ECONOMIC DEVELOPMENT AND POPULATION GROWTH

——with Special Reference to Southeast Asia——

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Introduction

A large and dense population with a remarkably high rate of increase is the basic outstanding feature of Southeast Asia. In particular, it is said that the high rate of population increase is the biggest factor preventing the economic development of Southeast Asia. This fact was confirmed in the United Nations' Asian Population Conference held in New Delhi, India, in 1963.[1]

On the other hand, Japan has achieved modernization since the Meiji Restoration with amazing speed and has raised the level of living of the people. Because Japan had a dense population to begin with and because she succeeded in modernizing with an Asian cultural base, it may be possible for Southeast Asia, which is at present endeavouring to propel itself into modernization, to draw some valuable lessons from the experience of Japan, even though this experience cannot be transplanted just as it is.

There are many reasons why Japan was successful in modernizing, but of these, we will analyse what role the demographic factor played. The aim of this analysis is, first, to make a comparative study especially with Southeast Asia of what the initial conditions were with respect to population, and second, to make clear what effects trends in population pursuant to modernization had on her economic development.

I. DEMOGRAPHIC TRENDS IN MODERN JAPAN

The Tokugawa period (1603–1867) which preceded the Meiji Res-

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[1] Economic Commission for Asia and the Far East, UN, *Report of the Asian Population Conference, 1963* (E/CN. 11/670), October 23, 1964, pp. 104–106.

toration (1868) was a long feudal society which spanned two hundred some years. The population growth during this period showed itself to be fairly well divided into an earlier period and a later period. The population of Japan in the late Middle Ages (1573–1592) as estimated from the *kokudaka* 石高 (measurement of yield) of that period was about 18,000,000,[1] while according to the national count of population in the middle of the Tokugawa period (1721), making adjustments for the portion of the population omitted out of the count, the population of Japan by that time had increased to about 30,000,000. The rate of this increase averaged 0.4% per year, and for a feudal society, this was a considerable increase. However, the population in the second half of the Tokugawa period stood at a standstill, and for a period of one hundred some years showed no more than an increase of five million. This stagnation was due to the stagnation of the feudal economy itself and the effect of such natural disasters as severe famines.

Even after the Meiji Restoration, the rate of population growth was seen to be no higher than that of the late Tokugawa period whose population dynamics were inherited. But from about 1890, there was seen a high rate of increase appropriate to a modern society. It has only been since 1920 that a modern population census has been carried

Table 1. THE POPULATION AND ANNUAL AVERAGE POPULATION INCREASE RATES IN THE MEIJI PERIOD

Year	Population (in 1,000 persons)	Increase Rate (%)
1870	36,288	—
1875	37,198	0.50
1880	38,166	0.51
1885	39,245	0.56
1890	40,353	0.56
1895	41,789	0.70
1900	43,785	0.93
1905	46,257	1.10
1910	49,066	1.18
1915	52,500	1.35
1920	55,450	1.09

Note: Population as of January 1 of each year.
Source: Y. Okazaki, *Meiji Shonen ikō Taishō Kyūnen ni itaru Danjo Nenreibetsu Jinkō Suikei ni tsuite* 明治初年以降大正九年に至る男女年齢別人口推計について (Population Estimates by Sex and Age from Meiji 1 to Taishō 9), Research Series No. 145, Institute of Population Problems, Ministry of Health and Welfare, Tokyo, 1962.

[1] Yoshida Tōgo 吉田東伍, *Ishin-shi Hakkō* 維新史八講 (Eight Lectures on the History of the Restoration), 4th edition, Tokyo, Fuzanbō, 1910, p. 26.

out in Japan, and thus there are many problems concerning the population prior to that date, during the Meiji period, though much material exists.[1] Here, we will carefully examine the population changes in the Meiji period (1868–1912) based on a retrospectively estimated population taking the 1920 census results as the base population (Table 1).[2]

The rate of population increase just after the Meiji Restoration averaged 0.5% per year. After that, for about a twenty-year period up until the first half of the 1880's, this low rate of increase continued. However, in the latter half of the 1880's, the rate of population increase gradually began to rise. In the 1900's, it reached an annual rate of 1.0%, and there continued a trend towards a rising rate of increase until the end of the Meiji period.[3]

Viewing the entire course of Japan's modernization, the Meiji period is seen to belong to the first half of this process, but looking at the

Figure 1. THE TRANSITION OF THE POPULATION GROWTH IN JAPAN AND ENGLAND
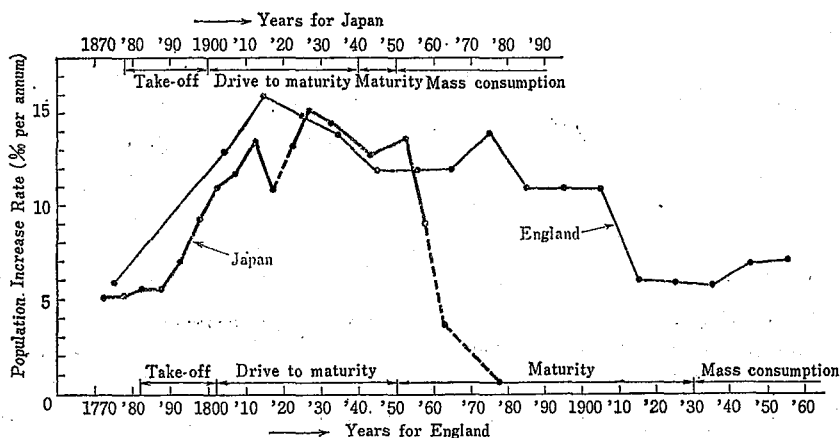
Note: The population increase rate for Japan from 1935–1950 is the long-term growth rate for the period between the census of 1935 and the census of 1950. The dotted lines for Japan are estimates prepared by the Institute of Population Problems, Japan.

1   M. Tachi, "Labour: Population Trend and Economic Growth in Japan," in Kenneth Berrill ed., *Economic Development with Special Reference to East Asia, Proceedings of a Conference Held by the International Economic Association*, London, 1964, pp. 53–54.

2   Y. Okazaki, *Meiji Shonen ikō...*; *ditto*, "Meiji-jidai no Jinkō—tokuni Shussei-ritsu to Shibō-ritsu ni tsuite 明治時代の人口—とくに出生率と死亡率について— (On the Population of the Meiji Period—Particularly the Birth and Death Rates)," *Keizai Kenkyū*, Vol. XVI, No. 3 (July, 1965), pp. 207–213.

3   M. Tachi, "Labour," p. 54.

entire course in which the second half of the course of modernization is
also included, it is clear that there occurred certain characteristic condi-
tions which can be separated into stages.   Seen from the aspect of
population, the course of modernization, starting with a low rate of
increase based on a high birth=high death rate, follows a series of pro-
cesses which end in a low rate of increase based on a low birth=low
death rate.[1]   As is shown in Figure 1 which is in accordance with
Professor W. W. Rostow's analysis of economic and social stages,[2] there
is a clearly corresponding relationship between the stages of population
development and the stages of economic and social development.   Accord-
ingly, the rate of population increase rose rapidly in the "stage of take-off"
from the end of the 1870's to 1900, and in the "drive to maturity" and
the "stage of maturity" following this, there appeared a high rate of
population increase which rose past a 1.0% yearly average, at time to
1.5%.   However, the rate of population increase rapidly declined from
about 1950 as the "age of high mass-consumption" was entered.

The same pattern of relationship as in Japan between population
and economic and social development can be seen in England.   The
difference between Japan and England is that in Japan the rate of
population increase in the first period of modernization was somewhat
lower than in England, and that in Japan, because the stage of "maturity"
was extremely short and the stage of " high mass-consumption " hastily
rushed into, the period in which the rate of population increase exceeded
1.0% was shorter than that of England's.   Even though there exist
these differences, in the advanced countries such as Japan and England
which have already achieved modernization, the population displayed a
movement corresponding to socio-economic development, and there was
no unbalanced increase in the population which prevented economic and
social development.   In the various countries of Southeast Asia today,
in which the economy has not entered a course of sustained growth,
the rate of population increase is extremely high, and even in this one
point alone, these countries already bear a heavy burden which the
advanced countries did not have to bear.

1   M. Tachi, *Keishiki Jinkōgaku—Jinkō-genshō no Bunseki-hōhō* 形式人口學—人口現象
     の分析方法 (Formal Demography—Method of Demographic Analysis), Tokyo, Kokin-
     shoin, 1960.
2   W. W. Rostow, *The Stages of Economic Growth, A Non-Communist Manifesto,*
     Cambridge, Cambridge University Press, 1962 (8th print).

II. THE INITIAL CONDITIONS OF MODERNIZATION SEEN
FROM THE ASPECT OF POPULATION

Because the process of modernization is a dynamic process which during its course actively propels rapid changes in economic and social conditions, it is not necessary to regard as unchangeable the conditions which are present in a country at the start of its modernization. However, the conditions which a country must accept as the initial conditions for its modernization sometimes have an important influence in determining the success or failure of its modernization, and even if they are not important to this extent, they often have a great effect on the process of modernization. There must have been sufficient reason for Japan's success in modernizing in its initial conditions. In comparing the initial conditions of Japan with those of the Southeast Asian countries of today from the aspect of population, let us make clear the root of the difficulties facing the latter countries.

(1) *Population Density.* In a pre-modern society in which agriculture

Table 2. POPULATION DENSITY AT THE BEGINNING OF THE MODERN ERA

Country	Year	Cultivated Land per Person Engaged in Agriculture (hectare)	Cultivated Land per Farm Household (hectare)
Ceylon	1954/55	1.46	—
India	1954/55	—	2.06
Malaya	1954/55	2.50	—
Pakistan	1954/55	1.51	—
Philippines	1954/55	2.03	—
Thailand	1954/55	1.24	—
Taiwan	1953	—	1.20
Egypt	1954/55	0.67	—
Japan	1886	—	1.03
Finland	1900	6.74	—
Portugal	1900	4.24	—
Spain	1900	7.00	—
Italy	1901	3.48	—
Sweden	1870	—	6.75
Denmark	1861	8.70	—
Bavaria	1840	—	6.93
Prussia	1858	—	9.35
France	1851	4.97	—
England & Wales	1688	—	10.57

Source: B. F. Hoselitz, *Sociological Aspects of Economic Growth*, Glencoe, Ill., Free Press, 1960, p. 121.

is the principal industry, the relation between population and area, i. e., population density, is the fundamental factor which determines the economic level of a society. Japan's population is said to have been 18,000,000 at the end of the Middle Ages, and though the population increase in the Tokugawa period was comparatively slow, the population at the time of the Meiji Restoration had grown to more than 35,000,000. On the other hand, the area of land was originally limited and has not increased, and because of this, the population density in Japan at the beginning of the modern era was extremely high.[1]

When we compare the population density which various countries had at the beginning of the modern era (Table 2), we find that Japan's population density was not only extremely high compared to that of European countries, but was rather high even compared to the present population density of Southeast Asia. However, this did not prevent the modernization of Japan. On the contrary, it played a decisive role in setting the basic direction of modernization towards industrialization. Accordingly, the question lies not in Japan's having had an excess of population to area, but in how Japan was able to accumulate enough capital for industrialization under strong population pressures.

(2) *Population Growth Rate.* When the demographic factor is taken up as a dominant factor preventing the economic development of Southeast Asia, it is discussed as the problem of population growth rate rather than that of population density. Considering that population density is a static concept, while population growth is a dynamic one, it is natural that the population growth rate is more important and more closely connected with economic progress and development policies than density. The thesis which most economists have been apt to adopt is one which should be called the modern version of the Malthusian theory. According to this, in Southeast Asia the population is generally capable of increasing more rapidly than the resources needed for life. Consequently, if for some reason—for example, economic aid—the level of living is temporarily raised, this gives rise to an increase in population, and this ultimately brings back the former low level of living. The theory is often called the "low-level equilibrium trap theory," and any number of models have been presented conforming to this theory.[2]

1   M. Tachi, "Labour."
2   E. g., R. R. Nelson, "A Theory of the Low-Level Equilibrium Trap in Underdeveloped Economics," *American Economic Review,* Vol. XLVI, No. 5 (December, 1956), pp. 894–908. H. Leibenstein, *Economic Backwardness and Economic Growth, Studies in the Theory of Economic Development,* New York, J. Wiley, 1957, pp. 147–173.

The special characteristic of this theory is an emphasis on the relation between a rise in the level of living and the cause of population increases. Certainly this sort of phenomenon of "endogenous population growth" cannot only be theoretically hypothesized, but may also be found in reality. However, it must be noted that this is not the heart of the population problem in Southeast Asia.

If endogenous population growth were the only problem, the advanced countries which have already highly modernized should also have been troubled by the same problem in the first period of their modernization. We must ask why these countries were not decisively prevented from modernizing due to "endogenous population growth," and why only the countries of Southeast Asia must be decisively oppressed by this problem. It can be said that the pivotal point of the population problem in Southeast Asia today is not "endogenous" but "exogenous population growth." As seen above, the rate of population growth in the first period of modernization in Japan was 0.5% per year and was lower than that which the advanced countries had at the same stage of modernization. However, a markedly high rate of from 2–3% per year holds sway over the area of Southeast Asia at present. (Table 3)

Table 3. ANNUAL AVERAGE POPULATION INCREASE RATES IN SOME ASIAN COUNTRIES (1958–1962)

Country	Annual Increase Rate (%)
India	2.3
Indonesia	2.2
Pakistan	2.1
Philippines	3.2
Thailand	3.0
Ceylon	2.7

Source: U. N., *Demographic Yearbook, 1963*, New York, 1964.

This high rate of population increase was definitely not caused by a rise in the level of living; it was a phenomenon which occurred as a result of a rapid decline in the mortality rate due to a wider use of new drugs and public health measures which were introduced from abroad after the war. This population increase can be called "exogenous population growth" in the sense that the decline in the rate of mortality and the population increase did not come about pursuant to economic development and a rise in the level of living.[1] And this very exogenous

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1   However, we cannot say that a decline in the death rate has no connection with economic and social conditions. There is a clearly recognized relationship between a decrease in the death rate, particularly infant death rate, and the level of economic

population growth is the greatest population problem in Southeast Asia today. If there is a population increase after modernization has already begun to progress smoothly, it can be expected that the increased population will be used as a force which contributes to productivity, and that fertility will decline along with the diffusion of modern attitudes towards life, resulting in a moderate rate of increase. If population increases before this stage, it will only work to put pressure on the economy.

(3) *The Age Distribution of Population.* There are elements in the population, such as infants and children and the aged, which cannot contribute to production at all. To the extent that this unproductive population is numerous is the burden on the economy of a society heavy. Infants, children, and the extreme aged clearly constitute unproductive population, but the portion of the population for which it is not clear to what extent it is unproductive is most numerous in the economic society

Table 4. DEPENDENT RATIO OF POPULATION IN SOME ASIAN COUNTRIES

Country	Year	Age Structure Coefficient[a] (%)			Dependent Population Index		
		0–14	15–19	60 and over	Total	Infants[b]	Aged[c]
India	1961	41.1	54.1	4.9	85.0	76.0	9.0
Pakistan	1961	44.5	49.5	6.0	101.8	89.8	12.0
Burma	1954	37.1	58.4	4.5	71.2	63.5	7.7
Ceylon	1955	40.7	55.8	3.5	79.1	72.8	6.3
Thailand	1960	43.1	52.1	4.6	91.5	82.7	8.8
Federation of Malaya	1957	43.8	51.6	4.6	94.0	85.0	9.0
Singapore	1957	42.8	53.4	3.8	87.4	80.2	7.2
Philippines	1960	45.7	50.0	4.3	100.0	91.4	8.6
Taiwan	1961	45.6	50.2	4.2	99.3	91.0	8.3
Japan	1873	28.2	61.2	10.6	63.4	46.0	17.4

Notes: a) Proportion against total population.
   b) Ratio of the child population under 15 years of age to the productive age population, 15–59 years of age.
   c) Ratio of the aged population, 60 years of age and above to the productive age population.

Source: U. N., *Demographic Yearbook, 1963.* Japan is estimated.

development. M. Tachi, "Sekai-jinkō no Seichō to Shōrai Yosoku 世界人口の成長と將來予測 (Growth and Future Prospect of the World Population)," in Minami Ryōzaburō 南亮三郎 & M. Tachi eds., *Sekai no Jinkō-Mondai* 世界の人口問題 (World Population Problems), Tokyo, Keisō-shobō, 1963, pp. 47–49. Also, the following book points out that in Korea a decline in the death rate is lagging behind that of other Asian countries. The reason for this is that the effect of the popularization of new drugs and chemicals is offset by an increase in malnutrition due to a decline in the level of living and also the prevalence of disease. Kim Chiol, *Kankoku no Jinkō to Keizai* 韓國の人口と經濟 (Population and Economy in Korea), Tokyo, Iwanami-shoten, 1965, pp. 98–99.

centring around agriculture. For example, in Table 4, the population is divided by age, and the ratio calculated between the child population of under 15 and the aged population of 60 and over. As indicated in Table 4, the proportion of the child population in the age distribution of Japan's population at the beginning of the Meiji period (1873) was extremely low compared to that of Southeast Asia today. The ratio of aged population was higher, but not to the extent of offsetting the low ratio of child population. Due to this, the ratio of the dependent population, the child and aged population added together, was in the final analysis low.

The age-distribution of the present Southeast Asian population is of a type with a high ratio of dependent population because the infant and child mortality rates have already fallen considerably although the fertility rate is still high. But whatever the cause, a heavy burden of dependent population is an initial condition which is disadvantageous to economic development.

(4) *Quality of Population.* How productive a population is as a group is not determined merely by quantitative relations such as proportion of productive population in total population. Even in similarly productive populations, if there are qualitative differences, there should be a difference in the extent to which these populations contribute to production. There used to be a tendency in economic theory to consider that the productivity of the population or the labour force population was determined by its ratio to capital, but recently, in addition to this, serious consideration has come to be given to the problem of the quality of the population and the labour force population.

The concept of quality can be understood in both a narrow and a broad sense. In the broad sense, the type of political system and the social organization of a country become part of the problem. In this aspect, Japan began its modernization under extremely favourable conditions. Namely, the feudal society which has lasted for several hundred years preceding the Meiji Restoration was under a feudal system in which power had been firmly centralized to an extent not seen in many other countries. These political conditions encouraged the firm establishment of various institutions necessary for a modern nation and which the new Meiji Restoration government established after the Restoration.[1] Most of the countries of Southeast Asia at present are completely dif-

[1] Irene B. Taeuber, *The Population of Japan*, Princeton, Princeton University Press, Chaps. III and IV.

ferent from Japan. Due to the fact that they were for a long period
ruled as colonies of foreign countries, these countries are lacking in a
"unified system of national economy,"[1] which is an indispensable condition
for sustained economic growth.

When quality of population is interpreted in the strict sense of the
term, the problem taken up is often that of education.   Becoming
influential in recent years is the interpretation which seeks the key to
Japanese modernization in the diffusion of education.[2]   The Restoration
government announced its educational system in 1872 soon after the
Meiji Restoration and in 1886 put into effect four years of compulsory
education.   The rate of school attendance rose from 28.1% in 1873 to
45.0% in 1887, and 91.6% in 1902.[3]   Of course the government not
only endeavoured to extend general education, but invited foreign teachers
to introduce advanced research and technology and sent students abroad.
The reason why Japan could absorb this modern technology in a short
period of time and apply it was due to the education which was well
diffused among the people and to the excellent quality of labour as a
whole.   Japan's modernization is often looked at with great surprise.
When we study its initial conditions, it becomes clear that there were
many advantageous points which Southeast Asian countries do not at
present possess.

III. THE MECHANISM OF POPULATION INCREASE AND
ECONOMIC DEVELOPMENT

In Section I, population trends in the course of Japan's modern-
ization were defined, and in Section II, the situation of Japan's population
in the early part of the modern period was examined from the aspect
of the initial conditions of modernization.   The analysis of these aspects
was of course made on the assumption that they are related to economic
development, but the connection between population and economy has
not been directly commented upon.   In this Section we wish to make
clear the relationships between population increase and economic develop-
ment based on the example of Japan.   Of course, we do not think that
Japan's experience as it is pertinent to the countries of Southeast Asia

1   Itagaki Yoichi 板垣與一, *Ajia no Minzokushugi to Keizai Hatten* アジアの民族主義
     と經濟發展 (Nationalism and Economic Development in Asia), Tokyo, Tōyōkeizai-
     shimpō-sha, 1962, particularly Section II (Asian Economic Development Theories).
2   Tōbata Seiichi 東畑精一, *Nihon Shihonshugi no Keiseisha—Samazama no Keizai
     Shutai* 日本資本主義の形成者—さまざまの經濟主體— (The Builders of Japanese Capital-
     ism—Various Economic Subjects), Tokyo, Iwanami-shoten, 1964, p. 102 ff.
3   S. Tōbata, *Nihon Shihonshugi no Keiseisha.*

today, but in spite of this, we may be able to draw not a few suggestions from it for the discussion on the development policy in those countries.

1. The Relationships between Population and Economic Development
The relationships between the population and the economy can be thought of from two aspects; that in which population functions as the labour force, and that in which the population functions as consumers. We will begin our study from the connection between an increase in the labour force population and economic development.

The fact that in Japan the population density has been high from the beginning of modernization was pointed out earlier. It was also pointed out that the rate of population increase in the early modern period in Japan was lower than that of the same stage in England. However, a point on which we must be careful is that the fact that the rate of population increase was comparatively moderate does not mean that the rate of increase in the labour force was moderate. It can be said that the supply of labour to the modern industrial sector in Japan was almost equivalent to the rate of increase in England at the time of the Industrial Revolution due to the pressure by the labour force which was discharged from the agricultural sector in Japan.[1]

This existence of abundant labour was the fulcrum which effectively supported the economic development of Japan. It was natural that Japan with its small area had no choice but to choose industrialization for its economic development, but because Japan was blessed neither with a large area nor with industrial resources, resources for development of industry had to be imported, and in order to pay for them, exports had to be expanded. Thus, in order to successfully industrialize, the growth of exports was a necessary condition.

In actuality, Japan's exports, as is shown in Table 5, favourably increased from the first part of the Meiji period. At first they were roughly 5% of national income, but later they came to exceed 15%. Thus, the tempo of the increase of imports and exports was much faster than the tempo of increase in national income, and along with this, there was seen a remarkable change in the content of exports and imports.

Imports at first were heavily weighted towards manufactured products and foodstuffs, but later the weight of these goods declined, and the proportion of raw materials for manufacturing increased. Scholars of

[1]   Umemura Mataji 梅村又次, *Chingin, Koyō, Nōgyō* 賃金, 雇傭, 農業 (Wages, Employment, and Agriculture), Tokyo, Taimeidō, 1961, pp. 70–77.

one school think that the population increase was the reason for the increase in Japan's imports,[1] but that view is not entirely correct. The reason for the increase in imports was rather in the development of industry.

Table 5. THE TRENDS OF JAPAN'S EXPORTS AND IMPORTS (current prices)

Period	Imports (Million yen)	Exports (Million yen)	National Income (Million yen)	Imports compared to National Income (%)
1868–72	23	16	—	—
1873–77	27	22	—	—
1878–82	33	30	667	4.9
1883–87	33	42	606	5.4
1888–93	73	77	830	8.8
1894–98	223	139	1,436	15.7
1899–1903	270	244	2,016	13.4
1904–08	442	377	2,695	16.4
1909–13	544	496	3,589	15.1
1914–20	1,300	1,434	7,636	17.0
1921–25	2,102	1,690	12,131	17.3
1926–30	2,103	1,926	12,907	16.3
1931–35	1,868	1,818	13,153	14.2

Source: G. C. Allen, *A Short Economic History of Modern Japan, 1867–1937*, London, George Allen & Unwin, 1951, p. 179. K. Ohkawa, *The Growth Rate of the Japanese Economy since 1878*, Tokyo, Kinokuniya Bookstore, 1957, p. 247.

On the other hand, there was also seen a great change in the content of exports. The weight of exports gradually changed from raw silk, tea, and rice to manufactured goods such as textiles. The remarkable increase in the export of Japanese textiles was due to the fact that purchasing power increased due to an increase in income among customers abroad (income effect), but more important was the fact that the Japanese export price was low and her competitors could be ousted from the market (price effect). And behind the cheap export goods were the undeniable conditions of abundant labour and low wages.

Table 6 shows an international comparison of the wage rates, labour productivity, and labour cost per item in the cotton industry. Despite the fact that the labour productivity in Japan was lower than that of many foreign countries, due to the fact that wage rates were lower still, labour costs per item were particularly low.

What pushed wage rates so low was, it goes without saying, an over-supply of the labour force population. When we come this far in

[1]   W. W. Lockwood, *The Economic Development of Japan, Growth and Structural Change, 1868–1938*, Princeton, Princeton University Press, 1954, Chap. IV.

our study, it is clear that what gave rapid modernization to Japan was a chain mechanism of an excess of labour creating low wages, which in turn made for low prices and a high rate of exports, and hence a high growth rate.

Table 6. AN INTERNATIONAL COMPARISON OF WAGE RATES, PRODUC-
TIVITY, AND LABOUR COSTS IN THE COTTON INDUSTRY, 1932

Country	Wage Rate per Week (Yen)	Reciprocal of Productivity (Persons)	Labour Costs per Finished Item (Yen)
Japan	5.8	6.1	13.2
Germany	13.0	4.5	25.4
England	18.0	4.0	31.4
United States	35.0	3.4	49.6

Source: Shinohara Miyohei 篠原三代平, "Keizai Hatten to Bōeki no Kankei 經濟發展 と貿易の關係 (The Relation between Economic Development and Foreign Trade)," in *Nihon Keizai no Kōzō-bunseki* 日本經濟の構造分析 (An Analysis of Economic Structure in Japan), Tokyo, Tōyōkeizaishimpō-sha, 1956, p. 115.

Naturally, the excess labour force population which we will speak of here does not mean an excess in terms of area. It is an excess in the sense of employment opportunities. Japan, a backward capitalistic country at the beginning of the Meiji period even after her economy was on the road to development, could not give enough employment opportunities to the labour force population which reached more than 18,000,000 at this time.[1] This explains why, despite the fact that Japanese capitalism developed smoothly, it could not break up the pre-modern agricultural sector.

The Japanese economy was able to develop using its abundant and consequently cheap labour, but it must be noted that this did not necessarily result in technological stagnation. The Japanese government and entrepreneurs were extremely enthusiastic in introducing new techniques from abroad. This, of course, was not done for the purpose of economizing on labour but because it raised the quality of goods and was conducive to exports.[2] Thus, the view of the predominant vicious circle[3] of low wages leading to a low level of technology which in turn leads to a low level of productivity is not correct. In actuality, cheap labour and a high level of technology were combined, and displayed strength in international competition.

The basic structure of economic development in which excess labour

1   Ohkawa Kazushi 大川一司 ed., *Nihon Keizai no Seichō-ritsu* 日本經濟の成長率 (The Growth Rate of the Japanese Economy), Tokyo, Iwanami-shoten, 1956.

2   G. C. Allen, p. 29.

3   W. W. Lockwood, Chap. IV.

was made a stepping-stone has not changed even in the advanced stage of development in which the main axis of the Japanese economy has swung from light industry into heavy.

2.   The Relationship between the Population Growth Rate and Economic Growth Rate.   Even under undeveloped economic conditions, there are numerous times when population growth signifying an increase in the labour force population helps economic growth. However, when population growth becomes merely an increase in the consuming population, it will probably become a heavy burden preventing development in an immature economy. For a highly developed economy which has the problem of creating effective demand rather than that of directly increasing productive capacity, population growth in every sense of the term is more often welcomed as being desirable for economic development.[1] Here, however, we have taken for our subject an economy in which the main force has been put in increasing productivity at a stage prior to this advanced development.

It was pointed out in the discussion on initial conditions that the population growth rate in the early period of modernization in Japan was clearly low compared to that of the advanced country England. And the fact that the present population growth rate in Southeast Asia is higher than in any previous example has also been pointed out. A study measuring to what extent a high rate of population increase influences the speed of economic growth has been undertaken by Professors Ansley J. Coale and Edgar M. Hoover who take for their models the economies of India and Mexico.[2] Using the Japanese economy for our model, let us analyse the relationship between the population growth rate and the economic growth rate.

First, let us denote the fundamental idea underlying our model. Y represents real national income; C, total consumption; S, total savings; K, total capital stock; I, total investment; and P, total population. The various relationships composing our model are:

$$Y = C + S \qquad\qquad (1)$$

1   J. M. Keynes, "Some Economic Consequences of a Declining Population," *Eugenics Review*, April, 1937, reprinted in R. V. Clemence ed., *Readings in Economic Analysis*, Vol. 1, Cambridge, 1950, pp. 192–196. A. H. Hansen, "Economic Progress and Declining Population Growth," *American Economic Review*, Vol. XXIX, No. 1, Pt. 1 (March, 1939), reprinted in J. J. Spengler & O. D. Duncan, *Population Theory and Policy, Selected Readings*, Glencoe, Ill., Free Press, 1956, pp. 256–269.
2   A. J. Coale & E. M. Hoover, *Popluation Growth and Economic Development in Low-Income Countries, A Case Study of India's Prospects*, Princeton, Princeton University Press, 1958.

$$C = \alpha + \beta Y + \gamma P \qquad (2)$$
$$S = I \qquad (3)$$
$$Y = \sigma K \qquad (4)$$
$$\frac{dk}{dt} = I \qquad (5)$$
$$P = A e^{gt} \qquad (6)$$

(1) shows the distribution of national income, and (2) shows that total consumption is the function of national income and population. The fact that population is included in this consumption function is the distinctive feature of this model. Due to population increases, consumption, and consequently savings, change, and the economic growth rate is affected. (3) determines the equilibrium level of the economy based on the equilibrium between savings and investment. (4) is the production function which determines the level of national income as the value of capital stock multiplied by its average productivity. Neither population nor the labour force population are included in this production function on the assumption that there was an excess supply of labour and that the volume of labour force did not affect the output of real income. The conditions under which the existence of excess labour was effectively used for the development of the Japanese economy have already been explained, but these conditions were a factor in determining the general level of the production function. (5) is a formula merely signifying that the increment of capital stock is equal to investment. Finally, (6) shows that population increases at rate g with no relation to the level of the economy. In order to examine whether a large or small rate of population increase affects the rate of economic growth, we will deal with the population increase rate as an exogenous variable.

The basic idea has been presented here in the above model, and an examination of the actual proof of this is as follows. The period under our consideration is from 1888 to 1937. This period was one in which the Japanese economy progressed from take-off to maturity, and may not be appropriate as a model for the present economy of Southeast Asia. However, there is proof that even for an economy which stood on a firm basis, an excessively high rate of population increase had no small effect on the economic growth rate. And because of this, we may be able to clarify the importance of the relationship between population increase and economic growth rate.

Real consumption per person, $\overline{C}$, which was realized in the first period (1888–1892) became a fixed consumption level, and it can be considered that there was great resistance to breaking this standard

down. That is, $\overline{C}$ signifies the "basic consumption level" for the entire period being considered. If we express the population for the tth period as P_t, the total amount of basic consumption for this period is $\overline{\overline{C}}_t = \overline{C} \cdot P_t$. This $\overline{\overline{C}}_t$ is the amount of consumption which the population of the tth period has to consume under any circumstances. The remainder of national income of period t, Y_t minus $\overline{\overline{C}}_t$ is the part which is left to be freely consumed or saved. This remainder will be called "residual income" Y_t'. In this residual income, the part to be consumed is called "surplus consumption" C_t and it is determined as the function of residual income in the same way as the ordinary consumption function ($C_t = a + b \cdot Y_t'$). Total savings for period t (S_t) is given by $S_t = Y_t' - C_t = Y_t - \overline{\overline{C}}_t - C_t$. By our assumption, total savings S_t equal the total investment I_t, and consequently there results in the increase of a certain amount of national income from period t to $t+1$. The relationship between investment and an increase in income is given by the formula, $\Delta Y_t = \alpha + \beta \cdot I_t$.

In our calculations, the basic consumption level was 0.03938 million

Table 7. CALCULATION OF NATIONAL INCOME, CONSUMPTION, SAVINGS, AND THE RATE OF INCOME INCREASE FOR A POPULATION INCREASE RATE OF 1 PER CENT

(Unit: Million yen)

Period	Population (1) (in 1,000 persons)	Total Basic Consumption (2)	National Income (3)	Residual Income (4)=(3)−(2)	Surplus Consumption (5)	Savings (6)=(4)−(5)	Income Increase (7)
1888–92	39,109	1,540	2,140	600	0	600	530
1893–97	41,104	1,619	2,670	1,051	32	1,019	900
1898–1902	43,200	1,701	3,570	1,869	630	1,239	1,095
1903–07	45,403	1,788	4,665	2,877	1,367	1,510	1,334
1908–12	47,718	1,879	5,999	4,120	2,277	1,843	1,628
1913–17	50,151	1,975	7,627	5,652	3,397	2,255	1,992
1918–22	52,708	2,076	9,619	7,543	4,780	2,763	2,441
1923–27	55,396	2,181	12,060	9,879	6,489	3,390	2,995
1928–32	58,221	2,293	15,055	12,762	8,598	4,164	3,679
1933–37	61,190	2,410	18,734	16,324	11,203	5,121	—

Notes: The basic consumption level per person is 0.03938 million yen per 1,000 persons. The estimation for $C_t = a + b \cdot Y_t'$ is $C_t = -736.9693 + 0.7314 Y_t'$. The estimation for $\Delta Y_t = \alpha + \beta \cdot I_t$ is $\Delta Y_t = -0.1487 + 0.8836 I_t$.

Source: For national income and consumption, K. Ohkawa ed., *Nihon Keizai no Seichō-ritsu* 日本経済の成長率 (The Growth Rate of the Japanese Economy), Tokyo, Iwanami-shoten, 1956, and Yamada Yūzō 山田雄三, *Nihon Kokumin Shotoku Suikei Shiryō* 日本國民所得推計資料 (Materials for Estimation of Japanese National Income), Economic Planning Agency, Tokyo, 1951. For population, Y. Okazaki, *Meiji Shonen ikō...*, and Statistical Bureau, *Kokusei Chōsa Hōkokusho* 國勢調査報告書 (Report on the National Census).

yen per 1,000 persons. The estimated equations estimated for the entire period under consideration reaching from 1888 to 1937 are: $C_t = -736.9693 + 0.7314 Y_t'$ (correlation coefficient $r = +0.9870$) and $\Delta Y_t = -0.1487 + 0.8836 I_t$ (correlation coefficient $r = +0.8720$).

We will calculate what level the growth rate of national income reaches when the initial population of 39,110,000 increases at a rate assumed as one pleases. Table 7 shows the calculations for a 1% annual rate of population increase. At this rate of increase, the growth rate of national income is 5.0%.

The higher the rate of population increase, the greater the increase in total basic consumption, and if there are no changes in other conditions, total saving, and consequently total investment, will be restricted, and finally the growth rate of national income will decline. In Table 7, the population increase rate was assumed at 1%, while in Table 8, the growth rate of national income is computed with assumed population growth rates of 2%, 3%, and 4% also. The "demographic elasticity coefficient" is the ratio of the increase rate of income to the population increase rate. The coefficient shows the rate of the rise in level of income per person.[1]

Table 8. ASSUMED RATES OF POPULATION INCREASE AND DEMOGRAPHIC ELASTICITY COEFFICIENTS

Population Increase Rate (%)	Rate of Increase in Income (%)	Elasticity Coefficient
1	5.0	5.00
2	4.7	2.35
3	4.4	1.47
4	3.9	0.98

As is depicted by the above consumption function, the marginal rate of consumption, i. e., the ratio of the increase of surplus consumption to the increase of residual income, is a fairly low one of 70%, and as we know from the production function, the marginal capital coefficient, i. e., the ratio of investment to income increases just exceeds 1%, and this too is low. It is thought that these are conditions which cannot be expected to exist in present Southeast Asian countries. Even in Japan's period of growth in which these favourable conditions existed, had the population increase rate been, let us say, as high as 3%, as is shown in Table 8, the rate of the rise in the income level per person

[1] M. Tachi, *Forecasting Manpower Resources: Population and Labour Force—Some Experiences in Japan,* English Series No. 55, Institute of Population Problems, Tokyo, 1962, pp. 3–4; *ditto, The Problem of Population and National Development,* English Series No. 59, Institute of Population Problems, Tokyo, 1964, pp. 23–24.

would have been extremely low.

"The United Nations Development Decade" adopted by the General Assembly designated the 1960's as a decade of development and set up a goal of pulling up the growth rate of national income in every under-developed country to a minimum of 5% by the end of this period.[1] In order to reach this target, positive measures must be pushed forward which reach into every aspect of socio-economic development, but our calculations make clear the fact that, in order to attain this objective, controlling the rate of population increase is an essential condition. In Japan and in England, the rate of population increase throughout the entire course of modernization did not exceed an annual rate of 2%.

IV. CONCLUSION

There are probably many reasons why Japan was successful in modernizing, but one of them, it can be pointed out, is that the initial conditions were favourable. Thus, when we look at these conditions with respect to population, it can be seen that the rate of population increase was low for the early period, and the ratio of dependent population in the age structure of the population was low. Also, there was a modern labour force of good quality with the level of education rapidly rising, and even an extremely dense population did not prevent modern-ization; we can say rather that it was a force which shared in pointing the direction of Japan's modernization towards industrialization.

As an economic society develops step by step, the population increase rate also shows a graded change. This was the type of balanced de-velopment which the advanced countries including Japan experienced, but there appeared in Southeast Asia an imbalance in which only popu-lation showed an extraordinary increase before socio-economic development has taken place.

Due to the abundant reserve of labour force population inherited from the feudal society and also, on the other hand, due to the successful nourishing of capitalism utilizing this reserve as a modern labour force, this in a sense surplus labour was productively utilized in the course of Japan's modernization. Consequently, a weapon for international com-petition of low wages leading low prices was provided for the Japanese economy for which the growth of exports was an indispensable condition because of the country's small area and restricted resources.

[1]　Resolution adopted by the General Assembly of the United Nations 1710 (XVI) of 19 December, 1961.

The supply of abundant labour to the capitalistic sector did not have for its background a high rate of population increase. The rate of Japan's population increase was rather low even compared to other developed countries and this played an important role in the development of the Japanese economy. It would have been difficult even for the Japanese economy which had a high savings rate and an efficient utilization of capital to achieve high and smooth growth if its rate of population increase had been as high as that of Southeast Asia's is today.