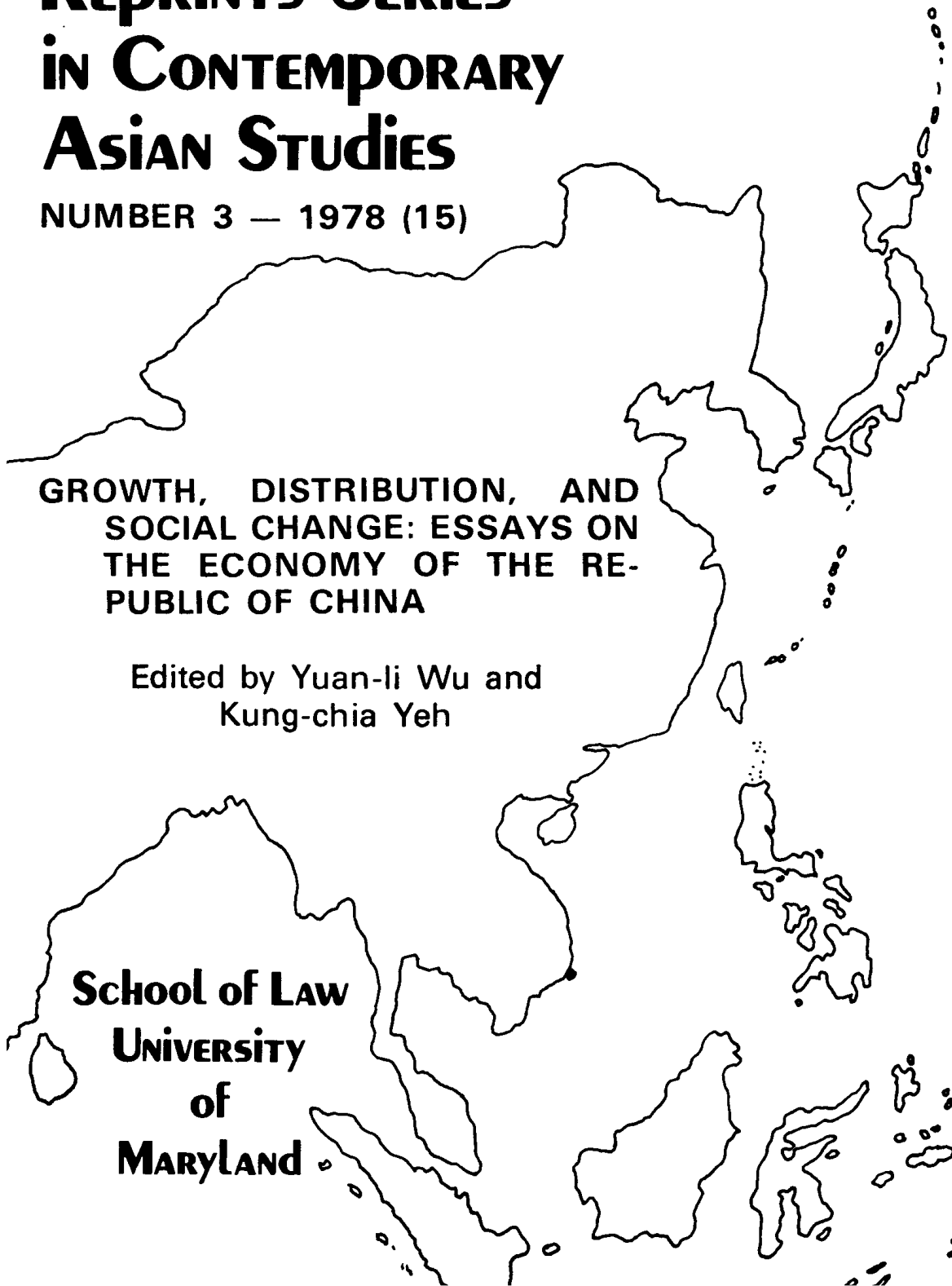# Occasional Papers/ Reprints Series in Contemporary Asian Studies

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GROWTH, DISTRIBUTION, AND SOCIAL CHANGE: ESSAYS ON THE ECONOMY OF THE RE- PUBLIC OF CHINA

Edited by Yuan-li Wu and Kung-chia Yeh

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Occasional Papers/Reprints Series in Contemporary Asian Studies

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IN MEMORY
OF
PROFESSOR AND MRS. TA-CHUNG LIU

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PREFACE

The economic transformation of the Republic of China in Taiwan from a semicolonial to a rapidly growing and prosperous economy within two decades is an accomplishment that has few parallels in the history of world development. Today Taiwan is not only a key member of the economic community of the Pacific Basin, but also a major trading partner of many developed nations and a model of development for other developing economies.[1] To many government administrators, scholars, and businessmen who maintain a keen interest in Taiwan's changing roles, two crucial and interrelated questions arise: How did the transformation occur, and will Taiwan be able to sustain its phenomenally high growth rate in the future? The latter question is especially timely because the economic security of Taiwan has always been highly dependent on external circumstances, and in recent years international developments have repeatedly turned against the Taiwan economy. The abrupt change in U.S. and Japanese policy toward Peking since 1971 was a major diplomatic setback to the Republic of China and generated widespread concern over Taiwan's economic future. In the aftermath of the worldwide energy crisis, Taiwan had to face strong inflationary pressures and mounting protectionist sentiments abroad. At this moment, even more diplomatic storms loom over the horizon. Will the Taiwan economy encounter problems so severe and intractable that high rates of growth can no longer be sustained? Clearly the question for the future is not independent of those for the past. To provide a better understanding of Taiwan's development experience and its economic prospects, the present volume brings together six essays that address various aspects of these two problems.

The introduction outlines some preliminary thoughts on the lessons of Taiwan's development as reflected in the major economic challenges and Taiwan's responses. The first chapter presents an overview of Taiwan's growth record, the distinctive features of the development process, and the principal sources of growth. Because growth of output is only one, although an important, aspect of economic progress, Chapter II deals with a key element that is closely related to the economic welfare of the people, that is, the changing distribution of income in the growth

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1. For editional convenience we use the names the Republic of China, ROC, and Taiwan interchangeably in this study. Likewise, Communist China, the People's Republic of China, and PRC are used interchangeably.

process and its implications for future growth and political stability. Chapters III through V discuss three important aspects of Taiwan's development strategy: agricultural growth, external economic relations, and the development of human resources. Because this study is a collection of essays by different authors, there are inevitably some duplications and major gaps that we have not been able to remedy.

Several features distinguish this study from others in the literature and should make it more useful to those concerned about Taiwan's economic future. First, the analysis is set in a comparative framework. The development experiences of five major Asian economies (South Korea, the Philippines, Japan, Mainland China, and India) are used as a background against which we observe and assess the record of Taiwan's performance. The selection of these economies as bases of comparison is not arbitrary. Although these six economies differ markedly in size, natural resource endowment, economic organization, extent of reliance on external trade, stage of economic development, and their strategic positions and historic heritages, it still seems fair to say that a high rate of growth of per capita output has been the most important single national goal for all these countries. It should be of interest to relate their economic performances to the different development paths they follow, the different value systems and institutional frameworks, or to the various constraints each must face. Second, special emphasis has been placed on noneconomic factors to underscore our basic precept that economic growth can best be understood if we take into account the political, social, and strategic factors as well as the economic. Finally, this study is specifically designed for the general public and not for professional economists.

In the preparation of this study we are indebted to numerous persons for comments and suggestions regarding various parts of the manuscript, particularly Professors Yu-chu Hsu of National Cheng-chih University, Wan-yung Kuo, Kuo-shu Liang, Chien-sheng Shih, Chun Sun, Tso-yung Wang, all of National Taiwan University; and Tzong-shian Yu of the Academia Sinica. We wish to also thank Mr. Chi-cheng Chang (Secretary General of the Executive Yuan), Mr. Kwang-shih Chang (Vice Minister of Economic Affairs), Mr. Kan Lee (Director of the Central Bank of China), Ms. Carolyn Lee (The Rand Corporation), Mr. Kuo-ting Li (Minister without Portfolio), Mr. Shih-cheng Liu (Vice Minister of Economic Affairs), Mr. Y. C. Liu (Chairman of China Sea Products Development Corporation), Mr. Yun-suan Sun (Minister

of Economic Affairs), Mr. Yien-si Tsiang (member of the Joint Commission on Rural Reconstruction), Mr. M. T. Wu (Director of Investment and Trade Office, New York), Mr. Wan-an Yeh (Economic Planning Council), and Mr. Kuo-hwa Yu (Governor of the Central Bank of China), for their comments and stimulating discussions. Finally, we are grateful to Prof. Hungdah Chiu of the University of Maryland School of Law for his efforts in expediting the publication of these essays and to Ho-I and Pyng-Pyng Wu for their preparation of the index.

But it is the authors, not the organizations or individuals who have so generously helped them, who are responsible for the views expressed in this study.

Y. L. WU	K. C. YEH
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January 1, 1978

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INTRODUCTION

YUAN-LI WU

To understand the course of Taiwan's economic development in the last 25 years, we need to bear in mind that the activities of individuals—including both those who make policy and the ordinary consumers and producers—are influenced, if not fully determined, by the internal and external environment they perceive, their objectives and priorities, and their ideological, cultural and historical background. It is only when we bear in mind the sources of these influences that we can understand why the ROC government in Taiwan has adopted certain policies at certain times, why they have refrained from doing certain other things, and why the population has responded in a particular manner and taken certain initiatives of its own. The behavior of private producers and consumers in Taiwan has also been profoundly influenced by their experience during the post-World War II inflation and, for a segment of the population, by life under Japanese rule before 1945. A combination of these circumstances has made possible the remarkable economic performance of Taiwan in the last quarter century.

The constraint imposed by certain physical factors is obvious. Taiwan is an island economy with limited natural resources, with the exception, relatively speaking, of land resources during the early phase of its economic development when the population was much smaller than it is now. Its sustained economic development must therefore be predicated upon the utilization of natural resources located in other countries and on the creation of new and sometimes intangible resources. Since acquisition of foreign resources and their products cannot be continued in the long run except through imports that have to be paid for, development of the island can proceed indefinitely only on the basis of foreign trade and export promotion. Import substitution would take much longer before it could bring about the same degree of development, and it would be easier to pursue at a later stage of development. For the beginning, and at any rate for Taiwan, export promotion is a much faster and surer way of entry into sustained economic growth.

Export expansion is not without its preconditions. To be able to export requires knowledge and availability of external markets. Furthermore, production must be at an adequate level and the economy must have sufficient capacity for expansion before

exports can develop on any scale. Since an abundant resource available on the island in the beginning was labor, the most natural development was the type offered by "export processing zones." Here foreign investors would bring in their technical know-how, raw material, and intermediate goods, which Taiwan does not possess, for processing with the aid of labor that was cheaper than they could hire elsewhere. Then the finished products were exported by the same investors who had a preconceived and prearranged export market to begin with. When the labor became less abundant and, therefore, more expensive, new resources had to be developed so the country could regain its comparative advantage for export promotion. At a later stage of development, which corresponds to the present time for Taiwan, new labor resources that are qualitatively at a more advanced level must be created through upgrading by education and training. Sustained economic growth must, in the long run, be predicated on the proper coordination of manpower development with economic policy. This leads to considerations of educational and manpower policy, reversal of the "brain drain", infusion of technology from overseas, etc., as part and parcel of the gradual restructuring of the economy.

Furthermore, as the island becomes more developed and domestic demand increases, the domestic market will be more able to absorb sales of new products. At the same time, as the number and size of productive enterprises increases, the relative importance of intersectoral, or intermediate, demand will also increase. Thus the time will come, and it may already have, when a greater degree of import substitution in the form of producing domestically more and more goods that would provide both forward and backward linkages and that were previously imported can be profitably pursued. (Import substitution does not mean the exclusion of imports.) This shift in emphasis is, however, only relative because total exports must continue to be expanded even though their content will change in the direction of a larger percentage of goods with higher value added per unit of sales than before, and so will the content of total imports.

What constituted the most likely items on Taiwan's export list in the beginning of the post-war period? Since the island's major prewar exports were sugar, rice, pineapples, and other agricultural products, one would expect these same primary exports to constitute the core of the island's exports while new exports would also emerge in the agricultural field. This historical factor was compounded by the fact that at the time of the transfer of both

government institutions and trained manpower from the mainland to Taiwan in 1949, there was a sizable inflow of agricultural technicians and researchers who were connected with the former National Bureau of Agricultural Research and whose employment was continued through U.S. aid. At that time, overall U.S. aid to the ROC had been suspended with the exception of a small amount that was still in the pipeline. This aid enabled the researchers on food and agriculture to move to Taiwan and, fortunately for Taiwan, there happened to be a sizable pool of such talents that had emerged during the prewar and wartime development of applied agricultural research in China. Assured of employment, these specialists were able to apply their talents to work on Taiwan which increased productivity, controlled pests and insects, and developed agricultural extension. Fortunately again for Taiwan, the island's farmers had been well organized, disciplined, and trained while under Japanese rule, in the use and acceptance of new farming techniques. Communication between the farmers and the technicians was readily established and successfully maintained. This combination of circumstances, which one can only attribute to the vagaries of history, provided a favorable climate for the development of new agricultural exports and a general increase in farm output.

When the ROC government moved to Taiwan, it correctly attributed its own defeat on the mainland partly to the Chinese Communist Party's successful strategem of gaining both domestic and foreign support by cloaking itself in the mantle of agrarian reform. The Nationalists, having learned this bitter lesson, were now ready to carry out agrarian reform in Taiwan in a way that they had advocated in their party platform but had never been able to enforce while they still ruled the mainland. The successful land reform of the early 1950s inevitably reduced the average size of farm holdings. This could have had a negative effect on productivity but for the offsetting influence provided by the agricultural researchers, as well as the stimulus of new land ownership to former tenant farmers. Consequently, land redistribution in Taiwan was accompanied by an increase in productivity and by the restoration of agricultural exports and the expansion of new farm exports. Land reform, increasing agricultural production, expansion of agricultural exports and later of processed agricultural goods for export all combined to increase overall exports in the early phase of Taiwan's economic development. Political theorists argue that one can never really expect any group of people in a position of authority to adopt policies

that are seriously detrimental to their own economic interests. This is not to say that individuals can never rise above personal considerations. However, in the case of Taiwan, the government that enforced the land reform program and redistributed private property in land came from the mainland, and members of that government were not landowners in Taiwan. Consequently, consideration of private personal interest could not have affected their decisionmaking, and whatever they might have done in other circumstances is immaterial. This historical political fact has also worked in favor of Taiwan's economic development.

Still another lesson of the past that both the policymakers and the older members of the population have learned is the devastating effect of galloping inflation as well as the potential of an incipient inflation to get out of control. The ROC government on Taiwan has continuously stressed that economic stability is a national goal equally as important as rapid economic growth. During the hyperinflation on the Chinese mainland before 1949, the accelerating depreciation of the Chinese currency in terms of foreign exchange was widely regarded as an indicator of inflation in general and was exploited by speculators who benefited from instability. This explains the reluctance of the ROC authorities in the 1950s to adjust the official exchange rate to a more realistic level or to relax exchange controls until the end of that decade. By the time exchange and trade controls were relaxed, which benefited Taiwan's exports, there had been a prolonged period of reasonable price stability. Apparently, the body politic had by then recovered from the inflation psychosis of the late 1940s. One can always argue about the timing of the 1960-61 exchange reform, but these historical circumstances explain the delayed decision of the ROC government to adopt measures that were soon to prove eminently successful in promoting exports.

It is in the same light that one should regard the current reluctance of the ROC government to allow the New Taiwan dollar to be untied from the U.S. dollar and float on its own. It also explains why the ROC authorities habitually resist the idea of either devaluing or revaluing the New Taiwan dollar against the U.S. dollar. There still is a lingering concern that the public might regard changes in the foreign exchange value of the currency as an indication of monetary instability. This concern has been magnified by the experience of the price hikes made necessary in early 1974 following the quadrupling of the international price of crude oil, which Taiwan must import. The oil price hike and long years of development and demand

expansion had finally made the raise in domestic prices inevitable, and the authorities felt constrained to reemphasize their dedication to economic stability.

One cannot overestimate the importance of U.S. economic aid—both commodities and project aid—in the stabilization of prices and the reconstruction and initial development of the economic infrastructure during the 1950s. Nor can one overestimate the effect of confidence provided by the U.S. security shield on economic development and stabilization. Initial reluctance notwithstanding, in the end, the ROC government did gather enough courage to institute exchange reform in the beginning of the 1960s, and the policy was a success. Together with reconstruction and expansion of the economic infrastructure with U.S. aid, the exchange reform of 1960–61 and the removal of restraints on private business succeeded in bringing about rapid economic growth. Consequently, when U.S. aid was finally ended in 1965, this potential shock was met by a renewed upsurge of the economy and unprecedented expansion of exports. Confidence was now building up until the oil crisis again dealt Taiwan a severe economic blow. However, by then the Taiwan economy was able to demonstrate a high degree of resilience so that after a short recession, economic growth was resumed in the latter half of 1975, and new economic heights were scaled in 1976.

The Nationalist government that established itself in Taiwan is obviously against the type of command economy practiced on the Chinese mainland. At the same time the Nationalists are not advocates of laissez-faire. They have tried time and again to intervene in the economy, to maintain economic stability, to promote greater equality in the distribution of income, and to guide economic development in the direction of agricultural expansion and then in industrial development—first in the promotion of exports and more recently in the restructuring of foreign trade. Fortunately, however, the ROC authorities have opened up the economy to private efforts and have restricted government economic activity to a limited area of public enterprise and state monopolies. They have also restricted government intervention primarily to the maintenance of price stability and the promotion of greater equity. Taiwan's economic progress and future, therefore, owe a great deal both to government efforts and to the deliberate limitation of these efforts to certain areas. One may argue about the appropriateness of timing of different policies, but the authorities' ability to learn from the

past and their increasing readiness to face new issues and problems as they arise cannot be gainsaid.

Throughout the past quarter century, the theme of national survival has run through all government policies. Survival in the long run is predicated upon economic growth, the maintenance of relative stability, and the good measure of general consensus through a widely shared sense of equitable distribution of income and wealth. Growth has always been a primary objective, as has stability. In recent times, however, more and more emphasis has been given to equity and to the uplifting of those segments of the economy and population that have lagged behind in the general advance of the last decades. Somehow the above approach to economic development has succeeded; it would seem to create a sufficiently broad consensus in Taiwan to have galvanized the private sector into a notable economic performance, some aspects of which are described and analyzed in the following essays. Even in the post-oil crisis era of widespread uncertainty, cautious optimism seems more than justified in future projections for Taiwan.

Chapter I

ECONOMIC GROWTH: AN OVERVIEW

KUNG-CHIA YEH

Taiwan emerged from the Second World War a backward, war-torn economy. In six years, it more or less restored its prewar productive capacity. During the following two decades, it has become one of the fastest growing economies in the world, and its living standard has risen far above levels prevalent in most Asian countries. This paper examines the various macroeconomic dimensions of the transformation that have taken place since 1952, and compares Taiwan's performance with those of five other Asian economies: Japan, South Korea, the Philippines, Communist China, and India.[1] The purpose is to lend a broader perspective to Taiwan's economic growth by comparing it with economies that are similar or different in resource endowment, organization and institutions, scale and stage of development, and objectives and strategy of development.

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1. This paper draws heavily on a number of excellent studies on Taiwan's economic development. Foremost among them are: Kuo-wei Chang (ed.), *Taiwan ching-chi fa-tsan* (Economic Development in Taiwan), Taipei: Cheng-Chung Book Co., 1967; Cheng-hsuing Chiu (ed.), *Taiwan ho-pi yu chin-yung lun-wen-chi* (Studies in Money and Finance in Taiwan), Taipei: Lien-ching Publishing Co., 1975; Mo-huan Hsing, *Taiwan: Industrialization and Trade Policies*, London: Oxford University Press, 1971; Anthony Y. C. Koo, *The Role of Land Reform in Economic Development: A Case Study of Taiwan*, New York: Praeger, 1968; Shirley W. Y. Kuo, *The Economic Structure of Taiwan 1952-1969*, Taipei: Graduate Institute of Economics, National Taiwan University, 1970; Teng-hui Lee, *Intersectoral Capital Transfer in the Economic Development of Taiwan-A Case Study* (Ph.D. dissertation, Cornell University, 1968); Kuo-shu Liang, *Foreign Trade and Economic Development in Taiwan 1952-67* (Ph.D. dissertation, Vanderbilt University, 1970); Douglas S. Pauuw and John C. H. Fei, *The Transition in Open Dualistic Economics*, New Haven: Yale University Press, 1973; Tzong-shian Yu, "An Econometric Model for Taiwan's Economy," *Journal of the Chinese Statistical Association*, March 1970, 2892-2909; and papers in the two conference volumes, *Conference on Economic Development of Taiwan*, Taipei, 1967, and *Conference on Population and Economic Development in Taiwan*, Taipei: Institute of Economics, Academia Sinica, 1976, especially those by Kwoh-ting Li and Wan-an Yeh, "Public Policy and Economic Development on Taiwan," *Conference on Economic Development of Taiwan*, Taipei, Taiwan, 1967, 27-51, Kuo-shu Liang, "Trade and Policy in Taiwan, 1952-1965," *Conference on Economic Development of Taiwan*, Taipei, Taiwan, 1967, 239-277 and; K. T. Li, *The Experience of Dynamic Economic Growth on Taiwan*, Taipei: Mei Ya Publications, 1976.

Economic performance can be measured in a number of ways depending on the specific criterion of performance.[2] For the present purpose, we have selected three basic criteria to assess the achievements of Taiwan's economy: growth, stability, and welfare.[3] These are not the only, nor necessarily the ultimate goals of economic development, but they clearly are fundamental to economic progress, however defined.

Section I focuses on the growth of total and per capita product, and on stability of the growth rates and domestic prices. Section II discusses structural changes in the economy. The level and pattern of private consumption are examined in Section III. Section IV traces the sources of rapid economic growth. A summary of the main findings is given in Section V.

I. ECONOMIC GROWTH AND STABILITY

Growth of Total and Per Capita Product

The most common yardstick for evaluating economic performance is the growth of real gross national product.[4] Figure 1 shows changes in Taiwan's GNP, population, and per capita product in 1952-72.[5] The tremendous growth of total output since

2. For a variety of indicators of socioeconomic change, see Irma Adelman and Cynthia T. Morris, *Society, Politics and Economic Development*, Baltimore: Johns Hopkins Press, 1967; United Nations Research Institute for Social Development, *Contents and Measurement of Socio-Economic Development*, Geneva, 1970; Nancy Baster, "Development Indicators: An Introduction," *Journal of Development Studies*, April 1972, 1-20; Dudley Sears, "What are We Trying to Measure?" *Journal of Development Studies*, April 1972, 21-36; Donald McGranahan, "Development Indicators and Development Models," *Journal of Development Studies*, April 1972, 91-102; Charles L. Taylor and Michael C. Hudson, *World Handbook of Political and Social Indicators*, Second edition, New Haven and London: Yale University Press, 1972; Milton Moss (ed.), *The Measurement of Economic and Social Performance*. Studies in Income and Wealth, Vol. 38, New York: National Bureau of Economic Research, 1973.

3. Welfare is a rather elusive concept. It is used here loosely to mean the quantifiable material well-being of the people.

4. The conceptual limitations of GNP as a performance indicator have been extensively discussed in recent years. See especially Moss, *op. cit.* Nonetheless, for all practical purposes, GNP remains the most useful single indicator. Its shortcomings, of course, should be borne in mind.

5. Data underlying this chart refer to GDP in constant 1971 prices and are taken from *Statistical Yearbook 1975* pp. 194-195; and *Monthly Bulletin*, November 1976, p. 18. In general, there are two conceptually different measures of total product: gross national product (GNP) and gross domestic product (GDP). GNP refers to total output attributable to the factors of production supplied by the nationals of Taiwan; GDP refers to total payments from abroad. GNP is the appropriate measure of its productive capacity. Furthermore, an economy is often
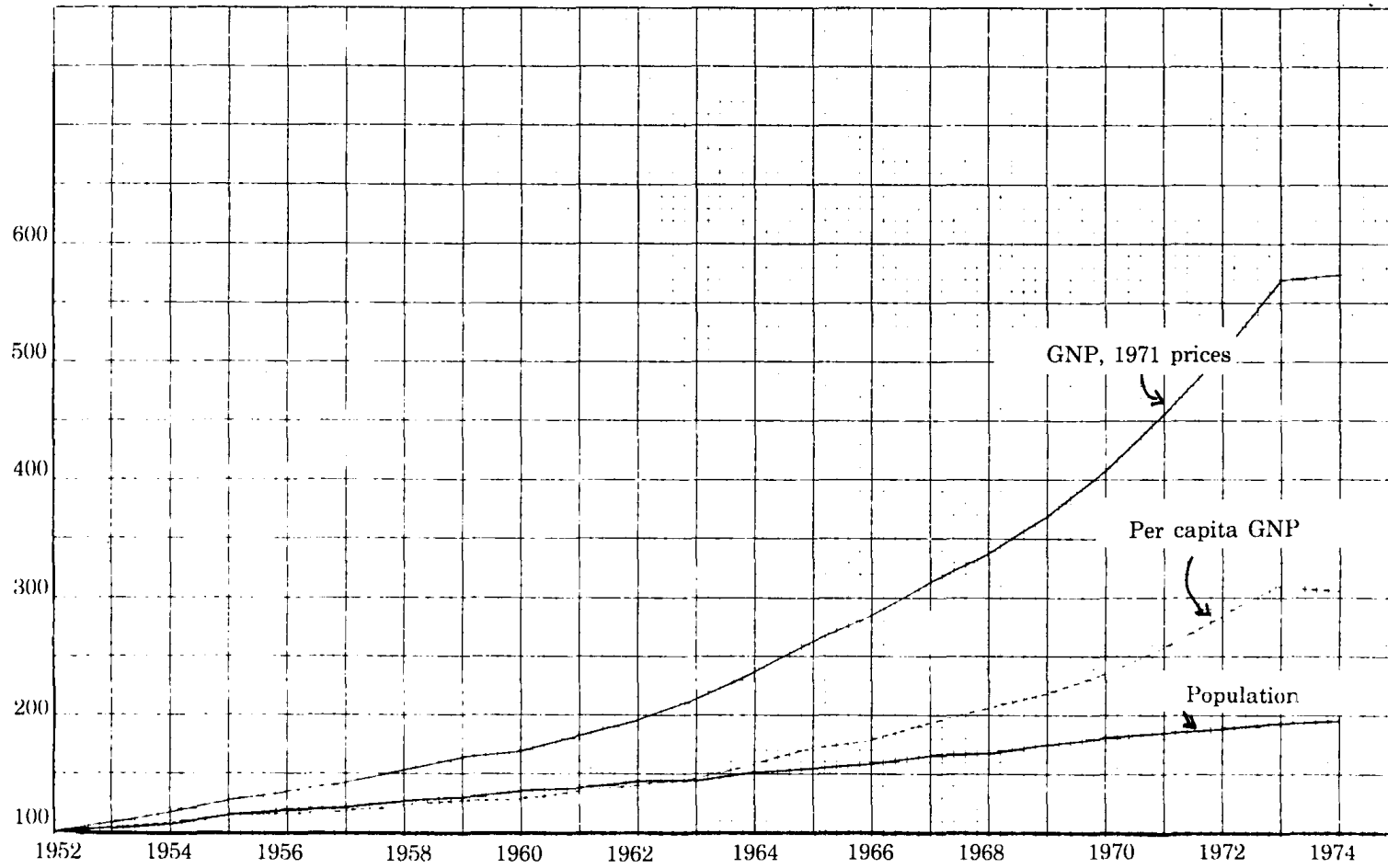
Figure 1. Indexes of Real GNP, Population, and GNP per Capita

1952 is unmistakable. By 1972, GNP rose to more than five times its initial level, and per capita GNP was 186 percent higher than in 1952. Growth was continuous throughout the period and has actually accelerated since the early 1960s. The oil crisis in 1973 and its disruption of the world economy also brought a halt to Taiwan's growth in 1974, but since 1975 the economy has been turning upward again.

Table 1. Rates of Growth of Population and
GNP, 1952-1972†

	1952-72	1952-60	1960-65	1965-72
GNP per capita				
Republic of China	5.6	3.6	6.4	7.3
Japan	8.5	7.2	8.8	9.5
South Korea	4.8	2.7	3.6	8.4
Philippines	2.7	3.1	1.6	2.9
Communist China	3.3	3.6	2.9	3.3
India	1.3	1.8	0	1.8
GNP††				
Republic of China	8.8	7.2	9.6	10.1
Japan	9.6	8.3	9.8	10.8
South Korea	7.2	4.9	6.4	10.3
Philippines	5.7	6.2	5.0	5.6
Communist China	5.6	6.0	4.7	5.7
India	3.5	3.8	2.6	3.9
Population				
Republic of China	3.2	3.6	3.2	2.8
Japan	1.1	1.1	1.0	1.3
South Korea	2.4	2.2	2.8	1.9
Philippines	3.0	3.1	3.4	2.7
Communist China	2.2	2.3	1.8	2.3
India	2.2	2.0	2.6	2.1

operating below its full capacity. For some purposes, potential GDP (or GNP) — i.e., full employment GDP — should be used. In the present case, GNP and GDP for Taiwan do not differ very much and can be used interchangeably for most purposes.

† The initial year for South Korea is 1953.

†† For Republic of China, the growth rates are based on gross national product in constant market prices of 1966; for Japan, South Korea, and Communist China, gross national product in constant prices; for the Philippines and India, net domestic product at constant factor cost.

Source: Economic Planning Council, Republic of China, Taiwan Statistical Data Book 1974, 1975, pp. 4, 19; United Nations, Yearbook of National Accounts Statistics, 1969, New York, 1970, Vol. III, pp. 175-177; id., 1973, 1975, pp. 152-153; United Nations, Demographic Yearbook 1970, New York, 1971, pp. 128-131; id., 1973, p. 103; Joint Economic Committee, China: A Reassessment of the Economy, U.S. Government Printing Office, 1975, pp. 42-43.

To show how fast the Taiwan economy has been growing compared with other countries, Table 1 presents the average rates of growth of GNP, population, and per capita product for Taiwan and five selected Asian countries in 1952-72 and three subperiods.[6] The year 1952 has been selected as a base point for appraisal mainly because by then the economies had fairly well recovered from the war and were entering a new phase of economic growth. In Taiwan, the land reform program initiated in 1951 was just about completed. Agricultural output had regained its prewar peak. The focus of U.S. aid, which began flowing in soon after the Korean War, now shifted from rehabilitation to expanding social infrastructure and agriculture. For Communist China and India, the year 1952 marked the period immediately before they both launched their first five year plans. In Korea, the war had by then stabilized, and rehabilitation and growth got underway soon afterward. The choice of 1972 as the terminal point is not a compelling one; indeed, a more recent year might have been preferred. However, it was the last year before the worldwide economic disruptions caused by the oil crisis in 1973 and thus provides a convenient vantage point from which to take stock of developments in the last two decades.

The striking feature suggested by Table 1 is the rather high growth rate of Taiwan's per capita income of 5.6 percent per year since 1952, which exceeded those in all other countries except Japan. In particular, Taiwan's growth rate is much higher than those of the Philippines, Mainland China, and India. The rapid growth of Taiwan's per capita income is all the more remarkable if one notices that Taiwan's population increased very rapidly

6. The measures of total product for the six countries are not uniform. Some represent gross domestic product, others refer to gross national product. Some are net, others are gross of capital consumption. Some are based on constant market prices of a certain year, others are based on constant factor cost of another year. Even if uniform measures were available, international comparisons of rates of GNP growth would still be beset with numerous conceptual and statistical difficulties. For a brief discussion of these complexities, see Simon Kuznets, *Economic Growth of Nations*, Cambridge, Mass.: Belknap Press, 1971, pp. 3-10. In the present case, varying degrees of statistical differences in the evaluation basis will undoubtedly affect the comparison. In particular, the estimates of GNP and population for the Chinese mainland are likely to have wider margins of error because of uncertainties surrounding the rather narrow statistical base, the quality of the data, and certain methodological issues. And, with the exception of Japan, all the countries were primarily agricultural economies in the 1950s and their GNP may well be heavily influenced by their harvests, which tend to fluctuate with the weather conditions. The rate of growth based on the initial and terminal years would therefore be rather sensitive to the harvests in these years. Nonetheless, all these difficulties are not likely to distort the overall picture significantly.

during this period. In fact, all the five developing countries in Table 1 had quite high rates of population growth of more than 2 percent per year. But Taiwan's population increased the fastest, at an average rate of 3.2 percent per year during the last two decades. Yet, despite such a high rate of population growth, per capita income expanded at a phenomenal pace, faster than in the other developing countries.[7] This implies, of course, that Taiwan's aggregate income expanded even more rapidly than those of other countries. In the two decades since 1952, Taiwan's real GNP rose at an average rate of 8.8 percent per year, second only to Japan's 9.6 percent, and higher than those of others, which range from India's 3.5 percent to Korea's 7.2 percent.

Table 1 also shows the growth rates in three subperiods: 1952-60, 1960-65, and 1965-72. The main reasons for taking 1960 and 1965 as intermediate time points are that there had been a major shift in Taiwan's developing policy around 1960 and that economic assistance from the U.S. terminated in 1965. It is of interest to examine how the economy performed after these crucial events took place. For other countries such a periodization might seem arbitrary, but it apparently introduces no serious distortion except perhaps in the case of India, which had a poor year in 1965.

During these three subperiods, growth of Taiwan's per capita income has been accelerating. The growth rate in the 1960s was distinctly higher than in the 1950s. The higher growth rate since 1965 is of particular interest, for it signifies unmistakably a sustained growth without external economic aid. Among the countries listed in Table 1, only Japan and South Korea experienced a similar pattern of accelerating growth. For the others (the Philippines, Communist China, and India) no acceleration occurred. In the latter case, the average growth rates in the second subperiod (1960-65) declined rather sharply and they hardly recovered to their initial levels in the third subperiod (1965-72).

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7. There appears to be a consensus among experts that, on balance, rapid population growth has a retarding effect on growth of per capita income even though how serious the effect is remains controversial See Study Committee of the Office of the Foreign Secretary, National Academy of Science, *Rapid Population Growth — Consequences and Policy Implications,* Vol. I, Baltimore: Johns Hopkins Press, 1971, pp. 27-34. Some believe that "rapid population growth is not a bar, perhaps not even a hindrance to rapid rise in per capita income." Everett E. Hagen, *The Economies of Development,* Homewood, Illinois: Irwin, 1968, pp. 247-271. Others argue that "there are serious economic dangers arising from the natural tendency of population to grow too rapidly." Stephen Enke, *Economics for Development,* Englewood Cliffs, New Jersey: Prentice Hall, 1963, pp. 335-355.

In contrast to total GNP, Taiwan's population growth has been declining, from 3.6 percent in the 1950s to about 3 percent in the 1960s, quite possibly as a result of the population control program. Again, no comparable downward trend can be found in the other countries during the same period.[8] However, up to the early 1970s, Taiwan's population growth rate remained the highest, more than twice as high as Japan's. If population growth should continue to slow down as is likely, per capita income could increase even faster.

As a result of rapid growth in the last two decades, Taiwan now ranks high among the Asian countries in terms of per capita income. Table 2 compares the per capita income of 11 Asian countries in U.S. dollars in 1975 prices and averages for world developed and developing countries.[9] Taiwan's per capita income, U.S. $900 in 1975, is still far below that of Japan, but exceeded that of Malaysia and far above those of India, Communist China, and the Philippines. It is substantially higher than that of neighboring Korea, not to mention the average for the world developing countries. But equally clear, it still has a long way to catch up when compared with the developed countries.

8. The effect of birth control on the Chinese mainland is unclear. Despite some reports of a sharp decline in birth rates in some localities, some demographers have not found the available evidence sufficiently convincing to conclude that the rate of population increase had indeed fallen during 1953-70. See John S. Aird, "Population Policy and Demographic Prospects in the People's Republic of China," in Joint Economic Committee, U.S. Congress, *People's Republic of China: An Economic Assessment*, Washington, D.C., 1972, 220-334.

9. The measure of a country's product in terms of another's currency unit is an intricate problem. Thus, the figures shown in Table 2 are only a rough order of magnitude. Different estimates of GNP have been made of the different Asian countries based on different conversion rates, but they do not alter the ranking significantly.

Table 2.   Rank of Selected Asian Countries by
GNP Per Capita, 1975

	GNP/capita (in 1975 U.S.$)	Rank
World:		
Developed countries	4,445	—
Developing countries	437	—
Asia:		
Japan	4,358	1
Taiwan	900	2
Malaysia	761	3
Republic of Korea	551	4
Philippines	352	5
Thailand	334	6
Communist China	253	7
Indonesia	215	8
India	158	9
Pakistan	147	10
Burma	101	11

"—" Not applicable.

Source: U.S. Department of State, *The Planetary Product in 1975,* Washington, D.C., 1977, pp. 22–27.

Economic Stability

Economic stability refers here to stability in the domestic price level and in the growth of total output with reference to a long-term trend.[10] Clearly, economic stability is a highly desirable development goal. Fluctuations in prices and output not only disrupt economic growth, they generally result in underutilization of the economic capacity and more inequitable distribution of income. In an important sense, economic stability is also an essential element in political and social stability. Has the Taiwan economy been able to maintain relative stability in the process of rapid growth? We focus first on fluctuations in its total economic activity.

10. Two important aspects of economic stability (employment and balance of payments) have not been included in the following discussion for lack of adequate information for international comparison.

Table 3. Fluctuations in GNP, Selected Countries

Country	Period	Degree of instability
Taiwan	1952–72	2.0
Philippines	1950–70	2.0
Japan	1952–72	3.0
India	1950–72	3.1
South Korea	1953–72	3.3
Communist China	1952–72	9.5
Eighteen free market economies	1950–60	5.7
Eight planned economies	1950–60	2.7

Sources: See note to Table 1, Staller, 1964, p. 391.

Table 3 compares the year-to-year fluctuations in GNP for Taiwan and five other Asian economies in the last two decades. For reference, we also include the averages for 18 free market economies and eight planned economies in 1950–60.[11] The measure of the degree of instability is the antilog of the square root of logarithmic variance of the series $Yt/Yt1$, with unity subtracted from the antilog.[12] The value ranges from zero to infinity. If there were no fluctuation at all, the value would be zero. The higher the value, the less stable the path of growth. As Table 3 shows, economic growth in Taiwan has been much smoother than in almost any of the other five countries and the

11. The 18 free market economies are: Austria, Belgium, Canada, Denmark, France, Germany (F.R.), Greece, Iceland, Ireland, Italy, Luxemburg, the Netherlands, Norway, Portugal, Sweden, Turkey, the United Kingdom, and the United States. The 8 planned economies include: Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, the Soviet Union, and Yugoslavia.

12. The method is described in Joseph D. Coppock, *International Economic Instability*, New York: McGraw-Hill, 1962, pp. 23–24, and has been applied to various countries by George J. Staller, "Fluctuations in Economic Activity: Planned and Free-Market Economics, 1950–1960," *American Economic Review*, June 1964, 385–395; and Yuan-li Wu, "Communist Economic Planning vs. Capitalism as a Model for Development," in M. M. Drachkovitch (ed.), *Marxist Ideology in the Contemporarq World — Its Appeals and Paradoxes*, Stanford: Hoover Institution, 1968. The index of stability equals

$$\text{antilog} \sqrt{\frac{\Sigma [\log(Yt/Yt\text{-}1) - (1/N) \Sigma \log(Yt/Yt}{N}}$$

where Yt represents GNP in constant prices in year t, and N is the number of years minus one.

Rate of
Growth
of GNP
(% per yr)

10

8

6

4

2

0

Japan
x

Taiwan
x

S. Korea
x

Communist China
x

Philippines
x

India
x

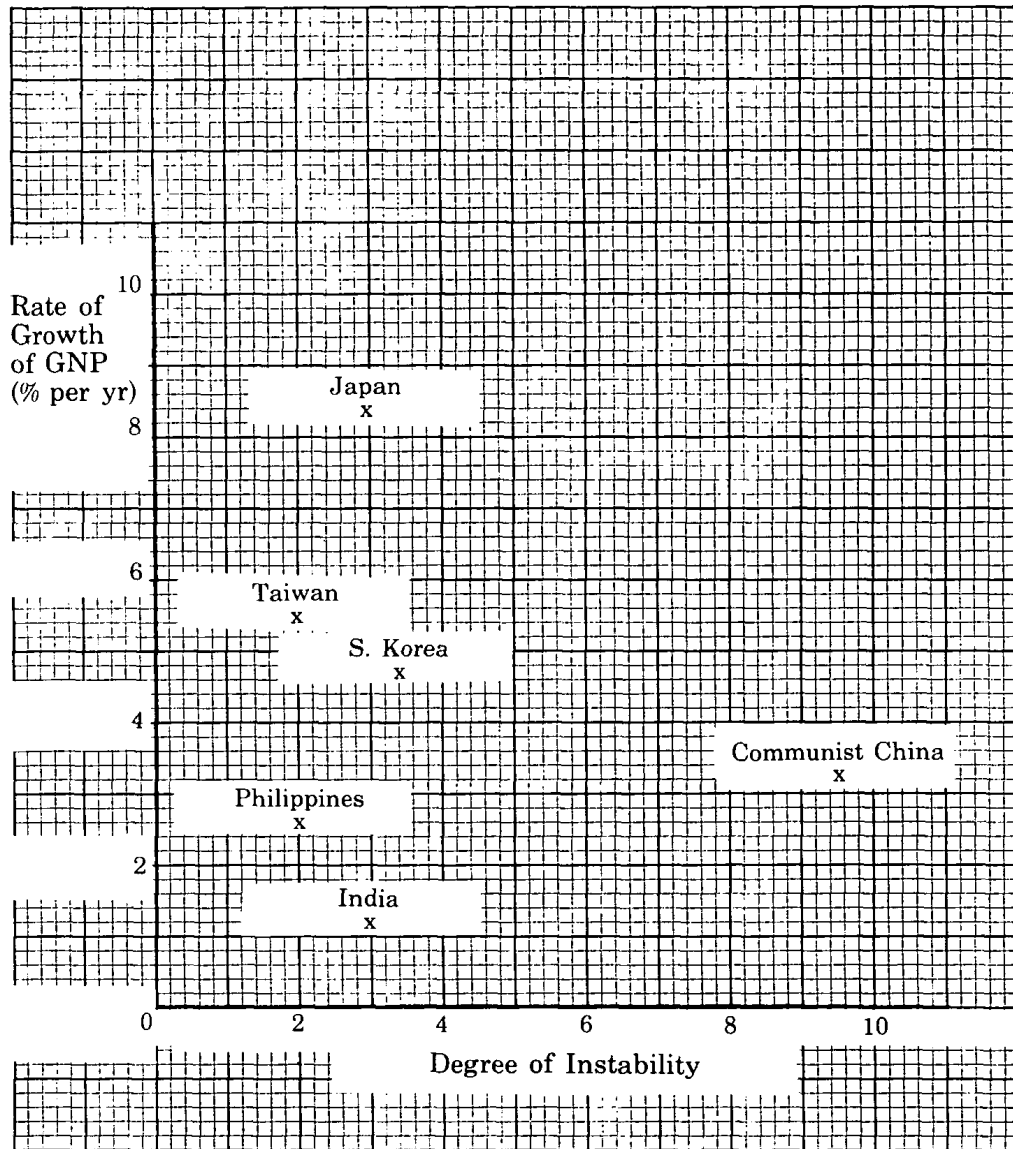0   2   4   6   8   10

Degree of Instability

Figure 2.   Scatter Diagram: Growth Rate and Instability

averages for planned and free market economies in the 1950s. Of particular interest is the exceptionally high degree of instability in Communist China. While the European Communist economies were subject to wider fluctuations than those of the free market economies, Communist China had even greater instability in growth than the other planned economies.

As noted by Wu, the Chinese Communists claim that fluctuations result in higher rates of growth. The implication is that the pace of development and smoothness of the growth path are tradeoffs. A rough test of this proposition is made in a scatter diagram relating the rates of growth to the measure of instability in Figure 2. If the Communist claim were empirically true, the data should show a positive correlation between the growth rate and the degree of instability. But the scatter diagram for the six countries indicates no such relationship. It is not clear whether a larger sample would yield results that corroborate the proposition. In any event, data for all the countries except Communist China suggest that both high and low rates of growth could be achieved with fairly low degrees of instability. Among these six countries, the performances of Japan, Taiwan, and South Korea are clearly better. Their growth rates are higher and their paths of growth have been quite smooth. That of Communist China is perhaps the worst. Its growth rate is considerably lower than the three best countries, and its economy exhibited a much higher degree of instability.

Taiwan was also successful in maintaining price stability. To be sure, there were considerable inflationary pressures immediately after the war and following the massive evacuation from the mainland. However, since 1952, the implicit GDP deflator rose at a moderate rate of 6.8 percent per year.[13] This is well within the limit of 10 percent considered by some economists as the maximum justifiable price of rapid development.[14] The path to price stability has not been a smooth one. During the earlier period 1952-60, the inflationary rate was about 10 percent per year. It was not until the 1960s that it fell to about 5 percent. In 1974-75, prices rose sharply by 34 percent, but the rate of increase has since declined.

13. *Statistical Yearbook 1975*, pp. 194-195.

14. See A. C. Harberger, "Some Notes on Inflation," in Warner Baer and Isaac Kerstenetzky (eds.), *Inflation and Growth in Latin America*, Homewood, Illinois: Irwin, 1964.

Table 4. Average Annual Rates of Increase in Wholesale
and Consumer Prices, Selected Countries, 1952–73

(Percent per year)

	1952–60	1960–73	1952–73
Wholesale prices			
Taiwan	8.8	3.4	5.4
Japan	0.3	2.0	1.3
S. Korea	—	11.8	—
Philippines	0.9	8.3	5.4
India	2.6	6.9	5.2
Consumer prices			
Taiwan	9.7	4.0	6.1
Japan	2.4	6.2	4.7
S. Korea	18.9	12.2	14.7
Philippines	0.2	3.6	2.3
India	2.2	6.9	5.1

Source: Economic Planning Council, 1974, pp. 157, 272–273; United Nations, *Statistical Yearbook 1960,* New York: United Nations, 1960, pp. 447–448, 453–455; *Statistical Yearbook 1966,* New York: United Nations, 1967, pp. 535–537; *Statistical Yearbook 1970,* New York: United Nations, 1971, pp. 566–568.

Table 4 compares the rates of increase of the wholesale and consumer price indexes in Taiwan and four other countries in 1952–73. The comparison shows that, for the period as a whole, Taiwan's wholesale price and consumer price indexes rose at a rate faster than those of all others except Korea. Taiwan's higher rate of inflation than Japan's should not be surprising. The financial system in a developed country like Japan is apparently more efficient in mobilizing and economizing the use of money in the face of inflation, and the degree of mobility of resources is likely to be higher so that the response of output to price changes might well be faster and more flexible.[15] The higher inflationary rates in Taiwan than in other developing countries seem to suggest that Taiwan had been less successful than others in controlling inflation. This is clearly true of the period 1952–60. Wholesale and consumer prices in Taiwan rose at a rate many times those of others, except Korea, which was still feeling the effects of the war. However, the picture was very much different in the 1960s. Although the inflation rates in Japan, the Philippines,

15. See Harry Johnson, "Is Inflation the Inevitable Price of Rapid Development or a Retarding Factor in Economic Growth?" *Malayan Economic Review,* X:1, April 1966, 22–28.

and India were higher than in the 1950s, those in Taiwan declined markedly. It may be recalled that Taiwan's economic growth during this period (1960-72) was much faster than in 1952-60. The experience of Taiwan suggests that inflation need not be a concomitant of rapidly rising per capita income, either as an instrument of development policy or an inevitable outcome of structural change.

The comparison in Table 4 leaves out the case of the Chinese mainland, mainly because data on price changes are lacking. Official sources claim that prices have been stable for the past 25 years.[16] However, almost all prices are administratively set. Changes in demand and supply conditions generally are reflected in quantity changes rather than in price variations. Price stability under these conditions thus has a different meaning and cannot be easily interpreted.[17]

II. PATTERNS OF ECONOMIC GROWTH

Changes in Industrial and Employment Structure

Economic growth is both the cause and consequence of changes in the industrial and employment structure. In the process of growth some sectors generally grow faster than others, and structural changes in output and employment are simply manifestations of the differential rates of growth of the various sectors during the period. At the same time, economic growth is largely the result of continuous shifts of resources from low-productivity to high-productivity sectors. For these reasons it is useful to make a brief examination of the extent and pace of structural changes in Taiwan.

16. See, for example, *New China's First Quarter Century*, Peking: Foreign Languages Press, 1975, pp. 45-50; and Kuang-hsi Peng, *Why China Has No Inflation*, Peking: Foreign Languages Press, 1976.

17. For a discussion of the price system, see Nai-renn Chen, *Chinese Economic Statistics*, Chicago: Aldine, 1967; Peter Schran, "China's Price Stability: Its Meaning and Distributive Consequences" (mimeographed), 1976.

Table 5. Industrial Origin of Net Domestic Product, 1952-73
(Percent)

	Agriculture	Industry					Transportation and Communications	Commerce	Others
		Total	Mining	Manufacturing	Electricity	Construction			
1952	35.7	17.9	2.1	10.8	0.6	4.4	3.8	18.7	23.9
1953	38.0	17.6	1.7	11.2	0.7	4.0	3.4	18.4	22.6
1954	31.5	22.0	1.8	14.4	0.5	5.3	3.7	17.5	25.3
1955	32.5	20.9	1.7	13.7	0.7	4.8	4.0	16.8	25.8
1956	31.2	22.2	2.2	14.4	0.8	4.8	3.9	16.9	25.8
1957	31.3	23.6	2.6	15.5	1.0	4.5	4.3	15.2	25.6
1958	31.0	23.8	2.9	15.4	1.2	4.3	4.1	15.4	25.7
1959	30.3	25.5	2.5	17.6	1.1	4.3	3.9	14.6	25.7
1960	32.5	24.7	2.3	16.7	1.3	4.4	4.1	14.4	24.3
1961	31.3	24.9	2.1	16.9	1.5	4.4	4.8	14.0	25.0
1962	29.0	25.7	2.5	16.9	1.8	4.5	4.6	14.5	26.2
1963	26.6	28.0	2.1	19.6	1.7	4.6	4.4	14.7	26.3
1964	27.7	28.2	1.8	20.4	1.7	4.3	4.3	15.0	24.8
1965	27.0	28.2	1.9	19.9	1.8	4.6	4.8	14.9	25.1
1966	25.7	28.6	2.0	20.1	1.8	4.7	5.4	14.4	25.9
1967	24.5	29.4	2.0	20.9	1.7	4.8	5.2	14.5	26.4
1968	23.8	30.3	1.7	21.9	1.7	5.0	5.5	13.9	26.5
1969	20.3	31.6	1.4	23.0	2.0	5.2	5.7	14.6	27.8
1970	19.1	32.5	1.4	23.8	2.3	5.0	5.7	14.3	28.4
1971	17.1	34.5	1.3	25.7	2.3	5.2	5.8	14.4	28.2
1972	16.7	35.3	1.2	26.8	2.2	5.1	6.0	14.5	27.5
1973	15.5	37.9	1.0	29.8	2.1	5.0	5.4	15.0	26.2

Source: Economic Planning Council, *Taiwan Statistical Data Book 1974*, p. 28.

Table 5 shows Taiwan's net domestic product by industrial origin in 1952-73.[18] The most striking feature of the table is the rise in industry's share from roughly 18 percent in the early 1950s to about 38 percent in 1973. The rise was accompanied by a fall in agriculture's share by almost the same amount, leaving the share of the service sector virtually unchanged over the last two decades. Within the industrial sector, the shares of manufacturing and electric power rose while those of mining and construction declined. The rise in manufacturing was especially marked. It accounted for almost the entire increase in industry's share. Within the service sector, the shares of transportation and communications and other services rose slightly while the share of commerce declined moderately.

The rise in industry's share is characteristic of the process of economic growth. Taiwan's experience, however, is unique in several respects. First, the pace of industrialization is unusually rapid. Within a period of two decades, industry's share of net national product increased by 18 percentage points. By comparison, industry's share in Britain rose by only 11 percentage points over a period of 40 years during 1801-1841. In the early phase of Japan's development during 1878/82 to 1923/27, industry's share increased sharply by 22 percentage points, but it took Japan 45 years to bring about such a drastic structural change.[19] As shown in Table 6, the Philippines and India both experienced less rapid change in their industrial structures over the same period. Only South Korea and Communist China could match Taiwan in its rapid pace of industrialization. In the case of Communist China, undoubtedly there has been considerable industrial development. However, it is not clear whether and to what extent the rather sharp increase was due to the larger price weights attached to industrial growth than in other countries. In any event, Taiwan in the 1970s is second only to Japan in the degree of industrialization as measured by industry's share of total output, and is substantially ahead of South Korea, Communist China, India, and the Philippines. The experience of Taiwan, and for that matter, of South Korea, clearly demonstrates that rapid industrialization is certainly feasible without having to repeat the prolonged process of the developed countries.

18. Estimates are based on totals in current prices. Conceivably a rise (or fall) in relative agricultural prices could have exaggerated (or understated) agriculture's share in real terms. However, in the present case, relative prices of agricultural and nonagricultural products have not changed significantly enough to distort the picture.

19. See Simon Kuznets, *Modern Economic Growth*, New Haven and London: Yale University Press, 1966, p. 88-91.

Table 6. Industrial Distribution of National Product, 1952 - 71, Six Economics
(Percent)

	Agriculture	Manufacturing, Mining, and Construction	Services
Taiwan, shares in NNP, market prices			
1952	36	18	46
1960	32	25	43
1965	27	28	45
1971	17	35	48
Japan, shares in NDP, factor cost			
1952	23	31	46
1960	15	36	48
1965	11	36	53
1971	6	44	49
S. Korea, shares in GDP, factor cost			
1953	49	11	40
1960	40	19	42
1965	41	24	35
1971	29	29	40
Philippines, shares in NDP, factor cost			
1952	35	23	42
1960	31	24	45
1965	32	24	45
1971	29	20	51
India, shares in GDP, factor cost			
1952	49	17	33
1960	50	21	30
1965	46	22	31
1971	45	27	28
Communist China, shares in GNP			
1952	56	15	29
1960	33	36	31
1965	38	31	31
1971	32	37	31

Source: EPC, 1974, p. 28; United Nations, 1970, pp. 91-93; United Nations, 1974, pp. 574-575; JEC, 1972, p. 42; JEC, 1975, pp. 42-43.

Second, the structural shift from agriculture to industry in Taiwan occurred over a period of expansion in which both agricultural and industrial production advanced rapidly and simultaneously, although at different rates. During 1952–72, industrial production rose at 15 percent per year.[20] But agricultural output has also been growing continually at a respectable rate of 4.6 percent per year. This remarkable achievement can be seen in Fig. 3, which shows the growth rates of industrial output on the horizontal axis and that of agricultural output on the vertical axis for six countries.[21] The two perpendicular lines with Taiwan as the origin divide the plane into four quadrants. Any point in the northwest quadrant (I) indicates that the country's industrial growth rate is higher than that of Taiwan but its agricultural growth rate is lower. The southwest quadrant (II) is the worst case for the other countries in which both the agricultural and industrial growth rates are below those of Taiwan. Countries in the southeast quadrant (III) have higher agricultural growth rates than Taiwan, but their industrial growth rates are lower. Countries in the northeast quadrant (IV) have both growth rates higher than those of Taiwan. It can be seen that none of the five major Asian countries could match Taiwan's performance. The only country that came close is South Korea. Japan and Communist China did experience rapid industrial growth, but their agricultural growth rates are considerably lower than Taiwan's. For India and the Philippines, both their agricultural and industrial growth rates are very much below Taiwan's. The significance of the Taiwan experience is that rapid industrialization need not be at the expense of agricultural development, and indeed, the two sectors might well be closely complementary rather than competitive in the medium run.

A third interesting feature in Taiwan's case is that the time path of the structural changes assumed the form of successively rising plateaus. The years 1953, 1961, and 1965 stand out as major

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20. Economic Planning Council, Executive Yuan, Republic of China, *Taiwan Statistical Data Book 1974*, Taipei, 1974, p. 70.

21. For data used to calculate rates of agricultural growth, see *Statistical Data Book 1974*, p. 51; Joint Economic Committee, *op. cit.*, pp. 42–43; Food and Agricultural Organization of the United Nations, *Production Yearbook 1970*, Rome: FAO, 1970, p. 30, and 1973, pp. 27–28. Growth rates are computed on the basis of averages for 1952–54 and 1970–72 to reduce the sensitivity of the index to single-year fluctuations. For those used to calculate industrial growth rates, see *Statistical Data Book 1974*, p. 70; JEC, *op. cit.*, pp. 42–43; *Statistical Yearbook 1960*, New York: United Nations, 1961, pp. 81–82; United Nations, *Statistical Yearbook 1973*, New York: United Nations, 1974, pp. 143–153.
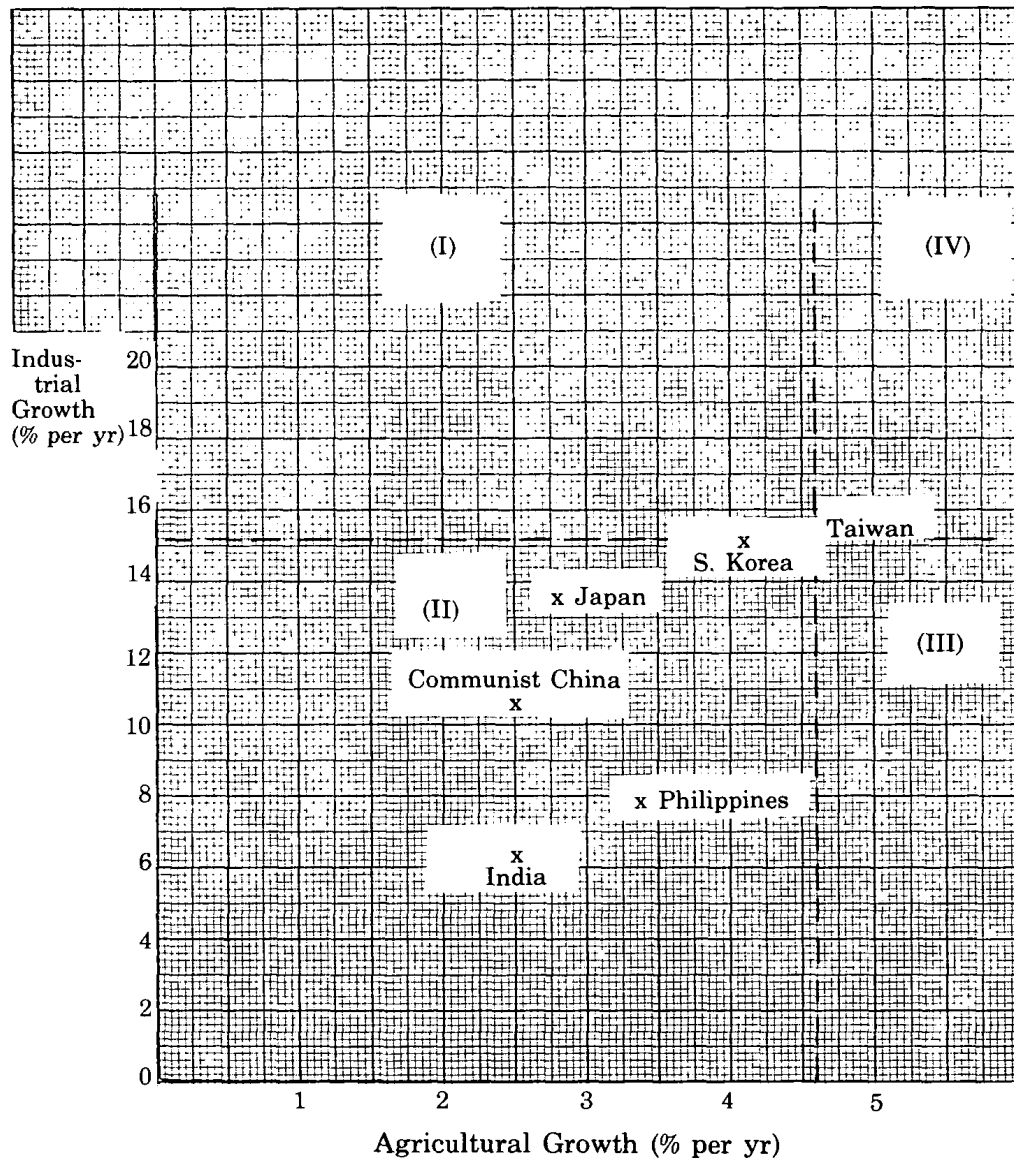
Figure 3. Comparison of Industrial and Agricultural Growth Rates

benchmarks of a step function. Up to 1953, agriculture's share remained at about 37 percent of net domestic product. Then it settled at a lower level of about 31 percent during 1954-61. Beginning in 1962, it fell to a still lower plateau of about 27 percent for the period 1962-65. Thereafter, it declined continuously rather sharply to a low of about 16 percent by 1973. These benchmarks generally coincided with major changes in development policies.

When we turn to the structure of the labor force, a similar pattern emerges. As Table 7 shows, a structural shift from agriculture to industry has occurred in the employment structure as in the output structure. The share of labor force in agriculture dropped from 52 percent in 1952 to 30 percent in 1975, while that in industry rose significantly from 20 to 36 percent, and the share of employment in the service sector rose moderately from 28 to 35 percent over the same period.

Table 7.   Labor Force by Industrial Sectors, 1952-75
(Percent)

Year	Agriculture	Industry	Services
1952	52.1	20.2	27.7
1955	50.3	20.9	28.8
1960	47.2	22.0	30.8
1965	44.1	23.1	32.8
1970	36.7	28.3	35.0
1975	29.9	35.5	34.6

Source: W.Y. Kuo, "A Study of Factors Contributing to Labor Absorption in Taiwan, 1954-1971," *Conference on Population and Economic Development in Taiwan,* Taipei, Taiwan: Academia Sinica, 1976, p. 492.

Changes in Expenditure Patterns

Two broad problems concerning the pattern of expenditures are of interest: First, how is total output distributed among various end uses in Taiwan compared with other countries at their present stage of development? In particular, how much of the total output has been set aside for future growth? Second, what major changes since 1953 have occurred in the relative share of each category of final demand?

Table 8. Expenditures On Gross Domestic Product,
Six Economies, 1973
(Percentage of GDP in current prices)

	Taiwan	Japan	Korea	Philippines	M. China*	India†
Personal consumption	52	51	68	69	64	77
Government consumption	15	9	10	8	10	10
Gross fixed investment	26	37	24	18	23	16
Inventory change	1	3	2	2		1
Exports	49	10	32	22	3	4
Imports	-43	-10	-35	-20		-5
Total	100	100	100	100	100	100

* 1970.

† 1971. Sub-items sum up to 103 percent. Apparently there is a statistical discrepancy of -3 percent.

Source: Taiwan — *Statistical Yearbook of the Republic of China, 1975,* p. 190. Japan, Korea, Philippines and India — United Nations, *Yearbook of National Accounts Statistics 1974,* New York: United Nations, 1975, pp. 43-45. Mainland China — T. C. Liu and K. C. Yeh, "Chinese and Other Asian Economies: A Quantitative Evaluation," *American Economic Review,* May 1973, p. 221.

Table 8 shows the distribution of gross domestic product for Taiwan and five other Asian economies in 1973 in terms of six categories of final expenditures: personal consumption, government consumption, capital investment (gross domestic fixed capital formation), inventory changes, exports, and imports.[22] The distinctive features of resource allocation in Taiwan are the large share of resources devoted to growth, the substantial government consumption, high proportion of output entering into foreign trade, and the small share of personal consumption. In terms of the proportion of total output allocated to growth, Taiwan stands second only to Japan, slightly above Korea and Mainland China, and considerably higher than the Philippines and India.

Government consumption in Taiwan absorbed a much larger share of total output than in other countries partly because of its fairly large expenditures on education, science, and culture,[23] and presumably also because of a large defense burden. Taiwan is trying to maintain rapid growth and a sizable defense program at the same time, a difficult task that most other countries have been able to avoid.

The extent of Taiwan's participation in external trade is highest among the six economies. About one-half of total output was exported in 1973. Its average propensity to import is also very high. Such high foreign trade proportions are not uncommon for small countries.[24] South Korea and the Philippines also have rather high import ratios. What is unique in Taiwan's case is its trade surplus, about 6 percent of total GDP, whereas other countries had either a deficit or a much smaller surplus.

Figure 4 shows the changing pattern of expenditures over the last two decades. The most striking feature is the very rapid increase in the share of exports from less than 10 percent in the 1950s to 44 percent of GDP in 1973-74. The rise has been especially steep since the mid-1960s. Over the same period, the share of imports also increased but at a less rapid rate, so that the sizable trade deficit in the 1950s declined steadily, and finally a surplus appeared in the early 1970s. The increase in the share of

22. For definitions of these concepts, see *Statistical Yearbook 1975*, pp. 370–371.

23. These expenditures accounted for 20 percent of total government current expenditures in FY 1973. See *Statistical Yearbook 1975*, p. 239.

24. By size we refer to the size of land area and population. For a discussion of the inverse relationship between size and foreign trade ratio, see Simon Kuznets, *V. Capital Formation Proportions: International Comparisons for Recent Years* (in *Economic Development and Cultural Change*, VIII: 4, Part II, July 1960), pp. 14–32.

(%)

70

60

Personal Consumption

50

Percent
of
GDP

40

Govt Consumption

30

20

Imports

Gross Fixed Capital
Formation

10

Exports

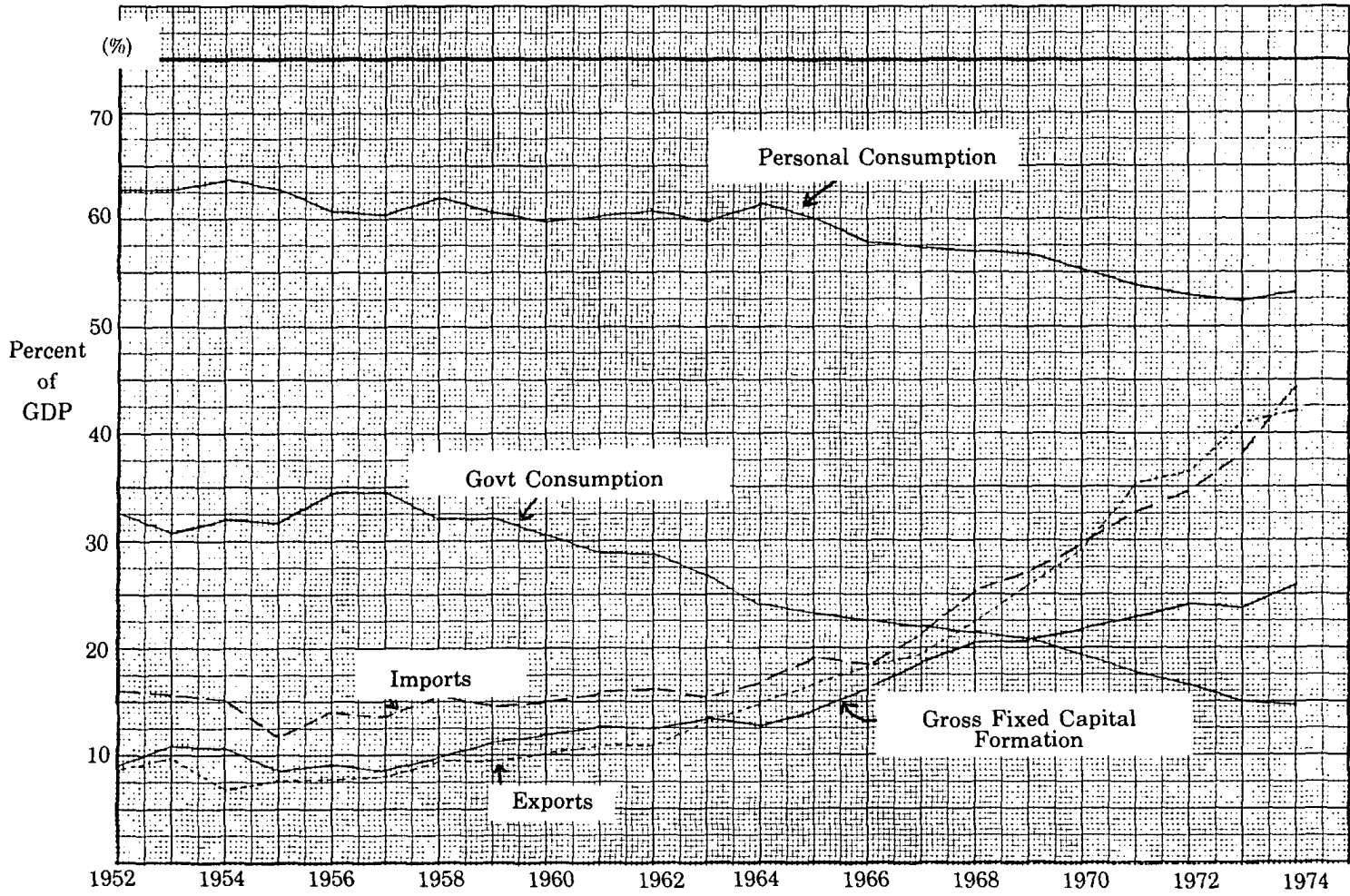1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974

Figure 4. Expenditures on GDP

gross fixed capital formation was no less dramatic, from about 10 percent in the 1950s to about 25 percent of GDP in the early 1970s. The marked increase was accompanied by a substantial reduction of the share of government consumption and a moderate decrease in the share of personal consumption. In sum, the shift of resource allocation clearly indicates that Taiwan in the last two decades has transformed itself from a high consumption to a high investment economy, and from an internally oriented to an externally oriented economy.

The significant size of foreign trade in Taiwan's GDP indicates that rapid domestic growth has been intertwined with rapid growth of external trade. Two observations in this connection are worth noting. First, foreign trade has become significant only since the early 1960s. As Table 9 shows, both Taiwan's imports and exports grew at about the same rate as world imports and exports in 1952–61 so that Taiwan's share of world trade remained the same during this period. But in 1960–73, Taiwan's trade expanded much faster so that its share of the world's imports increased threefold and exports fivefold. The ratios of goods and services traded to GDP show the same trend.

Table 9. Selected Measures of Taiwan's Participation
In Foreign Trade, 1952–73*

(Percent)

	1952	1961	1973
(1) Taiwan's imports as percent of world imports	0.23	0.23	0.64
(2) Taiwan's exports as percent of world exports	0.16	0.15	0.78
(3) Ratio of imports of goods and services to GDP	16.0	15.7	38.0
(4) Ratio of exports of goods and services to GDP	8.7	10.8	46.0
(5) Ratio of imports to GDP plus imports	13.8	13.5	27.5
(6) Ratio of exports to GDP plus imports	7.4	9.4	33.3
(7) Index, physical volume of imports, 1952 prices	100	186.4	1,284.0
(8) Index, physical volume of exports, 1952 prices	100	168.7	2,260.3

* Imports are valued cif, and exports fob. Lines (1) and (2) refer to imports and exports of commodities only, and are based on totals in current U.S. dollars. Lines (3) through (6) refer to imports and exports of goods and services and are based on totals in constant 1971 NT dollars.

Second, by 1973 the interdependence of foreign trade and economic growth reached unprecedented proportions. About 28 percent of the total supply of resources were from abroad, and exports absorbed one-third of Taiwan's total resources. Consequently, Taiwan's economy is now rather sensitive to the changing economic conditions abroad that affect its imports and exports. In particular, the enormous size of the export-GDP ratio means that the direct effect of export expansion on economic growth will be substantial.[25] For example, in 1970-73 the high rate of growth of exports (29.9 percent per year) compounded by a large export-GDP ratio (29.2 percent in 1970) accounted for over 70 percent of the growth of GDP during this period.[26] During 1973-74, mainly as a result of the oil crisis, exports declined and (involuntary) inventory rose sharply. Consequently, GDP hardly increased at all.

III. ECONOMIC CONSEQUENCES OF GROWTH: LEVEL AND PATTERN OF CONSUMPTION

One of the principal goals of economic development is to increase the economic welfare of the people. Economic welfare, however, is hard to define. Conventional measures in terms of national income are only rough approximations, partly because many crucial aspects of welfare lie outside the scope of national income measurement, and partly because the national income estimate itself involves many intricate aggregation problems.[27] For our present purpose of a general overview, we focus on the levels and patterns of personal consumption as indicators of

25. The rate of growth of GDP is a linear combination of the growth rates of exports and other components of GDP, with their corresponding shares in GDP in the base period as weights. By direct effect of exports, we refer to the rate of growth of exports weighted by the export-GDP ratio. For further discussion, see the following section.

26. Growth of GDP over the same period was 11.8 percent per year. For data used, see *Statistical Yearbook 1975*, p. 195.

27. Theoretical and empirical issues surrounding the use of national income as a measure of economic welfare have been the subject of an extended discussion among economists in the past two decades. See Simon Kuznets, "National Income and Economic Welfare," in S. Kuznets, *Economic Change*, New York: Norton, 1953, 192-215; Paul A. Samuelson, "Evaluation of Real National Income," in Kenneth J. Arrow and Tibor Scitovsky, *Readings in Welfare Economics*, Homewood, Illinois: Irwin, 1969, 402-433; Milton Ross (ed.), *The Measurement of Economic and Social Performance*, New York: National Bureau of Economic Research, 1973. Foremost among the difficulties of using per capita income as a measure of standard of living is that it fails to take into account the distribution of income among persons. On this problem regarding Taiwan, see Chapter II of this volume.

changes in the standard of living in Taiwan, bearing in mind the many limitations of these measures.[28]

Earlier, we observed that the proportion of private consumption in gross domestic product declined moderately in the last two decades. The decline, however, does not signify a reduction in the standard of living. Both per capita income and consumption have been rising, and the decline only implies that per capita consumption increased at a lower rate than per capita income. In fact, a downward trend in the proportion of private consumption in GNP is not uncommon in the experience of the developed countries.[29] The decline is generally accompanied by a rise in the share of capital formation as was the case with Taiwan. In an important sense, the change represents a tradeoff between current and future consumption. Moreover, the decline in the share of private consumption is compensated for to some extent by an increase in the share of government services to the consumers such as education, health, recreation, and environmental improvement. For example, the share of public expenditures on education in GNP doubled during 1952-72.[30]

The rise in the standard of living in Taiwan is clearly reflected in the various indicators in Table 10. Per capita consumption in 1973 is almost two and one-half times that in 1952. This is a significant increase by any standard. But perhaps more impressive is the pace of change compared with the experience of other developed countries. For example, Japan doubled its per capita consumption between 1924-28 and 1962-64, a 38-year period.[31] It took Taiwan less than 20 years to increase its per capita consumption more than twofold.

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28. The implicit assumption here is that personal consumption is the end in itself and not an intermediate product. As Kuznets points out, "higher consumption levels may make for higher productivity of the population, either because of beneficial physical effects or greater training, or because of inducements toward more enthusiastic participation in productive activity." Simon Kuznets, *Quantitative Aspects of the Economic Growth of Nations*: VII. Supplement to *Economic Development and Cultural Change*, X:2, Part II, January 1962, p. 59. Nonetheless, it seems fair to say that personal consumption is more a goal of, rather than a means to, production in societies like that of Taiwan.

29. Kuznets, 1962, *op. cit.*, pp. 20-23.

30. *Statistical Yearbook 1975*, p. 262.

31. Simon Kuznets, "Trends in Level and Structure of Consumption," in L. Klein and K. Ohkawa (eds.), *Economic Growth*, Homewood, Illinois: Irwin, 1968, p. 198.

Table 10.   Selected Indicators of Consumption
In Taiwan, 1952, 1961 and 1973

	1952	1961	1973
Per capita consumption in 1971 prices			
(1952 = 100)	100	127	246
Per capita calorie intake per day	2,078	2,430	2,754
Percent from animal products	12	11	19
Index of food consumption per capita:			
Cereals, as flour	100	120	117
Potatoes and other tubers	100	93	27
Sugar	100	100	154
Pulses, nuts and seeds	100	150	235
Meat	100	93	172
Milk	100	500	1,100
Fats and oils	100	144	289
Protein	100	122	151
Per capita consumption of industrial products (1952 = 100)			
Steel	100[a]	2,329	13,480
Rubber	100	423	2,495
Energy	100[b]	137	327
Residential use of electricity	100	192	956
Index of per capita output (1952 = 100)			
Alcoholic beverages	100	134	227
Cigarettes	100	117	130
Cotton fabrics	100	168	349
Paper	100	257	800
Cement	100	247	695

[a]1953 as base.
[b]1954 as base.
Source: Economic Planning Council, 1974, pp. 79-80; Statistical Yearbook 1975, pp. 2, 117, 168-169, 208-209; Economic Planning Council, 1976, p. 46.

As per capita income increased, both the quantity and quality of the diet improved, as suggested by increases in per capita daily calorie intake, in the proportion of calorie intake from animal products, and in the substitution of meat, pulses, nuts, seeds, fats and oils, and milk, for such inferior products as potatoes and other tubers. Per capita consumption of basic industrial products (steel, rubber, and energy) also went up sharply. No doubt, a large proportion of these products went into other final uses such as investment and exports. But most likely private consumption also

rose significantly. The 856 percent increase in residential use of electricity was primarily the result of the rapid increase in consumer durables.

Table 10 also shows indexes of per capita output of five industrial products related to private consumption: alcoholic beverages, cigarettes, cotton fabrics, paper, and cement. In all cases, the rise in the last two decades or so has been substantial. As measures of standard of living, these indexes are less meaningful than per capita consumption, but they do point to the direction if not the magnitude of improvements of the people's consumption standards.

All the indicators show an acceleration in improvements in the 1960s compared with the 1950s. The average rate of growth of per capita consumption was 5.4 percent per year from 1960–62 to 1972–74, considerably higher than the average of 3.0 percent for the period 1951–53 to 1960–62.[32] The rapid growth was interrupted in 1973–74 when per capita consumption hardly increased. But there are indications that the upward trend resumed again in 1975 and 1976.[33]

Table 11. Distribution of Private Consumption
Expenditures by Types Of Goods In Taiwan, 1951–74

(Percent)

	1951–53	1960–62	1972–74
Food, beverages and tobacco	66.7	59.1	47.1
Clothing and footwear	3.8	4.2	5.2
Gross rent, fuel and power, furniture, furnishings, household equipment, and operations	15.8	19.5	21.8
Medical care and health expenses	4.4	4.6	5.6
Transportation and communications	1.1	0.8	3.4
Recreation and entertainment	2.4	2.9	4.8
Miscellaneous goods and services, including education and cultural services	5.8	8.9	12.0
Total private consumption	100.0	100.0	100.0

Source: Statistical Yearbook of the Republic of China 1975, 1976, pp. 208–209.

32. For data used, see Statistical Yearbook 1975, pp. 2, 208–209.

33. See Monthly Bulletin of Statistics, The Republic of China, II:7, July 1976, pp. 15, 18.

As per capita consumption increased, the structure of consumption expenditures by types of goods also changed. Table 11 shows the percentage shares of types of expenditures in total private consumption: (1) food, beverages, and tobacco; (2) clothing and footwear; (3) gross rent, fuel and power, furniture, furnishings, household equipment, and operations; (4) medical care and health expenses; (5) transportation and communications; (6) recreation, entertainment, education, and cultural services; (7) miscellaneous goods and services. Two distinctive features of the trend are evident. First, the share of food in personal consumption declined considerably, indicating an expenditure (or income) elasticity of less than one.[34] This change conforms with the experience of other countries and accords with Engel's law.[35] Second, the shares of all other categories increased.[36] Changes in the shares of transportation and communications, and recreation and other services are especially marked. Although this may seem unusual, it is by no means unique. The Japanese experience in 1952–64 shows a similar pattern.[37] So does the cross-section comparison of non-Communist countries with different levels of per capita income. However, it should be borne in mind that the level of per capita income is but one of many factors underlying the structural changes in Taiwan. Other socioeconomic and demographic changes such as urbanization, reduction in income inequality, interregional and international diffusion of technologi-

34. One should not confuse the elasticity of consumption of a commodity group with respect to total consumption *expenditures* with the elasticity of consumption of the commodity group with respect to *income*. The two are different concepts. The *income elasticity* of food consumption, for example, is equal to the *expenditure elasticity* of food consumption multiplied by the income elasticity of total personal consumption. In Taiwan's case, we have observed that the average propensity to consume has been declining, implying that it was greater than the marginal propensity; i.e., the income elasticity of consumption is less than one. If the expenditure elasticity of food consumption is also less than one, as in the case here, then one can infer that the income elasticity of food consumption is also less than one. However, where the expenditure elasticity of consumption of a commodity exceeds one, as is the case with all categories other than food in Taiwan, one cannot infer that income elasticity of consumption of these commodity groups is greater or less than one.

35. See Kuznets, 1962, *op. cit.* Note that the empirical findings on structural change in personal consumption based on cross-section intercountry and intertemporal comparisons for individual countries do not always agree. The inverse relationship between the share of food expenditures in total expenditures and the level of per capita income is perhaps the most consistent result.

36. The original data for transportation and communications for 1961 are apparently in error. Hence the irregular pattern.

37. Kuznets, 1968, *op. cit.*, p. 229.

cal change, consumption habits, and the size of households may also be significant.[38] Whatever the causes of the structural change, such changes do indicate shifts from "necessities" (such as food) to "luxuries" (such as recreation, entertainment, education, and cultural services), suggesting a rise in the standard of living.

Consumption expenditure is one important component of the level of well-being of the people. There are other dimensions of welfare, such as the pleasantness of living environment, working conditions, security of income, crime rate, equity in the distribution of the tax burden and benefit, etc. A detailed examination of these elements is beyond the scope of this paper. We shall briefly review changes in three aspects of the quality of life: health, education, and living conditions. Changes in these elements are the consequences of rapid economic growth and in turn may affect future growth.

One commonly used indicator of the general health of the population is its life expectancy at birth. Table 12 shows that the life expectancy of males in Taiwan increased from 56 years in 1952 to 68 years in 1974, and females from 61 to 73 years over the same period. Closely associated with this change was the sharp drop in the crude death rate, from 9.9 to 4.8 per thousand during this period. How this improvement was achieved can be readily seen from the increases in the number of medical personnel and hospital beds per thousand population in 1952-74. Again it is clear that the change in the last decade or so was much more impressive than during the decade before

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38. For some in-depth studies, see Yung-san Lee, "The Effect of Population Growth on Consumption Patterns in Taiwan," in *Conference on Population and Economic Development in Taiwan,* Institute of Economics, Academia Sinica, Taipei, 1976, pp. 487-526, and references therein.

Table 12. Selected Indicators of Social
Development in Taiwan, 1952-1974

	1952	1961	1974
Medical care and health			
Medical personnel per 10,000 population	14.5	16.4	33.8
Physicians	6.3	6.6	9.3
Nurses, including midwives	3.5	5.2	15.5
Others[a]	4.7	4.6	9.0
Hospital beds per 10,000 population	2.9	3.9	6.3
Life expectancy at birth: Male (no. of years)	56.5	62.3	67.9
Life expectancy at birth: Female (no. of years)	60.7	67.7	72.8
Crude death rate (no. per 1,000)	9.9	6.7	4.8
Infant mortality rate (no. per 1,000)	37.2	32.7	14.1
Crude birth rate (no. per 1,000)	46.6	38.3	23.4
Education			
Enrollment rate, primary education (age 6-11)[b]	84.0	96.0	98.5
Secondary education (age 12-17)			
Male	17.9	33.9	69.8
Female	7.2	16.6	56.8
Higher education (age 18-24)			
Male	1.5	4.0	11.8
Female	0.2	0.9	7.1
Public expenditures on education as % of GNP	1.7	2.4	3.0
Living conditions			
Percent of urban population in total	47.6	50.9	63.4
Percent of households using electricity	35.4	60.8	97.3
Percent of households using piped water	28.8	30.8	46.1
Radio receivers per 1,000 population	—	87.8[c]	88.8
TV sets per 1,000 population	—	1.4[d]	60.1
Telephone sets per 1,000 population	4.2	9.8	57.0
Automobiles per 1,000 population	1.1	2.2	15.3

[a] Includes herb physicians, dentists, assistant dentists, pharmacists, and assistant pharmacists.
[b] Ratio of number of students to the corresponding school-age population.
[c] 1962.
[d] 1963.

Source: Economic Planning Council, *Social Welfare Indicators, Republic of China 1975*, Taipei, 1976; *Statistical Yearbook of the Republic of China, 1975*, Taipei, 1976.

Meanwhile, the crude birth rate also declined sharply, from 46.6 per thousand in 1952 to 23.4 per thousand in 1974. Taiwan began its development process in the early 1950s with substantial population pressure. The rapid reduction in the mortality rate would have intensified the pressure had not the birth rate fallen even more sharply. As it was, the natural rate of increase in population fell from 3.6 percent in 1952 to 1.9 percent in 1974. From a longer perspective, the almost simultaneous improvement

in health conditions and reduction of the crude birth rate within a short period is one of Taiwan's most important achievements as well as one of the most significant development lessons Taiwan could offer to other countries.[39]

Development planners have rightly placed great emphasis on education as an investment in human capital. Nonetheless, this in no way diminishes the importance of intellectual enlightenment as a development objective in itself. But whether education is to be an end or means to economic growth, its tremendous development in Taiwan is unmistakable. By 1974, over 98 percent of the population aged 6–11 years are enrolled in primary schools. The enrollment rates for the population in age groups of 12–17 and 18–24 have also risen severalfold. In particular, the rather sharp rise in secondary school students has been due to the extension of free schooling for ages six to nine since the late 1960s. This is reflected in part in the rise of the share of public expenditures on education in total GNP. As noted earlier, GNP has grown very fast in the last two decades, but public expenditures expanded even faster so that its share increased from 1.7 percent in 1952 to 3 percent in 1974.

Seven indicators of the changing living conditions are summarized in Table 12. The proportion of total households using electricity and piped water rose sharply. By 1974 about 97 percent of the households were using electricity. The percentage is substantially higher than the percentage of total population in urban areas, indicating that rural electrification is highly developed. The numbers of major consumer durables (television, telephones, and automobiles) per thousand population increased dramatically, especially since 1961, but the number of radios remained unchanged. In sum, all the indicators suggest substantial improvements in the standard of living in the last two decades or so. This is not to say that there have been no disamenities resulting from economic growth. Indeed there are clearly discernible negative aspects, such as the pollution of air and water in Taipei, traffic overcrowding in the cities, and erosion of traditional cultural values, all directly or indirectly associated with rapid industrialization. Still, it is difficult to accept the conclusion that such undesirable developments have outweighed the tremendous positive achievements.

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39. The problem is actually more complicated than it appears. See T. Paul Schultz, *Evaluation of Population Policies: A Framework for Analysis and Its Application to Taiwan's Family Planning Program*, Santa Monica: The Rand Corporation, R-643-AID, June 1971.

Table 13. Selected Indicators of Personal Consumption,
Six Asian Economies, 1973

		Taiwan	Japan	S. Korea	Philippines	Mainland China	India
(1)	Per capita income, U.S.$	601	3,838	374	262	221	128
(2)	Percent of total consumption						
	Food, beverages, and tobacco	47.1	32.4	54.6	59.3	—	61.2
	Clothing and footwear	5.4	9.4	12.0	5.9	—	7.8
	Gross rent, fuel and power	17.8	14.8	8.0	10.6	—	8.6
	Furniture, furnishings and household equipment	4.5	10.4	3.5	5.8	—	3.9
	Miscellaneous goods and services	25.2	33.0	21.9	18.4	—	18.5
	Total private consumption	100.0	100.0	100.0	100.0	—	100.0
(3)	Nutrition						
	Calories per capita per day	2,620	2,510	2,520	1,940	2,170	2,070
	Protein, grams per capita per day	70	79	68	47	60	52
(4)	Education**						
	Public expenditures per capita, U.S.$	23	166	10	7	9	2
	School-age population per teacher	53	30	76	47	47	58
	School-age population in school,	66	70	65	67	63	39
	Literacy rate	85	99	88	72	95	34
(5)	Health						
	Public expenditures per capita, U.S.$	17	130	1	1	2	1
	Population per physician	2,967	864	1,983	1,490	8,142	4,399
	Population per hospital bed	1,064	97	1,723	776	1,000	1,980
	Infant mortality, no. per 1,000	18	12	60	78	55	139
	Life expectancy at birth	69	73	61	58	62	50

(6) Other indicators

Sugar consumption per capita, kg†	19.6	30.4	6.5	20.5	4.8	6.5
Newsprint consumption per capita, kg†	2.0	20.2	4.8	1.5	0.9	0.3
Energy consumption per capita, kg†	1,427	3,839	961	309	460	201
Steel consumption per capita, kg†	151	691	124	29	37	14
Radios per 1,000 population	94	658††	127††	47	16*	24
Television sets per 1,000 population	58	229	36	11	0.4*	0.3
Telephones per 1,000 population†	48	35.6	3.5	1.1	—	0.3
Passenger cars per 1,000 population†	6.0	144.0	2.3	8.7	—	1.2

— Not available.

† 1974.

†† 1972.

* 1970.

** School-age refers to ages 5-19. Literacy rate refers to percent of adult population (over 15) able either to read or write.

Source: Ruth Leger Sivard, *World Military and Social Expenditures 1976,* Arms Control Association, 1976, pp. 26-27; *Statistical Yearbook of the Republic of China 1975,* pp. 2, 117, 153, 166-168, 209, 280; United Nations, *Yearbook of National Accounts Statistics 1975,* New York: United Nations, 1976, Vol. I, pp. 627-628, 782, 834-835, Vol. II, pp. 323-324; United Nations, *Demographic Yearbook 1965,* New York: United Nations, 1966, p. 135, United Nations, *Demographic Yearbook 1974,* New York: United Nations, 1975, p. 129; United Nations, *Statistical Yearbook 1975,* New York: United Nations, 1976, pp. 70, 380, 493-494, 582, 587, 593-594, 605, 901; *China: Energy Balance Projections,* Washington, D.C.: Central Intelligence Agency, 1975, p. 33.

Table 13 compares a number of socioeconomic indicators for six economies in 1973 to show how Taiwan stands among these countries. Direct comparison of per capita consumption in terms of a common currency unit is not possible for lack of statistical data. As an approximation, we compare the per capita GDP in U.S. dollars. These figures are subject to serious limitations in comparability, and the share of personal consumption in GDP varies widely among countries. Nonetheless, the differences shown in Table 13 are so wide that clearly Taiwan's per capita consumption in 1973 was above all these countries except Japan. A comparison of the structure of consumption corroborates this finding. In general, the larger the shares of such "luxuries" as household equipment and miscellaneous goods and services, or conversely, the lower the shares of "necessities" such as food, clothing, and rent, the higher the standard of living. As Table 13 shows, the share of "luxuries" in total consumption in Taiwan (29.7 percent) is lower than Japan's but higher than those of the three other economies.

A comparison of the daily calorie intake per capita indicates that the people in Taiwan enjoy a larger supply of calories. To some extent, the number of calories depends partly on climatic conditions. A better indicator of the standard of living is the per capita consumption of protein in the diet. Here, again, Taiwan is second only to Japan in terms of protein consumption.

In education and health, Taiwan's public expenditures on education on a per capita basis are much less than Japan's, but several times larger than the other countries'. Its enrollment rate and literacy rate are about the same as all others except India. The relative sizes of population per physician or hospital bed rank about the middle among the six economies. However, its infant mortality rate is distinctly lower, and its life expectancy at birth distinctly higher than all others except Japan.

Various other indicators also convey the impression that the standard of living in Taiwan is quite high relative to that in other countries. Its per capita consumption or possession of eight major industrial products ranks second or third. In particular, the number of television sets, radios, telephone, and passenger cars per capita is very much higher than in most other countries.

IV. SOURCES OF GROWTH

The preceding sections describe the various dimensions and consequences of growth. We turn to the question: How did the Taiwan economy grow so fast? Longrun growth of output is

possible only if there is a sustained increase both in the productive capacity of the economy and in aggregate demand. The first question is, therefore: What are the sources of growth on the supply side?

Changes in Output per Worker and Employment

As a first approximation, the growth of GNP can be separated into two parts: the rates of growth in the size of the labor force and output per worker. Table 14 shows two interesting features in the rates of growth of these two elements in 1952-73 and in the two subperiods. First, for the period as a whole, growth of output per worker contributed a larger share to growth of GNP than increase in employment, a characteristic common to economies undergoing rapid economic expansion. Second, the pattern of change in the subperiods shows that the growth rate for employment rose markedly, whereas that of output per worker remained the same in the 1960s as compared with the 1950s. As a result, increase in output per worker accounted for about three-fourths of the growth in GNP during 1952-60, but it declined to about one-half in 1961-73.

Table 14. Rates of Growth of GNP, Employment,
and Output Per Worker in Taiwan, 1952-73

(Percent per year)

	1952-60	1960-73	1952-73
GNP	6.9	9.7	8.6
Employment	1.6	4.7	3.5
Output per worker	5.3	5.0	5.1
Output per worker as share of total	76.8	51.5	59.3

Source: Statistical Yearbook 1975.

The growth of employment at 3.5 percent per year over two decades is impressive. Its significance, however, lies in the extent to which human resources in Taiwan have been fully and economically utilized.[40] Some insight into the question can be

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40. For excellent studies of various aspects of this problem see Cheng Li (ed.), *Taiwan jen-li tzu-yuan lun-wen-chi* (Studies in Human Resources in Taiwan) Taipei: Lien-ching Publishing Co., 1975; and *Conference on Population and Economic Development in Taiwan,* Taipei: Institute of Economics, Academia Sinica, 1976.

gained by relating employment to population and labor supply as shown in Table 15. Three points suggested by the data are of interest. First, the proportion of population participating in production had hardly changed between 1953 and 1974. The rapid increase in employment was matched by an equally rapid increase in total population.

Table 15. Labor Supply and Employment in
Taiwan, 1953, 1960, and 1974

		1953	1960	1974
(1)	Total population (1,000)	8,283	10,612	15,708
(2)	Population, aged 15 and over (1,000)	4,759	5,822	9,957
	a. Not in labor force	1,677	2,339	4,321
	b. Labor supply	3,082	3,483	5,636
(3)	Employment (1,000)	2,888	3,270	5,486
(4)	Unemployed (1,000)	194	213	150
(5)	Labor participation rate	34.9	30.8	34.9
(6)	Percent of population aged 15 and over	57.5	54.9	63.4
(7)	Ratio of labor supply to population, aged 15 and over	64.7	59.8	56.6
(8)	Employment rate	93.7	93.9	97.3
(9)	Unemployment rate	6.3	6.1	2.7

Source: (1) and (2)—*Statistical Yearbook 1975,* pp. 14-15, 20. Totals refer to midyear population calculated by taking an average of those in beginning and end of year.

(2)a = (2) minus (2)b.

(2)b = sum of (3) and (4).

(3) and (4) — W. Y. Kuo, "A Study of Factors Contributing to Labor Absorption in Taiwan, 1954-1971," *Conference on Population,* pp. 485, 494.

(5) = (3)/(1).

(6) = (2)/(1).

(7) = (2)b/(2).

(8) = (3)/(2)b.

(9) = (4)/(2)b.

Second, the rate of increase of total population was especially high in the early 1950s so that the number of new entrants into the labor supply in the late 1960s and early 1970s was quite large, raising the proportion of those aged 15 and over from 58 percent in 1953 to 63 percent in 1974. In short, potential labor supply actually increased faster than population or employment.[41] However, the economic life of the people of Taiwan is such that not all those in this age group would seek employment. In fact, the

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41. Strictly speaking, potential labor supply should be defined as the total population in the age group 15 and over, less the number of those disabled. The latter is believed to be small relative to total population.

proportion of those that could have been but are not gainfully employed has increased, partly because of a sharp rise in student enrollment in the secondary level or above, and partly because of an increase in life expectancy and per capita income. Thus, if we define labor supply as those aged 15 and over, excluding those unable or unwilling to work and those not otherwise occupied (such as students and housewives), total effective labor supply as a percentage of those in the age group 15 and over declined from 65 percent in 1953 to 57 percent in 1974.

Third, the rate of employment, defined as the ratio of those gainfully employed to effective labor supply increased perceptibly from 93.7 percent in 1953 to 97.3 percent in 1974. Correspondingly, the unemployment rate was cut in half from about 6 percent in 1953 to 3 percent in 1974. It probably went up in 1975 somewhat under the effects of the world recession.

Growth of employment is but one of several dimensions of the problem of labor's contribution to growth of output. Possible changes in man-hours worked, in the quality of labor, and in interindustry shifts in the employment structure are also pertinent. The limited information on hours of work suggests little change over the years.[42] This means that employment changes are fair approximations to changes in labor input. No information on the changing quality of labor is available, but there can be little doubt that the tremendous achievements in Taiwan's educational effort noted in the preceding section has greatly enhanced the contribution of Taiwan's labor force to economic growth.

On the question of structural shifts in employment, it can be shown that, *ex post,* changes in output per worker for the economy as a whole reflected relative changes in sectoral output per worker and in the sectoral shares of employment.[43] Table 16 presents

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42. *Statistical Yearbook 1975,* p. 45.

43. Let O and O' represent total output in the current and base periods; N and N', total employment in the current and base periods; and Oi and Ni, output and employment in sector i. Then,

$$\frac{O/N}{O'/N'} = \sum \left[\left(\frac{O_i/N_i}{O_i'/N_i'} \right) \cdot \left(\frac{N_i/N}{N_i'/N'} \right) \cdot \frac{O_i'}{O'} \right]$$

The item on the left-hand side refers to changes in overall output per worker. The three items on the right hand side represent changes in the average output per worker in sector i, relative changes in sector i's employment share, and the output share of sector i in the base period.

estimates of output and employment structure and output per worker by the three broad sectors: agriculture, industry, and services in 1952, 1962, and 1972. As may be expected, output per worker in agriculture is lower than those in industry or services, and the gap has been increasing. A comparison of the relative output per worker in the industry and service sectors in the last two decades indicates that the ratio of the former to the latter has been increasing. The trend is consistent with the findings based on cross-country studies that the ratio is positively correlated to total product per worker.[44]

Table 16. Output and Employment Structures and
Output Per Worker in Taiwan, 1952, 1962, and 1972

	1952	1962	1972
Shares in NDP, current prices (%)			
Agriculture	35.7	29.0	16.7
Industry	17.9	25.7	35.3
Services	46.4	45.3	48.0
Shares in labor force (%)			
Agriculture	52.1	45.9	33.0
Industry	20.2	22.5	32.1
Services	27.7	31.6	34.9
Product per worker (1000 NT/worker)			
Total	5.1	18.0	46.1
Agriculture	3.5	11.4	23.4
Industry	4.5	20.6	50.7
Services	8.6	25.8	63.5
Index of output per worker (%)			
Total	100.00	352.9	903.9
Agriculture	100.00	325.7	668.6
Industry	100.00	457.8	1,126.7
Services	100.00	300.0	738.4

Source: Economic Planning Council, 1974, pp. 27–28; Kuo, 1976, pp. 492 pp. 492, 494.

Capital Formation

It has been observed that the rise in output per worker has been responsible for a considerably larger share of the growth in GDP than has the rise in the size of the labor force in the two

44. Simon Kuznets, *Quantitative Aspects of the Economic Growth of Nations. II. Industrial Distribution of National Product and Labor Force,* in Economic Development and Cultural Change, V:4, Part II, July 1957, p. 41.

decades since 1952 (Table 14). Changes in the output per worker, however, are the combined result of many factors other than those associated with labor, such as changes in the stock of capital per worker, new technology, scale of production, efficiency in management, and so on. Among these factors, capital investment is perhaps one of the most important.[45] This is primarily because the formation of physical capital is a necessary if not sufficient condition for an increase in productive capacity, and because growth in any economy must depend on its own capability to generate and sustain fairly high rates of capital formation. To evaluate the performance of the Taiwan economy in this particular respect, we focus on three issues: (1) the level, structure, and trend of capital formation proportions, to indicate the changing volume of output set aside for investment; (2) the financing of capital formation, to trace the sources of funds that make capital formation possible; and (3) the relation between investment and economic growth, to indicate roughly how effectively investment is being used to increase output.

Table 17 shows the gross domestic capital proportions in 1952-74 in constant 1971 prices. Three observations based on this table are worth noting. First, the proportion of capital formation rose significantly during 1952-74, from an average about 12 percent in the 1950s to about 27 percent in the early 1970s. Over the entire period, it accounted for about 18 percent of total output. Second, the rising trend shows sharp upturns around 1960 and 1965. Before 1960, the rate of capital formation averaged less than 12 percent. It rose to 16 percent in 1961-65, followed by an even larger increase to 25 percent after 1965. Third, the increase in the rate of capital formation was almost entirely due to the rise in the rate of fixed capital formation. The proportion of inventory change in total output varies from year to year but remains more or less constant at about 3 percent over the long run.[46] The overwhelmingly large share of fixed capital formation is significant because fixed capital formation generally contributes more to increasing productive capacity than increases in stocks.

45. The role of investment in economic growth has been a controversial issue in the economic literature of the 1950s and 1960s. But despite the controversy, no development economist goes so far as to deny the importance of capital. See Gerald M. Meier, *Leading Issues in Economic Development,* Second edition, London: Oxford University Press, 1970, pp. 165-185.

46. The exceptionally high percentage in 1974 was probably due in part to the accelerated purchase of raw materials in the face of world inflation following the oil crisis, and in part to involuntary inventory accumulation.

Table 17. Percentage of Gross Capital Formation
in Gross Domestic Product, 1952-74*

(Percent)

	Gross Capital Formation	Gross Fixed Capital Formation	Increase in Stocks
1952	12.0	9.1	2.9
1953	12.5	10.8	1.7
1954	12.7	10.7	1.7
1955	9.9	8.6	1.3
1956	11.0	9.3	1.7
1957	10.3	8.5	1.8
1958	11.7	9.9	1.7
1959	12.8	11.1	1.7
1960	14.7	12.0	2.7
1961	15.4	12.7	2.7
1962	15.5	12.5	3.0
1963	15.3	13.5	1.8
1964	16.4	12.8	3.6
1965	19.1	14.2	4.9
1966	19.8	16.4	3.4
1967	22.4	18.6	3.8
1968	24.4	20.5	3.9
1969	23.5	20.8	2.7
1970	25.7	21.7	4.0
1971	25.8	22.9	2.9
1972	23.4	24.1	-0.7
1973	24.9	23.7	1.2
1974	34.0	25.9	8.1
Average			
1952-60	11.9	10.0	1.9
1961-65	16.3	13.1	3.2
1966-74	24.9	21.6	3.3
1952-74	18.0	15.2	2.7

* Based on totals in constant 1971 prices.
Source: Statistical Yearbook 1975, pp. 194-195.

Table 18. Capital Formation Proportions, Six Asian
Economies, 1952, 1961, and 1972[a]

	1952	1961	1972
Gross capital formation (%)			
Taiwan	15	20	23
Japan	26	35	36
South Korea	16[b]	14	.22
Philippines	12	19	19
Mainland China	—	—	—
India[c]	10	15	15
Gross fixed capital formation (%)			
Taiwan	11	16	24
Japan	20	33	34
South Korea	7[b]	12	20
Philippines	11	17	17
Mainland China	10	—	24[d]
India[c]	10	15	15
Increase in stocks (%)			
Taiwan	4	4	-1
Japan	6	2	2
South Korea	9[b]	2	1
Philippines	1	2	1
Mainland China	—	—	—
India	—	—	1

[a] Based on totals in current prices except those for Mainland China.

[b] 1953.

[c] Fiscal year beginning 1 April, 1952, 1961, and 1970 respectively.

[d] 1970 and 1957 prices.

— Nil or not available.

Source: United Nations, *Yearbook of National Accounts Statistics 1969,*
Vol. II, 1970, pp. 46-47; 1973, 1975, pp. 42-44; ECAFE, *Economic Survey of Asia
and the Far East 1957,* p. 216; *Statistical Yearbook 1975,* pp. 194-195; Field, 1976.

Compared with those of five selected Asian countries shown
in Table 18, Taiwan's capital formation proportion in 1972 is
second only to that of Japan, and substantially above those of the
Philippines and India. Even more impressive is the rapidity with
which the current high capital formation was attained. While all
the developing countries experienced a rise in capital formation
during this period, none experienced an increase as large as that
of Taiwan.

Capital formation can be financed by domestic savings or
capital flows from abroad. Foreign capital inflows are important
both as additional resources to fill the savings or foreign
exchange gaps and as carriers of new technology. But in the long

run, economic growth can be sustained only if internal financing becomes an inherent part of the growth process. Table 19 shows the proportions of the two different sources of capital formation in Taiwan in 1952–72: gross domestic savings (which include provision for capital consumption and private and public savings) and capital inflows (which include U.S. aid, foreign capital, and loans). Up to 1962, Taiwan depended heavily on external sources. During this period U.S. aid, foreign capital, and loans accounted for over one-third of domestic capital formation. But after 1962, there was a sharp drop in the percentage of external financing. The dramatic shift reflects the increasing capability of the economy to generate domestic savings. By comparison, there had been no discernible downward trend in the degree of reliance on foreign financing in Korea or the Philippines over more or less the same period, although proportions of foreign financing in the early stages in these countries were lower than in Taiwan.[47] About the only other developing country in the group that has become much more independent of external financing since the early 1960s is Communist China. However, the method of mobilizing domestic savings is very much different in the two regions.

47. See United Nations, *Yearbook of National Accounts Statistics 1969*, New York: United Nations, 1970, pp. 201–202.

Table 19. Sources of Gross Capital Formation, 1952–72*
(Percent)

		Gross Domestic Savings			
	Total	Provision for Capital Consumption	Net National Savings Total	Private	U.S. Aid, Foreign Capital, and Loans
1952	58.1	31.3	26.8	27.7	40.0
1953	60.6	33.0	27.6	26.6	36.9
1954	49.7	31.2	18.5	21.6	52.5
1955	65.6	37.6	28.0	25.5	32.5
1956	58.0	33.2	24.8	25.1	42.9
1957	63.4	36.9	26.5	23.5	33.2
1958	54.1	33.2	20.9	18.3	44.2
1959	51.2	33.2	18.0	16.3	45.8
1960	59.9	32.1	27.8	23.2	37.3
1961	64.8	31.4	33.4	32.9	35.6
1962	68.4	33.1	35.3	34.8	34.5
1963	93.6	35.2	58.4	49.9	4.0
1964	99.8	32.7	67.1	52.1	-1.2
1965	84.9	27.0	57.9	42.4	15.4
1966	93.2	26.8	66.4	52.1	4.5
1967	89.5	24.4	65.1	49.4	7.9
1968	88.5	23.9	64.6	43.4	11.5
1969	94.8	24.4	70.4	42.3	4.1
1970	97.8	24.2	73.6	51.1	0.8
1971	108.9	25.8	83.1	62.9	-9.8
1972	127.5	27.6	99.9	69.2	-27.5

* Gross domestic savings and capital inflows do not sum up to 100 percent because of statistical discrepancies.

Source: Economic Planning Council, *Taiwan Statistical Data Book 1974*, p. 41.

As Table 19 shows, the rise in the share of domestic savings in Taiwan was due primarily to the increase in net national savings. While provision for capital consumption declined slightly, net national savings rose from 25 percent of total domestic capital formation in the 1950s to about 85 percent in the early 1970s. The latter, in turn, was the result of the rising trends in both private and public savings. By contrast, savings in Communist China consist almost entirely of public savings. In Taiwan, the decision to save or consume remains largely with the individuals or private businessmen. In Communist China, the state determines how much to save.

The incremental output-capital ratio (i.e., the ratio of increase in output to investment) has often been used to show what additions to output could be obtained from one unit of investment. Other things being equal, the higher the ratio the larger the "returns" to a given amount of investment. The concept has many limitations and its measurement is usually beset with numerous difficulties.[48] For this reason, measures of total factor productivity are often used instead. Nonetheless, under certain not too unrealistic assumptions, the ratio can be useful as a device to separate the two elements underlying the rate of growth of output: the rate of savings and the incremental output-capital ratio.[49] This has been done by others for various countries.[50] It is interesting to compare Taiwan's experience with some of the findings for other countries summarized in Table 20.

48. See Otto Eckstein, "Capital Theory and Some Theoretical Problems in Development Planning," *American Economic Review*, May 1961, 92-101; Maurice Allais, "The Influence of the Capital-Output Ratio on Real National Income," *Econometrica*, 30 1962, 700-728; A. A. Walters, "Incremental Capital-Output Ratios," *Economic Journal*, December 1966, 818-822; G. Myrdal, *Asia Drama*, New York: Twentieth Century Fund, 1968; Hagen, *op. cit.*; Harvey Liebenstein, "Incremental Capital-Output Ratios and Growth Rates in the Short Run," *Review of Economics and Statistics*, February 1966, 20-27; Kazuo Sato, "International Variations in the Incremental Capital-Output Ratios," *Economic Development and Cultural Change*, July 1971, 621-640; J. Vanek and A. H. Studenmund, "Toward a Better Understanding of the Incremental Capital-Output Ratio," *Quarterly Journal of Economics*, August 1968, 435-451.

49. These assumptions are that new technology is generally embodied in new capital; the rate of utilization of existing equipment remains more or less constant, the supply of factors other than capital is fairly elastic; and appropriate time lags have been allowed for.

50. Kuznets, 1960, *op. cit.*; Simon Kuznets, VI. *Long Term Trends in Capital Formation*, in *Economic Development and Cultural Change*, IX:4, part II, July 1961; Liebenstein, *op. cit.*; Sato, *op. cit.*; United Nations, *Statistical Yearbook 1960*, New York: United Nations, 1960.

Table 20. Rates of Growth of Output, Investment,
and Incremental Output–Capital Ratios,
Selected Countries, 1950s and 1960s

Country	Period	Rate of growth of GNP (%/year)	Rate of investment (%)	Incremental output–capital ratio
(1) 18 countries	1951–57	4.6	15.5	0.30
(2) 10 countries†	1950–58	4.7	14.2	0.33
(3) Taiwan	1952–58	7.1	11.4	0.62
	1960–72	9.5	20.1	0.47
(4) Japan	1960–72	10.6	36.7	0.29
(5) S. Korea	1960–72	9.2	20.2	0.45
(6) Philippines	1960–72	5.3	20.2	0.26
(7) India	1960–70	3.4	16.6	0.20
(8) Communist China†	1961–70	4.2	21.5	0.20

† Gross fixed capital formation only.

Source: (1) Kuznets, 1960, pp. 50–51. See pp. 78–79 for countries in the group. (2) Kuznets, 1961, p. 16. (3) Statistical Yearbook 1975, pp. 194–195; (5) through (7) United Nations, 1975, pp. 42–44, 101, 114. (8) Liu and Yeh, 1973, pp. 218–221.

The comparison brings out several notable features in Taiwan's development experience. First, the ratio for Taiwan is distinctly higher than the average for developing countries in the 1950s and for the other selected countries in the 1960s. In short, during these periods investments were rather "productive" in the sense that increase in output per unit of investment was much larger than in other countries.

Second, in the 1950s, the rate of growth of output in Taiwan was higher than the average for developing countries, not because the rate of investment was higher but because its incremental output–capital ratio was higher. Similarly, Taiwan's rate of growth of GNP was higher than those of the Philippines, India, and Communist China in the 1960s for the same reason.

Table 21. Sectoral Distribution of Gross Fixed
Capital Formation in Taiwan, 1952–74*

(Percent)

	1952	1960	1970	1974
Agriculture	20.5	15.0	7.5	6.8
Industry[1]	21.5	25.9	37.9	38.4
Utilities	7.1	10.9	9.4	16.7
Transportation	10.3	14.9	14.5	8.8
Housing	1.7	2.0	1.2	0.8
Others[2]	38.9	31.3	29.6	28.5
Total	100.0	100.0	100.0	100.0

[1] Includes mining, manufacturing, and construction.
[2] Includes trade, education, military construction, and other services.
* Based on totals in current prices.
  Source: Statistical Yearbook 1975, pp. 210–212.

Third, the incremental output–capital ratio for Taiwan during the two subperiods declines, suggesting that a higher rate of growth of output was obtained only from much more capital. The declining trend could have been due partly to a shift of investment from sectors with higher ratios (such as manufacturing) to those with lower ratios (such as utilities and transportation), and partly to changes to technology that requires more capital per unit of output.[51] But the sectoral distribution of gross fixed investment shown in Table 21 indicates that such shifts are likely to have rather small effects. Industry's share of investment did rise markedly from 1952–70 and remained at a high level between

51. Changes in relative prices could also have been a factor.

1970 and 1974. However, the increase was largely offset by the decline in the share of agricultural investment, so that if we take investment in agriculture and industry together, their combined share hardly increased in 1952-74.[52] Similarly, aggregate investment in the sectors with low output-capital ratios such as transportation and housing also remained virtually unchanged, from 27.8 percent in 1960 to 26.3 percent in 1974, the sharp rise in the share for utilities during 1970-74 being offset by a decline in the shares of transportation and housing. The presumption is quite strong that structural or technological changes within a sector favoring lower incremental output-capital ratios have taken place. Little is known about technological changes associated with the new investment. There are, however, some indications that within the industry sector more investment apparently has been allocated to "heavy" industries in recent years. This is suggested by the rather drastic change in the output structure in the last decade or so. Gross value added in the manufacture of food, beverages, and tobacco as a percentage of value added in manufacturing as a whole declined from 45 percent in 1960 to 19 percent in 1974.[53] By contrast, the share of chemicals, and chemical, petroleum, coal, rubber, and plastic products increased from 10 percent in 1960 to 23 percent in 1974; and that of fabricated metal products, machinery, and equipment from 8 to 24 percent over the same period. To the extent the change in output structure implies a corresponding shift in investment allocation and that investment in the "heavy" industries requires larger doses of capital per unit of output, a good part of the decline in the aggregate incremental output-capital ratio could be traced to structural shifts within the industry sector. Whatever the cause for the decline, if the trend should continue, the need for further rise in the savings ratio would be great, as more and more investment would be required to compensate for the decline in the incremental output-capital ratio in order to maintain a high rate of growth.[54]

Growth in Total Factor Productivity

Thus far we have been concerned with growth of employment and capital stock as two major sources of growth. Other factors, such as improvement in skills, technology, organization, and

52. Note that investment in agriculture includes mostly equipment purchase for agricultural production. Investment in water works and the like is included in "others" as part of investment by producers of government services.

53. *Statistical Yearbook 1975*, pp. 206-207.

54. An incisive analysis of this problem was made by Ta-chung Liu in an unpublished study.

scale, also contribute to growth of output. How significant these other factors were, relative to capital stock and employment, can be roughly measured by a combined capital and labor input approach.[55] Table 22 summarizes estimates of the sources of growth of output, attributable to growth of labor, capital and "total productivity" in Taiwan, Japan, the Philippines, India, Communist China, and the Soviet Union. The comparison brings out several interesting features in Taiwan's development process. The first is the relative importance of increases in total productivity compared with growth of labor and capital inputs. It accounted for over one-half of the growth of total output in the last two decades, far more significant than increases in capital or labor.[56]

55. The rate of growth of these other factors, generally referred to as total factor productivity or technical progress, is defined as that portion of growth of total output not attributable to increases in labor and capital input. We use here a simple method developed by Solow that measures technical progress as the residual obtained by deducting the logarithmic aggregation of the rates of growth in labor and capital from the rate of growth of total output. The weights used in combining the labor and capital inputs represent the relative factor shares in total output and are assumed to add up to one. This simple device is subject to a number of criticisms. Conceptually, its weakness lies in the restrictive properties of the underlying Cobb-Douglas production function. Implicitly, the approach assumes neutral technical progress, technical progress being independent of increases in factor inputs, and constant unitary elasticity of substitution between factors (whatever the factor intensity). Statistically, as the residual, the measure not only includes increases in total productivity but also contains the measurement errors in the capital and labor series. Moreover, both capital and labor are highly heterogeneous with respect to levels of skill and age. The meaning of the aggregate series is thus imprecise. Because of these limitations, many attempts at refinement have been made. (For a comprehensive survey of these studies, see M. Ishaq Nadiri, "Some Approaches to the Theory and Measurement of Total Factor Productivity: A Survey," *Journal of Economic Literature*, December 1970, 1137-1177; and C. Kennedy and A. P. Thirlwall, "Surveys in Applied Economics: Technical Progress," *Economic Journal*, March 1972, 11-72.) However, these various more sophisticated approaches are not without shortcomings. For example, the more general constant elasticity of substitution production function (of which the Cobb-Douglas is a special case) has specification errors that only production functions with variable elasticity of substitution could avoid. (See the discussion in George H. Hilderbrand and Ta-chung Liu, *Manufacturing Production Functions in the United States, 1957,* Ithaca, New York: New York State School of Industrial and Labor Relations, Cornell University, 1965.) For our present purpose of a limited inquiry, the simple Solow approach, though far from ideal, is adequate.

56. Although the weights used to combine labor and capital outputs are arbitrarily assigned, estimates of productivity increase using alternative sets of weights are not very sensitive to the choice of weights. The same findings are also true of the estimates for the Philippines. See Jeffrey G. Williamson, "Dimensions of Postwar Philippine Economic Progress," *Quarterly Journal of Economics,* February 1969, p. 96.

Table 22. Sources of Growth of Real National Income, Selected Countries
(Percent per year)

Country	Period	Growth of national product	Sources of growth		
			Labor input	Capital input	Increase in productivity
Taiwan	1952–73	8.61	1.79	2.37	4.45
	1952–61	6.86	1.04	1.12	4.70
	1961–73	9.94	2.36	3.34	4.24
Japan	1953–71	8.77	1.85	2.10	4.82
	1953–61	8.13	1.91	1.62	4.60
	1961–71	9.29	1.78	2.57	4.94
Philippines	1947–65	5.75	2.24	1.01	2.50
India	1950–60	4.48	1.86	1.55	1.06
Communist China	1952–57	6.00	1.05	1.95	2.90
Soviet Union	1950–58	6.40	1.08	3.60	1.72
	1958–67	5.30	1.02	3.60	0.68

Sources: (1) Taiwan — GDP in 1971 prices, *Statistical Yearbook 1975*, pp. 194–195; employment, W.Y. Kuo, 1976, p. 494; capital stock data provided by Professor W.Y. Kuo. The weights are assumed to be 0.6 and 0.4 for labor and capital inputs respectively. (2) Japan — Edward F. Denison and William K. Chung, "Economic Growth and Its Sources," in Hugh Patrick and Henry Rosovsky (eds.), *Asia's New Giant*, Washington, D.C.: Brookings Institution, 1975, p. 94. (3) Communist China — T.C. Liu, "The Tempo of Economic Development of the Chinese Mainland, 1949–65," *An Economic Profile of Mainland China*, Washington, D.C.: U.S. Government Printing Office, 1967, pp. 62–63. (4) Philippines and India — M. Ishag Nadiri, "International Studies of Factor Inputs and Total Factor Productivity: A Brief Survey," *Review of Income and Wealth*, June 1972, p. 136. (5) Soviet Union — Abram Bergson, "Towards a New Growth Model," *Problems of Communism*, March-April, 1973, p. 3.

Second, in both absolute and relative terms, productivity increases in Taiwan during the 1950s was greater than in all the other countries, including Japan. During this period, Taiwan's growth of total output was only moderately higher than those of the Philippines, Communist China, and the Soviet Union. Yet its productivity increase was far greater than in those countries. In the 1960s, the pace of productivity increase in Taiwan remained high, far above that of the Soviet Union and only slightly below that of Japan. Since productivity indicates how efficiently the inputs are being used, its change is a useful measure of economic performance. In this respect, Taiwan has out-performed the Philippines, India, Communist China, and the Soviet Union, and its record matches that of Japan.

Third, in Taiwan and, for that matter, in most other countries for which estimates are available, productivity increases have slowed down in the 1960s compared with those in the 1950s.[57] However, the growth of output in Taiwan accelerated, while those in other countries slowed. The result was that the relative importance of productivity increases in Taiwan's growth declined, while that of capital input increased markedly. If the trend should continue, it points again to the increasing importance of capital formation in Taiwan's future growth.

Sources of Growth: Changes in Final Demand

Turning to the sources of growth on the demand side, we summarize the contributions of various components of final expenditures to GDP growth in Table 23.[58] For the period as a whole, exports of goods and services were the most important; government consumption and increase in stocks were the least important. The picture, however, was very much different in the 1950s. During 1952–60, growth of private consumption and government consumption accounted for over 80 percent of the growth of GDP. But since then, the contribution of both components declined, while those of gross fixed capital formation and exports rose sharply. By the early 1970s exports constituted over 80 percent of total growth.

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57. See M. Ishaq Nadiri, "International Studies of Factor Inputs and Total Factor Productivity: A Brief Survey," *Review of Income and Wealth*, June 1972, p. 147; and Williamson, *op. cit.*, p. 96.

58. By definition, GDP is the sum of its components. Its rates of growth can thus be expressed as the sum of the growth rates of the components each weighted by its percentage share in GDP at the base period. The contribution of each item to growth of total product is simply the share of its weighted rate of growth in the growth of GDP.

Table 23. Sources of Growth of GDP by
Final Expenditures, 1952-73

	1952-73	1952-60	1960-70	1970-73
Average annual rate of growth (%)				
Private consumption	7.7	6.2	8.2	9.6
Government consumption	4.7	6.0	4.2	2.6
Gross fixed capital formation	13.7	10.6	15.7	15.2
Increase in stocks	4.1	5.9	13.6	-25.3
Exports	17.6	9.0	21.3	29.9
Less: imports	13.2	6.1	16.8	21.3
Gross domestic product	8.6	6.9	9.1	11.8
Percentage share of GDP growth (%)				
Private consumption	49.9	55.6	52.2	44.0
Government consumption	11.2	27.4	11.4	3.8
Gross fixed capital formation	26.8	16.1	28.7	28.8
Increase in stocks	0.8	2.4	4.9	-5.8
Exports	53.9	12.2	43.2	87.9
Less: Imports	42.7	13.7	40.4	58.7
Gross domestic product	100.0	100.0	100.0	100.0

Source: Statistical Yearbook 1975, pp. 194-195. Estimates are based on totals in constant 1971 prices.

To identify exports as the fastest growing component of total output is simply to describe what happened. The decomposition of output growth does not tell us whether export expansion was the cause or consequence of growth, and if the former, how export expansion has generated growth. Has Taiwan's growth been export-led? Export-led growth occurs when an export expansion originating from an external source triggers domestic growth. Cves has suggested a test of whether growth is export-led. If the export expansion arises primarily from external demand, then changes in the prices and quantity of exports should be positively correlated; if it arises from shifts in domestic supply, the correlation would be negative.[59] By this test, Taiwan's growth was clearly export-led, since both the price index for exports and the export volume moved upward during 1952-73. To be sure, one can trace the origin of Taiwan's export expansion at some stage to such exogenous factors as the liberalization of Japan's import restrictions, the sharp increase in imports of the developed countries, and the escalation of the Vietnam War in the 1960s. And, the increase in exports undoubtedly had direct effects on

59. Richard E. Caves, "Export-Led Growth and the New Economic History," in J. N. Bhagwati (ed.), *Trade, Balance of Payments and Growth*, Amsterdam: North Holland, 1971, 403-442.

output growth. However, at most, such external factors could have accounted for only part of the growth of exports. An equally, if not more plausible, explanation of the relation of exports and economic growth is that exports played a strategic role in channeling the inflow of resources essential for domestic growth. A glance at the ratio of imports to GDP shows that Taiwan's reliance on imported goods has been increasing during the last two decades. In 1974, Taiwan required almost three times as much imported resources per unit of GDP as it did in 1952. These imports contributed to economic growth in several ways. First, close to one-half of total imports consists of raw materials and fuels for which the possibility of domestic substitution in the short run is rather limited. Fuel, oil, cotton, and wheat are examples. Second, capital goods imports also accounted for a substantial share of total imports, larger than that of consumer goods. We noted earlier the importance of investment to Taiwan's economic growth, and clearly investment depends heavily on imports.[60] Third, imports of capital goods have also been major carriers of foreign technology. But growth of imports could not have been achieved without a concomitant export growth, particularly after U.S. economic aid was terminated in 1965.

60. For an interesting model of the relation between imports and growth along these lines, see Tzong-shian Yu, "Taiwan's Foreign Trade and Economic Growth," in Cheng Sun (ed.), *Studies in Taiwan's Foreign Trade*, Taipei: Lieng-ching Publishing Co., 1975, 85–131.

Table 24. Relative Effects of Increased Home Demand, Export
Expansion and Import Substitution on Manufacturing
Output, 1953-70

(Percent)

	Home demand	Export expansion	Import substitution
Total manufacturing products			
1953-70	80.0	28.1	-8.0
1953-55	99.5	-8.6	9.2
1955-60	91.7	16.5	-8.3
1960-65	82.7	17.3	0
1965-70	73.4	34.9	-8.3
Nondurable consumer goods			
1953-70	42.5	59.1	-1.6
1953-55	75.2	2.5	22.4
1955-60	84.6	21.2	-5.8
1960-65	72.2	31.3	-3.3
1965-70	27.9	78.8	-6.8
Metals and machinery			
1953-70	65.4	15.4	19.1
1953-55	80.5	1.5	18.0
1955-60	93.6	3.8	2.5
1960-65	77.9	9.5	12.6
1965-70	72.4	22.2	5.4
Intermediate goods			
1953-70	84.4	13.7	1.9
1953-55	99.4	0.5	0.1
1955-60	96.2	5.5	-1.6
1960-65	77.5	14.8	7.7
1965-70	87.0	16.1	-3.0

Source: Liang Kuo-shu, *op. cit.*, p. 236.

Table 24 shows the relative effects of increased domestic
demand, export expansion and import substitution on manufac-
turing industries for 1953-70 and subperiods, estimated by
Liang.[61] (1) For manufacturing as a whole, the importance of
export expansion is clear. Except for the early 1950s when import
substitution was significant, exports accounted for an increasing
proportion of total output growth. (2) The most drastic shifts
occurred in the nondurable consumer goods. In the early 1950s,
the influence of domestic demand was dominant. Import substitu-
tion accounted for 22 percent of its output growth, and the effect of
export expansion was miniscule. By the late 1960s, export

61. Kuo-shu Liang, "Taiwan's Exports and Employment," *ibid.*, pp. 209-246.

expansion became the most important source of growth, far more important than domestic demand, not to mention a negative effect of import substitution. (3) A similar but less drastic change has also taken place in metals and machinery and intermediate goods. In both cases, domestic demand remained significant, with export expansion assuming an increasingly important role, particularly for metals and machinery.

V. SUMMARY

The intent of this chapter is to describe what happened to the Taiwan economy in the last two decades in terms of some broad aggregates. The principal findings can be briefly summarized: (1) The most significant feature is of course the high rate of growth of total and per capita output since 1952. Few nations in the world, both developed and developing, could match Taiwan's performance during this period. Fewer still had achieved such a high rate of growth with relatively stable prices and little fluctuations in output, and in the face of rapid population growth and a heavy commitment to defense. Of the five main economies selected for comparison, only Japan and South Korea experienced such high growth rates. The Philippines, Communist China, and India belong to a different group with distinctly lower growth rates.

(2) As is characteristic of all countries going through rapid industrialization, Taiwan's industrial and employment structure shifted in favor of manufacturing, while the share of agriculture in GDP declined. The unique feature in Taiwan's experience is that the transformation occurred in a fairly short span of time. Furthermore, the agricultural sector actually expanded quite rapidly as the economic structure changed. This was in marked contrast to the experience of such economies as that of Communist China.

(3) From yet another standpoint, Taiwan's economic change was also unique. Like most other developed countries, Taiwan shifted from a high-consumption to a high-investment economy. But unlike most others, its development process went through, first, an import substitution stage, which was then replaced by a dramatically different export-oriented phase.

(4) As per capita income rose, both the level and the structure of per capita consumption changed. Per capita consumption more than doubled in two decades. Proportions of consumption expenditures on high-income elasticity items (education, recrea-

tion, household equipment) increased markedly. Other indications of social development, such as life expectancy, enrollment rate in schools, and television sets per capita, also suggest rapid improvements in this standard of living to a level considerably more advanced than other developing Asian economies.

(5) Rapid growth was the result of growth in employment and even faster growth in output per worker. The latter is probably related to the sharp rise in the capital formation proportions. U.S. aid was particularly important in financing capital formation up to the early 1960s. But domestic savings and to a lesser extent foreign private capital became the important sources of capital formation after 1965. The incremental output-capital ratio has been fairly high, considerably above those of other countries. But it declined somewhat in the last decade, presumably because of structural changes within the industrial sector favoring industries that required larger doses of capital per unit of output. The change suggest that, if the trend continues, demand for capital will intensify in the future growth of the Taiwan economy.

(6) A breakdown of the sources of growth of GDP by the simple Solow method indicated that increases in total factor productivity were far more important than either the growth of labor input or capital input. The overall pattern is similar to that of Japan but very much different from those of the Philippines, India, or the Soviet Union where increases in labor or capital input were the important sources of growth. It will be recalled that the growth rates of Taiwan and Japan are substantially higher than the rates of these other countries. The disparities in the growth rates might well be related to the difference in the relative weights of the various sources of growth.

(7) An examination of the increase in GDP by final expenditures indicates that increments in exports by far accounted for the largest share. Exports have become important only since the 1960s, reflecting the dramatic shift of an import substitution policy in the 1950s to an export promotion policy since the late 1950s. In an important sense, the economic achievements of Taiwan were largely due to the successful promulgation of an outward-looking policy.

Our brief overview necessarily overlooks many interesting aspects of Taiwan's development experience. In particular, we have not discussed the role of the government and the major economic policies in various stages of development. It will suffice to point out that U.S. aid, land reform and technological change

in the agricultural sector, and an inward-looking development strategy emphasizing import-substitution were the major landmarks in this first phase of the development (1952–59). Since the 1960s, export expansion has provided the momentum for rapid economic growth. Subsequently, the inflow of private foreign capital and technology became the crucial growth-generating elements, reinforcing the outward-looking development program. Some of these issues will be taken up in the following chapters.

Chapter II

INCOME DISTRIBUTION IN THE PROCESS OF ECONOMIC GROWTH IN TAIWAN

Yuan-Li Wu

I. INTRODUCTION

Economic Benefits — Distribution and Growth

Analysis of economic development in quantitative aggregates would be woefully incomplete if one were to ignore the distribution of benefits of development. If we compare the GNP, a frequently used quantitative measure of economic welfare, to a pie, successful economic development will make the pie larger, as has been amply demonstrated in the case of Taiwan. However, since a growing "pie" is not produced merely as an object of wonderment, to be admired in the abstract but not to be touched by anyone, how the pie is sliced and how and when the slices are made available to individual members of the society are an inalienable part of economic development. Success or failure of the development process must, therefore, be judged from the points of view of both production and distribution.

Some students of economic development have even gone so far as to suggest that a single index of economic development might be constructed that would automatically take into account both aspects[1] so that when the index is employed in choosing from among economic policies and assessing their results, the best policies chosen will automatically take both goals into account. For instance, one might divide the population into five (or any other number of) income classes in descending order of income size, each class to consist of one-fifth (or quintile) of the total population. One might then choose to consider a 1% increase in income of the lowest fifth of the population to be equivalent to a multiple of a 1% increase in the income of the highest one-fifth, and so forth for the other income intervals. If such a weighting system is adopted in calculating the result, a policy to achieve

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1. See Montek S. Ahluwalia and Hollis Chenery, "The Economic Framework," Chapter II in Hollis Chenery, Montek S. Ahluwalia, C.L.G. Bell, John H. Duloy and Richard Jolly, *Redistribution with Growth* (Oxford: Oxford University Press, 1974). A. K. Sen has actually developed such a measure. See his "Real National Income," *Review of Economic Studies,* Vol. 43, No. 1 (February 1976): 19-39.

high economic growth would automatically tend to favor an accelerated increase in the income of the poorest one-fifth of the population. Conversely, a policy favoring the poorest segment of the population in income distribution would tend to yield a higher calculated rate of growth even if the absolute increase in output were constant.

The choice of weights in constructing such a comprehensive index of development (i.e., including objectives in both production and distribution) must in the final analysis rest on value judgments, and a decision on this basis can be reached only as a part of the society's political process, with the term "political" being construed in a very broad sense, including both ideological considerations and practical (i.e., institutional and other) constraints. However, before we proceed further, let us remind ourselves of some of the relationships between production and distribution in general, as well as the object of distribution.

First, the nature of the economic development strategy followed will inevitably affect the pattern of *income distribution,* which is a major component of the distribution of benefits in general. For instance, an industry-first policy will initially and directly create more income for those in industry — owners as well as workers — and for those in both industry and non-industry who sell to the industrial sector. Alternatively, an agriculture-first strategy would have the corresponding primary effect on those engaged in agriculture and in industries supplying agriculture. Moreover, whether the development strategy aims at achieving self-sufficiency or is export-orientated is another major channel of causal relationship that directionally runs *from* production *to* distribution. Still another element in development strategy which has causal relationship running from production to distribution is the choice between labor-intensive and capital-intensive methods of production.

Second, a major determinant of the rate of expansion of production is capital formation. Since private capital formation in a market economy, even when there is an inflow of foreign capital, is largely determined by the availability of domestic private savings, the distribution of income, which could affect savings, can influence the rate of increase of aggregate production, although, according to some students, the propensity of thrift may not vary as much between the rich and the poor in Taiwan as one might be inclined to believe a priori. Furthermore, the pattern of income distribution will also affect the composition of market demand for goods, and, therefore, the demand for inputs and the

rate at which production in the aggregate can expand. Here the causal relationship is directionally reversed; the linkage is *from* distribution *to* production.

A third linkage between production and distribution has to do with the effect of the distributive pattern of economic benefits on the institutional framework and socio-political environment within which production takes place. If this environment is hostile to the orderly planning and execution of economic activities, production will not expand rapidly or steadily. Since no economic system can realistically expect the benefits (and cost) of production to be shared absolutely equally by every member of the society, whether the distributive pattern will lead to the emergence of groups whose interests are mutually antagonistic becomes a critical issue to social and political stability. For example, a particular development strategy might consistently favor urban dwellers and discriminate against rural residents so that rural-urban antagonism will in due course arise as an outcome of opposition of economic interests. Antagonism may also stem from conflicting economic interests between farmers and non-farmers, between new immigrants and earlier settlers (e.g., the Chinese in Malaysia versus the Malays under the Bumiputra program), between those who were initially rich and those who were initially poor, and so forth. If the economic development strategy followed tends to create such antagonistic groups, the latter would work against the emergence of political consensus which is needed for an effective economic policy, including measures to modify the distributive pattern that would otherwise prevail. Effective implementation of the income tax, subsidies, and other forms of income transfer, is more likely if a reasonable degree of consensus can be developed. The same issue can also be formulated in terms of the effect of a particular distributive pattern on socio-political homogeneity.

Economic interest groups that could become mutually antagonistic may overlap. For example, there could be one conflict of economic interests between farmers and non-farmers and another between two linguistic or ethnic groups, yet each of the latter may include both farmers and non-farmers. In the Taiwan context, in addition to the usual farmer-non-farmer division, we must also look into the relative positions of the post-1945 settlers (commonly described as "mainlanders") and the pre-1945 settlers (commonly described as "Taiwanese"), who, or whose forebears, came to Taiwan in earlier times.

Economic Benefits and Non-economic Values

The preceding remarks have focused attention on the interrelationships between economic growth and the distribution of economic benefits. However, man does not live by bread alone. A longer life in good health, better education, more congenial working conditions, stable employment, and, last but not least, a greater measure of personal freedom are easily among the desiderata that many would wish to attain. Since economic development is only one aspect of development, and since with economic development many other variables will also change, two questions immediately arise. First, what other variables might usefully serve as indicators of socio-political-economic development other than the sheer volume of output?[2] Discussion of the importance of distribution in addition to production can be viewed as a variant of this question, the scope of which can be expanded to cover non-economic values. Second, what are the interrelationships among these different variables? In particular, how might the pattern of distribution of economic benefits affect that of non-economic values and vice-versa?

Clearly, the development of Taiwan can and should be analyzed also from this broader perspective. [This is discussed in a later chapter of the book from which this chapter is excerpted — ed.] Nevertheless we might note in this connection that, a priori, one can envisage the interrelationships between the distributive patterns of two such variables both as supportive of each other and as substitutes. Thus, as time passes, a more equitable distribution of educational opportunities is likely to lead to greater equality of economic opportunities and, therefore, of income. Conversely, a more equitable income distribution is likely to lead to a more equitable distribution of education.[3] In a more static

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2. See, for instance, Adelman and Morris, *Society, Politics and Economic Development: A Quantitative Approach* (Baltimore: Johns Hopkins University Press, 1967), and D. V. McGranahan, C. Richard-Proust, N. V. Sovani and M. Subramanian, *Contents and Measurement of Socioeconomic Development* (New York: Praeger, 1972). For a discussion on Taiwan in this respect, see Charles H. C. Kao, "Development Indicators and their Implications for Taiwan's Economic Development," *Industry of Free China*, Taipei: Economic Planning Council, Vol. XXXXI, No. 5 (May 1974).

3. These propositions are predicated on the assumption that the initial level of educational opportunities is sufficiently high so that their greater availability would benefit the recipients. Similarly, in the second case, the initial level of income must be sufficiently high if a more equal distribution is to be beneficial. A more equal distribution of very little income (or of educational opportunities) would hardly increase the potential availability of more educational opportunities (or of income).

sense, it is quite plausible that at a given time those who are at the lower end of income distribution could regard greater educational opportunities, such as special scholarships, as partially making up the disadvantage they suffer in income distribution. The initial disadvantage could be viewed as temporary, and more future advantage may be traded for less present advantage.

Of all the non-economic values to which people aspire, perhaps the most fundamental is the sharing of political decision-making power which can result in a more equitable "allocation" of all other "values." Consider now the relationship between the distributive patterns of income — representing all economic benefits — and of political power — representing all non-economic values. On the one hand, those who do not enjoy an equal share of political power may regard a more than equal share of income as an adequate compensation, at least in the short run, and vice versa. On the other hand, as equity in the distribution of political power increases, it is likely to be used to increase equity in income distribution.[4] By the same token, as income distribution becomes

4.

Increasing
political
equality

Increasing
income equality
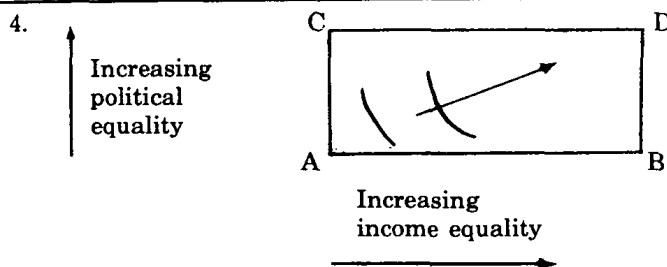
In the above diagram Point A represents total inequality in both income distribution and the distribution of political power. Point D, on the other hand, denotes complete equality in both respects. Point C represents complete political equality together with complete economic inequality in distribution. At the other end, Point B represents complete economic equality with complete political inequality. The proposition advanced in the text is that both B and C are essentially unstable situations. As political equality increases, for instance, through the evolution of democratic institutions, it is likely that the more equally distributed political power will be used to promote economic equality. This essentially is in accord with the thesis advanced by Simon Kuznets in his 1955 paper on the tendency toward greater income equality during the later stages of economic development following the establishment of political democracy. See also Simons Kuznets, "Demographic Components in Size-distribution of Income" (Papers and Proceedings of the Seminar sponsored by the Japan Economic Research Center and The Council for Asian Manpower Studies, December 16-20, Vol. II, July 1975). On the other hand, Point B is also unstable because the population that shares economic benefit and power equally among its members will probably be unwilling to support the smaller group holding political power in a

more equal, barring the existence of a totally authoritarian government,[5] it will become increasingly improbable for inequity in the distribution of political power to prevail inasmuch as such an inequity will become progressively harder and more costly to support. [These issues are also discussed fully in the next chapter — ed.]

Finally, the distribution of the benefits of economic development is, of course, only one side of distribution. The obverse is the distribution of development costs, which one might regard as negative benefits. Unfortunately, it is not possible to net the benefits or costs of economic development for individual members or groups of the society. Rather the two aspects must be considered separately. Since consideration of the distribution of the costs of development would require a detailed examination of the sources of private savings and of the financing of government capital formation, which would take us far afield, we will confine our discussion in this paper to an account of income distribution and how changes in the pattern have come about.

II. INCOME DISTRIBUTION IN TAIWAN

Distribution by Income Class — A Preliminary International Comparison with Developed and Less Developed Countries

According to an IBRD study on income distribution in less developed countries[6] (LDCs), the typical pattern to be found in an LDC is as shown in Table 1.

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highly concentrated form. Such a situation would seem to require the use of force by those holding political power in order to maintain their own authority.

Our hypothesis suggests that the two kinds of equality can to some degree be traded in order to maintain the same level of satisfaction for individual segments of the population. This is illustrated by the "indifference curves" shown in the diagram. At the same time, it is also our hypothesis that increase in either income (or political) equality is likely to facilitate further increases in political (or income) equality. The movement in the direction from A to D, as denoted by the arrow in the diagram, tends to become progressively easier, at least for a part of the way. This part of Kuznets' hypothesis may be true even if his argument that economic development in its early stages leads to greater inequality may not hold. The point raised by Oshima in "Income Inequality and Economic Growth, the Postwar Experience of Asian Countries," in *The Malayan Economic Review*, Vol. XV, No. 2 October 1970), is further substantiated in our discussion in the text.

5. One may note in this connection Mao Tse-Tung's concern about the periodic recurrence of "revisionist tendencies" in mainland China which would give rise to greater income inequality especially as the lower incomes remain at an extremely low level absolutely.

6. Chenery et al., *op. cit.*, pp. XVI and 40.

Table 1. Income Distribution in LDCs

Percent of total Households Arranged in Descending Order of Income	Percent of Total Income
Highest 20%	53
2nd 20%	22
3rd 20%	13
4th 20%	7
Lowest 20%	5
Total	100

Sixty-six developed and underdeveloped countries that had data on income distribution were examined by the author and classified into three groups: (1) "high inequality" (income share of the lowest, i.e., poorest, 40% of all households being less than 12%); (2) "moderate inequality" (income share of the lowest 40%, between 12 and 17%); (3) "low inequality"[7] (income share of the lowest 40%, 17% and above). Each of the three groups was further divided into three subsets according to the level of per capita income. See Table 2.

Of the 66 countries included in the IBRD study, ten are in East, Southeast and South Asia.[8] In terms of GNP per capita, Japan is the most developed of these ten while Sri Lanka, India, Pakistan and Burma, all in South Asia, with Burma also straddling Southeast Asia, are the poorest. The remaining five, including Taiwan, Korea, Thailand, Malaysia, and the Philippines fall within a relatively narrow range and are all in East or Southeast Asia. For comparison, the respective income distribution patterns of these Asian countries, as given by Chenery et al., can be seen in Table 3.

As far as Taiwan is concerned, especially noteworthy are (1) the virtually identical pattern of its income distribution with that of Japan, (2) the close approximation of the Taiwan and Japanese patterns to that of the United States, and (3) the slightly larger share of the lowest 40% on the income ladder in the Taiwan and Japanese distributions as compared with the other Asian countries of low inequality, or, for that matter, as compared with the United States.

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7. Montek Ahluwalia, "Income Inequality: Some Dimensions of the Problem," Chapter I, in Chenery et al., op. cit., pp. 8-9.

8. Iran, Iraq and Turkey are regarded as Middle Eastern countries and are, therefore, not listed here.

Table 2.   Number and Percent Distribution of
Selected Countries in Terms of
Income Distribution

	Total	High Inequality	Moderate Inequality	Low Inequality
		(1) 26 Countries with per capita GNP up to US $300 a year		
Number	26	10	8	8
Percent	100.0	38.4	30.8	30.8
		(2) 21 Countries with per capita GNP of US $300-750 a year		
Number	21	10	6	5
Percent	100.0	47.6	28.6	23.8
		(3) 19 Countries with per capita GNP above US $750		
Number	19	3	8	8
Percent	100.0	15.8	42.1	42.1
		(4) All 66 Countries		
Number	66	23	22	21
Percent	100.0	34.8	33.3	31.8

Source: Chenery et al., *Redistribution with Growth* (Oxford: Oxford University Press, 1974), pp. 8-9.

The fact that income distribution has become increasingly equitable over a lengthy period of rapid growth in GNP per capita has made the Republic of China on Taiwan one of the few developing countries whose growth is "distributionally biased" in favor of persons with low incomes. A comparison with three other Asian countries can be seen in the estimates of Chenery et al., given in Table 4.

The Trend of Increasing Equality in Income Distribution by Household

The cross-section comparison presented in Table 2 shows the Taiwan economy as one of low income inequality on the basis of 1964 data. A closer examination can be made by looking at the same statistics in several benchmark years both before and after 1964. These figures show a progressive decline of inequality during a 20-year span in terms of several alternative measures (Table 5).

Several phenomena are most interesting from the point of view of economic policy, and politically most significant from the

Table 3.   Patterns of Income Distribution in
Selected Asian Countries

	Year of Data	GNP per Capita (US $)	Relative Shares of Income by Income Class		
			Lowest 40% of All Households	Middle 40% of All Households	Top 20% of All Households
High Inequality					
The Philippines	1971	239	11.6	34.6	53.8
Malaysia	1970	330	11.6	32.4	56.0
Moderate Inequality					
Burma	1958	82	16.5	38.7	44.8
India	1964	99	16.0	32.0	52.0
Low Inequality					
Sri Lanka	1969	95	17.0	37.0	46.0
Pakistan	1964	100	17.5	37.5	45.0
Thailand	1970	180	17.0	37.5	45.5
ROK (South Korea)	1970	235	18.0	37.0	45.0
ROC (Taiwan)	1964	241	20.4	39.5	40.1
Japan	1963	950	20.7	39.3	40.0

Source: Chenery et al., *op. cit.*, pp. 8-9.

According to Chenery et al., "The income shares of each percentile group were read off a free-hand Lorenz curve fitted to observed points in the cumulative distribution. The distributions are for pretax income. Per capita GNP figures are taken from the World Bank data files and refer to GNP at factor cost for the year indicated in constant 1971 U.S. dollars."

For the benefit of American readers, the corresponding figures for the United States, also a country of low income inequality, are:

1970	4,850	19.7	41.5	38.8

perspectives both of the Republic of China and of other countries. One is the combination of a progressive movement toward greater equality by income class with a sharp increase in GNP and in average household income over the same period. At constant 1972 prices, per capita GNP in Taiwan rose from NT$10,875 in 1964 to NT$19,122 in 1972, while average household income rose from NT$32,452 in 1964 to NT$61,032 in 1972.[9] This means that the

9. At constant 1972 prices the real household income of the lowest decile rose by 109.2% from NT$9,854 in 1964 to NT$20,618 in 1972. In contrast, the improvement for the top decile was 52.5% during the same period, from NT$84,454 in 1964 to NT$128,760 in 1972. These data, not including the Taipei municipality

Table 4.   Comparative Income Growth Rates

| | | Annual Rates of Income Growth in Percent by | | | Annual Increase in | | |
| | | Class of Income Recipients | | | Welfare for the Country as a Whole | | |
	Period	Upper 20%	Middle 40%	Lowest 40%	GNP Weights	Equal Weights	Poverty Weights
Korea	1964-70	10.6	7.8	9.3	9.3	9.0	9.0
The Philippines	1961-71	4.9	6.4	5.0	5.4	5.5	5.4
India	1954-64	5.1	3.9	3.9	4.5	4.1	4.0
Taiwan	1953-61	4.5	9.1	12.1	6.8	9.4	10.4

Source: Chenery et al., *op. cit.*, Chapter 2, p. 42.

"Equal Weights" implies a weight of 0.2 for the upper 20% of the income recipients, and 0.4 and, again, 0.4 for the middle and lowest 40% respectively. "Poverty Weights" are 0.1 for the highest 20%, 0.3 for the middle 40%, and 0.6 for the lowest 40%.

Although the "poverty weights" are clearly arbitrary and could just as well be replaced by other weights, the effect of their use in the case of Taiwan is especially illuminating.

groups at the lower end of the income ladder enjoyed an accelerated rate of absolute and relative improvement, which is what some development economists have advocated as most desirable.[10] The narrowing of the income gap between the rich and the poor in the course of economic growth through the faster improvement of those in lower income intervals is bound to affect mutual perceptions of one another by people of different incomes, making the establishment of consensus for major policies easier. Given the wide distribution of television sets in Taiwan and the great visual impact of differences in living standards and life styles due to income differences, this is an important stabilizing and unifying influence not to be lightly ignored.

A second interesting phenomenon is the continuation of the trend toward greater equality over the entire 20 year period. The first decade of economic development was accompanied by a sharp decrease in income inequality: 18% between 1953 and 1961

for 1972, would yield a ratio between the top and bottom deciles of 6.2. If Taipei is included, as in Table 2, the ratio becomes 6.8, reflecting the greater concentration of higher income households in the capital city.

10. See Chenery et al., *op. cit.*

Table 5. Changes in Income Distribution in Taiwan

Distribution in Quintiles	1953	1961	1964	1972
Lowest quintile of all households	3.0	4.5	7.7	8.6
Second quintile	8.3	9.7	12.6	13.1
Middle quintile	9.1	14.0	16.6	17.0
Fourth quintile	18.2	19.8	22.1	22.2
Highest quintile	61.4	52.0	41.0	39.1
Second highest 15%	28.8	26.4	24.8	24.8
Top 5%	32.6	25.6	16.2	14.3
Gini Coefficient	0.56	0.46	0.33	0.30
Ratio of Income Share				
Top 10% to bottom 10%	30.4	19.3	8.6	6.8
Top 20% to bottom 20%	20.5	11.6	5.3	4.6
Index of Decile Inequality	0.46	0.37	0.26	0.24

Source: Wan-yong Kuo, "Income Distribution by Size in Taiwan Area — Changes and Causes" (Paper presented to the Joint JERC-CAME Seminar on Income Distribution, Employment and Economic Development in Southeast and East Asia, Tokyo, December 16-20, 1974), Table 5. The original 1953 figures are taken from Kuo-wei Chang, "An Estimate of Taiwan's Personal Income Distribution in 1953 — Pareto's Formula Discussed and Applied" (in Chinese), *Journal of Social Science,* Taipei, Vol. 7 (August 1956): 260. The 1961 estimates are from Kuo-wei Chang's report on a *Pilot Study of Personal Income and Consumption in Taiwan* (mimeographed in English), prepared under the auspices of a National Income Statistics Working Group of the Directorate-General of Budget, Accounting & Statistics (DGBAS), of the Executive Yuan, Table A, p. 23. The 1964 estimates are those of DGBAS as presented in its report on *Survey of Family Income & Expenditure & Study of Personal Income Distribution in Taiwan* (in Chinese). The 1972 estimates are also based on DGBAS data, adjusted by Wan-yong Kuo with income tax receipts data and through the incorporation of data for the Taipei *special municipality* which is no longer included in the original provincial figures following the elevation of its administrative status in 1968. (Provincial Statistics in 1968 still include Taipei.) The 1964 data in this table give us 20.3% for the lowest 40%, 38.7% for the middle 40%, and 41% for the top 20%, which are very close to the estimates for Taiwan in Table 1.

in terms of the Gini income concentration ratio.[11] This was followed by a further decrease in terms of the same index of 28.3% in 1961-64 and of another 9.1% in 1964-72. How did these

11. The Gini index can vary from 0 (total absolute equality) to 1 (total inequality). The Gini index for family income in the United States was .37 according to the 1960 census and .36 in the 1970 census. That of Japan was .35 (1960). U.S. Bureau of the Census, 1960 and 1970 *Census of Population,* Part I, *U.S. Summary,* and Annual Report of the *Family Income and Expenditure Survey,* Japan, 1963.

progressive and continued improvements in distribution come about simultaneously with rapid increases in total output and several significant shifts of Taiwan's development strategy during the two decades?

Income Differentials between Farmers and Non-Farmers and Sectoral Distribution Patterns

If changes in income distribution in Taiwan have resulted in greater equality in terms of various measures based on income classes cutting across different economic sectors, what changes in income differences have occurred both between and in individual sectors? An answer to this question will go a part of the way in answering the question raised at the end of the last section. As mentioned in the Introduction, growing differences in this respect could also create antagonisms detrimental to economic and political stability and the national consensus in policy making.

Let us attempt to answer this question with respect to farm and non-farm families[12] about which considerable statistical information is available. Using the DGBAS data for 1970-72 adjusted to include the city of Taipei, Kuo Wan-yong shows that while income equality increased in the entire economy during 1964-72, the degree of equality increased more — that is, the Gini coefficient decreased more — for non-farm families than for farm families (Table 6). In 1972, the Gini coefficient showed a greater degree of equality for the former than for the latter although their relative standings had been the reverse in 1964. The "cross-over" occurred between 1970 and 1971. Given these patterns of distribution within the two sectors, respectively, it is not surprising that the rapid expansion of the industrial sector in the late 1960s and early 1970s contributed to greater overall equality rather than inequality.

Contrary to the preceding favorable distributive effect of rapid industrial growth, to be explained below, an unfavorable development during 1964-72 was the widening discrepancy between farm and non-farm incomes although both were rising. Average income per farm family rose by 53.3% between 1964 and 1972, from NT$32,013 to NT$49,090, at constant 1972 prices. On the other hand, average non-farm family income rose by 97%, from NT$32,740, virtually at par with farm family income, in 1964 to

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12. The classification is based on the occupation of the family head. Family income from all sources is included. Thus, the income of a farm family may include income from both agricultural and non-agricultural pursuits of all family members. The same is true of the income of a non-farm family.

Table 6. Gini Coefficients of Income Concentration by Sector

Year	Farm	Non-farm	Both Sectors
1964	0.315	0.336	0.328
1968	0.292	0.338	0.335
1970	0.283	0.285	0.299
1971	0.297	0.292	0.301
1972	0.291	0.288	0.295

Source: Kuo Wan-yong, "Income Distribution by Size in Taiwan Area — Changes and Causes" (1974). (Papers and Proceedings of the Seminar sponsored by the Japan Economic Research Center and The Council for Asian Manpower Studies, December 16-20, Vol. II, July 1975), Table 7.

NT$64,497 in 1972, 31.5% higher than the corresponding farm figure.[13] This factor is probably among the most serious potential threats to income equality if it is allowed to continue unchecked.

Economic Policy and Income Equality

The changes in overall and sectoral income distribution in Taiwan can be explained in terms of (1) sectoral emphasis and shifts in development strategy over time, (2) the open economy and foreign trade orientation of the island, (3) the initial state of asset distribution and subsequent changes effected by government intervention, and (4) other governmental measures that have improved access to education and technology and redirected investment in favor of certain groups and sectors that might otherwise have been at a disadvantage in comparison with the rest of the society.

The 1950s and Early 1960s

Two basic facts should be borne in mind. First, since the ratio of labor to capital in agricultural production, given Taiwan's small-farm, labor-intensive economy, was a priori greater in

13. Kuo, op. cit., 1974, Table 13. This increasing sectoral discrepancy also accounted for the fact that the overall Gini index in 1970-72 (Table 4) is higher than both sectoral coefficients. See Kuo, op. cit., for a technical discussion of what she calls the "within," "between," and "share" effects.

agriculture than in the non-agricultural sector during the 1950s, a larger share of factor income should go to labor in the agricultural sector than in the non-agricultural sector as production in both sectors increased. (The reverse may be true in the case of the labor-land ratio other than urban housing construction.) How the relative shares of labor to capital (or labor to land) in factor income might change in the aggregate would depend upon the relative rates of growth of the two economic sectors during a given period. Second, as shown in Table 7 the contribution of agriculture to net domestic product per capita grew at about the same rate during 1952-60 as did the non-agricultural sector. Thus, if other things had been equal, the expansion of agricultural and non-agricultural production at a virtually equal pace during 1952-60 should not alter the proportion between factor income earned by labor and factor income that went to owners of property, i.e., both land and capital. The benefit of increased production would then be shared by labor and property owners in the same proportion as their respective income shares were at the beginning of the period.

Table 7. Contribution of Agriculture to Net
Domestic Product per Capita

	1952	1960	1972
Total population (in thousand persons)	8,128	10,792	15,289
Agriculture	4,257	5,373	5,947
Non-agriculture	3,871	5,419	9,342
Net Domestic Product (NT$ million)			
Agriculture	5,233	16,528	38,121
Non-agriculture	9,424	34,305	190,217
Per Capita Value-added (NT$)			
Agriculture	1,229.3	3,076.1	6,410.1
Non-agriculture	2,434.5	6,330.5	20,361.5
Ratio of Non-agriculture:			
Agriculture	1.98:1	2.06:1	3.18:1

Source: *Taiwan Data Book* (Taipei: Economic Planning Council, 1974), pp. 4, 27, 49.

However, other things did not remain equal during this period. One of the most important economic events in the early 1950s, if not the most important single event, was the implementation of land reform in Taiwan in 1953 (one of the benchmark years previously selected), preceded during 1949-52 by sale of public land

and reduction of land rent paid by tenant farmers. The rent reduction had the effect of reducing the rate of return to property in the agricultural sector, thereby increasing the relative share of labor in a period of rising agricultural output and income (Table 8).

Table 8.   Distribution of Agriculture Income
by Factor (in percent)

	Land	Capital	Labor
Before Land Reform			
(Under Japanese Rule)			
1941	52.20	11.48	36.32
1942	51.99	11.44	36.57
1943	45.65	10.04	44.31
Post Land Reform			
1953	37.39	8.23	54.38
1956	36.28	7.98	55.74

Source: S. C. Hsieh and T. H. Lee, "Nung-yeh Fa-chan ti Tsung-ho Lun-shu" (A Comprehensive Study of Agricultural Development). JCRR Special Report No. 28, July 1959 reprinted in T. H. Yu, ed., *Taiwan Nung-yeh Fa-chan Lun-wen-chi* (Essays on Taiwan's Agricultural Development) (Taipei: Lien-ching Publications Co., 1975), p. 37, Table 13.

Under Land Reform, the conversion of many tenants into owner farmers and wider dispersion of land ownership, with limitation on the size of individual holdings, had the effect of further spreading property income among a larger number of farm families. The net effect of rent reduction and land reform together, therefore, was to increase sharply the degree of equality in income distribution in the agricultural sector.

It goes without saying that these beneficial effects of asset redistribution through land reform could have been at least partially nullified had agricultural production declined. The actual increase in production after land reform enabled the recipients of property income in the agricultural sector also to enjoy rising income from property ownership. One must therefore also examine why agricultural output actually increased after land reform, a point to be discussed elsewhere.

The overall equalizing effect of greater income equality in the agricultural sector during 1952-60 was not offset by developments in the non-agricultural sector where income distribution was more unequal. Several factors contributed to this outcome. First, the discrepancy between agricultural and non-agricultural per capita income which developed later did not widen significantly during this period. Second, the expansion of production in the non-agricultural sector during this period was probably brought about by an increase mostly in relatively small businesses, many of which were established by new immigrant entrepreneurs from the China mainland. Even in the beginning of the 1970s small firms employing less than 100 persons each were still responsible for 35% of gross production in manufacturing.[14] Private capital ownership was not highly concentrated. A number of large industrial enterprises previously owned by the Japanese had been taken over by the ROC government and were run as public enterprises so that income which would have accrued to property owners of these enterprises went to the Treasury. Third, outside the economic infrastructure which was expanded by the government and government enterprises, industrial production in Taiwan during this early phase of the island's postwar economic development stressed consumer goods production using products from the agricultural sector as inputs. Thus expansion in the non-agricultural sector had the effect of stimulating production in the agricultural sector where income distribution was more equal. At the same time, production in the industrial sector was not capital intensive; the initial asset distribution did not seem to be highly

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14. See Gustav Ranis' essay on Taiwan in Chenery et al., op. cit., 1974.

According to the criteria employed by the ROC government, any firm that is engaged in manufacturing, processing or handicraft production is officially designated as a small or medium-sized enterprise (a) if its registered capital and total assets are below NT$5 million and NT$20 million respectively, or (b) if its registered capital is below NT$5 million and its employment is below 100-300 persons, the exact cut off being dependent upon the nature of the industry. For firms engaged in trade, service and transportation the maxima are 50 persons in employment and NT$5 million in annual sales. Of all these firms, those employing fewer than one hundred persons are generally regarded as "small businesses." According to the 1971 Industrial and Commercial Consensus, the small firms numbered 276,095 or 98.97% of all the reporting firms. Within the manufacturing sector, they numbered 40,737 or 95.43% of the total. These small manufacturers were responsible for 35% of gross production, 35.6% of employment, 34% of value-added, and 45% of export sales, as compared with the entire manufacturing sector. See C. C. Chao, "Small Business Development" (paper prepared for the US-ROC Symposium for Small Business Development and Trade Promotion, San Francisco, March 25-26, 1976).

concentrated; the small-scale enterprises tended to spread the benefit of increased production more widely among owners of industrial property. Also, the most important industrial inputs used by the agricultural sector at that time, viz., chemical fertilizers and pesticides, were mostly imported. Their purchase did not constitute a source of demand for the domestic industrial sector. Finally, greater industrial employment and the relative ease of business formation by enterprising persons of low income were obviously helpful in raising the earnings of the lower-income groups in the non-agricultural sector.

To sum up, (1) the ROC government's initial emphasis on agricultural production, (2) asset redistribution through land reform, (3) the consumer goods and small business emphasis in the industrial sector, and (4) certain characteristics of asset distribution of the postwar and post-1949 period were responsible for the improvement in income distribution in Taiwan during the 1950s and the beginning of the 1960s.

From the 1960s to the early 1970s

Although further improvement in income equality slowed down during the 1960s and early 1970s, a remarkable phenomenon was that the movement toward greater equality continued in both the farm and non-farm sectors. This occurred in spite of a widening gap between farm and non-farm family incomes due to the failure of agricultural production to keep pace with the accelerated expansion of industrial production. Several factors are involved in explaining what happened to income distribution in the second decade.

First, the crux of the development strategy adopted during this period was the expansion of foreign trade. In the light of the preceding expansion of the agricultural sector, export expansion began very naturally with increased export of agricultural and processed agricultural products. This was helpful in sustaining agricultural income.

Second, because of the paucity of its natural resources, Taiwan's foreign trade orientation involved an expansion of both exports and imports. By eschewing self-sufficiency as an objective, the rapidly expanding exports were based on progressively increasing imports which included many capital-intensive products. Any attempt to achieve self-sufficiency by stressing import substitution at this point would doubtless have reduced the rate of expansion considerably. The export orientation of Taiwan's economic development not only increased the rate of economic

growth, but also reduced the rate at which capital's share of factor income was to increase.

Third, much of the export expansion during this period took place in the form of labor-intensive products. Imported raw materials and intermediate goods were processed into finished goods for export through the concentrated application of labor which was much cheaper in Taiwan than in the countries where Taiwan exports were marketed. The several Export Processing Zones established to attract foreign capital were especially illustrative of this practice. The effect on income distribution was twofold. Within the industrial sector, the very rapid expansion of labor-intensive exports in the late 1960s and early 1970s, prior to the 1974 world-wide recession induced by the oil cartel's price hike, reduced the initial labor surplus and raised wages and employment. The result was to raise the earnings of non-farm families at the lower income levels. For farm families, participation in the rapid expansion of the industrial sector took place partly through access to the new employment opportunities offered. Many women employees of foreign businesses in the Export Processing Zones came from farm families. The net effect was to increase the proportion of non-agricultural income for farm families, especially those with smaller land holdings. This in turn served to reduce the income discrepancy between farm and non-farm families, in spite of the lagging growth of the farm versus the non-farm sector, while simultaneously increasing income equality in the farm sector.[15]

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15. See Chang Han-yu, "Taiwan Nung-chia So-te ti Pien-hua yü Shih-p'ing Chia-kung chih Fa-chan," (Changes in Taiwan's Agricultural Income and Development of the Food Processing Industry), *Taiwan Ying-hang Chi-k'an* (Quarterly Journal of the Bank of Taiwan), Vol. 24, No. 4 (December 1973). Chang gives the following data for 1965 and 1971:

Non-agricultural Income as Percent of Agricultural Income

	1965	1971
Farm family with cultivated land under ½ ha.	35.3	53.3
Farm family with cultivated land exceeding 2 ha.	11.8	22.2
Average of all farm families	19.4	28.2

In 1971, for farm families or under .5 hectare, 34.6% of the non-agricultural income received came from wages, the rest being property income and income from other occupations, which presumably included both wage and property income. For families having more than 2 hectares, the proportion of wages in non-agricultural

In short, a very rapidly expanding industrial sector oriented to export that was based on processing of imported materials by highly labor-intensive methods was instrumental in raising wages, which also benefited farm families. The latter were progressively becoming less dependent on agriculture as their sole source of labor income. Under these conditions income equality was able to improve further, albeit at a slower rate than before.

Distribution of Wealth between Pre- and Post-1945 Settlers

Aside from the distribution of income between farm and non-farm families, a related distributive factor of major interest is the relative economic status of the pre-1945 ethnic Chinese settlers of Taiwan (often loosely referred to as Taiwanese by Westerners) versus that of the post-1945 settlers (often referred to as Mainlanders). Since the "Mainlanders" came to Taiwan in 1945 to take over the Japanese administration, political power was initially vested entirely in their hands. During the past 30 years, they have progressively broadened the participation of government so that more and more members of the pre-1945 settler group are now included in the government hierarchy. This progressively more equal distribution of political power, more advanced at the provincial and local government levels than at the central government level, should be considered in conjunction with the distribution of economic benefits between the two groups. An interesting point that concerns us in this paper is whether the relative economic status of the two groups corresponds to their relative political positions or whether a different relationship prevails.

Although income distribution data are not available on the basis of the dates of immigration of family heads to Taiwan, the problem can be approached indirectly by examining the distribution of wealth between the two groups. Two major points need to be borne in mind in this connection. First, the 1953 land reform which took place not very long after the transfer of the central government of the Republic of China from the mainland to Taiwan effectively precluded the existence of absentee landlords. The earliest group of post-1945 settlers from the mainland consisted primarily of government officials, members of the armed forces, officers of public corporations and some businessmen. Few of them, if any, had either the inclination or time, before the land reform, to become farm land owners. Thus, land, a form of

income was 11.1%. The corresponding proportions of wages in non-agricultural income in 1965 were 26.1% and 15.1%, respectively.

physical asset of dominant importance during the early years of Taiwan's post-World War II economic development, has remained entirely in the hands of the pre-1945 settlers. Some of the public land taken over by the ROC government from the Japanese was also sold to the farmers as a part of the land reform program. While the government and public corporations, such as Taiwan Sugar, still own some of the land, there has not been any redistribution benefiting the post-1945 settlers. Only to the extent that land has been transferred from crop cultivation to non-agricultural or other agricultural uses could ownership of landed wealth outside the urban areas become vested in the hands of post-1945 settlers.

In view of the above, unless the distribution of wealth outside the agricultural sector were in favor of the post-1945 settlers, the distribution of wealth as a whole would tend to favor the pre-1945 settlers who are owners of virtually all private farm land. A most important factor to bear in mind in this connection, therefore, is the distribution of ownership of large enterprises in the civilian sector of the economy. In 1975 there were 35 businesses in Taiwan whose annual sales exceeded NT$1 billion each. In addition, another 66 firms had annual sales exceeding NT$400 million each (see Table 9). Altogether 132 firms had annual sales exceeding NT$200 million each. If these firms are grouped according to whether the Chairman of the Board of Directors and the President of the firm[16] are from pre- or post-1945 settler families, 59% of the aggregate capital of all the firms is accounted for by enterprises headed by pre-1945 settlers as against 41% by post-1945 settlers. Furthermore, if a line is drawn at the level of NT$300 million in capitalization, there are 47 firms above this line. Of these larger firms, which are further divided into five intervals (see Table 10), those headed by pre-1945 settlers account for an overwhelmingly larger proportion of invested capital than the post-1945 settlers in four groups, the single exception being the group of firms with capitalization from NT$500 million to NT$1 billion. In contrast, for firms capitalized below NT$300 million, a larger proportion of invested capital is accounted for by enterprises with post-1945 settler heads, the only exception being the group of firms with capitalization of NT$100 to NT$200 million.

Similarly, one can use annual sales as the criterion. On this basis, of 10 firms each with annual sales in excess of NT$3 billion, 7 are headed by pre-1945 settlers and only 3 by post-1945 settlers.

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16. A few firms had non-Chinese Presidents or Board Chairmen.

Table 9. Business Enterprises in Taiwan with Annual Sales Exceeding NT $200 Million

Heads of Firms	No. of Firms	Aggregate Annual Sales (NT $ million)								
		Over 6,000	5,000 to under 6,000	4,000 to under 5,000	3,000 to under 4,000	2,000 to under 3,000	1,000 to under 2,000	500 to under 1,000	Under 500	Total
Pre-1945 Settlers	69	6,147.5 (1)	10,947.3 (2)	9,162.7 (2)	6,163.0 (2)	4,559.2 (2)	12,692.8 (10)	22,203.7 (32)	6,162.1 (18)	78,038.3 (69)
Post-1945 Settlers	63	9,859.5 (1)	(0) (10)	4,080.1 (1)	3,225.4 (1)	7,477.7 (3)	13,970.5 (10)	10,480.0 (14)	11,995.8 (33)	61,089.0 (63)
Total	132	16,007.0	10,947.3	13,242.8	9,388.4	12,036.9	26,663.3	32,683.7	18,157.9	139,127.3
Percent										
Pre-1945 Settlers	52	38	100	69	66	38	48	68	34	56
Post-1945 Settlers	48	62	0	31	34	62	52	32	66	44
Total	100	100	100	100	100	100	100	100	100	100

Figures in parentheses are the numbers of firms in each group.
Source: *Ching-chi Jih-pao* (Economic Daily News) (Taipei), April, 1976.

Table 10.   Business Enterprises in Taiwan
with Annual Sales Exceeding NT $200 Million

Heads of Firms	No. of Firms	Total Capitalization (1,000,000 NT $)								
		Over 2,000	1,000 to under 2,000	500 to under 1,000	400 to under 500	300 to under 400	200 to under 300	100 to under 200	Under 100	Total
Pre-1945 Settlers	69	2,040.0 (1)	5,379.3 (4)	5,077.0 (8)	4,493.7 (10)	2,425.3 (7)	2,717.0 (12)	2,581.5 (19)	429.3 (8)	25,143.1 (69)
Post-1945 Settlers	61*	— (0)	2,120.0 (2)	7,430.9 (11)	810.0 (2)	680.0 (2)	3,521.8 (15)	1,907.6 (14)	667.8 (15)	17,138.1 (61)
Total	130	2,040.0	7,499.3	12,507.9	5,303.7	3,105.3	6,238.8	4,489.1	1,097.1	42,281.2
Percent										
Pre-1945 Settlers	53	100	72	41	85	78	44	58	39	59
Post-1945 Settlers	47	0	28	59	15	22	56	42	61	41
Total	100	100	100	100	100	100	100	100	100	100

*Two of the firms are without data on capital
Figures in parentheses are the numbers of firms in each group.
Source: *Ching-chi Jih-pao* (Economic Daily News) (Taipei), April, 1976.

In contrast, of 122 firms each with annual sales below NT$3 billion, 62 are headed by pre-1945 settlers as against 60 by post-1945 settlers. Furthermore, within each sales interval above the NT$3 billion mark, firms headed by pre-1945 settlers account for an overwhelmingly larger proportion of total sales, there being only a single exception. In all the sales intervals below the NT$3 billion mark the reverse is true, again with the exception of a single interval.

An earlier survey in 1969[17] which divided business firms in Taiwan on the basis of financial groups shows that of 337 firms which can be clearly identified in terms of ownership by pre- or post-1945 settlers, 60% were accounted for by the pre-1945 settlers while the post-1945 settlers controlled 28% (95 firms), with 12% (41 firms) representing combined ownership. Furthermore, the firms of the pre-1945 group were responsible for 61% of invested capital on the basis of capitalization and 59% of business revenue in that year. On the other hand, the firms of the post-1945 group were responsible for 30% of invested capital and 31% of total business revenue. The mixed group accounted for 9% of capitalization and 11% of revenue. These earlier statistics point to the larger ownership of the pre-1945 settlers in business outside the agricultural sector, but there was no noticeable disparity in size between the enterprises of the two groups. Hence the growth of the relative importance of the pre-1945 settlers in the control of the larger enterprises in the 1975 survey appeared to be a phenomenon of the early 1970s.

Both the 1969 and 1975 statistics lend support to the conclusion that the larger Taiwan enterprises are headed by pre-1945 settlers while the smaller firms have a larger proportion of post-1945 settler heads. The more recent growth was in favor of the pre-1945 settlers for the larger enterprises and the post-1945 settlers for the smaller ones. The exceptions to the rule are relatively few. Although the 1975 data deal with only the larger firms, while the 1969 data include a wider spectrum of businesses, comparison of the more recent findings with the 1969 statistics suggest that there may have been a trend during the first half of the 1970s for the post-1945 settlers to move up in their relative economic standing while some members of the pre-1945 settler group forged even further ahead. In view of the fact that the post-1945 settlers were late comers and few of them had settled in

17. See Chang Chün-Hung, *Taiwan She-hui-li ti fen-hsi* (An analysis of Social forces in Taiwan) (Taipei: Huan-Yü Publishing Co., 1972), pp. 32-42.

Taiwan with vast personal wealth, it is quite understandable that they have had to compete very hard in the private economic sector and are not in a dominant position. This can be contrasted with the more favorable political position the post-1945 settlers enjoyed. We have already noted the movement toward greater equality in the distribution of political power in favor of the pre-1945 settlers. The present statistical analysis indicates that there may have been a slight and slower shift toward greater equality in the distribution of industrial and commercial wealth in favor of the post-1945 settlers. Fortunately for Taiwan, therefore, the redistribution of political power and material wealth can move in opposite directions, thus serving to compensate each other. A priori, one is inclined to conclude that this is a situation favoring greater social stability.

Future Prospects

We have put the preceding discussion on income distribution in the past tense although many of the conditions of the 1960s and early 1970s continue to hold today, because several circumstances now exist that could significantly alter the course of development. First, Taiwan is trying to shift toward more capital-intensive and technology-intensive production. It is also trying to supply domestically more of the manufactured industrial raw materials it needs. The relative rates of growth of the agricultural and non-agricultural sectors will change further and the relative share of capital as factor income will probably also rise. There is a latent tendency, therefore, toward less rather than greater equality in income distribution unless capital ownership can become progressively more equally distributed, and unless other corrective measures are undertaken. Thus the role of government intervention may have to, and probably will, increase in order to forestall a reversal of the previous trend toward greater equality in income distribution. Both existing and new measures, fiscal and otherwise, will have to be expanded, but greater government intervention could stifle productivity and economic growth if adequate safeguards and judicious restraint are not provided.

Within this context some of the measures adopted in recent years deserve mention. In the first place, the progressive income tax, although a part of the ROC's long-standing taxes, has been implemented much more vigorously in recent years as a result of technical reforms in data collection and reporting. Income tax collections increased noticeably between 1966 and 1972, especially

for the higher income brackets.[18] Secondly, among the more recent measures, reduction of various hidden taxes levied in the form of rice collection since 1964, and particularly since 1969, has contributed to greater income equality, especially in reducing the disparity between farm and non-farm incomes. These two categories of measures are clearly focused on income transfers.

In the third place, expansion of the stock exchange, which can be seen in an increase in the number of listed stocks between 1962 and 1973, has been a welcome development in promoting the dispersion of property ownership.[19] This development could be extended if institutions can be developed in the near future so that farm families can progressively participate in industrial expansion by becoming owners of stocks in industrial enterprises just as they have already participated by providing labor to the expanding industrial sector. It may be necessary for the government to step in by organizing intermediaries in the form of "mutual funds" which can collect rural savings for investment in industry, thus altering the distribution of industrial assets which are growing rapidly.

Another set of government measures has had the effect of especially accelerating development in the lagging agricultural sector. Special funds over and above the level of private investment have been earmarked in recent years for investment in the accelerated development of agriculture. Central government funds totalling NT$2.43 billion have been provided for this purpose in the 1977 fiscal year. As of 1975 year-end, projects totalling NT$2.58 billion (including central government and other funds) in expenditure had been approved out of the 1976 fiscal year program.[20] A portion of the expenditures is channeled through programs for irrigation, flood control, etc. under the jurisdiction of the provincial authorities. The bulk of these expenditures is aimed at expanding the infrastructure of the agricultural sector. Efforts such as this are aimed at modifying sectoral balance and income disparity between sectors. There may be some question about the rate of return obtained from such special efforts. The issue clearly is one of balancing growth against distribution and touches upon the central question that

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18. See Kuo, op. cit., 1974. The income tax, however, does not seem to have significantly altered the differential between farm and non-farm incomes.

19. The number of listed stocks increased over 14 times between 1962 and 1973. The increase in their market value was over 43 times. See Kuo, op. cit.

20. See reports in the Central Daily News (Taipei), January 4 and 7, 1976.

economic development, not to mention the overall development of a society, may have multiple goals.

Finally, there are two important sets of measures that have begun to be implemented in 1976. One is the ruling that the heads of government-related banking institutions must henceforth be rotated so as to avoid the emergence of financial fiefs. The second development is the progressive implementation of the law limiting urban land ownership and taxation of large capital gains derived from such ownership. This is both to avoid overconcentration of ownership of urban property and to discourage land speculation and wealth accumulation based on large "unearned" increments. Thus the authorities are evidently coming to grips with emergent issues affecting distribution.

The Anti-Poverty Program (Hsiao-k'ang Chi-hua)

In considering income distribution we must obviously examine not only the relative shares of successive segments of the population on the income ladder, but also especially the absolute income levels of the lowest income groups. Another effort aimed at a particular segment of the population is Taiwan's anti-poverty program. This effort to reduce the number of persons in absolute poverty and to elevate the income level of persons at the bottom of the income ladder deserves closer attention. The issue was officially recognized by the provincial government of Taiwan in October 1972 as a major plank in its program.[21] Already in 1967 a set of unified standards was adopted by the Taiwan provincial government in defining and registering "poverty households." According to these standards the poorest or "Step 1 poverty households" consist of those households whose members are "unable to work" and are devoid of all assets or income.[22] They are therefore completely dependent upon relief and government

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21. For reference see *Tai-wan-sheng T'ui-hsing Hsiao k'ang-chi-hua Kung-tso-shou-ts'e* [Anti-poverty Program Manual, edited and published by the Taiwan Provincial Government, May 1973] and *Tai-wan-sheng Cheng-fu She-hui-ch'u King-tso-pao-kao* [Work Report of the Office of Social Affairs, Taiwan Provincial Government before the Seventh Session of the Fifth Taiwan Provincial Assembly, March 31, 1976].

22. The following twelve categories of persons are defined as "without ability to work":

   1. Persons under 16 years of age.
   2. Persons in school under 18.
   3. Persons under 18 who have no earnings from work and who have only widowed mothers or grandparents.
   4. Parents in active military service.

aid. The medium or "Step 2 poverty households" are those whose total income is not more than one-half of the stipulated expenditure at "subsistence level" and not more than one-quarter of whose members can work. The minimum or "Step 3 poverty households" are those whose total income is not more than two-thirds of the subsistence level and not more than one-third of whose members can work. "Subsistence level" is defined as NT$200 per capita per month or NT$2,400 a year. The "poverty line," at two-thirds of NT$2,400, is therefore set at NT$1,600 per person per year. For a family of five persons a total annual income of NT$8,000 (approximately US$200) would put it on the poverty line.[23]

As of 1967 there were 110,036 poverty households in Taiwan, outside Taipei. In addition, there were 8,929 poverty households in the municipality of Taipei. In combination there were 118,965 poverty households in all Taiwan. This total amounted to 5.11% of total households in Taiwan in that year, 5.28% for Taiwan province and 3.31% for Taipei. Between 1967 and 1971, as a result of growing economic prosperity, the number of poverty households declined steadily, averaging 8.9% a year for all Taiwan. A sharp decrease was further registered immediately after the inauguration of the anti-poverty program in 1972, and the decline of poverty households has continued since.

5. Persons serving prison or probationary sentence whose unexpired term exceeds six months in duration.
6. Persons who are disabled or mentally ill and who have no earnings from work.
7. Men over 60 and women over 55 without earnings from work.
8. Persons registered as missing for more than six months.
9. Persons who have been seriously ill for more than three months and cannot work and are without regular income.
10. Widowed single parents who have to care for one or more children under 6 years of age and are without regular earnings.
11. Orphaned children under 12 years of age who are cared for by grandparents and are without regular income.
12. Women without regular earnings who are six months pregnant and have to support their own children under three years of age.

The above stipulations are those of the Taiwan Provincial Government. Similar regulations with minor variations exist in the Taipei Municipality.

23. The Taipei Municipality poverty standard, as revised in November 1973, divides poverty households into two categories only. Step 1 poverty households are defined identically as the first step poverty households under the Provincial Government regulations. The Step 2 poverty households are defined in the same way as the minimum poverty households under the Provincial Government regulations. However, the minimum subsistence level is fixed at NT$300 a month instead of NT$200.

Statistical data on the anti-poverty program are more readily available for "Taiwan province" outside the Taipei municipality. As can be seen from Table 11, the number of poverty households fell from 74.2 thousand in 1971 to 25.7 thousand in 1975. The total number of persons in such households declined from 391 thousand to 104 thousand during the same period. While statistics concerning Taipei are less current, there was also a decline from 8.4 thousand poverty households in 1971 to 7.0 thousand in 1973. As of 1973, only 1.59% of all households in Taiwan outside Taipei and 1.64% in Taipei were still classified as poverty households.

Table 11. Number of "Poverty Households" and Persons

	Poorest		Medium Poverty		Minimum Poverty		Total	
	House-holds	Persons	House-holds	Persons	House-holds	Persons	House-holds	Persons
1971	16,992	27,196	18,887	110,822	38,368	253,445	74,247	391,463
1972	17,536	28,634	17,182	100,274	33,250	218,001	67,968	346,909
1973	14,461	23,744	11,006	58,062	17,675	114,556	43,142	196,362
1974	11,587	18,882	9,065	48,191	11,254	70,907	31,906	137,980
1975	—	—	—	—	—	—	25,726	103,952

Source: Department of Social Affairs, Taiwan Provincial Government:

It should be borne in mind that poverty households are defined on the basis of per capita income. A poverty household of many persons can therefore have a larger family income than a non-poverty household smaller in size. Therefore, one cannot assume that households below a certain income level in statistics of income distribution by household would automatically consist of poverty households. However, most of such households are probably below the poverty line. Thus the decline in poverty households and the reduction of the number of households in lower income levels on the income distribution ladder discussed earlier go hand in hand.

With the rise of retail prices, the required expenditures at the stipulated subsistence level have also increased. However, a study conducted in 1971 showed that even if the subsistence level expenditure had been fixed at 50% higher, or NT$300 per person per month outside the Taipei municipality, the number of poverty households under the jurisdiction of the Taiwan provincial

authorities would only be raised by 7.8%. This is considerably below the 36.5% decrease in poverty households registered in 1973 as compared with 1972 when the anti-poverty program was officially inaugurated. Thus the decline in poverty households during the first half of the 1970s is quite real and should be attributed largely to both economic expansion and efforts under the anti-poverty program.[24] In the post-1973 oil crisis period, price inflation has further increased expenditures at subsistence level. However, by defining household income, which is compared with the fixed subsistence level expenditure in determining the poverty line, at "standard" wage levels by occupation substantially below the actual wages received, some, if not all, of the effect of inflation has been offset.

The anti-poverty program includes nine major activities: (1) expansion of relief and institution care, (2) aid to production through small business loans and construction of marketing facilities, (3) active job placement, (4) expansion of occupational training in cooperation with factories and vocational schools, (5) construction of low-cost housing in order to improve environmental hygiene, (6) promotion of family planning including free family visits and advice, (7) promotion of school attendance by school age children, as well as vocational and adult education, from poverty households through such measures as tuition loans, (8) promotion of community production and welfare activities in order to expand the base of the anti-poverty program beyond the level of government effort alone, and (9) integration of the program as a social movement with education, mass communication, and the establishment and expansion of special relief funds. The basic approach of the program is threefold: (1) increasing employment and employability, (2) broadening the movement by enlisting the resources of the society as a whole, which helps reduce the fiscal and manpower burden on the government, and (3) increasing both emergency aid, which helps minimize the emergence of new poverty households, and long-term aid to those who really cannot help themselves.

Table 12 shows that the size of the poverty households varies considerably with the degree of poverty. The poorest, or Step 1 poverty household, averages only 1.6 persons per household while the average number in the medium poverty household varies from 5.9 persons in 1971 to 5.3 persons in 1974, showing a steady decline during the period. For the minimum poverty household,

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24. Lu Kuang, *Tai-wan Ti-ch'ü To-P'ing-chung Wen-ti* (The Poverty Problem in Taiwan), *She-hui Chien-she* Social Reconstruction (Taipei, 1975) pp. 1-24.

the average number of persons per household varied from 6.6 in 1971 to 6.3 in 1974. These figures suggest that the medium and minimum poverty households are poor partly because of the large size of the family. However, since the large family probably contains persons who could become employed, it may also stand a better chance of escaping poverty if employment can be found. On the other hand, the small size of the very poor families indicates that for them poverty is probably a chronic condition due to old age, physical disability or, at the other end of the income ladder, lack of adult care. (See the discussion on single person households at the end of this chapter.)

Table 12.   Number of Persons per "Poverty Household"

	Poorest	Medium Poverty	Minimum Poverty	All Poverty Households
1971	1.6	5.9	6.6	5.3
1972	1.6	5.8	6.6	5.1
1973	1.6	5.2	6.5	4.6
1974	1.6	5.3	6.3	4.3

Source: Department of Social Affairs, Taiwan Provincial Government.

Table 13.   Percent Distribution of Poverty Households by Degree of Poverty

	Poorest	Medium Poverty	Minimum Poverty	Total
1971	22.9	25.4	51.7	100.0
1972	25.8	25.3	48.9	100.0
1973	33.5	25.5	41.0	100.0
1974	36.3	28.4	35.3	100.0

Source: Department of Social Affairs, Taiwan Provincial Government.

An examination of the distribution of poverty households by degree of poverty as shown in Table 13 indicates that the above interpretation is essentially correct. In 1971, nearly 52% of the

poverty households were in the minimum poverty category while the medium poverty and poorest households accounted for 25% and 23%, respectively. By 1974 the poorest households were responsible for 36% of a much smaller total of poverty households while the medium poverty group accounted for 28% and the minimum poverty group 35% of the total, respectively. The larger relative share of the poorest group indicates the existence of a hard-core poverty category requiring long-term aid. The largest reduction of the relative share of the minimum poverty group is, on the other hand, indicative of the increased employment of its members to which the anti-poverty program has contributed.

One major thrust of the anti-poverty program is to encourage poverty households to declare themselves as "self-reliant households." Such a declaration entails a pledge to accept vocational education, employment guidance, etc. that would help uplift the household above its poverty status. Annual surveys are conducted to follow up on the current status of the poverty households, including the self-reliant households. The survey also includes households that have risen above the poverty line. The 1974 survey showed that 7% of the members of the poverty households were chronically ill and 6% were physically handicapped. In contrast, the same two categories accounted for 4.1% and 3.3% respectively of the self-reliant households, and the ratios were even lower — 2.8% and 2.6% respectively — for households that had risen above the poverty status. Furthermore, the proportion of persons "able to work" increased from 24% of the members of the poverty households to 32% in the self-reliant households and 35.5% in households that had risen above the poverty line. Sixty-six percent of those who were able to work in the poverty households were burdened by family misfortunes while about 14% were ill or disabled. The incidence of these two major reasons for poverty conditions declined to 60% and 8.7% respectively for the self-reliant households and 51% and 7% respectively for households that had risen above the poverty line. Furthermore, among the members of these households that successfully escaped the poverty line, according to the same survey, 15.7% had complained about loss of employment or lack of employment opportunities and 13% of lack of training or work experience. These statistics again indicate that the most effective means to eliminate poverty in Taiwan have been increases in employment and employability. Table 14 shows the percent distribution by type of aid under the anti-poverty program that has contributed to removing households from the poverty status. Family planning was credited with

26% of the program's success, followed by vocational training and employment aid, 24%; medical, surgical and emergency aid, 15%. Other single categories that have proved significant are family subsidy, 9%; housing improvement, 7%; and production and marketing aid, 4%.

Once poverty households have found employment for their members, their income naturally increases. The 1974 survey indicates that the median annual income of such households that had risen above the poverty line was NT$25,763 (US $678). At the same time, the median annual income of the self-reliant households whose members had found employment was NT$19,534 (US $514).

Table 14. Types of Aid Contributing to Removal of Poverty Status under the Anti-Poverty Program

	Percent
1. Family planning	26.3
2. Vocational training and employment aid	24.3
3. Medical, surgical and emergency aid	15.2
4. Family subsidy	9.0
5. House improvement	6.7
6. Production and marketing aid	4.3
7. Other	14.2
Total	100.0

Source: Department of Social Affairs, Taiwan Provincial Government.

More recently, Taiwan's anti-poverty effort has begun to focus its attention on households in certain specific occupations, notably the salt producers and segments of fishermen families. The anti-poverty program has also consistently included the aborigine households living in central Taiwan. The entire anti-poverty program is a facet of income distribution that deserves far more attention and study.

III. COMPARISONS WITH OTHER COUNTRIES

Eastern Europe and Mainland China

The experience of Taiwan in income distribution in relation to its economic policy and socio-political environment can be compared with that of mainland China and other communist countries, as well as with that of other non-communist Asian

countries, both developing and developed. In making the first set of comparisons, one's interest turns very naturally toward the PRC as "the other China," although brief reference might be made to some European communist countries as well. See Table 15.

Table 15.   Income Share of All Households

	Year	Per Capita GNP /U.S. $)	Lowest 40%	Middle 40%	Top 20%
Yugoslavia	1968	529	18.5	40.0	41.5
Taiwan	1972	503	21.7	39.2	39.1
Poland	1964	850	23.4	40.6	36.0
Hungary	1969	1140	24.0	42.5	33.5
Bulgaria	1962	530	26.8	40.0	33.2
Czechoslovakia	1964	1150	27.6	41.4	31.0

Source: For Taiwan, see page 13 of text. For the East European countries, see Chenery et al., *Redistribution with Growth,* pp. 8-9

According to available estimates (mostly from U.N. sources) cited above, if comparison is made with several East European communist countries in the mid to late 1960s, Taiwan in 1972 would find itself situated between Yugoslavia and Poland in terms of the income shares of the lowest 40% and the highest 20% of income recipients respectively. The same would be true for Taiwan in 1964. In a very general way one can speak of income distribution in Taiwan in 1972 as being slightly more "equal" than it was in Yugoslavia in 1968 and slightly less "equal" than in Poland in 1964. Yet, in contrast to both Poland and Yugoslavia, Taiwan is a market economy with ownership of private property.

Because of inadequate official data from Peking, no such overall comparison of income distribution can be made directly between Taiwan and the Chinese mainland. However, several indicators can be used to make partial comparisons so that a plausible overall impression can nevertheless be inferred.

First, regarding the income differential between the agricultural and non-agricultural sectors, we have already noted above the declining ratio between farm and non-farm family incomes in Taiwan in 1964-72. The ratio worsened in 1973, a year of unprecedented industrial boom before the oil crisis. See Table 16.

However, if the municipality of Taipei is excluded, the corresponding differentials would be significantly lower: 1.23 in

Table 16. Change in Ratios of Farm and Non-Farm Family
Incomes

	1964	1972	1973
	(NT$ per annum, constant 1972 prices)		
I. Average farm family income	32,013	49,090	54,544
II. Average non-farm family income	32,740	64,497	81,373
Ratio of II:I	1.02	1.31	1.49

As shown in Table 17, these income differentials are not significantly affected by comparing the average disposable incomes after tax.[a]

Table 17. Average Disposable Incomes After Tax

	1966	1972	1973
A. Average disposable income *per* farm household[a]	30,423	46,481[b]	52,123[a]
B. Average disposable income *per* non-farm household[a]	32,718	61,293[b]	77,394[a]
Ratio of B:A	1.08	1.32[b]	1.48[a]

Sources: (a) These disposable income estimates are calculated by Han-yü Chang, "Taiwan Ching-chi fan-chan kuo-ch'eng-chung so-te fen-p'ei chih fen-hsi" (An Analysis of Income Distribution in the Process of Taiwan's Economic Development), *Taiwan Ying-hang Chi-k'an* (Bank of Taiwan Quarterly), Volume 26, No. 4, Taipei, December 1975, Tables 2-1 and 2-2, pp. 12-13.

(b) Kuo, *op. cit.*, July 1975, Table 13.

1972 and 1.35 in 1973. This can be seen from the data for Taiwan Province (i.e., Taiwan excluding Taipei) in Table 18.

When the average disposable income is calculated on a per capita rather than per household basis, the excess of non-farm household income would rise to 50% in 1972 and 65% in 1973. Apparently the larger size of the farm household made the farm sector even worse off on a per person basis.

If comparison is made between the data for Taiwan including Taipei and those excluding Taipei, it is quite clear that the higher income households in the capital city make the income differential between the farm and non-farm sectors much higher than it would otherwise be. Furthermore, inclusion of Taipei makes the worsening of the differential between 1972 and 1973 proportionately somewhat greater (from 1.31 to 1.49) than it would otherwise

be (from 1.22 to 1.36). This phenomenon points to the greater concentration of higher income families in the capital.

Table 18. Income Differentials for Taiwan Province

		1972	1973
A.	Average income *per farm family*	49,033	54,352
B.	Average income *per non-farm family*	60,010	73,957
	Ratio of B:A	1.22	1.36
A.	Average disposable income *per farm household*[a]	46,429	51,934
B.	Average disposable income *per non-farm household*[a]	57,022	70,318
	Ratio of B:A	1.23	1.35

Source: (a) Chang, *op. cit.*

		1966	1972	1973
C.	Average disposable income *per person* in farm households			
	Estimate (1)	4,244	7,140	8,153
	Estimate (2)	5,628	9,348	12,047
D.	Average disposable income *per person* in non-farm households			
	Estimate (1)	6,206	10,776	13,472
	Estimate (2)	8,620	16,174.	20,920
	Ratio of D:C			
	Estimate (1)	1.46	1.50	1.65
	Estimate (2)	1.53	1.73	1.73

Source: Chang, *op. cit.* Estimate (1) is based on Survey reports on family income and expenditures. Change also presents an alternative estimate (2) based on farm household accounts.

While sectoral income disparity between agriculture and non-agriculture, together with the greater disparity attributable to Taipei within the non-agricultural sector, plagues Taiwan as a distributional problem, as it does other developing countries, the disparity is by all counts even greater on the Chinese mainland. According to one American estimate,[25] the money income of the

25. Charles Hoffman, *Work Incentive Practices and Policies in the People's Repulic of China, 1953-65* (New York: State University of New York Press, 1967), p. 13.

average mainland Chinese non-agricultural worker was around ¥560 a year in 1960 or about four times that of the average peasant, thus inferentially making the latter's income about ¥140 a year. While the ¥560 figure refers to the worker, the average annual income of the entire worker-employee (*chih-kung*, or worker and staff) group was ¥656 in 1958[26] and remained at the roughly constant level of ¥650 in 1971.[27] (The official press compared this 1971 figure with that of 1952, noting that it was a 50% increase, but omitted to compare it with the 1957 or 1958 benchmark level.) It is not clear whether the average worker's income also remained stationary in 1958-71, although any increase that may have occurred could not be significant since the average of the numerically larger worker-employee group, which includes the numerically larger sub-group of workers, became even slightly lower, ¥650 instead of ¥656.[28] Peking's policy to keep the worker's income low is essentially intended both as a means of maintaining a high rate of capital investment and of keeping the income disparity between farmers and non-farmers within bounds.

According to a British author, a survey of rural-urban income differentials in Kiangsu suggested that on the average the urban worker's income in 1957 was probably twice that of the peasant working on a cooperative farm.[29] Allowing for changes in the pricing of goods both bought and sold by the urban and rural workers, some narrowing of this differential may have occurred in the 1960s and 1970s.

In two production teams whose accounts are used as illustrations in texts for training financial and accounting workers, the average per capita annual incomes of peasant households in 1971 were ¥-108 and ¥-139 respectively (Table 19). Other per capita figures given for both production brigades and

26. The *Ta Kung Pao* (Peking), May 24, 1958.

27. *NCNA International* (Peking), September 18, 1971.

28. In his testimony on the allocation of resources in mainland China, Michael Field stated that

The average wage of a worker in China now [1975] is about the same as it was in 1957, ... In real terms . . ., so there has been no appreciable increase in the standard of living.

In various times, e.g., 1967, 1968 and 1974, "There were demands for increased wages and for better times." See "People's Republic of China: An Economic Assessment" (A compendium of Papers submitted to the Joint Economic Committee, Congress of the United States, Ninety-second Congress, Second session, May 18, 1972), p. 72.

29. See Christopher Howe, *Wage Patterns and Wage Policy in Modern China, 1919-1972* (Cambridge: Cambridge University Press, 1973), pp. 50-51.

communes in six geographically widespread areas, possibly for different years, vary from ¥94 to as high as ¥176 and are generally in the same order of magnitude as the two textbook examples cited before. Still other average annual farm household incomes in 1957 vary from ¥171 for Kansu province to ¥306 for Szechwan, ¥399 for Hopei, and ¥454 for Kiangsu.[30] Depending upon the number of full-time workers and the size of farm and non-farm households, alternative ratios of non-farm to farm household incomes can be obtained as shown in Table 20.

Table 19.   Annual Income in 1971

	A Production Team in Liaoning[a]		A Production Team in Hunan[b]
		(in current yuan)	
Per farm household	475.4		432.0*
Per farm worker equivalent	369.7	(1.3 persons/household)	—
Per capita	138.6	(3.4 persons/household)	108.0

Sources: a.   Department of Agricultural Economics, Liaoning Academy of Finance and Economics, ed., *Cheng-yang Tso-hao Shen-ch'an-tui Ts'ai-k' uai Kung-tso*, (How to Do Financial and Accounting Work in the Production Team Properly) (Shenyang: Liaoning Jen-min Publishers, 1973), p. 105.

b.   Hunan Revolutionary Committee, Bureau of Agriculture and Forestry and the Hunan Financial and Accounting Training Program, ed., *Nung-ts'un Jen-min-kung-she Sheng-ch'an tui K'uai-chi*, (Accounting in the Production Team of an Agricultural Commune) (Hunan: Jen-min Publishers), p. 84

*estimated.

In spite of the inadequacy of data, one can probably conclude that the average income of non-agricultural households in mainland China in the early 1970s was about twice that of agricultural households and that it might be three to four times as large, if not more.[31] The differential was in any case significantly larger than the current ratio in the Republic of China.

30. See *People's Daily* (Peking), May 5, 1957.

31. According to a U.S. Government analyst, "In 1970-71, industry-related production had caught up with agriculture-related production, and the 15 percent of the people in the urban areas were producing six times as much per capita as their country brethren." Although the differential between urban and rural

Table 20. Alternative Income Ratios

(I)			(II)			
Non-agricultural Household Income		Household Income	Average Agricultural Household Income		Ratio of (I) to (II)	
		Assumed number	1957			
		of full-time		(II)	(a)	(b)
	Annual	of full-time	Kansu	¥171	5.70	7.60
	income per	equivalent	Szechwan	306	3.19	4.25
	full-time	workers per	Hopei	399	2.44	3.26
	workers	household	Kiangsu	454	2.15	2.86
	(a)		1971		(a)	(b)
			Liaoning	475	2.05	2.74
¥650	x 1.5	(a) ¥ 975	Hunan	432	2.26	3.01
	(b)	(b) ¥1300				
	2					

Within the agricultural sector, the pattern of income distribution among farm households was sharply altered in mainland China through the initial redistribution of land from former "landlords" and "rich peasants" to "poor peasants," accompanied by the reduction of farm laborers.[32] However, inequality has increased subsequently for several reasons. First, whenever distribution according to labor is the dominant form of distribution in the PRC rather than distribution according to need,[33] inequality among households can come about as a result of unequal distribution of labor and skills among them. The relative emphases of the two forms of distribution have continued to be a

incomes per capita is not the same as average non-agricultural and agricultural family incomes, this differential is in the same area of magnitude as estimates in the text suggest. Furthermore, it is also about double the ratio of the non-agricultural sector and the agricultural sector in Taiwan in terms of per capita value-added in 1972 (3.18:1). See page 18 of text.

The quotation is taken from Arthur G. Ashbrook, Jr., "China: Economic Policy and Economic Results, 1949-71," in "People's Republic of China: An Economic Assessment" (A compendium of Papers submitted to the Joint Economic Committee, Congress of the United States, Ninety-second Congress, Second Session, May 18, 1972), p. 41.

Ashbrook also thought that the bulk of the new agricultural inputs had gone to the favored communes and brigades so that an important ideological controversy dealt with the contrast between "rich brigades" and "poor brigades."

32. See Peter Schran, The Development of Chinese Agriculture, 1950-1959 (Urbana: University of Illinois Press, 1969), for extensive calculations on changes in class and income distribution.

33. "Need" is presumably defined by the party cadres rather than the income recipients.

matter of controversy for nearly two decades. Secondly, under the
system of distribution practiced in 1971, each member of the
production team is rewarded principally according to the number
of work points he earns through labor. However, the value of a
work point depends upon the total number of work points
accumulated by all the team members and the net income
available for distribution among them. The net income is, in turn,
the difference between gross income and the aggregate amount of
taxes, compulsory purchase by the state, production cost,
collective consumption, collective investment, payment to the
higher level production brigade, and addition to the team's
inventory. Since these deductions are of fairly stable proportions,
disparity in the gross income of different production teams is a
source of disparity in income distribution. Differences in gross
income occur regionally due to differences in soil, climate, and the
nature of crops (e.g., industrial crops versus cereals). In 1957,
among the four provinces of Kansu, Szechwan, Hopei and
Kiangsu, the difference varied from 1 to 2.65. In the same year, in
Shensi province, the range of variation among different agricultu-
ral regions was from 1 to 6.4. Similarly, the composition of
agricultural production in terms of livestock, fruits, fishery
products, and crops also varies among provinces, and changes in
their respective procurement or market prices would affect relative
income regionally. A final source of income disparity consists of
differences in income derived from private plot and free market
sales.

Within the industrial sector, a rough comparison can be made
between Taiwan and Mainland China in terms of income
distribution in several ways. In the first place, the wage rate
differential between the lowest and highest rates on an 8-grade
scale employed in the PRC appears to be noticeably wider than
the corresponding differential between unskilled and skilled labor
in Taiwan's industrial sector. According to Peking's wage scale of
1955, the highest wage rate (grade 8) was generally a little over
three times that of the lowest. The corresponding ratio of the wage
rate at grade 6 to that of grade 1 was generally around 2.2 to 2.4.[34]
Some adjustments in wage rates have taken place since 1955,
especially in the 1963 wage reform, but the differential may not

34. See Charles Hoffman, *Work Incentive Practices and Policies in the
People's Republic of China, 1953-1965* (Albany, New York: State University of New
York Press, 1968), Table 2, p. 21.

have varied greatly.[35] In contrast, the wage differential between unskilled and skilled labor in manufacturing in Taiwan during 1970 varied from a low of 1 to 1.43 in the cement industry to a high of 1 to 2.19 in the electronics industry.[36] The Taiwan wage differential in 12 different manufacturing industries in July 1970 can be seen from Table 21.

Table 21.	Average Monthly Wage in Taiwan (NT$)

Industry	I Skilled Labor	II Unskilled Labor	Differential I/II
Clothing	3,090	1,590	1.62
Synthetic fibers	2,960	1,760	1.56
Motor cycles	2,930	1,130	1.96
Cotton textile	2,600	1,420	1.83
Cement	2,520	1,910	1.43
Food Manufacturing	2,510	1,640	1.49
Plastics	2,480	1,410	1.66
Plywood	2,460	1,470	1.67
Electric Appliances	2,340	1,660	1.50
Pharmaceuticals	2,300	1,510	1.73
Electronics	2,280	1,070	2.19
Wool textiles	1,950	1,450	1.54

Source: Chen Hsi-chao, "Taiwan Ti-ch'ü Ch'an-yeh Yüan-kung Yi-tung Yen-chiu" (Turnover of Production Workers in Taiwan), in Li Ch'eng (ed.), Taiwan Jen-li Ts'u-yüan Lun-wen-chi (Essays on Taiwan's Human Resources), (Taipei: Lien-ching Publications Co., 1975), p. 484.

What has happened in mainland China is a concentration of a far larger group of persons in the lower wage grade, and this has had the effect of yielding a very low income inequality. However, the average wage rate as well as the total wage bill have been kept very low through very high profit rates which are, however, appropriated by the State as a result of nationalization of

35. Cf. Christopher Howe, Wage Patterns and Wage Policy in Modern China, 1919-1972 (Cambridge: Cambridge University Press, 1973), p. 96.
36. In mainland China the comparable ratios in 1955 were 2.19 (grade 6 to grade 1) and 3.00 (grade 8 to grade 1) in the cement industry and 2.22 (grade 6 to grade 1) and 3.04 (grade 8 to grade 1) in light industry as derived from Charles Hoffman, Work Incentive Practices and Policies in the People's Republic of China, 1953-65 op. cit. There are also substantial regional differentials in industrial wages. See Howe, Wage Patterns and Wage Policy in Modern China, 1919-1972, op. cit., p. 52.

industry.[37] Without attempting to construct income distribution estimates for all households in mainland China, which cannot be done for lack of data, especially in more recent years, one can probably safely assert:

1. that income distribution in the industrial sector, as well as in the agricultural sector, shows a high degree of equality in the small geographical and enterprise units, but this is modified by regional disparity to a degree that we cannot determine;

2. that there is a very wide differential between farm household and non-farm household incomes, the disparity being a great deal larger than the corresponding disparity in Taiwan;

3. that the average non-farm worker's income (say at ¥650 a year, or approximately US$325) at the official exchange rate would yield more than $650 for a two full-time working member family, this family income being only 40% of the average non-farm family income in Taiwan (about NT$64,500 or US$1,612, also at the official exchange rate). If the average mainland Chinese farm household has no more than one-half to one-quarter of the non-farm household's income, while farm family income in Taiwan is only 30% below that of the non-farm family, the farm family on the Chinese mainland would probably enjoy an income varying from 14 to 29% — which one can conservatively place at 30% — of the corresponding farm family in Taiwan.[38]

Finally, both Taiwan and mainland China grant subsidies to individuals and groups, thus altering the distribution of real income. In the case of Taiwan, the nine-year free schooling introduced in 1969 has probably benefited the low-income groups more than those of higher income. It has therefore contributed to a reduction of real income inequality in Taiwan, both in the short run and in the long run. While such subsidies also exist in

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37. Recent studies of Jung-chao Liu, State University of New York at Binghamton, have dealt with the comparison of wages and profits between China and India.

38. If the non-farm family income in Taiwan is denoted by 100, the corresponding figure for mainland China, as discussed in the text, would be 40. One-quarter to one-half of the 40 would yield a figure of 10-20 as the corresponding value of the mainland Chinese farm family's income. If the Taiwan farm family has an income 30% below that of the non-farm family, its income level can be denoted by 70. Comparing 10 or 20 with 70 we obtain percentages equal to 14.3 and 28.6, respectively. Granted that such comparisons based on official exchange rates raise methodological issues, they are nevertheless illuminating as rough indications of orders of magnitude.

Communist China, the effect need not be the same and may even be in the opposite direction, either because the subsidies to different groups are not of the same quality — barefoot doctors do not provide the same medical service as the modern medical facilities in the cities — or because the subsidy is only granted to a certain group which may happen to be the higher income group, thus increasing rather than diminishing the income gap. An example of the latter genre is the low residential rent in cities, which benefits only the urban dwellers. Distributive justice in mainland China is often based on class origin in the pre-communist period, thus departing from the criterion of current economic status. In Taiwan measures to modify income distribution do not contain an element of retribution.

Non-communist Asian Countries

An interesting comparison can be made between Taiwan and South Korea among the non-communist Asian developing countries.

Both countries underwent asset redistribution in the agricultural sector through land reform. Both did not suffer from initially large inequalities in the distribution of assets in the non-agricultural sectors inasmuch as Japanese-owned assets were taken over by the respective governments after World War II. On the other hand, the destructive Korean war had a further levelling effect in both the agricultural and the non-agricultural sectors from which Taiwan fortunately escaped. Like Taiwan, Korea also went through an initial phase of import substitution before it turned toward export promotion, and it was after 1964, especially in the 1970s, when the rapid expansion of labor-intensive exports began that, again like Taiwan, Korea entered a stage of very rapid economic growth. Largely because of the war, however, Korean agriculture did not enjoy the kind of rapid growth simultaneously with asset redistribution through land reform. Hence the initially equalizing effect of land redistribution was not compounded by growth. Furthermore, the disparity between farm and non-farm income in Korea might be widening more than it has done in Taiwan.

In combination, these factors have given South Korea an income distribution resembling but somewhat more unequal than that of Taiwan. On the other hand, while there probably was little change in the Korean pattern between 1964 and 1970,[39] there was

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39. See Irma Adelman on "South Korea" in Chenery et al., *Redistribution with Growth* (Annex 1974), pp. 280-285.

continued improvement in the Taiwan pattern as shown in Table 3. It is also possible that the available Korean data have underestimated the very large incomes.[40] In the absence of post-1970 information and Korea's rapid economic and export growth since 1970, one cannot state unequivocally whether the Korean and Taiwan patterns of income distribution are now closer or farther apart than before.

If comparison is made between Taiwan and India,[41] a significantly greater income inequality seems to prevail in India.[42] This would seem to be attributable, *inter alia*, to the following factors: first, India has been unable to implement its policy of land redistribution which it has consistently advocated as an integral part of economic planning. The difference between the Taiwan and Indian experiences in this respect would seem to lie both in their disparity in size and in the political conditions facing the two countries. Second, India has not adopted a foreign trade orientation in its development strategy as has Taiwan. Nor has India followed an agricultural emphasis in its initial phase of development. Again, the very much larger size of the Indian economy and greater resource availability in comparison with Taiwan have contributed to the two countries' different approaches. Ideological differences between the political leaders of the two constitute another important factor. Finally, given its development strategy, it would be all the more important for India to resort to government measures to modify asset and income distribution. Yet for the same reasons as those that have stymied land reform, it seems that India has been unable to take sufficient and appropriate corrective measures to redistribute income. Taiwan, on the other hand, presents a contrasting experience.

Because of the many resemblances the economic development of Taiwan bears to that of Japan, an interesting comparison can be made with Japan from the point of view of income distribution. First, according to the Japanese employment status survey, the Gini index of the agricultural sector increased from 0.3097 in 1962 to 0.3470 in 1971 during a period of very rapid economic growth.

40. See Hakchung Choo, *Review of Income Distribution Studies, Data Availability and Associated Problems for Korea, the Philippines and Taiwan*, Korea Development Institute, Monograph 7406 (1974).

41. For a brief discussion on the Indian case, see Chenery et al., *Redistribution with Growth* (1974), *op. cit.*

42. Various estimates of income distribution data in India are given in Chapter III, "Economic Growth and Income Distribution," *Economic Survey of Asia and the Far East, 1971*, United Nations Publication E/CN.11/1047, pp. 49-64.

On the other hand, income distribution in the non-agricultural sector became more equal during the same period, declining from 0.3231 in 1962 to 0.3199 in 1971. These divergent movements had the net effect of reducing the Gini index of income distribution for *all* households from 0.3351 in 1962 to 0.3261 in 1971.[43] The changes paralleled those of Taiwan after 1968 which we have previously pointed out.

One of the reasons for the improvement in income distribution in the non-agricultural sector during this period of rapid growth was the disappearance of surplus labor, especially unskilled labor. On the other hand, among the factors working for greater inequality was an increase in the number of "non-standard" households, that is, households headed by single persons or persons either just entering or just retiring from the labor force. The last factor was partly a result of demographic changes in the age composition of the Japanese population and partly an outcome of migration from rural to urban areas, accompanied by the formation of separate households by young workers who tend to be poorer. In the agricultural sector, greater use of capital equipment, especially on the larger farms, had the effect of increasing the importance of property income. On the whole, an allegedly narrow distribution of property in Japan may also have had the effect of creating greater inequality. Lastly, the disparity in the rate of growth of productivity and earned income in agriculture verses non-agriculture also had the effect of widening income disparity between the two sectors.

On the basis of Taiwan's experience as discussed earlier, the disparity of growth between agriculture and non-agriculture, the shift of rural workers to industry — although young Chinese women working in the export processing zones have not really set up separate households and are still regarded as contributors to the income of the farm households from which they have come — and the gradual disappearance of labor surplus all bear strong

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43. These data are quoted in Richard Osamu Wada, *Impact of Economic Growth of the Size Distribution of Income: The Postwar Experience of Japan,* unpublished Ph.D. thesis, University of Hawaii (May 1975). Wada's study also presents an analysis of income distribution adjusted for various understatements of income. According to his data, there continues to be a widening of income disparity in Japan although the trend had slowed down during the latter phase of the 1956-71 period. The phenomenon noted above in the case of Japan is also discussed by Simons Kuznets as common to developed countries where separate households headed by young people, including many households of single persons who leave their parental homes early, tend to increase disparity in income distribution. See Simon Kuznets, *op. cit.*

resemblances to the experience of Japan. It remains, however, to be seen whether the distribution of property income in Taiwan will in fact become more unequal or whether governmental measures to modify distribution will succeed in offsetting this potential development.

Chapter III

INSTITUTIONAL INNOVATIONS, TECHNOLOGICAL CHANGE AND AGRICULTURAL GROWTH IN TAIWAN

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In a recent conference on Taiwan's agricultural development, Walter P. Falcon has remarked, "In the past quarter of a century we have come to look to Taiwan for innovative policies and institutions to strengthen the role of agriculture as a supporting sector in development."[1] How impressive is Taiwan's growth record in agriculture? What has been the pattern of agricultural production? What have been the input-output relationships? What have been the sources of agricultural growth? What role have government policy and institutional innovations played? What are the problems and prospects for future growth?

It is obviously not possible in one short essay to offer an in-depth analysis of all these issues. I will simply try to examine them briefly with emphasis on the relationships among institutional arrangements, technological change, and output growth.

AGRICULTURAL OUTPUT

The increase of agricultural production in Taiwan since 1945 has been very impressive (see Table 1), with a growth rate averaging 6.2 percent a year for 1947-1975. During the recovery and rehabilitation stage after World War II — that is, from 1947 to 1952 — the average annual growth rate was nearly 14 percent (Table 2). By 1952, the previous peak level reached in 1939 was restored. (During the years from 1939 to 1945, agricultural production declined sharply at 12.3 percent a year. In 1945, the level of production was the same as in 1910.)[2]

1. Walter P. Falcon, "Lessons and Issues in Taiwan's Development," in T. H. Shen (ed.), *Agriculture's Place in the Strategy of Development: The Taiwan Experience* (Taipei: Joint Commission on Rural Reconstruction, 1974), p. 284.

2. S. C. Hsieh and T. H. Lee, "Agricultural Development and Its Contribution to Economic Growth in Taiwan," in *Economic Digest*, No. 17, JCRR, Taipei, 1966, as cited in You-tsao Wang, "Technological Changes and Agricultural Development in Taiwan, 1946-1965," which was first presented at the Conference on Economic Development of Taiwan, Taipei, 1967. Wang's article was reprinted in *Taiwan Nung-yeh Fa-chan Lun-wen-chi* (Essays on Taiwan's Agricultural Development) (Taipei: Lien-ching Publications Co., 1975), pp. 67-118.

Table 1.   Index of Agricultural Output in Taiwan
(1971 = 100)

Year	Total	Farm Crops[a]	Forestry Products	Livestock Products	Fishery Products
1946	20.3	26.8	10.6	10.3	7.7
1947	25.4	33.5	16.8	12.1	9.3
1948	32.8	38.2	28.1	14.7	13.0
1949	33.5	44.6	20.7	15.0	12.4
1950	37.4	48.7	25.9	20.0	13.2
1951	39.0	48.7	28.5	26.2	15.9
1952	42.3	52.3	35.3	27.3	18.5
1953	46.3	56.7	36.0	33.8	19.0
1954	47.3	57.1	38.0	34.4	22.7
1955	47.6	56.3	40.0	35.7	26.2
1956	51.2	61.1	37.8	38.1	28.1
1957	54.9	64.6	43.8	42.6	31.0
1958	58.6	68.2	50.1	47.8	31.8
1959	59.6	68.0	64.2	47.4	33.9
1960	60.4	69.1	66.6	45.8	35.3
1961	65.7	74.2	76.0	50.7	40.6
1962	67.4	75.2	77.9	55.0	42.2
1963	67.5	74.2	77.6	56.4	45.4
1964	75.6	83.5	95.9	59.9	49.4
1965	80.5	90.2	97.9	61.6	51.4
1966	83.1	91.6	90.3	68.3	59.0
1967	88.3	95.4	91.9	78.0	66.7
1968	93.5	95.3	91.4	89.5	91.2
1970	98.7	99.9	95.7	98.3	95.3
1971	100.0	100.0	100.0	100.0	100.0
1972	102.6	101.1	93.7	107.9	107.1
1973	108.0	102.1	88.5	127.2	119.6
1974	108.5	107.6	81.8	117.5	114.0
1975	106.3	104.7	74.7	109.8	125.0

[a] Includes food products and other crops such as fibers, tobacco, tea, and coffee.

Source: For 1946-52, *Statistical Yearbook of the Republic of China, 1975* (Republic of China: Director-General of Budget, Accounting & Statistics, 1975); for 1953-1975, *Taiwan Statistical Data Book, 1976* (Taiwan Economic Planning Council, 1976)

Table 2. Annual Growth Rates of Agricultural
Output in Taiwan

Year	Total	Farm Crops	Forestry Products	Livestock Products	Fishery Products
1947	25.1	25.0	58.5	17.5	20.8
1948	29.1	14.0	67.3	21.5	39.8
1949	2.1	16.8	−26.3	2.0	− 4.6
1950	11.6	9.2	25.1	33.3	6.5
1951	4.3	0.0	10.0	31.0	20.5
1952	8.5	7.4	23.9	4.2	16.4
1953	9.5	8.4	2.0	23.8	2.7
1954	2.2	0.7	5.6	1.8	19.5
1955	0.6	− 1.4	5.3	3.8	15.4
1956	7.6	8.5	− 5.5	6.7	7.3
1957	7.2	5.7	15.9	11.8	10.3
1958	6.7	5.6	14.4	12.2	2.6
1959	1.7	− 0.3	28.1	− 0.8	6.6
1960	1.3	1.6	3.7	− 3.4	4.1
1961	8.8	7.4	14.1	10.7	15.0
1962	2.6	1.3	2.5	8.5	3.9
1963	0.1	− 1.3	− 0.4	2.5	7.6
1964	12.0	12.5	23.6	6.2	8.8
1965	6.5	8.1	2.1	2.8	4.0
1966	3.1	1.4	− 7.8	10.9	14.8
1967	6.3	4.1	1.8	14.2	13.1
1968	6.7	4.1	5.4	7.1	9.2
1969	− 0.7	4.0	− 5.7	7.2	9.2
1970	5.6	4.8	4.7	9.8	4.5
1971	1.3	0.1	4.5	1.7	4.9
1972	2.6	1.1	− 6.3	7.9	7.1
1973	5.3	1.0	− 5.5	17.9	11.7
1974	0.5	5.4	− 7.6	− 7.6	− 4.7
1975	− 2.0	− 2.7	− 8.7	− 6.5	9.6
Average					
1947–52	13.5	12.1	26.4	18.3	16.6
1954–60	4.6	3.6	8.7	7.0	8.6
1961–65	6.0	5.6	8.4	6.1	7.9
1966–70	4.2	2.1	0.3	9.8	13.4
1971–75	1.5	1.0	− 4.7	2.7	5.7
1947–75	6.2	5.0	8.4	9.3	10.8
1953–75	4.3	3.2	3.7	6.9	9.4

Source: Table 1.

After 1952, total agricultural production continued to grow, but at a lower rate. It increased at an annual rate of 4.6 percent from 1953 to 1960 and at 5.1 percent in the 1960s. The acceleration was particularly noticeable for livestock and fishery products. For farm crops,[3] the annual rate of increase was 3.6 percent for 1953–1960 and 3.8 percent for 1961–70.

But starting in 1971, the rate of growth has declined substantially for all groups of products. For total agricultural production, the average growth rate was 1.5 percent from 1971 to 1975; for farm crops, 1.0 percent; and for livestock products, 2.7 percent. Forestry products declined at nearly 5 percent a year from 1971 to 1975. Only fishery products managed to grow at nearly 6 percent a year during this period.

If the average of a five-year period is used, the growth rate started to decline rather sharply for farm crops and forestry products since 1961–65. Farm crops grew at 5.6 percent a year in 1961–65, and then only 2.1 percent in 1966–70. Forestry products hardly increased at all in 1966–70, after an annual increase of 8.4 percent in 1961–65. But livestock and fishery products continued to increase at an accelerated rate until 1970.

For the 23 years from 1953 to 1975, the average growth rate of total agricultural production was 4.3 percent, considerably higher than the growth rate of population, which averaged about 3 percent for the same period.[4]

Among the categories of agricultural production, the growth rates varied substantially. For farm crops and forestry products, the average growth rates were 3.2 percent and 3.7 percent, respectively, for 1953–75. But for livestock and fishery products, they were 6.9 percent and 9.4 percent, respectively.

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3. Farm crops include: (a) rice; (b) other dry land crops, such as sweet potato, barley, wheat, millet, barn-yard millet, sorghum, corn, buckwheat, soybean, multiflora bean, other beans and fresh edible sugar cane; (c) special crops: tea, sugar-cane, tobacco, coffee, peanut, sesame, rapeseed, arrow-root, cassava, reamie, flax, jute, ambai hemp, cotton, tachia rush, triangle rush, perfume plants, citronella, sisal, derris, and peppermint.

4. *Taiwan Statistical Data Book, 1975* (Taipei: Economic Planning Council, 1975), p. 4. The growth rate for 1969 is not included because of change of statistical coverage.

Table 3. Annual Growth Rates of Production of Farm Crops in
Taiwan
(Percent)

Years	Total	Rice	Common Crops Other Dry Land Food Crops	Special Crops	Fruits	Vegetables	Mushrooms
1947-52	9.9	10.0	10.3	27.8	17.0	11.4	—
1953-60	3.2	2.6	5.4	5.0	7.5	3.9	—
1961-65	3.9	4.2	4.3	6.1	20.6	7.1	142.1
1966-70	1.0	1.1	0.2	-3.3	9.1	14.2	- 5.1
1971-74	3.8	3.8	4.3	8.1	12.7	4.4	16.7
1947-74	3.8	3.8	4.3	8.1	12.7	8.0	—
1953-74	2.2	22.2	2.6	2.7	11.6	7.1	—

Source: Computed from *Statistical Yearbook of the Republic of China (op. cit.).* (Annual growth rate is calculated by using previous year as base.)

Divergent growth rates also occurred among various farm crops. For major food grains, the growth rate was substantially lower than that of fruits, vegetables, and mushrooms, as Table 3 shows. The explanation probably lies at least in part in Engel's Law and the expansion of external markets.

For the population in Taiwan, Engel's coefficient (food expenditure as a proportion of total private consumption expenditure) declined continuously in the past two decades. It was 56 percent in 1951, 51 percent in 1961, and 41 percent in 1971.[5] The income elasticities of demand for major farm products are, in general, low, though with great variance. They have been estimated as follows:[6]

Rice	-0.0219	(1961-69)
Fish	0.3069	(1952-69)
Pineapples	0.5921	(1952-69)
Pork	0.5958	(1953-69)
Sugar	0.6637	(1962-69)
Duck	0.8032	(1963-69)
Vegetable	1.0129	(1952-69)
Chicken	1.0139	(1963-69)
Citrus fruits	1.6934	(1952-69)

5. T.H. Lee and Yueh-eh Chen, "Change in Food Consumption Patterns," in T. H. Shen (ed.), *op. cit.,* p. 325.

6. The income elasticity of demand is defined as $(\Delta c/c) / (\Delta y/y)$, where C is per capita consumption (in physical units) and y is per capita real disposable income. The coefficients given in the text are estimated by Han-yu Chang. See his "Taiwan Ching-chi Fa-chan Ko-ch'eng-chung Liang-shih Hsu-ch' iu Chieh-kou ti

For products for which income elasticity of demand was high, growth rates were also high, namely, fruits, vegetables, livestock, and fishery products. For food grains, the income elasticity of demand was low; so was their growth rate.

For certain farm products, foreign markets have helped their expansion. This is particularly true for fruits and vegetables. The increase of exports of mushrooms and bamboo shoots, for example, has been phenomenal. The degree to which a product is dependent on exports may be measured by the ratio of domestic production to domestic consumption, which may be called the self-sufficiency rate. A coefficient of less than one indicates imports, and a coefficient of more than one indicates exports. The coefficients of self-sufficiency of various farm products are given in Table 4. It can be seen that, up until the end of the 1960s, Taiwan was about self-sufficient in rice and meat, had a great deal to export for fruits, vegetables, and sugar, and was dependent on imports for wheat, corn, soybeans, and milk. For food crops as a whole, Taiwan was about self-sufficient.

Table 4.   Self-Sufficiency Rates of Major Food Items in Taiwan
(Percent)

	1952–56	1957–61	1962–66	1967–71	1952–71
Rice	111.9	106.5	108.4	103.8	107.6
Wheat	10.1	13.4	7.9	3.4	8.7
Corn	95.0	61.7	69.4	17.1	60.8
Soybeans	19.4	31.2	27.9	13.6	23.0
Fruits	126.3	131.5	197.7	179.7	158.8
Vegetables	99.9	99.8	139.4	156.4	123.9
Sugar	834.3	823.1	687.5	461.7	701.7
Meat	100.0	100.7	100.5	100.9	100.5
Milk	7.5	6.2	14.3	14.5	10.6
Sea Products	91.6	99.2	101.1	117.6	102.4
Total Food	103.2	100.0	03.5	95.7	100.6

Source: T. H. Shen (ed.), *Agriculture's Place in the Strategy of Development: The Taiwan Experience* (Taipei: Joint Commission on Rural Reconstruction, 1974).

Pien-hua yü Chan-wang" (Demand for and Supply of Food in Taiwan: Structural Changes and Prospects) in *Taiwan Yin-han Chi-kan* (Quarterly Journal of the Bank of Taiwan), Vol. 22, No. 4 (December 1971).

But, from 1971 to 1975, farm crops increased at only 1 percent a year, whereas population increased nearly 2 percent, so the self-sufficiency rate must have declined. According to one estimate, the self-sufficiency rate of food grains has actually dropped from 100 percent in 1968 to 88 percent in 1974.[7]

AGRICULTURAL INPUTS

Agricultural inputs or the factors of agricultural production are conventionally classified into three categories: land, labor, and capital. Technological improvements either in production techniques or in organizational changes may be treated as a separate input.

Land

Taiwan is very densely populated and has been so for decades. It has become impossible to increase the area of cultivated land. From 1946 to 1970 the annual rate of increase of cultivated land was only 0.4 percent, much less than that of agricultural population, which was 2.5 percent from 1951–55 to 1956–60, 2.7 percent from 1956–60 to 1961–65, and 1.4 percent from 1961–65 to 1966–70.[8] As a result, the area of cultivated land per capita on farm continued to decline, from 0.21 hectare in 1952 to 0.15 hectare in 1970.

Agricultural population, after peaking in 1969, has continuously declined at a rate of 1.56 percent a year for 1970–75. At the

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7. See Yu-kang Mao, "Taiwan Nung-yeh Fa-chan Chih Fang-hsiang yü Tiwei" (Prospects for Agricultural Develpment in Taiwan) in *Taiwan Ching-chi Fa-chan Fang-hsiang chi ts'e lüh yen t'ao hua* (Conference on Prospects and Strategy for Economic Development in Taiwan) (Taipei: The Institute of Economic Academia Sinica, 1976), p. 105.

For alternative estimates and discussion on food self-suffiency rate, see Yu-yuan Pien, *Taiwan Liang-shih Tzu-chieh-Lü chih yen-chiu* (On Self-Sufficiency of Food Grain in Taiwan) in Tsung-hsien Yu and Yu-hsien Yu (eds.), *Taiwan Nung-yeh Fa-chan Lun-wen-chi* (Essays on Taiwan's Agricultural Development) (Taipei: Lien-ching Publications Co., 1975), p. 610.

8. See Ko-chih Liu, "1945 Nien I-lai Taiwan Ching-chi Fa-chang Yü Jên-k'ou Chih Ch'üan-mein Kuan-ch'a" (Economic Development and Population in Taiwan Since 1945: An Overview) in Tsung-hsien Yu and Cheng Li (eds.), *Taiwan Jên-li Tzu-yuan Lun-wen-chi* (Essays on Human Resources in Taiwan) (Taipei: Lien-ching Publications Co., 1975), p. 37.

Total agricultural population was 3,523,000 in 1946, 4,257,000 in 1952, and 6,152,000 in 1969, the peak year. Thereafter, it declined continuously to 5,598,000 in 1975. It was 5,997,000 in 1970. From 1970 to 1974, the annual rate of decline was 0.8 percent. The 1946 figure is given in You-tsao Wang, *op. cit.*, p. 170. For other years, see *Taiwan Statistical Data Book, 1976*, p. 53.

same time, there was also a slight increase in the area of cultivated land. Consequently, the area of cultivated land per capita on farms increased to 0.16 hectare in 1975.[9] However, efforts have been made to increase sown (or crop) areas, thanks to abundant labor, irrigation, chemical fertilizers, early maturing varieties, control of crop pests and disease, use of farm machinery, and favorable weather conditions. Total crop area increased from about 1,506,000 hectares in 1952 to 1,702,000 in 1966, or about 13 percent over a period of 14 years. It has declined since 1966, however. In 1975 it was 1,659,000 hectares, only about 10 percent more than in 1952.[10]

The multiple cropping index (ratio of crop acreage to total cultivated acreage) increased continuously from 118 in 1946 to 172 in 1952, and 190 in 1966. Thereafter, it declined to 175 in 1973 and went up to 181 in 1975.[11] The decline since 1966 probably reflected the increasing scarcity of labor, for multiple cropping is a highly labor-intensive operation at planting and harvesting seasons. The decline in prices received for winter crops was probably another contributing factor.

Leading multiple cropping systems in Taiwan include: rice-rice-sweet potato, rice-rice-soybean, rice-rice-corn, rice-rice-tobacco, rice-rice-vegetable, and rice-vegetable-rice. In 1970, practically all of Taiwan's flax, tobacco, and wheat, and over 80 percent of its soybeans, 52 percent of its corn, and 61 percent of its vegetables were grown in paddy fields under multiple cropping. The yield of rice under multiple cropping is usually only 3 to 10 percent less than under single cropping.[12]

LABOR

The number of agricultural workers increased at an annual rate of 3.4 percent in 1946–51. From 1951 to 1970, it increased at only 0.3 percent a year (Table 5).

9. *Taiwan Statistical Data Book, 1976*, p. 54.

10. *Ibid.*, p. 52.

11. *Ibid.*

12. T. H. Shen and Y. T. Wang, "Technological Adjustments," in T. H. Shen (ed.), *op. cit.*, pp. 375–379.

Table 5. Annual Rate of Growth of Agricultural Inputs in Taiwan, 1946–70
(Percent)

	1946–51	1951–60	1960–70	1946–70
Total input	7.8	2.7	3.2	3.9
Cultivated land	1.0	0.0	0.4	0.4
Crop area	6.0	0.9	0.3	1.7
Labor				
Working days	6.6	1.7	0.9	2.4
Number of workers	3.4	0.3	0.3	0.9
Fixed capital	4.2	2.4	4.8	3.8
Current inputs				
Fertilizer	32.0	8.0	3.5	10.6
Total	23.0	8.5	10.4	12.3

Source: T. H. Lee and T. H. Shen, "Agriculture as a Base for Socio-Economic Development" in T. H. Shen (ed.), *Agriculture's Place in the Strategy of Development: The Taiwan Experience* (Taipei: Joint Commission on Rural Reconstruction, 1974).

The number of working days in agriculture increased at a substantially faster rate than the number of workers. For 1946–70, the annual rate of increase of working days was 214 percent, but that of number of workers only 0.9 percent (Table 5). This means that the average working days per worker increased substantially. In 1946–47, the number of working days per agricultural worker was only 73 days a year. It increased to 148 days in 1969–70. For the female worker, it was 75 days in 1946–47 and 152 days in 1969–70.[13] The increase in the number of working days per worker per year suggests a more intensive utilization of labor, or possibly a decline in underemployment or disguised unemployment.[14]

13. Wen-hui Lai, "Trend of Agricultural Employment in Postwar Taiwan," presented to the *Sino-American Conference on Manpower in Taiwan* (Taipei: *Ho-tso Jen-li Tzu-yüan Hui-i Lun-wen Chuna-chi* (Papers of the Sino-American 1972 Manpower Conference). Lai's estimate of the number of working days per year is different from what is implied in Table 5.

14. The issue of disguised unemployment is too complicated to be discussed here. According to one study, the rate of utilization of farm labor was only 46 percent for both 1956 and 1962. (This rate is defined to be the ratio of labor used in farm work and side occupations to available farm labor.) This seems to suggest the existence of large disguised unemployment. See Ch'ing-jung Liu, "Taiwan Nung-tsun-chung Chih Ying-ts'ang-hsing Shih-yeh wen-t'i" (Rural Disguised Unemploy-

The increase of farm labor input (in terms of man-days per year) was associated with the increase in multiple cropping and a shift to more labor-intensive crops, such as fruits, vegetables, mushrooms, and asparagus. Labor input per hectare crop increased from 97 working days in 1945–47 to 151 in 1969–70. Labor input per hectare of cultivated land increased from 122 working days in 1945–47 to 272 in 1969–70.[15]

Farm labor has not only increased in quantity; its quality has also witnessed substantial improvement. In 1956, for example, 39 percent of agricultural workers were illiterate, and 51 percent had an education at the level of primary schools. Only 3.8 percent had a high school education.[16] In 1975, 24 percent were illiterate, 55 percent had a primary school education, and 13 percent had an education at the high school level.[17]

CAPITAL

Capital input may be divided into fixed capital (such as farm implements and equipment, farm buildings, and irrigation facilities) and working capital (such as fertilizers, feeds, seeds, pesticides, and insecticides). Farm fixed capital increased at 4.2 percent a year during the recovery period, that is, 1946–51. In the 1950s, it increased at 2.4 percent, and in the 1960s, 4.8 percent. From 1946 to 1970, it increased at an annual rate of 3.8 percent (Table 5).

Farm working capital increased even faster. The corresponding annual growth rates were 23 percent (for 1946–51); 8.5 percent

ment in Taiwan), in *Taiwan Jên-li Tzu-yüan Lun-wen-chi* (Essays on Human Resources in Taiwan) (Taipei: Lien-ching Publications Co., 1975), p. 426.

But the wage data do not seem to suggest such large-scale disguised unemployment. Real wages in manufacturing rose at an average annual rate of 3.4 percent and 4.0 percent in 1960–64. Taking the nonagricultural sector as a whole (mining, manufacturing, and public utilities), real wages rose at an annual rate of 1.3 percent in 1954–59 and 3.6 percent in 1960–64. See Chi-ming Hou and Yu-chu Hsu, "The Supply of Labor in Taiwan," in *Conference on Population and Economic Development in Taiwan* (Taipei: Institute of Economic Academia Sinica, 1976), p. 347. It might be that, contrary to the Lewis-Ranis-Fei model, a rising wage rate might not be entirely incompatible with the existence of rural disguised unemployment. A rising wage rate might have been necessitated by a rising "minimum" living standard in the cities. Seasonality of farm work would make any estimate of disguised unemployment an exceedingly difficult task.

15. Wen-hui Lai, *op. cit.*, p. 129.

16. Ko-chih Liu, "Growth and Utilization of Human Resources in Taiwan," in Tsung-Hsien Yu and Cheng Li (eds.), *op. cit.*, p. 86.

17. Computed from Taiwan Provincial Labor Force Survey and Research Institute, *Quarterly Report on the Labor Force Survey in Taiwan*, July 1975, p. 56.

(1951–60); and 10.4 percent (for 1960–70). For the period from 1946 to 1970, it increased at an average annual rate of 12.3 percent (Table 5).

Of all farm capital inputs, chemical fertilizer and feeds are most important. For example, in 1961–65, chemical fertilizers accounted for 32 percent of all capital imputs, and feeds, 38 percent. The relative share of various capital inputs are given in Table 6.

Table 6. Percentage Share of Farm Capital
Inputs in Taiwan (1946–65)
(Percent)

	1946–50	1951–55	1956–60	1961–65
Chemical fertilizer	13.77	32.12	33.90	32.45
Seeds	23.36	14.84	12.43	10.59
Feeds	36.62	34.04	36.31	37.83
Pesticides and insecticides	1.19	1.65	3.61	7.89
Depreciation of farm building & equipment	16.06	12.52	9.91	8.09
Water fee	9.00	4.85	3.84	3.15
Total	100.00	100.00	100.00	100.00

Source: You-tsao Wang, "Technological Change and Agricultural Development in Taiwan," Taiwan Nung-yeh Fa-chan Lunwen-chi (Essays on Taiwan's Agricultural Development) (Taipei, Lieng-ching Publications Co., 1975).

Water conservation work and irrigation are extremely important in Taiwan, as paddy rice is the staple food and monthly rainfall is very uneven. According to one study, the increase of rice production was influenced greatly by irrigation; from 1950 to 1960 each 1 percent increase in irrigated area brought about a 2.5 percent increase of paddy rice yield.[18] But the expansion of irrigated area was rather limited — it has remained around 500,000 hectares, or about 60 percent of the total cultivated area.[19]

18. The regression is as follows:

$$Y = -186.5523 + 0.4971F + 2.47861 - 0.0047P$$
$$(0.7273) \quad (0.6880) \quad (0.0036)$$
$$R^2 = 0.97 \qquad S = 2.4918$$

where Y = paddy rice yield
  F = quantity of fertilizer application
  I = irrigated area
  P = ice of rice.

The calculation was done by E. L. Rada and T. H. Lee, as cited by T. H. Shen and Y. T. Wang, op. cit., p. 371.

19. You-tsao Wang, op. cit., p. 166.

Chemical fertilizers have been used quite heavily in Taiwan. Table 5 shows that the rate of increase of fertilizers (primarily chemical fertilizers) was substantially larger than that of cultivated land or crop area. From 1946 to 1970, the use of chemical fertilizers per unit of crop area went up by about 9 percent a year. In terms of cultivated area, it went up by more than 10 percent a year. The trend has continued since 1970.

In 1970, total chemical fertilizer used was 653,545 metric tons. In 1974, it increased to 1,136,604 metric tons, or 74 percent. Total crop area actually declined from 1,653,000 hectares in 1970 to 1,645,000 hectares in 1974. Area of cultivated land increased only slightly from 903,000 hectares in 1970 to 917,000 hectares in 1974.[20] In absolute terms, chemical fertilizer used in 1974 was 0.69 metric tons per hectare of crop area, or 1.24 metric tons per hectare of cultivated area.

Farm mechanization has played an important role in Taiwan's agricultural development. Since the early 1950s, power tillers have been increasingly used to supplement or replace water buffaloes. Since the 1960s, when farm wages began to rise substantially, labor-saving machines have become widely used. They include power sprayers, power threshers, corn shellers, jute decorticators, sweet potato diggers, grain dryers, hand soybean planters, peanut threshers, tea cutters, and rice transplanters. The rapid increase of farm machines and the decline of draft animals may be seen in Table 7.

Table 7.   Increase of Farm Machines and Decline of
Draft Animals in Taiwan
(1,000's)

	1960	1969
Draft Animals	417.1	305.2
Power tillers	3.7	24.6
Power sprayer	0.3	14.8
Hand sprayer	104.2	181.6
Hand duster	10.8	22.4
Rice thresher	177.3	198.5
Pump	8.4	52.0
Grain dryer	—	1.7

Source: T. H. Shen and Y. T. Wang, "Technological Adjustments," in T. H. Shen (ed.), Agriculture's Place in the Strategy of Development: The Tawian Experience (Taipei: Joint Commission on Rural Reconstruction, 1974).

20. Taiwan Statistical Data Book, 1975, pp. 48 and 58.

FACTOR PRODUCTIVITY

The rate of growth of total agricultural output in Taiwan has been consistently larger than that of total agricultural input, implying that factor productivity has increased. As Table 8 shows, total factor productivity increased at 1.7 percent per year from 1946 to 1970.

Table 8. Annual Rate of Growth of Agricultural Factor
Productivity, 1946–70
(Percent)

	Increase in total output	Increase in total input	Increase in total input productivity	Increase in Productivity per worker	ha. of arable land
1946–51	10.2	7.8	2.4	6.3	9.2
1951–60	4.7	2.7	2.0	4.4	4.6
1960–70	4.2	3.2	1.0	3.9	3.9
1946–70	5.6	3.9	1.7	4.6	5.2

Source: T. H. Lee and T. H. Shen, "Change in Food Consumption Patterns," in T. H. Shen (ed.), *Agriculture's Place in the Strategy of Development: The Tawian Experience* (Taipei: Joint Commission on Rural Reconstruction, 1974), p. 298.

As in the case of total output and total input, total factor productivity increased at a decreasing rate, averaging 2.4 percent a year in 1946–70. It is not entirely clear why this happened, but, given the constant amount of total cultivated area, it seems that the law of diminishing returns asserted itself, despite all the technological progress that took place.

The rate of increase of average productivity of labor (output per worker) was about the same as that of the average productivity of land (output per unit of arable land) from 1950 to 1970. The increase of capital (Table 5) was evidently the main determinant of labor and land productivity.[21] Total capital per

21. This can be demonstrated as follows: Let Y be output and L, N, K land, labor, and capital, respectively.

$$\frac{Y}{N} = \frac{Y}{L} \cdot \frac{L}{N}$$

Similarly,

$$\frac{Y}{L} = \frac{Y}{K} \cdot \frac{K}{L}$$

Thus,

$$\frac{Y}{N} = \frac{Y}{K} \cdot \frac{K}{L} \cdot \frac{L}{N}$$

Since, in the Taiwan case, both Y/K and L/N have declined (see note 22), the increase in Y/N must have been due to an increase in K/L.

unit of labor as well as per unit of arable land increased substantially during the period.

According to one estimate, capital investment per unit of cultivated land increased at a rate of 8.65 percent a year from 1946 to 1965.[22] Capital investment per worker increased at a much lower rate, because labor increased faster than land. The increase of capital intensity brought down the efficiency of capital. For the period from 1946 to 1965, the average productivity of capital declined at 0.71 percent a year.

The increase of land productivity implies an increase of crop unit yield. The unit yield of all crops rose by about 26 percent from 1946 to 1951 and by 70 percent from 1951 to 1968.[23] Among different crops, unit yield increased fastest for fruits and slowest for vegetables for the period 1946-65. The growth rates of yield for various crops are given in Tables 9 and 10.

Table 9. Annual Growth Rate of Yield Per Unit of Crop
Area in Taiwan, 1946-65
(By Groups)

Food Crops	3.45
Special crops	4.67
Fruits	5.39
Vegetables	0.43
All crops	3.63

Source: You-tsao Wang, (op. cit., Table 6), p. 105.

22. You-tsao Wang, op. cit., p. 179. For the period 1946-65, Wang's results on Taiwan's agricultural factor productivity are as follows:

	Annual Growth Rate (1946-1965)
Productivity of labor (per worker)	7.21
Productivity of labor (per man-day)	4.16
Productivity of capital (fixed and current)	-0.71
Productivity of land (per unit of cultivated area)	7.87
Aggregate input productivity	2.25
Capital-land ratio	8.65
Land-labor ratio	-0.60

23. T. H. Lee and T. H. Shen, op. cit., p. 293.

Table 10. Annual Rate of Increase of Yield Per Unit of Crop
Area in Taiwan, 1953-1974: By Individual Crops
(Percent)

Crops	1953-64	1965-74	1953-74
Rice (brown)	3.3	0.7	2.1
Sweet potatoes	3.6	1.3	2.5
Wheat	5.2	1.5	3.5
Soybeans	5.4	2.9	4.3
Peanuts	3.7	2.4	3.1
Cotton	7.6	0.2	4.2
Jute	4.1	-2.8	0.9
Tea	4.5	3.9	4.2
Bananas	6.7	3.6	5.3
Pineapple	6.0	0.7	3.5
Citrus fruits	2.4	4.0	2.9
Sugarcane	3.1	2.2	2.7
Sugar	2.2	0.1	1.2
Brown sugar	6.6	4.0	5.4
Citronella	-0.3	2.0	0.8
Mushrooms	N/A	8.9	N/A
Watermelon	0.9	4.9	2.7

Source: *Taiwan Statistical Data Book 1975* (Taipei: Economic Planning
Council, 1975), pp. 53-57.

Note: N/A = not available.

Since the increase of both cultivated and crop area was fairly
small, especially since 1960, the increase in agricultural output
has been brought about largely through increases in unit yield.
The rate of increase of unit yield has declined since 1965 for
nearly all principal crops, as shown in Table 10. For rice, for
example, the average annual rate of increase of unit yield was 0.7
percent in 1965-74, compared with 3.3 percent in 1953-64.

ORGANIZATION AND POLICY

The above analysis suggests that the increase in agricultural
production in Taiwan has been associated with intensive
utilization of labor, more use of capital, and introduction of
modern technology. But what has brought about the changes in
agricultural inputs? Why did the farmer want to work harder?
Who supplied the capital? Who introduced technology? Who was
the agent of technological diffusion? Has all this been a result of
the interplay of market forces alone? Or were there other
instruments of change? What role did the government play?

While an exhaustive study of all this cannot be made here, the following institutional arrangements and government policy are generally regarded as crucial ingredients of agricultural development in Taiwan.

LAND REFORM

In 1949 the government began a rent reduction program for all private tenanted land, with a ceiling of rental rate being 37.5 percent of total annual main crop yield. The latter was fixed by the government (or agreed upon by landlords and tenants) at the 1948 level. But since actual crop yield has increased substantially in later years, the effective maximum rate has been much lower than the fixed 37.5 percent.[24]

In 1951 the government started to sell farm lands that it had taken over from the Japanese colonial government and Japanese settlers and corporations in 1945, and had, in large part, leased to farmers. These lands were offered for sale to tenant farmers at a price equal to 2.5 times the annual main crop yield, to be paid in 20 installments over ten years. In 1949, the Chinese government owned a total of 180,000 hectares of land. It sold 130,000 hectares to 177,000 tenant families from 1950 to 1973.[25]

In 1953, the "Land-to-the-Tiller" program was formally launched. Under this program, a landlord was required to sell to the government all his tenanted land in excess of three hectares of paddy field (of medium grade) or its equivalent, at a price equal to 2.5 times the crop yield; 70 percent of the payments were in bonds in kind and 30 percent in stocks of government enterprises. The bonds in kind bore an annual interest rate of 4 percent and were redeemable in installments over a period of ten years. The land so purchased by the government was then sold to its original tenants or farmhands at the same price as that paid to the landlords. The payment was also in installments over a period of ten years with an annual interest rate of 4 percent. Under this program, a total of 140,000 hectares of land was purchased from 106,000 landlords

24. For the details, see Chao-chen Chen, "Land Reform and Agricultural Development in Taiwan," in *Conference on Economic Development of Taiwan, 1967* (Taipei: China Council on Sino-American Cooperation in the Humanities and Social Sciences, 1967), pp. 126–153; Yu-kang Mao, "Population and the Land System in Taiwan," in *Conference on Population and Economic Development in Taiwan, 1976,* pp. 163–191; Anthony Y. C. Koo, *The Role of Land Reform in Economic Development: A Case Study of Taiwan* (New York: Praeger, 1968); Yhi-min Ho, *Agricultural Development of Taiwan* (Nashville: Vanderbilt U. Press, 1966).

25. Yu-kang Mao, *op. cit.,* p. 174.

and sold to 195,000 tenant families.[26] Those farmers who cultivated their own land were not affected by this program, regardless of the amount of land they owned.

The land reform programs have had drastic effects on land tenancy. The rent reduction program lowered the value of the farm land leased to tenant farmers and encouraged the landlords to sell the land to their tenants. A total of 66,328 tenant families bought 34,453 hectares of farm land between 1949 and 1953.[27] The sale of public land and the "Land-to-the-Tiller" program directly reduced tenancy and increased ownership.

In 1949, of total farm households in Taiwan, some 39 percent were tenant farms (as it had been for decades), 25 percent part-owner farms, and 36 percent owner-operator farms. The proportion of pure tenant farms was reduced to 21 percent in 1953 and 9.7 percent in 1974. The proportion of owner-operator farms increased to 55 percent in 1953 and 79 percent in 1974. Before land reform, about 61 percent of private cultivated land was cultivated by owners; thereafter, it increased to 85 percent in 1953. By 1974 the ratio was 91 percent.[28]

It is generally felt that the sharp increase in owner-operator farms has been not only politically and socially desirable, it has also had desirable economic consequences. The owner-operator may be expected to work harder when he does not need to share the fruits of his labor with his landlord. It is also likely that what would be used as payment for rent is now at least in part saved for capital investment in land. To the extent that the rental income of the landlords is not used for investment in land, either because it is used for consumption by the landlords or other farmers (through loans by the landlords) or because it is used for investment in nonagricultural sectors, capital formation in agriculture may be increased.

According to one estimate, the marginal propensity to save of new farm owners in Taiwan was as high as 49 percent for 1952–62.[29] But there are no data to show how the former landlords disposed of their income.

It has been suggested that the land reform program has resulted in smaller size farms, which has resulted in inefficient

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26. In 1953, there were altogether 872,738 hectares of cultivated land and 702,325 farm families. *(Taiwan Statistical Data Book, 1976,* pp. 51 and 54.)
27. Chao-chen Chen, *op. cit.,* p. 135.
28. *Ibid.,* p. 144 and Yu-kang Mao, *op. cit.,* p. 175.
29. Chao-chen Chen, *op. cit.,* p. 148.

operation. Before the Land-to-the-Tiller program, 58 percent of all farms had less than 3 hectares of land; thereafter, the ratio increased to 77 percent.[30] But part of this change must have been due to an increase in the number of farm households. It must be remembered that the land reform program did not involve breaking up the large owner-operated farms. Furthermore, there is no evidence to suggest that smaller size means less efficiency in terms of output per unit of land. On the contrary, one study shows that in 1965 the value of total output per hectare of cultivated area was NT$40,900 for farms of less than 0.5 hectare. It was only NT$26,700 for farms of more than 0.5 hectare. But on a per man-year basis, it was smaller for farms of less than 0.5 hectare: NT$20,000 compared with NT$25,400 for farms of more than 0.5 hectare.[31]

Joint Commission on Rural Reconstruction (JCRR)

This Joint Commission of China and the United States, created under the U. S. China Aid Act of 1948, has played a crucial innovating role in agricultural development in Taiwan. It has assisted the government in planning and coordinating agricultural programs and has provided technical and financial assistance to various agencies and organizations, private as well as public. Its activities have formed an integrated agricultural and rural development program, including technological improvements and institutional changes and readjustments.[32] It has introduced new and improved varieties and breeds, better cultural methods, irrigation, and the scientific application of fertilizers and pesticides. For organizational developments, it has assisted the land reform programs and the reorganization of farmers' associations, irrigation associations, and fishermen's associations. It has also played a role in the improvement of marketing procedures and facilities, the development of the rural credit system, and the promotion of family planning programs.

30. Yu-kang Mao, op. cit., p. 176.

31. Hsi-Huang Chen, "Economic Analysis of Small Farms," in Tsung-Hsien Yu and Yu-hsien Yu, op. cit., pp. 378–379.

32. Wen-fu Hsu, "The Role of Agricultural Organizations in Agricultural Development in Taiwan," in Conference on Economic Development of Taiwan, 1976, p. 121; T. H. Shen, "Organizations to Promote Agricultural Development," in T. H. Shen (ed.), op. cit., pp. 346–365; You-tsao Wang, "Agricultural Development," in Kowie Chang (ed.), Economic Development in Taiwan (Taipei: Cheng-chung Book Co., 1968), pp. 217–223; T. H. Shen, The Sino-American Joint Commission on Rural Reconstruction: Twenty Years of Cooperation for Agricultural Development (Ithaca, Cornell U. Press, 1970).

JCRR staff has provided technical assistance in the planning and implementation for the agricultural sector of the Four-Year Economic Development Plans which started in 1953. JCRR has served as a coordinator on matters relating to the overall national agricultural plan.

JCRR has also provided funds for the agricultural programs. (The U.S. China Aid Act of 1948 provided that up to 10 percent of all U.S. economic aid to China could be used to carry out JCRR programs.) For example, from 1951 to 1965, JCRR approved more than 6,000 projects carried out by various agencies and spent a total of NT$4,000 million and US$7 million. A total of NT$13,330 million was used for investment in agriculture in Taiwan from 1953 to 1965. (NT$6,270 million of the total represented private investment and NT$7,060 million public investment.)[33]

The Farmers' Association

The Farmers' Associations are a federation of cooperative organizations and are operated at the township (district) level, the county level, and the provincial level. Township Farmers' Associations are the grass-roots organizations that are directly controlled by the farmers.

The Farmers' Associations are engaged in a wide variety of both government-sponsored and self-initiated activities. The government-sponsored functions have included distribution of fertilizers and feeds, collection and purchase of rice, and participation in agricultural extension services. The latter include not only production technology of crops and livestock, they also include farm management and organization and training of young people to become better farmers. Adult farmers enroll in farm discussion groups, farm women take part in home improvement clubs, and farm boys and girls join 4-H clubs. The Farmers' Associations have been effective agents of dissemination of technology. They are also engaged in purchasing farm supplies, marketing and processing farm products, receiving deposits, and making loans. They are truly multipurpose cooperatives.[34]

33. Chi-tseng Shih, "Real Assets of Farming Households in Taiwan," in Tsung-hsien Yu and Yu-hsien Yu, op. cit., p. 537.

34. T. H. Shen, "Organizations to Promote Agricultural Development," op. cit., pp. 354–357; Mao-Ying Chiu, "Farmers' Associations and Economic Development," in Tsung-hsien Yu and Yu-hsien Yu, op. cit., pp. 173–196.

The Rice-Fertilizer Barter Policy

This policy was begun in 1950 for the purpose of raising rice production by the farmers on the one hand and rice collection by the government on the other hand. Government-imported fertilizers were given to farmers in exchange for rice, with the exchange ratio being determined by the government. Thus the government gained a large supply of rice, which was used for exports. In 1966, for example, rice acquired by the government under the rice-fertilizer barter program constituted 70 percent of all rice obtained by the government. (Other sources included taxes in kind, rental in kind, and purchases.)[35]

The advantages to the farmers of the rice-fertilizer barter program were twofold. First, all farmers were guaranteed a supply of fertilizers, which were the most important input of rice production and yielded high returns. Without this program, the poor and small farmers would probably have been denied such a supply because of lack of funds and inability to borrow at reasonable terms. Second, the farmers were free from risks due to price instability. The rice-fertilizer ratio was fixed in advance.

This system was not without its shortcomings. Farmers had no freedom of choice regarding quality or quantity of fertilizers used, nor could they grow other crops without losing their fertilizer supply. All the inconveniences of barter trade existed. And the rice-fertilizer exchange ratio was not adjusted to reflect changing market conditions and worked to the disadvantage of the farmers.[36] The system was finally abolished in 1973. (In the early 1970s, the government-owned fertilizer industry became well-established.)

A New Agricultural Policy

Agricultural production increased at a rapid rate in the 1950s and 1960s, but the rice-fertilizer barter system effectively transferred part of the increase out of agriculture. When this was combined with the fact that nonagricultural production grew even faster than agricultural production, the gap between per capita farm and nonfarm incomes and living standards widened. In 1968, for example, per capita income of farm people was only 58 percent of that of nonfarm people. In 1954, the ratio was 75

35. Yu-hsien Yu, "An Analysis of Prices of Farm Outputs and Inputs in Taiwan," in Tsung-hsien Yu and Yu-hsien Yu, op, cit., p. 201.

36. Tso-yung Wang, "Rural Reconstruction," in Tsung-hsien Yu and Yu-hsien Yu, op. cit., pp. 443–446.

percent.[37] To cope with this and other problems, a new agricultural policy was adopted by the Chinese government in 1969.

The main objective of the new policy was to reduce costs of agricultural production and marketing by such measures as reduction of fertilizer price and irrigation fees, farm mechanization, lower interest rates, and lower taxes. In 1972, it was announced that the government was prepared to earmark in two years a total of NT$2 billion in grants and almost an equal amount (NT$1.8 billion) in loans to improve agriculture. Specific measures included establishment of specialized agricultural production areas, improvement of farming techniques (including farm mechanization), and strengthening of rural infrastructures. (A specialized agricultural production area means that all farms producing certain items in a locality are urged to form a large production and marketing unit to facilitate joint purchases and joint production operations.)

The adoption of the new agricultural policy reflected the changing role of agriculture in the economy. The agricultural sector may no longer be regarded as a crucial source of financing economic development, and the rural people may now equally share in the fruits of economic growth. In 1953, agriculture contributed 34 percent of gross domestic product and 87 percent of total exports. By 1970, the corresponding shares had become 15 percent and 12 percent.[38]

But all the above does not mean, of course, that there had been no increase in farmers' income and living standards. Per capita income of farm families rose, in 1952 prices, from NT$1,375 in 1954 to NT$1,836 in 1970, or about 1.8 percent a year.[39]

By 1970, 93 percent of farm families had electric lights, 70 percent had electric fans, 53 percent had radios, 70 percent had sewing machines, 17 percent had a television set, 36 percent had running water, and 50 percent had water from sanitary wells. In 1970, 70 percent of the persons working on family farms had a primary school education, or higher.[40] These were no small achievements.

37. T. H. Shen, "A New Agricultural Policy," in T. H. Shen (ed.), op. cit., p. 39.

38. Statistical Yearbook of the Republic of China 1975 (Republic of China: Directorate General of Budget, Accounting & Statistics, Executive Yuan), p. 191; Kuo-shu Liang, "Taiwan's Agricultural Trade and Economic Development," in T. H. Shen (ed.), op. cit., p. 117.

39. Per capita income data at current prices are from T. H. Lee and T. H. Shen, "Agriculture as a Base for Socio-Econovic Development," in T. H. Shen (ed.), op. cit., p. 299. Index of Consumer Prices is from Taiwan Statistical Data Book, 1975, p. 157.

40. Ibid., pp. 433-435.

ISSUES AND PROSPECTS

The rate of increase of agricultural production has slowed down since 1971, averaging 0.98 percent a year for the five years from 1971 through 1975. This may be compared with the average annual rate of increase of 5.6 percent during the five years from 1961 to 1965.[41] This slow growth in recent years has occurred at a time when the following phenomena have also occurred.

First, agricultural employment has declined continuously in absolute numbers since 1969, with the exception of 1974 when there was a decline in industrial production and some industrial workers returned to the countryside. From 1969 to 1973, the average annual rate of decline was 1.53 percent.[42] Such a rate of decline, if continued, implies that an increase of agricultural production at, say, 4 percent a year (roughly the historical rate), would require an increase of labor productivity of nearly 6 percent a year. This may be compared with the annual rate of increase of labor productivity (agricultural output per employed person per year) of 1.91 percent for the five years from 1971 to 1975.[43] For the period 1946–70, the annual rate of increase was 4.6 percent (Table 8). The rate of increase of productivity of the agricultural worker has also declined sharply in the past few years.

Second, the average size of farms in Taiwan was never large and has been getting smaller. In 1925 it was 1.97 hectares. By 1950 it was reduced to 1.36. It continued to decline and reached 1.03 in 1970. In 1974, it increased to 1.05.[44] What is worse is that the percentage share of the smallest farms has increased over the years. In 1955 some 34 percent of all farms had less than 0.5 hectares of land. In 1970, the ratio reached 44 percent. In 1955, 53 percent of all farms had less than 1 hectare; by 1970, nearly 72 percent had less than 1 hectare.[45] As noted earlier, labor productivity in small farms (less than 0.5 hectare) is substantially lower (by more than 20 percent) than that in larger farms.

Factors affecting farms size are complicated. Aside from the increase in the number of farm households, the land tenancy system probably has also been important. The small farmers are

41. *Taiwan Statistical Data Book, 1976*, p. 56.

42. Calculated from *Taiwan Statistical Data Book, 1976*, p. 16. Employment data are from the *Quarterly Report on the Labor Force Survey in Taiwan* (Taipei: Taiwan Provincial Labor Force Survey and Research Institute, 1974).

43. Calculated from *Taiwan Statistical Data Book, 1976*, pp. 16 and 55. Agricultural employment data are from the *Labor Force Survey in Taiwan*.

44. Yu-kang Mao, *op. cit.*, p. 167.

45. T. H. Shen (ed.), *op. cit.*, p. 419.

reluctant to sell their farms because of the risks involved in nonagricultural jobs. They are also reluctant to lease their land to others for fear of losing their land to the tenants under the land reform regulations.

As a result, part-time farming has increased. Many farmers find it necessary to supplement their incomes with nonfarm jobs locally or in near-by towns or cities. Friends or relatives are asked to take care of their farms during their absence, which may last from several days to several weeks. This arrangement often leads to inefficient operation.[46]

In 1960, 52 percent of all farms were part-time farms. By 1970, the ratio increased to 70 percent. For farms of less than 0.5 hectares, 70 percent were part-time farms in 1960 and 83 percent in 1970.[47] The productivity of part-time farms is substantially lower than that of full-time farms, as shown in Table 11.

Table 11. Productivity of Full-time and Part-time Farms
in Taiwan, 1967

	Full-time Farms	Part-time Farms	
		(A)	(B)
Income per household (NT$)	26,004	23,360	13,727
Income per man-equivalent (NT$)	17,248	12,990	5,935
Rate of return on capital investment (%)	7.13	6.03	1.86
Returns per NT dollar input (NT$)	1.94	1.89	1.46

Source: Terry Y. H. Yu, "Economic Analysis of Full-time and Part-time Farms in Taiwan," as cited in T. H. Shen (ed.), *Agriculture's Place in the Strategy of Development: The Taiwan Experience.*

The problems for agricultural development in Taiwan today seem clear. To increase farm output and to reduce income inequalities between agricultural and nonagricultural sectors, which is a stated goal of the government, farm labor productivity would have to be increased. One model of raising farm labor productivity would be the American approach: development of highly capital-intensive techniques (farm mechanization), but that would require a much larger farm size than is found today in Taiwan. Land consolidation would, in turn, require a set of

46. Yu-kang Mao, *op. cit.,* p. 180.
47. *Ibid.,* p. 177.

institutional innovations whereby the inefficient part-time farmers would be willing to sell or lease their land to others and find employment in nonagricultural sectors. This is probably what should or would happen. Agricultural employment still accounts for 30 percent of total employment (1975) — a very high proportion by the standards of industrially advanced countries. Rapid industrial development would surely require a shift of labor from the agricultural to the nonagricultural sectors. The question is how to make such a shift without undesirable social consequences. Reliance on market forces alone for such a shift would probably mean an increasing disparity between farm income (especially for the small, part-time farms) and nonfarm income — something the government tries to prevent. Innovative job-training and reallocation programs for small, part-time, and low-productivity farmers would thus be called for.

Another approach to raising farm labor productivity is to retain the present dispersed farm ownership and part-time farmers but to find ways whereby the small farms could form cooperative and large operating units. Such large operating units would make it possible to introduce mechanical technology. The Chinese government has apparently already taken steps to encourage this path of development: cooperative purchasing and marketing, joint operations and management, and specialized production area. But farm mechanization means labor-saving. If it is deemed desirable to keep part-time farmers on the farm, plenty of part-time nonfarm jobs have to be provided. This would require a pattern of industrial development with highly dispersed locations. It would also require a pattern of industrial management whereby jobs may be performed by part-time workers. It might be argued that socially, morally, or ecologically, it is desirable to combine farm and nonfarm work and minimize urban growth, but whether this is economically desirable or feasible remains to be studied.

It would not be an easy task to accelerate the increase in farm labor productivity when the separation of land ownership and operation is to be avoided, when a structural transformation of labor from farm to nonfarm employment is to continue during a period of declining agricultural labor force, and when income inequalities between agricultural and nonagricultural sectors are to be reduced. Aside from an increase in capital investment in agriculture, a new set of institutional arrangements, or even an industrial development strategy would have to be innovated. But, in the past two or three decades, Taiwan has never lacked for innovative policies and institutions.

Chapter IV

MANPOWER, INDUSTRIALIZATION AND EXPORT-LED GROWTH—THE TAIWAN EXPERIENCE

HENRY Y. WAN, JR.

I. INTRODUCTION

Over the past 30 years, the economy of Taiwan has experienced one of the best records of continuing development in the world. This record is usually considered in one of two contexts:

1. As an exceptional observation in a cross-country study. The superior performance of Taiwan is usually attributed to some "atypical conditions." No in-depth follow–up is offered in that context.
2. As a single-country case study, where the interactions between Taiwan and the other economies are not emphasized. This approach tends to gloss over those conditions without which a resource-scarce economy like Taiwan can never prosper.

The more recent papers by Balassa[1] and Cole,[2] and the book by Pauuw and Fei[3] have remedied some of the omissions. The present study is intended to close the gap further.

The story of the Taiwan "economic miracle" is one of sustained rapid growth. Despite its meager resources and heavy defense burden, the Taiwan economy exhibits a growth rate of per capita gross domestic product that ties with South Korea and Japan as the highest for the entire world outside of the oil-producing countries. Both the rich and the poor have gained in the development process, and income distribution did not worsen as rapid expansion took place. Without industrial strikes, real wages have been rising rapidly, and unemployment is negligible. The monetary authority has accumulated a sizable foreign reserve, and the exchange rate has always been firm. Price stability is attained in most years and domestic saving has risen to 25

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1. Bela Balassa, *Changing Patterns in Foreign Trade and Payments* (New York: Norton, 1964).

2. D. C. Cole, "Market Penetration by Asia's Super Exporters," in Hong Wontack and Krueger, eds., *Trade and Development in Korea* (Seoul: Korean Development Institute, 1975).

3. D. Pauuw and John C. H. Fei, *The Transition in Open Dualistic Economies* (New Haven: Yale University Press, 1973).

percent or more of national income. Taiwan is nearly self-sufficient in food grain and the industrial sector is expanding very fast. Life expectancy at birth is 66 years for men and 72 years for women; the birth rate has fallen to less than 2 percent per year. With 16 million people crowding on an island where population density exceeds that of the Netherlands, residents are amassing modern consumer durables briskly: one TV set per 17 individuals and one motorcycle for every 13. Postal service is the best in Asia, and high-rise buildings transform the skyline.

No economist anywhere has seriously challenged the broad outline of such a record. Moreover, no other developing economy is superior to that of Taiwan on all dimensions. South Korea may have grown faster recently but has heavier foreign debts and frequent devaluations. Israel has a worse balance of payments. Singapore has a worse employment situation, and Hong Kong is not training enough skilled workers. Given the international situation as well as the initial economic conditions, even critics would be hard-pressed to suggest a policy alternative that would guarantee a much better overall growth performance.

Manpower appears to be the single most important factor underlying the development process. It is the availability, the continuous upgrading, and the effective use of such manpower that characterizes the Taiwan experience. With some modification, this experience should be applicable to all economies, developing or developed, market oriented or otherwise.

II. A BACKGROUND SKETCH[4]

Taiwan: A Rapid Survey

Taiwan is an island of 13,885 square miles, slightly smaller than either Switzerland or the Netherlands, or the combined area of Connecticut, Massachusetts, and Rhode Island. Less than one third of this is arable. Irrigation and much chemical fertilizer are required for good crops. The rest of the area is mountainous, covered by forests of indifferent commercial value. Coal, limestone, and natural gas are present in quantities insufficient for local needs. The same holds for hydroelectric energy. For "The Beautiful Island," nature has not been bountiful.

Under Japanese rule, 1894–1945, Taiwan supplied tropical produce and rice to fulfill the import-substituting goal of the Japanese Empire. Japan left three legacies: (1) good roads and

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4. Unless otherwise stated, data on Taiwan came from *Taiwan Statistical Data Book* of various years (Taipei: CIECD and Economic Planning Council).

port facilities, (2) some food processing industries, and (3) a peasantry conducive to technical change. The naval blockade and aerial bombing in World War II reduced (1) and (2) to pale shadows of their old selves.

The postwar years, 1946–1952, were a time of turmoil and trial. During the first three years, the government of the Republic of China at Nanking was locked in desperate civil strife. The best administrators and technicians went to Manchuria; all resources were mobilized for war. Nothing could be spared for Taiwanese reconstruction. War damage was noticeable in Taipei until 1949. Railroad shipping reached its prewar peak only by 1951.[5] The recovery has not been rapid. From 1952 to 1956, both Japan and Mainland China were no longer sheltered markets. About 1.2 million evacuees had to be absorbed in an economy of less than 7 million. Military preparedness assumed top priority to stop any invasion forces across the strait of Pescadores. Inflation raged: 3400 percent in 1949, 306 percent in 1950, 66 percent in 1951, and 23 percent in 1952.[6] The currency reform in 1949 failed to stem the tide, and the government deficit was financed by money issue. As a last resort, a multitude of controls were clamped down on trade and foreign exchange to preserve the remaining foreign assets. By late 1950, much needed U.S. aid came on the heels of the Korean War. Yet the repeated reversals suffered by the UN Command in the first year of the war did not inspire investors anywhere off the Asian mainland.

The decade 1953–62 was one of consolidation and stabilization. With U.S. aid, both the double-digit inflation and exchange rate devaluation came to an end by 1960. Import substitution policies were adopted to secure supplies of chemical fertilizer, textiles, and cement. Under the 1953 land-to-the-tiller program, shares of state enterprises were distributed to landlords to secure their titles. Titles were given to tenant farmers against their installment payments in grain over a decade. A series of trade and foreign exchange liberalization measures were adopted between 1958 and 1963.[7] Per capita real income grew at the average annual rate of 3 percent, a creditable but average record for other LDCs.

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5. N. H. Jacoby, *United States Aid to Taiwan* (New York: Praeger, 1966), p. 82.

6. C. Y. Lin, *Industrialization in Taiwan, 1946–1972* (New York: Praeger, 1973), Table 2–3, p. 46.

7. Much credit is due to the late Professor T. C. Liu and to Professor S. C. Tsiang, See M. H. Hsing, "Taiwan," in J. H. Power, G. P. Sicat and M. H. Hsing, *The Philippines, Taiwan: Industrialization and Trade Policies* (London: Oxford University Press, 1971), p. 200 footnote.

Some structural change of the economy also occurred. The percentage of rice and sugar—traditional staples exported from Taiwan—in total exports fell steadily, reaching 50 percent in 1960. The changing structure of the economy is depicted by the following figures:

Percent of Employment		Percent of GDP		Percent of Export	
Agriculture	Industry	Agriculture	Industry	Agri-cultural Good and Products	Indus-trial Prod-ucts
(1953) 61	9	38	18	93	7
(1962) 55	12	29	26	49	51

The years 1963–73 represented a period of sustained growth. Various fiscal schemes — e.g., tax holidays and tariff rebates on imported material processed for exports — were adopted to encourage foreign investment and export. Export cartels for farm products, export processing zones for manufactured exports, industrial parks designed for land purchases and setting up infrastructure were all adopted. The government recognized that close international economic contacts may promote both economic prosperity and international support to forestall or offset diplomatic reversals. In this period, population growth slowed down from 3.2 percent to under 2 percent. Per capita real GDP grew at an average rate of 7 percent per year. The changing structure of employment, GDP, and exports has continued. The data on employment and GDP will be shown later. The structural change of exports continued, the percentage of agricultural goods and products fell from 43 percent to 17 percent and the percentage of industrial products went from 55 percent to 83 percent. Within the "industrial exports," 90 percent were manufacturing products. Structural changes also took place.[8]

The fastest growth between 1966 and 1971 belonged to the electronics industry. This industry attracts most of the foreign investment and exports most of its output. Its subsectors, telecommunication and generators/motors, grew at annual rates of 80 percent and 54 percent. In 1971, 60 percent of textile products were exported. The subsectors of knitted products and processed apparel also grew at 65 percent and 41 percent per year between

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8. The only data available in that period are from "Household registry", a record believed to be biased in overstating the farm population, as people leaving farms may not register. The trend shown is probably correct.

1966 and 1971. Another industry that attracted foreign investment and exported much of the output is rubber, chemical, and petroleum products. Its output growth in 1963–72 kept pace with the industrial sector as a whole — i.e., its output rose by five times. Finally, food, beverages, and tobacco industries increased their output by a factor of 2.5 in that decade. Consequently, their weight among all manufacturing outputs fell over time. During this period of rapid growth, the average increase of wholesale prices was 3.5 percent. The official exchange rate to the U.S. dollar remained at 40:1 throughout, and there was scarcely any difference between the official and black market rates. Unemployment was insignificant, but the real wage was rising. The ratio of exports to GDP rose to about 50 percent.[9]

The years 1974–76 were a period of external disturbances and internal adjustment. Near the end of 1973, the rise of world prices over Taiwan prices caused an explosive export boom. Stock-in-trade was quickly depleted and export revenue was instantly transformed into domestic money supply. The shortage of soy beans was followed by the oil crisis. The government briefly subsidized imported farm produce at an untenable fiscal cost. When this measure was finally abandoned, it was coupled with a sharp increase of public utility rates. In early 1974, prices rose by more than 50 percent in one year. By then the recession in the developed world deepened. Export markets for a while disintegrated and factories started laying off workers. Per capita GDP fell but prices stabilized under a tight monetary policy. As recovery in Japan and the United States finally came, the Taiwan economy also started to recover, a process that is going on today. The surprising resilience of the economy shows that even during an acute international recession Taiwan could weather the storm without resorting to quotas and controls. This study will focus on the period before the Yom Kippur War, since the worldwide stagflation in its aftermath is still not quite over and it is too early to analyze the events.

Japan And The Far East Four:
The Perspective

The industrialization of Germany, Russia, and Japan is by now a familiar tale. Rapid tempo, gigantic scale, basic industrq, and special institutions designed to mobilize savings characterize their development process.[10] Attempts to exulate such examples

9. *Perspective on Industrial Development in Taiwan* (Taipei: Ministry of Economic Affairs, 1973), pp. 73–74.

10. See, for instance, Alexander Gerschenkron, *Economic Backwardness in Historical Perspective* (Cambridge, Mass.: Harvard University Press, 1962).

were made after World War II by India, Indonesia, and others in starting with heavy industries of modern design, but with poor results.[11] At the other end of the spectrum, when the export-propelled growth of Latin American states suddenly ended during the Great Depression and World War II, they took up the theory and practice of import-substituting industrialization.[12] The experience was frustrating: initial success and heightened hope, followed by stagnation and disillusion. The same was true for the Philippines.[13]

In fact, in the late 1950s, the Taiwan economy was in a similar plight: overvalued exchange rate and underutilized plant capacities.[14] In the past 20 years, four Far East economies — Hong Kong, Singapore, South Korea, and Taiwan — have had the highest observed sustained growth of per capita GDP (Tables 1-4). Yet there are important variations. To understand the development process in Taiwan, one may conveniently consider the development process of this group. (See Chart 1.)

11. See, for instance, J. Bhagwati and P. Desai, *India: Planning for Industrialization: Industrialization and Trade Policies since 1951* (London: Oxford University Press, 1960).

12. See, for instance, Albert O. Hirschman, *A Bias for Hope* (New Haven: Yale University Press, 1971), Chapter 3.

13. G. P. Sicat, *Economic Policy and Philippine Development* (Manila: University of Philippines Press, 1972).

14. Kuo-hsu Liang, "Trade and Employment in Taiwan," in Proceedings of the Sino-American Conference on Manpower in Taiwan, Academia Sinica, Taipei, 1972, p. 240, reported that factories producing tennis shoes, paper, etc. in 1959 had utilization rates from 23 to 67 percent. With few exceptions, improvements were dramatic by 1969. Pauuw and Fei, *op. cit.*, proposed a theoretic explanation about why import-substituting industrialization must fail.

	Facts at a Glance 1973			Average Annual Growth of % GDP constant prices			Average Annual Growth of The Export/GDP Ratio		
	Population (million)	Density per km²	% GNP (U.S.$)	1960-65	1965-70	1970-73	1960-65	1965-70	1970-73
South Korea	33	334	378	3.6	9.0	8.7	14.4	25.3	28.6
Taiwan	16	429	655	6.4ᵃ	7.0ᵃ	9.7	13.2	17.1	24.6
Hong Kong	4	3980	1416	8.1	5.9	5.9	0.5	5.8	1.0
Singapore	2	3761	1890	2.5	10.9	10.5	N.A.	N.A.	N.A.
	55								
Japan	108	291	3782	9.0	10.6	7.4	4.5	4.0	1.3
West Germany	62	249	5671						
United Kingdom	56	229	3088						
Italy	55	182	2515						
France	52	95	4797						
Netherlands	13	329	4435						

Other non-oil producers with rapid sustained growth of % GDP

	1960-65	1965-70	1970-73
Cyprus	—	6.6	5.5
Israel	4.9	5.6	6.1
Greece	7.1	7.0	8.1ᵇ
Spain	7.3	5.2	6.2
Portugal	5.5	5.1	7.9
Tunisia	2.3	1.5	7.6
Brazil	1.2	3.9ᶜ	7.2ᵃ

ᵃ Average of the % annual growth rate.
ᵇ 1970-72.
ᶜ 1965-67.

Source: Economic Planning Council, Republic of China, *Taiwan Statistical Data Book,* 1974, pp. 4, 19; United Nations, *Yearbook of National Accounts Statistics, 1969,* New York, 1970, Vol. III, pp. 175-177, and *Yearbook of National Accounts Statistics 1973,* 1975, pp. 152-153; United Nations, *Demographic Yearbook 1970,* New York, 1971, pp. 128-131, and *Demographic Yearbook 1973, 1974,* p. 103; Joint Economic Committee, Congress of the United States, *China: A Reassessment of the Economy,* Washington, D.C.; U.S. Government Printing Office, 1975, pp. 42-43.

Table 2. Percent Distribution of GDP (Employment)

	Singapore		South Korea		Taiwan[a]		Japan	
	Agr.	Mfg.	Agr.	Mfg.	Agr.	Mfg.	Agr.	Mfg.
1960	4	12	37	14	33	17	13	33
1965	3	15	39(59)	18(9)	27(44[c])	20(17[c])	10(25)	32(24)
1970	2(.5)	23(30)	28(51)	22(13)	19(37)	24(20)	7(17)	36(27)
1973	2(.5)	27(36[b])	26(50[b])	26(14[b])	16(31)	30(27)	6(13)	38(28)

[a] Percent of NDP.
[b] Percent in 1972.
[c] Percent in 1966.

Table 3. Percent Distribution of GDP from Mfg. Industries

	South Korea			Taiwan			Japan		
	Fd.	Text.	CWM/M	Fd.	Text.	CH/MM	Fd.	Text.	CH/MM
1960	40	29	17	44	15	22	13[a]	8[a]	53[a]
1965	33	23	27	35	15	33	12	7	57
1970	29	21	35	24	14	43	10	6	62
1973	23	30	34	17	18	50	8	6	61

[a] Percent in 1963.
Source: See note to Table 1; George J. Staller, "Fluctuations in Economic Activity: Planned and Free-Market Economics, 1950-1960," American Economic Review (June 1964), p. 391.

Table 4. Ch/M/M — Chemical Products, Basic Metal and Machinery

| | Share of U.S. and Japan in Exports (%) | | | | | | | | |
| | South Korea | | | Taiwan | | | Japan | | |
	U.S.	Japan	Sum	U.S.	Japan	Sum	U.S.	Japan	Sum
1962	22	43	65	24	24	48	21	5	26
1965	23	25	60	22	21	53	28	6	34
1968	52	22	74	36	16	51	34	6	40
1971	50	25	74	43	12	56	35	7	42

Source: David C. Cole, "Market Penetration by Asia's Super Exporters," in Hong Wontak and A. O. Krueger (eds.), *Trade and Development in Korea* (Seoul: Korean Development Institute, 1975); Economic Planning Council, Executive Yuan, Republic of China, *Taiwan Statistical Data Book 1974*, Taipei, 1974, pp. 157, 272–273; United Nations, *Statistical Yearbook 1960*, New York: United Nations, 1967, pp. 535–537; *Statistical Yearbook 1970*, New York, United Nations, 1971, pp. 556–568.

Briefly speaking, the Far East Four and Japan all have meager natural resources and very high population densities. (In fact, all the Far East Four have higher population per square mile than Japan.) But the Far East Four have less capital per head, lower per capita income, and a far smaller domestic market than Japan. There is scarcely any R&D capability and all have large numbers of displaced or unemployed persons to support. The dependance ratio was high and population pressure was strong in the early stages. None of these economies are self-sufficient in food, yet they all have had rapid growth in per capita GDP and all enjoy fast growing export markets. In fact, exports increase faster than GDP in all cases. The structures of their GDP, employment, and exports have all undergone profound transformations, such that the manufacturing sector has increased by any of these three indices in all of the four economies. Within the manufacturing sector, the industry group of chemicals, basic metals, and machinery has gained over time relative to food processing, while textiles and apparel hold their own, relative to the aggregate manufacturing output. These structural transformations are similar to those experienced by Japan. All these economies have little difficulty in negotiating private loans or attracting private foreign investment, yet they all have high savings/income ratios, approaching that of Japan. All these economies have succeeded in displacing Japan in labor-intensive products on the American market, and the combined markets of America and Japan loom large in all these economies' exports.

These four economies all enjoy domestic peace and order and are free from industrial disputes. Real wages steadily rise through the competitive market force, and they all maintain "realistic" exchange rates. Interest rates are all kept either equal to the international rate or sufficiently high to encourage domestic saving in the form of saving deposits. They all have liberal regulations regarding trade and foreign investment. They all have a high ratio of literacy and widespread education, especially among the young females who form the backbone of the textile and telecommunication labor forces. Public enterprise has a low profile outside the utility fields, and American and Japanese firms are the main foreign investors.

Needless to say, they all face the contemporary world where (1) technology has made transportation and communication fast and cheap, (2) institutions (IMF, GATT, etc.) have facilitated international movements of goods and capital, (3) the world economy has provided long periods of steady expansion with only

short and mild recessions where "mass high consumption" in the developed "center" demands high-value, low volume goods such as radios, TV sets, minicomputers, plastic toys, etc., and (4) politics have made resources easily available (due to decolonization), markets open (since the United States cannot afford to pauperize countries by prohibitive trade restrictions) and boundaries closed for Japan and the United States regarding "foreign workers" (of South Africa, West Europe, and Israel). They may also explain, at least in part, the "trend acceleration" of the Japanese growth observed by Ohkawa and Rosovsky.

The diversities among the Far East Four are equally telling. Historically, Taiwan and South Korea specialized in agriculture before industrialization. Hong Kong and Singapore specialized in entrepot trade. Singapore and South Korea originally received income from foreign garrisons; Hong Kong and Taiwan did not. South Korea and Taiwan enjoyed U.S. aid until 1971 and 1965, respectively. South Korea and Taiwan produce the bulk of their foodstuffs, and they also have sizable defense burdens, while Hong Kong and Singapore have little defense expenditure and must import food. Hong Kong has always been on a floating exchange rate. Taiwan has tied its exchange rate with the U.S. dollar, and South Korea has had a series of devaluations. South Korea, alone of the four, has had quite a bit of inflation. Singapore alone has still some unemployment, while Taiwan and Hong Kong have absorbed migrants from Mainland China since 1949-50. Hong Kong pursues a strict laissez-faire doctrine, while the other three first adopted import-substituting industrialization, followed by export-promotion, investment-inducing policies. Politically, Hong Kong has no government, while in the other three, strong government guidance pervades in all spheres. Except for South Korea, all have Chinese populations and investors shift investment funds among the three.

The combined population of the Far East Four is one-half that of Japan, or equivalent to any of the big four in the EEC: West Germany, United Kingdom, Italy, or France. Hence, if their growth trends continue, these economies will be of considerable significance in their own right.

Table 5. Inter-Asian Market Transfer in U.S. Imports (%)

	Japan	Korea	Taiwan	Hong Kong
Textile (SITC 8411)				
1962	35.3	.3	3.7	27.7
1965	35.3	3.8	3.8	27.4
1968	31.9	5.8	5.3	29.1
1971	21.8	12.9	10.0	28.2
Footwear (SITC 8510)				
1962	43.0	0	0	0.3
1965	32.5	2.3	.9	0
1968	20.6	2.5	4.0	0
1971	12.5	3.5	8.7	0
Clothing Acc. Knit (SITC 8414)				
1962	17.0	0	0.9	11.5
1965	14.9	1.1	1.3	23.0
1968	11.4	10.9	7.9	25.2
1971	13.2	13.5	26.4	20.8
Radio (SITC 7242)				
1962	71.2	0	0	0.3
1965	74.2	0.8	1.7	9.1
1968	67.6	0.6	5.0	10.0
1971	65.5	0.8	6.8	14.3
Telecommunication (SITC 7249)				
1962	0	0	0	0
1965	38.1	0	0	4.1
1968	34.0	0	4.7	
1971	42.4	0	6.6	2.2

Sources: Cole, *op. cit,* EPC, *op. cit.,* 1974, p. 28.

The relationship between Japan and the Four is complex, partly competitive and party complementary (Table 5). Their displacement of Japanese products is based upon differential wage trends.[15] Since 1960, the rise of the Japanese wage rate outranks all other OECD countries.[16] By 1972, its wage rates were way above all other Asian economies, as shown in Table 6. The efficiency differences between these economies are not too great, as Table 7 illustrates. However, Japan plays various complementary roles to the Far East Four. As a trailblazer, Japan's success has encouraged the Far East Four by example. Japan shares the

15. See M. Y. Yoshino, "Japanese Direct Investment," in Frank Isaiah, ed., *The Japanese Economy in International Perspectives* (Baltimore: Johns Hopkins University Press, 1975).

16. See, for instance, Walter Galenson and Konosuke Ldaka, in H. Patrick and H. Rosovsky, eds., *Asia's New Giant* (Washington: The Brookings Institution, 1976).

same disadvantages of lack of natural resources and dense population, and in fact, planners in Taiwan and possibly in South Korea use the Japanese experience as a reference. Japan is the major source of petrochemicals for synthetic fiber textiles and plastic products. It is also the major source of specialized alloy steel for the machinery industries. Moreover, Japanese components are used in fabricating transportation equipment and electronic appliances throughout the Far East.[17] For the Taiwan electronic industry in 1971, 53 percent of the material and components for exported products came from Japan, 10 percent from America, and the rest were produced locally. The reason for favoring Japanese intermediate products is their high quality and low cost. In 1973, for example, silicon steel from Belgium was 30 percent more expensive than Japanese and American steel was 50 percent higher.[18] During the exploration of alternative supplies by experts in Taiwan, when Japan was under pressure from Mainland China to discontinue Taiwan trade, alternative sources were available for all inputs, but they were all costlier.

17. See A. D. Little International Co., *The Outlook of the Petrochemical Industry in Taiwan*, *The Outlook of the Non-Electrical Machinery and Equipment Industry in Taiwan*, and *The Outlook of the Electronics Industry in Taiwan* (Taipei: MOE, 1973).

18. A. D. Little International Co., *The Outlook of the Electronics Industry in Taiwan*, p. 47; *The Outlook of the Electrical Machinery and Equipment Industry*, pp. 36-37 (Taipei: MOE, 1973).

Table 6. Monthly Wage Rates for Various Types of Labor Force, 1972 (in U.S.$)

	Japan	Singapore	Hong Kong	Taiwan	South Korea	Philippines	Indonesia	India
Engineers	537	762	451	200	213	134	314	207
Craftsmen	262	133	142	99	96	50	47	45
Skilled workers	272	183	122	73	102	63	53	54
Semiskilled workers	240	87	84	73	66	47	32	—
Unskilled workers	120	60	82	45	68	42	26	16
Assemblers	180	39	72	25	—	57	—	120
Quality inspectors	257	82	87	35	42	76	53	153
Management	901	869	647	467	388	486	—	360

Sources: The Outlook for the Electrical Machinery and Equipment Industry in Taiwan, *op. cit.,* pp. 42–44; EPC, *op. cit.,* 1974, p. 28: United Nations, *op. cit.,* 1970, pp. 91–93; United Nations, *op. cit.,* 1974, pp. 574–575; JEC, 1972, p. 42; JEC, *op. cit.,* 1975, pp. 42–43.

Table 7. Cross-Country Efficiency Comparison of Female Semiskilled Worker in Electronics

	Japan	Singapore	Hong Kong	Taiwan	South Korea	Philippines	Indonesia Malaysia	Thailand
Productivity	1	0.7–0.8	1	0.8–1.0	0.7–1.0	0.8	0.65–0.8	0.7–0.8

Source: A. D. Little International Co., *The Outlook for the Electronics Industry in Taiwan* (Taipei: MOE, 1973), p. 35.

As distributors and buyers, Japanese firms often either purchase components from the Far East Four to fabricate in Japan (e.g., Taiwan electric motors) or procure the outputs and resell them under their own well-established brand names, through their well-developed marketing channels (e.g., canned food from South Korea and Taiwan). However, the Japanese government discourages the importation of labor-intensive products for domestic consumption, for fear of the pressure on smaller Japanese firms.

Table 8.   Change of Real Wage in Four Economies (1963=100)

	Hong Kong	Taiwan	South Korea	Philippines
1962	96	98	105	101
1965	124	111	98	86
1968	154	131	131	88

Source: Sicat, G. P. Economic Policy and Philippine Development, op. cit. Table 17-4, p. 426.

As an investor, Japan entered the Far East Four with two different motives: (1) to end-run American quotas on textiles[19] and (2) to procure cheap labor (see Table 8) and meet the "American challenge" through their own offshore production strategy. The latter deserves some elaboration. Japan experienced a labor shortage for the first time about 1960, particularly for young females. American firms seized the initiative and invested in Taiwan to compete against Japanese products on the basis of the low wage, efficient semiskilled female labor in Taiwan. As a countermeasure, the Japanese followed suit. Subsequently, Mainland China pressure induced the Japanese to diversify investments to South Korea and Singapore.[20] Japanese direct investments are usually more numerous in the number of projects but smaller in total amount in both South Korea and Taiwan,[21] but more "pervasive" in penetrating all sectors, compared with investments from other countries.

As a source of technology, Japan plays a major role. Lacking capabilities for engineering design as well as an industrial base, the Far East Four must import their production technology and

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19. C. Y. Lin, op. cit., p. 141.

20. M. Y. Yoshino, op. cit.

21. Wan-son Tae, Development of Korean Economy (Seoul: KDI, 1972), p. 80 for South Korea, and A. D. Little International Co., Perspective on Industrial Development in Taiwan (Taipei: MOE, 1973), p. 41.

often their equipment as well from abroad. Since the Japanese wage rate (relative to the cost of capital) is in between that of the LDCs and the United States or West Europe (see Table 9), Japanese processes are usually more applicable to the Far East Four. In fact, the obsolete production processes from Japan are often transplanted to the Far East Four under license. In 1973, product designs of the Taiwan electrical machinery and equipment industry were often five to ten years old. Of the 16 major firms, 14 received their technology from Japan in 1972-73.[22]

Table 9. Hourly Labor Cost for Electronic
Products in 1973

	Taiwan	Japan	Europe	United States
Semiskilled assembler	0.19	1.28	2.02	3.30
Skilled technician	0.62	2.50	3.38	4.80
Junior engineer	0.75	2.75	4.05	6.60
Electronic engineer	1.00	3.50	7.76	9.60

The last cited point is of most interest. During its own industrialization, Japan enjoyed a large domestic market and a population that excelled in assimilating technocultural influences from abroad. Production technology in the late 19th and early 20th centuries was also fairly simple. None of the Far East Four has had any of these advantages. Their present mode of industrialization is a two-edged sword. In the short-run, by cooperating with foreign business, these economies can safely attain access to modern technology. They have successfully side-stepped the do-it-yourself hurdle encountered by the Mainland Chinese in their backyard steel-making experiment. They also have avoided the gambles wagered and lost by India in its heavy-industry strategy. But in the long-run, if they cannot break out of the habit of turnkey factories and licensed technologies, they can never join the ranks of advanced, small-sized industrial powers such as Scandinavia, Benelux, and Switzerland.

To some extent, a competitive-complementary relationship also exists between the Far East Four. There is competition in their struggle for export markets and foreign investments. Shortages of labor and land make Hong Kong less competitive than Taiwan for certain industries. Table 8 depicts the faster rise

22. *The Outlook for the Electrical Machinery and Equipment Industry in Taiwan, op. cit.*, pp. 5, 30-31, and 34.

of real wages in Hong Kong during the 1960s. The upheaval in Hong Kong in 1967—a spillover of the Red Guard movement—also led some industries to migrate to Taiwan.[23] Much of the "overseas Chinese" investment was Hong Kong-based and Japan-based.[24] The rise of the textile and garment industries in Singapore is partly due to the transfer of capital from Hong Kong and Taiwan.[25] Rising wages in Taiwan also make the competition from South Korea much more effective. The demonstration effect certainly operates among the Far East Four. The success of the Hong Kong economy in the 1950s stimulated trade and foreign liberalization in Taiwan.[26] The success of the Kao-hsiung Export Processing Zone encouraged similar developments in South Korea[27] and Singapore (i.e., Jurong City).

The development process in Taiwan is not coincidental; its experience deserves more attention than has been accorded it. The Philippines, Indonesia, Malaysia, and Thailand are currently considering climbing on the bandwagon, with varying degrees of success. As Professor S. Ichimura remarked to this author, several years ago, there must be certain conditions in Taiwan conducive to development, otherwise, the same international circumstances should allow all Southeast Asian economies to grow equally well. The inquiry into those conditions will be pursued below.

III. CAUSAL EXPLANATIONS OF THE TAIWAN EXPERIENCE: PRELIMINARIES

Various explanations have been posited to account for the successful development in Taiwan:

1) The modernization of Taiwan agriculture.
2) The import-substitution policy in the 1950s.
3) The infusion of capital from U.S. aid.
4) The infusion of technical and managerial labor force from Mainland China.
5) The sagacity of economic policies.
6) The availability of cheap, efficient manpower.

23. E. H. Phelps-Brown, "The Hong Kong Achievements and Prospects," in Keith Hopkins, ed., *Hong Kong, the Industrial Colony* (Oxford: Oxford University Press, 1971).

24. C. Y. Lin, *op. cit.*, pp. 139–141. Of the 152 firms in the Kao-hsiung Export Processing Zone in 1969, 52 were from this category.

25. You Poh-Seng and Lim Chong Yah, eds., *The Singapore Economy* (Singapore: The Eastern University Press, 1971), p. 203.

26. M. H. Hsing, *op. cit.*, pp. 189–190.

27. Bong Jong Choe, "An Economic Study of the Masan Free Trade Zone," in Hong and Krueger, eds., *op. cit.*

History never repeats itself and available data rarely permit the settlement of a controversy beyond a reasonable doubt. But if the Taiwan experience is to provide any information for LDCs, at other places, other times, some scrutiny of the above six theses is essential.

The Role of Agriculture

The agriculture sector contributed in three ways to the development process: (a) it provided a reservoir of labor for industrialization without reducing agricultural output; (b) it provided foreign exchange revenue in the earlier years and made the economy self-sufficient in rice, vegetables, and meat (even though some feed has to be imported) so that valuable foreign exchange need not be spent on food imports; and (c) it provided capital formation in 1951–55 and 9 percent of NDP, or 40 percent of capital formation in 1956–60.[27a] Certainly the role of agriculture in Taiwan's development has been most helpful. But is its role indispensable? I doubt it. The close resemblance of the development modes within the Far East Four was noted in the last section. Of these four, Taiwan is the only economy where agricultural modernization preceded industrialization. Hong Kong and Singapore have no agriculture to speak of. Their development was not hampered by the "import gap" or the "savings gap." True enough, because of points (b) and (c), the Taiwan economy overcame those two gaps; but the experience of Hong Kong and Singapore have shown there are other alternatives. The case of South Korea is also illuminating. An agriculture slow in its modernization, like that in South Korea, would imply a faster outpouring of manpower to the industrial sector.[28] Under the conditions prevailing for the other three economies in the Far East Four, export-oriented industry would quickly mop up the released labor, financed by domestic savings, if possible, by foreign investments, if necessary. To argue that agricultural modernization is indispensable for Taiwan is tantamount to arguing that the nonagricultural sector in Taiwan would fail where the same sectors in South Korea, Hong Kong, and Singapore have succeeded. So far, no one has come up with the proof.

Caution is required in generalizing this observation. It is possible for some LDCs to industrialize without raising agricultur-

27a. T. H. Lee, *Inter-sectoral Flows in the Economic Development of Taiwan, 1895–1960* (Ithaca, N.Y.: Cornell University Press, 1971).

28. Pauuw and Fei, *op. cit.*

al output first. It is not possible for a collection of LDCs, with sizable population to pursue such a strategy. Otherwise, massive reversals would be suffered in the terms of trade.[29]

Import-Substitution-Industrialization (ISI)

By now, most economists agree that it was wise for Taiwan to take its "outward looking" posture in the late 1950s and early 1960s. But did import-substitution-industrialization serve an essential purpose along the "infant industry" lines? Quite a few economists have answered in the affirmative. Since both South Korea and Singapore had their own import-substitution phase before their rapid growth, the thesis deserves careful consideration. The beneficiaries of the import-substitution policy in Taiwan were the textile, fertilizer, and cement industries. The textile industry is by far the largest and it has more linkages (with both petrochemicals and apparel) than cement and fertilizer. Consequently, the issue can be settled then and there, if we can prove that the textile industry in Taiwan has gained or lost because of protection. Luck provides us a natural control sample—the textile industry of Hong Kong. Hong Kong has a miniscule domestic market and no tariff protection whatsoever. With less than 30 percent of the Taiwan population, it has a much larger textile output. Moreover, its textile industry emerged in 1949–50 as some Mainland Chinese arrived with their equipment and capital. All the fiber has to be imported. These circumstances are similar to those of Taiwan. (See Table 10.) It has more modern equipment than even Japan and a higher intensity of utilization than anywhere else.[30] From the textile industry, the forward linkage led to the establishment of the apparel industry. Together they employed half of the manufacturing manpower in Hong Kong. To argue that import-substitution was helpful in Taiwan, one must argue that the textile firms in Taiwan did not stagnate behind the protective barriers relative to their Hong Kong counterparts. Proponents of the historical usefulness of ISI have still far to go to document their case.[31]

29. W. Arthur Lewis, *The Development Process in the Case for Development: Six Studies* (New York: Praeger, 1972).

30. See Table 10.

31. C. Y. Lin, *op. cit.*, pp. 113–114 observed that in late 1953, a Taiwan producer of cotton yarn would earn 42 percent more out of each bale by selling his product domestically rather than abroad, thanks to ISI. By early 1966, under export promotion, he would gain 30 percent more by selling abroad than selling at home. Over the years, the U.S. government has restricted imports of low grade textiles but exempted higher grade outputs. The entry into the high-grade market involves new equipment, new process, and the uninsurable risks including the loss

Table 10.   Asian Loom Activity, 1965

	No. of Looms (in thousands)	% Automatic	Hrs. Worked per Loom per yr.
Japan	371	34	4,786
South Korea	9	52	6,401
Taiwan	16	63	4,864
Hong Kong	20	100	8,161
Philippines	16	100	5,143
Thailand	12	71	4,149

Sources: N. C. Owen "Economic Policy" in K. Hopkins (ed.) Hong Kong, the Industrial Colony (Oxford University Press, 1971), p. 148; EPC, op. cit., 1974, pp. 79-80; Statistical Yearbook 1975, pp. 2, 117, 168-169, 208-209; Economic Planning Council, Social Welfare Indicators, Republic of China 1975, Taipei, 1976, p. 46.

The U.S. Aid Factor

Between 1950 and 1965, Taiwan received US$1.5 billion in economic aid. This amounted to 10 percent of GDP in the mid-1950s and 4 percent in the early 1960s.[32] Without this timely assistance, both economic and perhaps even political stability would be in doubt. Jacoby speculated that without aid, recovery and growth would still be feasible but would be more painful and delayed—an assessment biased on the generous side regarding the viability of the politicosocial fabric.

The interesting question for the other LDCs is somewhat different: the political conditions called for a defense burden around 10 percent to 12 percent of the GDP, in monetary value. This exceeds the magnitude of U.S. aid. With an adopted Harold Domar model, Jacoby asserted that the no-aid, no-defense effort would be worse off than the observed situation. This conclusion seems unwarranted. Jacoby's view is based upon the premises that rapid expansion of exports is impossible and the export/GDP ratio must remain quite low—assumptions contradicted by later events. He then argued that without defense efforts, the manpower under arms would simply be unemployed and could not contribute to export revenue. In view of the latter events as well as

of costly trained employees to competitors (Chinese do not share the Japanese custom of "one boss the whole life"). No doubt technical stagnation results under ISI.

32. M. H. Hsing, op. cit., pointed out even those figures understate the benefits of U.S. aid since they were computed at overvalued local currency for the early period.

the performance of Hong Kong and Singapore, his conclusion is hardly tenable. In fact, the monetary value of the defense expenditure definitely understates the actual burden. In the early half of the period with aid, the armed forces represented a manpower equivalent to the combined employment of all industrial and commerce sectors. In the latter half, the armed forces still freeze up a manpower equal to that of the industrial sector: manufacturing, construction, utilities and mining all included.[33] In other words, in equivalent numbers, such a civilian labor force produced about one-third of the national income. All in all, I submit that a no-aid, no-defense Taiwan would grow at least as fast as it did, other things being equal.

The Technical/Managerial Manpower Arriving From The Chinese Mainland

Japan did not encourage Taiwan youth to seek higher education during colonial days. Most of the students enrolled in the Taihoku Imperial University were Japanese. Taiwan students had to go to colleges in metropolitan Japan, which few could afford. Only half of high school enrollments were Taiwanese, studying in segregated schools of inferior quality. The repatriation of Japanese at the end of World War II left Taiwan with administrative and technical anemia. The first wave of Mainlanders dispatched to Taiwan as well as Taiwanese returning from Japan did not improve matters much. By 1948, three years after Taiwan's retrocession from Japan, there were 37,000 persons with a college education in a population of 6.8 million—less than six per thousand—which is low even by the standard of many LDCs. The evacuation from the Mainland increased the total population to about 8 million, but the number of college graduates reached 68,000 by 1949. (The difference need not be all due to arrivals from Mainland China, since the annual increases between 1946 and 1947 and between 1947 and 1948 were 7,000 and 11,000 respectively.) There is little debate that the increase in educated manpower exerted a positive influence on the development process. However, up to 1963, the growth performance in the period of consolidation and ISI was by no means spectacular compared with other developing countries such as the Philippines or Brazil. An average 3 percent per year growth of per capita GDP was grounded down below 1.5 percent. By 1963, there were 207,000 persons with a college education in a population of 11.9 million, or

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33. *Ibid*, Chapter 9.

17 per thousand. Quite a few of the original 30,000-odd college graduates from the Mainland were by that time retired or dead. Historically, one can hardly deny that those technical/managerial personnel from the Mainland performed their mission—to fill the gap before the next generation could arrive at the scene, and to educate, train, and lead the younger cohorts until they swelled the ranks for the industrialization task. But it would be grossly misleading if any LDC with an average complement of educated manpower would explain away their lagged performance behind Taiwan by the fact that no tide of educated emigres had hit their shores. The comparable initial condition is Taiwan, 1963, and not Taiwan, 1949. By 1963, the thinned ranks of the original educated emigres no longer supplied the wherewithal of the economic take-off.

The Sagacity of Economic Policies

As the economic policies of the government changed over time, the broad question stated above is hard to answer. We shall focus on four classes of economic policies:

A. Import-Substitution Policy. As we argued before, the import-substituting policy cannot be proved to be beneficial to the development process. On the other hand, the protection of the textile, fertilizer, and cement industries was designed to reduce the value of the import bill needed for producing clothing, food, and housing. With backward integration, the reduced import demand can be met out of reserves in case the export revenue declines. The policy is quite rational for promoting sociopolitical stability, in view of the volatility of sugar exports, which accounted for 60 percent of the export value, in those days.

B. Exchange Rate Stabilization Policies. The complicated trade and foreign exchange control in Taiwan was imposed to protect the overvalued domestic currency. As an emergency device, these measures may be justifiable against public panic. After all, the United Kingdom went on and off "convertability" after World War II. It is the persistent defense of an untenably overvalued exchange rate and the bureaucratic abuses caused by a complex control scheme that did real harm. There are few who favor those control measures in their original forms.

C. Policies Encouraging Foreign Investment and Export. These measures are generally agreed to be necessary for the growth record since 1963. Basically, they stimulate technological transfer and spur domestic firms to adapt continuously to the dictates of the world market. On the other hand, residual administrative red tape remains. In principle, if material imported for producing exports is entitled to tariff rebate, which should be equivalent to tariff-free imports of such material, then the export processing zones (EPZ) should offer no discernible advantage. The fact that firms favor EPZ sites testifies to the bureaucracy outside these enclaves.

Most of the observed growth performance is attributable to items (a) through (c). In my view, (a) and (b) are possibly harmful for development. The liberalization measures made progress. But they have not gone far enough for firms outside the EPZ to enjoy conditions as favorable as inside the EPZ in which the situation approximated the laissez-faire situation in Hong Kong where economic policy is absent.

However, all these are valid only relating to the observable performance of Taiwan to date. There is another class of policy.

D. Selective Inventives To Promote Skill-Intensive Industries. Excepting Hong Kong, all the other three in the Far East Four are actively pursuing such measures. With high wages and scarce land, Singapore adopts "skill-promotion" policies by sheer necessity. Both Taiwan and Korea are acutely aware of the potential limitations of expanding labor-intensive industries. As a South Korean officer observed,[34] if and when all LDCs in the world produce labor-intensive products, the terms of trade are likely to swing decisively against economies like those of the Far East Four. In comparison, Hong Kong persists in specializing in textiles and apparel as well as plastic products. These are industries with low barriers to entry. The philosophy appears to be: no point in worrying about sharing the pie, if the pie grows fast enough. Since such industries as instrumentation, precision tools, etc. offer high value-added per worker and broad scope for efficiency increases but also call for skills with a long gestation period, Hong Kong may conceivably be left behind by the rest of the Far East Four in the future.

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34. Wan-son Tae, *op. cit.*, p. 58.

In short, the economic policies adopted in Taiwan have some justification. The observable performance cannot be attributed to the superiority of such measures, if pitted against the laissez-faire of Hong Kong. Yet the skill-promoted policy in operation now may finally prove to be superior to laissez-faire in the future.

The Availability of Cheap, Efficient Labor

By the process of elimination, the availability of cheap, efficient labor appears to be the common initial condition causing the sustained rapid growth of all the Far East Four. Of course, there must be certain permissive conditions. Externally, cheap transportation and communication, relatively free movements of goods and capital, prosperity at the developed "center" and political conditions for some industrial powers to allow factories to emigrate but not workers to immigrate must be present. Internally the government must provide peace and order and control debilitating corruption and bureaucracy. (As the Lockheed case in Japan showed, not all corruption is debilitating to growth, a topic I shall not explore here.) Firms must also be spurred to compete internationally in order to keep their competitive edge undimmed.

However, all these do not explain the mechanism of development. After all, the cheapness of labor may lead to a once-for-all upward adjustment of the wage rate. Institutions may keep the adjustment process to approach completion for, say, two or three years. What accounts for sustained rapid growth must be found elsewhere. Capital accumulation is hardly an admissible answer. In the Far East Four, an adequate inflow of investment can take the place of domestic savings. R&D is not a suitable explanation. Currently, none of the Far East Four has much designing experimentation going on, to say nothing of organized research. An in-depth analysis will be offered in the next section.

Such studies may appear superfluous at first sight. Would not laissez-faire take care of matters all by itself, judging from the "openness" of all the Far East Four who have attained rapid, sustained growth? History shows this is not so. If rapid sustained growth is the invariable lot for every practitioner of laissez-faire, the wind would be long since taken out of the protectionists' sails. After all, the quintessence of export-propelled growth before 1929 did not witness indiscriminate rapid industrialization all over the world. A thorough understanding of the development mechanism may reveal the preconditions for development for the Far East Four, as well as the road ahead for skill promotion.

IV. CAUSAL EXPLANATION OF THE TAIWAN EXPERIENCE: THE ANALYSIS

For developed economies, the growth of per capita output is conventionally decomposed into causal factors of "capital deepening" and technical progress. In the context of the Far East Four, the upgrading of the labor force is the ultimate source for both elements.

First, consider technical progress, by and large, a synonym for the borrowing of technology. Turnkey factories and license arrangements are open to all comers, provided locally favorable conditions warrant. For the Far East Four, natural resources are conspicuous by their absence and domestic markets are quite modest, at best. Cheap and efficient labor forms the only possible condition that may favor a particular industrial location. But wages rise with economic development, and continuously improving efficiency of labor is indispensable for technological transfer.

Next, consider "capital-deepening". Parsimony is characteristic of not all Asians. What spells the difference between risky, usurious consumption and hoarding of precious metal, land titles or beaux art on the one hand, and productive investment on the other hand, is a matter of investment opportunity. In the traditional industries of the Far East Four—be it entrepot trade in Hong Kong and Singapore or intensive farming in South Korea and Taiwan—precious little scope is present to absorb much domestic savings. In fact, even the textile industry appears to have been insufficient to absorb the "overseas Chinese" capital before Japanese and Westerners introduced new industry and technology into the area. Consequently, either the mobilization of domestic savings or the attraction of foreign investment into more capital-intensive undertakings requires the attraction of new industries. An efficient, cheap labor supply is indispensable in this regard. But the labor in the Far East Four is by far not the cheapest in the Far East, as efficiency again holds the key.

In what follows, we shall consider in turn, (a) the supply of various types of labor in Taiwan (b) the demand for labor by various types of industries, (c) the form of labor upgrading that has occurred in Taiwan so far, and (d) the future prospects.

The Supply of Various Types of Labor in Taiwan

We shall use the various labor types required by the electronics industry as a concrete example. Broadly equivalent labor types are needed by other industries as well. Table 11

summarizes the requirement of formal training or experience for seven types of labor force.[35]

Table 11. Training and Experience Requirements
for Various Types of Electronics Industry

| Labor Types | Requirements | |
	Formal Training	Experience
Unskilled workers		
Semiskilled workers	Junior High (general)	and 1 month on-job training
Inspectors		Several Years of on-job
Skilled workers	Vocational High School	or training for the selected
Craftsmen		semiskilled workers
Supervisors		
Superintendents	College Education	
Technicians	Technical Junior College and 2 + years of experience	
Junior engineer	Bachelor Degree in Electronic engineering	and 1 year of experience
Graduate engineer	Bachelor Degree in Electronic Engineering	and 5 + years of experience

Although different industries differ in their manpower needs, these classifications are broadly applicable. The various volumes of A.D. Little Reports summarize the strengths and weaknesses of the manpower supply in Taiwan:

1. The supply of unskilled labor is of little significance. No industry of prospective expansion potentials relies heavily upon unskilled labor. Farming may be the only major vocation where formal education plays an essential role. However, neither in Taiwan nor elsewhere does the development process rely upon intensive labor application on the farm.

2. The supply of labor force readily trainable into semiskilled labor is the main strength of Taiwan for industrialization. The same points hold true for Hong Kong and for South Korea. Hardworking and intelligent, these workers attract industries to these economies.[36] The main source of such labor is the "traditional sector"— i.e., the agricultural sector in South Korea and Taiwan and the refugee families in Hong Kong. These

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35. A. D. Little International Co., *Minicomputers, and Opportunity of Investment in Taiwan* (Taipei: MOE), 1973.

36. See C. Y. Lin, *op. cit.,* K. Hopkins, ed., *op. cit.*; and Wan-son Tae, *op. cit.*

workers are mostly young men and women newly joining the manufacturing industries after 6 to 12 years of general schooling. The effect of such education will be considered below.

3. The supply of skilled labor, craftsmen, and technicians falls short of their supplies, partly because of biased education priorities in earlier years and partly because of the inability of the existing small firms to train such labor on the job. This bottleneck is also acutely felt in South Korea and Singapore.[37] This problem has been addressed in Taiwan, Singapore, and South Korea.

4. The supply of "junior engineers" is paradoxically abundant. Social preference favors engineering rather than technician's training for well-to-do youth. The universities also tend to be able to raise more money than technical junior colleges and vocational high schools. In the end, since the economy is not yet highly industrialized, engineering students have little chance to gain experience to become "graduate engineers." Since they are not accompanied by an adequate complement of technicians, craftsmen, and skilled workers, they have difficulties in obtaining suitable industrial employment. Brain-drain through migrating overseas and "promotion" into managerial/executive ranks further diminishes those who would be able to upgrade their own capability through experience. The same problem hurts South Korea to some degree.

5. The supply of "graduate engineers" is usually very short. However, inasmuch as the demand per firm for such expertise is usually very small and high-skill industries are not yet in blossom, the shortage is not acutely felt. The hiring of "expatriate" specialists from developed countries is still possible, although very costly.

Demand for Labor by Various Types of Industries

Obviously, most industries need all labor types, and interindustry dependence is also important. It is not our intention to delve into the manpower requirements of all industries: references for such information are available.[38] However, the availability of cheap, efficient labor of certain types is crucial for the operation of certain industries, either because wage costs for that category loom large in the cost structure, or because the product quality critically depends upon the presence of certain expertise. The following listing is illustrative only:[39]

37. Wan-son Tae, *op. cit.*, p. 166; and You and Lim, *op. cit.*, pp. 300–301.

38. E.g., M. A. Horowitz, M. Zymelman, and I. L. Herrnstatt, *Manpower Requirement for Planning* (Boston: Northeastern University, 1966).

39. This is largely based upon the various volumes of the A. D. Little Reports, *op. cit.*

1. The textile industry and telecommunication assembly industry. Cheap and efficient semiskilled labor is essential because the proportion of such wage cost is large in the cost structure.

2. The petrochemical industry. Formally trained technicians and engineers are essential because of the character of the operations, even though their wage bill is not important in this capital-intensive sector.

3. Industries producing high quality electric appliances. Experienced engineers are needed for product design, etc., so that elements of originality and utility can be balanced by technical and economic feasibility.

4. The precision equipment industry. The reputation of the entire firm, or the image of the workmanship of an entire economy, is needed to market the product among the industrial buyers.

The Taiwan economy, along with Hong Kong, Singapore, and South Korea, currently enjoy a comparative advantage in industries of type 1. For social reasons, presumably, Pakistan is capable of producing textiles for export, but cannot assemble television sets competitively. The A. D. Little team did not find it difficult for Taiwan to expand its petrochemical production. Apparently, the junior engineers and technicians, with perhaps some infrequent assistance from more experienced personnel, can handle such standardized operations quite well. This covers industries of type 2. For products of type 3, Taiwan has not seriously entered the market yet. The production of machinery and equipment of medium or lower quality is thriving in Taiwan. The shortage of experienced, skilled workers is easing over time and there are institutions providing specialized training. However, the shortage of senior engineers is much harder to alleviate. Industries of type 4 are largely a matter of the future. Only time and continued superior performance can make progress.

The Upgrading of the Labor Force in Taiwan

The improvement of labor efficiency in Taiwan is attributable to the following factors:

1. The spreading of secondary education facilitates the rural-urban migration of the peasant youth. This increases the supply of an efficient semiskilled labor force.

2. The sociocultural values encourage young female workers to accept factory jobs at wage rates lower than the male semiskilled workers and possibly what they themselves could command in the service industry.

3. The cumulation of experience under the Taiwan environment, and

4. The gradual expansion of the industrial vocational education, the on-the-job training programs.

The Role of Secondary Education

Education has been expanded in Taiwan at all levels during the last 25 years. The percentage of school-age children in school and the percentages of primary, junior high, and senior high graduates admitted to the next higher level of schooling have either increased or remained the same. But the fastest increase belongs to the percentage of primary school graduates admitted to secondary schools. It went from 32 percent in 1950 to 84 percent in 1973, i.e., more than doubling. (See Table 12.) The numbers of individuals with a junior high level of education (but not above) went up by a factor of 3.5 for the males and 4.4 for the females between 1953 and 1972, while the population has not quite doubled itself.[40] The junior high education seems to be of special significance. A student with 9 years of schooling at 15 years has more influence over his or her future than a primary school graduate at 9; the latter is likely to go back to the original family environment. The former has a high tendency to migrate to "greener pastures": the urban area for the rural youth. Even in 1955, only 33 percent of the Taiwan population resided in cities of more than 20,000. The ratio rose to 46 percent by 1972. The figure may be somewhat low, as migrants may fail to report their movements. At any rate, Taiwan is still not highly urbanized, so that migration into urban areas, which secondary education encourages, is significant.[41]

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40. *Statistical Yearbook and Explanatory Notes* (Taipei: DGBAS, 1975).
41. *Ibid.*

Table 12. Taiwan School-Age Children in School and
Graduates Attending School of Higher Levels

	School-Age children in School (%)	Elementary School Grad. Adm. to Junior High (%)	Junior High Grad. Admitted to Senior High (%)	Senior High Grad. Admitted to College (%)
1950	80	32	61	73
1960	96	51	80	76
1970	98	80	90	72
1973	98	84	65	75

Source: Education in the Republic of China (Taipei) Ministry of Education.

Migrants into urban areas often lead to shanty-town squalor and urban unemployment in other developing countries. But armed with 9 years of education of the type prevalent in Taiwan, these youths have acquired such attitudes and habits that they become readily trainable as semiskilled workers. These are precisely the types of workers intensively used in textiles and electronic assembly operations, which supply the major exports from Taiwan.

Semiskilled labor is not hard to train, provided the worder has the appropriate work ethic. In my opinion, the single most important factor transforming a youth of the traditional sector into an effective worker in the manufacturing sector is junior high school. Due to the young age of the students, primary school is usually less demanding on the children. Hence the marginal effect of 3 junior high school years appears to be considerable. Through these 9 years of education, a youth is conditioned to a structured life style, the habit of fulfilling the task under a reward system, and a capacity to attend to details. This is especially true under the types of schools in Taiwan where all schools use the same texts, and 89 percent of the subjects are "required" rather than selective.[42] The peer pressure is strong, reinforcing where no formal system can hope to reach. Intense homework is done for competitive admission tests into schools of higher level. Finally, boys' and girls' schools are ranked by group academic scores.

The Discriminatory Wage Structure by Sex

Table 13. Age Distribution in Percent (1974)

	15-19	20-24	25-29	30-34	35 +
Agricultural labor force	12	8	8	11	61
Manufacturing labor force	33	20	11	10	26
Female labor force	46	29	6	5	14

Source: Quarterly Report on the Labor Force Survey in Taiwan, Republic of China, Taipei, Taiwan Provincial Labor Force Survey and Research Institute, July, 1974.

The age distribution of the labor force, shown in Table 13, is particularly revealing. Manufacturing has a much younger distribution than agriculture. Hence, the young are recruited by manufacturing and the old remain on the farm. The spread of

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42. Education in the Republic of China (Taipei: Ministry of Education, 1974).

education thus makes the manufacturing workers better educated. The female manufacturing laborers are much younger than the males, corroborating the observations that female workers in Taiwan often start work at 15, the graduation age of junior high school. They work for at most six years and get married. Subsequently, they rarely return. The youthfulness of these workers and the brevity of their working life make such a labor force full of vitality and relatively immune to boredom. Moreover, since they support no family members and only earn their own living with some contribution to their dowry, they do not insist on high pay. In fact, performing semiskilled tasks, these women receive wage rates only about half of that of an unskilled (male) worker. Their alternative options are idling at home, working very long hours at retail shops, or serving as socially less desirable domestic servants. Reputedly, girls prefer a factory job to a maid's position at twice as much pay. Their marriage prospects are supposedly much better if they work in factories.

The situation is in sharp contrast with India. There, apparently by custom, assembly work is done by men who demand higher wages. The monthly wages in U.S. dollars during 1973 for assemblers and unskilled workers were as follows:[43]

	(1) Assembler	(2) Unskilled worker	(1)/(2)
India	120	16	7.50
Taiwan	25	45	0.55

It is understood that the recent effort by Pakistan to assemble telecommunication equipment has not been successful because of high costs. In Pakistan, by custom, females who are qualified would not work in factories.

In 1973, exports of textile products and electrical machinery and apparatus are the two most important items among all export products.[44] In September of that year the sex composition of three industries was as listed below:[45]

	Textile Apparel and Leather	Electric Generators	Communication Equipment
Percent of women in labor force	70	63	72

43. A. D. Little Co., *Perspective on Industrial Development in Taiwan, op. cit.*
44. *Taiwan Statistical Data Book, 1974, op. cit.*
45. *Statistical Yearbook* (Taipei: DGBAS, 1975).

This strongly suggests the importance of the wage differential by sex and export competitiveness.

The wage differential by sex provides the Taiwan economy a comparative advantage for industries intensively using the semiskilled female labor force, and the expansion of education provides an expanding supply of labor force emigrating out of the traditional rural sector. This, of course, is only part of the story. The great majority of the working women in those export-oriented industries do not stay long. The growth of labor efficiency which offsets the increasing Taiwan real wage must be largely explained by other factors.

Learning-By-Doing

Given the opportunity, efficiency may be acquired through experience. The upgrading of the individual labor in Taiwan is assisted by the following conditions:

1. With a large and growing manufacturing sector, there is much opportunity to "manufacture up".[46] In other words, experience can facilitate an industrial worker to shift to products of higher value-added (e.g., from bicycle to motorcycle to automobile). This is not usually the case with either farming or mining, where resource endowment plays the dominant role in product selection.

2. Export emphasis causes the firms to take uninsurable risks to upgrade their products in meeting international competition. In doing so, workers also must upgrade their skills.

3. Direct investments of foreign firms bring the economy face to face with modern productive and managerial methods. Either through learning-by-doing of the middle-layer executives, or through the experience of local firms in supplying parts or intermediary goods to foreign firms, the technical competence of the Taiwan labor force rises over time.

Much of such learning takes the form of "doing other things." There is no convenient measure for such improvements. However, the continuous diversification of Taiwan's exports[47] is indirect evidence, even though the formula measuring such diversity is admittedly *ad hoc,* dependent upon the classification scheme used for commodity classification.

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46. See Owen, *op. cit.*
47. See Liang, *op. cit.*

The Expansion of Technical Vocational Education

The conventional way of training skilled workers is on-the-job training. However, in Taiwan, most local firms are too small to provide effective training. The average employment per plant for the nonelectrical equipment industry was 17.3 in 1973.[48] Public enterprises and some large firms do have their own training programs, yet supply falls short of demand. Although it is desirable for new firms to undertake their own training programs, without an adequate supply of skilled workers and technicians, it is hard to attract new firms. This justifies the expansion of the vocational schools. The number of students going into senior high schools and senior vocational schools in 1950 and 1963 were as follows:[49]

	Students in ('000)		Percent Distribution of Senior Vocational School Students			
	Senior High Schools	Senior Vocational Schools	Agr.	Com.	Ind.	Other
1950	19	11	33	38	26	7
1963	191	233	6	42	44	7

The Road Ahead

Now that junior high school is free for all students (since 1968) and with the rural population declining, the influence of the spreading of junior high school education is likely to recede in importance. Those intending to leave the rural sector would be largely gone pretty soon.

If the international environment remains the same, the upgrading of skill in Taiwan should continue. The speed of such upgrading depends upon several factors, not the least of which are those sociocultural aspects that are hard to quantify. Certain cultural characteristics of the Chinese are not favorable to rapid development.

1. As workers, the Chinese in Hong Kong and Taiwan tend to be "employer satisfaction-oriented" rather than "task-oriented" like the Japanese or the Koreans. In other words, the latter devote full attention to performing the specified tasks. The Chinese

48. A. D. Little International Co., *The Outlook for the Non-Electrical Machinery and Equipment Industry in Taiwan, op. cit.*

49. *Educational Statistics of the Republic of China* (Taipei: Ministry of Education, 1974).

workers try to do what they perceive as the best interest of the employer rather than the letter of the instruction. This makes the Chinese workers slightly less productive, if task-fulfillment is the measuring rod.[50]

2. As entrepreneurs, Chinese businessmen exhibit strong herd instincts and are reluctant to venture into new fields with technology unfamiliar to them. In both Hong Kong and Singapore, it is the foreign investors who break into industries outside the familiar fields of commerce and textile products. Also, the Chinese firms seem to be slow in merger movements. Fragmented industrial structure means weakness in finance, workers' training, etc.

3. The Chinese engineering practice seems to emphasize the strict emulation of licensed processes. Few attempts are made on new product designs. In licensing arrangements, they do not purchase "development analysis" as the Japanese do. Hence, the Japanese can often modify their borrowed techniques and plunge ahead on their own.

As the Taiwan economy is leaving the labor-intensive phase for the skill-intensive phase, attitudinal changes in these three aspects appear to be of considerable importance.

50. A. D. Little International Co. Reports, *op. cit.*

Chart 1. The Far East Quartet

	Singapore	South Korea	Taiwan	Hong Kong
Population Density	High	South Korea	Taiwan	Hong Kong
Natural Resource	Nil	Nil	Nil	Nil
Domestic Market	Small	Small	Small	Small
P.C. Income v. Japan	Low	Low	Low	Low
R&D Capacity	Limited	Limited	Limited	Limited
Exchange Rate	"Realistic"	"Realistic"	"Realistic"	"Realistic"
Foreign Investment	Free, large	Free, large	Free, large	Free, large
Education of Labor Force	Good	Good	Good	Good
Sustained Rapid Growth	Yes	Yes	Yes	Yes
Expansion of Export v. Output	Fast	Fast	Fast	Fast
Manufacturing Sector	Rapid Growth	Rapid Growth	Rapid Growth	Rapid Growth
Ease of Raising Foreign Loans	Easy	Easy	Easy	Easy
Structural Change in Output and Export	Drastic	Drastic	Drastic	Drastic
Strong Government Role	Yes	Yes	Somewhat	No
Full Employment	No	Yes	Yes	Yes
Self-sufficiency in Food	No	Nearly	Nearly	No
Domestic Price Stability		After 64' Moderate inflation	After '52 Most Years	
Industrial Dispute	Nearly Absent	Absent	Absent	Nearly Absent
Foreign Exchange		Mid Devaluation	Tied to $	Floating
Foreign Aid	Little	Till 1971	Till 1965	None
Spending of Foreign Troops	Till 1970	Early Years Now Insignificant	Little	Little
Defense Burden	Yes	Yes	Yes	No
Access to Large Trade Area Free	Sometimes	No	No	Sometimes
Exports, Prior to Industrialization	Entreport Service	Rice	Sugar	Entreport Service
Exports, present	Petro-chemical	Textile Electronics	Textile Electronics	Textile Electronics
Future Policy Goal	Skill-intensive export	Skill-intensive export	Skill intensive export	Laissez Faire: No policy
Chinese Population	Yes	No	Yes	Yes

(Left margin vertical labels: THEME — applied to the rows from "Population Density" through "Self-sufficiency in Food"; VARIATIONS — applied to the rows from "Industrial Dispute" through "Chinese Population")

Chapter V

TAIWAN'S EXTERNAL ECONOMIC RELATIONS

Yuan-li Wu and Kung-chia Yeh

Foreign trade has been crucial to Taiwan's economic growth and will probably remain so in the future. This essay examines Taiwan's evolving trade policy and external economic relations in an attempt to identify some of the key policy issues and lessons of development in the past and to assess its prospect for the future. Section I reviews the growth of trade and development in the last two decades. Section II discusses certain long-range policy problems at the present stage of development.

I. STAGES OF GROWTH OF EXPORTS AND IMPORTS

A statistical overview of the growth of Taiwan's foreign trade since 1952 (Fig. 1) suggests that its historical record can best be divided into four distinct periods: (1) from 1952, when postwar rehabilitation was about completed, and 1959, when foreign exchange and other economic reforms were instituted; (2) from 1959 to 1965, when U.S. economic aid was officially terminated; (3) from 1965 to the outbreak of the oil crisis in 1973; and (4) the post-1973 period.[1] Developments in these four periods were markedly different in several respects: The first major difference is in their rates of growth. There was hardly any growth during 1952–59. The average annual growth of exports was only 4 percent. During the period 1959–65, an upward trend in exports began, rising at an average rate of 22 percent per year. Growth of exports accelerated to an unprecedented rate of 33 percent per year during the third period, 1965–73. In the fourth period, 1973–76, the growth rate dropped to 22 percent per year.[2] If allowance is made for price increases, the recent decline would have been even more marked. Developments in imports generally followed the same pattern.

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1. Volume of imports and exports shown in Fig. 1 are in current U.S. dollars. For source of data, see Economic Planning Council, Republic of China, *Taiwan Statistical Data Book, 1976* (Taipei, Taiwan, 1976), p. 177. (Hereafter cited as *Data Book, 1976*).

2. For data on exports and imports in 1976, see *Monthly Bulletin of Statistics, The Republic of China.* Vol. III, No. 2 (February 1977), p. 11.

Fig. 1. Growth of exports and imports, 1952-75.

Millions of US$

7,000

6,000

5,000

——— Exports

.... Imports

4,000

3,000

2,000

1,000

1952   1956   1960   1964   1968   1972   1976
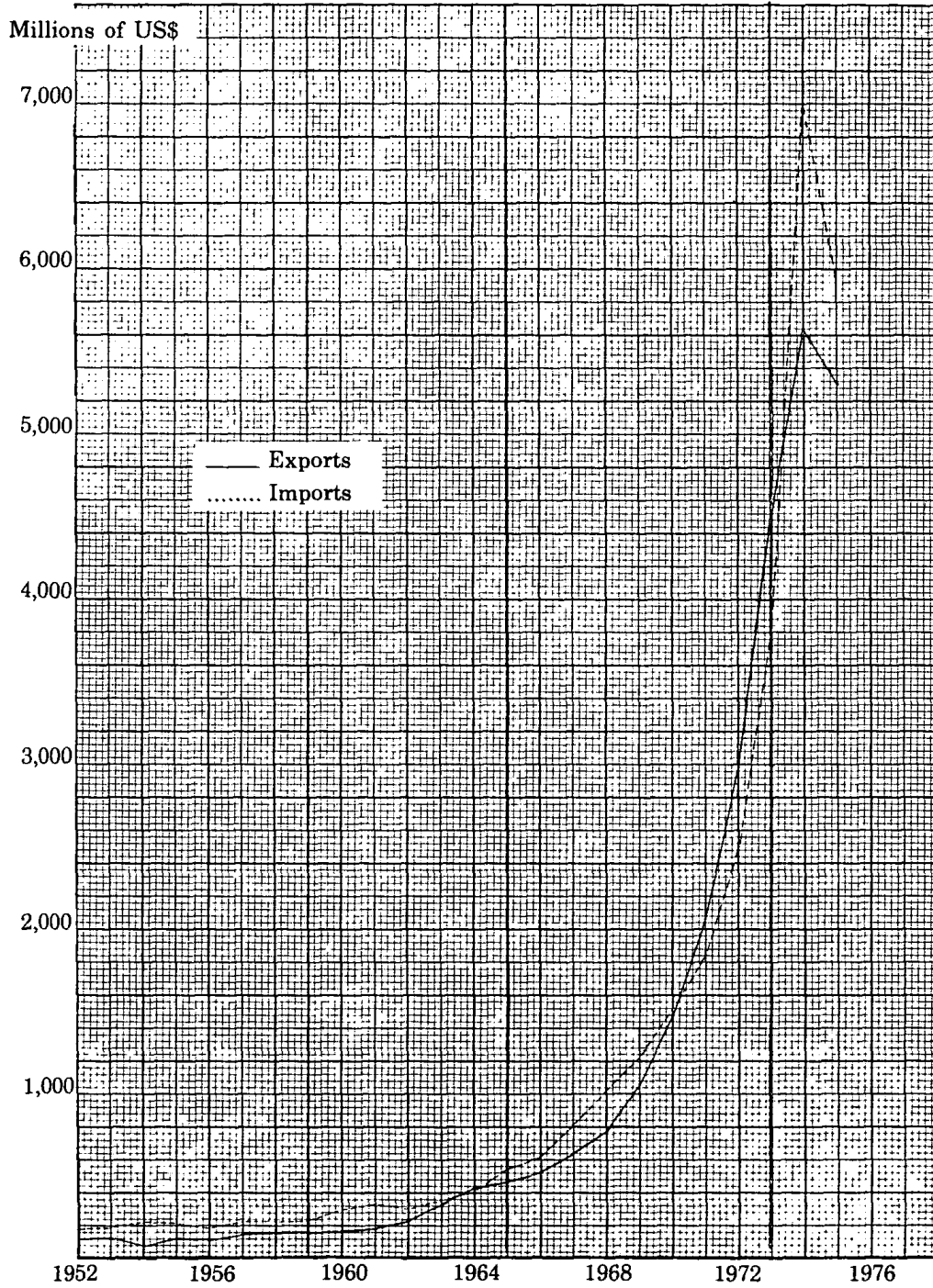
The second major difference over the periods is in the relation of exports to gross domestic product (GDP). The changing role of exports in the growth process is indicated by the rise of the share of exports in gross domestic product, from 9 percent in 1952 and 1959 to 17 percent in 1965 and 46 percent in 1973.[3] The increase in the incremental ratio of exports to GDP is even more striking, reflecting the increasing significance of exports to output expansion. In 1952–59, the ratio of the absolute increase in exports to that in GDP in constant 197 prices was 10 percent; it rose to 28 percent in 1959–65 and to 71 percent in 1965–73.

The third major difference in the various periods relates to the balance of trade. Taiwan had a persistent trade deficit during 1952–70, financed largely by U.S. aid.[4] An export surplus resulted during 1971–73, but the balance turned adverse in 1974–75.

Why did the pattern of development vary and how was it related to the changing trade policies and development strategies in these periods? What were the rationales and consequences of these policies? What major lessons of development policy can be drawn from Taiwan's experience? These questions can best be discussed in terms of the challenges and opportunities Taiwan faced and its responses in each of the four periods.

Trade and Import Substitution Policies in the 1950s

To a large extent, the lack of growth of trade during the 1950s was caused by the government's adoption of a development strategy built around import substitution rather than export promotion.[5] Theoretically, there are obvious advantages in choosing an import substitution policy. The most important is that it will foster infant industries and generate externalities for future development.[6] In addition, a protectionist policy, which is

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3. Percentage shares are based on totals in 1971 prices, given in Directorate-General of Budget, Accounting and Statistics, Executive Yuan, the Republic of China, *Statistical Yearbook of the Republic of China 1975,* Taipei, Taiwan, 1975 (Hereafter, *Statistical Yearbook, 1975*), pp. 194–195.

4. With the exception of the trade balance in 1964, which showed a small surplus. *Data Book, 1976,* p. 177.

5. Some economists would have preferred to call these inward-looking and outward-looking policies for the simple reason that import substitution will occur even in the case of export promotion. See, for example, Donald B. Keesing, "Outward-looking Policies and Economic Development," *Economic Journal,* Vol. LXXVII, No. 306 (June 1967), pp. 303–320. In the present case we use these concepts interchangeably.

6. United Nations, *The Economic Development of Latin America and Its Principal Problems,* New York: United Nations, 1950.

essential for the import substitution strategy, may raise the rate of return to capital in the import-competing sector and thereby induce an inflow of capital.[7] It is mainly on these grounds that many Latin American countries adopted such a policy. But there are also serious drawbacks. Protectionism may encourage the establishment of uneconomical plants, weaken the incentives to introduce modern techniques, and slow down the rise in productivity.[8] By contrast, developing manufactures for export would promote industries that can compete efficiently on the world market. World price competition would compel the producers to keep attuned to changing market conditions as well as changing technology, product design, and quality control.[9] For an island economy like Taiwan's, there are additional reasons for adopting an outward-looking strategy. Since Taiwan has limited natural resources, its growth and economic viability must be predicated upon its ability to draw upon available resources in other countries. These external resources have to be paid for. Accordingly, the sustained growth of the economy requires the concomitant growth of exports. Indeed, the rapid growth of exports and GNP in the 1960s demonstrated the case quite clearly. The question then arises whether a policy stressing home markets for manufactures was misplaced and whether the expansion that began in the 1960s could not have started earlier. By the same token, one might ask whether the increasing emphasis we find today in Taiwan on the development of the domestic sector by building up certain capital-intensive industries is a reasonable and wise policy.

The answer to the question regarding the earlier period is that the range of options open to Taiwan in the 1950s was narrower than is commonly recognized. It is most unlikely that expanding exports of manufactures could have taken place even if it were the primary goal during the period, given the severe internal and external constraints Taiwan faced at that time.

7. For other possible benefits, see Richard E. Caves and Ronald W. Jones, *World Trade and Payments,* Boston: Little, Brown and Co., 1973, pp. 554–557.

8. United Nations Conference on Trade and Development, *Towards a New Trade Policy for Development,* Geneva: United Nations, 1964, p. 22; John H. Power, "Import Substitution as an Industrialization Strategy," and Santiago Macario, "Protectionism and Industrialization in Latin America," in Gerald M. Meier, *Leading Issues in Economic Development,* Second Edition, London: Oxford University Press, 1970, pp. 520–527 and 528–533.

9. See Keesing, *op. cit.,* and Jagdish N. Bhagwati and Anne O. Krueger, "Exchange Control, Liberalization and Economic Development," *American Economic Review,* LXIII:2 (May 1973), pp. 419–427.

The most serious economic problems in Taiwan in the late 1940s and the early 1950s were inflation and a severe shortage of foreign exchange. In part, the inflationary pressure had its origin in the postwar shortages of materials, but it also reflected some structural imbalances in the economy. On the demand side, there had been an abrupt and substantial increase in population as a result of a large influx of people from the mainland. Furthermore, the move of the central government and the military forces to Taiwan imposed additional demands on the economy. On the supply side, the fundamental problem for Taiwan was that its industrial capacity was ill-equipped to meet the abrupt change in economic conditions. Under Japanese rule, the semicolonial economy became a source of supply of foodstuffs and raw materials to Japan and a market for Japan's manufactures. Consequently, Taiwan's agriculture was highly commercialized, and overhead capital was developed to support agriculture, such as irrigation networks, transportation and port facilities, and hydroelectric power supply. The limited productive industrial capacity was designed mainly to process food for export to Japan. In the 1930s, some heavy industries were built to assist Japan's war effort, such as aluminum and copper refining, chemical fertilizers, cement and petroleum refining. But nondurable consumer goods industries were conspicuously absent, because all along Taiwan had relied on imports from Japan. The return of Taiwan to China cut off this relationship. It was the upsurge of demand for these consumer goods that fueled inflation and put pressure on the balance of payments.

To stabilize prices the government imposed controls on inventory speculation and the export of rice. At the same time, import and foreign exchange controls were tightened to stop the rapid drain of foreign exchange reserves. But these were essentially stopgap measures. A solution to the long-term problem had to be found. At this point, there were three options. The first was to return to the prewar policy of exporting primary products and importing manufactures. At first glance, existing conditions seemed to favor this approach. As noted earlier, the Japanese left behind substantial overhead capital in the agriculture sector so that output could be expanded with little additional investment. Moreover, the highly commercialized agricultural sector would readily respond to export opportunities. But several considerations made such a policy unattractive.

First, Taiwan's traditional exports included rice, sugar, bananas, pineapples, and tea. These agricultural products went

largely to Japan. The rice surplus available for export was greatly reduced because of the abrupt increase in population and a slow growth in productivity. As a result of the return of Taiwan to the ROC, Japan was no longer the assured market for the other agricultural products. Some items, such as sugar, could have found a ready market in Mainland China but the political situation made that infeasible. Second, world demand for primary products is rather inelastic with respect to price so that expansion in exports is not likely to increase foreign exchange earnings fast enough to meet the growing needs. Third, even if the policy were successful, the high degree of commodity concentration would be risky. The concentration also would contribute little to initiating a balanced growth in the economy. Finally, the emphasis on agricultural expansion alone would not help to solve the unemployment problem.

A second alternative was to develop industries for export and to promote development through trade. Again there were opportunities for Taiwan to follow this route. The inflow of technicians, managers, and entrepreneurs helped to fill the gap left by the evacuation of Japanese technical manpower. The population influx, discharged military manpower, surplus labor from the rural sector, and large numbers of high school graduates all contributed to the labor supply and kept the wages low. The high degree of literacy of the labor forces was also an advantage. However, these factors by themselves were not sufficient to provide Taiwan with a distanct comparative advantage in the production and export of manufactures. Social overhead capital in support of industrialization was short. So were domestic savings. The labor force, while highly literate and ample in supply, consisted entirely of farm labor at this stage and had yet to be trained to become a disciplined and skilled work force. Also, the entrepreneurs lacked experience in export marketing. Political uncertainties, excessive bureaucratic controls, inflation, and overvalued exchange rates all tended to discourage the inflow of private foreign capital, which could have filled part of the gap in savings, technology, and marketing skills. In such circumstances it would have been impossible for any new industries to compete effectively in world markets with such industrialized nations as Japan.

A third alternative was industrialization by developing import substitution industries. This was the policy that the government adopted. Apparently, the choice was based on the following considerations. The separation of Taiwan from Japan

after the war and the restriction of imports created opportunities for the development of domestic manufacturing industries, particularly nondurable consumer goods such as textiles and food processing, the production of which required little capital and technology. Inefficient as these industries might be at the initial stage, they could survive in a protected domestic market whereas they would probably fail in international competition. Development of these industries could absorb a large number of the idle or semi-idle into productive employment and utilize agricultural resources more fully. Moreover, output of these industries could help to stabilize prices and conserve foreign exchange.

To carry out this strategy, a series of measures was introduced to provide incentives for entrepreneurs to enter into production of import substitutes. The first was the tightening of foreign exchange controls for infant industry promotion and protection. Because the exchange rates overvalued the Taiwan currency, there was an acute shortage of foreign exchange and it had to be rationed. Incentives for industrial investment were provided through preferential allocation of foreign exchange. The multiple exchange rate system adopted in April 1951 was structured to favor the import of plant equipment and U.S. aid-financed goods, including raw materials for import substitution industries. Meanwhile, part of the proceeds from exports of primary products controlled by the state — such as rice, sugar, and salt — was used to subsidize the development of industries in the public sector, such as fertilizers and petrochemicals. Similarly, because of price inflation and other factors, the interest rate was rather high. Credit was made available at below market interest rates to private investors involved in import substituting activities.[10]

Another policy instrument to induce import substitution was tariff protection and import controls. The tariff schedule enacted in 1948 was designed primarily to protect domestic production of semifinished products rather than manufactures. It was therefore not compatible with the development strategy. In 1955, the tariff was revised to raise the effective rates on manufacture imports, but the revised schedules were still quite low and the government had to rely mainly on import controls to protect the infant industries.

During this period, a land reform program was put into effect. While the objective of land reform was primarily political (to

10. For details, see Lin Ching-yuan, *Industrialization in Taiwan, 1946–72*, New York: Praeger, 1973.

prevent widespread social unrest in rural areas), it nevertheless indirectly benefited the industrial development. The fixing of land rent at 37.5 percent of the main crops harvested and the low price policy for farm products left the former landlords with little incentive to reinvest in farming. In effect, there was a compulsory transfer of the former landlords' capital from land to other forms of assets more readily available for redirection of investment. The low price policy also contributed to the development of urban industrial centers by keeping workers' cost of living fairly low.

In addition to all these measures, the continued inflow of U.S. economic aid was also a key factor that made the import substitution policy feasible.[11] During 1951-65, Taiwan received over US$1.4 billion in economic assistance. As noted earlier, the most serious problem that Taiwan faced at this time was inflation. The U.S. aid played a crucial role in bringing it under control through augmenting the supply of critically short resources, but the massive U.S. aid also contributed directly to the implementation of the development strategy in a number of ways.

Like most developing countries at the initial phase of development, Taiwan depended heavily on external sources for capital, equipment, and raw materials. So far as capital formation was concerned, Taiwan faced a twofold problem. On the one hand, domestic savings were inadequate to finance the development program. The rate of gross domestic capital formation was about 15 percent of GDP in the early 1950s, of which net national savings accounted for less than one-third of the total.[12] The difficulty in mobilizing savings arose partly because of a sizable military burden and partly because of an underdeveloped money market in Taiwan. Under the circumstances, the U.S. aid contributed indirectly to development finance by providing part of the defense support, and directly to Taiwan's supply of savings by providing development loans or grant and aid-generated local currency funds.[13] During 1952-60, about 40 percent of total gross

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11. See H. T. Lin, "U.S. Aid and Taiwan's Economic Development," *Conference on Economic Development of Taiwan,* Taipei: Academia Sinica, 1967, pp. 295-322; Neil H. Jacoby, *U.S. Aid to Taiwan,* New York: Praeger, 1966.

12. Economic Planning Council, Republic of China, *Taiwan Statistical Data Book, 1974,* Taipei, Taiwan, 1974, pp. 30, 41 (Hereafter, *Data Book, 1974*).

13. Under the aid program, the Chinese government was required to deposit Taiwan dollars equal in amount to the sales of U.S. aid commodities (mainly PL 480 commodities or those financed by Defense Support). The original purpose was to sequester monetary claims on Taiwan resources and place them under joint US-Chinese control, in order to curb inflationary tendencies and to use local funds to support other parts of the aid program. However, about one-half of the total was used for development finance.

domestic capital formation was financed by U.S. aid, foreign capital, and loans.[14] A substantial portion of the foreign capital was allocated to the mining and manufacturing sector, and an even larger share to such infrastructure facilities as electric power, the Shihmen Dam, transportation, health and sanitation, and education.[15] The construction of social overhead capital benefited not only the import substitution industries being developed but also the new industries yet to emerge in the subsequent period.

Apart from a savings gap, Taiwan also faced a foreign exchange gap mainly because most of the capital goods needed for investment had to be imported.[16] During 1952–60, capital goods acquired through the U.S. aid program amounted to some 44 percent of the total capital goods imported.[17] A second and perhaps more fundamental cause for the foreign exchange gap was the shortage of raw materials for the development of the domestic industries. This was because Taiwan, as an island economy, had few natural resources. Most raw materials and fuels had to be imported. Not surprisingly, over 70 percent of Taiwan's imports during 1952–60 consisted of raw materials.[18] Of this total, U.S. aid commodities accounted for 42 percent.[19]

Mainly as a result of the import substitution policy, there had been a discernible change in the economic structure. The share of manufacturing in GDP rose from 16 percent in 1952 to 22 percent in 1959, indicating a much faster rate of growth of manufacturing relative to other sectors.[20] As may be expected, the most important branches of manufacturing included (a) food, beverages, and tobacco; (b) textile, wearing apparel, and leather industries; and (c) manufacture of chemicals, and chemical, petroleum, coal, rubber, and plastic products. These three branches accounted for 78 percent of total manufacturing in 1952, and their share remained as high as 72 percent in 1959.[21] Industrial growth, however, was not confined to nondurable consumer goods. Some other branches also expanded rapidly, such as nonmetallic

14. *Data Book, 1974,* p. 41. Foreign private capital inflow during this period was negligible.

15. *Ibid.,* pp. 201, 203.

16. H. T. Lin, *op. cit.,* p. 303.

17. *Data Book, 1974,* p. 205; *Data Book, 1976,* p. 183.

18. *Data Book, 1976,* p. 183.

19. *Data Book, 1974,* p. 205.

20. Directorate-General of Budget, Accounting and Statistics, Executive Yuan, Republic of China, *Statistical Yearbook of the Republic of China, 1975,* Taipei, Taiwan, 1975 (Hereafter, *Statistical Yearbook, 1975),* p. 191.

21. *Ibid.,* p. 206.

mineral products (except coal and petroleum products), basic metal products, and fabricated metal products, machinery, and equipment. The share of these industries rose from 8 percent in 1952 to 17 percent in 1959.[22] Some new industries also emerged, such as monosodium glutamate, rayon fiber, plastics, and sheet glass.

By and large, import substitution was highly successful. By the late 1950s, the percentage of imports in total supply (domestic output plus imports) was reduced to less than 10 percent for a number of industries.[23] However, for industries requiring advanced technology and a sizable scale of production, such as heavy machinery and chemicals, the import ratio remained above 30 percent of total domestic demand.[24]

Meanwhile, export of agricultural products still accounted for an overwhelmingly large share of total exports in 1969.[25] The principal agricultural exports included sugar, rice, bananas, tea, and canned goods. These five items alone accounted for 87 percent of total exports in 1952 and as much as 69 percent in 1959.[26] Because Taiwan was previously tied to Japan, it was natural that Japan remained the largest market for Taiwan's agricultural products.

SHIFT TOWARD AN OUTWARD-LOOKING STRATEGY. 1959-1965

Toward the end of the 1950s, the government's priority goal of restoring economic stability by and large had been achieved, although the shortage of foreign exchange remained acute. Per capita income was considerably higher than in 1952, but new problems emerged. Growth of some major industries slowed down as the domestic market for their products became saturated.[27]

22. *Ibid.*

23. See Hsing Mo-huan, *Taiwan: Industrialization and Trade Policies,* London: Oxford University Press, 1971, pp. 180-181.

24. Ken C. Y. Lin, "Industrial Development and Changes in the Structure of Foreign Trade," *International Monetary Fund Staff Papers,* No. 15 (July 1968), pp. 290-321.

25. *Data Book, 1976,* p. 182.

26. *Ibid.,* p. 197.

27. The growth rates for textiles and food, the two major industries, were 24 and 16 percent per year in 1952-55, compared with 6 and 4 percent per year in 1955-59. *Statistical Yearbook, 1975,* p. 118. Many industries (woolen textiles, plywood, paper, rubber goods, soap, iron rods and bars, insulated wires, sewing machines, and electric fans) were operating at 40-70 percent capacity. Lin, 1968, p. 303.

Labor supply was expanding faster than employment.[28] It was clear that the government must now decide on a new development strategy.

Again the range of policy choices was limited. First, a shift back to primary exports was out of the question, despite substantial increases in the output of rice, pineapples, tea, and sugar.[29] This was mainly because demand in Japan, the principal market for Taiwan's agricultural products, had declined. Moreover, the long-term considerations against heavy reliance on primary exports was as valid as before. Second, the prospect of pushing forward with the import substitution policy did not seem very promising. In the 1950s, this policy was quite successful (by almost any standards) when carried out in industries producing nondurable consumer goods and their inputs. Extending import substitutions to intermediate products, machinery, and durable consumer goods, would be rather costly because of heavy requirements of new capital and technology and because of the small domestic market for these products in Taiwan.

Meanwhile, an outward-looking policy appeared the most attractive alternative because of favorable conditions at home and abroad.[30] With massive U.S. aid, in the 1950s the government had been able to construct large-scale overhead capital in support of industry, as distinguished from the overhead left over by the Japanese that was primarily designed to serve the agricultural sector. A large well-motivated labor force with a high educational level and fairly low wages had been trained. The entrepreneurs had accumulated considerable experience in technical management. Expansion of the nonendurable consumer industry in the 1950s had created a sizable productive capacity. Interestingly, it was the import substitution policy of the 1950s that brought into being some favorable factors that were not previously available, providing Taiwan for the first time with a competitive advantage in international markets for labor-intensive products.

28. Population 15 to 59 years of age increased 2.9 percent per year during 1952-59, but employment (age 12 and over) increased at only 1.6 percent per year over the same period. *Data Book, 1974*, pp. 8, 11.

29. See *Data Book, 1974*, pp. 53-56.

30. For an incisive analysis of Taiwan's trade policy, see Kuo-shu Liang, "Trade and Policy in Taiwan 1952-1965," *Conference on Economic Development of Taiwan*, Taipei, Taiwan: Academia Sinica, 1967, pp. 239-277; Bela Balassa, "Industrial Policies in Taiwan and Korea," *Welwirtschaftliches Archiev*, Vol. 106, No. 1, 1971, pp. 55-77; Kuo-shu Liang and Teng-hui Lee, "Taiwan," in Shinichi Ichimura (ed.), *Economic Development of East and Southeast Asia*, Honolulu: University of Hawaii Press, 1975, pp. 209-346.

External conditions in the 1960s also favored such a change. In Japan, the economy just began its phase of sustained rapid growth. Consequently, its industrial and export structure shifted toward more capital- and technology-intensive products, thus opening the markets for labor-intensive products to countries like Taiwan. Meanwhile, the imports of many developed countries began to accelerate toward the end of the 1950s.[31]

At this point, the government adopted several major economic reforms designed primarily to promote export growth. The first was a major foreign exchange reform in 1958. Before this time, Taiwan had a complicated multiple exchange rate system.[32] The exchange rate grossly overvalued the Taiwan dollars in terms of foreign currencies. In 1958 a single exchange rate set at a more realistic level replaced the old system. The real significance of the reform was the devaluation of the currency, which helped to reduce the excess demand for foreign exchange and to encourage exports.

The second major policy change was the liberalization of tariff and import controls. In 1959, tariff rates for a number of finished goods and their principal imported raw materials were reduced. Import controls, an important instrument for infant industry production, were now relaxed somewhat; a number of items were removed from control.[33] The liberalization of controls heightened external competition and compelled the domestic producers to pay more attention to world market conditions and efficiency.

A third policy change was the introduction of a set of measures to stimulate exports directly. These included an extension of the foreign exchange entitlements, preferential tax treatment of exports and raw materials for export industries, and low-cost export loans. Subject to certain restrictions, exporters of manufactured goods now could retain all the export earnings for most items for use in importing raw materials (approved by the authorities) or for sale to other users. Import duties, defense taxes,

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31. *Economic Report of the President, January 1967,* Washington, D.C. 1967, pp. 170–175.

32. The system included special exchange rates applicable to negotiable foreign exchange certificates given to exporters, tax rebates to manufacturers for import duties on raw materials used in the manufacture of export products, and foreign exchange entitlements that permitted manufacturers to retain certain portions of their foreign exchange earnings for use in the purchase of imported raw materials. See Ching-yuan Lin, *Industrialization in Taiwan, 1946–72,* New York: Praeger, 1973, pp. 74–76.

33. *Ibid.,* p. 93.

and harbor charges (and subsequently the salt tax and slaughter tax) on imported raw materials used in production for exports were now refundable. In 1957, the Bank of Taiwan introduced low-cost loans to exporters, 6 percent for loans payable in foreign exchange, 11.88 percent for those payable in local currency, very much below the current interest rate on loans to other borrowers. Other policies include export insurance by a government organization, direct subsidies to a few industries, and market research by government institutes.

Finally, and perhaps most important, was the set of measures to promote foreign investment in Taiwan. The attempt to attract foreign investment was not new. In 1954 and 1955 investment laws were enacted to encourage inflow of capital. Foreign investors were permitted to import plant and equipment and raw materials for their own use and other goods to be sold in domestic markets to generate local currencies needed for the investment projects. But as the margin between the official and the black market foreign exchange rates narrowed, the advantages to the foreign investor gradually disappeared. Beginning in 1959 the government relied more on tax incentives to attract foreign capital. A maximum income tax of 18 percent and a five year tax holiday for new investments were applicable to foreign capital. Other concessions included deferred payment of import duties on plant and equipment, payments to be made in installments after the plant began operation, and charges up to 7 percent of their annual dividends to allow for possible loss from exchange devaluation.

Another measure to attract foreign investment was the establishment of export-processing zones (EPZ) in 1965. Foreign firms that set up production facilities within the zones were given certain advantages: plant sites with easy access to harbor and warehouse facilities and water and power supply were made available. Costs of some of these services were reduced to levels competitive with those of other ports in the Far East. No import duties were to be imposed on plant and equipment. Red tape connected with applications for licensing of investment, imports and exports, and remittance was cut to a minimum.

The shift of emphasis from an inward-looking to an outward-looking strategy had important effects on the growth, structure, and direction of Taiwan's foreign trade. Exports rose at an impressive rate of 19 percent per year during 1959-65, compared with only 4 percent during the import substitution period

1952-59.[34] Growth of exports was accompanied by a dramatic change in its commodity structure. The share of manufactured products in total exports averaged 41 percent during 1959-65, far above the average of 12 percent for 1952-58.[35] The export of import substitution products accounted for a large proportion of this growth. Increases in the exports of food, beverage, and tobacco preparations, and production of textiles, leather, wood, paper, and related products constituted 58 percent of the total increase in exports in 1959-65.[36] With the change in the commodity structure of exports, the direction of exports also shifted.

Broadly, Taiwan's exports during this period were of three types. The first was the group of labor-intensive products (apparel, plywood, electronics) for markets in developed countries. Among these countries, Japan remained the most important, but its relative share declined. The share of total exports to such developed countries as the United States, Germany, Australia, and Canada rose sharply, from 11 percent in 1959 to 31 percent in 1965. The second group consists of capital-intensive products such as cement, metal and metal products, and electrical machinery, which were sold to the developing countries. A third group was primary products, such as sugar and tea, which were exported to both the developed and developing countries. Of the three groups, the first expanded the fastest, especially since 1962.

The growth of imports during 1959-65 (16 percent per year) was also much faster than during 1952-59 (3 percent per year).[37] That this was so should not be surprising, for Taiwan's imports and exports were highly interdependent. Growth of exports generated the need for more imported capital equipment and raw materials and at the same time increased the capacity to import. Thus, during the period of rapid growth in 1959-65, capital goods imports constituted 25 percent of total imports, compared with only 17 percent for 1952-58.[38] As for the sources of imports, about 70 percent of all imports came from Japan and the United States during 1959-65. This pattern was little different from that of the previous period.

34. *Data Book, 1976*, p. 177.
35. *Ibid.*, p. 182.
36. *Ibid.*, p. 180.
37. *Data Book, 1976*, p. 177.
38. *Ibid.*, p. 183.

Capital Inflow and Export Growth, 1965-73

As exports grew after the exchange reforms of 1958, U.S. economic aid began to phase out and in 1965 the aid program officially came to an end. Throughout this period Taiwan had a persistent trade deficit.[39] To cushion the impact of the termination of U.S. aid, Taiwan obtained a loan of US$150 million from Japan. But the really significant factor that permitted a continued net import of resources was the inflow of private foreign capital. The foreign exchange reform and the tax incentives introduced around 1960 evidently initiated an upward trend in the inflow of foreign capital. The trend accelerated after the establishment of the export-processing zones. As of March 1977, there were 10 U.S. firms, 68 Japanese firms, and 68 firms jointly owned by U.S., Japanese, and other investors in the EPZs. Investments of these 146 firms totalled US$109.0 million.[40] Still other investors, many from Hong Kong, were also located in the EPZs. Inflows of capital since 1965, however, were by no means confined to investment in the EPZs.[41] The following figures clearly show how foreign investment rapidly grew since 1960:[42]

| | Foreign Investment Approvals | | |
	1952-59	1960-65	1966-73
Cumulative totals			
Investments (million US$)	20.1	114.6	962.7
Number of cases	72	224	1.639
Average per year			
Investments (1,000 US$)	2.5	19.1	120.4
Number of cases	9	37	205
Investment per case			
(1,000 US$)	280	516	587

Not only did the number of cases and the amount of investment increase sharply since 1960, the average size of investment per case was also larger.

Apart from improving Taiwan's balance of payments situation and increasing employment, the inflow of foreign capital was

39. The only exception was the small surplus in 1964 due to the sugar price boom at that time.

40. These data are provided by the Economic Planning Council, Executive Yuan, Republic of China.

41. For example, of the U.S. investment in Taiwan up to 1976, totalling $418.8 million, 96 percent were outside the EPZs. Data provided by Industrial Economic Cooperation and Development, Taipei, Taiwan.

42. *Data Book, 1974*, p. 212.

instrumental in solving two key problems on which export expansion and economic growth depended.

The first was the infusion of new technology needed to restructure Taiwan's output and exports in the face of changing market conditions in the late 1960s. The foreign investments were concentrated in such new industries as electronic and electrical products, chemicals, machinery equipment and instruments, and metal products.[43] These have been among the fastest growing industries since 1965.[44] Along with textiles and apparel, they were also the fastest growing exports.[45] By 1973, industrial products dominated the export structure, accounting for 85 percent of total exports, and the commodity composition of manufacturing exports also changed markedly in favor of such items as electrical machinery and apparatus and high-quality textile products.[46] Unlike the principal exports of the earlier years, these products were developed primarily for exports rather than as import substitutes.

Mainly as a result of these developments, the degree of export commodity concentration declined appreciably.[47] This trend is in line with the development experience of other countries. As the economy becomes more industrialized, exports become more diversified.

The other important problem that foreign investments helped to solve was that of marketing. A substantial portion of the investments was from Japan and the United States, the purpose of which was to utilize the labor in Taiwan to assemble and package parts into finished products for export directly to the United States. Foreign investment thus automatically provided marketing channels for Taiwan's exports, which was of enormous value to Taiwan where the supply of international marketing skills was still rather short.

The close relationship between Taiwan's exports and foreign capital in general and between U.S. foreign investment and

43. *Data Book, 1976*, p. 231.

44. *Statistical Yearbook, 1975*, p. 119.

45. *Data Book, 1976*, pp. 180-181.

46. *Ibid.*, p. 182.

47. According to calculations by Lee and Liang, *op. cit.*, p. 280, the index of commodity concentration dropped from 56 percent in 1955 to 22 percent in 1970. The index is measured by $100VE(X_i/X^2$, where X_i; represents exports of commodity i, and X, Taiwan's total exports. The higher the index, the higher the degree of commodity concentration.

exports to the United States are shown in Figures 2 and 3.[48] Mainly as a result of the increase in direct investments, the share of Taiwan's exports to the United States surpassed its share to Japan since 1967, and the United States became Taiwan's most important market. To be sure, neither effective marketing with the aid of foreign investors nor unilateral reform on the part of Taiwan would have sufficed had not the demand for Taiwan's exports expanded considerably during this period. Between 1966 and 1973, U.S. total imports increased fourfold. During the same period, U.S. imports from Taiwan rose nearly fourteenfold. This sharp increase of Taiwan's exports to the United States was partly a reflection of the greater competitiveness of Taiwan products on the U.S. market, but the increase was also aided by the general expansion of U.S. imports. Furthermore, Taiwan's exports to the United States had been so small that the large increase during this period could in most cases be better tolerated by Taiwan's competitors. Given the competitiveness of Taiwan's products and the increasing U.S. demand for imports, the existence of U.S. as well as Japanese firms in Taiwan, both making exportable goods for the American market, contributed significantly to Taiwan's expanding share in U.S. imports.

As exports expanded, so did imports, albeit at a lower rate. During 1965–73, imports increased by 27 percent per year.[49] The composition of imports remained more or less unchanged during this period, with the share of capital goods stabilized at around 32 percent, raw materials at 63 percent, and consumer goods at 5 percent.[50] The degree of import commodity concentration also remained at a fairly low level.[51]

Problems in the Post-Oil-Crisis Period

At the time the worldwide energy crisis broke out, Taiwan ranked among the highest of the developing countries in the rate of economic growth and per capita income. But its very success of development through trade also created serious problems because Taiwan was now so dependent on trade that the economy became increasingly sensitive to abrupt changes in the outside world. The

48. Data for exports used for these calculations are from *Data Book, 1976,* and Chung-yang jih-pao (Central Daily News), Taipei, January 12, 1977. Data on foreign investments are provided by the Economic Planning Council, Executive Yuan, Republic of China.

49. *Data Book, 1976,* p. 177.

50. *Ibid.,* p. 183.

51. Lee and Liang, *op. cit.,* p. 280.

following ratios of exports and imports to gross domestic product in selected years since 1952 show the extent of Taiwan's dependency on external markets and sources:[52]

52. Ratios are based on totals in current prices. *Statistical Yearbook, 1975,* p. 190; *Monthly Bulletin of Statistics, the Republic of China,* Taipei, Taiwan, Vol. III, No. 1 (January 1977), p. 18.

Fig. 2. Correlation of the cumulative value of total overseas direct investments in Taiwan and Taiwan's exports to the world, 1952–76 (t = 1953–75).

Taiwan's Exports to the World (y_{t+1})
$ thousand

$$y = - \; 99 + 0.0049x$$
$$(\; r = 0.984 \;)$$

Total Overseas Investments $ million (x_t)

100,000   300,000   500,000   700,000   900,000   1,100,000   1,300,000
200,000   400,000   600,000   800,000   1,000,000   1,200,000
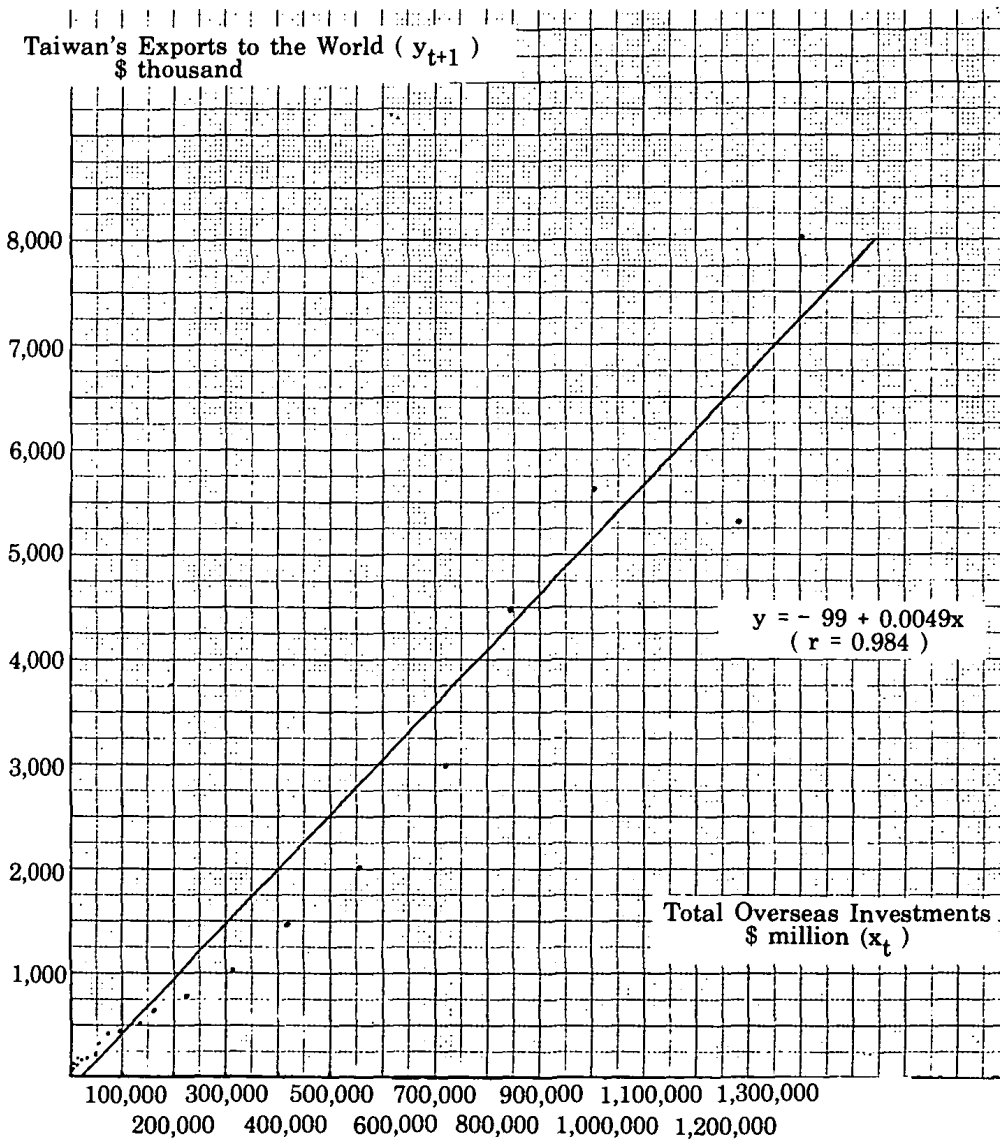
Fig. 3. Correlation of the cumulative value of U.S. direct investments in Taiwan and Taiwan's exports to the U.S., 1953-76 (t = 1953-75).

Taiwan's Exports to the U.S. (y_{t+1})
NT $ million

$$y = -5,450 + 0.2x$$
$$(r = 0.975)$$

U.S. investment in Taiwan (x_t)
$ thousand
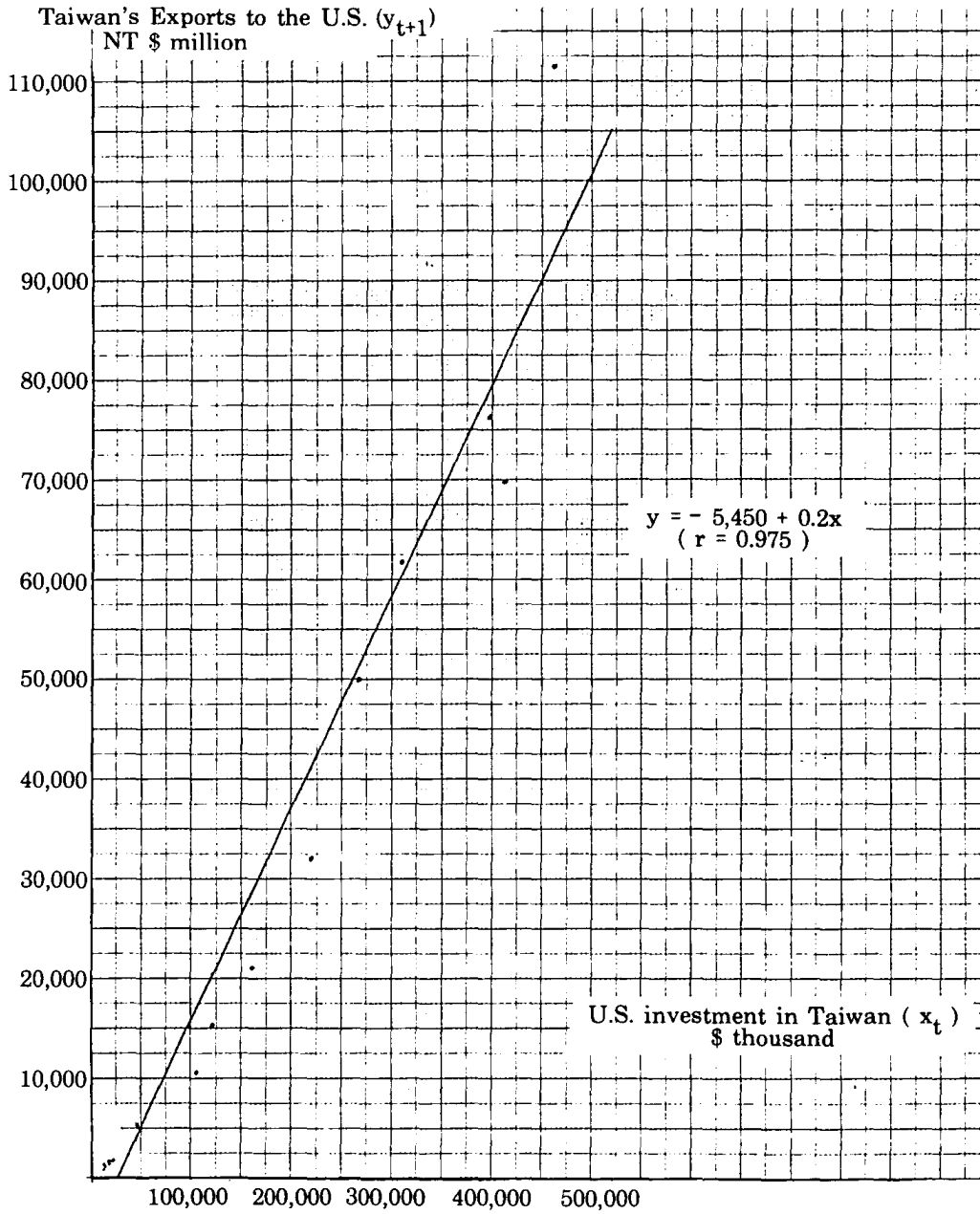
	Exports/GDP	Imports/GDP
1952	8	14
1959	12	21
1965	18	21
1973	49	43
1976	52	50

The problem of high trade–GDP ratio is further compounded by heavy reliance on trade with Japan and the United States, as demonstrated by the following figures showing exports to and imports from the United States and Japan as percentage of Taiwan's total exports and imports:[53]

Year	Exports		Imports		
	To U.S.	To Japan	From U.S.		From Japan
1953	4.2	45.6	38.7	0	30.7
1959	8.6	41.5	36.1		40.3
1965	21.3	30.6	31.7		39.8
1973	37.4	18.4	25.1		37.5
1975	34.3	13.1	27.8		30.4

Taiwan's exports to these two countries accounted for about 50 percent of its total exports. The degree of heavy reliance on these two markets as a whole has remained unchanged in the last two decades. However, the share of exports to the United States rose sharply since the 1960s, while that to Japan declined for the reasons given above.

Taiwan's dependence on these two countries for imports was even greater than its dependence for exports. About 70 percent of total imports came from these two countries in the period up to 1965. The proportion fell to about 60 percent in the early 1970s. The decline was due to a reduction of the U.S. share after the termination of the U.S. aid in 1965. Japan's share, however, remained fairly high. The concentration of trade with Japan and the United States means that Taiwan's economy would be highly vulnerable to changes in these countries.

The immediate effect of the oil crisis on Taiwan was an enormous trade deficit of US$1.3 billion in 1974. Taiwan's deficit with the oil-producing countries (Kuwait, Saudi Arabia, and Iran)

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53. *Data Book, 1976*, pp. 189, 191.

totalled US$0.7 billion, actually much less than its deficit with Japan, US$1.4 billion.[54] In 1975, both total exports and imports declined for the first time since 1969. The total trade deficit was reduced to US$0.6 billion, but the deficit with Japan remained as high as US$1.1 billion.[55]

In fact, for decades before the oil crisis, Taiwan had persistent deficits with Japan, for various reasons. Taiwan's exports to Japan consist largely of agricultural products, partly because the geographical proximity of the two countries lowers the transportation costs for bulky agricultural products, partly because of the similarity in the Chinese and Japanese diets, and also because of Japan's restrictive policy toward its imports of manufactured products. The growth of such imports has been slow despite Japan's rapid economic growth, because the income elasticity of demand for these products was rather low. Taiwan's demand for imports of capital goods (steel, machinery, chemicals) however, expanded by leaps and bounds. Again because of lower transport costs and the sizable Japanese investment in Taiwan, together with the traditional ties between the Japanese and the Taiwanese business community, imports of these capital goods were largely from Japan.[56]

Another serious problem in the post-1973 period was the effect of worldwide inflation on domestic prices. Wholesale prices in 1974 rose by 35 percent and the consumers price index by 47 percent over 1973.[57] The sharp increase in prices inevitably forced the labor costs to go up despite the rise in unemployment.[58]

By 1976 the situation had improved. The rate of inflation was greatly reduced. Exports and GNP turned upward again, and the rate of unemployment was much lower. However, the economic recovery does not necessarily mean a return to the smooth sailing of the last decade, for Taiwan now faces some new economic and political challenges. Competition from Hong Kong and South Korea has become keener as these countries have moved into textiles and electronics. Wages in Taiwan rose faster than in other countries so that Taiwan lost some of the advantages in low labor cost. Moreover, in the developed countries, the slowdown in economic growth and high rates of unemployment gave rise to

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54. *Data Book, 1976,* pp. 184–189.

55. *Ibid.,* p. 184.

56. As of 1972, imports of transportation equipment, chemicals, electrical machinery, and equipment from Japan accounted for 53, 60, 75 and 64 percent of Taiwan's total imports of these products. *Data Book, 1976,* pp. 210–211.

57. *Monthly Bulletin of Statistics, Republic of China,* Vol. III.

58. *Ibid.,* p. 5.

protectionist sentiments. More serious still, changes in the relations between Peking and Washington in recent years renewed fears about Taiwan's future. The political uncertainty could have adverse effects on the economy. In the first place, insecurity on the part of Taiwan might force the government to divert more resources from investment to defense preparations. Second, economic viability and growth depend heavily on foreign investment, which is apparently very sensitive to changes in the political climate. The rate of U.S. and Japanese investment in Taiwan dropped in 1971 and 1972 probably as a result of the ROC's international setbacks during those years and investors' concern over its future status. Another decline in new Japanese investment in Taiwan occurred in 1974 and 1975 following Japan's transfer of diplomatic recognition from Taipei to Peking in 1973, although the cause of the decline is somewhat ambigious because it coincided with the worldwide recession. Without the continued inflow of foreign capital that brings in new technology and marketing skills, it would be difficult to sustain high rates of export growth. Once again Taiwan has reached a critical stage, as it did in the late 1950s and early 1960s; however, the conditions are different, but so is Taiwan's economic capability. The economy's productivity and capacity to save and the stock of physical and human capital have grown tremendously over the last two decades. Of the ten major investments now under construction, seven are new additions to the infrastructure, which, when completed, will greatly increase the power-generating capacity and transportation facilities needed for future export growth. Above all, the government and the business community have accumulated substantial experience in adapting themselves to changing conditions. At each critical juncture in the past, the government had been able to take appropriate measures to promote the transition from one stage of growth to the next. Although Taiwan now faces many problems, the central question remains essentially the same as in the past: how to identify, develop, and exploit new areas of comparative advantage in the future international environment. In the search for solutions, political, economic, and strategic issues are inevitably involved.

II. LONG-TERM EXPECTATIONS

As an economy develops, the commodity composition and country distribution of its external trade are bound to change. In the case of Taiwan, the rate of adjustment required is enhanced by

the speed of economic change inherent in the continuation of fairly rapid economic growth that the ROC authorities plan to maintain. There certainly are strong noneconomic reasons calling for steady economic growth at an at least moderately high rate. Given Taiwan's island economy, this means continued large imports that must be paid for. Thus, exports must continue to rise, and it would be necessary, not merely desirable, to have a given amount of resources devoted to exports to earn an increasing amount of imports. Exports based on low wage, labor-intensive production methods will increasingly lose their edge in competition with the products of other countries as wage rates rise in Taiwan and as other countries with a much larger labor supply— e.g., South Korea and several countries in Southeast Asia— expand their manufacturing and export industries further. Taiwan's import demand for intermediate products can be progressively reduced through domestic production in what is sometimes described as the backward linkage process. However, both the production of intermediate products at home and expansion of more capital and technology-intensive exports of higher unit value will still require the inflow of technology from overseas and of some foreign capital in the case of "embodied technology." In addition, there will be a need to expand other sources of foreign exchange earnings than current exports. This need will still be there even if raw material imports become relatively more important as the proportion of intermediate industrial products in imports recedes. In light of the world's recent experience concerning the pricing and availability of primary commodities (including both raw materials and energy products), security of imported raw material supply is one aspect of its future trade pattern that Taiwan cannot ignore.

Changes in the direction of Taiwan's foreign trade are also becoming increasingly necessary as the volume of trade increases. In some commodities, such as low-priced footwear and textiles and black-and-white TV sets, Taiwan products now account for a very large portion of certain markets, e.g., the United States. This phenomenon has evoked the usual outcry from local producers demanding import tariffs and quotas, countervailing duties, "voluntary" restraint on the part of Taiwan exporters, etc. To some extent, this roadblock to Taiwan's export expansion can be bypassed through limiting sales of any specific commodity in any one market to a share of the total supply that would be regarded as tolerable by local competitors. (What would constitute such a share is another question.) This can be done by trying to sell in

more markets and by selling a larger number of exports in any given market. Diversification by commodity and by market must, therefore, be regarded as a most urgent task facing Taiwan's foreign traders.

This and the following section will explore these issues further with particular attention to some of the more uncommon aspects.

Augmenting Natural Resources Supply from Overseas

The pattern of external trade of any country will change in the long run as its comparative advantage changes. Since comparative advantage is a reflection of the relative scarcities of resources, of tastes and preferences, and of given technologies, all of which are subject to change, the crucial question is how these factors might change for Taiwan, especially how resources and technologies might change. In the long run, in spite of its small size, Taiwan may turn out to possess new natural resources, hitherto undiscovered, that can be utilized in external commerce as a result of changes in technology and demand. However, in the absence of the emergence of radically new technologies, major new discoveries of hidden resources (such as off-shore oil and gas) in quantities sufficient to alter comparative advantage are fraught with greater uncertainty than some other developments that simply augment available resources through investment. In this regard, Taiwan's resource augmentation can proceed in several ways. As a matter of fact, a small beginning has already occurred in what could turn out to be a trend.

In the first place, natural resources located overseas can be, and have been, acquired through investment. Like the Japanese, businessmen in Taiwan who have developed certain enterprises and technical expertise have begun to establish similar undertakings in foreign markets. For instance, this has been done through investment in outlets and facilities for foreign sales. Manufacturing facilities have also been located overseas to promote sales in local foreign markets, in industries in which the investors have already gained considerable experience at home—e.g., textiles, petrochemicals, and construction materials. In addition, overseas investment to provide for the supply of resources for domestic use in the future has also started, as yet only on a very small scale. The types of foreign investments by the Japanese are, of course, of far greater magnitudes. For example, timber land in Indonesia, corn-growing farms in Thailand, etc. have been developed by Taiwan-based investors. In due course, such acquisitions will help

assure Taiwan producers and consumers of continuity of supply and access to raw materials on potentially more advantageous terms. Most such direct investments will also present possibilities of exporting to third countries from overseas locations.

All types of foreign investment by Taiwan investors will, directly or indirectly, provide foreign earnings that can be used to promote export sales or to increase imports, which again may either be for domestic production (or consumption) in Taiwan or for the production of exports. In short, the historically common case of a developing country itself becoming an investor country can and will be repeated in Taiwan. One might state even more emphatically that such developments must take place if Taiwan's economic growth is to continue. One of the effects of these developments is to alter the pattern of comparative advantage in the long run.

From 1959 through 1975, 91 applications by ROC businessmen for investment in foreign countries, totalling $26.5 million, were officially approved. Their distribution by sector and by country is shown in Table 1. Forty percent of such investments are in various manufacturing industries; 19 percent in construction and construction materials; 13 percent in textiles; 10 percent in foreign trade; 8.5 percent in machinery and metal products. Only a little over 3 percent are for the development of mineral and agricultural resources.

The accompanying data represent only officially approved investments from Taiwan. Some investments, however, have been made in the form of joint ventures in partnership with business interests in the host countries or third countries. Some "third" country (e.g., Hong Kong) interests conceivably may also be beneficially owned by Taiwan investors. At any rate, Taiwan exporters are permitted to retain, in foreign exchange, a small amount of their export proceeds for purposes of their overseas business operations. With annual exports currently (1976) running at the rate of about $8 billion, even 5 percent would come to $400 million.

There is some evidence that Taiwan investments abroad are substantially larger than those shown in Table 1. Obviously, one important source of such capital consists of residual export earnings retained abroad, as shown in Table 2.

Table 1. Overseas Investment by Taiwan Investors, Distribution by Country and Industry, 1959-75
(Value in US $ thousand based on approved investment applications)

	Construction Material and Engineering		Lumber		Mining and Refining		Textiles		Machinery and Metal Products		Petro-Chemicals		Agriculture and Fisheries		Miscellaneous Manufacturing		Foreign Trade		Total		Percent
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	
Southeast Asia																					
ASEAN																					
Malaysia	3	179	1	201	1	160	1	129	4	412	1	80	1	13		—	1	16	13	1,190	4.6
Thailand		—	2	379		—		—	4	1,154	2	460		—	10	2,098	1	96	19	4,187	16.3
Singapore	1	956		—		—	5	1,272	2	251	1	408		—	1	374		—	10	3,261	12.7
Philippines		—		—	1	80	1	60		—	1	69		—	1	250	1	100	5	559	2.2
Indonesia	1	354		—		—	1	215	1	180	1	270		—	1	1,500	1	225	6	2,744	10.7
Other		—		—		—	2	180	1	194		—		—	2	838		—	5	1,212	4.7
Hong Kong	1	2,128		—		—	1	34		—		—		—	1	82	2	103	5	2,347	9.1
Japan		—		—		—		—		—		—		—		—	1	50	1	50	0.2
Okinawa		—		—		—		—		—		—		—	1	5		—	1	5	0.02
Republic of Korea		—		—		—		—		—		—		—	1	25		—	1	25	0.09
Australia		—		—		—	1	90		—		—		—		—		—	1	90	0.3
U.S.A.		—		—		—	1	500		—		—		—	4	240	1	900	6	1,640	6.4
Guam	3	1,336		—		—		—		—		—		—	2	187		—	5	1,523	5.9
Canada		—		—		—		—		—		—		—	1	25		—	1	25	0.9
Latin America		—		—		—	1	500		—		—		—	2	1,063	2	1,050	5	2,613	10.2
West Germany		—		—		—		—		—		—		—		—	1	22	1	22	0.08
United Kingdom		—		—		—		—		—		—		—		—	1	35	1	35	0.1
Middle East		—		—		—	1	375		—		—		—	1	3,125	1	113	3	3,613	14.1
Africa		—		—		—		—		—		—		—	1	463	1	21	2	484	1.9
Total	9	4,953	3	580	2	240	15	3,355	12	2,191	6	1,287	1	13	29	10,275	14	2,731	91	25,625	100.0
Percent	19.3		2.3		0.9		13.1		8.5		5.0		0.05		40.1		10.5		100.0		

Source: Data provided by Economic Planning Council, Taipei, Taiwan.

Table 2.   Other Foreign Investments by Taiwanese (US$ million)

Host Country	Period and Remarks	Investments Reported by Host Country as Taiwan Investments	Approved Investments in 1959–75 as Reported by the ROC
Indonesia	Approved invest-ments cumulative to 1975	16.0	2.7
Philippines	Investment by Board of Invest-ment approved firms, 1968–75	85.1	0.5
Thailand	Total registered capital, 1960–May 31, 1975	22.6	4.2
Malaysia	1974–75 only	2.8	1.2
		126.5	8.6

These data are obtained from the Investment Coordinating Board (BKPM), Jakarta; the Board of Investment, Manila; the Board of Investment, Bangkok; and the Federal Industrial Development Authority, Kuala Lumpur.

If the data in Table 2 are correct, actual investments are at least 14–15 times the value of approved investments that have been made directly by Taiwan investors in four of the ASEAN countries during 1959–75. Since investments in Singapore and Hong Kong are bound to be sizable in view of the close relations maintained by businessmen in the three areas, one might hazard the guess that $200 million would be the minimum value of Taiwan's direct foreign investments in Southeast Asia to date.

Since the official data on approved investments indicate a predominant concentration in light manufacturing and foreign trade, activities in overseas resources development accounting for a very small share, the majority of these investments appear to have been motivated by efforts to support and supplement external trade activities, as well as to extend established manufacturing to production in foreign markets. Investments for resource development, however, present an opportunity that Taiwan can ill afford not to exploit, and more should be expected in the future, the present small beginning notwithstanding.

Geographically, Taiwan's existing approved foreign invest-ments are concentrated in Southeast Asia, where manufacturers

from Taiwan frequently enjoy a technical advantage over local enterprise and where joint ventures with local ethnic Chinese interests are quite common practice. The ASEAN countries, for example, accounted for 46.5 percent of such approved investments through 1975, while Hong Kong took another 9.1 percent. Since Southeast Asia is a logical source of raw materials for Taiwan, as it is for Japan, it will probably take precedence over other areas as Taiwan businessmen increase their investments for resource development in the future. However, other major exporters of resources, such as Saudi Arabia, Taiwan's principal source of crude oil, and Bahrain, have also attracted Taiwan businessmen. Expanding bilateral trade and economic relations have arisen as a result of Taiwan's need to secure an oil supply from the Middle East, and growing trade relations have in turn fostered invest-ment. (However, no investment in Middle Eastern oil has been attempted so far.)

The Potential of Ocean Fishing

A second method for an island nation to expand its supply of natural resources is to increase its access to the surrounding waters. "Farming the sea" in an ever-widening area, a natural development in these circumstances, is a function of the development of the fishing industry. Taiwan's fishing fleet today is no longer confined to the island's coastal waters or even the South China Sea. The Indian Ocean, the waters near Australia, and the American Pacific fishing grounds are frequented by fishing vessels from Taiwan. Perhaps the farthest these vessels have ventured is the exploratory shrimping trip to the South polar region undertaken by an experimental vessel in 1977, which used Capetown as its staging point. The potential of ocean fishing can be illustrated by the data in Table 3.[59]

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59. Taiwan Fisheries Bureau, Fisheries Yearbook, 1975, Taipei, May 1976, pp. 80 and 222 also report on activities in 1976, February 1977.

Table 3. Composition of Taiwan Fishery Production

| | Total Production (thousand metric tons) | | Index 1965 = 100 |
	1976	1965	
Deep Sea	325,327	135,949	239.3
Inshore	317,327	160,924	197.4
Coastal	31,961	30,655	104.2
Aquaculture	135,450	54,160	250.0
Total	810,475	381,688	212.3

Of the total volume reported in Table 3, 157,800 tons, valued at $314.2 million, were exported. Between 1965 and 1976, the increase in production was more than 2 times while that of export was nearly 28 times in volume and 11.4 times in value. These data are indicative of such overseas development as we have postulated.

Investing in Human Resources Overseas and Deferred Returns

Any upgrading of exports by increasing their technological content will require a continuous increase in the supply of technicians, engineers, scientists, and modern managerial personnel. Better coordination of vocational, scientific and managerial education with (a) the specific manpower requirements of development, (b) domestic research and development, and (c) technological imports is extremely important. This topic is usually discussed in connection with education and manpower planning for economic development. Our concern at this point is, however, with investment in human resources overseas, which could subsequently rebound to the economic benefit of Taiwan.

During the past 25 years, large numbers of Chinese graduate students have left Taiwan for advanced training abroad. The majority have chosen to specialize in the physical sciences and engineering, and many have subsequently remained abroad instead of returning to Taiwan. This phenomenon is generally thought of a "brain drain" to Taiwan. (See Table 4.)

Table 4.   Distribution of Chinese Students in the
United States by Field of Study, 1970

Field of Study	U.S. Graduate Students 1973	Chinese Students 1970
	(in percent)	
Engineering	7.94	27.25
Natural sciences	9.39	33.59
Social sciences	11.91	8.57
Health professions	1.74	3.59
Business	10.72	6.96
Agriculture	1.06	2.35
Humanities	4.60	11.44
Other (including law, education, etc.)	52.64	6.25
	100.00	100.00

Sources: These data are originally from U.S. Department of Health, Education, and Welfare, *Digest of Educational Statistics,* 1973, p. 81; and Department of International Cultural Affairs, Chinese Ministry of Education, Taipei. They are taken from a paper on "The Professional Chinese-American" contributed by John Y. Ma of the Sinologisch Institut, Leiden, The Netherlands, in a forthcoming study on the economic condition of Chinese Americans.

Between 1950 and 1974, 30,765 Chinese students were approved for advanced study abroad by the ROC Ministry of Education. The annual figure reached a peak of 3,015 in 1969 and averaged about 1,900 persons in the first half of the 1970s. An overwhelming majority of these students came to the United States, so that, as shown in Table 4, a comparison of their distribution by field of study with the corresponding distribution of U.S. graduate students as a whole would be illuminating.

Thus, the United States is the principal focus of overseas investment in human resources in the technological fields by Taiwan investors. Utilization of this reservoir of human capital as its productivity increases with appropriate "maturing" will, therefore, be of vital importance in the long-run evaluation of Taiwan's comparative advantage.

Understandably, if a person educated in Taiwan at considerable private and public expenditure emigrates, earns his living abroad, sends no money home, and otherwise contributes little to the Taiwan economy, the resources invested will be a loss to Taiwan. In general, a university graduate from Taiwan who moves to a foreign country spends additional funds on education,

and the total investment he represents is even larger. However, whether there will be a waste of resources is by no means a foregone conclusion. Analogous to the installation of a valuable piece of equipment in a factory located abroad in an overseas investment project, such an overseas investment in human resources leads ultimately to waste from Taiwan's point of view only when there is little or no return. The crucial question, therefore, is whether a number of the graduate engineers and scientists might not at some future date become channels of communication in introducing new technology as well as managerial and business know-how into Taiwan that would not otherwise be available. They may not have returned in the past to participate in the island's regular labor force; they could, however, return in the future as investors and partners in joint ventures with resident Taiwan interests in new industries.

A good example of this kind is the series of biennial seminars that Chinese engineers in the United States have organized since 1966 for the benefit of Taiwan industry. The seminars began in response to specific queries initiated by major Taiwan industrial enterprises. The dialogue, once begun, soon extended to the introduction of new ideas from abroad and to a wider exchange of ideas in technological and management areas. In the early 1970s these seminars were establishing new industrial undertakings in which specific foreign firms were selected to provide for the further training of specialists and the installation of pilot plants. This development began with the electronics industry and will probably expand into other sectors such as precision machines and certain chemicals. It is a reversal of the process represented by the emigration of trained Chinese human resources. However, the counterflow of technological and managerial know-how is at a technical level substantially above that attained by the university graduates who left Taiwan earlier. It would be stretching the truth to point to this process entirely as the reaping of benefits of past investments in education by Taiwan in the form of the "maturing" of prior overseas investment in human resources by Taiwan, because many of the senior personnel involved received their education in China long before the period covered by this volume. However, younger engineers, scientists, and managerial personnel are gradually appearing on the scene, and the "maturing" of their investment in human resources overseas by Taiwan investors (including both the ROC government and the private sector) could well become an expanding reality.

The kind of technological inflow described above had its beginning in 1966. Its effects on production and increase in productivity through technological upgrading has only just begun. One is probably correct in assuming that the effectiveness of this process is contingent upon the attainment by the Taiwan economy of a stage in economic development at which it will no longer be dependent in every case upon external sources for both financing and technology. This would seem to be the same condition under which licensing agreements with foreign businesses can begin to be effectively used to expand and upgrade production in any developing country. It is a variant of the technological inflow process that takes advantage of the "brain drain".

Technical and Managerial Training of Ethnic Chinese from Southeast Asia — Effect on Future Export Marketing and Investment Abroad

Still another often-ignored aspect of ROC external economic activities is the technical training Taiwan offers to students of Chinese origin from foreign countries, mostly from Southeast Asia. Where advanced technical training is denied to ethnic Chinese by certain foreign governments through a quota system, as in Malaysia, the availability of such training in Taiwan is a boon to those who cannot go to Europe or the United States for their advanced education and technical training. Statistics in Table 5 on ethnic Chinese students from foreign countries who have undergone such training in summer institutes in Taiwan are a good demonstration of the scope and potential of this phenomenon.

Table 5. Distribution of Ethnic Chinese Students
from Outside Taiwan in Summer Training Courses
By Field of Interest 1961-75

Discipline	Year Initiated	Number of Students
Engineering and technology		
Electrical engineering	1961	388
Mechanical engineering	61	538
Chemical engineering	61	464
Agricultural engineering	63	25
Textile engineering	63	6
Mining	63	32
Civil engineering	63	310
Hydraulic engineering	64	12
Architecture	64	41
Marine products manufacturing	65	4
Metallurgy	68	3
Industrial engineering	68	2
Agricultural machinery	68	5
Electronics	70	36
Computers	72	9
Physics	72	4
Navigation	72	1
Marine mechanics	72	8
Urban planning	72	1
Shipbuilding	72	10
Food technology	72	7
River and ocean engineering	74	1
Mining and petroleum industry	75	3
Engineering science	75	1
Subtotal		1,911
Life, agricultural, and medical sciences		
Horticulture	63	71
Forestry	63	44
Agricultural chemistry	63	93
Animal husbandry	63	53
Agronomy	63	50
Veterinary	63	18
Agricultural extensions	64	6
Plant pathology	64	40
Fishery	65	2
Entomology	68	5
Botany	70	3
Soil conservation	71	4
Agricultural products processing	74	5
Afforestation	74	1
Subtotal		395

Business and economics

Economics	62	111
Industrial & business management	62	49
International trade	62	107
Business administration	63	23
Agricultural economics	63	33
Banking	63	94
Accounting	63	132
Maritime management	64	7
Finance and taxation	64	6
Enterprise management	65	85
Cooperatives	68	4
Customs administration	68	1
Transportation and management	68	3
Banking and insurance	72	3
Statistics	72	2
Tourist business	74	1
Subtotal		661
Psychology	72	4
Art	72	1
Home economics	72	1
Subtotal		6
Total		2,973

Source: Hua-cha'iao ching-chi nien-chien (Overseas Chinese Handbook) (Taipei: World Chinese Traders Liaison Office, 1976), pp. 589–593.

Taiwan's role as an intermediary in conveying technological know-how and experience in economic development to Southeast Asian countries began in the 1960s. At its peak in 1967,[60] 114 persons were involved in the program of overseas technical cooperation and teams of specialists from Taiwan were found in Vietnam and Singapore. Two years earlier, similar teams from Taiwan were also found in Malaysia and the Philippines. By 1974, however, Vietnam was the only Southeast Asian country that still had a Taiwan technical cooperation team. With the fall of Vietnam in 1975, Taiwan's role in providing technical aid was sharply curtailed in Southeast Asia. Consequently, training of students from Southeast Asian countries has become a much more important source of contact with the future technological *cum* business elite of Southeast Asia than it was ten years earlier. It is more than likely that upon return to their own countries, many of these students will become active businessmen and profession-

60. See Economic Planning Council, *Taiwan Statistical Data Book, 1976* (Taipei, Taiwan: 1976), pp. 236–237.

als.The contacts they have gained in Taiwan will be an asset that could lead to a preference for Taiwan products and opportunities for joint ventures with Taiwan interests. Their assistance in foreign marketing and an expanding investment horizon in Southeast Asia are advantages of vast importance to Taiwan's future export growth.

What is peculiarly Chinese in the Taiwan case is the specific opportunities presented by the many large and economically active — in some instances, even dominant — ethnic Chinese communities in Southeast Asia, together with the importance of Southeast Asia as a source of raw material supply. Joint ventures between ROC and Southeast Asian business interests have vast potential. At the same time, the educational, training, and business opportunities that Taiwan offers to the ethnic Chinese elsewhere are attractions that the latter can hardly ignore. Future expansion of trade and investment relationships that take advantage of these facts and ultimately use Taiwan as an intermediary in the infusion of technological know-how from the West (and Japan) to Southeast Asia, along with direct infusions from the West to Southeast Asia, offer a challenge to business entrepreneurs everywhere who are interested in the region.

Various efforts capitalizing on the sense of kinship among ethnic Chinese in different countries have been initiated by Taiwan to promote trade, investments, and other economic activities between Taiwan and other countries where Chinese reside. Joint meetings of various national chambers of commerce in which ethnic Chinese businessmen are a major component, as well as a joint banking institution with a strong Filipino-Chinese participation, are some good examples.

At first glance, one would assume that the specific advantages the ROC enjoys by virtue of the affinity of its population to ethnic Chinese communities elsewhere, both in the United States and in Southeast Asia, would be equally available to the PRC. In reality, however, this is not quite so.

In the first place, it is true that both the ROC and the PRC have changed their policies toward ethnic Chinese outside China. Both have now called upon the latter to conduct themselves as good citizens of their adopted countries. However, there are still some fundamental differences between the two in the eyes of Southeast Asian countries. First, the PRC has never abandoned its ideological stand on revolution. To endeavor to bring about social change by revolutionary means is by implication the basic

duty of every member of a pre-socialist society. Therefore, any ostensible policy not to pursue such a goal smacks of a tactical shift only. Second, even for those who are inclined to give scant emphasis to an argument based on the PRC's ideological position, it is undeniably true that the PRC is large while Taiwan is small. A large Chinese power could become a threat to a country with a large ethnic Chinese community if it should choose to, and could successfully, exploit the Chinese in that country. Regardless of the latter's real attitude, perception by the non-Chinese local authorities, right or wrong, is the all-important factor. One would suspect that the more they have discriminated against Chinese in the past, the more they would be concerned about the ethnic Chinese in their midst and the more fearful they would be of hostile intentions on the part of the PRC that might attempt to exploit the ethnic Chinese communities outside China and Taiwan.

In the second place, by virtue of its non-market economic system, the PRC does not possess as much flexibility as private business in Taiwan. It is not able, in the long-run, to enter into free-wheeling joint ventures with ethnic Chinese businessmen in Southeast Asia, Hong Kong, Japan, and the United States. While the PRC can subsidize ethnic Chinese business outside China, especially covertly and indirectly, the scope and variety of its economic activities are necessarily limited by its inability to give private entrepreneurship the full range of the imaginativeness of which it is capable. Although one group of ethnic Chinese engineers in the United States has, as of this writing (1977), also organized several technical tours and seminars in Mainland China, providing introductions to new developments overseas, their effort appears to have been somewhat less productive than that of their counterpart in Taiwan. In the long-run, the same will probably hold true for their relationship with ethnic Chinese businessmen outside China in general.

III. EXTERNAL ECONOMIC RELATIONS, POLITICS AND STRATEGY

Some Basic Considerations

Viewed both domestically and internationally, there are certain political and strategic aspects of trade that should not be ignored if we wish to understand the economic and political evolution of Taiwan in its entirety.

First, as long as the PRC continues to threaten Taiwan with military annexation and irredentist political claims, residents on the island will always be subjected to feelings of uncertainty. This sense of uncertainty tends to be pushed to the background of public consciousness when business is brisk, employment is high, and the benefits of prosperity are widely shared. Thus, economic growth is a *sine qua non* of Taiwan's internal "political buoyancy" and of the people's confidence in their own system.

Second, since 1971, Peking has actively pursued its policy to isolate the ROC government diplomatically. As a result, many countries have, since that time, shifted diplomatic recognition from Taipei to Peking. This means that the existence of nondiplomatic relations with other countries, particularly the establishment and expansion of external trade ties, is viewed both internally and externally as evidence of Taiwan's economic and political viability as an independent system.

Third, from Taiwan's point of view, expansion of trade and other economic relations is one way to develop a community of interest between other countries and Taiwan. Such a community of interest could benefit Taiwan diplomatically. When diplomatic relations have been severed or are nonexisting, expanding trade relations conceivably could lead to quasi-diplomatic relations.

Fourth, while the last two points focus on the function of trade and economic relations as a substitute for external political and diplomatic relations, a separate factor that needs to be considered is the importance to trade expansion of international political status. The crux of the issue lies in the geographical position of Taiwan, which is dependent upon open and secure transportation, communication, and travel between the island and the rest of the world. Unless these conditions are maintained, continued trade expansion would become progressively difficult. Therefore, a fundamental issue is whether these conditions can in fact be secured for an indefinite period independently of Taiwan's international political status.

Finally, there is a corollary to the above point. As the political importance of trade and other external economic relations increases, it will be necessary for Taiwan to minimize the vulnerability of such relations to adverse external political influences or deliberate attacks on Taiwan's economy by the ROC's political enemies. In this connection, there is a potential dilemma between Taiwan's alternative national objectives.

Concentration Versus Dispersion of Trade

The more a country sells to, or buys from, a single foreign country, the more vulnerable it will be to an unfavorable change in trade policy on the part of the latter. In terms of specific commodities, the larger the market share accounted for by a country's export in the total supply in another country, the more susceptible it will be to protectionist measures instigated by the other country's domestic producers. The same may not be true, however, in the case of imports, inasmuch as foreign exporters would normally not object to expanding purchases by a single foreign buyer. Of course, foreign consumers may raise objections in this case just as they would reap greater benefits in the previous case. However, consumers are usually politically less influential than producers in the formulation of national trade policies.

In view of the above, reduction of the degree of concentration of Taiwan's growing foreign trade and diversification of exports to any given country are likely to become increasingly important elements in Taiwan's foreign trade policy. Any political benefit Taiwan conceivably might derive from the growing economic interdependence of other countries with Taiwan, however, is likely to be larger if Taiwan's foreign trade is concentrated in a few countries and is, therefore, of importance to them. This potential dilemma can be side-stepped in the long-run only if Taiwan can become a major, but not overdominant, supplier of a significant number of commodities to a large number of countries. The same may be said of Taiwan's imports, although, for reasons mentioned earlier, the requirement regarding the varieties of commodities might be relaxed in this case. In order to achieve such a reconciliation of objectives, an inescapable conclusion is that Taiwan's foreign trade must continue to grow for both economic and political reasons. The long-term target of trade expansion envisaged by ROC economic planners is thus entirely understandable.

Community of Interests with Other Countries

What are some of the more important circumstances governing Taiwan's trade prospects? The usual economic factors can be quickly listed: for example, the state of the world economy, particularly the rate of economic recovery and growth of the United States and Japan as long as they are still Taiwan's largest

trade partners; the extent to which protectionism will continue to rear its head, especially in countries with which Taiwan hopes to expand trade in the future; Taiwan's success in restructuring its commodity pattern in trade and in remaining competitive with Korea and Hong Kong, etc. These economic factors aside, perhaps the most important political condition is the extent to which other countries will be interested in maintaining for businessmen from Taiwan freedom of transportation, communication, and travel as they would for themselves.

Since Taiwan is astride the principal sea lanes between Japan and countries to the South, as well as the Middle Eastern countries and others west of the Malacca Straits, Japan in particular would not wish to see the establishment of any overt precedent of trade disruption as a result of the open and gross infringement of freedom of shipping, communication, and travel. The same may be said of other countries in the Western Pacific, especially Indonesia, whose trade links with Japan pass by Taiwan. The more powerful nations, such as the United States and the Soviet Union, may wish to keep these same freedoms intact as a matter of principle, although one can readily think of exceptions.

A special economic interest also exists for those countries whose trade with the PRC is substantially smaller and is faced with less favorable growth prospects than their Taiwan trade. This is true especially if their exports to Taiwan are both sizable and larger than exports to the PRC. In their case, loss of the Taiwan market cannot be ignored, nor can it be replaced by expanding exports to the PRC. If exports to Taiwan must be maintained, imports from Taiwan can also be more readily tolerated, although experience shows that this attitude does not always follow.

During 1976, U.S. exports to Taiwan amounted to $1,569 million, or 1.4 percent of U.S. exports to the world, while U.S. exports to the PRC were $135 million, or 0.12 percent of total U.S. exports. On the import side, the United States imported $2,958 million of goods from Taiwan in 1976, or 2.3 percent of total U.S. imports, versus $202 million, or 0.15 percent, from the PRC (see Tables 6 and 7). As a market for U.S. products, Taiwan was half as important as the average of France and Italy combined, which in 1976, accounted for 3 percent and 2.7 percent of U.S. exports to the world. As a supplier of goods on the U.S. market, Taiwan was exceeded only by two of the nine European Community members

— West Germany (4.7 percent of total U.S. imports from the world) and the United Kingdom (3.5 percent) — ranking ahead of France and Italy (2.1 percent each), as well as the Netherlands, Belgium-Luxembourg, Denmark, and Ireland. To U.S. businessmen and consumers the Taiwan economy can no longer be off-handedly dismissed.

Table 6. U.S. Imports from Taiwan and PRC, 1971–75
(Million US $)

	1971	1972	1973	1974	1975	1976
Total imports						
Taiwan	817.4	1,293.5	1,772.5	2,107.6	1,946.0	2,958.4
PRC	4.9	32.3	64.0	114.7	158.3	201.9
Food, live animals						
Taiwan	54.2	84.1	85.3	111.9	192.4	142.0
PRC	1.5	4.2	6.0	13.5	14.2	23.8
Beverages, tobacco						
Taiwan	—	—	0.3	0.4	—	0.09
PRC	—	—	0.7	2.8	1.8	0.3
Crude materials, inedible (except fuel)						
Taiwan	7.0	11.7	15.0	14.1	11.1	13.9
PRC	2.2	12.3	14.6	16.3	17.6	38.5
Mineral fuels, lubricants, etc.						
Taiwan	—	0.4	2.1	0.4	3.4	0.01
PRC	—	—	0.4	0.1	—	—
Oils & fats, animal, vegetable						
Taiwan	—	—	0.1	0.1	0.5	0.3
PRC	—	—	0.7	0.4	1.9	2.4
Chemicals						
Taiwan	6.9	9.5	12.1	31.9	16.2	26.1
PRC	0.3	2.1	8.2	18.4	15.9	18.0
Manufactured goods						
Taiwan	119.4	193.2	242.2	288.0	238.0	355.4
PRC	0.5	7.4	21.0	42.7	79.4	68.5
Machinery, transportation equipment						
Taiwan	202.2	401.1	600.5	685.3	488.5	780.2
PRC	—	0.1	0.4	0.1	0.3	1.3
Miscellaneous, transportation equipment						
Taiwan	420.1	584.0	797.6	954.7	964.5	1,618.0
PRC	0.3	6.1	11.2	19.2	25.6	47.5
Miscellaneous						
Taiwan	7.5	9.4	17.1	20.8	31.4	22.4
PRC	—	0.1	0.8	1.2	1.6	1.6

Sources: See table 7.

Table 7. U.S. Exports to Taiwan and PRC, 1971-75
(US $ Millions)

	1971	1972	1973	1974	1975	1976
Total exports						
Taiwan	342.7	629.5	1,165.0	1,423.8	1,655.7	1,568.9
PRC	—	60.2	689.1	806.9	303.6	135.4
Food and live animals						
Taiwan	30.5	55.9	154.1	167.8	180.9	202.1
PRC	—	56.0	410.1	329.6	0.02	—
Beverage and tobacco						
Taiwan	10.1	14.9	18.7	30.8	27.5	13.2
PRC	—	—	1.4	2.7	—	—
Cruje materials, inedible (except fuel)						
Taiwan	141.6	149.1	319.1	307.3	407.5	304.5
PRC	—	—	171.9	328.0	100.1	13.0
Mineral fuels, lubricants, etc.						
Taiwan	2.1	2.6	3.5	7.2	7.2	0.01
PRC	—	—	—	0.2	0.2	0.1
Oils & fats, animal, vegetable						
Taiwan	4.4	4.3	5.2	18.4	10.0	12.2
PRC	—	2.2	19.2	7.5	—	—
Chemicals						
Taiwan	25.2	32.4	90.0	127.4	125.3	154.6
PRC	—	—	7.9	10.2	5.2	10.4
Manufactured goods						
Taiwan	25.3	31.4	76.2	123.4	141.3	143.2
PRC	—	—	9.0	18.5	73.8	43.3
Machinery, transportation equipment						
Taiwan	157.5	233.4	398.2	562.7	599.7	666.2
PRC	—	2.0	69.0	106.7	118.8	65.1
Miscellaneous, transportation equipment						
Taiwan	13.1	20.5	21.2	32.4	39.2	69.5
PRC	—	1.1	0.8	2.7	4.9	3.4
Items not classified by kind						
Taiwan	1.8	2.5	5.9	6.7	6.2	3.4
PRC	—	—	—	0.3	0.4	0.02

Sources: 1971: U.S. Department of Commerce, *General Imports, World Area by Commodity Groups,* U.S. Government Printing Office, 1972, pp. 374; 1972-75: *Far Eastern Economic Review* (Hong Kong), July 2, 1976, p. 44. U.S. Department of Commerce; Bureau of East-West Trade, office of East-West, *U.S. Trade Status with Communist Countries,* February 1977.

For comparison with The European Economic Community, see U.S. Department of State, Special Reoirt No. 32, *U.S. Trade with the European Community,* April 1977.

During 1971–73, Japan exported an average of $1.2 billion of merchandise to Taiwan versus $740 million of goods to the PRC. These figures were respectively 4.1 percent and 2.5 percent of Japan's exports to the world (Table 8). The relative shares of Taiwan and the PRC in Japan's total exports during 1974–75 shifted to 3.4 percent, at $1.9 billion, and 3.8 percent, $2.1 billion, respectively, as a result of a slowdown of the Taiwan economy immediately after the oil crisis as well as stepped-up purchases by Peking from Japan, some based on deferred payments. On the import side, Taiwan accounted for 2.0 percent of Japan's total imports from the world in 1971–73 as against Peking's 2.1 percent. These ratios also changed during 1974–75 to 1.5 percent for Taiwan and 2.4 percent for Peking, as a result of Taiwan's post-oil crisis economic slow-down and increased oil exports from the PRC to Japan (Tables 9 and 10). However, allowing for economic recovery in Taiwan in 1976, even a modest rate of growth of imports should boost Japan's exports to Taiwan at a rate at least commensurate with the rate of Japan's exports to Peking. This is likely to be true in spite of Taiwan's efforts to favor machinery imports from the United States over Japan in view of the large export surplus Taiwan enjoys in the American market.

Table 8. Destinations of Exports (1971–73 average)

Exporting Countries	Taiwan		PRC	
	Value	In percent of exporting country's total exports from the world	Value	In percent of exporting country's total exports from the world
Japan	1,220.9	4.1	743.5	2.5
ASEAN				
Indonesia	99.5[a] (1972–73)	4.6	0.4 (1973)	0.0002
Malaysia	26.3	1.3	42.0	2.0
Philippines	27.2	2.0	4.7 (1972–73)	
Thailand	42.9	3.7	—	—
Singapore	26.5	1.0	29.6	1.2
Total	1,443.3	3.7	820.2	2.1

Source: International Monetary Fund, *Direction of Trade* (Washington, D.C.: Annual 1969–75), pp. 138, 221, 262, 272, and 275.

(a) Chinese Chamber of Commerce to Jakarta, *Economic Data on Republic of Indonesia* (Jakarta: July 1975).

Table 9.   Sources of Imports (1971-73 average)
(US $ million)

Importing Countries	Taiwan		PRC	
	Value	In percent of importing country's total imports from the world	Value	In percent of importing country's total imports from the world
Japan	532.9	2.0	596.2	2.1
ASEAN				
Indonesia	76.1[a] (1972-73)	3.9	38.5	2.1
Malaysia	37.7	2.0	94.2	5.1
Philippines	22.4	1.5	13.0 (1972-73)	0.009
Thailand	51.3	3.2	—	—
Singapore	90.0	2.2	170.3	4.5
Total	810.4	2.2	912.2	2.5

Source: International Monetary Fund, *Direction of Trade* (Washington, D.C.: Annual 1970), pp. 169, 203, 246, 265, 280, and 321.

[a] Chinese Chamber of Commerce to Jakarta, *Economic Data on Republic of Indonesia* (Jakarta: July 1975), p. 17.

Table 10.   Sources of Imports (1974-75) average)
(US $ million)

Importing Countries	Taiwan		PRC	
	Value	In percent of importing country's total imports from the world	Value	In percent of importing country's total imports from the world
Japan	882.5	1.5	1,416.5	2.4
ASEAN				
Indonesia	73.9 (1975)	2.0	145.0	3.2
Malaysia	77.2	2.0	172.1	4.5
Philippines	82.7	2.3	38.9	1.1
Thailand	76.8	2.4	7.4	2.3
Singapore	151.8	1.7	275.3	3.3
Total	1,458.8	1.7	2,055.2	2.5

Source: International Monetary Fund, *Direction of Trade* (Washington, D.C.: Annual 1969-75), pp. 137, 221, 262, 272, and 275.

If comparison is made between Taiwan and Peking with respect to exports from the ASEAN countries, it can be easily seen from Tables 8 and 11 that, with the exception of Malaysia, all the other four countries exported substantially more to Taiwan than to the PRC during 1971–73 and 1974–75. The Malaysian exception was accounted for by larger PRC imports of rubber and tin, partly to curry political favor with Kuala Lumpur. However, Peking's role as a source of supply of imports to the ASEAN countries was larger than that of Taiwan in the case of Singapore and Malaysia during 1971–73, and possibly also Indonesia during 1974–75.

Table 11.   Destinations (1974–75 average) (US $ million)

Exporting Countries	Taiwan		PRC	
	Value	In percent of exporting country's total exports from the world	Value	In percent of exporting country's total exports from the world
Japan	1,914.0	3.4	2,120.5	3.8
ASEAN				
Indonesia	79.5 (1975)	1.1	—	—
Malaysia	50.0	1.2	69.8	1.7
Philippines	28.0	1.1	18.2	0.007
Thailand	107.5	4.4	2.0	0.0008
Singapore	62.4	1.1	46.0	0.008
Total	2,241.4	2.9	2,256.5	2.9

Source: International Monetary Fund, *Direction of Trade* (Washington, D.C.: Annual 1969–75), pp. 138, 221, 262, 266, 272, and 275.

If, as we have speculated earlier, Taiwan should increase its raw material imports from Southeast Asia as its economic expansion continues, the probability is very high that it will have a larger share of the exports of countries on its sea route than Peking. Such a situation would enhance the community of interest these countries will have with Taiwan. It is fortunate for all concerned that political-strategic considerations in this connection coincide with economic interests. From Taiwan's point of view, a reinforced orientation of its foreign trade toward Japan and Southeast Asia would have much, to recommend it in Taiwan's future trade policy, although other potential and actual trade partners should not be ignored.

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