

ECONOMIC DEVELOPMENT
AND
INTERNATIONAL TRADE

A THESIS
Presented to
the Faculty of Graduate Studies and Research
McGill University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

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May 1952

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INTRODUCTION

In Economics, when the development of backward countries is being considered, the problem is usually treated with reference to some specific area. Most frequently a monograph is presented, a case study documenting the economic possibilities and making definite policy recommendations for a given country. This method is essentially empirical and inductive; the concern is with immediate obstacles to economic progress. There is little attempt to deal with economic development more generally or to formulate a theory which might be applicable to a variety of countries and conditions.

Admittedly the diversity of economic circumstances prevailing in different backward areas tends to discourage generalizations and the case study does provide a useful framework within which to make policy decisions. But is not this whole structure of recommendations and policy proposals usually erected on a precarious foundation of ill-defined, inadequate theory? The preoccupation with details has led to a neglect of those larger dimensions of development as a general process, a basic theory. Without making any claims to path-breaking, the present study does focus its attention on the analytical and deductive aspects of economic change. While offering much less than a complete theory, it shops around among some features of which such a theory might logically consist.

Although the study of backward areas has been largely non-theoretical, economics has always shown considerable interest in development as a section of its general, abstract theory, e.g. Adam Smith, Ricardo,

Marx, Mill, Marshall and Schumpeter. The present work takes what is felt to be one of the least controversial among these theories, namely Schumpeter's 'The Theory of Economic Development', and undertakes to modify it in a manner to make it more adequate for dealing with the situations and problems of undeveloped countries. Accordingly, PART I, consisting of Chapters I,II,III,IV, is devoted to this theory of Schumpeter's and its modification.

Since backward countries must undertake to develop within a world economy which is itself progressing and they are to a large extent dependent upon capital equipment that can only be provided, if at all, by this international economy, problems of development often turn out to be problems of international trade. Economic progress starts with different factor endowments and proceeds at varying rates in the distinct nations of the world economy. However, there is a close inter-relationship between such national developments and the course and magnitude of international trade.

A theory of international values should have a large measure of complementarity to the theory of economic development. National price levels, international exchange rates, industries of comparative advantage, etc. may be given a static type of explanation in terms of a given international distribution of factors, as does Ohlin.¹ However, the dynamics of factor accumulation, as it proceeds in the separate countries, determines the pattern of trade and international values over time. But the present study is concerned with speculations of a

¹ Ohlin, Interregional and International Trade (Cambridge, Mass., Harvard University Press, 1933)

lesser magnitude, namely, the particular international trade difficulties which confront backward countries undertaking development within an advancing and in some sectors, already highly advanced, world economy.

Chapters V and VI of PART II further elaborate the theory outlined in PART I and make an extensive discussion of its international aspects and implications. Chapter VII is a final summary and conclusions.

PART I

CHAPTER I

THE NATURE, SCOPE AND PROBLEMS OF ECONOMIC DEVELOPMENT

The economic development of backward areas, an increasingly insistent problem before World War II, is now the primary preoccupation of countries directly concerned and a major aim of the various post-war organizations for international co-operation. This emphasis upon some immediate, significant improvement in the economic condition of so-called 'backward' countries is readily understandable when the extreme mal-distribution of income and wealth in the world economy is considered and the abject poverty in which whole populations find themselves. Within such countries, popular movements for national self-betterment have had a long period of gestation and are able to marshal particularly strong support from the aftermath of recent world events. The breakdown of traditional institutions and ideas in contact with technologically advanced, highly industrialized, market economies and the impact of international depression and war have nurtured among them a general unrest and desire for change.

This political restiveness, although varying widely in its complexion from one under-developed country to the next and usually representing an uneasy coalition of highly dissimilar groups and thus presenting ill-defined, often logically inconsistent programs of 'reform', generally centers on some plan for quickening the pace of economic

activity and improving the material well-being of the peoples concerned. This primary focus of political activity upon some program of economic betterment brings the economist into a prominent although uncomfortable limelight. It is he who treats of development essentially as an economic process. Economics has always been very much concerned with the theory of development and is in a position to offer considerable knowledge and advice regarding its economic aspects, in this case, aspects which are such a major, immediate interest of undeveloped, politically restive nations.

While the economic problems are being considered and the technical advice given, it has to be recognized that in a more complete view development, even in its economic aspects, involves a sweeping reconstruction of society in basic and what are generally thought of as non-economic features. In order that plans for purely 'economic' change may be carried out, radical reorganization of the social, cultural and institutional structure of these nations will be necessary and if the economic program proves successful, further, equally sweeping and socially disturbing changes will result. Successful economic development depends upon the growth of efficient economic institutions; banking, communications, transportation and markets. But as social phenomena these are themselves products of a quite distinct process of social evolution. Thus, the developing country has its social framework altered by economic progress while, at the same time, extent and success of such progress will be largely determined by the social environment in which it is brought forth. Consequently, a theory of economic development must take account of this

complicated cause-effect relationship and application of the theory to so-called 'backward' countries must be done with an ever conscious awareness of these non-economic features.

The nature of this widespread social re-organization which will precede, condition and follow economic development depends upon the particular undeveloped country being considered. This makes the problems facing each backward nation unique and the direction and extent of the changes which progress would entail hard to define, to forecast or to accomodate within a generalized theory. Therefore, even in regard to essentially economic matters, it is exceedingly difficult to present any general explanation of the process which might qualify as a theory of development. To do so it must be flexible enough to apply to a wide variety of conditions, both economic and social, and yet be sufficiently concise, logically rigorous and internally coherent to be dignified with the name of 'theory'. For each country, the economic characteristics alone, i.e. its labour force, its location relative to the channels of international commerce, natural resources, industries of comparative advantage, etc., present a distinct background for economic development. At first glance, it seems almost hopeless to attempt the construction of any general theory. However, the present pre-occupation with backward areas, the problems of their economic development and the search for practical policies to overcome these makes it important to try and frame such a general theoretical explanation. For if it is possible to select a corpus of basic economic variables which can be fitted together into some comparatively general analysis, this may serve as a guide for policy

decisions in undeveloped regions.

This may seem to be an undue emphasis on the importance of theory. Admittedly, from the standpoint of the countries directly concerned, economic progress and how to get it is a highly practical, pertinent problem. They view their present condition as a deplorable state of affairs about which something has to be 'done', not theorized. Their interest is, in the short-run, in policies leading to comparatively immediate results. But without a general schema of theory against which to measure and evaluate such policy measures, it is not possible to draw up a consistent, effective, over-all program of economic improvements and bring about the type of basic, comprehensive economic changes which these nations so much require.

A major task of the present paper will be to outline such a schema of development applicable to the contemporary situation of under-developed countries. This theoretical outline will partake of two basic subject matters; the theory of economic development proper and the theory of international trade. The theory of development considers how to use an existing aggregate of factors of production to eventually increase the productivity and income of the economy concerned. The international trade theory to be utilized will be those portions dealing with the balance of payments mechanism, i.e. how and how much to use available foreign factors of production to increase future domestic productivity and income. Accordingly, for the present discussion, the international trade of a country is to be treated as an index of its use of foreign resources to supplement domestic production and thereby expedite development.

The trade balances of the various countries which collectively make up the world economy form a summary of international economic relationships over the limited period, usually a year, selected for an accounting. The trade balances are a mirror of existing relationships between aggregates of Income, Saving, Investment, Imports and Exports of the various national economies within an international framework of markets and prices. Development proceeding at vastly different rates and with highly dissimilar resources in the individual countries is constantly changing these relationships as well as the over-all dimensions of the international economy. Any particular trade balance reflects that country's immediate position vis-a-vis the rest of the world; also, it is the outcome of a causal sequence that stems from its aggregate decision where to employ domestic resources and when to command those of the international economy. The trade balance gives an accounting of what domestic resources (exports) were exchanged for foreign (imports) and to what extent, if at all, part of this exchange was balanced off by evidences of debt rather than resource transfers. In view of this, it is surprising there has not been a closer liason between the theory of economic development and of international balances since there is this direct connection between the latter and the course, speed and international distribution of the former.

This international aspect of a country's economic development should not be over emphasized; on the other hand; for a backward economy, development is essentially a domestic task. It is locally and mostly with indigenous factors that the productive structure is remodelled,

improved and extended in a manner to raise productivity and income. However, foreign resources are in various cases indispensable, in others highly convenient and the undertaking of development projects will cause changes in the economic relations between the domestic economy and the rest of the world. The results of successful development will again change these international relationships as levels of income, consumer tastes, comparative advantages in various types of production and international creditor-debtor arrangements are altered. The theory of international values and the mechanism of trade balances are closely intermeshed with the process of economic development as it unfolds in different parts of the world economy.

Economic progress requires increased domestic investment and unless this displaces an equal volume of voluntary saving, an income expansion ensues. At a given moment, an economy is only capable of a limited amount of voluntary saving, depending on its income and propensity to consume. When investment occurs in excess of this, an expansion of income is inevitable. Supposing the economy to have been initially at some under-employment level of national income, then increased investment brings it toward full employment. With this expansion there comes a limit to such voluntary saving. Should an economy desire to undertake a measure of development in excess of the voluntary savings forthcoming at full employment, then the planned investments will bring an 'inflationary gap'. The demand for goods and services for consumption and investment will be greater than the total supply at existing prices. In this case, total supply is made up of domestic production, plus imports, minus exports.

It is true that if domestic prices are allowed to rise, the real goods counterpart of consumer expenditures will be reduced and a larger share of national product channelled into investment. Without considering its effects on imports and exports, an increase in the domestic price level may help of itself to increase real gross national product. Thus, inflation and forced saving are useful in a period of development for they enable an economy to make a greater investment effort than would be possible by voluntary saving alone. But there comes a point beyond which price level increases do not have this effect. When used to excess, inflationary forced saving may so completely disrupt production that the gross national product and total real investment is markedly reduced.

Another technique by which the investment efforts of an economy can be increased is by permitting an unfavorable trade balance to develop. When investment is increased and national income expands, the demand for foreign goods will rise. Then, as an inflationary gap develops domestically, this is a further factor tending to increase the flow of imports. As domestic prices rise, factors of production will move out of the export industries into domestic production and imports increase. With this increase a domestic economy can support greater total investment out of its current production. Domestic production plus the increased volume of imports and minus the now reduced exports gives a larger total of goods currently available within the economy. Therefore, by virtue of the trade deficit, more can be devoted to investment without reducing consumption. However, as in the case of forced saving, here, as well, the increase in investment eventually reaches a maximum. Perhaps the

most important and obvious reason for this is that a country cannot go on indefinitely increasing its international indebtedness.

In a program of development, factors are employed now in ways that will enable the same aggregate of factors to be used more effectively in subsequent periods. Both adverse trade balances and domestic inflation are to a degree useful for accomplishing this. But the effectiveness of either at some point reaches a maximum beyond which its marginal contribution becomes quickly, substantially negative. Thus, for a backward country to achieve a maximum of development in the shortest possible time, these techniques must be used in the proper combination. Economic advance hinges upon the use of these two devices; the inflationary gap and the negative trade balance. However, as tools for implementing an investment program, adverse balances and domestic inflation are joint effects of the same economic process; namely, investment increase and income expansion. Hence, the study of development is pushed back into an investigation of autonomous investment and income expansion.

The increased volume of investment necessitated in a development program will inevitably result in an expansion of income regardless of whether the program is undertaken in a backward country or one already economically well advanced. But the problems to which this basic sequence gives rise in an under-developed nation seem in the real world to be of an entirely different magnitude relative to the investments undertaken from what is the case for the more advanced economy. In the former, limitations upon the inflationary gap and the deficit trade balance, as devices for expediting development, do not seem to allow an adequate

volume of investment to occur relative to the developmental needs of the economy. Before the planned investments can be completed, or in some cases even well started, the income expansion has burgeoned into a runaway inflation on the one hand and an alarming trade deficit on the other.

With the growth of the Keynesian macro-economics in the late 30's, there was built up a substantial body of knowledge with respect to the various forms of the 'multiplier' and the process of income creation¹ following upon autonomous changes in investment. Fundamentally, this analysis depends upon the assumption of an initial, under-employment equilibrium, stable relationships between the economic aggregates of income, savings and consumption and the absence of price changes during the process of expansion. Furthermore, by assuming propensities to import for two countries, the technique can be broadened to demonstrate the effect² upon each of changes in the functions or data for either. From this has been worked out a highly exact discussion of the conditions required for balance of payments equilibrium when various incidents (autonomous investment, consumption, import or export changes, for example) disturb a stable pattern of international relations.

During the last war, a parallel enlargement of theoretical economics came out of another 'multiplier' study, that of interactions between investment, income, the price level and gross national product, i.e. analysis

¹ Alfred E. Kahn, "The Relation of Home Investment to Unemployment", Economic Journal (1931) is usually considered the first in this series.

² Fritz Machlup, International Trade and the National Income Multiplier (Philadelphia: The Blakiston Company, 1943)

of the 'inflationary gap'. Since this analysis uses the same pattern of data and assumptions as the foreign trade multiplier and the studies of international equilibrium in the balance of payments just mentioned, they are highly complimentary techniques. The conclusions of each are, at least in part, the subject matter of the other and both rely on the same range of data. For example, the inflationary gap analysis requires or assumes data as to investment, imports, etc. for the economy whose inflation problem is to be assessed. With these it is possible to determine how great a total output and investment can be undertaken without any, or with some controllable magnitude of inflation, the nature of the price rises, shortages, etc.. Such conclusions are either among the data or assumptions used by studies of international trade multipliers and balance of payments equilibrium or they represent information which can be used to considerably refine the conclusions of such investigations. This complementarity of the inflationary gap and the foreign balance follows from the direct connection pointed out earlier between the price level and aggregate demand behavior of a particular national economy and the balance of trade situation arising between it and the rest of the world. The present study will attempt to fit both the domestic inflationary gap and the balance of payments deficit (which is largely but another form of inflationary gap) into a theory of economic development that has been suitably revised to entertain the specific problems confronting backward nations.

As already noted, development requires an investment program and results in an income expansion. The two multiplier techniques are

concerned with aspects of this process; investment, income expansion, realized development. By a series of successful applications of these techniques, a country can maximize its rate of developmental investment and its economic progress. They are the economic mechanics which would underlie a successful development program. When one looks at economic progress in these terms, the infrequent reference to the theory of development in the literature on the balance of payments is surprising. Then, too, how much was written during the War and post-War periods on the 'inflation gap' and how little if any reference is ever made to that technique in discussions of the extensive investment programs in under-developed nations at present. Yet, in war-time, the unusual investment effort (war-effort) in an advanced economy presents many points of similarity to the situation of a backward nation undertaking a comprehensive peacetime development program. It ought to prove possible to apply some of the knowledge gained from the former to analysis and policy considerations for the latter.

The present paper will undertake a comparative study of investment and income expansion in backward and advanced types of national economies. It will rely on the inflationary gap and foreign trade multiplier techniques to try and explain what are the basic obstacles confronting under-developed countries which tend to make their efforts at economic progress haphazard, speculative, and frequently disappointing. First there will be a review of the theory of economic development as it has been presented in a general form abstracting from time and the initial economic condition from which the process is assumed to start. The

Schumpeterian version has been chosen. It might be objected that Schumpeter's account is somewhat less than a general theory. It is an explanation of development as it occurs in a capitalistic economy under the guidance of entrepreneurs and a 'general' theory should not restrict itself to explanation in terms of one type of economy---namely capitalism. Since much of the world area at present categorized as backward is somewhat less than capitalistic in the Schumpeterian sense, this objection has a certain validity. However, only what are 'general' aspects of Schumpeter in the above sense will be used. Thus, the summary will be limited to an outline of the idea of an 'innovation', the necessary investments and subsequent productivity increases.

After these aspects of the Schumpeterian theory have been reviewed, modifications which can serve to incorporate ideas of time and initial level of development into the explanation will be suggested. The task will be to undertake the framing of a sub-theory adapted to the analysis of development in particular countries, specifically, the backward and advanced. It is hoped that significant differences in the process as it unfolds in these two groups can be pointed out. For example, a program of development undertaken in the countries of South East Asia differs in its magnitude, course and consequences from one undertaken in the United States. It is reasonable to expect that the Schumpeterian theory will need to be modified, interpreted, and have appropriate values assigned to its relevant variables before it can be applied to the distinct parts of a real world of diverse

³ Joseph A Schumpeter, The Theory of Economic Development (Cambridge, Mass., Harvard University Press, 1934)

national economies at highly disparate levels of economic accomplishment.

The Schumpeterian theory will need to be rewritten in a Keynesian terminology for this purpose. The process of 'innovation' must be couched in a language that can describe its effects upon national aggregates of income, consumption, investment and saving. Thereby it will become an outline of what happens to these major economic dimensions of the economy. It may then prove possible to identify a broad pattern of functional changes among these aggregates which is the result of a cumulative series of 'innovations'. It is very likely there may occur secular adjustments in the functional relationships between income, consumption, saving and investment as the economic progress of a nation continues.

Schumpeter's 'Theory of Economic Development' is a qualitative explanation of the process; into it must be inserted values for Y, I, S and C to make it quantitative as well. Once these aggregates are assigned the relevant values, development can be studied in reference to the particular problems of distinct countries and economic areas. This would constitute a useful broadening and extension, a quantitative outline of the basic qualitative theory. It might serve as a description and a yardstick by which to identify the achieved development and relative economic positions of individual nations and areas.

If the aggregate functional relationships within an economy do change as development proceeds and without certain initial values for these variables development does not occur at all, then this knowledge can be applied to the contemporary world economy to show the forces

which operate to condition the general Schumpeterian process in divergent types of national economies. Moreover, analysis in macro-economic forms, such as foreign trade multipliers and domestic inflationary gaps, can be turned to the problems of comparative development.

Backward countries undertake economic advance in a world which is itself progressing economically. Just as the process sets up a chain of reactions in the backward nation, it does so as well in the rest of the world. The further sequence of reactions that arises between the domestic and international economies may not be easily harmonized. Where investments in the domestic and international economies conflict, it may well add insuperable extra burdens to the difficulties with which an 'innovation' confronts the under-developed country.

After a suitable modification of the Schumpeterian theory has been suggested by means of which to place these backward countries in a proper perspective relative to problems of development, the final sections will be an application of some of the knowledge gained from recent balance of payments and inflationary gap discussions to the situations confronting these countries. It is hoped to place these specialized studies inside a framework of theory where it can be useful for the present political problem ----- the economic development of backward areas. There will be an over-all theory and subsidiary analytical tools with which to understand the immediate short-run repercussions of a developmental program and the means of assessing the likely effects of various policy measures that may be suggested to expedite economic progress in such areas.

CHAPTER II

THE SCHUMPETERIAN THEORY

An initial circular flow is the first premise of the Schumpeterian theory. As Schumpeter points out, it is logically necessary to start from¹ a changeless condition if the process of development is to be explained. Nor can such a theory as he attempts place any qualification upon, or involve itself in a discussion of, the level of economic well-being existing in the initial circular flow. Therefore, Schumpeter does not take into consideration the economic status of the community in the interval immediately preceeding the appearance of development. Consequently, his work is, as I think he intended, to be taken as a statement of the genesis of economic development, abstracting from time, place and quantitative considerations.

The concept of the 'innovation' is the well-spring of Schumpeter's argument. Its significance lies in the fact of its being a qualitative² change in the structure of economic activity. This will be referred to later when the theory is to be modified in the sense of re-interpreting it in terms of macro-economic aggregates of income, consumption, saving, etc. The fundamental nature of the Schumpeterian theory appears in its primary assumption, the circular flow. A circular flow can exist at various levels of

¹ Joseph A. Schumpeter, The Theory of Economic Development (Cambridge, Mass.: Harvard University Press, 1934) pp. 64

² Ibid., pp 66

income and employment; the only necessary condition is that no net investment be taking place. As it happens, Schumpeter assumes a full employment circular flow and thus autonomous investment represented by the 'innovation' leads to expansion of money national income.³ This, in turn, directly affects prices since it cannot lead to an increase in total product; all factors were being used before the 'innovation' commenced. However, were a less than full employment level of circular flow assumed initially, real income as well as money income could expand with the autonomous investment. The nature of the problems confronting a developing economy in these two situations will be quite distinct. In fact, this full-employment versus under-employment assumption furnishes a good illustration of how the different quantitative terms in which the Schumpeterian theory can be expressed become important for the analysis of what happens during an 'innovation' in an actual economy of the real world.

According to Schumpeter, development begins when the entrepreneur introduces an 'innovation' into the circular flow of production and consumption of a stationary equilibrium economy.⁴ A simple numerical model can be used to illustrate this event. Assume an initial equilibrium condition with the aggregate accounts of the economy appearing as follows:

EMPLOYMENT	OUTPUT	COST	SALES	PROFIT
100	100	100	100	0

These figures need not be thought of as absolute amounts but only taken to indicate aggregate relationships. Employment is an index of production

³ Ibid., pp. 67-74

⁴ Ibid., pp. 74-94

cost represents factor payments, etc. For convenience and clarity the continuous flow of production and consumption is divided into successive periods, the product of one becoming the consumption of the next. Since equilibrium is assumed initially, product and consumption for each period are equivalent; thus $\text{Sales} \approx \text{Output} = \text{Cost}$. No profit figure appears in the accounts in the sense of a surplus after all factors have been paid the reward necessary to command their aggregate services, i.e. total factor claims completely exhaust the product.

Successful development would result in a reorganization of production so that with the same factor endowment as before a greater product would be forthcoming in subsequent periods. This is important to a study of the inflationary and deflationary forces arising in the developing economy at successive stages of an innovation. Their basis will be the changes which take place in the current ratio of factor payments to goods available. When an innovation is being created, this ratio will be increased and when it is completed and absorbed into the economy, the ratio will be decreased. Alterations in this ratio are a *sine qua non* for price changes attendant upon an 'innovation'.

The above model of a circular flow economy represents a stable pattern of production and consumption. At the time when the innovation is to be introduced, authority in some fashion has to be given to the entrepreneur so that he may secure the transfer of factors out of this circular flow.⁵ By this transfer a portion of the product of the economy

⁵ Ibid., pp. 74

comes to be 'saved' and 'invested'. By whatever manner this 'saving' and 'investment' is assumed to occur, these factor transfers are the real means for the creation of an innovation. Moreover, with this transfer, the production of goods immediately available for consumption is reduced.

The immediate result of the innovation may be considered as a temporary division of the economy into two distinct sectors: one composed of the undisturbed portion of the original circular flow and a second made up of the entrepreneurial undertakings. But, while this dichotomy arises in factor employments, the expenditure of factor incomes is directed entirely to the purchase of consumer goods from the first sector. During this interval, the aggregate accounts of sectors I and II might appear as follows:

SECTOR I	-----EMPLOYMENT	OUTPUT	COST	SALES	PROFIT
	80	80	80	80	80
SECTOR II	----- 20	'innovation'	----	-----	-----

At this juncture, the continued absence of profits in sector I will only hold true if consumer demands are somehow restricted in accordance with the reduced production of consumer goods. This is to assume that 1/5th of the productive factors of the economy have been commandeered for the work and a corresponding portion of factor incomes expropriated for 'saving'. If this state of affairs continues for as long as is required to complete the innovation, there need arise no inflationary pressure upon the price level.

When the innovation has been completed and is absorbed into the circular flow, a more efficient organization of production will have been

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accomplished. Henceforth, either a greater total of consumer goods can be produced, i.e. a new circular flow established at a higher level of consumption, or the same level as before the innovation maintained by using something less than all the factors available to the economy. If this second alternative is chosen, it becomes a question of whether the surplus factors will be left unemployed or devoted to further innovations. However, before going on to this problem of the absorption of the innovation, its initial introduction warrants a little more attention.

In the above outline, factors were 'commandeered' and their incomes 'expropriated'. Another way would be for the entrepreneurs to borrow funds from the banking system and bid up factor prices to the degree necessary to obtain them for the innovation. Then with some factors temporarily employed on these autonomous investments and hence outside the circular flow, the goods available for immediate consumption, i.e. those being produced within the circular flow itself, would be reduced. But if factor incomes have risen, the community is able to spend and consequently to try and consume more than in the original equilibrium. The result must be an increase in the prices of consumer goods as a means of equating the increased money demand to the curtailed goods supply. Subsequently, when the innovation is completed, the factors of production can be used more efficiently and a greater total product produced than was possible in the initial equilibrium. Here it depends upon the manner the innovation is assumed to be absorbed into the circular flow whether prices will be

⁶ Ibid., pp. 129

reduced or not. A reversion of the economy to a new equilibrium at full employment, but with all entrepreneurial loans repaid to the banking system, will result in a price level deflated below that of the initial circular flow.

To introduce another consideration into the analysis, if the original equilibrium was at less than full employment, the innovational investment could result in an expansion of both money and real income without any change in the price level. The absorption of the completed innovation, if it were 'successful', could mean a reduction of money income and price level below their initial values and a return to the original unemployment situation. Another alternative would be a return to the same degree of unemployment but with a larger money national income and an unchanged price level. To summarize, there are two broad groups of alternatives to be considered when the interaction between innovational investments and the price level of an economy is being considered. With the 'classical', in this case the Schumpeterian assumption, of a full employment circular flow, an innovation must result successively in inflation and deflation. With what might appropriately be called the Keynesian assumption of a less than full employment equilibrium, an innovation need only bring about a sequence of real income expansion and contraction. When the process of development actually occurs in countries of the real world, it is usually evidenced in a combination of both.

The Schumpeterian theory of development is concerned with inflation and deflation rather than with expansion and contraction. In an economy

organized along the lines of private enterprise, for factors to be transferred into an innovation the change must be made attractive to factor owners. It is necessary as well to convince recipients of factor incomes that it is to their advantage to 'save' part of these and turn them over to the entrepreneurs, at least temporarily, in exchange for some future premium. If a voluntary transfer of purchasing power does not occur, the same result may be accomplished by other means which force up factor prices and thereby restrict the ability of consumer incomes to command productive facilities. In this instance, the purchasing power used by the entrepreneurs to bid up factor prices will have been created by the banking system.

Before going further with this discussion of how inflation and subsequently deflation are likely to come about during an interval of development, it would be well to define exactly what is understood here by inflation, deflation, inflationary and deflationary. In the previously cited aggregate accounts of a circular flow economy, 'Employment' is defined as total factors, 'Output' as goods currently available and 'Sales' as total goods expenditures of the economy. 'Sales' is a monetary while 'Employment' and 'Output' are physical dimensions. Now inflation will be defined as an increase in the Sales/Output ratio above its initial value and deflation as a decrease below it. In a similar fashion an increase of the Employment/Output ratio will be inflationary and a decrease⁷ deflationary. Our definition of economic development has been 'factors are employed now in ways that will enable the same aggregate of factors

⁷ Cf., P. 12

to be used more effectively in subsequent periods⁸. Therefore, throughout the innovational process the total factor endowment of the economy will remain unchanged, but during the creation of an innovation 'Output' will be reduced. In accordance with the above definitions, an innovation is inflationary although it need not give rise to overt inflation, i.e. a situation where the Sales/Output ratio increases. By a similar reasoning, the absorption of an innovation into the economy is deflationary, although here again deflation need not actually occur. This terminology and these distinctions have only a descriptive usefulness at the moment, but they will be called upon for larger services when the Schumpeterian theory⁸ is being modified in Chapter III.

The Schumpeterian way to accomplish an innovation is for the banking system to create purchasing power for the entrepreneurs with which the latter can break into the circular flow and hire sufficient factors⁹ away from the established firms. In any case, unless consumption were voluntarily restricted to a sufficient degree and factors smoothly transferred from their customary employments to the entrepreneurial undertakings, inflation would arise. If entrepreneurs must bid up factor prices in order to command the necessary amounts, this will raise the general wage level and increase production costs for the consumer goods industries.

⁸ While an increase in the Employment/Output ratio is a necessary condition for inflation, an increase in that for Sales/Output constitutes a sufficient condition.

⁹ Schumpeter, op. cit., chap. III

Furthermore, unless factor incomes spent on consumer goods are restricted *pari passu* with consumer goods production, prices will rise again as a means of rationing the supplies available and profits occur in sector I. When the innovation is completed, these profits will tend to disappear and others appear temporarily in sector II where production is being carried on more efficiently. Eventually the new, more efficient methods will be diffused throughout the entire economy and competition for factors force up prices to eliminate profits from the system. This increased efficiency of factor employment will constitute a deflationary element that follows after and eventually more than counteracts the previous inflationary one. The final equilibrium will be the result of an over-balance of deflationary as opposed to inflationary forces.

An innovation can be initiated without giving rise to inflation (it will be by definition inflationary, however) only if resources can be commandeered and factor incomes expropriated as was assumed in the accounts on page 22. Theoretically a voluntary saving and frictionless transfer of factors would accomplish the same result. In this case the factors are turned to the innovation as they become redundant in the consumer goods industries. Unfortunately, in a private enterprise economy, the first alternative is ruled out and the second very likely as well. This will more certainly be the case the nearer the economy is to full employment. Therefore, a strong probability of inflation almost inevitably attends an innovation, although a well developed economy of this type may have very effective weapons to dampen such forces as will be brought out in later chapters.

While an innovation is in its gestation period inflationary and may well lead to overt inflation, when successfully completed, it enhances the productivity of the economy and is consequently deflationary. With the same factor endowment as before, a greater quantity of goods can be produced. This leads to any one or a combination of the following three results; an increase in consumption, a decrease in employment, or a diversion of surplus factors into another innovation. All three have occurred in the world economy as individual countries developed; per capita consumption has risen, development has been expedited and also, a tendency for advanced economies to adjust to increased productivity by factor unemployment has been apparent.

Should an economy hold its consumption to the initial level and channel the surplus factors into further development, then, after another interval of innovational construction, there will be a new innovation completed for absorption into the system. This again increases the efficiency with which production can be carried on and reduces in turn the share of aggregate factors needed to produce the original consumption requirements. To continue this policy will mean that larger and larger amounts of factors can be released to development. For a relatively backward country, but one having an environment favorable to progress and a blueprint of technology to apply in the form of innovations successfully completed by more advanced countries, it becomes possible, by holding down consumption, to enjoy a cumulative rate of economic progress. Similarly, in the comparatively advanced countries where, although there is no blueprint of technology to copy there is likely to

be an environment highly favorable to the birth of innovations, if surplus factors are kept employed rather than allowed to lapse into idleness, progress of a like cumulative nature may be attained.

This practice of channelling all productivity gains into further development has likely never been rigorously pursued in any economy. Nevertheless, the economic growth of Russia and Japan would appear as good approximations to this formula. Moreover, for the U.S. and some of the British Dominions where development took place in a highly propitious atmosphere, a less rigorous diversion of productivity increases into innovations has resulted in a comparable rate of progress. This cumulative nature of the process seems likely to have enabled well-endowed nations to pull ahead of less fortunate ones, and, with every productivity gain they experienced, it made the undertaking of the next innovation that much less burdensome.

In regard to national savings characteristics and their change over time, the following paragraph from Colin Clark may be cited.

"The ratio of savings to national income can be studied for a fairly long period of years. In the case of Great Britain and U.S. it shows a downward tendency. The ratio is highest in Japan, where 22% of a low income per head is saved, followed by Russia with 14 %." 10

This evidence is presented in a table, a portion of which is reproduced below: upper figure--income per head of working population, lower--percentage saved.

	1900-10	1919-24	1925-30	1934-37
Great Britain	926 12.2	1117 8.1	1208 7.6	1323 7.2
U.S.A.	1325 14.3	1499 12.2	1692 10.9	2013 5.0

¹⁰ Colin Clark, The Conditions of Economic Progress (London: MacMillan, 1939)

	1900-10	1919-24	1925-30	1934-37
Germany	670		722	864
	19.1		7.7	11.8
Russia	330		325	358
	8.2		7.8	14.2
Japan		195	312	362
		21.9	19.8	21.9

The world economy can now be divided into nations where for some reason little or no economic progress has taken place and others which have enjoyed an accelerated development. The result of this has been substantially two classes of countries. As can be seen from the statistics, there is an advanced and a backward group of countries in terms of absolute economic welfare and a very great mal-distribution of the world's income.¹²

World Income 1925-34

figures for particular countries that might be considered as representative of backward (B) and advanced (A)

	U.S.A.	65.6		China	22.7	
A	Great Britain	21.9	119.0	B	British India	15.0
	Germany & Austria	19.0			Dutch Indies	2.6
	France	12.5				

Distribution of World Income

	Income per Head	Millions of Population Receiving it
	over 1250 I.U.	139
A	1000-1250 "	65 = 222
	700-1000 "	18
	300-400 I.U.	451
B	200-300 "	68 = 1532
	under 200 "	1113

This is out of a world total of 2095 I.U.

¹¹ Ibid., pp. 406

¹² Ibid., pp. 56, Arrangement into (A) and (B) categories not in original.

There appears to be a marked distinction between 'economic development' as it occurs in backward and advanced countries. In the Schumpeterian theory, development is the product of an 'innovation' and this in turn depends on technological advance. In fact, when a technological improvement has reached the point of being economically profitable then an entrepreneur, recognizing the opportunity, translates it into an innovation. However, innovations occur sporadically, a backlog of inventions has to be built up, then development is accomplished in a burst of autonomous investment.

This sequence is true for the advanced country where progress must wait upon an accumulation of new inventions which will nourish a wave of innovation. However, for the backward country there exists a tremendous backlog of technique and technology; there are any number of improvements already incorporated into the advanced economy that only require sufficient capital, etc. to make them economically profitable here. Thus, while development is inevitably sporadic in the advanced, it need not be so for the same reason in the backward. For the world economy this distinction is important; development in the backward countries is basically a function of 'saving' and in the advanced of technological progress. There is always the potential background for a 'boom' in the former but this is not so of the latter. The former is constantly on the brink of an inflationary expansion, the latter only intermittently as an accumulation of inventions ripens into an innovation.

This seems a good point to pause and consider the role of 'saving'

in the process of development. It can mean two quite different things and have similarly distinct forms at different stages of economic progress. Let us define 'abstinence' to be saving in the sense of a restriction of consumption below its customary level. It is 'abstinence' that is required when an undeveloped economy undertakes an initial innovation. Here it is necessary to reduce the customary standard of consumption in order to release resources to the innovational investment. This reduction may present major difficulties. However, once it has been accomplished, if the following innovation proves successful and the productivity of the economy rises significantly, a surplus over the requirements of the traditional standard of consumption becomes potentially available. Henceforth, development can proceed by a less rigorous form of saving. It can be supported out of the enhanced productivity resulting from the achieved progress and saving need only signify a limitation of consumer demand below the full ability of the economy to produce; saving becomes merely the curtailment of consumption below what would be possible if all factors were employed with the newly acquired efficiency in consumer goods production. It does not involve sacrifice or disutility of the same magnitude a reduction in the conventionally accepted standard would entail. The new efficiency, whose fruits are being in a manner forgone, represents an income in excess of what could formerly be produced.

For the present undeveloped areas of the world, it will most likely require a large measure of domestic 'abstinence' in order to initiate a program of economic change. If progress is to take root in what are, in most cases, such unpromising circumstances, it will be necessary to

complete a long-range, thorough-going program of initial innovations during which such abstinence must be continued since any productivity gains forthcoming will be long delayed. But in these particular countries, it is infinitely difficult to reduce a consumption which is already of a minimal, as well as traditional, sort. By contrast, this problem of 'abstinence' need not arise for an advanced economy where further progress requires nothing more than applying a temporary brake to a large, secularly increasing, changing pattern of consumer demand. Whereas, for the backward country to safeguard itself against excessive inflation during the gestation of initial innovations, a rigorous, prolonged form of saving must be endured. Moreover this distinction between saving and abstinence underscores an important contrast in economic changes as they unfold in under-developed and advanced countries. In the former, consumption standards will have to be, at least temporarily, reduced. In the latter only the secular increase of consumption accruing from already completed innovations need be curtailed. Consequently, for the backward nation it may be necessary to depress the average propensity to consume in order to free the productive facilities needed in the economic program. By contrast, for the already economically advanced country, the requirements of further progress can often be accommodated by adjustment of consumption that operates through its marginal propensity alone.

¹³ Economic Background of Social Policy Including Problems of Industrialization (International Labour Organization, Montreal, 1946) p. 145, "The needs of the Asiatic countries for capital are so great, that, even if full advantage is taken of every opportunity to borrow abroad, the great bulk of capital will have to be accumulated at home."

The present chapter has outlined some salient features of the Schumpeterian theory. The discussion has been concerned with basic changes; it has been an enumeration of general principles applying irrespective of whether the country concerned was already advanced and undertaking further development or backward and trying to initiate the process. The Schumpeterian theory stresses the primary role of credit creation in a free enterprise economy. However, regardless of the type of economic organization being considered, an innovation will be inflationary during its period of construction and deflationary when¹⁴ it is being absorbed into the economy. The following chapter considers the economic aggregates Y, I, S, C, etc., and how these are influenced by the process of innovation here outlined. By considering an innovation from the standpoint of changes in these macro-economic aggregates, it is hoped to point out major differences that arise when this general Schumpeterian formulation is applied to countries in markedly dissimilar economic circumstances.

¹⁴ Supra., p. 25 for the manner in which inflation, deflation, etc., are being defined in the present work.

CHAPTER III

THE SCHUMPETERIAN THEORY REINTERPRETED

In this chapter it is intended to take the theory already outlined and to build upon it an analysis in terms of the aggregate variables Y, I, C, S, etc. of an economy. Schumpeter abstracts from time, place, and magnitude. He describes the nature of an innovation, the necessary background for its occurrence and the permanent economic consequences of its success. Since his theory deals with qualitative changes in Investment, Income, Consumption, etc. it is an explanation of the nature rather than the magnitude of development. The innovation is created out of what has previously been a stationary equilibrium circular flow of production and consumption and it is eventually absorbed into a similar circular flow only this time one representing a higher level of economic well-being. Finally, the Schumpeterian analysis is of an innovation for a closed economy. Such a theory will obviously require modification and interpretation before it can prove useful for an understanding of a real world where economic progress is a continuing process, taking place in distinct national economies and proceeding at varying rates in each.

The present analysis will deal with quantitative aspects of an innovation, the magnitude of Income, Consumption, Investment and changes in these during a period of development. It will translate Schumpeter into a pattern of such macro-economic changes. The cumulative possibilities

of development pointed out in the last chapter will be investigated and the changing international economic relationships development brings. Finally, it is hoped to be able to propose a theoretical schema capable of explaining the historically accumulated innovations of the present world economy and their distribution among the individual countries. If successful, this should provide a framework in which to study the contemporary forces that bear upon an under-developed country undertaking a program of economic improvements.

In the Schumpeterian theory the relationship between total product, consumption and the undertaking of an innovation were discussed. It was recognized that the portion of total product which the economy abstained from consuming could be devoted to economic advance. At every stage it was the surplus of factors over those necessary to fulfill consumption requirements which could be so used. Therefore, development, both initially and as a continuing process, was related to the size of the total product and the consumer demands upon it. Hence, to analyze economic progress one must inquire into the determinants of gross national product, its distribution, disposition and the characteristics of any surplus which remains. For this purpose consider total product as a function of natural resources, technology and technique, man-made productive equipment and present labour.

$$P = f(R, E, N, T)$$

where P is gross national product; R, natural resources; E, working population employed in construction of productive equipment; N, directly employed working population; and T, the existing state of knowledge in

regard to technology and technique. Then $\frac{P}{N-E}$ may be taken as an index of productivity and development defined as the change in this index with respect to time.

$$\frac{d}{dt} \left(\frac{P}{N-E} \right) = \frac{d}{dt} f(R, E, N, T)$$

This second equation may be analyzed by referring back to the concept of a 'surplus' and changes in this 'surplus' with respect to time. In a general way the primary relationship between 'surplus' and rate of development has already been pointed out. If R and T are assumed given and constant during any period, then total product becomes a function of the two types of labour, that applied indirectly, i.e. to the building of machines, and directly to the working of them. Consequently, total product reduces to a function:

$$P = g(E, N)$$

This is similar to the Cobb-Douglas formulation of the production equation. To furnish a definite background for the argument which follows, let us assume as did Professor Douglas that the production function is linear and homogeneous, i.e. of the form $P = bN^k \cdot E^{1-k}$ where $mP = f(mN, mE)$.¹

With this formula, theoretically at least, it would be possible to plot the pattern of total products which arise from varying the proportions between E and N. Thus, with a given 'capital' and varying amounts of direct labour, a changing total product will be forthcoming. Similarly, this production function can be considered from the opposite standpoint, a fixed direct labour force and varying amounts of 'capital'. Either

¹ Paul H. Douglas, The Theory of Wages (New York: MacMillan, 1934) p.37 - 64 et passim.

case leads to the same pattern of iso-product curves. As is customary, these may be logically assumed to illustrate the law of diminishing returns.² Therefore, as more of the variable factor is combined with a given quantity of the fixed, total product first increases but beyond some point may be considered to start decreasing. Due to the assumption of linearity and homogeneity of the production function the slope of each iso-product curve is the same at the point where they intersect any straight line from the origin. All this serves to provide a definite background for the $g(T, N)$ production function where T and L are assumed to be given and constant. These facts and assumptions are presented in diagram I.

Perhaps it ought to be made clear exactly what is meant by T and R given and constant. Somehow there appears to be a contradiction between this assumption for T and R and the possibility of economic change. However, it was observed earlier that for a backward economy the economically more advanced nations may be considered to present in the working of their productive plant a blueprint of successful innovations. Thus, for the former, technology would appear as a body of productive 'know-how' whose operation could be checked against this blueprint. Now suppose for the moment that advances in technique and technology ceased in the most economically progressive nations. This would mean that the appearance of new innovations ceased as well, for without the one there is no basis for the other to occur. Yet, for the backward country where

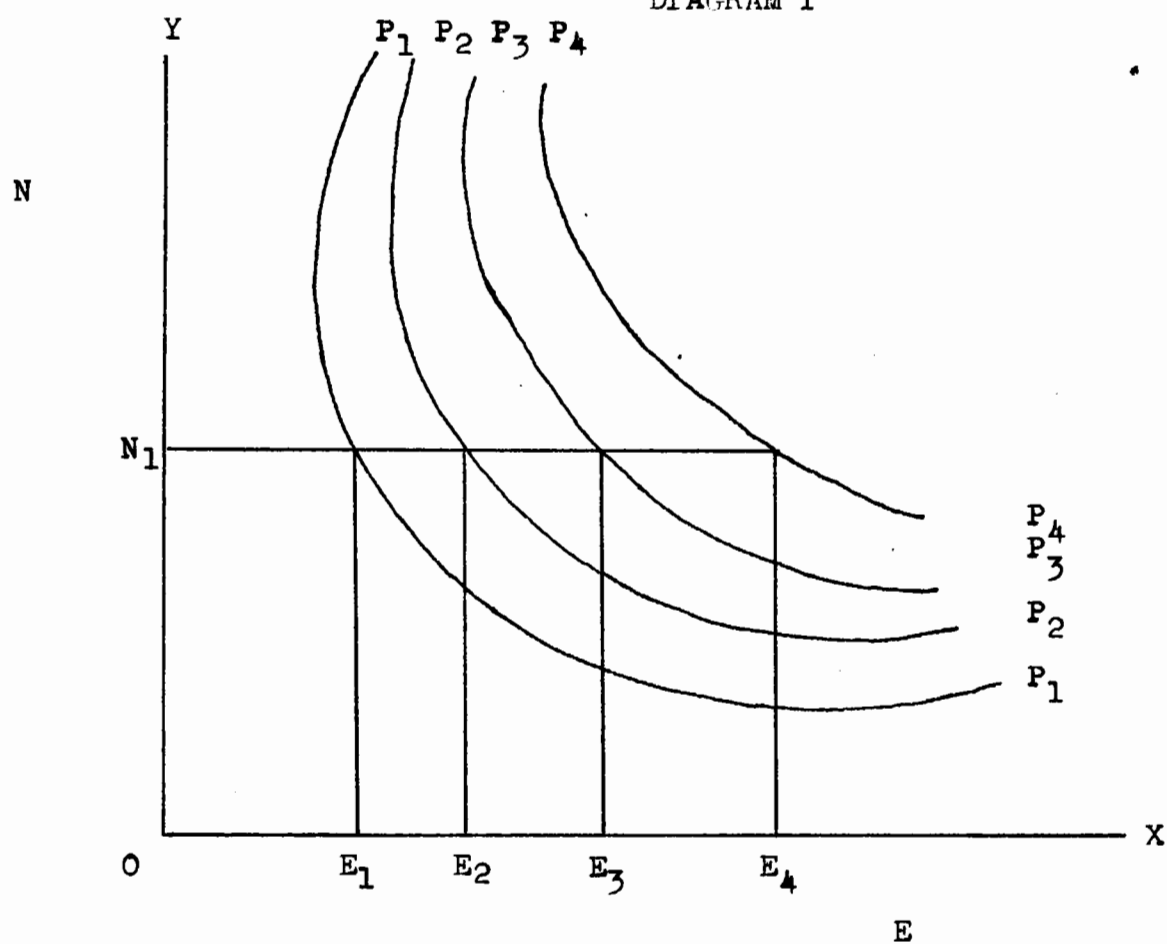
² J. Cassel, "On The Law of Variable Proportions", Explorations in Economics (McGraw-Hill:1936) pp. 223-236.

economic advance consists of duplicating innovations which are already successful elsewhere, it can still continue. This state of affairs would be what is meant by a situation where technology and technique are given and constant and yet there is scope for economic development. It will be argued later that this is not an unrealistic description of the condition of undeveloped areas in the contemporary world economy.

Now, let us return to the original argument for which these assumptions were being advanced. As well as for T it was also assumed that R was given and constant. The logic here is that abstracting from the fortuitous case of new discoveries, changes in the natural resource endowment of an economy result from changing technology. It is by technological progress that the natural elements become valuable resources or that old resources are given new, more profitable uses, etc. If it is justifiable to consider technology constant, it perpetrates no great further violence upon reality to deal with natural resources by a like assumption. Having set the stage with these various assumptions, the first major argument will be traced out with the aid of two diagrams.

Diagram . I is of the production function, $P = g(N, E)$. Suppose a particular economy has at a given time the ratio N_1/E_1 between direct and indirect labour; then its total product will be P_1 where curves $P_1 \text{ --- } P_4$ are an ascending series of iso-product curves. If with the passage of time the relationship between E and N were to change to N_1/E_2 , later to N_1/E_3 and finally to N_1/E_4 , total product will increase first to P_2 , then P_3 and eventually P_4 . If per capita product has increased, this sequence of changes in N/E agrees with what has been

DIAGRAM I



Graph of the production function, $P = g(N, E)$
 Direct labour inputs (N) are plotted along O -- Y and
 indirect labour inputs (E) along O -- X. P_1 -- P_4 are
 an ascending series of iso-product curves.

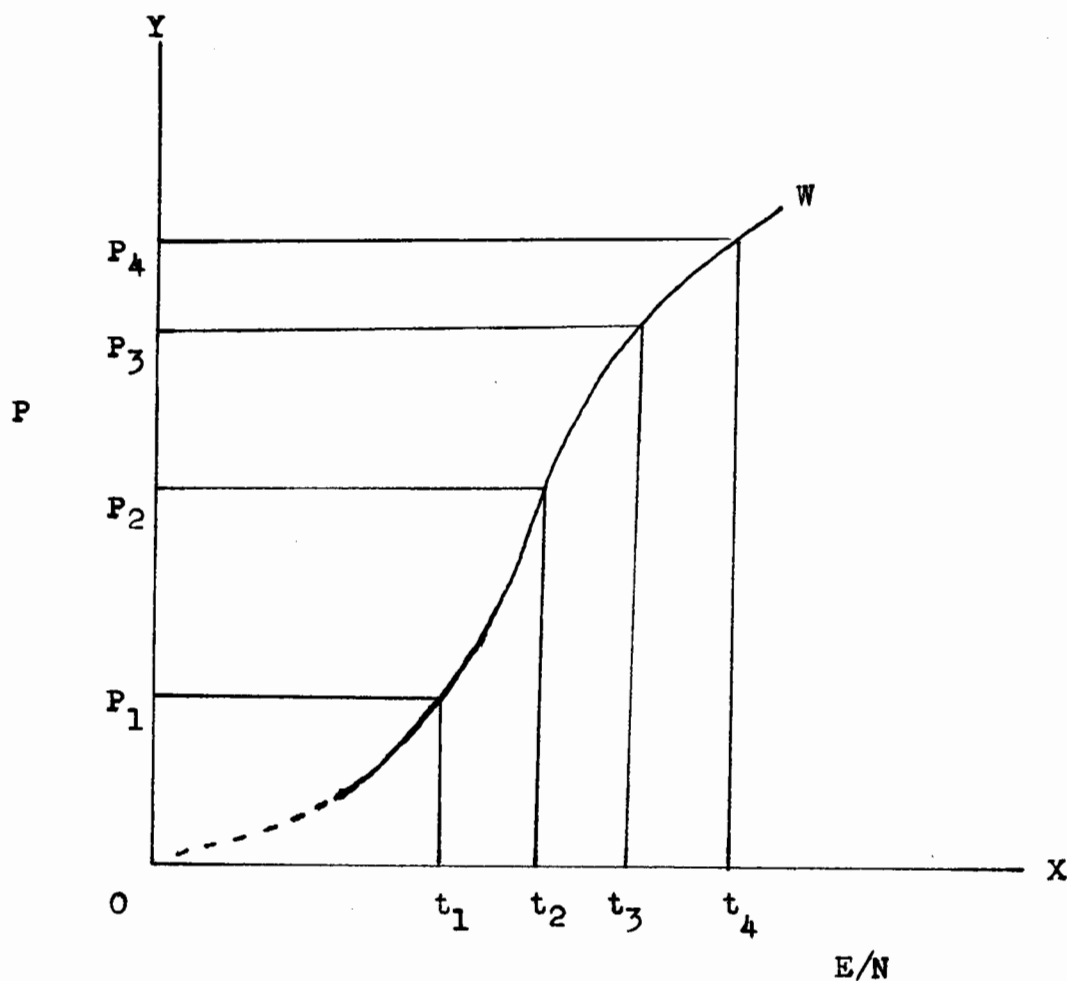
defined as economic development.

Diagram II illustrates the same sequence in a different form. Assuming, as before, technology and resources constant and an unchanging population of workers, then as the E/N ratio increases along the X axis, total product can be plotted along $O \text{ --- } Y$. Thus development is represented by the curve $O \text{ --- } W$ as it was by the movement onto successively higher iso-product curves in Diagram I.

Diagram I represents a static, timeless model of the production possibilities open to a backward economy at a given level of 'the arts'. As soon as it is known how E/N can change with respect to time, Diagram II becomes a graph of possible development and the slope of $O \text{ --- } W$ the rate of change in productivity attainable by the economy at that point. The movement of E/N in II depends upon a sequence of innovations. However, the speed with which successive innovations can be undertaken is dependent at basis upon the surplus available out of current production for autonomous investments. This is the connection between Diagram I (the function of existing production possibilities) and Diagram II (the functional relationship between labour, 'capital' and time as expressed by $O \text{ --- } W$).

In Diagram II total product is plotted against the E/N ratio; for any given value of N (direct labour) the larger the amount of capital (indirect labour), the greater, within limits, will be the total product. E and N are simply two ways of employing manpower; to increase the relative share of the former is to employ more men indirectly and fewer directly in the structure of production. To do this would be to utilize

DIAGRAM II



Graph of output for an economy using the production function, $P = g(N, E)$ where E/N and P are functions of Q and the latter assumes a series of values as the economy progresses through a sequence of income periods, i.e. a sequence of production-consumption periods. Along $O -- Y$ is plotted total product (P), along $O -- X$ the values for E/N at different time periods, $t_1 -- t_4$. At any moment there will be some given value of this ratio E/N which characterizes the productive structure of the economy. With increased investment this fraction will start to increase and gradually converge to some maximum value as the capital-intensity of the productive structure reaches a maximum.

methods of production that represented technological advances not possible with a lower E/N ratio, for such advances require an increased use of indirect to direct labour and only with an increase in E/N can they be incorporated into the productive structure.

As outlined in Diagram II, changes in total product with increases in E/N are a function of time and 'surplus'. The surplus of each period is devoted to innovations which result in a more efficient organization of production. By means of successful innovations, E will increase relative to N and per worker productivity be improved. For the backward nation relying on a blueprint of development furnished by the advanced country, this progressive change in E/N could go on until that point was reached where the given technology was entirely used up in innovations. Thus, we would have a description of what would happen for an undeveloped country were world technological progress to cease and its economy be in a position to proceed to use up the backlog of available innovations.

The next step in the analysis is to examine the functional relationship between P , $N - E$, total consumption, and surplus. For the present, total consumption will be explained by falling back on the classical concept of a subsistence wage. There will be further discussion of this point later. However, for now, the classical 'consumption function' may be broadened to include the notion of a 'subsistence' requirement for all members of society. Thus, given the prevailing hierarchy of social organization, the approved patterns of consumption for different classes, etc., in any economy there emerges an aggregate

subsistence requirement, its 'consumption function'.³ If this pattern of consumption is fairly stable, its individual requirements will not vary in the short-run. Accordingly, the consumption function for the economy could be assumed as of the form $C = c(N-E)$ where C is total consumption and (c) the socially prescribed average standard.

Now the production function already discussed was of the form $P = g(E, N)$. Moreover, as the amount of E relative to N was increased from very low levels, total product would increase as well. However, whether E is going to be able to increase relative to N depends upon the ability of the economy to carry out an innovation. This necessitates that there exist a 'surplus' of factors to be turned to autonomous investment. But upon what is the presence of such a surplus dependent? Obviously, the difference between gross national product and the subsistence requirement. Consequently, there is a simple, obvious relationship $P - C = Q$ where Q is the surplus. In any time period, the degree to which E can be increased relative to N depends on this sum, Q . Herein are sufficient facts to link the static production function (diagram I) to the dynamic process of development (diagram II). The equations of our system as so far developed are:

$$\begin{aligned} P &= bN^k \cdot E^{1-k} \\ C &= c(N-E) \\ Q &= P - C \end{aligned}$$

³ To some this may seem an unconventional use of the term 'consumption function'. However, the classical economists, just as the modern Keynesians, were interested in macro-economic aggregates, e.g. gross national product, national income, etc, as well as Ricardo's concept of 'Net Revenue'. But to arrive at net income, net 'surplus', etc. requires a statement of the relation between production and consumption for any economy. The classical economists viewed this relationship in terms of a 'subsistence wage'. This was their version of the 'consumption function'.

It was pointed out that apportioning labour between E and N so as to increase the share of E increases per capita productivity. Similarly, if the proportions were changed in the opposite direction, productivity would be decreased, assuming in both instances that population remained unchanged. Finally, if total population is increased and this goes into N, then per capita product is again decreased. If the 'consumption function' is of the form $C = c(N-E)$, then total consumption will have increased relative to total product. Conceivably, it could occur that population increased so much and E/N became so low that only by consuming the entire product could a minimal consumption standard be maintained.⁴ In this case, Q would disappear and development could not occur.

To show the working of our equations, let values be assigned for population, E/N and C. Assume that there is a Q and it is being turned over to entrepreneurs to be used in autonomous investments. This Q is the 'saving' out of current income and an index of the degree E/N can be altered during the subsequent period. The larger the Q, the more investment and hence development can be undertaken. Moreover, with a given technology, the final ratio between E and N will be determined by the time preference for present as opposed to future income at the margin,

⁴ Economic Background of Social Policy Including Problems of Industrialization, (Montreal: International Labour Office, 1946) p. 151 for a description of this in regard to the present Far-Eastern situation. 'Asia today is in an extremely difficult situation. In so far as the process of industrialization brings about a gradual rise in living standards, death rates will fall and the population will grow more rapidly than at present. If industrialization is slow, the population is likely to catch up with the increased production, and real income will fail to rise.'

i.e. where the marginal efficiency of capital equals the interest rate. However, the situation presently being considered is that of a backward country which has an ample blueprint to draw its innovations from and where the problem is to change its E/N ratio as fast as Q permits.

For this economy it has been assumed the technological blueprint remains constant for a considerable interval even though the more progressive countries may be transforming new techniques and technology into further innovations. In a backward country existing capital equipment will be scarce, the E/N ratio low. While there might appear to be all manner of ways in which direct labour could be converted into indirect, in actuality this will not be the case. The range of innovations which the under-developed country can undertake will be limited; not only will its amount of autonomous investment be small, but the uses to which this can be put, restricted.

"In the economically advanced countries, agricultural workers normally have some measure of general education and are familiar with the operation of agricultural machinery. This gives them a basic understanding on which can be built, fairly quickly, a grasp of the techniques needed at least for semi-skilled industrial processes. Industrialization in Asiatic countries however, is hampered by a shortage of the kind of labour required for modern industry. The capacities required differ greatly from those commonly found among workers in agriculture and household industries in these countries. The industrial worker has to be literate; often he has to be able to read blueprints; he has to understand the need for industrial discipline. The countries in question are all short of workers with these qualifications. The shortage varies from country to country, and from trade to trade, but it exists throughout the region. There is a shortage of managers, of capitalists willing to become entrepreneurs, of technicians and machinists. There is a shortage of all the more skilled types of labour needed in industry. This last shortage is of crucial importance. Resources can be imported, capital equipment can be imported or created at home. Skilled labour, however, apart from the few experts who may be persuaded to come from abroad, can be developed only by training.

Unless domestic labour develops interest and energy in acquiring the necessary skills, this training may take a very long time."⁵

This restriction will be such as to compel them to follow a fairly definite sequence of innovations as laid down by the already discussed blueprint. Most contemporary changes in technology and technique which occur will not represent possible innovations for the under-developed country. They are innovations it will be able to undertake only at some future time when it has proceeded far enough on the path of development as laid down in the present blueprint.⁶

There is this limited range of innovations that the backward economy can adopt and thus, its exclusion from many of the latest inventions because it cannot change its E/N ratio except to a limited extent and in a few directions. It cannot do this because its direct labour is illiterate, immobile, lacking in skills and economic incentives, etc.. In most cases where new ways of combining labour with other factors are found to be economical in the advanced country, owing to the poor quality of labour or a lack of necessary complementary equipment, these will not be applicable to the backward country. Technological improvements and new techniques which can be adopted in the advanced nation quite often will remain inaccessible to the backward until education,

⁵ Ibid., p. 143

⁶ Alfred E. Kahn, Investment Criteria in Development Programs, Quarterly Journal of Economics (Feb 1951). Kahn points out that investment in a developed, capital-rich economy is not the same thing as in an undeveloped one and cites as the basic differences in regard to the latter country, p. 57 'the very absence of the essential pre-conditions of economic progress--housing, transport, power, water systems, an established or readily cultivable domestic market, a literate, healthy, skilled labour force susceptible to economic inducements, an indigenous entrepreneurial or trustworthy managerial class.'

skill, markets, transportation, communications, etc have been considerably improved.

It is not possible for the under-developed country to skip over the innovations stipulated in the blueprint and rush ahead into those being at present undertaken by the advanced countries. Indeed, the production function of the backward economy may be best thought of as being separated by a time dimension from that of the advanced economy. The two economies are using distinctly different productive techniques, the backward country one which is markedly inferior in per worker productivity. It is only by a heightened rate of investment continued over considerable time that the backward economy could, if at all, approach the productivity standard represented by the production function of the advanced country.

Any given quantity of capital goods, productive equipment, real investment, however one chooses to label this category, consists of labour plus a time dimension. In fact, to translate such a given quantity of capital goods or physical investments into labour plus a time dimension merely makes this time dimension of capital explicit. However, an alternative method of recognizing the amount of capital being employed in a production function is to consider the number of stages into which production is divided and the present distribution of labour among them. In its most general form, the production function represents a relation between inputs and outputs. The inputs may be taken as labour and time, i.e. labour and capital equipment, or solely as a particular distribution of present labour (where it is assumed this present labour serves both to replace instruments of production currently used up as well as producing the current output of consumption goods). This latter formulation eliminates the need to include time

in the production equation.

In order to make certain that the above ideas are understood in the manner intended, the discussion of a production function $P = g(E, N)$ will be gone over to illustrate the two alternative ways of indicating capital, on the one hand as labour plus time and on the other as an existing distribution of labour among various types of productive activity. In the function, E and N have both been defined as labour, i.e. as different ways of employing manpower. E was manpower employed in the construction of machinery, plants, buildings, public utilities, etc.. In other words, it was manpower presently being employed indirectly by the productive system. At the same time, N was manpower being directly applied to the production of consumer goods. For any time period, the production function was considered to be some combination of these two types of labour.

As an alternative to this treatment, the same formal production function might have been used except the terms might have been defined as follows; N as labour, and E as 'capital'. Here E would stand for the physical productive equipment itself rather than a quantity of labour being employed indirectly in production. E is a population of machines, roads, buildings, etc., i.e. a summation of physical quantities and time dimensions. This is apparent when we try to express it as a quantity; to do so requires a summation of the undepreciated investments of

⁷ The first would be the J.B.Clark approach to capital, the second, that of F. Von Hayek. Cf., J. B. Clark, The Distribution of Wealth (New York: MacMillan Co., 1899) also F. Von Hayek, The Pure Theory of Capital (London; MacMillan, 1941).

the economy. With this, we have a production function similar to that in the paragraph above except (E) as indirect labour has been replaced by (E) as undepreciated capital equipment. The basic distinction in the two production functions is their way of treating the time dimension.

The fact that labour (direct) is combined with an aggregate of tools (capital) in the productive process can as well be expressed as a combination of two types of labour; namely, direct and indirect, cooperating in production, since there will be a unique relationship between the amount of indirect labour being employed and the amount of capital equipment existing in the economy. It may be asked what has happened to the time dimension that is implicit in the tools (capital) as a factor of production, where does it enter into the production function viewed as a combination of direct and indirect labour? In this latter formulation which was the one chosen for the present study, time does not appear in the production function; rather it is reserved for use as a dimension separating different production functions. Because the present study was of economic development, it was felt understanding of the basic process being examined would be facilitated by making time a discreet, explicit variable in the theory.

The backward economy has a low E/N ratio. Its capital equipment is so scarce and its economic organization so rudimentary that it will take huge amounts of education, buildings, railroads, power plants, etc., to provide it with the basic features of an advanced country. These are highly capital-intensive investments and until they are accomplished the presently undeveloped country will not have the labour force or the

complementary equipment with which to undertake what are now the current innovations of the advanced economy. The E/N ratio is an index of a myriad of investments; it is the present state of these in the economy. For the backward country this E/N ratio can only be changed by a huge amount of investment over a considerable time concentrated in basic innovations. Meanwhile, the innovations which are proceeding in the most advanced countries are going forward from a much higher E/N . They spring from a productive structure which in skills, machines, power facilities, etc. is far beyond the capacities of the backward economy.

For an advanced economy, an innovation is a qualitative change in production; it opens up a previously unrealized productive method. For the backward country the basic innovations which it must first accomplish are strictly quantitative changes; they are not discoveries of previously unknown techniques but rather gradual accumulations of investment to be incorporated in productive facilities that have already proved successful elsewhere. This illustrates the time dimension that separates the production function of the backward economy from that of the advanced. This time dimension which lies between the backward countries and the most progressive is usually expressed as a quantity of investment lacking in the under-developed country but present in the advanced. As far as the more basic of these investments are concerned, it is known what forms they should take in the undeveloped country, if and when the country can afford them. But surely, this is nothing more than the assumption that there is a blueprint of technology which can be considered to remain relatively constant in its outlines for the

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undeveloped economy.

If a blueprint of innovations has been satisfactorily established, it must be associated with a time dimension to give a schema of development for the backward country. The essential factor now is that for such an economy progress depends almost entirely on Q . The size of Q in any income period determines the autonomous investment which can be undertaken, hence the productivity increase possible in the next income period, and this in turn, the size of the next period Q . This state of affairs gives rise to a simple differential equation of the form:

$$\frac{dQ}{dt} = k Q$$

The rate of change in Q is a function of the existing level of Q ; solving for Q gives $Q = C_0 e^{kt}$. In other words, when $T = 0$ then $C_0 = Q$.

This would mean that development does not occur until Q is greater than 0 and equal to C_0 . If a backward country is in the unfortunate position where $Q = C_0 = 0$, there will be no development. That is, unless there were to transpire a technological advance directly beneficial to the country and capable of being taken advantage of without any investment being necessary, or there were a natural resource discovery, a sizeable

⁸ The advanced economy creates innovations whereas the backward economy has its blueprint of innovations already provided. For the former an innovation is a qualitative rather than quantitative change in its productive technique. By way of explaining this essentially qualitative nature of an innovation someone has observed that you could add together any number of stage coaches without getting a railroad. In other words, a railroad is not simply quantitatively, but more important, qualitatively different from a collection of stage coaches. However, for the relatively backward country, from the economic standpoint the process of acquiring a railroad is somewhat analogous to the physical addition of successive stage coaches. It will accomplish its innovations by virtue of such a summation process, namely, a periodic, cumulative investment in already known forms of productive equipment.

foreign loan; in other words, something would be necessary by means of which a surplus might at least temporarily arise. While there are unlikely to exist countries in which the situation is as bad as this, the example does seem to have a practical significance. There may be countries in which the E/N ratio is extremely low, where a very limited Q , although it could be attained, is not, either because of a failure to exploit the existing productive capacity to the maximum or the presence of an income distribution and social standards that completely exhaust any tentative surplus.

The present analysis of economic development serves to illustrate and explain some basic differences in the productive structure of advanced and backward countries. Actual methods of production in the latter may not be as primitive or inefficient from the economic standpoint as they seem when first compared with those characteristic of the more progressive countries. A nation whose present E/N is low and where Q is very small or even non-existent will of necessity be using its manpower in ways which must appear extremely wasteful. But given the human resources available, the opportunity cost of other productive methods, etc., those actually being used may be the best available. For example, take road construction in such a country. There will be few occasions where it will be economically justified to introduce modern earth-moving equipment for the job. This machinery is heavy, costly, highly specialized, difficult to transport even where there are well-developed road and rail systems, etc.. In consequence, the amount of labour it can replace may not compare favorably with the amount it requires even directly.

Probably such equipment will have to be imported, hence it must be paid for by domestic labour used in the production of exports. At this point, the effectiveness of domestic labour used in road building compared with that used in fabrication of the required exports must be considered. Finally, there is the lesser Q represented by a labour applied immediately as needed to specific road jobs as contrasted with that which would be tied-up in earth moving machinery and only over a long period and numerous construction projects converted into the desired product; namely, roads. This may be a crucial consideration for an economy where the current Q is extremely limited and therefore, it is most important to use it in ways that contribute useful product within the shortest interval relative to the needs of the economy.

There is another problem facing the backward country probably not as apparent but possibly of greater importance. In many cases this new difficulty may be the basic impediment to their whole process of development. There may be certain primary innovations without which the economy cannot undertake further economic progress of a really significant nature.⁹ The absence of these may best explain the degree of underdevelopment that exists today in countries that have actually had considerable foreign capital imports. These are countries with specialized industries in which they enjoyed a marked international advantage and have accordingly attracted large amounts of foreign capital. Yet, in many cases, this has not resulted in any significant economic progress

⁹ Kahn, op. cit., pp. 57

in the sense of an over-all development.

The reason for this is felt to be that such nations have never completed certain basic innovations which must to a degree ante-date other forms of economic advance. These consist of rudimentary education for the working population, the teaching of specialized skills to labour, the creation of an adequate transportation system, of communications, banking and the other attributes of a truly market economy. The explanation of this failure may be that relative to the available Q, such investments are large, long range and the advantages to be obtained indirect, communal and highly speculative even when undertaken in most propitious circumstances. Often they are investments where the marginal social product would exceed marginal social costs but where private costs would not exceed private products. Undertaking these investments might involve such a large measure of 'abstinence' that it would only be possible by extensive use of the public authority. These conditions seem highly typical of the world's major undeveloped areas at present.

These primary innovations once completed would have the effect of increasing the technology and techniques accessible to such countries; they are the necessary initial stage in a comprehensive program of development. In countries that lack the fundamental characteristics of a market economy such as these investments provide, the specialized market production is largely represented by a few fortunate industries

built with foreign capital to exploit a major natural resource or some¹¹ marked comparative advantage with which the economy is endowed. Generally the population will be living in small villages, perhaps densely distributed over the arable land and engaged in subsistence, non-market forms of production. There will be costly transportation between various sections and little labour mobility or market contact. As Adam Smith pointed out in his 'Wealth of Nations' and has been frequently elaborated by others, productive efficiency is a function, at least in part, of the¹² division of labour and this in turn of the extent of the market. In the circumstances portrayed here, markets are small, the division of labour at a minimum and there is a consequent sacrifice of productive efficiency.

There would be no point in specializing labour, introducing machinery, and thereby increasing productivity unless the essential attributes of a broader market were first provided. For example, consider a backward country where a valuable natural resource has just been discovered in quantity. An export trade will develop and its terms prove favorable. Thus, there will arise an excess of product over what was being produced and consumed in the economy before the discovery. But this surplus may go into an increase of rents and royalties for a

¹¹ Ibid., pp. 47 'Before 1914 most international investment in truly primitive economies (i.e. outside of Western Europe, the United States, Canada, Argentina, Australia and perhaps India) went into the development of export industries operating in more or less isolated segments of the debtor economies; it had a relatively small secondary effect on incomes and employment and contributed inadequately to economic development in these countries'.

¹² A.A. Young, "Increasing Returns and Economic Progress", Economic Journal (1928) pp. 533-34, concerning the relationship between the size of market and technological progress, he emphasizes the mutual interdependence of expanding output and expanding demand.

landowning class whose social position, rights, and privileges were acquired in entirely different circumstances from those in which they now find themselves. Moreover, without the opportunities for profitable employment of their increased income or the necessity for making profitable investments to protect their relative economic position, such as would be provided and required by a well-developed, competitive, market economy, this surplus is likely to go into luxury expenditures abroad, or the employment of servants, retainers, etc. at home. Thus, a good deal of the driving force that could stem from this initial surplus and result in a comprehensive program of economic development for the country is lost and with it the possibility of economic progress.

Suppose by an improvement of agricultural organization it were possible, without any investment being required, to increase the productivity of agriculture in such a country as has just been described. Then, with this re-organization, there would arise a surplus of agricultural labour. But if the transportation system is primitive, communications practically non-existent, etc., then the problem of employing this labour surplus in alternative occupations may be considerable. Widespread unemployment could result from the re-organization and thus, what was a more effective way of employing labour to produce the present food requirements of the economy prove quite valueless. Furthermore, even if it is not left unemployed, the labour 'saved' may go into many other channels than developmental investment, particularly if such investment must qualify by a standard of marginal

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private costs and returns. But if the basic innovations are somehow under-taken whereby the market is opened up to allow profitable private-enterprise applications of this increased labour efficiency and surplus of factors, then the initial productivity increase in agriculture will permit autonomous investments to be made throughout the economy. Productivity increases in other sectors as the result of this increased capital and further division of labour will occur, and the initial productivity increase diffuse its benefits in the form of a cumulative expansion of productivity and product. The market mechanism acquired by virtue of certain basic innovations furnishes the means by which the flow of manpower can be channelled to those activities where it will make the greatest economic contribution.

In an under-developed country, capital investment in transport--in railroads, highways, and waterways--usually produces a far greater productivity raising affect than can be expected from the same amount of capital investment in most other industries. By widening the size of markets, developments in transport bring about a higher degree of inter-regional specialization and, consequently, a fuller and better utilization of the country's human and natural resources, and enable agricultural and industrial enterprises to be conducted on a larger

¹³ Kahn, op. cit., pp. 39, 'The correct criterion for obtaining the maximum return from limited resources is marginal productivity -- or, from the point of view of society as a whole, social marginal productivity (SMP) taking into account the total net contribution of the marginal unit to national product and not merely that portion of the contribution (or of its costs) which may accrue to the private investor'.

scale, to which more efficient methods of production can be applied. The particular activities associated with the Schumpeterian entrepreneur depend upon such a market economy. In this respect the rise of the entrepreneur is very closely related to the appearance of a proper economic environment.

In the formula $Q = C_0 e^{kt}$, development can take place when Q reaches a certain minimum value, C_0 . Moreover, Q will henceforth increase *pari passu* with development and for the undeveloped country continuing economic advance is largely to be explained by this sequence. The role of population and 'subsistence' in economic development is clear if one remembers the arguments used to arrive at the relationships $S = s(N-E)$, $P-S = Q$ and $Q = C_0 e^{kt}$.

For the backward economy the rate of economic progress may be considered as entirely dependent upon the size of its surplus (Q). There is a backlog of technology and technique already operative in the more advanced countries and furnishing the prototypes for innovations which the backward could undertake if it has the necessary funds free for investment, or in real terms, the necessary surplus. Moreover, if and when $Q = C_0$ development will occur. But if, at the same time, either the 'subsistence' requirement of the population or its numbers increase so as to more than balance the gain in productivity, then Q will be diminished rather than increased. This could mean that further development was arrested and the welfare of the population eventually forced down to or even below its original level. The country will now

be supporting a larger population but in conditions as miserable or even worse than they were in the beginning.

Another aspect of development so far excluded from the discussion may exercise an important influence on the process. Initially, in order to provide a definite background for the subsequent argument, it was assumed that the production function was linear and homogeneous, i.e. constant returns to scale. This assumption can now be discarded, in fact, there may be an early stage in which Increasing Returns play an important role in over-all development. What have been called the primary innovations and with which a country takes on the essential characteristics of a market economy, are fields where there are likely to be such increasing returns. These investments often consist of complete systems, roads, railroads, power and communication facilities, for example, and up to a considerable size merely increasing their dimensions more than to a corresponding extent increasing their capacities. Moreover, with such investments, an economy becomes increasingly better able to use its resources and factors more efficiently and transfer them speedily among various industries to take the greatest advantage of technological progress and maximize worker productivity. Herein are illustrated two types of increasing returns; those to particular firms and industries and others to the economy generally. It has been recognized that such innovations are often of a type wherein a balancing of social costs and advantages would warrant their construction although

¹⁴ Colin Clark, The Conditions of Economic Progress, (New York: MacMillan, 1949) Revised Ed. pp. IX et seqq.

a purely private estimate of their profitability might not.

These facts furnish the economic rational for the following sequence of events; to expedite its economic progress a country raises a tariff barrier against manufactured imports. This encourages domestic investment in the protected industries and since these in turn require services provided by the primary innovations, there results an increased demand for the creation and extension of such industries. This increased demand for services of the industries representing basic innovations makes them more profitable from the private enterprise standpoint. This may prove one of the ways least offensive to a private enterprise economy for encouraging these basic innovations. Manufacturing is stimulated by tariff protection and this increases the need for services provided by large, indivisible, capital intensive industries of increasing returns, both private and social. This may well have been essentially what the protectionist writers of the 19th Century had in mind in their arguments. There is likely to be a stage in economic development associated with them. Whereas, a narrow economic specialization too early may result in social stagnation and arrested economic development.

At this stage it may be helpful to summarize the arguments of this chapter and indicate the future course discussion is intended to follow. The immediate need was felt to be a quantitative theory of development by which to supplement Schumpeter's qualitative theory. By being expressed in macro-economic aggregates it was felt a theory could best

¹⁵ Ibid., pp. IX on the connection between economic development, increasing returns and protection.

be prescriptive for the immediate problems facing undeveloped areas. Such a theory might use as its variables the economic aggregates Y, I, S, and C and fit these into a framework having time as an explicit dimension. The very concept of 'economic development' implies this role for the time dimension. The necessity for making time a primary, explicit variable dictated the choice of a production function. Finally, a definition of economic development was framed so as to be consistent with this production function.

For the advanced economy, total product and economic development were stated as functions of R, E, N, and T; for the backward, as functions of E and N only. The idea of 'surplus' was used to link production functions and equations of development. For the backward economy the surplus and its rate of growth furnished the complete tie between the production function and the course of development. As thus worked out, the following equations are felt to retain the essential qualitative characteristics of the Schumpeterian theory and yet allow for the quantitative differences that distinguish development in the backward economy from the same process in the more advanced.

Advanced: $P = f(R, E, N, T)$

$$\frac{d(P)}{dt} = \frac{d}{dt} f(R, E, N, T)$$

Backward $P = g(E, N)$

$$\frac{d(P)}{dt} = \frac{d}{dt} g(E, N) = C_0 e^{kt} = q(Q)$$

These equations give a theoretical schema which can be translated into the relevant quantitative terms for any individual economy by

assigning appropriate values to the various aggregates and functions. Moreover, with sufficient statistical information, development as an historical process or as a current rate of change can be determined for the various countries and economic areas making up the present international economy. The theory of economic development has thus been brought to a stage where it can be readily translated into the macro-economic concepts of gross national product, national income, consumption, saving and investment. In the next chapter there will be a brief summary of economic development as an historical event of the last hundred years. It will be an attempt to discover what patterns of change in these macro-economic aggregates for individual economies this historical process seems to indicate. It is hoped a study of contemporary statistics and historical facts will furnish the necessary data for these equations. If so, these equations can be used as a theoretical framework in which to study the immediate problems, domestic and international confronting backward areas of the world today.

CHAPTER IV

THE PRESENT WORLD ECONOMY

AS A PRODUCT OF HISTORICAL DEVELOPMENT

In the Nineteenth Century, economic progress was for most nations a process of becoming more like England; today it might better be described as becoming more like the United States. While inadequate as an analysis of what happens, this does emphasize an important aspect of the process; namely, that for undeveloped countries economic advance will necessitate the building of a productive structure similar to that of the more progressive nations. The greater productivity and income of the latter is due to the successive modifications of their human and material resources, and, as has been argued earlier, these modifications can serve as a blueprint for the economic progress of countries further down the scale of development.

In biology, the distinction is made between development of the species (phylogeny) and of the individual (ontogeny). In international economics, the historical sequence of innovations, which has occurred in the more progressive nations, may be considered analogous to phylogenic development ---- the history of the species. The technological blueprint which these completed innovations present to the backward areas may be compared to ontogenic development. Furthermore, in biology it is usual for individual development (ontogeny) to retrace the stages through which the type or species has evolved (phylogeny). There is a somewhat

comparable sequence in economics; the undeveloped country, to increase its productivity and income must duplicate the capital equipment which the more progressive nations have accumulated historically.

According to Schumpeter, the successive innovations of historical development are the root cause of fluctuations in economic activity--- the business cycle. There is a wave of prosperity caused by the autonomous investment of each innovation. Diffusion of the innovation throughout the economy gives rise to a further crop of investments, a secondary wave in each era of prosperity. The tempo of economic activity proceeds with an increasing momentum until costs, prices, demands and supplies are changing with an unpredictability that make entrepreneurs hesitate to undertake any new investment; they no longer have a reliable datum from which to plan. At this juncture, deprived of the expansionary force of further autonomous investment, the economy passes through a period of re-orientation to a new circular flow incorporating the advantages of the previous innovation.

Historical development can be thought of as a sequence of such prosperity engendering waves of investment each of which has taxed the investment capacity of those nations in the vanguard of progress. Consequently, economic progress for the presently backward areas would involve satisfaction of an accumulation of such innovations each with its quota of investment requirements. However, the comparative poverty of these backward countries makes any autonomous investment whatever a severe burden upon their national product. Hence, their economic progress will likely prove to be a slow, speculative and difficult, where

not an entirely impossible undertaking.

In the last century, over widely separated regions of the world, there occurred a spectacular economic growth. International borrowing, as a movement of privately owned capital directed by individual self-interest, permitted certain undeveloped areas to acquire the necessary capital, imports, etc.. Economic progress spread from Great Britain to Germany and the United States, and, more gradually, to Canada, Australia, New Zealand, the Argentine and Uruguay. This was accomplished in an era of comparatively free trade, unrestricted capital movements and a minimum of planning and direction by the governments concerned. But this 19th Century formula has apparently not been adequate to overcome the difficulties of development encountered more recently by India, China, the Middle East, South-east Asia, etc.. In recent decades the growth of international productive capacity has been largely restricted to further increases in that of nations already comparatively well-endowed. If the benefits of economic progress are to be extended to this latter group it seems necessary to recognize that the problems involved are distinctly different and require substantially dissimilar treatment from those used so successfully in the 19th Century.

To illustrate the dissimilarities between development as it occurred in the U.S., Canada, New Zealand, the Argentine, etc., and the task facing

¹ Bachanan, pp. 536, in regard to growth of mfg. production and its narrow concentration.
 1870 U.S. 23.3%
 Ger. 13.3%
 U.K. 31.8%
 While index rose from 14.4 in 1870 to 135 in 1938, these three still accounted for over 50%.

India, China, the Middle East, etc., today, reference can be made to the theoretical schema outlined in the last chapter. In the first group, population has never 'pressed upon the means of sustenance'; immigration only tended to occur as the manpower needs of the economy grew and its productive equipment was expanded. Immigrants, when they did arrive, were generally literate, often skilled, at an age to be vigorous and productive, etc.. Therefore, E/N was always kept high, (C) relative to $\frac{P}{N-E}$ was small, Q large and capital accumulation consequently rapid. The situation might be analyzed in greater detail, but it is obvious from this brief outline that these countries presented a highly propitious environment for economic development.

By contrast, in the second group of countries at the present time, $\frac{P}{N-E}$ is small and (c), while a minimum in absolute terms, is nevertheless very large relative to productivity. Accordingly, Q is either meagre or non-existent and the population function such that any development which were to raise productivity likely would be swallowed up by a growth in numbers that would prevent any permanent increase in Q. To lapse into a Malthusian terminology, the population appears to have a tendency to increase at a much greater rate than capital can be accumulated with which to effectively employ it. From the two situations as here outlined, it is obvious that development presents a much more difficult task to the second group now than it did to the first group during the last century.

Recent history and statistics of world trade and international income illustrate how much economic progress has been limited to a few

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 fortunate areas. The industrial revolution occurred first in England, spread to France, Germany and the United States. In the final decades of the last century and the first of the present, it tended to distribute its benefits among a widening circle of nations; Canada, Australia, New Zealand, etc.. Subsequently, a high rate of progress has continued in these areas.

During World War I, the growth of productive facilities in Europe either ceased or was diverted to military purposes. Meanwhile, there was an accelerated increase in productive capacity in the United States and to a lesser extent in the other advanced countries outside of Europe. Some increases even occurred in the major under-developed areas, India, China, etc., but it was insignificant relative to that necessary to provide a minimum national income by the standards of the more advanced countries. In the 1920's further progress was made on the basis of war-inspired technology. A consequence of all this has been a marked differential in incomes and productive capacity between the advanced and backward countries of the present international economy. The 1929-32 depression, most severe and longest lingering in the United States, diminished, at least temporarily this increase in the mal-distribution of income and productive facilities. But further technological advance born of the drive to increase industrial efficiency and reduce costs, during the period after 1929, particularly in the

2 Colin Clark, The Conditions of Economic Progress, (London: MacMillan, 1939) pp. 3, 'entire world production of economic goods and services averaged over the decade 1925-34 was 254 milliard I.U. per year. As much as 119 milliard of this was produced in the four largest economic units (U.S., Great Britain, Germany and France).

the United States, meant the trend continued, at least in terms of potential capacity and full employment incomes, and would become apparent with a revival of prosperity.³

All this has tended to divide the international economy into one group of nations with high, and another with low, per capita incomes. The second group have a small per worker investment in productive equipment to which may be largely attributed their poor showing as regards productivity. By contrast, the economically advanced countries are well provided for in this respect. There is abundant investment, high productivity and large per capita incomes. Moreover, these differences are so great (per capita and per worker) that the countries which have collectively enjoyed the major share of the benefits of economic progress, although they include but a small fraction of world population, and hence of the world labour force, account for the overwhelming share of productive capacity and produce the corresponding bulk of its income.

In the countries with low per capita incomes, aggregate annual savings are small. There is little currently available for investment and a scarcity of capital equipment, particularly of the more intensive sort, is an obvious result. A small annual net investment cannot lead to any substantial accumulation of capital per worker, especially if

³ Ibid., pp. 6 where Colin Clark makes the following reference to this period. 'Some powerful secular force probably related to the investment and savings tendencies of the community is keeping down the level of achieved real income while the potential real income, if all the population were employed, continues to rise'.

the workers, i.e. the population, is increasing. But in the advanced countries where per capita income is high, large aggregate savings can be associated with comparatively opulent living standards and there still occur a huge per worker accumulation of capital.

This brief description of backward and advanced countries is an outline of what actually exists. It is the task of an historical or theoretical analysis to explain these facts. In any such explanation, the assumption that is made regarding the relationship between total product and total consumption and the behavior of these aggregates will be of the greatest importance. There are three possible alternatives among which this assumption must choose: total product increases faster than total consumption, at the same rate, or more slowly. Among these alterations the one chosen will in turn determine what is to be the secular change in the 'surplus' (Q) of the economy. The primary role of Q , especially for the under-developed country, in regulating its maximum rate of economic development has already been discussed in Chapter III.

Now let us refer back to the theory of development summarized in the system of equations on page 62. For the advanced countries of the contemporary world economy, $\frac{P}{N-E}$ will be large as well as the E/N ratio. If total consumption as a percentage of total income has remained constant over the course of development, then the present Q will be the same fraction of present P as earlier Q 's were of earlier P 's. But the absolute amount of Q will have increased since it is a constant fraction of an increasing P . Hence, even if consumption is

assumed to increase *pari passu* with productivity, the absolute amount of Q will be increasing, and to the extent development is dependent upon Q , it will tend to proceed at a cumulative rate. Alternatively, if it had been assumed that C increased more slowly than P , Q would be increasing even more rapidly than under the first assumption, and the development due to this could be proceeding at a heightened rate. Of course, if C is assumed to increase faster than P , then as development proceeds, the absolute value of Q is reduced, and the process of development, to the extent it depends upon 'surplus', is slowed. In this case, development would gradually converge to some level at which economic progress for the particular economy concerned would cease.

Now in the equation of development (chapter III), the economic advance of more progressive countries is considered a function of changes in technique and technology (T) and natural resources (R) as well as of the size of Q . Consequently, if Q were held constant for the advanced economy, development could still proceed by virtue of changes in these other factors. Moreover, there is another aspect of economic activity in such a country which limits the necessity for Q increasing in order that development may proceed at some cumulative rate. In an advanced economy, with a large $\frac{P}{N-R}$ and E/N ratio, not only is total capital equipment large but also its annual replacement. A great deal of innovational investment may be accommodated by what would have otherwise been ordinary replacement had (T) and (R) not changed. Consequently, as an economy increases its E/N ratio, it

becomes progressively less dependent upon net investment in order to achieve further economic advance.⁴ An advanced country, because of this, might enjoy some cumulative rate of economic progress even if consumption tended to grow faster than total product. Theoretically it would be possible for economic development to continue without abatement where the secular increase in consumption completely exhausted Q provided that innovations resulting in sufficient productivity increases could be created via technological improvements applied to its annual capital replacement.

The situation for presently backward countries will be largely the reverse of that for the advanced; $\frac{P}{N-E}$ will be low, also E/N , and even if the ratio of C to P is no higher than for the advanced country, $P-C$ as an absolute amount will be much smaller. Then, too, the only major factor in its development equation is Q , therefore, it is particularly dependent on this 'surplus' which in turn is so small. The conclusion to be drawn from all this is that given values for $\frac{P}{N-E}$, E/N and Q likely to be representative of countries identified as backward and advanced in the contemporary world economy, then, inside of a wide range of assumption regarding the secular change in the total consumption of product for each type of economy, it is apparent that economic development is likely to be much slower in the backward

⁴ Alvin Hansen, Fiscal Policy and Business Cycles, (New York: Norton & Co., 1941) Chap. XVII. on extensive and intensive development.

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countries. Any attempt to increase the rate of development in these backward countries in order to narrow the gap separating them from the presently more advanced meets with very sizeable difficulties. Finally, if to these outlines of development in backward and advanced countries are added values for population changes that would be relevant for each, then the situation of the backward country as far as closing this gap is concerned, is further worsened.

It may be interjected that this difficulty of closing the gap between the presently advanced and the still almost completely underdeveloped countries is not the essential point at issue. If countries already at a high level of economic well-being continue to progress, it is not so important that backward ones should manage to narrow the gap as it is that some development takes place meanwhile in the latter. In other words, it is absolute development, not relative, that the backward areas are primarily aiming at. However, it is important to realize that the various sections of the international economy are connected by a complex of commercial and financial relationships. Therefore, without going into the details, they will be investigated at a later stage, it is well to point out that what any single country can do in the way of autonomous investment and development is largely

⁵ In the analysis as so far presented, (Q) has been taken as synonymous with what is usually defined as voluntary saving out of a full employment national income. Such savings represent the aggregate an economy would willingly refrain from consuming out of its full employment income, given constant prices. Strictly speaking this is only one type of 'surplus' in the sense of resources available for investment; others would be forced savings and a foreign trade import balance. These will be considered in detail at a later stage, but the present conclusions are formally correct for whatever definition of (Q) i.e. 'surplus', one wishes to consider.

conditioned by what is going on in the rest of the world. But a very important aspect of these 'goings on' in the rest of the world is concerned with comparative changes in productivity and income in other national economies. The disparity in relative development between backward and advanced countries will condition their international economic relations. When backward countries face the problem of how to increase their economic efficiency and well-being, their economic relations with the rest of the world economy and particularly with this advanced section of it may be a very important determinant of what they can or cannot undertake in the way of development.

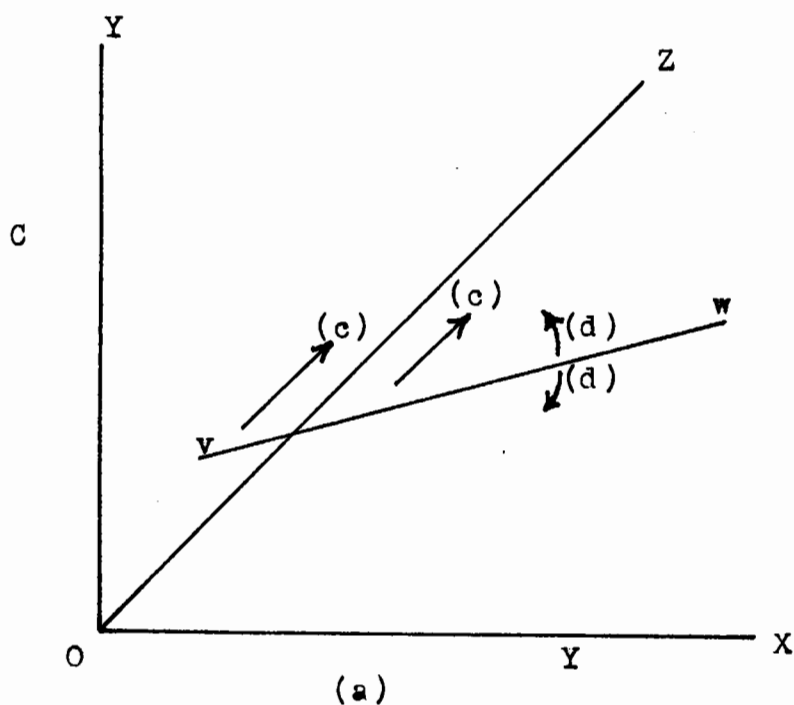
In the recent discussion, the arguments were stated in terms of total product, total consumption, and changes in these for an economy. These were treated as the basic quantities and assumptions necessary to the determination of Q . Total product was defined as a function of aggregate productive factors, namely, (E, N) and total consumption as of the form $C = c(N-E)$. At this juncture, in order to refine the explanation and state it, when necessary, in terms of less than full employment of all factors, as well as to make it more truly dynamic by allowing for relevant fluctuations in Y, C, I , etc., it is necessary to inquire more fully into the relationship between C, Y and Q .

Statistically, as well as conceptually, it is quite easy to indicate what is meant by the C/Y ratio of an economy. A time series of C plotted against Y would disclose the changes in this ratio occurring in response to changes in income. At a moment of time, or within whatever period one wishes to qualify as 'the short-run' small increments

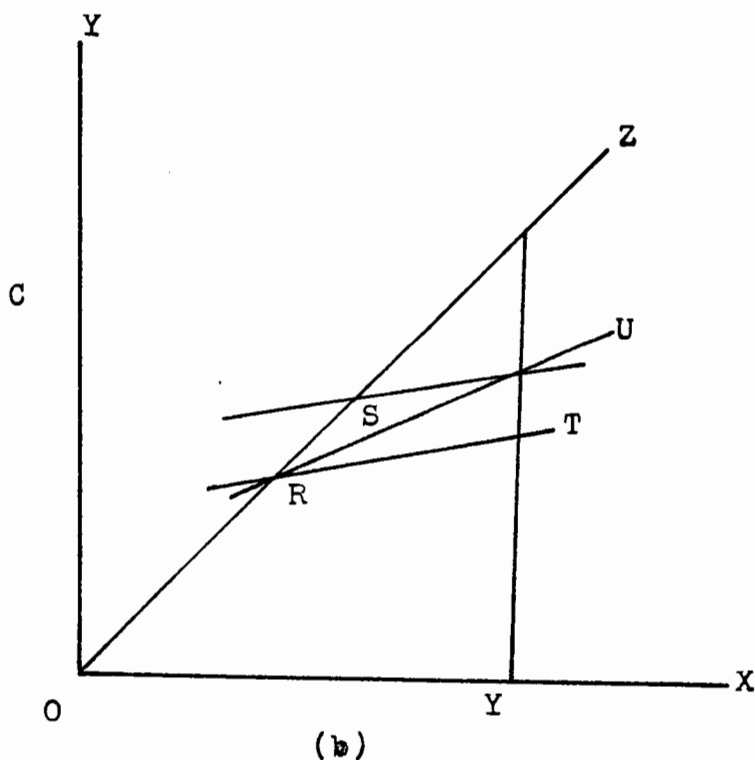
decrements in total income very likely result in different relative increments or decrements of consumption than would the same income change if taken over a longer time period. In other words, the C/Y ratio of an economy has two aspects, each relevant for a particular time dimension. The marginal propensity to consume is operative in the short-run and the average propensity to consume in the long-run. Moreover, at a given moment of time, to look at the situation in terms of a graph of Y and C , such as diagram E, the average propensity to consume might be considered to determine the absolute level of consumption and the slope of this the marginal propensity to consume.

Diagram III shows the C/Y ratio as it would emerge if consumption were to be plotted against national income. The slope of the consumption line is $\frac{dc}{dy}$. As income increases secularly, the position at which the line of total consumption intersects a 45° line shifts to the right. Moreover, for any level of income, this point of intersection equals as much as the slope of the consumption line enters into the ratio between consumption and income which actually results. This is illustrated in diagram where a change in the point of intersection from R to S is the equivalent of a change in slope $\frac{dc}{dy}$ from R-T to R-U. In each case, the change in C relative to Y and hence the actual C/Y ratio at income Y_1 is the same. A change in C/Y as progress occurs can either be the result of a change in $\frac{dc}{dy}$ or in this point of intersection. Consequently, any assumption regarding the secular change in the average propensity to consume of an economy or of comparative propensities in different economies must be coupled with a statement regarding marginal propensities in order to give

DIAGRAM III



This diagram shows possible changes in the relation between income and consumption as economic development occurs and national income increases. Values for income appear along $O \rightarrow X$ and corresponding values for consumption along $O \rightarrow Y$. (c) arrows show secular upward shift of consumption along 45° line, $O \rightarrow Z$, (d) arrows, the possible changes in slope of $v \rightarrow w$, i.e. the marginal propensity to consume. Both tendencies (c) and (d) if operative will affect the C/Y ratio of the economy.



a complete picture of the consumption-income relationship.

In the previous diagram, the point at which the consumption line, at a particular moment of time, intersected the 45° line was as important to the determination of the actual C/Y ratio prevailing at a given income as was the slope of this line, $\frac{dc}{dy}$. This point of intersection indicates the level of income at which C/Y is equal to unity; it is where the socially prevailing consumption standards insist that sufficient disinvestment occur if necessary to prevent any further decline in consumption. The income associated with this intersection of consumption and a 45° line is something of a modern counterpart to the classical (Ricardo, Mill) concept of a subsistence level of income. It might be called the minimum subsistence income of the economy. The social emphasis in its determination is also in keeping with 'subsistence' as these classical writers thought of it, for they were very much aware of the social nature and communal factors in the determination of the individual's 'subsistence'. As a final refinement of the concept of a subsistence national income, it can be taken that the marginal and average propensities to consume determine the total consumption out of any national income between this minimum level and what the economy would choose to consume at a full employment level.

To study the problems of backward areas, it was necessary to work out a theory of what economic development involves and how it proceeds in such regions. For this purpose the Schumpeterian theory, while serving as a basis, was modified to incorporate specific production functions stated in terms of economic aggregates; E , N , and where

necessary T and R. The process of development was framed inside an explicit time dimension. That is, the basic variables E/N and P were treated directly as functions of time and the others could be expressed indirectly in terms of time. T and R, where it was necessary to do so, specifically in the case of an advanced economy undertaking further progress, could also be considered as functions of time. Superficially, it might appear that all this is sufficient to make the theory dynamic. However, it must be realized that the theory only explains economic development as a temporal process in the sense of outlining what would be the maximum rate of development. The equations are all worked out on the basis of maximum product and hence of maximum Q and the greatest possible volume of autonomous investment and economic progress. To make the explanation truly dynamic, it is necessary to consider the income, surplus, and hence, economic development which actually does occur inside an economy that experiences fluctuations in income, and where only occasionally will the total income represent a full-employment maximum.

It becomes apparent from the consumption function already discussed and the manner in which it determines C, that Q will vary between zero and a maximum as national income fluctuates between its 'subsistence' and full employment levels. By interpreting our modified Schumpeterian explanation in a Keynesian context where Q is identical with autonomous investment, then, the range of short-run alternatives within which the developmental activity of an economy must lie, can be demonstrated. Economic development over a period of time is resolvable into what has

happened to P, C and Q during the sequence of short-runs making up this total time period. Of course, distinct short-runs separated from each other by a considerable time dimension will vary qualitatively as well as quantitatively, in that, not only will total product be different but the functional relationships between product, consumption, surplus, etc. will, or may, have changed. Nevertheless, the above outline represents the proximate relation between long-run economic development and a summation of short-run situations which is such an important aspect of the process in the backward economy. Moreover, this conceptual linkage of the short and long-run is a most important feature of a theory of development. Progress of an economic sort and for a backward economy is rooted in a time dimension, and what happens in the long-run can be nothing more than the logical accumulation of what has been happening⁶ in the sequence of short-runs of which it is made up.

Income fluctuates between 'minimum subsistence' and full employment levels as Q ranges from zero to a maximum. From the standpoint of economic development, this constitutes the fundamental occurrence in an economy during the short-run. For the international economy in the short-run, there will be a unique distribution of the total investment among the individual nations. The quota for each country being determined by a complex of forces, but of necessity falling between the limits outlined above. Finally, the distribution of this international investment, or Q, will determine the pattern and progress of development in the various

⁶ It was in order to adequately examine this fundamentally important tie between the short and long-run in economic development that a Clarkian type formulation of the production function was chosen in Chapter III. Cf., pp. 49, especially footnote 7.

areas of the world economy during the interval being considered. This is true providing individual countries don't experience balance of payments surplus or deficits. Of course, if a nation transfers some of its Q to another via international lending and a trade surplus, then, the Q does not represent development in the original nation, and it may, or may not, represent development in the second, depending on whether it is used by it for investment or consumption purposes. As a background to international trade and development, the distribution of potential Q among the nations of the world economy gives a range of possibilities for each country which will serve as one datum or restriction on its ability to undertake development in the short-run. Unless the international distribution of autonomous investment can be altered to a significant extent by capital transfers, etc. those countries most in need of development must get along with their very limited means while more advanced nations have an over-abundance of Q relative to their investment possibility.

There does exist an international economy and the tie between its various units, the individual countries, consists of exchange rates for their various currencies on the one hand, and of a price structure for goods bought and sold within the domestic economy of each country. If it is assumed, that in the short-run, these exchange rates and national price structures do not change, then, the international distribution of investment will determine the national income of each country up to its full employment level. The short-run process of economic development for the international economy may be represented as the outcome of the following sequence of events. Individual nations frame their investment and development plans and proceed to undertake the required

expenditures, both domestic and foreign. These, together with their consumption expenditures, account for the level of national income within each country. There arises an international distribution of imports, exports, investment and lastly, of actual development.

This sequence emphasizes the close inter-relation between the investment and development plans of individual countries. Also, it is a handy background from which to point up some of the conflicts which may arise between various sectors of the international economy and the connection between economic development and price structures. Suppose, that with a given technology and a particular distribution of natural resources and capital equipment internationally, as well as a fixed pattern of exchange rates and national price structures, that a particular country, at a less than full employment national income, undertakes a program of economic development, broad and comprehensive in scope, and looking to the long-range needs of its population. Such a program as requires large investment expenditures and will tend to bring the national income to a full-employment level. However, the rest of the world may be pursuing a much less expansionary fiscal policy and may be electing to remain at some less than full employment level. For the developing country, the results of its domestic expansionary program will be that as income expands, imports increase. Also, as full-employment is reached, domestic prices will rise and inflation at home will give further stimulus to the demand for imports. The country will be confronted by a brace of problems; domestically there is inflation and internationally a trade deficit. Certain measures will be required to

preserve the domestic price structure and others to restrict the growth of international indebtedness.

In international trade theory, the concept of Comparative Cost has had a long, influential history. Among others, it has been successively formulated by Ricardo, Mill, Marshall, Edgeworth, and its basic idea, the determination of comparative advantage, carried over into more recent theorizings by Heckscher and Ohlin. In these various statements of the theory, whatever the factors considered as determining 'cost' and therefore giving the dimensions in which comparative advantage is calculated for particular products and countries, there logically follows from this type of analysis a strong presumption in favor of free trade and a maximum international division of labour. However, just as Mill demonstrated that to the Ricardian formulation of comparative cost it was necessary to append an explicit analysis of international demands for specific goods, so the Keynesian theory has pointed out the relationship between free trade, international division of labour⁷ and aggregate international demand. In fact, any cost theory, comparative or otherwise, is by nature built upon assumptions regarding relative scarcities and the behavior of prices, supplies and demands. Mill showed that inside the limitations imposed by comparative costs, prices for internationally traded commodities would be determined by the structure of international demand. Keynes can be used to show the relationship between domestic investment and consumption, national incomes and

⁷ Seymour E. Harris, editor, New Economics (New York: A. Knopf, 1947) Part V, particularly Chapter XXI by Ragnar Nurkse, "Domestic and International Equilibrium", pp.264-93.

aggregate international demand, exchange rates and price levels.

Contemporary formulations of the theory of comparative advantage in terms of a generality of factor scarcities and the free trade and division of labour conclusions drawn from it are being framed upon a courageous assumption regarding the nature of aggregate international demand, namely, that there exists world-wide full employment. But even to assume international full employment will not resolve all the qualifications which must be placed on this theoretical endorsement of free trade when economic development is being considered. If there are industries of increasing return, then, it will be to the advantage of a nation to protect them and foster their maximum expansion within its boundaries.⁸ Moreover, in regard to free trade and economic development, it must be recognized that the consumption functions and amounts of autonomous investment in each nation influence the relative economic positions of all the others. In the short-run, what a country does or can do under the heading of economic progress depends upon its income, consumption and savings characteristics and the corresponding functions plus the levels of autonomous investment prevailing in the other countries of the international community. Moreover, deficits and balances arising in the trade between national economies will tend on the one hand to change income and employment in the individual countries and, on the other, to bring about necessary alterations in exchange rates and domestic price levels. Inside this complex international framework, the economic

⁸ Colin Clark, op. cit., pp. IX

activity of each individual country is conditioned, and among other things, its rate of economic development determined.

If a country whose international accounts are in equilibrium at a less than full employment level launches upon a program of development, its ensuing expansion of employment and income may result in varying degrees of domestic inflation and almost inevitably in a trade deficit in its current international accounts. If its development program is to continue, the measures taken to limit the growth of its international indebtedness will be such as to restrict its trade relations with the rest of the world. Although in terms of the arguments for free trade and division of labour internationally on the basis of comparative advantage, such techniques are inappropriate. However, in this situation, a country must choose between the advantages of free trade and those obtainable by an acceleration of its individual economic development. Moreover, when unemployment exists anywhere in the international economy, arguments drawn from an analysis in terms of comparative costs become irrelevant. There is no question of cost, or comparative cost, when the issue is to find ways of employing presently unemployed factors. For the economy concerned, unemployed factors are for all relative considerations costless.

If the economy undertaking a program of development happens to be presently ranked among the 'backward' nations, then its task will be to complete a program of basic innovations. These are investments of a highly capital-intensive nature, consequently, the problems of trade deficits and domestic inflation are likely to be particularly acute. For such a

country, it may only be by imposing restrictions that largely distort its pattern of comparative advantage and sacrifice to a considerable degree the advantages of an international division of labour, that it can accomplish these basic innovations which will raise its productivity and income, even in a full employment world. For such a country, it may be necessary to veer, at least temporarily, from the direction of production indicated by comparative advantage in order to eventually improve its international comparative advantage by raising its present productivity and income.

The Schumpeterian theory of economic development, when translated into a Keynesian terminology, provides a theoretical framework in which to determine the amount of foreign assistance a country should rely upon in its development. When a country embarks on a program of innovations, the ensuing course of events will depend on the amount of its domestic surplus that can be made currently available. By incurring a trade deficit, this domestic surplus can be supplemented and its development expedited. If the country's international credit is quite limited, it may have to take measures to restrict the growth of its trade deficit. One consequence of this will be a diversion of purchasing power from imports to domestic goods and inflation may result. Furthermore, inflation will restrict consumption demands somewhat and thus provide forced saving to supplement voluntary, full employment surplus. But, if foreign credit were very good, the country might build up its indebtedness with relative impunity and inflation be much less severe in the domestic economy. However, in this case, there would be little advantage accruing

from forced savings and as employment and income expanded domestically, consumption would increase by means of the funds being made available by foreign borrowing. Too little foreign borrowing might unduly restrict imports and cause a mounting domestic inflation that could disorganize production generally and the development program in particular. Too much foreign assistance may result in a premature raising of consumption standards, a temporary subsidization of consumption by means of a rising long-term indebtedness and a failure to utilize forced saving to the greatest extent possible as a means of supplementing the voluntary surplus.

The yardstick for a country to employ in evaluating an innovation is to ask—what is the nature of the investment required, will it necessitate imports directly or the use of domestic factors? How capital intensive is the investment, how soon will the increase in productivity accruing from it be forthcoming? Finally, what is the marginal, social advantage of another unit of foreign assistance now against the marginal disutility of the foreign liability to be liquidated later? It may well be that the time dimension of the investment is so long, the returns forthcoming so speculative, and/or so general and social in their nature, the difficulties of repayment so large, even with minimum interest, etc. that only to a very limited extent should foreign borrowing be relied upon

⁹ For an extensive discussion of those aspects of an investment program which affect a country's foreign balance see J.J. Polak, "Balance of Payments Problems of Countries Reconstructing With The Help of Foreign Loans", Quarterly Journal of Economics (1943) pp. 208-240

"Foreign investment which expanded the capacity of the debtor economies to supply food and raw materials for export may have made only an uncertain and inadequate contribution to economic development of backward areas, but it minimized the micro-transfer problem. It is a basic dilemma of economic development that backward areas can make little progress without the aid of foreign loans, yet the kinds of investment required for development are frequently the least certain to make easy repayment possible"..... 10

Into these calculations must be introduced an estimate of the extent to which inflationary forced saving, etc. could be used to supplement Q. Whatever the amount of foreign borrowing decided upon, it should not be arrived at principally by an assessment of the country's borrowing capacity. More foreign borrowing does not become justified simply because it is available unless the increase in international loan funds results in a lowering of the interest obligation involved. Nor, after a program is underway, will the occurrence of international depression and therefore the appearance of a trade deficit be a justifiable reason for increasing the scale of foreign borrowing.

Arguments are becoming increasingly fashionable to the effect that foreign borrowing should not be judged by the direct import needs of the investments being undertaken, but rather, the requirements for imports which will stem from the expanded income and consumption which the increased domestic income will inspire. However, owing to the danger of borrowed international exchange going into consumer imports needlessly, it may be well to discourage such income induced consumption increases. It would seem that the figure finally allocated for foreign

¹⁰ Alfred E. Kahn, "Investment Criterion in Development Programs", Quarterly Journal of Economics (Feb. 1951) pp. 59

funds to cover an investment, while it may be larger than that required directly for capital imports, should be considerably less than the total expenditure, domestic and foreign, on the specific investment project. Any appraisal of foreign borrowing as a means to national economic development should bear in mind that much investment is motivated by exaggerated, speculative hopes and many of the benefits that accrue are long delayed, difficult to forecast and, at best, problematical in amount. The success of much private domestic investment which has most directly contributed to a country's economic development may be attributed to a gradual euthenasia of the rentier, a device less likely to be available to a country where the bond-holder happens to be a foreigner and his claim, a sum of foreign money.¹¹ Finally, those investments whose returns happen to be largely indirect and social, or if direct, lead to exclusively domestic products rather than to replacement of imports or increase of exports, should be financed to the largest possible degree with the domestically accumulated Q. There are so many obstacles which can intervene in the process to prevent the broad social benefits from actually accruing, or any general social productivity increase from being so utilized as to make repayment of the loans easier, that one ought to adopt a basically pessimistic attitude toward arguments for broad and general foreign financing.

Our revised theory of economic development has now been presented. At this point, a final summary of its major outlines may not be out of

¹¹ Loc. cit.

place. Before Schumpeter's 'Theory of Economic Development' as a statement of basic principles could be turned to the study of backward areas, both its basic logic and specific content had to be over-hauled. A formal analysis of the 'innovation' is logically quite distinct from the specific process as it would occur in any particular backward area or country. The first is a general statement of how economic activity is increased in efficiency through the incorporation of new technology and techniques into the structure of production. It is an abstract, timeless study and as such it cannot deal with a sequence of actual innovations within a time dimension. But, for a backward area, economic development will consist of a sequence of such actual innovations. Actual in the sense that they already exist within the advanced economies, and having a time dimension, in that only with some determinate rate of capital accumulation can they come to exist in the now backward region. Thus, the analysis of development as an economic process occurring in backward regions can, in fact, must be given a time dimension. The basis of any such theory will be a series of quantity-time relationships between investments and productivity changes.

This quantity-time nature of the analysis makes it a suitable
¹²
 subject matter for the generalized Law of Growth. This general Law of Growth can be expressed as a functional relationship between appropriate economic variables. Although there are a large number of variables which can appear only implicitly in any equation of economic development

¹² Often referred to as the 'compound interest law' or 'exponential law', e.g. Lloyd L. Smail, Calculus (New York: Appleton-Century-Crofts, 1949) pp. 27

and many of these may be discontinuous, unpredictable, etc., nevertheless, economic development does seem to incorporate a basic principle of cumulative growth, progressive expansion. Its cumulative nature and the relationship between rates of investments and increases in productivity emerge as the paramount functional characteristics of economic progress for a backward country.

Without doing great violence to reality, the present world economy may be described as follows; there is one group of economically advanced and another of economically backward countries. This dichotomy among national economies has profound significance. Individual countries are of widely different economic power and advancing at vastly disparate rates; namely, the weakest, the slowest; the richest, the fastest. Finally it is felt the present theory as expressed in the equations for production and development characteristic of backward and advanced countries when applied to the data of income and wealth distribution for the present world economy give a useful framework in which to understand and interpret domestic inflation and foreign trade deficit as problems of development for backward countries. Moreover, the relative sizes and rates of growth of its individual member countries are both a basic ingredient of any theory of international trade and international values and the environment which confronts any particular country trying to expedite its economic progress.

PART II

CHAPTER V

ECONOMIC DEVELOPMENT FOR A CLOSED ECONOMY

If successful, the preceeding chapters are a theory of economic development which translates Schumpeter into Keynes plus a time dimension. The differences distinguishing the backward from the advanced countries have been made explicit by dating the general production functions and the relationships between macro-economic aggregates (Y,I,C and S) for nations at various levels of progress. The qualitative nature of an innovation in the advanced group and its quantitative nature in the backward have been pointed out. Formal equations have been given by which to define the maximum rate of development accessible to any particular backward country once population, resources, its present maximum total product and consumption are known. It is possible by assuming rates of population growth and time changes in aggregate consumption to determine the maximum rate of increase in total product and thereby the country's potential development over a specific series of production and income periods. A similar analysis was presented for advanced economies by including changes in technology and technique and resource discoveries in the developmental equation. By assigning relevant values to the variables and functions of these two sets of developmental equations, for backward and advanced countries respectively, the pattern of potential national and regional economic progress could be outlined. This pattern of potentialities would indicate the magnitude of those underlying

forces making for changes in the international distribution of productive facilities and the allocation of industries of comparative advantage, exchange rates, price levels and trade balances among individual countries.

This general framework having been presented, the next step will be to trace the detailed working out of its basic equations within a single economy. This will be a study of an innovation as it is presumed to occur in an isolated backward economy or alternatively in one more advanced. The comparative nature of the discussion is intended to show that difficulties common to an innovation in both types of economies assume a relatively greater magnitude in the backward than in the advanced. It is also intended to point out difficulties which constitute significant obstacles to progress in the former type economy but do not arise in the latter. This will be an investigation of the comparative obstacles development presents to backward and already well advanced economies. To present its comparative estimates in sharp, clear outline, succeeding chapters will use as their subject matter national economies of the most backward and advanced sorts. However, the conclusions advanced are felt to be in a lesser degree characteristic of any comparative study of relatively advanced and backward countries undertaking economic development. They would be valid for any economies which might be categorized as backward and advanced although when countries are separated from each other by a lesser disparity of economic development, the conclusions are correspondingly less significant.

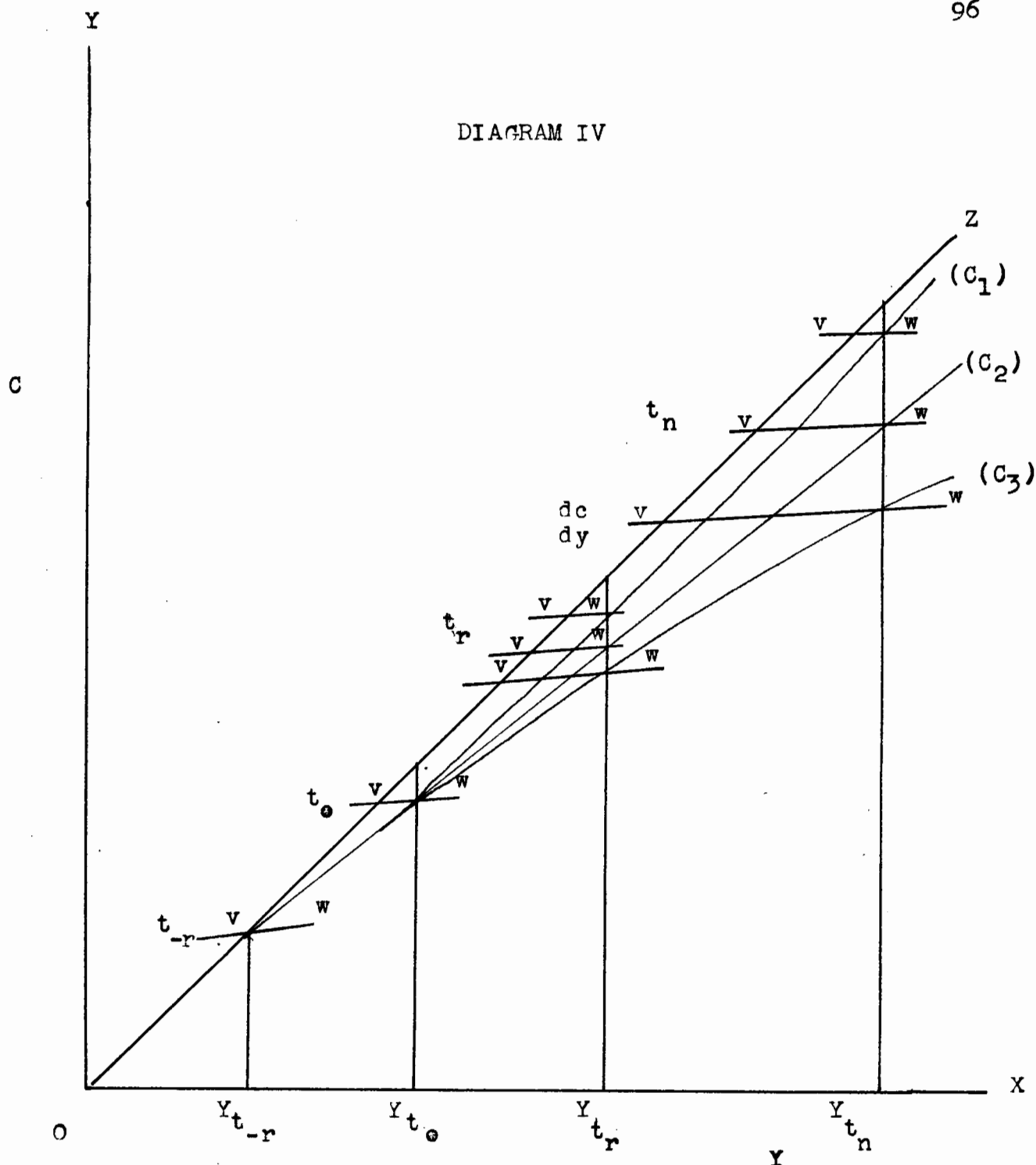
First, the details of an innovation's unfolding will be studied for an economy in isolation, then, the analysis broadened to include the

consequences arising out of inter-economy trade. This chapter will be concerned with isolated economies, the sequence of investment and income expansion up through full employment and beyond into the 'inflationary gap'. In this detailed discussion of the development process, what has so far been categorized as 'surplus' and represented by the symbol (Q) will be sub-divided into the three component forms it can take in an economy; namely, (Q_1) voluntary savings, (Q_2) forced savings, (Q_3) the foreign balance. For the backward economy economic progress is primarily the product of these developmental possibilities which can be enjoyed out of forced savings (Q_2) . There will be a parallel discussion of the situation for the advanced economy, but here, for reasons which will become more apparent as it proceeds, consideration will be given to the innovational activity supportable out of two types of surplus, namely voluntary and forced savings (Q_1) and (Q_2) . The next chapter will consider modifications of the conclusions for isolated economies when international trade is introduced. This will be the place to consider the role of foreign surplus, the import balance (Q_3) in the development of a particular domestic economy.

Although it may become progressively less true for more advanced countries, for backward ones economic progress depends exclusively on net investment. In the Schumpeterian theory, this net investment required breaking into an assumed full employment circular flow. Alternatively, were this initial circular flow at some less than full employment level (the Keynesian assumption), investment representing the innovation need not break into but could be super-imposed upon the existing aggregate of

economic activity and thereby go to swell total employment and income via the familiar multiplier route. There will be countries and situations where each of these assumptions proves to be the more realistic. The short-run course, speed and success of development will be largely determined by whichever initial conditions happen to characterize an economy. Between the limiting cases of substantially complete employment and significant unemployment with raw materials, complementary factors, etc. in highly elastic supply, there are a range of situations wherein innovations will give rise to income expansion and inflation in varying proportions. In other words, investments will be supported out of differing contributions from voluntary and forced surplus (Q_1 and Q_2).

With a constant price level, voluntary saving (Q_1), where it occurs, fluctuates from zero to a maximum as income moves between the minimum 'subsistence' and full employment levels. For purposes of economic development, countries might be divided into two groups, those with $Q > C_0$ and those with $0 < Q < C_0$. In the first group, the absolute value of Q_1 will vary relative to employment and national income depending upon the assumed relationship between average and marginal propensities to consume and income. Diagram shows what this range of possible values will be for countries at various levels of development and economic well-being under three different sets of assumptions as to the secular change in average propensities, marginal propensities being held constant. To the left of C_0 are the countries where $0 < Q < C_0$, in other words, there is not sufficient voluntary saving to permit any significant autonomous investment from this source. This does not mean that



Plot of alternative secular trends in consumption as per capita income increases in consequence of economic development. Along O -- Y are plotted values of per capita consumption, along O -- X a dated series of values for per capita income. O -- Z is a line drawn at a 45° angle to O -- X. System of parallel lines v--w represents a constant marginal propensity to consume as it is associated with various levels of income. (C₁) is resulting secular trend of consumption if it is assumed that the average propensity to consume increases with income and economic development. (C₂) is secular trend with average propensity assumed to remain constant. (C₃) is trend, falling average propensity.

development is completely ruled out, but rather, that a voluntary surplus does not arise even at full employment. In this situation, the Schumpeterian device of breaking into the full employment circular flow will have to be relied upon. The real cost of the innovation will have to come out of inflationary i.e. involuntary savings. Similarly, to the right of t_0 the maximum value for Q_1 does not indicate an absolute limit upon net investment. By breaking into the circular flow as full employment is approached, inflationary saving will arise to supplement voluntary saving. But, while countries to the left of t_0 are mostly concerned with inflation and its effectiveness as a technique for financing development, those to the right of t_0 may be able to largely accommodate their developmental plans out of Q_1 although where necessary inflation and hence Q_2 can be called upon.

Considering first those economies to the left of t_0 , there are present-day undeveloped countries which seem to approximate very closely this condition. To initiate economic advance among them will necessitate the withdrawal of factors of production from customary employments and their re-employment in innovational investments. There are the problems associated with an orderly transfer of resources; subsequently, the difficulties of completing the program in the face of persistent consumer demands which attempt to re-establish the previous circular flow of production and consumption. These insistent consumer demands derive their strength from a marginal propensity to consume which is likely to approximate very close to unity for the economy.

These countries are largely devoid of previous experience of

successful innovation and for this reason manifest a pronounced economic inertia. There is an apparent organic opposition to change. Moreover, the pronounced mal-distribution of productive factors (manpower, natural resources, capital equipment, etc.) make it an environment where only very limited improvements in economic well-being may be possible. Also, the incentive to seek as well as the possibility of finding more efficient methods of employing manpower is less here where labour has been a traditionally surplus factor and customs, cultural standards, in fact, the whole way of life is oriented to harmonize with a manpower abundance.

There may not be a potential entrepreneurial class present to take advantage of opportunities for successful innovation which do arise. Moreover, would-be entrepreneurs will be handicapped by the absence of a well-organized market economy and its ancillary institutions. Initial development will likely require much long-term, capital-intensive investment where social marginal gains in the long-run outweigh marginal costs but the profitability is not such as to attract private enterprise. There are other innovations which might be highly profitable even to private enterprise if carried out on a large scale, but the necessary minimum size may be so large relative to available credit facilities and the existing organization of private business that the government is able to initiate them. Yet, in spite of these obstacles, such large-scale, long-range, capital-intensive innovations may be the under-developed country's greatest immediate need, constituting a primary step in economic advance, an initial break in the traditional circular flow and one that will bring about major reductions in basic costs of production

for the economy.

For economies to the left of t_0 , an initial breaking of the circular flow is a necessary prelude to the progress. But the harder it is to achieve such a break and withdraw factors from their usual employments, the greater is likely to be the difficulty of successfully completing the innovations once inaugurated. In any closed economy, increased investment will generate some multiple increase of money income. But with a marginal propensity to consume approaching unity, the huge, immediate increase in income that follows becomes an insistent force attempting to re-establish the former pattern of production and consumption. These cumulative consumption demands may force factors of production back into their customary employments and this before the innovations to which they were originally transferred have been completed.

In an advanced economy (to the far right of t_0 , diagram IV) innovations do not require an abrupt break in a traditional, highly stable circular flow of production and consumption. Entrepreneurs will have much less difficulty both in attracting and holding factors of production. Of course, even in this group, innovations may demand a greater share of national income than is being voluntarily provided at full employment. Inflation and the attendant forced savings will have to be relied upon to supplement it. Beyond a certain point, such inflation can become rapidly cumulative, causing a general disorganization of production and the disappearance of any saving, forced or otherwise. But this sequence of events will not be of frequent occurrence in an advanced economy, its techniques of controlling inflation and deriving the maximum benefit

from forced savings are well-developed and the forces tending to dampen down income expansion strong and pervasive. By contrast, in the contemporary backward countries, development must start from a low national and per capita level and in an atmosphere basically antagonistic to progress. The entire financing of an innovation must be assigned to forced savings (Q_2) hence, the effective limits upon inflation as a means of generating savings are likely to be reached earlier and more often followed by a severe domestic inflation which as it gathers momentum contributes progressively less to the real needs of an investment program. Moreover, aside from the necessity of relying upon forced savings earlier and more completely in the backward than the advanced economy, the effectiveness of inflation as a generator of forced savings seems to be less in the former than the latter type of country.

What are some of the factors which might be supposed to blunt this effectiveness of inflation in the case of the backward areas? For such regions, even more than for those economically advanced, but to a considerable extent for the latter as well, the market economy is much less than all pervasive. Gross national product is larger; in the backward economy it will be relatively much larger than that portion which flows through the market place. A major share of product in the sense of aggregate economic welfare is not produced in response to nor does it pass through the market economy. Moreover, in the early stages of development, there are a great many employments only recently assimilated into this market economy and still able to be withdrawn from specialized, commercial production. Economic development encourages this drift to

specialization of productive activity and thereby the binding of factors to the monetary control expressed by an organized market.

Now inflation might be categorized as a technique for the monetary manipulation of market demand. Once it has been built up it is possible to utilize a market economy to withdraw a share of total product from the circular flow of production and consumption independently of the wishes of the owners of productive factors. These owners exchange factor inputs for money claims to market outputs. Their money claims as an effective demand for market output can be reduced by setting up additional money claims for entrepreneurs, i.e. credit creation. But when inflation becomes too burdensome, factor owners may combat its expropriations by withdrawing from market production. In doing so, they will have to transfer to less specialized productive activities in which they are comparatively less efficient but have succeeded thereby in eliminating the danger of having their money claims devalued in real terms. Employed less effectively, they produce less but may keep more of this smaller total product. However, for the economy undertaking development, factor adjustments of this type, would result in a diminished total real product due to the decreased specialization, lost efficiency from a lesser division of labour, unemployment of highly specific capital, etc. Consequently there is a lesser total product out of which to support the investment program.¹

¹ I am indebted to Professor Stolper of the University of Michigan for pointing out this particular characteristic of inflation. During the recent post-war inflation in Europe, this withdrawal of factors from the market economy apparently proceeded to considerable lengths. Subsequently, currency reforms, for example, that in the West Zone of Germany were characterized by an immediate large-scale re-appearance of factors and products in the regular market economy.

In an inflation production becomes less attractive relative to speculation. Normally speculation serves to increase the productivity of the economy by coordinating diverse productive activities. But, with a growing inflation, speculation comes more and more to play a harmful, disruptive role. It may slow production generally, waste resources and interfere with instead of facilitate and coordinate distinct types of production. Yet, while having this adverse effect on total national product, it may be providing factor owners with larger incomes via a with-holding of their factors from productive employment than would accrue to them by engaging in it. Here again inflation carried beyond a critical point demonstrates a potentiality for decreasing the total product out of which any investment program must be supported.

Speculation causes a distortion of investment away from its more capital-intensive forms. This may be very important in the under-developed country where a primary purpose of the initial development program is to increase the capital-intensity of the productive equipment. The inflation induced distortion can be explained as follows. Construction costs undertaken in a period of high or rising prices not felt to be permanent place a premium on facilities and equipment of the less capital-intensive sort which are more likely to be used up in the production of saleable product within a short enough interval to take advantage of the temporarily inflated price level. Therefore, as an inflation proceeds, particularly if it tends to become accelerated, short-term investments will compete factors away from longer-range, capital-intensive alternatives. It might be argued this should not affect programs undertaken by national

governments which are always in a position to compete successfully for raw materials, etc. for a long range program irrespective of how much speculative short-term investment demands bid up factor prices. It is true that communal credit creation and taxing powers strengthen the government's hand in such competition. But, credit creation results directly in further inflation, nor is it realistic to consider the ² taxing power as other than limited. If taxes effectively reach a level where they destroy a major portion of the taxpayer's equity in his income, this will discourage the incentive to employ factors of production most efficiently and thereby nourish the inflation. Finally, the governmental program is intended to help increase the capital-intensity of the country's productive structure but if supported out of excessive inflation it will discourage private forms of such investment. Consequently, even while the inflation may be facilitating the government's program, it may occasion no net gain in capital-intensity for the economy because of this counter-balancing effect upon the volume of private, long-term investments.

An important feature of an inflation is that all sectors of the price level are not likely to be affected simultaneously and to the same degree. It is a piecemeal process, the over-all change being a summation of what happens when particular prices come under the pressure of increased demand. In an 'uncontrolled' economy, appearance of an excess demand for a particular commodity at its present price necessitates a price-rise.

² Colin Clark, "Public Finance and Changes in Value of Money", Economic Journal (1945) pp.371-389.

But there will be other adjustments as well; an increased demand for³ substitutes and a slackening in the demand for complementary goods. These adjustments of the price structure will bring about transfers of productive resources at the same time as there is occurring a diffusion of the original excess demand among a wider group of commodities. When this diffusion proceeds smoothly and quickly, it obviates sudden, sharp price increases in particular goods. Alternatively, if excess demands are concentrated and sticky, the prices directly affected will tend to sudden, sporadic, upward adjustments. For the economy better able to diffuse its excess demands, inflation will be experienced more as a creeping, progressive phenomena rather than one which is sharp, speculative and unpredictable. An atmosphere of creeping inflation is less destructive of general confidence in the price structure and, in consequence, much less prone to degenerate into excessive speculation and the disorganization of production to which inflations may eventually lead.

It is felt that this creeping inflation is more likely to characterize an economically advanced country than one largely undeveloped. An important consideration is the extent to which diffusion of excess demands is likely to take place in the two economies. In an economy with a high per capita, secularly increasing income there is a pre-supposition in favor of this income representing not simply greater amounts of the same goods as does income in the more backward economies, but a greater

³ J.R. Hicks, Value and Capital (Oxford:Clarendon, 1946) chapter III.

variety of items as well. The logic of this is that consumption requirements broaden as income increases per capita; the specific demand for more and more goods has become relatively inelastic. Thus, in the advanced economy, individual commodities come to be associated with a larger number and a greater total of substitute goods. Therefore, an increase in purchasing power which at previously existing prices results in excess demand for any good by causing an upward movement in its price tends to bring about a rapid shift to the numerous substitutes. With a high per capita income, the relative importance of these substitutes is great and the price rise necessary to diffuse any particular excess demand correspondingly small. By contrast, in a low per capita income economy, excess demand tends to be more specific towards particular commodities. There is less likelihood of it being diverted away from points of original concentration and more generally dispersed throughout the economy.

In the economically advanced nation, consumer durables are a large item in annual consumption expenditures and by prolonging the life of such goods, i.e. temporarily substituting savings for consumer durables expenditures, a large amount of what might otherwise be an excess demand can be temporarily eliminated. Furthermore, in the advanced economy parri passu with this elimination of excess demand there is being provided an opportunity to release capacity in consumer durables production which can then be converted to the investment program proper. But excess demand of this type will not tend to be eliminated nor facilities highly complementary to an investment program made available in the undeveloped

country where such industries are either very small or non-existent and such consumer expenditures, to the extent they actually occur, are much less flexible.

One effect of inflation and an important factor in its success as a technique for increasing investment is the redistribution of income to which it leads. Thus, for undeveloped countries there is the crucial question whether, via inflation, it is possible to redistribute income in such a way as to increase savings and thereby liberate factors of production for a major development program. In this type of economy there may not exist sufficient savings differentials between economic groups and/or an item of income which is available for redistribution in order to achieve this increase in aggregate savings. A greater likelihood seems to be that sizeable, government inspired, investment expenditures will result in speculative price increases, augmented consumer demand, a speculative disruption of market production, etc. and these quickly head off the income redistribution and increased savings hoped for from the initial inflation. In the undeveloped country, the fact that subsistence is likely to absorb most, if not all, of total national income indicates the limited degree to which a redistribution of income away from spenders to savers is politically or economically feasible.

The situation which arises when inflationary, involuntary saving (Q_2) is relied upon exclusively to finance an innovation is mainly relevant for a backward economy initiating development. It is here the Schumpeterian assumption of an innovation as breaking into a full employment circular flow most definitely applies. The rudimentary form of market economy

characteristic of the backward country and the inability of even a well-developed market system to transfer factors wholesale to an investment program, the size and capital-intensive nature of the minimum developmental efforts required, the basic mal-distribution of factors and resources, absence of an entrepreneurial class or a favorable social environment for its emergence, etc. are a summary of severe restrictions upon development. But problems and restrictions are relative ——— to fully appreciate their onerous nature it is necessary to compare them with others operating elsewhere. In this case, elsewhere consists of the countries to the right of t_0 (diagram IV) where considerable progress has already occurred.

For these economies it was decided the process of innovation would be most realistically outlined by starting with the Keynesian-type assumption of less than full employment in the initial circular flow. Here the difficulties arising out of an income expansion following upon autonomous investment are counterbalanced by accommodating forces inherent in the structure of these economies but not to be found in those of less developed countries. The income expansion can be expressed as $-Y_0$ where Y_0 is the initial equilibrium level of income. The relation between Y_0 , $-Y_0$ and full employment income (Y_{f_0}) is highly important. The ratio $\frac{Y_0}{Y_{f_0}}$ represents the degree of physical expansion possible within the economy when the investment program begins. The percentage unemployment is an easily accessible, useful indication of this. A more careful analysis would also consider the qualitative composition of the unemployed margin and the extent to which complementary factors are available. The

physical expansion of production possible for an economy at a moment of time is represented by this ratio. Considering the countries to the right of t_0 (diagram IV) as closed economies, it can be said that with a given marginal propensity to consume, the smaller the ratio Y_0 , the larger can be the autonomous investment undertaken without the appearance of an 'inflationary gap'. Herein is to be found another accommodating force in the form of a margin of unused factors that serve to help insulate against inflation during a period of domestic expansion.

Another aspect of accommodation is best illustrated by the following sequence of events. $-I_1$ constitutes a direct demand for factors of production to turn out capital equipment and results in an equal, immediate increase of income $-Y_1$. This, in turn, brings forth an increase in consumption expenditures ($\frac{dc}{dy} \cdot -Y_1$). Henceforth, successively repeated $-I$'s do not bring about any further direct factor re-employment. But, via the multiplier effect stemming from the propensity to consume, there will occur a cumulative demand for idle factors to produce the consumer goods represented by a growing $-C$. $-I_1$ constituted an initial demand for factors, subsequent $-I$'s maintain this demand but do not increase it. After the first period it is the increasing re-employment of factors by the consumption goods industries which becomes significant. Consequently, for a closed economy undertaking autonomous investment, not only should the aggregate factor unemployment be considered in assessing the size of the program which can be accommodated, but also, the distribution of idle factors between capital and consumer industries.

This necessary qualitative composition of unemployed factors is

more important for such a single, isolated economy than one able to supplement domestic production by imports. Indeed, it is sometimes argued as if all factors except the manpower required in an investment program could be imported readily if the need arose, i.e. a shortage developed. Therefore, domestic investment is not supposed to be unduly hindered by the size of a country's investment goods industry even though a large share of the planned undertakings call for capital goods of a type (road, railway, canals, buildings, etc.) which must be constructed on the spot and with materials some of which it would never be economically justifiable to import. However, the situation required to bring about their importation would constitute an extreme distortion of international trade, one so extra-ordinary that if it came to exist at all, it could not continue long enough to make any substantial contribution to the economic development of the importing country.

Whether a particular good moves in international trade depends upon the price differential existing between the more efficient producing and the potential importing countries. Reliance upon wholesale importations of a greatly increased range of commodities to meet the requirements of a domestic investment program assumes a marked increase in the price level of the importing country vis-a-vis those of nations from which the imports are to be drawn. Even assuming a degree of inflation that would give rise to this situation without resulting beforehand in a breakdown of the country's productive system, there are other, physical limitations upon the extent to which domestic investment demands can be satisfied by imports. Certain raw material processing industries, the

building trades, transport facilities, skilled labour, etc., necessary to major investment activity are physically limited in their domestic supply and it is highly unrealistic to suppose they can be supplemented by imports. The qualitative composition of idle factors in an economy becomes highly relevant when assessing the particular demands a proposed investment program will make. A country with a better selection of idle factors relative to the needs of its innovational investments has a reduced likelihood of an income expansion ending in uncontrollable inflation. There can be little doubt of the distinctly different situation in regard to this parameter of expansion for countries to the left and extreme right of t_0 (diagram IV).

There is yet another characteristic of accommodation to income expansion arising out of the presence of idle factors in the original equilibrium from which an innovation is started. -I successively repeated constitutes a stable demand for resources and, as already discussed, the increased national income results in a cumulative demand upon the remaining unemployed resources to furnish consumer goods. While this second demand is expanding through successive income periods, the items of capital equipment, whose construction was the real good counterpart of -I's in earlier periods, will be nearing completion. To the extent such investment has correctly foreseen the demands of the community and comes to be embodied in useful capital equipment, its completion increases the productivity of the economy. Using the same manpower complement as before, the consumer goods industries should be able to produce an increased output or *mutatis mutandis* with less manpower the same output. This

increased productivity will mean that the drain upon idle manpower to meet the expanding needs of the consumer goods industries is reduced. This is the deflationary aspect of an innovation which was noted earlier in the discussion of Schumpeter's theory.⁴ It follows that for a given expansion of income due to innovational investment, a smaller total factor re-employment will be required the more rapidly productive equipment becomes available to exert its deflationary effect, the sooner there begins to materialize a situation calling for 'an absorption of the innovation'. Consequently, the more quickly a proposed investment program will result in usable product, the larger can be the scale of the initial innovation out of a given reserve of factors.

In the short-run, this deflationary strength of completed capital facilities will be inversely related to the capital-intensity of the innovation being undertaken. There are investment programs where the proportions between capital-intensive and non-intensive investment will vary and, in consequence, the magnitude of this deflationary force. Those which were more capital-intensive being less quickly and strongly deflationary and vice-versa. Moreover, an economy forced to undertake a highly capital-intensive program is at a disadvantage. Unfortunately it is the countries to the left of t_0 which are likely to require the relatively larger share of capital-intensive investments in their innovations. Furthermore, in economies to the right of t_0 it is likely the capital-intensity of innovations will be inversely correlated with

⁴ Cf., p.25

the degree of economic progress already achieved. Accordingly, in the short-run this deflationary pressure is apt to prove strongest where it is needed relatively the least, i.e. the further to the right of t_0 an economy has already travelled.

It is now time to embark upon a detailed investigation of what happens when an innovation leads to an expansion of income up through the full employment ceiling and on into the 'inflationary gap'. In the Schumpeterian economy this can be presumed to occur almost immediately and in the Keynesian more slowly, but, eventually. The multiplier analysis originally appeared as a technique for demonstrating what expansion in resource employment would follow upon a policy of autonomous investment assuming prices to remain constant. Price changes which did occur during the expansion process reduced the amount of factor re-employment occasioned by a given increase in expenditures. Accordingly, such changes were looked upon as detracting from the accuracy of the multiplier-predictions. The analysis had been conceived in an era of widespread unemployment and this was the major problem to which it addressed itself.⁵ Public attention was focused on the problem of income expansion and how to achieve a maximum of it with a minimum of investment. The present problem is largely the reverse of this; how to achieve a maximum of investment with a minimum income expansion.

During the last war when prices and the control of expansion became the immediate problems, it was found that what had been looked

⁵ Alfred E. Kahn, "The Relation of Home Investment to Unemployment", Economic Journal (1931)

upon as the weakness of the multiplier, namely the possibility of price changes, was itself a field of analysis where the multiplier technique could be useful. The basic idea was simple although it could be given two quite distinct formulations and in practice led to statistical difficulties in its application.⁶ Essentially, if the consumption and savings functions of an economy are known as well as a forecast of government expenditures, then, by use of the multiplier, figures for disposable income, savings and taxes can be calculated for the future income period. These are compared with a forecasted figure for the gross national product of the economy during this same future interval. The difference between the goods and services which these figures disclose as available for consumption and the amount which consumers shall wish to spend out of their forecasted, disposable income measures the 'inflationary gap' confronting the economy.

An economy undertaking an innovation and faced with a consequent income expansion to the extent it cannot adapt by increasing physical output will experience such an inflationary gap. For example, if Y represents money income and Y' real goods production, initially, provided the expansion starts from some level of considerable unemployment with an abundance of idle equipment and raw materials, changes in Y' are likely to approximate changes in Y . But, as production increases, certain portions of Y i.e. the money income allocated to the purchase

⁶ William S. Salant, "The Inflationary Gap, Meaning and Significance for Policy Making", American Economic Review (1942) pp. 308-14.

of goods, will increase faster than its comparable segment of Y^t , the production of these particular goods. There will be key factors, finished products, etc. in short supply first in one industry or area and then in another. Certain prices will begin to rise while there are still idle resources and unemployed manpower elsewhere in the economy. Thus, an inflationary gap type of analysis is necessary in order to forecast the probably Y and Y^t of various subsections, industries, geographical areas, etc. of the economy.

By encouraging factor mobility between industries and regions, utilizing wherever possible substitutes for factors in short supply and when necessary allocating materials, re-directing manpower, rationing commodities and generally super-imposing upon the ordinary market and price structure another framework of control, it is possible to diffuse excess demands which would otherwise drive particular prices up sharply. Factors can be made to move from industries of lesser demand to those of greater. Ordinarily the market accomplishes this but it is geared to bring about marginal transfers and the price system becomes increasingly less effective where rapid, major redistributions of factors are required. The inflationary gap analysis aids in forecasting where extra-market control will be required and the magnitude of particular re-allocation problems. But this technique of forecasting and the methods of control promulgated upon it are at basis by-products of a well-developed market economy with extensive transportation, communication, accounting and banking systems. Consequently, this ability to

redistribute resources and diffuse excess demands is likely to vary directly with the level of economic progress already achieved by the economy. Therefore, such an ability to accommodate inflationary expansion will be least in the countries to the left of t_0 and greatest in those furthest to the right.

In summary, for the undeveloped countries an innovation requires breaching a full employment circular flow economy. Due to the high marginal propensity to consume in all sectors of the community, income redistribution will not significantly increase its aggregate savings. It becomes a matter of trying to depress the average propensity to consume, a situation where inflation becomes prone to rapid self-acceleration. If this occurs, the price and market mechanism for redistributing factors of production becomes disorganized, measures of direct control have to be substituted. Yet, in these backward countries there do not exist well developed economic institutions through which such controls can operate. At every point these conditions in an advanced country present a favorable contrast. In the beginning there is likely to be a margin of idle factors. The problems of transfer and expansion are largely marginal, only gradually and as factor reserves come to be exhausted will the necessity for extra-market controls emerge. Here the ability to diffuse particular excess demands and when necessary to re-allocate resources will be much better developed.

The present analysis has indicated the relative difficulties which confront countries to the left and right of t_0 (diagram IV). For the former group there is almost no Q_1 and the economy has a proneness to

cumulative and yet ineffectual inflation which means there is little Q_2 . However, in the latter group, the relatively more advanced countries, farther innovations are being carried out from a level of economic well-being which already represents a large measure of achieved progress; there is probably a large Q_1 and potentially a large Q_2 . To assess the development potential of these two types of national economies, the amount of total surplus in each (Q_1 and Q_2) need only be plugged into the formal equations of development as they have been outlined in the earlier chapters. This gives a graphic demonstration of the unpromising syndrome from which those countries most completely undeveloped must start upward along the path of economic progress.

CHAPTER VI

NATIONAL PROGRESS AND INTERNATIONAL TRADE

In the world economy as individual nations undertake development, forces generated within their separate economies react upon each other via international trade. This process and some of the difficulties with which it confronts backward areas can be illustrated by a model of two-nation trade and national income multipliers. If consumption, saving and import functions are assumed for each of two countries, then, changes in the level of imports, exports and national income that follow from their individual investment programs can be worked out through a sequence of time periods. This gives a clear demonstration of the differential income expansions which arise in each country when autonomous investment occurs in one or both.

To illustrate this process three simple models of two nation trade¹ and autonomous investment have been presented. In model I, country A has marginal propensities to save and import of .3 and .1; country B corresponding propensities of .05 and .25. An investment program initiated by B causes increased exports for A, a growing trade deficit for B and expanded national incomes in both countries. Assuming the autonomous investment ($-I_p$) successively repeated, purchasing power ($-Y_p$) expands as long as these periodic additions are not counteracted by equivalent

¹ Fritz Machlup, International Trade and the National Income Multiplier, (Philadelphia: Blakiston, 1943) from which the format used in these models is borrowed.

MODEL I

Country A

marginal propensity to save .3
marginal propensity to import .1

Country B

marginal propensity to save .05
marginal propensity to import .25

Past -Y	Cur- rent -C	Im- duced -S	Home Ind. -M	For. Ind. -X	Net -(X-M)	Auton -I	Cur- rent -Y	Inc. Per- iod	Past -Y	Cur- rent -C	Im- duced -S	Home Ind. -M	For. Ind. -X	Net -(X-M)	Auton -I	Cur- rent -Y
								I							100	100
				25	25		25	II	100	70	5	25		-25	100	170
25	15	7.5	2.5	42.5	40		57.5	III	170	119	8.5	42.5	2.5	-40	100	221.5
57.5	34.5	17.25	5.75	55.3	49.5		89.8	IV	221.5	155	11.1	55.3	5.8	49.6	100	260.8
89.8	53.9	26.94	9	65	56		118.9	V	260.8	182.5	13	65	9	-56	100	291.5
118.9	71.3	35.7	11.9	72.9	61		144.2	VI	291.5	204	14.6	72.9	11.9	-61	100	315.9
144.2	86.5	43.3	14.4	79	64.6		165.5	VII	315.8	221.1	15.8	79	14.4	-64.6	100	335.5
165.5	99	50	16.5	83.9	67.4		182.9	VIII	335.5	234.9	16.8	83.9	16.5	-67.4	100	353.4
182.9	109.7	54.9	18.3	88.4	70.1		198	IX	353.4	247.7	17.7	88.4	18.3	-70.1	100	365.7
198	118.8	59.4	19.8	91.4	72.6		210.2	X	365.7	256	18.3	91.4	19.8	-72.6	100	375.8
210.2	126.1	63	21	93.9	72.9		219.9	XI	375.8	263	18.8	93.9	21	-72.9	100	384
219.9	131.9	66	22	96	74			XII	384	268.8	19.2	96	22	-74	100	390

MODEL II

Country A

marginal propensity to save .3
marginal propensity to import .1

Country B

marginal propensity to save .03
marginal propensity to import .25

Past -Y	Cur- rent -C	Im- duced -S	Home Ind. -M	For. Ind. -X	Net -(x-m)	Auton -I	Cur- rent -Y	Im- come Period	Past -Y	Cur- rent -C	Im- duced -S	Home Ind. -M	For. Ind. -X	Net -(x-m)	Auton -I	Cur- rent -Y
						100	100	I							100	100
100	60	30	10	25	15	100	185	II	100	70	5	25	10	-15	100	180
185	111	55.5	18.5	45	26.5	100	256	III	180	126	9	45	18.5	-26.5	100	245
256	153.6	76.8	25.6	61.1	35.5	100	314.7	IV	244.5	171.2	12	61.1	25.6	-35.5	100	297
314.7	188.8	94.4	31.5	74.2	42.7	100	363	V	196.8	207.8	14.8	74.2	31.5	-42.7	100	339
363	217.8	108.9	36.3	84.8	48.5	100	402.6	VI	339.3	237.5	17	84.8	36.3	-48.5	100	374
402.6	241.6	120.8	40.3	93.4	53.1	100	435	VII	373.8	261.7	18.7	93.4	40.3	-53.1	100	402
435	261	130.5	43.5	100.5	57	100	461.5	VIII	402	281.4	20.1	100.5	43.5	-57	100	425
461.5	277	138.3	46.2	106.2	60	100	482.2	IX	424.9	297.4	21.3	106.2	46.2	-60	100	444
482.2	290.5	145	48.3	110.9	62.5	100	501.4	X	443.6	310.5	22.2	110.9	48.4	-62.5	100	459
501.4	300.8	150.4	50.1	114.7	64.6	100	515.5	XI	458.9	321.3	22.9	114.7	50.1	-64.6	100	472
515.5	310.2	154.7	51.6	117.9	66.3	100	528.1	XII	471.4	329.9	23.6	117.9	51.6	-66.3	100	482

MODEL III

Country A

marginal propensity to save .3
marginal propensity to import .1

Country B

marginal propensity to save .03
marginal propensity to import .25

Past -Y	Cur- rent -C	Im- duced -S	Home Ind. -M	For. Ind. -X	Net -(x-m)	Auton -I	Cur- rent -Y	Im- come Period	Past -Y	Cur- rent -C	Im- duced -S	Home Ind. -M	For. Ind. -X	Net -(x-m)	Auton -I	Cur- rent -Y
						100	100	I								
100	60	30	10		-10	100	160	II					10	10		10
160	96	48	16	2.5	-13.5	100	198.5	III	10	7	.5	2.5	16	13.5		23
198.5	119.1	59.5	19.8	5.8	-14	100	224.9	IV	23	16.1	1.2	5.8	19.8	14		35.9
224.9	134.9	67.5	22.5	9	-13.5	100	243.9	V	35.9	25.1	1.8	9	22.5	13.5		47.6
243.9	146	73.2	24.4	11.9	-12.5	100	257.9	VI	47.6	33.3	2.4	11.9	24.4	12.5		57.7
257.9	154.7	77.4	25.8	14.4	-11.4	100	269.1	VII	57.7	40.4	2.9	14.4	25.4	11.4		65.8
269.1	161.5	80.7	26.9	16.5	-10.4	100	278	VIII	65.8	46.1	3.3	16.5	26.9	10.4		73
278	166.8	83.4	27.8	18.3	-9.5	100	285	IX	73	51.1	3.6	18.3	27.8	9.5		78.9
285	171	85.5	28.5	19.7	-8.8	100	290.7	X	78.9	55.2	3.9	19.7	28.5	8.8		83.7
290.7	174.4	87.2	29.1	20.9	-8.2	100	295.3	XI	83.7	58.6	4.2	20.9	29.1	8.2		87.7
295.3	177.2	88.6	29.5	22.0	-7.5	100	299.2	XII	87.7	61.2	4.2	22.0	29.5	7.5		90.6

leakages out of the B economy. Similarly $-Y_a$ expands as long as $-(X-M)_a$ the trade balance of the A economy remains positive. Equilibrium is reached when $-I_b$ has distributed itself between savings ($-S_b$) and imports ($-M_b$) and the increase in A-exports ($-X_a$) between A-savings ($-I_a$) and increased A-imports ($-M_a$). Thus, for an individual country increased purchasing power is withdrawn from active circulation via either domestic saving or expenditure on imports. However, as expenditure on imports, it only ceases to circulate within the international economy when it becomes savings in some other country.

In model II, A and B simultaneously embark upon investment programs. Both have rising national incomes and B experiences an increasing deficit in the balance of payments. The whole process is similar to that in model I except at equivalent periods in model II not only is the B-income higher but the A-income is larger than the B. The B-deficit is slightly lower, B savings fractionally higher and A-savings considerably higher in model II than in model I. In model III, country A undertakes the autonomous investment. The results are; the smallest rise in national income for either country in any example, that for B; a rise in A-income intermediate between its level in models I and II. There occurs a trade deficit in A, but this is the smallest such deficit for either country in any example. Of considerable interest is this small A-deficit and consequently the slight favorable balance B enjoys even in a situation where A initiates the investment program:

The foreign trade multiplier is a counterpart analysis to that covered by the domestic multiplier. They are both concerned with the aggregates (Y, I, C and S). When constant prices are assumed, there is a

direct comparability between these aggregates as monetary quantities and amounts of real goods and services. In the domestic version of the multiplier, autonomous investment $-I$ is the multiplicand and $\frac{1}{1-c}$ is the multiplier. In an extended but logically equivalent form of this, suitable to analyze the situation of an economy in international trade, $-I - -(X-M)$, becomes the multiplicand and $\frac{1}{1-c}$ the multiplier. An alternative method is to treat $-I - -X$ as the multiplicand and $\frac{1}{1-c-m}$ as the multiplier. For the isolated economy in the period income analysis $-I$ is expansionary, $-S$ deflationary, and equilibrium exists when $-I = -S$. Similarly, in the foreign trade analysis, $-I$ and $-X$ are income expanding, $-S$ and $-M$ income depressing. The salient features of the foreign trade multiplier can be summarized by referring to models I, II, III.

$$(1) \quad -Y_b \text{ increases as long as } -I_b - -X_b - S_b - -M_b$$

and assuming no autonomous investment in country A then

$$(2) \quad -Y_a \text{ increases while } -X_a - S_a - -M_a$$

or with autonomous investment taking place in A as well

$$(3) \quad -Y_a \text{ will increase as long as } -I_a - -X_a - S_a - -M_a$$

Most of the discussion of foreign trade multipliers has been concerned with the necessary conditions for particular types of equilibrium in the international economy.³ These studies and their findings can be

² William A. Salant, "Foreign Trade Policy in the Business Cycle", Public Policy, vol. II (Cambridge, Mass., 1941) pp. 211-212

³ Studies such as Lloyd A. Metzler, "The Transfer Problems Reconsidered", Journal of Political Economy (1942) pp. 397-414; "Underemployment Equilibrium in International Trade", Econometrica X (1942) pp. 97-112; "Tariffs, the Terms of Trade and the Distribution of National Income", Journal of Political Economy (1949) pp. 1-29; W. Stolper, "The Multiplier, Flexible Exchanges and International Equilibrium", Quarterly Journal of Economics (1950) pp. 559-82.

useful in our present inquiry into international economic development although to do so their emphasis needs to be changed and their conclusions re-interpreted. International equilibrium will require a balancing of national economic forces inside an international framework of exchange rates, price levels, and trade balances. However, when the various national economies are carrying out individually chosen investment and development programs, there is little reason to believe the macro-economic forces thus generated will be distributed in any such balanced fashion within the world economy. In the previous multiplier-type studies to which reference will be made, propensities to import and consume are given for individual countries and, starting from a condition of equilibrium in world income, various amounts of autonomous investment are assumed to take place in each country. Income expansions and the course of positive or negative trade balances are examined with the object of determining conditions for the re-establishment of an equilibrium of world income either with or without national trade balances, depending upon the purpose of the study. The present intention is to start with a similar multiplier formulation; autonomous investment for innovational purposes, domestic income expansion, changes in trade balances, etc.. Then it is intended to inquire what complications and limitations would need to be imposed upon the economic development of various countries in order to fulfill the conditions necessary for maintenance or re-establishment of international equilibrium.

Our major interest is the international ramifications of innovative investments when these are undertaken by countries at various levels of economic well-being and with particular reference to the situation of undeveloped countries. When disparate national economies, each with its distinct consumption and savings functions, embark upon individually chosen programs of autonomous investment and development, equilibrium, if it occurs internationally, does so only by chance. However, if the formal conditions for such equilibrium are taken as a starting point and values relevant to the developing national economies assigned to the variables and functions of the multiplier analysis, it will be possible to analyze the nature and extent of the dis-equilibrium which occurs. This international dis-equilibrium will cast its shadow over the course of innovations and development for each national economy. Arising as an effect, it will come to play a causal role in the course of development. As a country finds its investment program bringing it into serious dis-equilibrium vis-a-vis the international economy, with domestic inflation and mounting trade deficits, the measures it may have to take to re-establish its international solvency could seriously interfere with its plans for development.

Let us start with an analysis of the circumstances under which a trade deficit is most likely to occur and its importance for the course of national economic development. The following relationships may be taken as a basis for this discussion of the trade balances arising between two countries where domestic prices are constant in each and exchange rate is fixed: $M_a = f(Y_a)$ and $X_a = g(Y_b)$. Therefore,

$$(1) \text{ ----- } -M = \frac{dM}{dY_A} - Y_A \quad (2) \text{ ----- } -X = \frac{dM}{dY_B} - Y_B$$

First consider the situation for a country where exports are assumed to be independent of changes in the level of its income and exports, hence, ⁴
 $-X = 0$. Autonomous investment increases national income and as functions of income, imports and savings are increased. These latter constitute a growing deflationary element tending to counterbalance the expansion pressure of the autonomous investment. But increased imports are only deflationary to the extent they are not balanced by increased exports. However, by assumption exports remain unchanged, hence, an import balance emerges before the domestic income expansion is brought to a halt. For such an economy to long sustain a program of domestic development will require a continuing depletion of its foreign exchange reserves. Moreover, this drain of foreign exchange will be the larger the less able the domestic economy proves to be in the generation of voluntary savings at high levels of income.

This case may be highly realistic of what happens to backward countries of the contemporary world economy when they undertake an innovation. At present the disproportion in national incomes and production between the advanced and backward countries is so great that changes in autonomous income and imports for the latter may not have any significant effect on the corresponding items in the former. In the backward countries imports may be large relative to their national incomes and marginal propensities to import substantial, but the disproportionately small share

⁴ Metzler, "Underemployment Equilibrium in International Trade", Econometrica X (1942) pp. 101

of aggregate world income which they control makes it improbable that either individually or collectively they can measurably influence income and thereby stimulate imports for any major portion of the world economy.

Using equations (1) and (2) and assuming constant exchange rates, prices, etc. the conditions for equilibrium without national trade balances are easily defined:

$$\frac{dM}{dY_A} - Y_A = \frac{dM}{dY_B} - Y_B \quad \text{-----} (2_a) \quad 5$$

Thus, the degree of expansion in A and B must be inversely proportional to their propensities to import. For equilibrium without a trade balance to occur, the country with the larger propensity to save, hence the smaller domestic multiplier, must also have the larger propensity to import. That this negative correlation between saving and import propensities is likely in countries of the contemporary world economy seems extremely doubtful. Considering the countries to the left and right of t_0 in diagram it would seem a virtual certainty that those to the left, the undeveloped group, while having marginal propensities to consume approaching unity, will also evidence high marginal propensities to import if, during a period of domestic development, foreign exchange is made available to them in sufficient quantities to finance such imports. ⁶ Diametrically opposite characteristics are most probable in those countries to the extreme right of t_0 .

The conditions outlined in equation (2_a) are identical to the

⁵ Machlup, op. cit., pp. 189, equation (52)

⁶ Alfred E. Kahn, "Investment Criteria in Development Programs", Quarterly Journal of Economics (Feb. 1951), pp. 47. 'The marginal propensity to import is typically, extremely high in backward economies, largely because of a meager, undiversified domestic productive plant'.

situation of closed economies undertaking development with purely domestic resources. For each economy imports equal exports and therefore these sources of expansion and contraction cancel out. This leaves the international equilibrium to be determined by the domestic propensities to consume, i.e. the domestic multipliers. In equation (2_g) were the country with the larger domestic multiplier to undertake a sufficiently small autonomous investment relative to the country with the smaller multiplier, income expansions and inter-country equilibrium without a trade balance would be possible. However, the backward economies will most probably have both large domestic multipliers and planned innovations requiring volumes of investment. In these essentially undeveloped countries, economic progress waits upon a long-range, capital-intensive program of what have been called primary innovations. To achieve any significant economic advance, autonomous investments must be very substantial and in terms of equation (2_g) a large foreign deficit will most probably develop when an innovation is commenced.

The discussion so far has been of a balance of payments situation arising via a conventional expansion of income and production for two countries with foreign trade multipliers either of the form

(a) $\frac{1}{1-c} (I-X-M)$ or (b) $\frac{1}{1-c-m} (I-X)$ and with prices and exchange rates assumed constant. However, as was seen in the last chapter, excess demands in the domestic economy will begin to arise soon after an investment program is begun even though there may still exist a general reserve of idle factors. Inflationary gaps appear in markets for certain

⁷ Cf. ante. p 69-70

key factors, raw materials, etc. and as over-all demand continues to expand, more and more sub-sectors of the economy become afflicted. Finally, if the expansion continues long enough, a condition of excess demand becomes general. If this is the sequence in the domestic economy, allowance ought to be made for it when dealing with national expansions linked together by means of inter-country trade. The foreign trade multiplier ought to be reformulated to allow for gradual price changes in each domestic economy. However, just as in the case of the domestic investment multiplier, the original formulation of the foreign trade multiplier was restricted to analysis in terms of constant prices. But, at least conceptually, it seems possible to do something comparable to the 'inflationary gap' analysis for the foreign trade multiplier and thereby extend its analytical scope.

If an economy is presumed to have fairly stable propensities to consume, save and import, an income expansion will bring about predictable increases in the three corresponding aggregates (Consumption, Savings, and Imports). As an excess demand develops for particular goods domestically, adjustments will have to be made in the price level. Now, assuming foreign prices and exchange rates to remain unchanged, a greater range and quantity of imports become advantageous. Looked at from another standpoint, any currently occurring trade deficit might be treated as the international equivalent of what would have otherwise been a domestic inflationary gap. If the excess of imports over exports had not been provided by the international economy, it might well have constituted an additional demand for domestic product. This might have meant an excess

demand at present prices and given rise to an inflationary gap. As inflationary gaps occur in particular industries and markets domestically, they necessitate upward adjustments of the relevant prices, but this tends to stimulate imports and it must be taken account of in the equations for exports and imports of an economy. This leads to the following extension of the conventional foreign trade multiplier by a revision of equations (1) and (2): $M_a = f(Y_a, P)$, $X_a = f(Y_b, P)$.

$$(3) \text{ ---- } dM_a = \frac{dM}{dY_a} dY_a - \frac{dM}{dP} dP \quad \text{where } \frac{dM}{dP} \text{ is the price propensity to import}^8$$

$$(4) \text{ ---- } dX_a = \frac{dM}{dY_b} dY_b - \frac{dM}{dP} dP \quad \text{and } dP \text{ the change in price level.}$$

Before embarking on a further phase of the discussion, it may be helpful to summarize the arguments as so far presented. The foreign trade multiplier was introduced by means of three models of two-nation trade and autonomous investment. The equilibrating process was analyzed as well as the parallel between this and the expansion in a closed economy which had been dealt with in the last chapter. In the closed economy, savings counterbalance investment; in the two-nation economy, savings and imports offset investment and exports. The process is basically the same for individual countries in the international economy as it is for a single, closed economy except positive trade balances are expansionary, negative ones deflationary. The study then turned to the conditions of income expansion under which trade balances would occur in a two-country international economy. It was decided that the relatively backward country would experience trade deficits when it embarked on a comprehensive

⁸ The present argument has been adapted and equations (3) and (4) borrowed from an article by W. Stolper, "The Multiplier, Flexibility and International Equilibrium", Quarterly Journal of Economics (1950) pp.559-582.

development program either alone or in conjunction with the more advanced nation. Equations for the exports and imports of an individual country were stated and the importance of a growing inflation gap considered. This gap would increase the developing country's current trade deficit *parri passu* with its increase in the domestic price level. If the development program were to be continued, the economy must face a growing international deficit and the consequent drain on its foreign exchange reserves.

This brings us to the stage where the various measures a country may take in order to reduce this outflow of foreign exchange must be considered along with their effects on the course of domestic income, investment and development. To invoke exchange rationing may be considered equivalent to a reduction in the propensity to import. Reduced spending on foreign goods may not be replaced in its entirety by increased domestic spending but there will be at least some shift in this direction. This will further increase domestic demand relative to the commodities currently available to satisfy it. Therefore, if the investment program continues, rationing of foreign exchange will tend to worsen the domestic inflationary gap.

It is possible to apply an equivalent reasoning where the drain of foreign reserves is met by devaluation rather than exchange control. This will cause immediately higher domestic prices for most imports and to the extent their demand is thereby reduced it will be at least in part diverted to domestically produced commodities. Meanwhile, devaluation will have made some of the country's exports cheaper internationally, which is

equivalent to raising the marginal propensity to import of the other⁹ country. Again the over-all result of measures to improve the foreign balance is to worsen the internal inflation.

In the previous discussion of domestic excess demand, it was argued that in a country where per capita income is comparatively large, the likely presence of a wide range of substitutes for any particular commodity has an alleviating effect on domestic inflation pressures since it tends to redistribute excess demand among industries producing¹⁰ substitutes where idle capacity may still be available. A similar sequence of events may occur relative to excess demand for imports. In a high per capita economy, import demands may be more sensitive to market or price changes and more likely to divert from specific imported goods either to foreign substitutes or domestic ones. However, in the low per capita income country, it may be necessary to resort to a formal foreign exchange control and/or devaluation to divert an excess demand for imports toward the better utilization of still idle domestic factors. But exchange controls and devaluation may give strong upward thrusts to domestic prices. Altering exchange rates and/or the freedom with which foreign funds may be secured usually has to be supplemented by closer, more stringent controls over the domestic economy. These extra-market devices may be an inefficient way of redistributing excess demands for imports but a method to which backward countries have to resort due to the magnitude of redistribution required and the weakness of their

⁹ Salant, op. cit., pp. 204

¹⁰ Cf. ante., p. 104-5

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market mechanism for accomplishing it.

By way of conclusions, this chapter has arrived at the following: that a backward country is extremely likely to incur substantial trade deficits in a period of domestic investment and expansion associated with development; thus, deficits will be further increased by the appearance of inflationary gaps in the domestic economy; measures of exchange control and devaluation designed to alleviate the trade deficit will worsen the internal inflation and may not make any positive contribution to the trade balance. The large-scale redistribution of factors, of production and major reductions in consumption which these backward countries would have to accomplish in order to achieve economic progress if dependent strictly on their domestic resources are not significantly altered by the possibility of international trade. The difficulties which a backward country finds itself in vis-a-vis a more advanced economy when it undertakes an extensive development program are such as to impose almost as severe limits upon the economic development of such backward countries as would the previously mentioned condition of having to rely completely on domestic resources.

11 Cf. ante., p. 114

CHAPTER VII

SUMMARY, COMMENTS AND CONCLUSIONS

The particular sequence of income, consumption and import changes for each economy that can be derived from a multiplier analysis of two-nation trade (models I,II,III) is narrowly dependent upon the numerical values assigned to the various functions and aggregates. Moreover, it is easy to show that comparatively slight changes in these numerical values have a pronounced effect on the results obtained. This close interdependence between the conclusions of the usual multiplier model and the exact numerical values for its constituent elements very much limits the usefulness of such an analysis. However, in this respect the present investigation would seem to be less restricted and vulnerable. Its conclusions are not so intimately dependent upon the particular numerical values allocated to the consumption and import functions of the backward and advanced economy. The discussion has been conducted in terms of probabilities, of more and less, greater and smaller; thus, one might say it differs from the usual multiplier model by being ordinal rather than cardinal. All that is required logically in order to refer its conclusions to the real world is the possibility of determining whether nations at different levels of economic progress have relatively different propensities, something considerably easier to decide than definite numerical values for these propensities in any two economies. Consequently, it is felt the present use of the multiplier

technique has a quite different emphasis and a broader usefulness than is usually the case.

Historically both the theory of international values and foreign trade multipliers has been generally restricted in its detailed exposition to a two nation environment. After the theoretical framework had been built up in this simplified milieu, it would then be broadened by an 'extension to N-countries'. But with this N-country extension, the variables being discussed as well as the conclusions drawn tended to become blurred. It was open to the criticism often levelled at any economic theory of general equilibrium; n -variables, n -equations, everything dependent upon everything else ----- but with no clear cut statement of interdependence that might be interpreted as a primary cause-effect¹ relation where this approach proved necessary or useful. Admittedly the present discussion started out with a similar two-nation model. But rather than reconcile it to the actual world economy of multi-lateral trade by means of this conventional, rather nebulous, n -country extension, it is felt that for our present purposes the two economy assumption can stand. It is considered that such an assumption is both logically and empirically appropriate for the contemporary world economy. The last chapter proceeded on this assumption that dividing the world economy into two parts was a valid and functionally useful device. But, at some point, the following paragraph has been chosen, this viewpoint ought to be defended.

¹ Fritz Machlup, International Trade and the National Income Multiplier, (Philadelphia: Blakiston, 1943) and Lloyd A. Metzler "Underemployment Equilibrium in International Trade", Econometrica, X (1942) 97-112, as outstanding examples of the conventional period multiplier analysis which I feel are vulnerable to the above criticisms.

In our analysis of trade and autonomous investment for two economies, the fundamental consideration was not the number of countries involved but the types of countries. The question is whether two basically different groups of national economies do participate in international trade and if each group can be identified by the relative import and saving functions we have discussed. If it should prove possible to divide national economies of the real world into two such groups, each having unique, macro-economic characteristics, then the analysis as originally outlined, namely in terms of backward and advanced economies, is sufficient. If this argument is logical, the important matter becomes whether in reality nations of the contemporary world economy can be assigned to the groups 'backward' and 'advanced'. Statistics of international economic activity seem to bear out such a dichotomy. Of total world income, the major portion is produced by a small group of countries with but a fraction of its population. This disproportionate share is produced by the U.S., Canada, the U.K. and certain countries of North-west Europe. So enormous is the inequality of world income distribution that countries such as India and China, although the most populous, have not only small per capita but also small national incomes. Accordingly, as a first approximation to these categories of backward and advanced, the former might be taken to consist of Africa, South America and South-east Asia and the latter of the U.S., the British Commonwealth and the previously mentioned nations of Europe.

² Cf. ante., p. 30.

Thus, the theory is brought into line with the contemporary world economy without any need to translate it into an n -countries formulation.

In our theoretical outline of development the gap between Y_0 and Y_f was highly significant in determining the course of investment, expansion and economic progress. The various forms of surplus out of which innovations could be supported were dependent upon this margin, Q_1 directly, Q_2 indirectly. What can be said about the probable size of these surpluses in advanced and backward countries of the real world? Statistical time series of the percentage of workers unemployed in various countries for the period since World War I, more especially from the onset of the depression in 1929 until World War II, indicate that the countries here categorized as advanced not only seemed to possess an overwhelming portion of world productive capacity but also displayed a penchant for continuously employing a smaller percentage of it than did the backward group their more limited facilities. In advanced countries production fluctuated more over the business cycle than it did for the backward ones. The latter experienced instead a fluctuation of value rather than physical volume of output apparently the result of greater price flexibility in its economy.³

³ Colin Clark, The Conditions of Economic Progress, (London, MacMillan 1939) Fig. 458 where the following facts are presented, decline of sterling prices between 1929-1933.

mfgs	18%
foodstuffs	33%
raw materials	41%

or alternatively to consider the reduction in quantities appearing in international trade

mfgs	40%
foodstuffs	18%
raw materials	13%

In diagram IV taking those countries to the left of t_0 and those to the extreme right and even while making any one of a fairly wide range of assumptions as to secular changes in marginal and average propensities to consume, it seems that Y_0 would most probably equal Y_{f_0} for the first group but be markedly less for the second. Statistical evidence cited from the inter-wars period bears this out.⁴ B countries have tended to adjust themselves to deflationary conditions by price rather than output changes. Accordingly, it seems reasonable to assume that over time the average value of Y_0/Y_{f_0} would be found to decline progressively if individual national economies were examined starting from 0 and proceeding to t_n . If this ratio does decline progressively as development occurs, then the following arguments can be applied to any countries more or less backward and advanced. The only difference is that the conclusions are more compelling in the case of nations at the extreme ends of the yardstick of development. When countries are considered between which the disparity in economic progress is less, the following conclusions become relative assessments rather than definite assertions. Thus, if both the A and B economies were to undertake programs of innovation from their most probably unemployment equilibriums, $\frac{Y_0}{Y_{f_0}}$ a would be less than $\frac{Y_0}{Y_{f_0}}$ b and in consequence there would be less possibility of physical expansion and

⁴ For example these are the figures given for the U.S. economy in the period 1925-1929, America's Capacity to Produce, Brookings Institute as cited by Colin Clark, op. cit., pp. 60, 'during this period of high level production mining and manufacturing facilities were only utilized on the average to 80% of capacity, transport facilities for year 1929 only 70%' --- pp. 62, 'average percentage for capital-goods-producing industries (iron, steel, locomotives, textile machinery, machine tools, lumber, window glass and plate glass) was 73%.

a greater need of price level changes in the latter than in the former.

When one considers per capita income in the real world counterparts of these theoretical A and B economies, the figures are quite revealing. The much greater productivity and income of A must be explained largely by its huge per worker investment in productive equipment. In sections of the world where progress has occurred, surplus has bred more surplus; productivity gains have been translated into further productivity gains. This cumulative nature of economic development has helped create the huge gap to be found between economic well-being in the A and B countries at present. Moreover, any substantial economic advance in B could only come via a rapid increase in its capital investment per worker but its high Y_0 indicates an insuperable barrier in the way of such large scale creation of equipment. To introduce 'the population problem' into the analysis means that as numbers increase in B this will reduce investment per worker and, if anything, raise the Y_0 ratio.

In the theoretical study another factor of importance was the investment at earlier periods of the program which subsequently became embodied in consumer goods while the income expansion was still continuing. In a given period this portion of investment ($-D$) would represent the previous investment expenditures already converted into actual productive equipment and being used up in consumer goods production. Thus $-D$ is dependent upon the capital intensity of the investment program, the average time dimension of the planned innovations. Should the economy embark upon a highly capital-intensive investment, $-D$ will not increase

⁵ Cf. ante., p. 30

as quickly as would have been the case for one of a lesser intensity.

For the real world counterparts of A and B can anything be said regarding the $-D$ likely to accrue in the short-run from their investment programs? Buchanan for one argues that the B countries owe their economic inferiority to their historical inability to provide either the quantity or quality of productive equipment characteristic of advanced economies. While there is a general scarcity of capital in B, even more serious is the almost complete lack of the more capital intensive types of investment.⁶ Now if there does exist such a comparative dearth of capital-intensive investment in B, a primary, immediate task of a development program will be investments calculated to raise this capital intensity of the economy. But this is to accept the fact that $-D$ will be reduced in the short-run and thereby exert a lesser deflationary pressure upon the income expansion in B. This becomes increasingly important where thorough-going economic development giving a high priority to capital-intensive investment is undertaken.

Have the obstacles to economic development confronting the B group become more serious in recent decades? Among the A group, the increasingly preponderant position of the U.S. and its unique role in international trade may have decreased the complementarity between development in the A and B groups. On the part of the A there is not the same vested interest in increasing the raw materials productivity of the B group as was the case when Great Britain bulked comparatively larger in international trade.

⁶ N.S. Buchanan, "Deliberate Industrialization for Higher Incomes", Economic Journal (1946) pp. 542.

The economic growth of the U.S. today is not as dependent upon increasing raw material supplies from abroad as was the U.K. in the last century. Then too, for a multitude of reasons, private international lending as an aid to the economic development of backward areas has largely ceased. Finally, there is the quite obvious fact that the remaining undeveloped areas offer much less promising prospects for investment than was the case in the 19th Century when economic progress was spreading overseas rapidly from its fountainhead in the British Isles into lands endowed physically, geographically, culturally and by the accidents of history with a favorable conjunction of economic circumstances.

This study has been intended as a theoretical background against which to consider certain aspects of economic progress; emphasis has been made on the short-run obstacles that impede or prevent development in contemporary backward countries. To Schumpeter's theory of innovations there has been appended an outline of the sequence of macro-economic changes which the carrying out of an innovation implies. The theoretical schema presented seems to agree with available statistics for the world economy. Also, it has the virtue of being stated in a form which permits application of a great deal of recent economics (functional finance, inflationary gap analysis, foreign trade multipliers, etc.) to practical short-run problems arising out of an innovation. The theory is stated in terms of changes in macro-economic aggregates; it studies comparative rates of change in national product, consumption, savings and investment for countries at different levels of economic well-being. By assigning relevant values to the production and development equations, what had

previously appeared an entirely unique problem for each country, namely its economic development, can be understood within a single, general framework of analysis.

Development is viewed as a cumulative growth phenomena and as a summation of short-run situations. In economics every short-run situation is born out of the one existing previously, but new variables may appear or old ones assume a new importance. At some point the short-run situation may have had a distorting effect upon the basic process of development, either putting an end to the cumulative growth or preventing its occurrence altogether. Thus, a period of investment, innovation and productivity increase might be overtaken by an increase of population which would dissipate the gains already achieved and might put an end to further economic advance.

While concerned with the theory of economic development primarily in reference to the more backward countries, since these countries frequently get into international difficulties when they attempt extensive innovations, the present discussion is also concerned with questions of international economic equilibrium. A great deal of contemporary international disequilibrium is the result of non-economic causes, what Schumpeter would classify as exogeneous factors, World War I and II, etc.⁷ The present discussion ignores these, it investigates only the basically endogenous type arising out of national economic development. However, to the extent exogenous forces operate within the international

⁷ Joseph Schumpeter, The Review of Economic Statistics, vol XVII (May 1935) pp. 2-3.

market economy and affects the major economic variables, they become in a sense economic forces themselves. Many of the most important events in the development of various countries have been such exogenous forces; cultural values, religious doctrines, political philosophies, etc.. Development is an historical experience and it would be unreasonable to expect any analytical account to include everything which might be involved. Much of the present international distribution of income and wealth is the consequence of non-economic accidents of history; similarly with contemporary rates of change in various sections of the world economy. Short-run equilibrium or dis-equilibrium in the international economy is the result of a complex matrix of forces. Many of the economic variables involved are only to be understood in the light of the social, cultural and political structures out of which they arise. Consequently the immediate short-run situation of the international economy is just as much an historical inheritance as the productive structure with which each country has been blessed or cursed.

Any theory of economic development must rest on some basic, non-economic selection of variables. But it is the task of such a theory to explain the economic interactions among these; the unique sequence by which economic laws are worked out in a market system super-imposed on this basic environment. In the present theory, this basic environment must be taken into account in assigning values and rates to the functions and variables appearing in the equations of production and development. Finally, it is the economic interaction between the individual countries and economic regions that determines equilibrium or dis-equilibrium for

the international economy.

The inquiry which proceeded the writing of this paper started off as an examination of the 'dollar shortage'. At first glance it may appear to have wandered far afield. Yet there are a great many aspects of this particular problem of international dis-equilibrium which can be rather neatly fitted into the present theory. Extra-ordinary investment in a single country will most likely confront it with a deficit in its current international accounts. The rational of this has been worked out in the Machlup and Metzler studies of investment and income expansions in two or more national economies. Moreover, for the analysis of world economic development, it seems legitimate to divide the international community into two groups of countries and compare the inter-group relations. As economic growth and development proceeds at vastly different rates in these two groups, it is reasonable to expect the framework of exchange rates, price levels, commercial and financial relationships, etc. will be subject to various stresses and usually characterized by some degree of dis-equilibrium.⁸ The present dollar shortage might be best explained as such a state of development induced dis-equilibrium.

For long it was a basic supposition of international economic theorizing that the process of development, if left to operate in a free-trade world, would speed its course and diffuse its benefits in a manner superior to that possible under any system in which countries were to tamper with the process. Just as the gold-standard mechanism tended to

⁸ Metzler, op. cit., analyzes necessary and sufficient conditions for maintenance of international equilibrium when income expansions occur within the various national economies.

maintain an interdependent rate of national investment by gold out-flows from those countries undertaking too much investment, free trade was assumed to coordinate the increasing international specialization of labour and equitably distribute its benefits. The arguments were founded on the assumption that economic development could and would occur in any country under a private enterprise system as well as such more obvious assumptions as national full employment, etc.. However, if the degree of unemployment does vary in different national economies and there are marked gaps in economic progress between countries in the present world economy, these assumptions are invalid and the real situation becomes more likely a background for disharmony and disequilibrium. If free trade prescriptions are to work, it is necessary to fulfill some further important conditions. In the post-war economic agreements it was recognized that free trade to have its harmonious effect required the maintenance of full employment as a basic pledge on the part of participating countries. In this regard it is interesting to consider some concluding remarks appended to the Walker Report in 1949 by J. M. Clark. He advances the idea that a high level of world employment, income and economic stability might depend upon the maintenance of inflationary pressure in the U.S. economy. This would seem to concur with the outline of the international economy presented here.

⁹ Particularly, the maintenance of international full employment is deemed basic to the smooth operation of the International Monetary Fund, see Keynes' chapter XXVII in The New Economics, editor Seymour E. Harris.

¹⁰ National and International Measures for Full Employment (Lake Success, N.Y. : U.N. Publications, 1949) pp. 100-104.

A good contemporary approximation to the A and B groups might be to consider the U.S. as the A and the rest of the world as making up the B. Certainly the current per capita investment which the U.S. can undertake with relative immunity to inflation consequences is tremendous when compared to that of the rest of the world. In the post-war period, it has been astonishing how quickly the inflationary impetus of such investment burdens have been dampened down in the American economy. Even in this period how close it has appeared that deflationary forces making for economic recession followed after inflation and boom. The productivity of America is so great and its capacity to save so tremendous that even with a backlog of 10 years demand for some lines of civilian goods, a wave of post-war innovations and a huge ownership of assets easily convertible to purchasing power and in many cases supposedly accumulated expressly for this purpose, this country has experienced difficulty in¹¹ maintaining full employment. This is not to assert that the B countries are immune to deflation and depression but in their case that such happenings seem to depend more on the failure of effective international demand than a reluctance to consume enough out of their full employment income. B countries, with their comparative inflation propensities, rapidly get into difficulties when they attempt any extensive program of investment. To this add the probability of cyclical fluctuations arising in the advanced countries and the prospects of economic development for the B group become further beclouded.

¹¹ e.g. the comparative 'recession' which occurred in the U. S. during the winter and spring 1949.

For any economy, there exists a close relation between present income, present surplus and the degree or even the possibility of economic progress. Investment can only be accomplished out of some form of surplus. When investments result in mounting expansions beyond full employment income at existing prices, an inflationary gap arises for the domestic economy. This means upward adjustments of the price level and a resulting forced saving. Internationally it leads to a trade deficit, an increase in the foreign resources made available to the economy and thereby an additional source of surplus for domestic development. The multiplier analysis can serve as the basis for assessment of all three types of surplus (Q_1, Q_2, Q_3). It is by utilizing these forms of surplus to the limit of their economic effectiveness that development may proceed most rapidly. The techniques for expediting development are domestic full employment, inflationary forced savings and a balance of payments deficit. These are the devices by which to implement a Schumpeterian innovation. The process of economic development can be scrutinized with the knowledge furnished by Keynesian and post-Keynesian macro-economics. When this is done, one comes to realize the enormous forces which tend to keep poor countries poor and help make rich ones richer. A surplus is necessary for an investment and an investment for an innovation but, for the backward economy, 'surplus' is an awfully hard thing to find. Successful development is a harmonious growth of economic aggregates, it requires maintenance of certain relations between Y, C, I and S on the one hand and Land, Population, Technique and Technology on the other. The methods by which an individual economy, particularly one of the backward group,

farthers its economic progress are devices to secure the greatest possible surplus. These devices, full employment, domestic inflation and trade deficits, while they stimulate domestic development, are destructive of international equilibrium. The individual economy experiences a drain upon its foreign exchange reserves and has to choose between domestic development and international respectability.

No one knows whether it is most correct to consider the economic development which took place in certain sections of the world in the last century as the fortuitous result of a unique conjunction of favorable circumstances or as the working out of an economic process which can be duplicated, at least to a degree, in the present era in vastly different sections of the world. In other words, has development been an accident of history or a controllable economic process? The theory offered here does not attempt to answer this question; it merely poses it in a clear-cut, concise form. It states some equations which seem to represent salient features of development and the pattern of economic adjustment which must precede and accompany development. To answer the question posed at the beginning of this paragraph requires a knowledge of how basically non-economic factors, for example, population changes, will proceed once economic development has started. Reviewing the present theory, one would be sanguinary indeed to under-estimate the difficulties posed for present day countries which have remained so long undeveloped. The improvement of backward areas would be a difficult problem if the economic obstacles alone had to be contended with, but these are complicated by social, cultural, political and institutional factors that

tend to distort, disrupt or put an end to any tentative economic progress that might occur. While one hesitates to adopt the same prescription for economic progress that Rousseau once suggested be applied for political change, namely that people must be forced to be free, the economic planner is disturbed by the fact that his plans for development may be ruined by non-economic forces. There may be areas of the world where little if any improvement in economic well-being, that is, other than outright, highly expensive philanthropy, can be achieved unless to some degree we force these people to be more efficient, effective and prosperous.

BIBLIOGRAPHY

- Buchanan, M.S., "Deliberate Industrialization for Higher Income", Economic Journal (1946) 533-553 pp.
- Clark, Colin, "Public Finance and Changes in Value of Money", Economic Journal (1945) 371-389 pp.
- _____, The Conditions of Economic Progress. London: MacMillan, 1939, 584 pp.
- Clark, John B., The Distribution of Wealth. New York: MacMillan, 1899, 445pp.
- Cassels, J., "On the Law of Variable Proportions", Explorations in Economics. McGraw-Hill: 1936, 223-236 pp.
- Douglas, Paul H., The Theory of Wages. New York: MacMillan, 1934, 639pp.
- _____, Economic Background of Social Policy Including Problem of Industrialization. International Labour Organization, Montreal, 1946, pp. 175
- Hansen, Alvin, Fiscal Policy and Business Cycles. New York: Norton & Company, 1941, 462 pp.
- Harris, Seymour E., editor, The New Economics. New York: A. Knopf, 1947, 686 pp.
- Hayek, F. von, The Pure Theory of Capital. London: MacMillan, 1941, 454pp.
- Hicks, J.R., Value and Capital. Oxford: Clarendon, 1945, 337 pp.
- Kahn, Alfred E., "Investment Criteria in Development Programs", Quarterly Journal of Economics (Feb. 1951) pp. 57-79
- _____, "The Relation of Home Investment to Unemployment", Economic Journal (June 1931) 173-198 pp.
- Machlup, Fritz, International Trade and the National Income Multiplier. Philadelphia: The Blakiston Company, 1943, 237 pp.
- Metzler, Lloyd A., "Tariffs, the Terms of Trade and Distribution of National Income", Journal of Political Economy (1949) 1-29 pp.
- _____, "The Transfer Problems Reconsidered", Journal of Political Economy (June 1942) 397-414 pp.
- _____, "Underemployment Equilibrium in International Trade", Econometrica X (1942) 97-112 pp.

National and International Measures for Full Employment. Lake Success, N.Y. : U.N. Publications, 1949, 104 pp.

Ohlin, Interregional and International Trade. Cambridge, Mass., Harvard University Press, 1933, 617 pp.

Polak, J.J., "Balance of Payments Problems of Countries Reconstructing With the Help of Foreign Loans", Quarterly Journal of Economics (Feb. 1943) 208-240 pp.

Salant, William S., "Foreign Trade Policy in the Business Cycle", Public Policy. vol II, Cambridge, Mass., 1941, 209-231 pp.

_____, "The Inflationary Gap, Meaning and Significance for Policy Making", American Economic Review (1942) 308-314 pp.

Schumpeter, Joseph A., "The Analysis of Economic Change", Review of Economic Statistics vol XVII (May 1935) 2-10 pp.

_____, The Theory of Economic Development. Cambridge, Mass., Harvard University Press, 1934, 255 pp.

Smail, Lloyd D., Calculus. New York: Appleton-Century-Crofts, 1949, 592 pp.

Stolper, W., "The Multiplier, Flexible Exchanges and International Equilibrium", Quarterly Journal of Economics (1950) 559-582 pp.

Young, A.A., "Increasing Returns and Economic Progress", Economic Journal (Dec. 1928) 527-542 pp.