Japan and in Korea in bringing about the rapid growth of real capital input, and the change in labor quality was important in Korea for the rapid growth of real labor input.

The high rate of growth in the quantity of capital input confirms the importance of investments in economic growth. In turn, the high rate of change in capital quality suggests that increasingly advanced capital equipment is introduced in these countries in order to implement advanced modes of production. Since these are the countries which aimed at developing alternative exportable commodities as substitutes for the traditional exports, the rapid improvement in the quality of capital may be reflecting their efforts to increase their international competitiveness by acquiring more advanced modes of production.

As for the labor inputs, although the rate of change in labor quality in Japan is not a significant factor behind the growth of real labor input, its importance in Korea suggests that the level of labor quality may have an important bearing on overall growth performance. In this connection, an interesting comparative study on the education level and labor force was undertaken by Kaneko (1984). By using data from six countries in East and South East Asia, he examined the pattern

Figure 1. THE PATTERN OF CHANGES IN THE EDUCATIONAL COMPOSITION OF THE LABOR FORCE



Source: Kaneko: (1984), p. 54, Figure 1.

of changes in the educational level of the labor force and presented the results in a diagram which is reproduced in Figure 1. As we can see, Japan, Taiwan, and Korea stand out in the low proportion of workers with less than upper primary education and also in the high proportion of workers with secondary or tertiary education. Japan is an extreme case with 85% of workers having at least a secondary education and less than 5% with less than upper primary education already in 1960! In contrast, the countries other than Japan, Korea and Taiwan all had a higher proportion of workers having less than upper primary education and generally lower proportions of workers with secondary and tertiary education. These observations suggest that there is an association between rapidly growing countries and the level of education of their labor force. In fact, it can be said that in economies such as Japan, Korea, and Taiwan, a well-educated labor force is the only valuable resource that they have been endowed with, and they have made the best use out of this particular resource in their development efforts.

V. Concluding Remarks

In this paper, we started from a classification of countries into resource-rich and resource-poor countries and reviewed the past empirical findings on the differences in the patterns of development between these two groups of countries. The observed differences in the timing of industrial expansion were further analyzed by examining the sources of growth from the demand side to identify the factors contributing to the different growth patterns between the two types of countries. It was pointed out that the rapid industrialization in resource-poor countries may reflect the effects of a weak resource base, forcing these countries to develop an alternative export base to establish a reliable source of foreign exchange with which to proceed further in their efforts for industrial development. On the other hand, the availability of abundant natural resources as a source of adequate foreign exchange seems to underlie the tendency for the delayed industrialization in resource-rich countries. The actual policies pursued in these countries also appear to reflect the resource-availability conditions, so that both policy and development patterns appear to be associated with the resource endowments in each group of countries.

We have also investigated into the possible reasons for the success of some of the resource-poor countries, based on a recent analysis of the sources of growth from the supply side. The important finding reported by Christensen, Cummings and Jorgenson that there seems to be an association between high rates of growth of real output and high rates of growth of real factor inputs was discussed, which indicates a possible direction to proceed in order to attain higher rates of economic growth. In this connection, the importance of the high rates of change in the quality of capital input and the level of education or quality of labor force was pointed out. In fact, there seems to be an association between rapid economic growth and the level of education and quality of each country's labor force.

Although we have drawn inferences on the factors affecting the differences in the development patterns and development performance, our results have been based on the data available from the previous studies. In the future, additional studies that can provide a further basis to validate these inferences would be extremely valuable, especially studies on the relationship between the improvement in capital quality and export performance in resource-poor countries, and also on the role of education in economic development.

NOTES

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1. The precise definition used by Chenery and Taylor (1968) is slightly different from this and the above description corresponds better to the modified methodology used by Chenery and Syrquin (1975) and (1986). However, this exposition is maintained here in order to keep the description simple.
2. Although Chenery and Syrquin (1986) presents trade orientation indexes for both 1965 and 1975, we took 1975 figures since they are more recent estimates. For the purpose of later analysis, Norway was included in the table based on the classification given in Chenery and Syrquin (1975).
3. Among the economies classified as small industry-oriented in Chenery and Taylor (1968), Algeria, Chile, Guatemala, Peru, Tunisia and Uruguay are reclassified as primary-oriented, and Kenya is reclassified as industry-oriented in this classification.
4. For a description of the specific methodology, see, for example, Kubo, Robinson and Syrquin (1986).
5. There are alternative approaches to measuring the total factor productivity based on the gross output production function rather than assuming net production function. A number of studies based on this methodology have been undertaken. See, for example, Nishimizu and Robinson (1984). However, since the separation of real factor input growth rate into quality and quantity change in Christensen, Cummings and Jorgenson is useful, we shall resort to their results in our discussion.

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