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# FOREIGN TRADE AND THE GROWTH OF THE DUAL ECONOMY: A STUDY OF THE PHILIPPINES, 1950-66

by

George L. Hicks and Geoffrey McNicoll

M-9406
October, 1968

## FOREWORD

This study is an exercise in applying a particular form of highly aggregated analysis to the Philippine economy. The present version is a preliminary draft and is circulated in order to elicit comments. Any comments readers may care to make will be welcomed.

We wish to acknowledge the helpful criticism of our colleagues at the National Planning Association, in particular, Richard W. Hooley and Forrest E. Cookson. Many of the ideas in this study originated in our joint discussions.

We are grateful also for the cooperation and assistance of members of the faculty of the School of Economics, University of the Philippines, where one of us spent the two years 1966-67 carrying out field work for the NPA Project in the Philippines.

John C. H. Fei of Cornell University kindly gave us the benefit of his formidable graphical skills in translating our equations into diagrammatic form.

Our most basic debt, however, must be to Douglas S. Paauw, whose encouragement and frank criticism have been of constant help to us. In both substance and presentation, few parts of this work do not owe something to his guidance although, needless to say, on specific points and attitudes we may often have differed.

Errors remaining, of course, are our own, and we would be grateful to have them pointed out to us.

George L. Hicks
Geoffrey McNicoll

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# INTRODUCTION

A major objective of this study is to analyze at the aggregate level the process of economic development in the context of openness. It is our thesis that trade makes a fundamental difference to the growth process and should play a central role in the pure theory of development. Although having nothing new to say about the specific role of trade in the development process, we have attempted to incorporate it in a theory of growth of a dual economy.

The theory makes no claim to be generally relevant. Indeed, it is now widely agreed that the diversity of underdeveloped countries effectively precludes the possibility of a generally applicable growth theory.[1] In the present study we are concerned with the export-oriented, land surplus, dual economy.

The significance of treating an open economy is that it allows us to recognize the fact that most countries must rely heavily on imported capital equipment for their industrial growth. For all but a few countries,

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[1] Fei and Ranis, for example, argue that "the time has come to venture beyond the customary eclectic survey of growth problems and ideas and towards the evolution of a particular theory aimed at a particular type of economy." J. C. H. Fei and G. Ranis, Development of the Labor Surplus Economy: Theory and Policy (Homewood, Ill.: Richard D. Irwin, Inc., 1964), p. vii.

the assumption commonly made in closed economy approaches that industrial goods can be used indifferently as consumer goods or investment goods (or that the latter can be produced domestically at will) is inadequate and disguises what may well be an important constraint on growth.

We consider the land surplus economy in contrast to the labor surplus case of studies in the Lewis tradition in the belief that the former is a more accurate description of many developing countries. An examination of the sources of growth of agricultural output in such countries suggests that a major portion of this growth may be accounted for by simple expansion of cultivated area. Thus the emphasis on how to utilize the surplus or underemployed agricultural labor force to develop an industrial sector is replaced by a more rigid connection between a labor transfer out of agriculture and a decline in the potential agricultural surplus. This distinction, of course, cannot be pursued too far, and population growth may eventually transform the land surplus economy into the labor surplus type.

The third characteristic of the type of economy in which we are interested is its dualistic nature. The term "dualism" is used in the literature in a number of different senses. In this study we use it to characterize two fundamental features of the economy: a substantial labor productivity differential between a traditional agricultural sector and a

relatively modern industrial sector, and differing patterns of resource use and consequently of growth dynamics in the two sectors. The latter feature is seen in a basic asymmetry of the sectoral production functions, with capital playing a significant role in the modern industrial sector but a much less important (and often negligible) role in traditional agriculture.

The particular example of an open, land-surplus, dual economy towards which most of this study is directed is the Philippines. However, we believe that it is also relevant to economies such as Thailand, Burma, and Malaysia, which share the same essential characteristics.

Chapter 1 is a brief survey of the theoretical literature on trade and development. The elements of a theory of open economy development are seen to be present in the literature. In Chapter 2 we introduce the basic structural framework which underlies most of the analysis of this study and we describe in general terms, on the basis of historical experience, how we would expect development to proceed within this framework. Some recent divergences from this postulated process are noted, and we therefore consider in more detail some of the major changes which, from time-series or cross-section data, appear to be associated with development. These separate changes are listed as a set of "development indicators," against which the performance of a developing country can be compared.

An analysis of recent patterns of growth followed by some countries suggests that they may represent a case of temporary success which does not lay the foundation for sustained growth but is more likely to lead to future stagnation. The contrast between this deviant type of growth and the probable successful patterns is the major focus of this study. What we regard as an ultimately unsuccessful growth pattern is that characterized by excessive or "hothouse" import substitution and resour -intensive export growth.

Excessive import substitution, among other things, effectively discourages the export of manufactured goods and the growth of a domestic investment goods industry. As a result, the economy remains dependent on the import of capital goods and therefore on exports needed to pay for them. Partly because of the emphasis on import-dependent industrialization, traditional agriculture remains relatively stagnant although the growing modern sector is heavily dependent on it. Without increasing productivity, the exportable agricultural surplus is eroded by the twin pressures of eventual diminishing returns at the margin combined with the rising share of the nonagricultural population which must be fed. Countries with suitable natural resources such as minerals and forests can supplement traditional agricultural exports with these "extractive" exports, but this type of export, as with traditional agriculture, tends to be

resource using and ultimately resource exhausting. The dual flaw of this open economy growth pattern stems from excessive import substitution linked to natural resource using and traditional exports. Combined, but not singly, they lead to eventual cessation of industrial growth.

This thesis is hardly novel--indeed, it is basically the received doctrine. What we attempt in Chapters 3-5, however, is to formalize the theory and present a complete case study. The Philippines is an example of this deviant type of open economy growth. The deviation is with respect to the successful growth pattern which is described in Chapter 2. In Chapter 3 the cases of success and failure are put on a more formal basis as a simple aggregate model. As attention is to be directed to the case of the Philippines, the particular variant considered appropriate to that country is subject to the closest attention.

In Chapter 4, the theoretical model is applied to the Philippines. As the future of this growth pattern is closely tied to the growth of exports, this sector is subject to more intensive disaggregated analysis in Chapter 5.

In general, we conclude that the theoretical model of open economy growth is a useful framework of analysis for the Philippine economy, offering some important insights into economic relationships and future development prospects which may be obscured at a more

disaggregated level. Philippine growth diverges substantially from the postulated ideal pattern, and the major policy problem is seen in Chapter 6 as one of changing direction in order to bring about an eventual convergence of the actual and the ideal pattern. This involves policies which change the industrial structure to encourage exports of manufactured goods and backward integration to reduce import dependence. Equally important is an internal re-direction of resources which raises productivity in the traditional sector and reduces the resource-using bias of the export sector.

# CHAPTER 1

## THEORIES OF TRADE AND GROWTH: A SURVEY OF THE LITERATURE

The literature on the development of the open economy is extensive but scattered. It is to be found in the mainstream of development theory, in writing on the pure theory of international trade, and in the policy-oriented literature on the role of trade in growth. Each segment in itself, however, is inadequate. The greater part of development theory is built on the assumption of a closed economy. Pure trade theory, which has only recently begun to extend its boundaries to the field of growth, by and large continues to take as a parameter what development theory seeks to explain. And the third category, which lies outside the mainstream of both development and trade theory and, consequently, lacks the cohesion and constraints that such theory imposes, not surprisingly consists of independent fragments of analysis.

## DEVELOPMENT THEORY AND THE ROLE OF TRADE

"The causes which determine the economic progress of nations belong to the study of international trade."[1] Modern theories of development have largely ignored this Marshallian dictum and analyzed the process and determinants of growth with the assumption of a closed economy. The dominance of the closed economy approach to development theory is rather rarely commented on, but Austin Robinson, for example, puts it the following way:

> "While there has been during recent years an enormous volume of writing on the problems of economic growth, ... much less has been written on the subject of the relation of international trade to this process, and what has been written has not been at all completely integrated into the theories of economic growth. Very much of what has been written in the latter field seems implicitly to assume, indeed, that the economic system considered is a closed one."[2]

A glance at a few of the leading development texts illustrates the same point. Hagen, for example, discusses virtually all aspects of

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[1] Alfred Marshall, Principles of Economics (London, 1920), p. 270.

[2] Austin Robinson, "Foreign Trade in a Developing Economy" in Kenneth Berrill (ed.), Economic Development (London: Macmillan Company Ltd., 1964), p. 212.

development theory without reference to the role of trade.[3] Trade is dealt with briefly at the end of the book, but as a policy issue rather than as an aspect of development theory. The treatment in Kindleberger's Economic Development is similar.[4] The theory of economic development, which forms the heart of the book, discusses land, labor, capital, technology, scale, and transformation--but not trade. The implicit assumption throughout is that of a closed economy. The problem of capital formation, for example, "is seen as one of feeding (and clothing) the labor taken away from the production of food and clothing and put to work to produce capital."[5] The economy is opened only when the theory of economic development is complete; the usual issue of foreign trade or autarchy is then raised (Chapter 16).

The case for including trade in the mainstream of development theory rests on the proposition that the growth dynamics of the open economy are significantly different from those of an economy which is closed. This case will be spelled out in detail in the following chapters.

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[3]Everett E. Hagen, The Economics of Development (Homewood, Ill.: Richard D. Irwin, Inc., 1968).

[4]Charles P. Kindleberger, Economic Development (New York: McGraw Hill, 1965).

[5]Ibid., p. 97. In fact, of course, much of the capital stock in underdeveloped countries is imported.

Although the claim that trade is significant is hardly novel, it is useful to reflect on how trade has come to be largely excluded from modern development theory.

It may be that modern study of the very different nineteenth century development experience and the anti-colonial reaction to the exploitative foreign-created export economies has succeeded not only in greatly advancing knowledge of the various trading problems facing the developing countries (adverse terms of trade, instability of earnings, etc.) but also, on a less conscious level, in largely suppressing serious thought on the issue of the role of trade in economic development.

Another factor which has accentuated the closed economy approach of development theory is the dominance in much of the literature of empirical studies and examples based on India and Pakistan and models of development drawing their inspiration from these particular cases. The ratio of foreign trade to total output is lower for India and Pakistan than for almost any other underdeveloped economy and, hence, the assumption of a closed economy presumably does less violence to the reality.

The emphasis on India and Pakistan has also led to an overemphasis of the case of the overpopulated, labor-surplus economy. Hla Myint comments on this aspect and concludes:

> "Post-war theories about the developing countries tend to be dominated by the model of the overpopulated countries. But large areas of the underdeveloped world such as Latin America, Southeast Asia, and various parts of Africa started with sparse populations in relation to their natural resources and are not yet suffering from population pressure. We need, therefore, at least two main theoretical models, one for the countries with no significant population pressure and another for the overpopulated countries."[6]

It is no coincidence that Myint's analysis of the countries suffering from no significant population pressure also gives a prominent role to foreign trade. Countries without population pressure usually have high trade ratios. Myint's emphasis, however, is on the structural problems created by the growth of the export economy rather than in analyzing the interaction of trade and domestic variables during the growth process. Moreover, when he turns to discuss the major postwar theories of economic development (disguised unemployment, minimum savings ratios, critical minimum effort, and balanced growth), he reverts--as any survey must--to the assumption of a closed economy.

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[6]Hla Myint, The Economics of the Developing Countries (London: Hutchison & Co., Ltd., 1964), p. 36.

## TRADE THEORY AND ECONOMIC DEVELOPMENT

While it is clear that the main body of development theory says little about trade, it is equally true that trade theory largely avoids the issues of development. Traditional trade theory is mainly concerned with the international application of the theory of value and welfare. It takes as given and constant the quantities of the factors of production (which are assumed fully employed), population, and the level of technology, and then asks questions which relate to the commodities which will be traded and the gains from trade. The analysis is essentially that of statics or comparative statics and is not concerned with the time path of variables. Development theory, on the other hand, should concern itself with the interaction between variables and the changes over time in the factors of production, population, technology, and trade.

Although traditional trade theory is, therefore, not relevant to development problems, there have been a number of recent attempts to construct models which show the effect of growth on trade. These, too, however, are of only limited relevance. Corden writes of them: "The main body of this theory does not concern itself with the effect of trade on growth or the complex interrelationship whereby trade affects growth and this growth then has repercussions on trade. The models take the sources of growth--population increase, capital accumulation, and

technical progress--as given, and explore their impact on trade."[7] As the focus of the present study is on the effect of trade on growth rather than vice versa, it is not necessary to survey this literature. The major work in the field is associated with the names of Hilgerdt,[8] Verdoorn,[9] Bensusan-Butt,[10] and Johnson.[11] These and other contributors to the effect of growth on trade have been surveyed by Caves[12] and Corden.[13] Corden's conclusion is that this approach "which takes growth as a datum is certainly not a sufficient treatment of the relationship between trade and growth."[14]

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[7]W. M. Corden, Recent Developments in the Theory of International Trade (Princeton: Princeton University Press, 1965), p. 35.

[8]League of Nations, Industrialization and Foreign Trade (New York, 1945).

[9]P. J. Verdoorn, "Complementarity and Long-Range Projections," Econometrica, Vol. 24 (October 1956), pp. 429-450.

[10]D. M. Bensusan-Butt, "A Model of Trade and Accumulation," American Economic Review, Vol. 44 (September 1954), pp. 511-529.

[11]H. G. Johnson, Money, Trade and Economic Growth (London: George Allen and Unwin, 1962), Chapter 4.

[12]R. Caves, Trade and Economic Structure (Cambridge: Harvard University Press, 1960), Chapter 14.

[13]W. M. Corden, op. cit., Chapter 3.

[14]Ibid., p. 40.

## APPROACHES TO TRADE AND DEVELOPMENT

There is, of course, a large literature which traces a relationship from trade to growth, but on the whole it cannot compare in analytical rigor or logical consistency with the studies mentioned above. Perhaps because of the lack of formal statements of these theories and their heterogeneous nature, they have had little impact on the main body of theory--either of trade or development. Nevertheless, there do exist a number of isolated, yet persuasive, theories that argue a causal relationship from trade to growth.

The literature on development through trade is so often surveyed that a summary of the arguments is hardly necessary. This task has been performed in a book by Meier[15] and in the articles by Yang,[16] Haring,[17] and Hultman.[18] These and other authors of survey articles have usually adopted a taxonomic approach, which is probably an inevitable consequence of the nature of the material. Essentially, there is no complete theory

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[15] G. M. Meier, International Trade and Development (New York: Harper & Row, 1963), Chapter 7.

[16] Shu-Chin Yang, "Foreign Trade Problems in Economic Development," Scottish Journal of Political Economy, Vol. XI (1965), pp. 116-135.

[17] J. E. Haring, "Dynamic Trade Theory and Growth in Poor Countries," Kyklos, Vol. 16, fasc. 3 (1963).

[18] C. W. Hultman, Land Economics (May 1967), pp. 148-157.

of development through trade but, rather, a catalogue of arguments--for trade, against, and a few more or less neutral. In sharp contrast with the main body of trade theory and even development theory, the polemical element is very strong. Writers such as Robinson,[19] Cairncross,[20] Hicks,[21] Meier,[22] Berrill,[23] Haberler,[24] and Emery[25] argue a pro-trade

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[19]Austin Robinson, "Foreign Trade in a Developing Economy" in K. Berrill (ed.), Economic Development with Special Reference to East Asia (London: Macmillan, 1964).

[20]A. K. Cairncross, Factors in Economic Development (London: George Allen and Unwin, 1962).

[21]J. R. Hicks, Essays in World Economics (London: Oxford University Press, 1959), Chapter 8.

[22]Meier, op. cit.

[23]K. E. Berrill, "International Trade and the Rate of Economic Growth," Economic History Review (April 1960).

[24]G. Haberler, "International Trade and Economic Development" (National Bank of Egypt, Commemoration Lectures, Cairo, 1959).

[25]R. F. Emery, "The Relation of Exports and Economic Growth," Kyklos, Vol. XX, No. 2 (1967).

case, while Myrdal,[26] Prebisch,[27] Singer,[28] Myint,[29] Higgins,[30] and Levin[31] voice doubts. Nurkse[32] combines elements of both major schools, while Kindleberger,[33] a true eclectic, argues that sometimes trade helps, sometimes hinders, and sometimes plays a neutral role in the development process.

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[26] G. Myrdal, An International Economy (New York: Harper & Bros., 1956).

[27] R. Prebisch, Economic Development of Latin America and its Principal Problems (New York: United Nations, 1950).

[28] Hans W. Singer, "The Distribution of Gains Between Investing and Borrowing Countries," American Economic Review (May 1950).

[29] Hla Myint, "An Interpretation of Economic Backwardness," Oxford Economic Papers (June 1954).

[30] B. Higgins, Economic Development (New York: W. W. Norton & Co., 1959).

[31] J. V. Levin, The Export Economies (Cambridge: Harvard University Press, 1960).

[32] R. Nurkse, Patterns of Trade and Development, Wicksell Lectures (Stockholm, 1959).

[33] C. P. Kindleberger, Foreign Trade and the National Economy (New Haven: Yale University Press, 1962).

Those who support the pro-trade case stress comparative advantage, markets, specialization, and technological change. Haberler, for example, argues as follows:

> "First, trade provides material means (capital goods, machinery, and raw and semi-finished materials) indispensable for economic development. Secondly, even more important, trade is the means and vehicle for the dissemination of technological knowledge, the transmission of ideas, for the importation of know-how, skills, managerial talents, and entrepreneurship. Thirdly, trade is also the vehicle for the international movement of capital especially from the developed to the underdeveloped countries. Fourthly, free international trade is the best antimonopoly policy and the best guarantee for the maintenance of a healthy degree of free competition."[34]

Haberler concludes that "international trade has made a tremendous contribution to the development of less developed countries in the 19th and 20th centuries,"[35] and in a similar spirit and for similar reasons Cairncross emphasizes the "importance--indeed, the uniqueness--of the contribution that foreign trade can make to development...a country that

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[34] G. Haberler, op. cit. Reprinted in Meier, Leading Issues in Development Economics (New York: Oxford University Press, 1965), p. 355.

[35] Ibid., p. 353.

seeks development must invite foreign influences if it is to succeed. It needs foreign equipment, foreign capital, and foreign ideas."[36]

The opponents of trade argue that, in one form or another, underdevelopment is partly due to the forces of the international trading system. Nurkse takes an intermediate position, allowing that trade was a successful engine of growth in the 19th century but arguing that it cannot be expected to perform the same role in the 20th century. Because of this, countries must largely rely on industrial expansion for the home market.

Surveying the contributions to this field, Caves concluded that: "Unfortunately, most of the existing pieces of dynamic international trade theory are only dynamic fragments, patches of analysis compatible with any number of complete models."[37] But despite their partial nature, they do contain a number of important arguments to the effect that trade is relevant to the development process. Two major groups can be

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[36] A. K. Cairncross, op. cit. Reprinted in Meier, op. cit., p. 363.

[37] R. E. Caves, op. cit., p. 244. A major addition to this literature since the publication of Caves' book is the further elaboration by Baldwin of his theory of export technology and economic development. See R. E. Baldwin, "Export Technology and Development from a Subsistence Level," Economic Journal, Vol. LXXIII (March 1963). This theoretical model subsequently formed the basis of a case study: R. E. Baldwin, Economic Development and Export Growth: A Study of Northern Rhodesia, 1920-1960 (Berkeley: University of California Press, 1966).

distinguished, one focussed on the domestic economy and the other externally oriented. The first are those claiming that the impact of trade on development depends on the structure and behavior of the domestic economy. The emphasis in this approach is on the nature of the domestic production function. The second group of theories largely ignores the conditions prevailing in the domestic economy and focuses on external issues such as terms of trade, price stability, and all the favorable and unfavorable effects (e.g., technology) that trade is said to carry in its wake.

## Trade and the Domestic Economy

The domestically focused theories, those associated, for example, with the names of North, Myint, and Baldwin,[38] tend to be rather specific in their application. They have been applied to fairly clearly defined countries and historical circumstances, often only to explain a given historical outcome. In this sense, they are somewhat narrowly conceived.

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[38] Theories of enclave dualism associated with the work of Higgins (op. cit.) and others also emphasize the importance of the domestic economy. The failure of trade to stimulate growth is explained in terms of the structure of the domestic economy and the nature of the production functions. This approach is focused on the special case of non-growth and is, therefore, less helpful as a guide to understanding the process of development.

By limiting the range of their applicability, they are able to encompass more of the institutional and factual framework than is possible in more general theories. Hence, each in its own ground has considerable realism and historical explanatory power. Another feature of this approach is its low level of aggregation in contrast to the more general theories. Much of the discussion takes place at the commodity level rather than that of broad sectors. This level of disaggregation, together with the institutional factors incorporated, and the considerable variety of assumptions and behavioral relationships, mean that these theories tend not to be amenable to mathematical treatment or to inclusion as part of a wider general equilibrium model of trade and growth.

The "staple" and "export base" theories are examples of this approach to economic development. The staple theory was first developed by Innis, who showed the importance of the export staple in the development of the Canadian economy.[39] In a later elaboration, North[40] demonstrated how regional development in the American economy was often dependent on the successful expansion of an export base. He stressed

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[39]See North, "Location Theory and Regional Economic Growth," Journal of Political Economy, Vol. LXIII, No. 3 (June 1955), for references to the writings of Innis.

[40]North, op. cit.

not only the effect of the initial increase in income that followed successful development of a regional export but also the subsidiary industries that were likely to arise; for example, those that buy from or supply the export industry. Thus, North foreshadows subsequent discussion of backward and forward linkages and indirectly shows the significance for development of an industry's production function.

Baldwin presents a development theory "for an initially backward, subsistence economy into which a substantial foreign-financed and foreign-directed export industry is introduced."[41] His major case study is of Northern Rhodesia, which has a modern, capital intensive mineral industry together with traditional agriculture. The key feature of this theory is the technological nature of the production function. If the factor requirements for a given industry fit the existing relative factor conditions, then the input of the industry is favorable from the viewpoint of generating domestic demand. For example, tea and coffee are labor intensive and generate income which is largely spent domestically. On the supply side, however, the effect is less favorable; because the industry fits the existing factor conditions, there is little need to train and upgrade the labor force.

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[41] R. E. Baldwin, Economic Development and Export Growth.

The opposite holds with an industry such as copper mining, which on the supply side facilitates the training of skilled labor but, because it fails to generate much domestic demand, has little impact on the wider economy.

Myint, like Baldwin, lays considerable emphasis on the role of the production functions in the domestic economy as the main determinants of the impact of trade on economic development. Explaining the process of growth in peasant export production, Myint argues as follows:

> "Where the export crop happened to be a traditional crop (e.g., rice in Southeast Asia), the expansion in export production was achieved simply by bringing more land under cultivation with the same methods of cultivation used in the subsistence economy. Even where new export crops were introduced, the essence of their success as peasant export crops was that they could be produced by fairly simple methods involving no radical departure from the traditional techniques of production employed in subsistence agriculture.
>
> "Thus, instead of a process of economic growth based on continuous improvements in skills, more productive recombinations of factors and increasing returns, the nineteenth-century expansion of international trade in the underdeveloped countries seems to approximate to a simpler process based on constant returns and fairly rigid combinations of factors. Such a process of expansion could continue smoothly only if it could feed on additional supplies of factors in the required proportions."[42]

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[42] Myint, "The Classical Theory of International Trade and the Underdeveloped Countries," Economic Journal, Vol. 68 (June 1958), p. 321.

In a more recent publication, Myint elaborates this argument and draws out the implications for future growth. In expanding export production, the peasants "took full advantage of the market opportunities available to them; but this does not mean that they took full advantage of the technical opportunities to improve their productivity. Peasant holdings in rice production, for example, have remained approximately the same, and the same combinations of land, labor, and capital have been used throughout half a century of rapid expansion of rice exports from Southeast Asia....If this is true, then peasant export production continuing on the same basis as before is bound to come to a stop sooner or later, even if demand conditions continue to be favorable. Sooner or later the extension of cultivation will press against the limits of cultivable hinterland, and thereafter population growth will outstrip export expansion."[43]

Although not explicitly discussed, a production function for peasant agriculture is clearly implicit and it plays a central role in linking exports to economic growth. Myint mentions three factors of production: land, labor, and capital. Virtually the whole of the

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[43]Myint, The Economics of Developing Countries, p. 51.

discussion, however, is centered on land and labor; apparently capital is minor--and unmeasurable. Myint argues that these factors are combined in fairly rigid combinations although it is not clear whether this implies technologically fixed factor proportions or merely a constancy in the ratio in which they have historically been combined. An observed constancy in factor proportions does not, of course, imply technologically fixed factors.

Another important aspect of the production function postulated by Myint is that there is no significant technological change over time. If we assume that the land is all of roughly equal quality, then production per farmer remains constant and the area under cultivation increases pari passu with population. The implication is that at any point of time there must be a surplus of uncultivated land; clearly Myint writes with reference to a land surplus rather than a labor surplus type of economy. He stresses, however, that a land surplus is never unlimited and that the ultimate consequence of this growth pattern is a decline in exports and per capita production.[44]

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[44]The surplus land assumption is a part of the "vent-for-surplus" theory popularized by Myint. (Myint, "The Classical Theory of International Trade," op. cit.). The essence of vent-for-surplus is the existence of unemployed resources. Caves argues that the Lewis model of unlimited labor can also be classified as a vent-for-surplus model. R. E. Caves, "Vent for Surplus Models of Trade and Growth," in Trade, Growth and the Balance of Payments (Chicago: Rand McNally, 1965). With Lewis,

It is clear that no satisfactory analysis of the impact of trade on the development process can ignore the role of the production functions in the domestic economy. The observed differences in the impact of trade on different countries and on different sectors within the one country can to a large extent be explained by the differences in domestic economic structure and behavior. Myint's approach, while not openly specifying a production function and leaving a number of loose ends, is obviously pertinent to an analysis of the land surplus, open economy. Baldwin states explicitly that his theory hinges on the nature of the production function, although he, too, does not specify analytically the function implied (nor does he provide the data on inputs and output that would indicate its form). Nevertheless, this emphasis on the importance of the domestic production functions to the issues of trade and development is a novel and important advance.

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[44](Continued) the opportunity cost of employing additional labor can be assumed zero, while with Myint the same holds for land. This stresses the essential difference between the labor surplus India-Pakistan type economy and the land surplus economies typical of Africa and Southeast Asia. Myint draws all his examples from the latter two areas.

## Externally Oriented Theories

Externally oriented theories of trade and development, in contrast to those discussed above, place little emphasis on the conditions prevailing in the domestic economy. They are generally assumed to hold true, regardless of time and place. Although both pro- and anti-trade arguments can be distinguished, it is the former which are presently of most interest.[45]

The case for trade as a stimulus to development was argued quite fully by John Stuart Mill and modern statements have added surprisingly little. First, there was the Ricardian lesson that specialization according to comparative advantage results in an increase in real income. Mill also approved of the still older doctrine of Adam Smith that trade induces an increase in total productivity. Mill "regarded the gains in terms of

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[45]The anti-trade arguments of this externally oriented school appear to have lost ground in recent years. Macbean has shown that the importance of export instability has been grossly exaggerated. See A. I. Macbean, Export Instability and Economic Development (London: George Allen and Unwin, 1966). The adverse terms of trade hypothesis has never won widespread support. Baldwin, for example, concludes that it is on "shaky ground both theoretically and empirically" (see Baldwin, Economic Development and Export Growth, pp. 8-9). Other theories such as Myrdal's "backwash effect" appear to have limited empirical content.

comparative costs theory as direct gains and the gains in terms of Adam Smithian increases in productivity as indirect benefits."[46] Among the indirect benefits, Mill--following Smith--noted "the tendency of every extension of the market to improve the process of production. A country which produces for a larger market than its own can introduce a more extended division of labor, can make greater use of machinery, and is more likely to make inventions and improvements in the process of production."[47] He also stressed the favorable effects of the introduction of "foreign arts" and foreign capital and the stimulating effect of trade in breeding new ideas and new wants.

Modern statements of the case for trade mostly echo these arguments. Haberler's views have been quoted above, and Cairncross[48] and Robinson[49] argue in a similar vein. Many of the ideas have not been clearly and rigorously formulated; and, as a result, they have been largely

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[46] Myint, "The Classical Theory of International Trade and the Underdeveloped Countries," p. 319. In modern terms, Mill is distinguishing between a shift along a given production function and a shift in the entire function.

[47] J. S. Mill, Principles of Political Economy (London, 1848). Quoted by Meier in International Trade and Development, p. 155.

[48] Cairncross, op. cit.

[49] Robinson, op. cit.

ignored by the mainstream of both trade and development theory.[50] There are, however, a number of persistent ideas in this literature which have strong a priori plausibility.

There is, first of all, the obvious but important point made, for example, by Haberler: "trade provides material means (capital goods, machinery, and raw and semi-finished materials) indispensable for economic development."[51] Few would question the proposition that capital formation in most underdeveloped countries depends heavily on imported machinery and equipment. Another idea prevalent in the literature, but rarely elaborated in much detail, is that of trade as a carrier of technological change. Meier,[52] for example, says that the "importation of technical know-how and skills is an indispensable source

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[50]For example, the idea of trade as an "engine of growth" has not been presented rigorously. The same applies to the concept of trade as a "leading," "lagging," or "balancing" sector. (Kindleberger, op. cit.). Corden has noted the lack of rigor in the well known Kindleberger approach (Corden, op. cit., p. 41). Even less clearly formulated are a series of arguments, stemming in the main from Mill, which credit trade with something like metaphysical qualities. Cairncross, for example, argues that trade allows an economy "to be permeated with the ideas that are the seed of true development" and that "trade is no mere exchange of goods...as often as not it is trade that gives birth to the urge to develop, the knowledge and experience that make development possible." Cairncross, op. cit., p. 364.

[51]Haberler, op. cit., p. 355.

[52]Meier, International Trade and Development, p. 157.

of technological progress," and Haberler[53] argues that trade is "the vehicle for the dissemination of technological knowledge." As most underdeveloped countries produce little machinery and equipment, it follows that to a considerable extent technological change is carried in the imported capital equipment. Countries which import modern equipment automatically import technological advances. An associated but wider concept is the "productivity doctrine" which goes back to Smith's widening of markets and division of labor. In modern terms, it can be argued that through trade "economies of scale both internal and external may be realized that would be impossible within the confines of a very small and slowly growing home market."[54] Development theory for the open economy should recognize these different ways in which trade influences the development process.

We can conclude from this brief survey of the literature relating trade and growth that both the major schools described offer important insights into this complex relationship. The approach which emphasizes the influence of the structure of the domestic economy on the way in which trade affects growth serves to underline the role of the domestic production functions and factor supplies. The more general, externally oriented theories link trade to capital formation, technology, and productivity.

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[53]Haberler, op. cit., p. 355. [54]Robinson, op. cit., p. 218.

# CHAPTER 2

## THE DEVELOPMENT OF THE OPEN, DUAL ECONOMY

The theoretical literature surveyed in Chapter 1, particularly in the last section, indicates some of the requirements of a growth theory for an open economy. As we emphasized in the Introduction, however, we recognize the necessity for any such theory to be focused on a particular type of economy rather than aiming for general applicability. In the present study we are primarily interested in the economies of Southeast Asia: these are, in the main, relatively small countries with high trade ratios and (as yet) without serious overpopulation.

In this and the following chapter we shall develop a simple growth model which we believe incorporates the major characteristics of Southeast Asian economies. We first postulate the highly aggregated analytical framework on which the study is based. Then, in the terms of this framework, we sketch out a view of the development process based on the historical experience. A brief review of the patterns of growth actually followed in postwar years, however, suggests that many economies are diverging from this process in various respects, despite the fact that their per capita income may have been rising. In order to permit a

detailed comparison of these recent growth patterns with the historical record, we therefore identify a number of key changes (again in the framework we have assumed) which are generally associated with development. These relate to factor shares in product, changes in productivity, shifts in the distribution of product and labor force, and various aspects of foreign trade. In Chapter 3 we shall restate the argument in mathematical terms.

## THE STRUCTURAL FRAMEWORK

The overall operation of an economy is studied by the reduction of a very large number of flows (of goods, labor and capital, but all translatable into monetary terms) into a relatively small number of aggregates. It is recognized that the choice of aggregation procedure is necessarily to some extent arbitrary: it is influenced by the object of the study and by explicit or implicit a priori views as to the relevance of specific economic variables. Once chosen, however, the aggregation procedure determines the structural (or accounting) framework within which the economy is analyzed. The addition of behavioral relationships relating the aggregated flows transforms the structure into a model.

Two important problems are immediately apparent in deriving and applying such a structure. First, a basic decision must be made

as to the general level of aggregation to be adopted and the specific sectors, or junctures between flows, to be identified. Input-output analysis, for example, may identify some hundreds of sectors in an economy, but clearly something is lost in this effort to approach reality. Near the other extreme is the structure underlying the simple Harrod-Domar growth model. For most purposes, some intermediate level would be chosen. The second problem is the fact that a particular structural framework may be initially appropriate as a description of an economy but become progressively less adequate over time. This problem of changing structure may be particularly acute in studying a developing economy, because such changes are an essential characteristic of development.

The framework developed by the National Planning Association for the study of the development of Southeast Asian economies asserts that the important dynamic relationships in these economies involve a triangular pattern of flows among three principal sectors: agriculture, industry, and foreign trade.[1] The choice of these sectors recognizes two

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[1] Details of the NPA accounting framework are given in a number of Field Work Reports. See, for example, Douglas S. Paauw and John C. H. Fei, "The Open Dualistic Economy: Patterns of Development," and "Analysis of the Open, Dualistic Economy: An Application to the Philippines" (Field Work Reports Nos. 8 and 9; Washington, D. C.: National Planning Association, Center for Development Planning, August 1966), mimeo. The major Project Report is forthcoming.

fundamental characteristics common to the countries of this area: the dualistic nature of the domestic economy and the strategic role played by foreign trade--both imports and exports--in the development process. In the complete NPA framework, two further sectors, government and finance, are distinguished; and agriculture, industry, and government are separated into production and income-distribution components.

In the present study most of the analysis is carried out at this highly aggregated level, using three sectors (modern, traditional, and foreign) similar to those mentioned above. Industry and government together are taken to constitute the modern sector (nonagriculture), while agriculture is broadly identified with the traditional sector.[2] The resulting structure can best be seen as a linear graph, in which the directed lines (or edges) represent flows and the vertices are the sectors. Such a graph is drawn in Diagram 1a. The arrows show the directions of real flows; the corresponding monetary flows are obtained by reversing them. In this pattern, the basic flows identified are exports from the traditional sector (XF), imports into the modern sector (FY), and the

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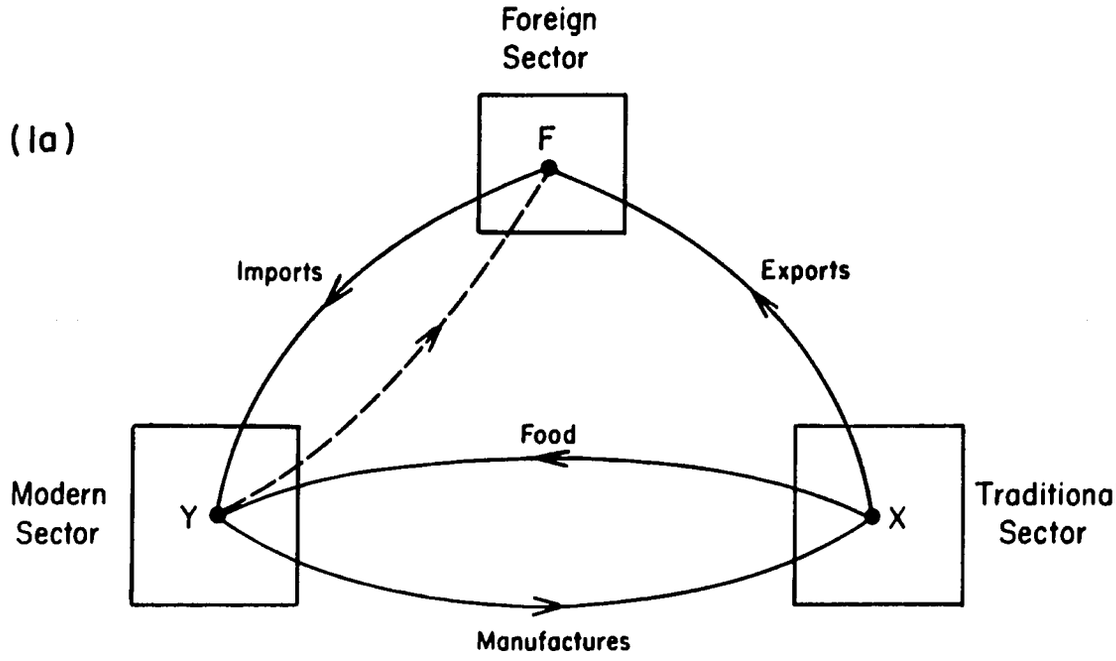
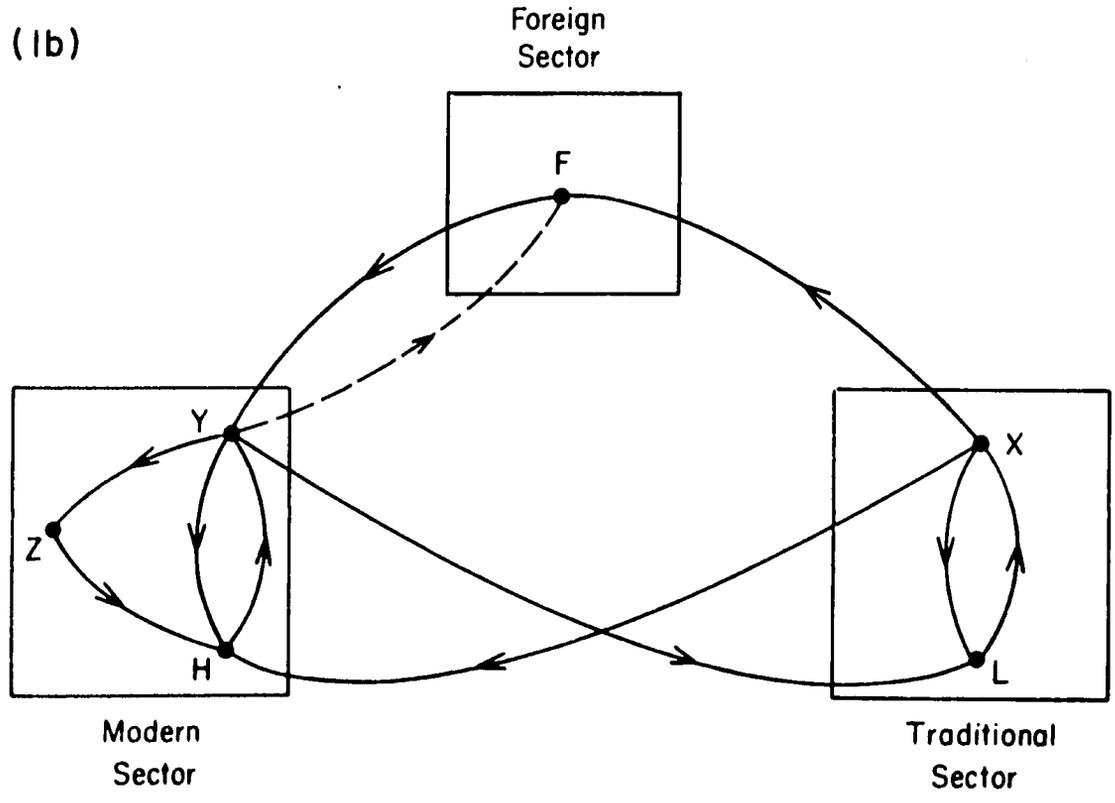
[2] A more precise discussion of the sectoral divisions is deferred until Chapter 4.

# DIAGRAM I

(Ia)




(Ib)



direct exchange between the two domestic sectors: a flow of food into the modern sector (XY), and a reverse flow of manufactures (YX) from the modern to the traditional sector as payment both for the food and for imports. In addition, part of the modern sector output may also be exported, and this is represented by the broken line, YF. We assume, however, that imports are directed only to the modern sector, so there is no flow FX.

This structure, we believe, captures the essence of open economy dualism, albeit in its simplest and most basic form. A generally modern and dynamic industrial sector coexists with a traditional agricultural sector. The two sectors are interdependent, interacting both through direct domestic trade and via the foreign sector. The traditional sector provides the food necessary to sustain the industrial labor force and, by exporting its surplus, generates most (if not all) of the foreign exchange necessary to pay for imports of capital goods.

Without changing these postulated intersectoral relationships, we may slightly elaborate the structure in order to take into account certain major intrasectoral phenomena. In Diagram 1b, X and Y now refer to the production components of the traditional and modern sectors, while L and H are the respective consumption components. Z represents the finance sector. The intersectoral flows between the traditional and

modern sectors are directed from the production component of the one to the consumption component of the other (XH and YL). Within the traditional sector, XL represents the flow of food into the households and LX the payment (in the form of labor services) for this food. Where the households are both producers and consumers, these flows, of course, may be purely formal. In the modern sector we have analogous flows (YH and HY) and also the indirect flow through the finance sector (YZH). The latter may be thought of as payment (in the form of industrial consumer goods) for modern sector investment funds (savings). Although we do not explicitly examine the case in this study, it would be equally possible to make such funds derive from the traditional sector as well as the modern sector.

The second basic problem mentioned earlier concerned the persistence over time of a postulated structural framework. In Diagram 1b, for example, the two flows FX and ZL have been assumed negligible. But during the process of development it may be that they increase to such an extent that their omission would seriously distort the overall view of the economy given by the framework. If we are to base an analysis of an economy on this structure, such a possibility must be kept in mind. However, it may well be that observed growth patterns do not substantially change over quite long periods--the "rules of growth"

being such that the initial structure remains relevant. This we believe to be the case for most Southeast Asian economies (and specifically, the Philippines), and consequently we are prepared to accept the structural framework given in Diagram 1b as the basis of our analysis.

## THE DEVELOPMENT PROCESS

In the above discussion we have outlined a simple structure which we consider appropriate for an analysis of the type of economy in which we are interested. From such a structure we may derive a set of accounting equations (one equation corresponding to each vertex in the linear graph), but in order to study the process of development it is necessary also to postulate behavioral relationships which will explain the changing magnitudes of the flows over time. These postulates are usually abstracted from historical experience.

In proceeding to this task, we shall briefly survey the growth experience of open dual economies, with emphasis on the countries of Southeast Asia. This survey is essentially descriptive and even assertive. It provides, in qualitative terms, a view of the growth process of the open dual economy in the framework already presented. In Chapter 3 this view will be formalized as a simple mathematical model.

## The Origins of Dualism

### a. The Early Impact of Trade

Most underdeveloped countries have been open to trade and have traded since the beginning of recorded history. In Southeast Asia, in particular, the construct of the isolated agrarian economy prior to the introduction of trade is not strictly applicable. Nevertheless, until the great nineteenth century fall in freight rates and the opening of the Suez Canal, trade was largely restricted to high value luxury goods and therefore had only a small impact. Before the last quarter of the nineteenth century the Southeast Asian economy was essentially a one-sector, agricultural economy.

Traditional agriculture was characterized by low productivity and slowly changing technology. Relatively little capital was employed except in a form closely tied to the land, such as water control and other land improvements. Land everywhere was in surplus as both population and cultivated area were between one-fifth and one-tenth of their present sizes. Moreover, it is likely that there was also surplus labor since farmers could satisfy their food needs with little difficulty and, as trade was limited, they could not exchange their potential surplus for other goods.

The improvement in transport and communications combined with a great increase in demand for tropical products such as rubber, oil seeds, and cocoa was matched by an increase in the production and export of peasant crops. In the Philippines, the export of abaca, tobacco, sugar, and coffee expanded enormously between 1855 and 1895, and the same was true of the exports from Indonesia, Malaya, Burma, and Thailand.[3] In general, the period 1870 to 1929 was one of sustained and rapid increase in peasant exports.

Myint argues convincingly that this great expansion of exports which followed large-scale commercial penetration was prima facie evidence of substantial surplus capacity.[4] Exports and, almost certainly, total production rose very much more rapidly than population, although there was no significant change in agricultural techniques. The initial impact of trade was to increase substantially production and per capita incomes. In effect, the peasants exchanged leisure for the new consumer goods which were purchased with the agricultural surplus.

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[3]See, for example, Census of the Philippines, 1902, and J. S. Furnwall, Colonial Policy and Practice (Cambridge: Cambridge University Press, 1948). Thailand's rice exports expanded slowly until 1875 and then grew rapidly from 3.5 million piculs in 1875 to 14.7 million in 1905. See J. C. Ingram, Economic Change in Thailand Since 1850 (Stanford: Stanford University Press, 1955).

[4]Hla Myint, The Economics of the Developing Countries (London: Hutchison & Co., Ltd., 1964), Chapter 3.

Once having entered the network of world trade, the rate of increase of production and exports slowed down to the rate determined by the natural increase of the agricultural labor force. The initial surge in output following the opening to trade was made possible by the taking up of a "slack" in underemployed resources, both of land and labor. Once labor was fully utilized, further increments to output were a function of the size of the labor force which could combine with surplus land. With static technology and new land more or less equal in quality to the old, per capita output and the land/labor ratio remained approximately stable over time--not because of inherently fixed factors but because, with given techniques, there was one ratio which maximized production.

This is broadly the process of growth which is outlined by Myint (see Chapter 1). The only respect in which we might differ from Myint's interpretation is to argue that the observed constancy in land/labor ratios is not because of the "fairly rigid combination of factors" but is a consequence of a land surplus. With the exhaustion of the land surplus, which, in Southeast Asia, occurred first in Java, the land/labor ratio falls and the constant returns to labor become diminishing returns. Basic to the whole process is the "vent for surplus" theory of growth. Following the initial opening of the economy, the surplus, both of land and labor, is vented through trade. Output and the area under cultivation

expand rapidly until the labor surplus is fully utilized. Thereafter, continued growth depends on the venting of the land surplus. This theory is in dramatic contrast to the usual classical and international trade theory approach, which assumes that all factors of production are fully employed.

Essentially, Myint presents a theory of production which is used to explain exports. It is useful, however, to distinguish between the two. If the simple assumption is made that per capita food consumption remains constant over time, then in a one-sector agrarian economy with surplus land, exports are a constant proportion of production. Once a nonagricultural sector is introduced, the growth rate of exports is likely to diverge from that of production. If the food requirements of the nonagricultural sector are to be met from domestic production and if this sector's share in total population is growing, then agricultural exports will have a slower growth rate than production.

b. Rise of the Industrial Sector

The growth of a substantial nonagricultural sector is made possible by the expansion of trade. Without significant international trade a limited handicraft industry can exist, but modern industry relies largely on imported machinery and equipment which must be paid for by exports.

Initially, the income from agricultural exports is mostly spent on the import of consumer goods. These goods may play the role of "mapping the market" for potential domestic industrial expansion.[5] It is not long before domestic production of the simpler types of imports can be undertaken, and, similarly, the processing of agricultural products and the manufacture of goods afforded natural protection by high transport costs.

Labor productivity in the growing modern sector is much higher than in traditional agriculture mainly because of the relatively advanced technology and high capital/labor ratio. The technology is also progressing over time as a result of the import of improved equipment and methods. This relatively productive and profitable modern sector is, therefore, able to draw labor as needed away from the traditional sector. Industrial wages are low but are maintained at a level sufficient for this transfer to take place.

The operation of this type of economy involves the basic triangular pattern of flows described earlier. The traditional agricultural sector generates exports which are used to finance the imports of capital

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[5] A. O. Hirschman, The Strategy of Economic Development (New Haven: Yale University Press, 1959), pp. 120-124.

goods and raw materials for the modern sector. The traditional sector purchases manufactured consumer goods from the modern sector which are paid for from the income earned from exports and from the direct sale of food to the modern sector.

The basic asymmetry of the two sectors is already apparent in this description. The modern sector grows as a result of additions to capital stock, the bulk of which--at least in the early stages--must be imported. Capital and labor are the major factors of production. Either sector may be the source of finance for modern sector growth, but we would argue that the most important source is likely to be the ploughing back of profits by industrial entrepreneurs. This dynamic growth mechanism is in sharp contrast to that of traditional agriculture, which expands simply as a result of population growth and the expansion of cultivated area.

The above description is clearly inadequate for many countries where a part or sometimes most of the exports originate outside traditional agriculture. A number of export industries (for example, petroleum and other mining industries) are part of the modern sector.[6] If the modern

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[6] Large-scale, mechanized plantation agriculture and the forestry and logging industries, the latter of very great importance in the Philippines, can also be regarded as "modern."

sector can generate substantial exports, it thereby reduces its dependence on traditional agriculture. Where modern sector exports are very large indeed, they may be sufficient to earn the foreign exchange for the import of both food and capital equipment needed for a growing industrial sector. In this type of dual economy the two sectors are likely to have little relation with each other, and the economy is best described as a case of foreign trade enclave dualism. Such a case is of limited interest as the two sectors are not effectively part of the same economy.

### Erosion of Dualism

The growth of the dualistic economy involves increasing intersectoral integration. The growing complexity of intersectoral relationships reduces the disparity between sectors, eroding the rigidity of the structure described above. Ultimately, the rules of growth of the modern sector can effectively describe the whole economy. An analysis of these intersectoral relationships, as Higgins has noted,[7] is basic to an understanding of the development process.

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[7] B. Higgins, Economic Development (New York: W. W. Norton & Co., 1959), p. 297.

The drawing of the traditional agricultural sector into the modern economy is one of the key problems of development. Stagnation in traditional agriculture may constrain the growth of the industrial sector both from the supply and from the demand sides. The slow growth of the agricultural surplus available for export, in the absence of a major alternative source of foreign exchange, limits the modern sector's capacity to import capital goods. At the same time, expansion of the market for manufactured goods outside the modern sector is inhibited. The latter constraint, moreover, applies irrespective of the existence of modern sector exports.

Historically, increases in agricultural productivity have been induced by both technical change and increases in agricultural inputs. How technical change in agriculture originates and how it is sustained are vital issues, but they are beyond the limits of this study. Although conceptually separate, technical change in practice is closely associated with increased requirements for material inputs.[8] These take the form both of inputs of intermediate goods, such as fertilizers, and of capital goods ranging from hand sprays to tractors and multi-purpose dams.

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[8] A new improved variety of seed appears to be an example of pure technical change. Often, however, the process of natural selection has bred a seed which is optimum for the traditional input. A new variety may yield much more than the old but only with better water control, more fertilizer, etc.

As the agricultural sector develops, the simple pattern of triangular flows becomes more complex, with the development of new flows of imported capital goods into agriculture and flows of intermediate goods and some of the simpler capital goods from industry to agriculture. Rising labor productivity in agriculture enables output to be maintained with a smaller share of the labor force. Alternatively, if we make the simplifying assumptions that per capita food consumption is approximately constant and that farmers market their entire surplus over and above their own food needs, then the rising productivity will increase the total surplus with the existing labor. (Since we are considering an open economy, it is not necessary to distinguish between food and nonfood crops. The latter, we assume, can always be exchanged for food on the world market.) The surplus available for export, i.e., agricultural output over and above the food requirements of both domestic sectors, will also be increased in the latter case. Usually both changes would occur: agricultural exports would rise and there would also be a transfer of labor from the traditional to the modern sector.

If traditional agriculture is the sole source of exports--assuming, for example, that there is no petroleum or mining industry in the modern sector--then the potential maximum rate of growth of industry is determined mainly by the rate of growth of the total agricultural surplus.

This surplus provides the food for the growing urban population and the excess may be exchanged in the foreign sector for the capital goods required by industry.[9] Hence, an increase in the surplus permits a higher rate of growth in the modern sector. However, whether the modern sector takes advantage of the rising agricultural surplus depends essentially on the entrepreneurial response.

Although, under our assumption of the necessity to import capital goods, the maximum level of investment is an externally given constraint (depending on import capacity), the actual level of investment depends also on the willingness of the entrepreneurs to invest. If they choose to engage in capital export or to consume profits rather than to reinvest them, then the actual level of investment will be below the ceiling set by the size of the agricultural surplus.

As the modern sector grows, productivity increases, partly in response to the technical progress embodied in the imported machinery and equipment and partly through economies of scale and other factors. The range of manufactured products expands steadily and begins to include

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[9] It is recognized that most, or at least a high and stable share, of producers' durables must be imported. The value of the imported component of domestic investment cannot exceed the value of exports. In fact, it must always be less because all countries import some consumer goods. (See the discussion of the import content of investment later in this chapter.)

an increasing number of capital goods. This brings about a slow fall in the import content of investment. Increased capability or efficiency enables domestic industry to produce many imported goods, thus setting in motion the process of import substitution. A further consequence of increasing efficiency and diversity in the structure of production may be a growing ability to export manufactured goods. As will be shown later, however, this is a likely but not inevitable concomitant of the development process.

Exports of manufactures and the increased flow of capital goods and raw materials between industry and agriculture are illustrations of the growing complexity of intersectoral relationships. As the industrial sector increasingly integrates backwards towards the source of supply, there is a shift in demand in favor of raw materials--some of which will be available locally--rather than imported semi-processed products. A further trend may be the increased processing of raw materials previously exported as such. The setting up of a smelting plant, for example, would enable a country to use its own mineral supply, instead of importing the refined metal. The existence of economies of scale, however, may greatly inhibit the (economic) establishment of these backward and forward linkages.

Intersectoral flows of capital and labor are also important in the developing open economy. It is sometimes argued that flows of capital from agriculture to industry are necessary for the early development of the industrial sector but this is difficult to substantiate with empirical evidence and cannot be argued on a priori grounds alone. The important point to make is that intersectoral financial flows from agriculture to industry play different roles in the closed and open economy. In a closed economy it is usually assumed that a flow of capital from agriculture to industry more or less automatically makes possible greater capital accumulation. In the open economy, however, such a flow of capital can only generate investment if it leads to the import of additional capital goods.

The development process involves the continuous reallocation of labor from agriculture to industry. As labor productivity and, therefore, incomes in agriculture grow, it is necessary for industrial wages to rise at least at the same rate so that the industrial sector may continue to draw labor out of agriculture.

The essential features of the development process in the open economy where the modern sector does not export on a significant scale can be summarized as follows. Rising agricultural productivity increases the agricultural surplus which feeds the urban population and is available

for export. This expanding surplus makes possible rising imports of capital goods, a higher level of investment, and the feeding of a larger urban population. Two essential requirements for development are an increase in agricultural productivity and a willingness to take advantage of profit opportunities and thereby invest at a level close to the ceiling set by the size of the agricultural surplus.

From the viewpoint of demand, the agricultural sector faces a set of problems quite different from those of industry. Although the domestic demand for agricultural produce is quite inelastic, because food requirements are more or less a function of population size, foreign demand for the individual country's agricultural output is likely to be quite elastic. In most cases, however, the agricultural sector faces few serious problems from the demand side. By contrast, the industrial sector usually experiences considerable difficulty in marketing abroad more than a small fraction of its output of manufactured goods, especially in the early stages of development. (The reasons for this will be discussed in detail in Chapter 5.) The industrial sector's main market must be domestic, and this depends on the real income of the urban wage earners and the demand for manufactures from the agricultural sector. The vital factor is labor productivity in agriculture, which determines the

competitive wage rate in industry and the size of the agricultural surplus. The agricultural surplus represents the demand from this sector for nonagricultural goods.[10]

## RECENT PATTERNS OF GROWTH

The pattern of growth followed by many small open economies in recent decades diverges substantially from the "ideal" pattern outlined above. In particular, the industrial sector has frequently managed to expand without a significant rise in agricultural productivity, whether of land or labor. A number of factors have made this possible. On the import side, a policy of intensive or "hothouse" import substitution has drastically changed the composition of imports, permitting a rate of increase of capital goods imports well in excess of the growth of total exports. (This is, of course, a once-and-for-all change.) Secondly, although agricultural productivity remained stagnant, agricultural exports continued to grow through the extension of cultivated area. The existence of a land surplus, and the opportunity for exploiting this surplus through

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[10] Agricultural sector demand for imported capital goods and consumer goods is a leakage from this surplus.

trade, made it possible to expand the agricultural surplus at much the same rate as the growth of the agricultural labor force. The latter, moreover, was not seriously diminished by intersectoral migration.

Many countries were further able to increase their rate of industrial growth by drawing on sources of foreign exchange in addition to that earned by traditional agriculture. In the past two decades, foreign aid has been an important source of financing of capital goods imports for a number of countries. More important, however, has been an increased reliance on exports of products of extractive industries. This can be seen, for example, in the rising share in total exports of tin, iron ore, and logs from Malaysia, oil from Indonesia, and minerals and logs from the Philippines. These essentially modern sector exports have grown so rapidly in importance that, despite continued stagnation in traditional agriculture in these countries, total exports have maintained a reasonable rate of growth.

The export of manufactured products is one potential source of foreign exchange which has not developed in this recent pattern of growth. One major reason for this is closely associated with the policy of intensive import substitution. The high cost industries which have developed behind the prohibitive tariff barriers associated with these policies have not been able to compete in world markets.

The quite considerable rate of growth of capital goods imports (and, consequently, of industrial output) which has been observed in some Southeast Asian countries, despite a slowly growing traditional agricultural surplus, has been made possible, therefore, by a combination of import substitution, a land surplus, and extractive exports. Where a land surplus and extractive exports were not available, exports usually stagnated--as in the case of India, Ceylon, and Java.

Export expansion which is dependent on a land surplus and extractive products is largely a "once over" process. This is most clearly seen in the case of the land surplus which must eventually be exhausted in all countries and has already reached the stage of sharply diminishing returns in many Southeast Asian economies. Extractive exports, if they are minerals, may have a long life, but the typical policy of "mining" rather than "farming" forests makes a future decline of log and lumber exports a near certainty.

Industrial growth which depends heavily on import substitution, a land surplus, and extractive exports is likely to face increasing problems in continued expansion. One way out of the dilemma is to reduce dependence on imports by lowering the import content of investment. However, for small countries, the process of industrialization does not seem to lessen substantially this dependence on imported producers' durables.

The tariff policies associated with import substitution, for example, tend to discourage backward integration and the production of capital goods.[11] If the import content of investment cannot be reduced, then the growth of industrial output--following the completion of import substitution--will remain closely correlated with exports. The latter, to the extent that they depend on surplus land, forests, and mineral resources, may be expected eventually to decline. Without sustained productivity increases in agriculture and lacking the capacity to export manufactured goods, the likely future for the industrial sector is stagnation rather than continued growth.

## DEVELOPMENT INDICATORS

We have seen that the pattern of 20th century and especially postwar growth in Southeast Asia is substantially different from that of the ideal case of development described earlier. This difference raises the question of what we mean by successful growth. In several respects the new pattern introduces chronic problems which often seem to imply

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[11]This argument is made convincingly by J. H. Power, "Import Substitution as an Industrialization Strategy," Philippine Economic Journal, Vol. V, No. 2 (1966).

that stagnation rather than sustained growth may be the eventual outcome. Clearly, the attainment of self-sustaining growth must be basic to our definition of success.

The historical record provides a description of changes which have occurred in the course of development of the open, dual economy. Where such changes are correlated with per capita income over a wide range, they may be regarded as indicators against which the performance of a particular economy can be evaluated. It is this complex of changes, however, rather than rising per capita income alone, that we identify as development.[12]

In this discussion we consider development indicators under six broad headings: (1) distribution of income; (2) productivity; (3) sectoral distribution of product and labor force; (4) trade ratio; (5) composition of imports; and (6) composition of exports. The documentation and analysis of the observed changes can be based on both time series and cross-section studies: both have well-known limitations which we shall keep in mind. Combined with the empirical evidence are various hypotheses which have been used to "explain" the observations.

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[12] On the basis of per capita income, Kuwait, with an average income of about $5,000, would be more developed than the United States.

These hypotheses will be briefly discussed, although it is the facts of the changes themselves which are of primary interest.

## Distribution of Income

There is relatively little information on the overall income distribution in underdeveloped countries, although it is generally believed that income is distributed more unequally in underdeveloped than in developed countries. More is known on the change in the distribution of income between wages and profits during the course of development. The evidence is drawn mainly from the historical experience of a limited number of European countries. (Almost no data are available on the more recent experience of the developing open economies.) Surveying the evidence, Kuznets notes that the sample of countries is small and the estimates leave much to be desired. "But if any general conclusion is justified, it is that the share in national income of the returns on capital declined over time in almost all countries--in some from almost a half to about a fifth or a quarter; and the share of 'labor' must correspondingly have risen."[13] In the United Kingdom, for example, labor's share over

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[13] S. Kuznets, Modern Economic Growth, Rate, Structure and Spread (New Haven: Yale University Press, 1966), p. 180.

the course of a century rose from 47 to 70 per cent, and in France over the same period it rose from 36 to 59 per cent.[14]

The reasons for this increase in labor's share are still the subject of dispute. The role of education and other factors which have increased the quality of labor are thought to be important, and it is argued that the gains in total productivity go mainly to labor. Whatever the explanation, it is reasonably clear that an increase in labor's share has usually been associated with a developing economy.

## Productivity

Another aspect of the development process is the long-run increase in the productivity of labor. For example, over periods of a century or more, the rate of growth per decade of per capita product was 14.1 per cent for the United Kingdom, 17.9 per cent for France, and higher still for the Scandinavian countries and Japan.[15] The sources of these productivity gains have been the subject of much recent research, resulting in the surprisingly unanimous verdict that most of the increase

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[14] Labor's share also rose in the United States. See, for example, E. F. Denison, The Sources of Economic Growth in the United States and the Alternatives Before Us (New York, 1962).

[15] S. Kuznets, op. cit., p. 64.

is due to technical progress and not the accumulation of capital.[16] Historically, the capital/output ratio has been quite stable.[17] Both capital and output have increased substantially faster than the labor force, leaving a "residual" unexplained by the conventional inputs. After inspection of the data, Kuznets is led to the "inescapable conclusion that the direct contribution of man-hours and capital accumulation would hardly account for more than a tenth of the rate of growth in per capita product--and probably less. The large remainder must be assigned to an increase in efficiency in the productive resources--a rise in output per unit of input, due either to the improved quality of the resources, or to the effects of changing arrangements, or to the impact of technological change, or to all three."[18]

In developed countries, although labor productivity is usually higher in industry than in agriculture, the differential is much less

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[16]The literature, which includes the well-known studies of Solow, Denison, and Abramovitz, is summarized by Everett E. Hagen, The Economics of Development (Homewood, Illinois: Richard D. Irwin, Inc., 1968), Chapter 8. We have followed the convention of these studies and define technical progress as "all causes of increase in productivity other than increases in the quantity of physical capital per worker not involving innovation." (Ibid., p. 180.)

[17]S. Kuznets, op. cit., p. 78.

[18]Ibid., p. 81.

marked than in underdeveloped countries.[19] For a developing dualistic economy we would therefore expect labor productivity in both sectors to increase, and perhaps even more rapidly in agriculture than in industry. A key factor in these productivity changes, moreover, should be that the rates of increase are greater than can be accounted for by simple additions to resource inputs. In contrast to labor productivity, the productivity of capital in the modern sector (the only part of the economy where it plays a significant role) may be expected to remain fairly constant.

In the agricultural sector it is also clearly necessary that the productivity of land should increase as the total cultivated area cannot indefinitely expand.

The residual factor referred to above is usually thought to consist of three major elements. First, there is "pure technical change," or what Denison calls "advance in knowledge." This involves innovation and the successful introduction of new techniques and methods. The other elements in the residual are economies of scale and improvement in the quality of the labor force. It is impossible to say very much about

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[19] In Thailand average labor productivity in industry is three to six times that in agriculture. In the Philippines the ratio is roughly 3:1.

the relative importance of these three factors during the process of development. It is clear that the residual term as a whole must increase, but the roles of the individual factors are much less certain.

Attempts to quantify the role of economies of scale in industrial development are made in the studies by Maizels[20] and Chenery.[21] Maizels found that economies of scale were significant only in the metals industry where a "ten per cent variation in population size between different countries tends to be associated with a difference of about four and one-half per cent in metal production per head after allowing for differences in per capita income levels."[22] Maizels points out that Chenery's results are quite different. Chenery found significant economies of scale in most investment and intermediate goods industries but not in consumer goods industries. Chenery's sample, however, includes the highly developed countries while Maizels' only the semi-industrial countries. It may be that economies of scale are non-linear and more significant in the higher income range. For underdeveloped countries with

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[20] A. Maizels, Industrial Growth and World Trade (London: Cambridge University Press, 1963), pp. 53-54.

[21] H. B. Chenery, "Patterns of Industrial Growth," American Economic Review, Vol. 50, No. 4 (September 1960).

[22] A. Maizels, op. cit., p. 54.

annual incomes of about $100 per capita the production of consumer goods accounts for about two-thirds or more of total output and investment goods for only about 10 per cent.[23] Both Chenery and Maizels agree that economies of scale are not significant for consumer goods. They also agree that they are significant for basic metals, which account for only 4 per cent of output at the $100 per capita income level. If economies of scale are mainly of importance for investment goods,[24] then they are of relatively little importance for a developing country at the lower end of the income scale.

## Sectoral Distribution of Product and Labor Force

Changes in the distributions of the product and labor force have historically been associated with the process of development. In both, the share of agriculture falls and that of industry rises. Based on Chenery's cross-section data, the share of primary production in total output falls from 45 to 15 per cent as annual income rises from $100 to $1,000 per capita. The share of industry increases over the same range

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[23]Chenery, op. cit., p. 632.

[24]In Chenery's results, petroleum products, for which Maizels has no equivalent, are subject to very large economies of scale.

from 17 per cent to 38 per cent. Services--including transport, communication and construction--rise from 38 to 47 per cent.[25]

The time series data assembled by Kuznets are consistent with these findings. In Japan, for example, the share of agriculture fell from 63 per cent to 14 per cent between 1878 and 1962. In Canada the fall was from 50 to 15 per cent over a similar period. The 13 countries studied, with the exception of Australia, all show this same trend.[26]

The decline in the share of the labor force in agriculture is equally well established. Cross-section data show the proportion of the labor force in agriculture ranging from 70-80 per cent for low income countries such as Thailand, India, and Pakistan to around 20 per cent at an income level of $1,000.[27]

Based on this cross-section data, the decline in the share of labor force in agriculture is greater than the fall in agricultural output over the same income range. This reflects the progressive narrowing of the labor productivity differential between the two sectors. Although difficult to estimate, the usual rule of thumb is that in underdeveloped countries agricultural productivity is one-third that of the rest of the

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[25] Chenery, op. cit., p. 635.

[26] Kuznets, op. cit., pp. 88-91.

[27] Charles P. Kindleberger, Economic Development (New York: McGraw Hill, 1965), p. 172.

economy.[28] With 75 per cent of the labor force in agriculture, this yields an output share of 75/[75 + (25 x 3)] = 50 per cent, close to the 45 per cent indicated by cross-section studies.

The usual explanation of this changing structure is in terms of the changing pattern of demand implied by a low income elasticity of demand for food.[29] As incomes rise, a progressively lower share is spent on food. This explanation is satisfactory enough in a closed economy where production equals consumption, but the same equality need not always hold in an open economy. Foreign trade enables countries to specialize in producing and exporting the products of one sector and importing their consumption needs of other products. There are, however, sharp limits to the degree of specialization possible. Transport costs require many goods to be produced domestically and services cannot be imported at all. Even the primary exports of developed countries are usually highly processed and therefore require an industrial sector. The range made possible by openness is indicated by the experience of Denmark and the United Kingdom. In the 1950s Denmark had 19 per cent

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[28] Ibid., p. 176.

[29] On the supply side, economies of scale in industry greater than those in agriculture would also explain part of the structural shift. (See Chenery, op. cit.)

of her labor force in agriculture, accounting for 18 per cent of total output. This contrasted with 5 per cent in both sectors for the United Kingdom.[30] Even for the heavily trade-oriented country, a decline in the labor force and income originating in agriculture is associated with the process of economic development.

### The Trade Ratio

The ratio of trade to national income is a highly aggregated relationship which is influenced by many different factors. It is, in fact, more illuminating to analyze these factors individually rather than attempt to read something of significance into changes in the aggregate ratio. (Two of the major factors are analyzed in the following section.) What is of major interest at this point, however, is the observed statistical relationship between trade and growth. The questions that are of central interest relate to the change in the trade ratio during the course of development and the actual magnitude of that ratio.

The historical experience of the developed countries is of limited use because of the very great differences in world trading conditions at different periods of time and, of course, their very different

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[30] Kuznets, op. cit., Chapter 3.

historical origins. The period from the mid-nineteenth century to 1913 was highly favorable to expanding world trade and most developing countries experienced sharp increases in their trade ratios. For example, the trade ratio of Japan rose from 10.3 per cent in 1878-87, to 29.5 in 1908-13, and 35.5 in the 1920s. For the United Kingdom, the increase was from 21.6 per cent in 1837-45, to 43.5 just prior to World War I.[31]

If we are to use cross-section data, however, we confront the difficulty that the trade ratio is strongly influenced by country size as measured by gross national product. As a general rule, foreign trade proportions are inversely correlated with GNP.[32] Kuznets has allowed for this factor of size and has shown that foreign trade proportions are positively correlated with the level of economic development as measured by per capita income. For each country he calculates the predicted trade ratio on the basis of GNP alone (assuming a simple but adequate trade model) and compares this with the actual trade ratio. For most countries with high per capita incomes the ratio is substantially higher than predicted on the basis of GNP, while the converse is true

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[31] Kuznets, op. cit., p. 313.

[32] Kuznets shows that the relationship is very strong. Grouping countries by GNP, he found that the highest GNP group had an average trade ratio of 25 per cent while for the lowest group it was 93 per cent. (See S. Kuznets, "Quantitative Aspects of the Economic Growth of Nations," Economic Development and Cultural Change, Vol. XIII, Part 2 [October 1964], p. 9.)

for low income countries.[33] Since the finding is an important one, it is worthwhile quoting Kuznets in full:

> "the finding...that foreign trade proportions are positively correlated with the level of economic development as measured by per capita income, once the size factor is taken into account, lends further support to the inference that small countries can attain economic growth only through heavy reliance on foreign trade, as indicated by high proportions to national product--although clearly this is a necessary but not sufficient condition; whereas the larger countries can attain economic growth with much lower foreign trade proportions, so that reliance on proportionally large material flows to and from the rest of the world is not a necessary condition, although it may occur (as it did in the United Kingdom). The implication is that small countries differ from large, both in the mechanism of economic growth and in an important aspect of the structure of national product."[34]

Kuznets points out that, contrary to the general impression, the trade ratios of underdeveloped countries are too low rather than too high. The fact that the actual ratio is often relatively high is a function of their small size and not of underdevelopment. "Indeed, underdevelopment,

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[33] Ibid., p. 26.

[34] Kuznets, Modern Economic Growth, p. 302. (Italics in original.)

in and of itself, cannot induce high rates of exports and imports to domestic product, for the implicit backwardness of transportation, trade organization, and technological knowledge in general would make large volumes of foreign trade impossible, barring such exceptional cases as the concentration of mineral resources easily accessible to developed country users."[35]

In support of his claim that small countries can grow only through heavy reliance on foreign trade, Kuznets argues as follows:

> "Obviously, if the small countries are to realize advantages of specialization and economies of scale, both indispensable prerequisites to higher per capita economic performance, they must rely more heavily on foreign trade than the large countries, whose internal markets and volumes of domestic resources in themselves permit such specialization and scale."[36]

The empirical evidence that Kuznets presents is convincing, but one is forced to ask whether the theoretical explanations of the observations are satisfactory. Are specialization and economies of scale the only or even the decisive factors that cause the trade ratio to be

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[35] Ibid., p. 431.

[36] Ibid., p. 303.

positively correlated with per capita income? If economies of scale are the crucial factor, it would be useful to know at a more disaggregated level where they are of importance. The findings of Maizels and Chenery, quoted above, suggest that economies of scale are significant in certain specific sectors and income ranges--in particular for capital goods industries at the higher levels of per capita income--but do not exert the pervasive influence argued by Kuznets.

## Composition of Imports

We may analyze the changes in the composition of imports by considering the changes in two separate ratios: the ratio of imports of capital goods to domestic investment (i.e., the import content of investment) and the ratio of imported manufactured consumer goods to domestic output of these goods--or to the total supply (domestic output and imports).

### a. Import Content of Investment

One of the marked features of the development process, at least in the early stages, is the difficulty of investment goods substitution in contrast with the apparent ease of consumer goods substitution. The

literature on import substitution[37] is almost entirely concerned with the latter, but it is instructive to apply the same approach to capital goods.

The empirical evidence on investment goods substitution has been analyzed in some detail by Maizels, Adams, and Kuznets.[38] According to Adams' cross-section data, the ratio of capital goods imports to gross domestic capital formation ranges from 41.4 per cent for countries with annual per capita incomes of less than $100 to 27.1 per cent for countries with per capita incomes greater than $700. Adams points out that this level of aggregation disguises an important difference between large and small countries. The decline in import dependence for capital goods is strongly marked only among the large countries, for which the ratio falls from 41.4 per cent in the lowest income group to 8.6 per cent in the highest.[39] This suggests that substantial import substitution for capital goods occurs only among the large developed countries.

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[37] Following Chenery, import substitution is said to occur when the ratio of imports of a product to total supplies of that product declines.

[38] Maizels, op. cit., pp. 264-270; N. A. Adams, "Import Structure and Economic Growth: A Comparison of Cross Section and Time Series Data," Economic Development and Cultural Change, Vol. XV, No. 2 (January 1967); and Kuznets, "Quantitative Aspects of the Economic Growth of Nations--IX."

[39] Adams, op. cit., p. 148.

Maizels reaches the same general conclusion but by a slightly different route and in substantially more detail. He points out that world production of capital goods is highly concentrated in a few countries and that this degree of concentration did not change significantly over the period 1938-59. As an example, he cites the world production of metal goods, of which 84 per cent of the total both in 1948 and in 1955 were produced in France, Germany, Italy, Japan, the United Kingdom, and the United States. "This heavy concentration of output in the large industrial countries implies that in all other countries, industrial as well as nonindustrial, there is a high degree of dependence on imports for supplies of producers' durables."[40]

Maizels' estimates show convincingly that only the large industrial countries have a low import content of investment.[41] The five large countries (excluding Japan) had an import content of investment averaging 7 per cent in 1957-59. The small industrial countries averaged

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[40] Maizels, op. cit., p. 265.

[41] Maizels' definition of the import content of investment differs from that of Adams. Maizels refers to the ratio of imported machinery and transport equipment to gross investment in these items. Adams' estimates are lower because they apply to the ratio of capital goods imports to gross domestic capital formation. A significant part of the latter is necessarily of domestic origin.

59 per cent over the same period, while the underdeveloped countries were higher still at about 80 per cent.

Kuznets' approach is very similar to Maizels'. He estimates the proportion of producers' equipment imports to producers' equipment capital formation. For the large developed countries he obtains a ratio of 12.5 per cent compared to Maizels' 7 per cent. As the relevant period is the same, the difference is almost certainly because of the inclusion of Canada in Kuznets' sample. His estimate of the import dependence of the developed small countries, 59 per cent, is the same as Maizels'. Underdeveloped countries also averaged 59 per cent, with the small countries substantially more import dependent than the large ones. Small countries with a high trade ratio had an import content of investment of 85 per cent.[42]

These results are of considerable importance, suggesting as they do that throughout its development the small economy must expect to remain highly dependent on imports of capital goods. During the course of growth from the lowest to the highest income group, the import content of investment in producers' equipment for the small economy might be expected to fall from about 80 per cent to around 60 per cent. The

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[42] Kuznets, "Quantitative Aspects of the Economic Growth of Nations--IX," pp. 64-65.

underdeveloped countries, whether large or small, produce few capital goods; but among the highly developed countries the crucial factor is size. The United States and Canada have similar per capita incomes, but the former has an import content of investment of 3 per cent in contrast to the latter's 68 per cent.[43]

Time series support of this cross-section finding is very much limited. Maizels could not find comparable data for the pre-war years, but Adams has long series for a small sample of countries. Between the late nineteenth century and the mid-fifties the import content of investment fell substantially only in Japan.[44] For the other (small) countries in Adams' sample--Denmark, Sweden, Canada, and Australia--there is no similar marked long-run trend in the ratio.

This dependence on imported capital marks a major difference between large and small countries,[45] and it is at least part of the explanation of Kuznets' observation, quoted above, that small countries, in contrast to large, can attain economic growth only through heavy

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[43]Maizels, op. cit., p. 266.

[44]Adams, op. cit., p. 157. In Japan the ratio fell from 31.2 per cent in 1903-07 to 4.2 per cent in 1955-58.

[45]The authors do not attempt to explain their results in these terms, but the pattern obviously supports the hypothesis that economies of scale are highly significant for capital goods.

reliance on foreign trade. It is also clear that in this respect small countries differ from large both in the mechanism of economic growth and in an important aspect of the structure of national product.

b. Import Substitution

If substitution for imported investment goods is conspicuously absent in the experience of most countries, the same is certainly not true of consumer goods. The process of substituting domestically produced manufactured consumer goods for the imported product is one of the most striking features of twentieth century industrial growth. However, Maizels' authoritative study, which documents the facts of import substitution, establishes a close correlation between success in import substitution and an unsatisfactory growth rate.[46]

One of the major conclusions of Maizels' study is that import substitution of manufactured goods has been carried so far by most of the developing countries that there is little further scope for its extension. In a sense import substitution represents a "slack" which, from the demand side, allows domestic production of manufactures to

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[46] Maizels' data, in fact, refer to import substitution for all manufactures (excluding food, beverages, and tobacco). When taken in conjunction with the findings quoted in the previous section, however, his results clearly refer primarily to consumer manufactures.

rise faster than total domestic demand. On the supply side, assuming a fixed import content of investment, a shift in the composition of imports towards capital goods enables domestic production of manufactures to rise faster than total imports. Import substitution may be viewed as a temporary phase which enables a country to escape partly the constraint imposed by exports on the level of capital goods imports. When the potential for import substitution is exhausted, the industrial growth rate will slow down unless exports can be expanded.

The facts of import substitution in the present century are briefly summarized in Maizels' data given in Table 1. The import substitution which occurred over 1913-59 was heavily concentrated in the semi-industrial countries, a group which includes India, Pakistan, Brazil, Argentina, Chile, Australia, and New Zealand. Within the group, most of the import substitution was accounted for by India, Pakistan, and the Latin American countries. In India and Pakistan the effect of import substitution was equal to expansion in demand, so that imports of manufactures in 1959 were almost the same as in 1913. For the industrial countries, five-sixths of the total import substitution was accounted for by the United Kingdom which also had by far the lowest growth rate of this group. Very high growth rates were recorded by Canada and the United States which experienced "reverse" import

TABLE 1

Effect of Import Substitution and of Expansion in Demand[1] on Imports of Manufactured Goods, 1913-59 (Billion dollars, f.o.b. at 1955 prices)

| | Total Imports in 1913 | Change Due to | | | Total Imports in 1959 |
|---|---|---|---|---|---|
| | | Import Substitution | Expansion in Demand | Total | |
| Industrial Countries | 8.9 | - 3.1 | + 16.8 | + 13.7 | 22.6 |
| Semi-Industrial Countries | 4.1 | - 8.9 | + 11.6 | + 2.7 | 6.8 |
| Rest of the World | 4.8 | - | - | + 9.2 | 14.0 |
| Total | 17.9 | - | - | + 25.5 | 43.4 |

Source: Maizels, op. cit., p. 152.

[1]Import substitution is defined as $S_1(m_1 - m_0)$, and the effect on imports of the expansion in home demand is defined as $m_0(S_1 - S_0)$, where S represents supplies and m is the proportion of supplies imported. The subscripts 0 and 1 refer to the earlier and later year, respectively.

substitution. In the United States, in particular, the proportion of manufactured supplies imported rose substantially between 1913 and 1959. Japan was the only country that was able to combine a relatively high level of import substitution with a high growth rate.[47] Thus, Maizels' results establish a correlation between success in import substitution and an unsatisfactory growth rate.

Maizels' data begin in 1899, but he presents evidence which strongly suggests that the industrial countries did not experience a similar import substitution during the early stages of their development. The import content of supplies of manufactures normally falls with development, but by the 1950s the semi-industrial countries had an import content of supplies which was as low as that of the small industrial countries.[48] Since the resumption of fairly normal trading conditions in the 1950s, the small industrial countries have raised their import content of supplies while, in the semi-industrial countries, it has continued to decline. There is little doubt that the latter group has pursued import substitution at a rate very much faster than could be achieved without the help of protectionist devices.

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[47] Maizels, op. cit., p. 155.

[48] Ibid., pp. 139-140.

A number of reasons are used to explain successful import substitution and poor economic performance.[49] In most cases, excess import substitution is induced by high tariff barriers which result in the growth of inefficient industries and waste of scarce resources.[50] These high cost import substitution industries supply the domestic market but are unable to compete in world markets. Despite decades of successful import substitution, the large Latin American countries, for example, have negligible exports of industrial goods. There are also a number of arguments to the effect that tariff policies which encourage import substitution discourage the establishment of industries with backward linkages.[51]

From the viewpoint of the present study, this brief survey of import substitution raises two major points of interest. In the first place, the import substitution strategy represents an alternative to export expansion as a way of making possible an increase in industrial output,

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[49] See, for example, A. O. Hirschman, "The Political Economy of Import Substituting Industrialization in Latin America," Quarterly Journal of Economics (February 1968), and J. H. Power, op. cit.

[50] Maizels shows that tariff barriers are very much higher in countries which have recently experienced drastic import substitution. Among the semi-industrial countries, Brazil, India, and Chile have average import duties of 30-40 per cent while Australia and South Africa only 8 per cent (Maizels, op. cit., p. 141).

[51] This is the theme, for example, of Power and Hirschman, op. cit.

although, unlike export expansion, it is a once-and-for-all policy. (According to Maizels' findings, opportunities for the developing countries to expand further by means of import substitution were virtually exhausted by 1959.) The second point is that these empirical studies suggest that successful import substitution for an underdeveloped country is an indicator of poor development performance.

As a consequence of the prevalent policy of import substitution for consumer goods, we would expect to observe that the share of consumer goods in imports would fall over time and that the share of producer durables would rise. This is borne out in the time series data presented by Adams and Maizels. Adams shows that between the 1870s and 1920s the share of consumer goods fell and that of capital goods rose in all the countries for which he has data (Japan, Denmark, Sweden, Australia, and Canada).[52] Maizels confirms the finding with data covering about forty countries and shows that it is a worldwide trend. Table 2 summarizes his results, with countries divided into the same three groups used in Table 1. For each group there is a marked trend for the share of textiles and clothing to fall and for machinery, transport equipment, and chemicals to rise. This trend was most rapid among the semi-industrial countries where the process of import substitution was marked.

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[52] Adams, op. cit., p. 153.

TABLE 2

Percentage Composition of Manufactured Imports of Industrial and Semi-Industrial Countries and the Rest of the World, 1899-1959

| | Year | Metals (1) | Machinery and Transport Equipment (2) | Chemicals (3) | Textiles and Clothing (4) | Other Manufactures (5) | Total (6) | Total Value ($ Billion 1955 Prices) (7) |
|---|---|---|---|---|---|---|---|---|
| Industrial Countries | 1899 | 16 | 10 | 7 | 38 | 29 | 100 | 5.1 |
| | 1929 | 20 | 24 | 7 | 20 | 29 | 100 | 11.3 |
| | 1955 | 19 | 33 | 11 | 11 | 26 | 100 | 16.2 |
| | 1959 | 16 | 35 | 12 | 11 | 26 | 100 | 22.6 |
| Semi-Industrial Countries | 1899 | 8 | 11 | 3 | 55 | 23 | 100 | 2.1 |
| | 1929 | 12 | 31 | 4 | 30 | 23 | 100 | 5.2 |
| | 1955 | 13 | 48 | 11 | 11 | 17 | 100 | 6.7 |
| | 1959 | 11 | 50 | 14 | 9 | 16 | 100 | 6.8 |
| Rest of the World | 1899 | 11 | 17 | 6 | 44 | 22 | 100 | 2.8 |
| | 1929 | 12 | 31 | 7 | 26 | 24 | 100 | 7.4 |
| | 1955 | 11 | 38 | 12 | 17 | 22 | 100 | 11.5 |
| | 1959 | 13 | 39 | 15 | 15 | 18 | 100 | 14.0 |

Source: Maizels, op. cit., p. 174.

In apparent contradiction to the time series data are the cross-section results for recent years presented by Kuznets.[53] These show virtually no difference in the structure of imports between developed and underdeveloped countries. Consumer goods make up about half the imports of each major group, while the share of producers' goods, ranging from 26 to 38 per cent of the total, is also not related to the degree of development. The inconsistency between time series and cross-section data may be explained by the import substitution trend which gathered momentum throughout the first half of the 20th century. The countries that were latest on the scene pursued the most rapid import substitution, with the result that by 1959 most countries, irrespective of their level of development, had a high share of capital goods and a low share of consumer goods in total imports.

While almost all countries have shown a marked reduction in the share of consumer imports, there appears to be a sharp contrast between the "natural" import substitution associated with genuine development and the "forced" import substitution typical of most of the underdeveloped world. The first occurs without much help from tariffs as developing

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[53] Kuznets, "Quantitative Aspects of the Economic Growth of Nations--IX," pp. 64-65.

domestic industries begin to be able to compete with the imported product. "Forced" import substitution takes place behind high trade barriers necessary to compensate for domestic inefficiency. Thus, changes in the composition of imports are not necessarily useful indicators of development because in recent decades they have been consequences of domestic policy measures, as well as responsive to growth and development.

Composition of Exports

There is a common presumption that the share of manufactured products in exports rises during the course of development. This is expressed, for example, by Hagen who argues as follows: "The sale of primary or very slightly processed products will typically provide the major share of foreign exchange earnings during the first several generations of the development process, but the share of secondary products in exports will steadily rise."[54]

In practice, however, there is relatively little relationship between the level of development and the composition of exports. Countries which have a large share of finished manufactures in exports are almost

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[54] Hagen, op. cit., p. 41.

always highly developed, but there are a number of developed and semi-developed countries that export practically no manufactures. This can be seen in Table 3, which relates the production of manufactures per head with manufactured exports as a share of total exports. India has a high share of manufactured exports, but it is an underdeveloped country. On the other hand, Australia and New Zealand export very few manufactured goods. (It can be concluded from Table 3, however, that, with the sole exception of India, economic development is a necessary condition for raising substantially the share of finished manufactures in total exports.) The proportion of manufactured exports in total exports may or may not rise during the course of development. In the majority of cases, it does rise, but there are so many exceptions and the relationship is so imperfect that this ratio is of limited use as a development indicator.[55] If, for a given country, the share rises over time, then the country is almost certain to be developing; but if the share does not rise, this does not indicate a development failure. Countries such as Australia and New Zealand, which have a strong comparative advantage in primary products, need not export manufactures even though their industrial structure is developed.

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[55] Maizels shows that the share of manufactures in exports for most industrial countries rose substantially between 1899 and 1959 (Maizels, op. cit., p. 64).

TABLE 3

Composition of Exports and Economic Development, 1955

| | Production of Manufactures Per Capita (Dollars) | Finished Manufactures as Proportion of Total Exports (Per Cent) |
|---|---|---|
| Industrial Countries | | |
| Belgium-Luxembourg | 460 | 35 |
| Denmark | 325 | 23 |
| France | 265 | 38 |
| Western Germany | 405 | 65 |
| Italy | 150 | 47 |
| Netherlands | 270 | 31 |
| Norway | 315 | 17 |
| Sweden | 465 | 33 |
| Switzerland | 480 | 76 |
| United Kingdom | 460 | 62 |
| Canada | 440 | 11 |
| United States | 695 | 48 |
| Japan | 45 | 64 |

TABLE 3
(Continued)

Composition of Exports and Economic Development, 1955

| | Production of Manufactures Per Capita (Dollars) | Finished Manufactures as Proportion of Total Exports (Per Cent) |
|---|---|---|
| Semi-Industrial Countries | | |
| Australia | 350 | 6 |
| New Zealand | 325 | 0.4 |
| Union of South Africa | 115 | 11 |
| India | 7 | 31 |
| Argentina | 145 | 0.4 |
| Brazil | 50 | 0.4 |
| Chile | 75 | 1.4 |
| Colombia | 45 | 0.6 |
| Mexico | 60 | 3 |
| Israel | 170 | 25 |
| Turkey | 30 | 0.4 |
| Yugoslavia | 85 | 13 |
| Non-Industrial Countries | | |
| Belgian Congo | 15 | 0.8 |
| Burma | 5 | 0.4 |
| Egypt | 15 | 3 |
| Pakistan | 5 | 5 |
| Philippines | 15 | 1.4 |
| Thailand | 10 | 1.1 |

Source: Maizels, op. cit., p. 59.

We may summarize this discussion of specific changes associated with development by listing the major indicators relevant to the performance of the open, dual economy. (Clearly, many other changes could have been identified as "indicators," but within the structural framework of the open, dual economy these are among the most important.)

1. Increasing average per capita income.

2. An increase in the share of total income accruing to labor and a decline in the share accruing to capital.

3. Increasing productivity of labor in both sectors, resulting, at least in part, from capital-embodied technical progress; and a narrowing of the labor productivity differential between sectors.

4. Increasing productivity of land in agriculture.

5. Declining share of agriculture in total product and a rising share of industry.

6. Declining share of labor force in agriculture and an increasing share in industry.

7. Increasing trade ratio, if allowance is made for the factor of size as measured by GNP. (An increase in size tends of itself to lower the trade ratio. Thus, a constant actual trade ratio during the course of

development indicates an increase in the trade ratio once the factor size is taken into account.)

8. Slowly declining (but high) import content of investment.

9. A probable rising share of manufactured exports in total exports. (However, there are some important historical exceptions.)

We have noted earlier that import substitution, insofar as it involves the development of domestic industries under "hothouse" conditions, is often associated with an unsatisfactory growth performance. Thus, the rising share of capital goods in total imports caused by import substitution cannot necessarily be adduced as an encouraging sign of development.

# CHAPTER 3

## A GROWTH MODEL FOR THE OPEN, DUAL ECONOMY

The major features of the open, dual economy of interest for the present study were sketched briefly in the first two sections of Chapter 2. Also described in that chapter were some of the structural changes expected in the course of development--particularly those connected with intersectoral relationships and the breakdown of dualism--and the various unfavorable changes actually observed in many countries which do not seem to be leading to true development. In order to pursue this analysis in a more rigorous fashion and then to apply it to a case study, it is necessary to specify more formally the underlying growth model implicit in the description. This is the object of the present chapter.

A simple model of a land-surplus, open, dual economy will be set up under a number of assumptions which, although very restrictive, we believe, retain many of the significant characteristics of the economies of Southeast Asia. The model will then be used to study the growth paths of the major variables and, in particular, the consequences of the type of resource-intensive export growth and import-dependent industrialization referred to earlier.

We consider first the structure of the two sectors, in the course of which we derive a definition of "land surplus." The intersectoral relationships are then discussed: the sectoral reallocation of labor and the direct and indirect (via the foreign sector) transfers of goods. The latter determine the intersectoral terms of trade. At this point, we are able to state the complete model in its most basic form. In the remainder of the chapter this basic model is elaborated with a view to giving a more realistic description of the economy. Finally, we propose the variant of the model which is thought to be a suitable tool of analysis for the Philippine case.

## TRADITIONAL SECTOR OUTPUT

In the dual economy models of both Jorgenson and Fei and Ranis, the production function in agriculture is assumed to be of the Cobb-Douglas form, with land and labor as the only factors.[1] Land being fixed, output, $Y_a$, in suitable physical units is given by:

$$(1) \qquad Y_a = f(t)L_a^{\alpha}, \quad 0 < \alpha < 1$$

where $L_a$ is the agricultural labor force and f(t) a shift factor corresponding to technical progress. In the type of economy which we wish to treat here, land is in surplus; indeed, for an initial and possibly lengthy period it can be regarded as a free good. We shall see, however, that for some purposes an equation similar to (1) may still apply.

Consider the situation of a single farmer confronted with an unlimited supply of free land. Clearly, with a given set of techniques, he can expand his output by taking more land under cultivation only up to a certain point. Thereafter, for purely physical, if not technical, reasons,

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[1] See Dale W. Jorgenson, "The Development of a Dual Economy," Economic Journal (June 1961), p. 313, and John C. H. Fei and Gustav Ranis, "Agrarianism, Dualism, and Economic Development," in I. Adelman and E. Thorbecke (eds.), The Theory and Design of Economic Development (Baltimore: Johns Hopkins University Press), p. 28.

any additional area cultivated will result in a reduction of his total output. The marginal physical productivity of land ($MPP_T$) would have declined to zero and become negative. Acting rationally, the farmer maximizes his output for his given labor input by choosing to cultivate an amount of land such that the $MPP_T$ is zero.[2] If the land is of even quality and the crops grown can be assumed homogeneous, the effect of each farmer taking his optimum area is to raise output proportionately to total cultivated area. Diagram 2 illustrates this simple relationship. The bottom graph gives the $MPP_T$ curves for two values of the agricultural labor force, $L_a(0)$ and $L_a(1)$. Corresponding to their intercepts on the land (T) axis, the output or total physical productivity ($TPP_T$) curves in the upper graph attain their maxima; namely, AC and BD, respectively. C and D lie on the same ray through the origin.

It is a corollary, of course, that the land/labor ratio actually observed will be constant. This is so, however, not because the postulated (ex ante) production function does not permit factor substitution but rather

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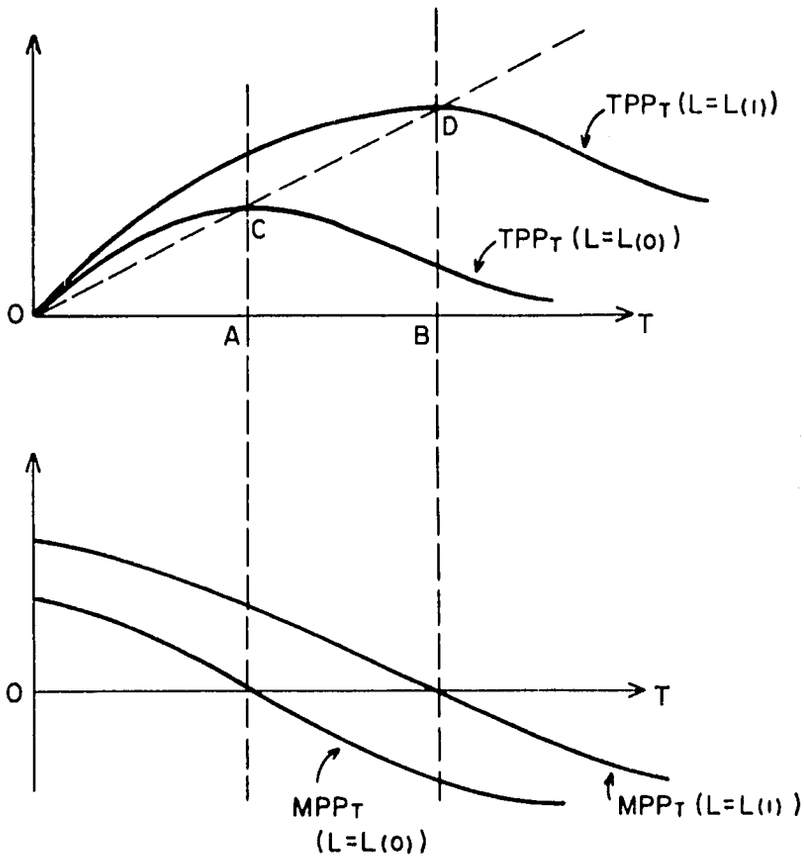
[2]The fact that it is not physically possible for one man to cultivate more than a limited area of land would be ignored if a simple Cobb-Douglas function--for which the $MPP_T$ is never zero--had been postulated. It would be necessary in this case to introduce an explicit cost of land and assume the farmer took up land until his marginal revenue equaled his marginal cost.

DIAGRAM 2



because of the behavioral assumption that the optimum area is cultivated for any given labor force. The observed production function:

$$(2) \quad Y_a = bL_a = cT$$

where b and c are constants, is the ex post relationship.

The output isoquants of the ex ante production function described above are sketched in Diagram 3a. No assumption has been made about factor substitution for large values of $L_a$, but we may suppose that this part of the curve resembles the usual Cobb-Douglas form. The important feature of the isoquant is that it is not asymptotic to the T axis; instead, it slopes back so that, for large T, constant output can be maintained only by increasing the labor force, $L_a$.[3] The locus of the point at which the gradient $\partial L_a/\partial T$ equals zero for different levels of output, $Y_a$, is the straight line OCD, representing the realized factor combinations.

The remaining parts of Diagram 3 require little explanation. The two graphs in the left-hand portion (Diagrams 3b and 3c) are the total and marginal land productivity curves given earlier in Diagram 2. Diagram 3d shows the total physical productivity of labor ($TPP_L$) for two given values

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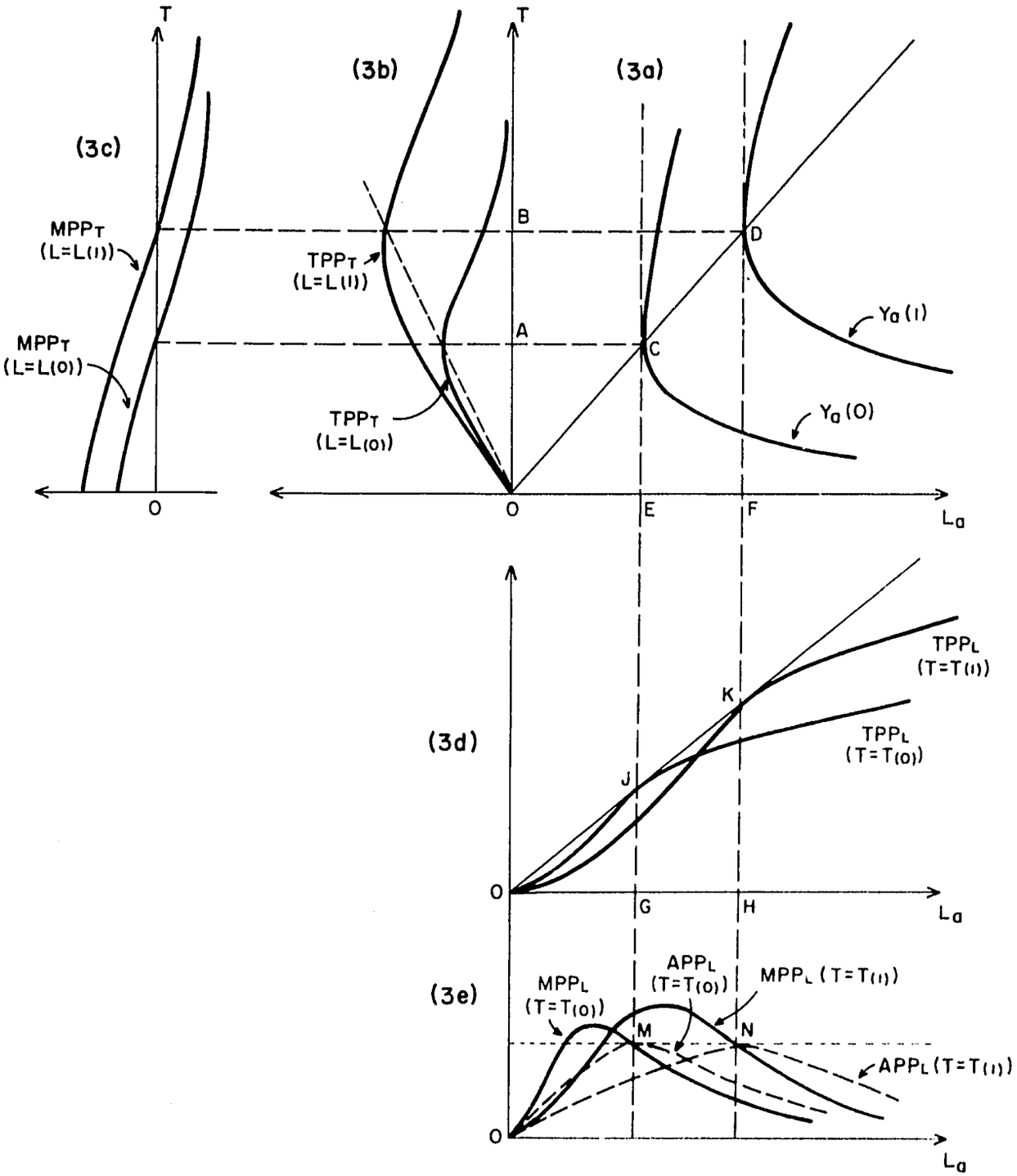
[3]As a consequence, for a given labor force, there are, in general, two distinct sizes of cultivated area from which could be produced a predetermined level of output. Only the smaller of these, however, has any practical significance.

# DIAGRAM 3


(3c)
T
MPPT
(L=L(1))
MPPT
(L=L(0))
O
(3b)
T
B
TPPT
(L=L(1))
A
TPPT
(L=L(0))
O
(3a)
D
C
Ya (1)
Ya (0)
E
F
La
(3d)
TPPL
(T=T(1))
K
TPPL
(T=T(0))
J
O
G
H
La
(3e)
MPPL
(T=T(0))
APPL
(T=T(0))
MPPL (T=T(1))
M
N
APPL (T=T(1))
O
La

of cultivated area [T(0) and T(1)] analogous to Diagram 3b. In the Cobb-Douglas case, these $TPP_L$ curves would have a continuously declining gradient as $L_a$ increases. In the present case, however, if the labor force working a fixed area of land, say T(0), is steadily increased, there is an initial period of increasing returns (i.e., a rising output/labor ratio) before the stage of diminishing returns begins. This is seen in Diagram 3e, where the output/labor ratio (the average physical productivity of labor, $APP_L$) is sketched as the broken line. Before the maximum $APP_L$ is reached, the marginal productivity ($MPP_L$) must necessarily already have begun to decline; but, provided it exceeds the $APP_L$, the latter can still increase. At the maximum point, the $APP_L$ and $MPP_L$ are equal. This maximum, moreover, is independent of $L_a$. The value of $L_a$ which maximizes $Y_a/L_a$ for T = T(0), namely, $L_a(0)$ or OG in Diagram 3d, is the most efficient size for the labor force on this land area. (But it should be recalled that our behavioral assumption means that T is a dependent variable, so that the requirement of "holding T constant" is of conceptual rather than practical significance.) The realized growth path of output with respect to labor is given by the line OJK in Diagram 3d, tangential to each $TPP_L$ curve.

For the purposes of the present argument, it is not necessary to specify analytically the production function drawn in Diagram 3a. However, we may mention in passing one suitable function which has the required properties:

$$(3) \qquad Y_a = gL_a^{\alpha}T^{1-\alpha} - hL_a^{\alpha-1}T^{2-\alpha}$$

where g and h are positive scale factors and $\alpha$ is less than one. For large values of $L_a$ (and small T), the second term becomes negligible and the function approaches the Cobb-Douglas case. On the other hand, as T increases with $Y_a$ constant, $L_a$ asymptotically approaches the line through the origin with gradient g/h. If g is much larger than h, this asymptote may be close to the vertical axis, but for any finite fraction g/h, $T \to \infty$ implies $L_a \to \infty$. The constant realized land/labor ratio (derived from the equation $\partial L_a/\partial T = 0$) is equal to: $g(1 - \alpha)/h(2 - \alpha)$.

While we may justify the use of the simple production function

$$(4) \qquad Y_a = bL_a$$

by arguments such as those presented above, for the case of free land, the situation immediately changes when this simplification is no longer valid. We may imagine that there is a certain limited area of land of

uniform high quality surrounded by margins of steadily worsening quality.[4] For example, the major river valleys would roughly correspond to the first category and the foothills and mountain slopes to the second. The high quality land is naturally taken up first; and while this process is occurring, Equation (4) determines total output. When land expansion presses into the lower quality extensive margins, it is no longer possible to regard land as a free good (i.e., with a zero opportunity cost). The maximum output per unit of labor on the marginal land (the output attained when the $MPP_T$ for this land is zero) is less than on the high quality land. If we assume perfect mobility and diffusion of information, the consequence will be that the land/labor ratio on the good land will fall. A farmer would produce as much by working a smaller than optimum area of good land as by taking up any quantity of inferior land on the frontier. Thus, for the agricultural sector as a whole, the $MPP_T$ will be positive.

Although it is not certain, it is likely that the land/labor ratio on the marginal land will be less than or, at most, equal to the average level maintained on the good land when this was still in surplus. For given crops and techniques of cultivation, the labor input varies directly

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[4] "Quality" here is broadly interpreted to cover difficulty of working (e.g., because of gradient) as well as soil fertility.

with the cultivated area and (probably) inversely with the land quality.[5] Hence, a falling land/labor ratio on the good land will be accompanied by a falling aggregate land/labor ratio.

The rate at which the aggregate ratio falls will depend both on the rate of growth of labor and on the fertility gradient (measured crudely, for example, by $\partial V/\partial T$, where $V = Y_a/T$ at the point where $Y_a$ reaches its maximum). To simplify the subsequent analysis without losing any significant generality, we shall assume that the realized growth rate of cultivated area is directly proportional to the growth rate of labor. Denoting these rates, respectively, by $\eta_T$ and $\eta_{L_a}$ (using the notation $\eta_x = [dx/dt]/x$), we put:

$$(5) \qquad \eta_T = k\eta_{L_a}, \quad 0 \leq k \leq 1$$

Although k is here regarded as a constant (an adequate approximation over a short period--say, one or two decades), in actual fact it must be a decreasing function of time. During the stage of free land, k is equal to 1. Eventually, when all the cultivable land is in use,

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[5] Of course, postulates of this sort are far removed from reality since both different crops and different techniques are frequently employed on the extensive margin.

k is zero. Thus, Equation (5) permits us conceptually (by varying k) to move smoothly from a pure land-surplus economy to the case of fixed land.

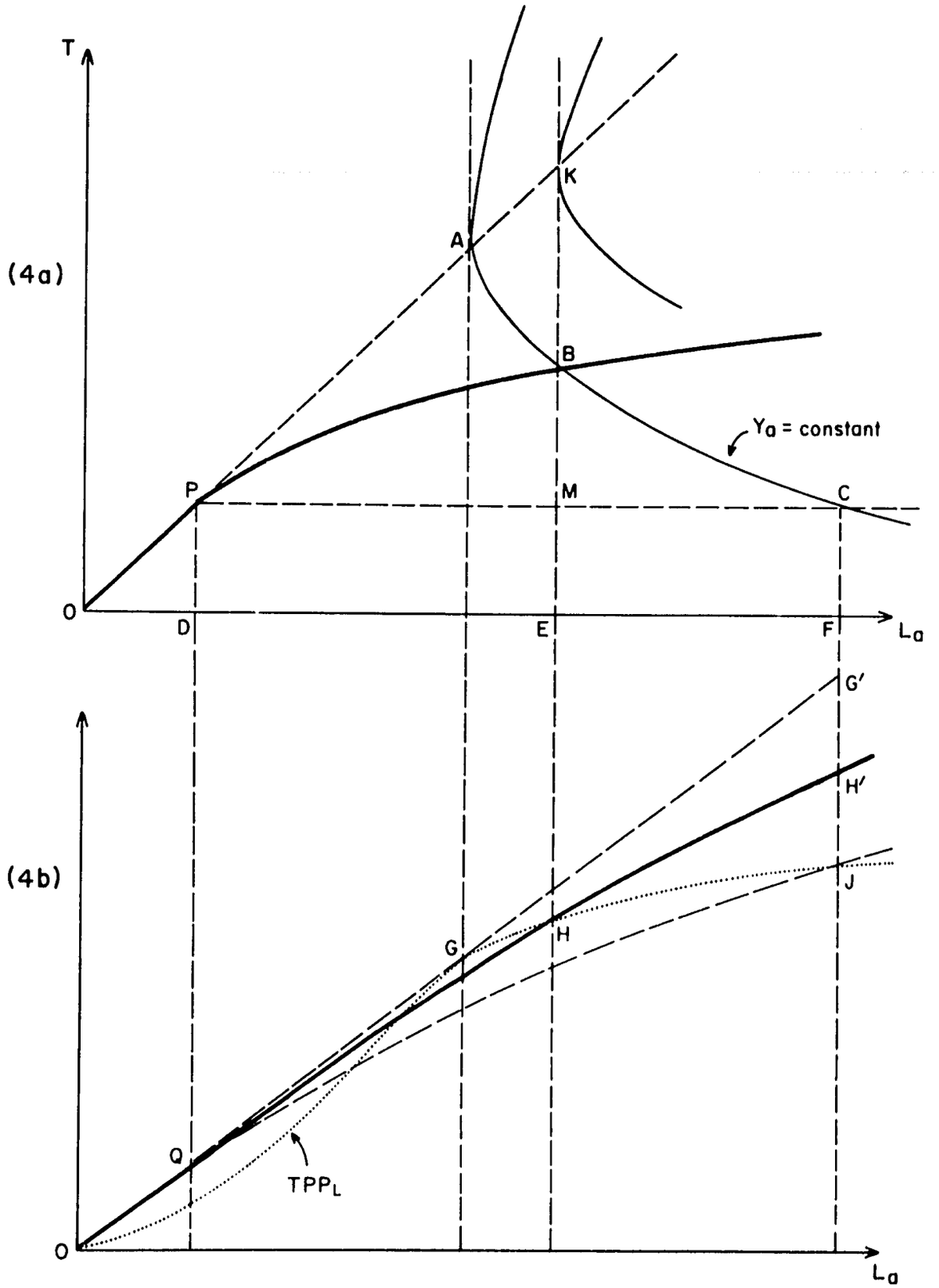
Diagram 4a illustrates the process. OP is the actual growth path of the factors with surplus land (corresponding to OCD in Diagram 3a). When $L_a$ exceeds OD, we enter the stage of diminishing returns, described above. Thereafter, any given labor force is associated with an area of land less than the optimum size for high quality land. For example, the labor force represented by OE would maximize its output on good land by working an area equal to EK. But the inferior quality of the land MK is such that the actual area worked to give maximum output is only EB. The equation to the line PB is given by Equation (5) for k positive but less than 1 and the variables measured from the new origin P. On integrating, it becomes:

$$(6) \quad T = cL_a^{\,k}$$

where c is a constant. The index k can be identified as the elasticity of cultivated area with respect to labor.

The realized growth of output with respect to labor is shown in Diagram 4 as the curve QHH'. It lies between the straight line QGG' (representing the growth of output if the pure land surplus had continued)

# DIAGRAM 4



and the curve QJ (which would be the path followed if DP had been the total cultivable area). We must now find a suitable analytical form for this curve.

If the initial (ex ante) production function had been Cobb-Douglas with constant returns to scale, the effect of constraining land expansion by Equation (5) would be to give the realized function:

$$(7) \qquad Y_a = bL_a^{\gamma}$$

where $\gamma = \alpha + (1 - \alpha)k$ and $\alpha$ and $1 - \alpha$ are the output elasticities with respect to labor and land.[6] Clearly, $\alpha \leq \gamma \leq 1$, so that $Y_a$ lies between $bL_a$ and $bL_a^{\alpha}$, the values for free land and fixed land, respectively. We observed earlier that the lower part of the production isoquant (ABC in Diagram 4a) could resemble the Cobb-Douglas function and that this was true of the particular analytical example given (Equation 3). This is now introduced as an assumption, and by "resemblance" we shall mean that Equation (7) is a satisfactory approximation to the curve QHH' of

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[6]For the Cobb-Douglas function, we have: $\eta_Y = \alpha\eta_L + (1 - \alpha)\eta_T$ (for no technical change). Substituting $\eta_T$ from Equation (4) gives: $\eta_Y = [\alpha + (1 - \alpha)k]\eta_L$.

Diagram 4b.[7] It may easily be demonstrated that Equation (3) fulfills this condition for k close to unity or for large values of $L_a$.

In the above discussion we have attempted to justify the use of a simple, single-factor production function for the traditional sector for the three cases of free land (constant returns), the slowing of expansion as the land frontier is exhausted, and the final case of fixed land. While the argument is perhaps more involved than is warranted by the end result, it seemed useful to start at a more fundamental level of analysis than that of merely assuming the final form of the function. However, other initial assumptions could also be used to reach the same conclusions, and the arguments are necessarily often heuristic.

Much of the following discussion will be of the case of free land (the pure land surplus), using the equation: $Y_a = bL_a$. To incorporate technical progress we may write $\eta_b = \varepsilon$, where $\varepsilon$, in the Fei-Ranis terminology, is the innovation intensity.[8] For $\varepsilon$ constant, we have simply $b = b(o)e^{\varepsilon t}$. But, as was pointed out in Chapter 2, agricultural

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[7]To arrive at Equation (7), however, a Cobb-Douglas function is a sufficient but not a necessary starting point.

[8]John C. H. Fei and Gustav Ranis, Development of the Labor Surplus Economy: Theory and Policy (Homewood, Ill.: Irwin, 1964), p. 77.

productivity has been relatively stagnant over long periods in most of the countries of interest here. For many purposes $\varepsilon = 0$ is a valid approximation.

## THE AGRICULTURAL SURPLUS

In the preceding section we have been concerned with the growth of traditional sector output $Y_a$ and the form of the sectoral production function. We now introduce some specific assumptions relating to the disposition of this output.

In the open, dual economy, $Y_a$ is divided three ways: food consumption in the traditional sector, food consumption in the modern sector, and exports. We assume that this exhausts the product. Provided $Y_a$ (measured in physical units) is sufficiently large, it makes no difference whether it consists of food crops or nonfood crops. In the latter case, exports can finance food imports. The problem of homogeneity, however, is of importance here, and we shall see in the following chapter that it raises considerable practical difficulties.

A major simplifying assumption we make is that food consumption per member of the labor force in both sectors is constant. Implicit in this assumption, when taken in conjunction with the postulated production function, are a number of underlying assumptions concerning the price and

income elasticities--both of demand and supply--for agricultural goods. In some instances it is relatively easy to estimate these elasticities and test the assumption; in others, in particular, the price and income elasticities of home consumption by the producer, it is not. We shall defer these problems until they arise in examination of actual data later in this study. Little further generality is lost by making the level of food consumption per worker identical in both sectors. This level, in units of agricultural goods, will be denoted by f.

The three-way division of output, noted above, immediately suggests two types of traditional sector surplus. First, there is the so-called total agricultural surplus, common to all dual economy models, defined as output less intrasectoral food consumption: $Y_a - fL_a$. Second, and of more importance in the present model, there is the exported surplus, $X_a$, defined as output less total food consumption:

$$(8) \quad X_a = Y_a - fL$$

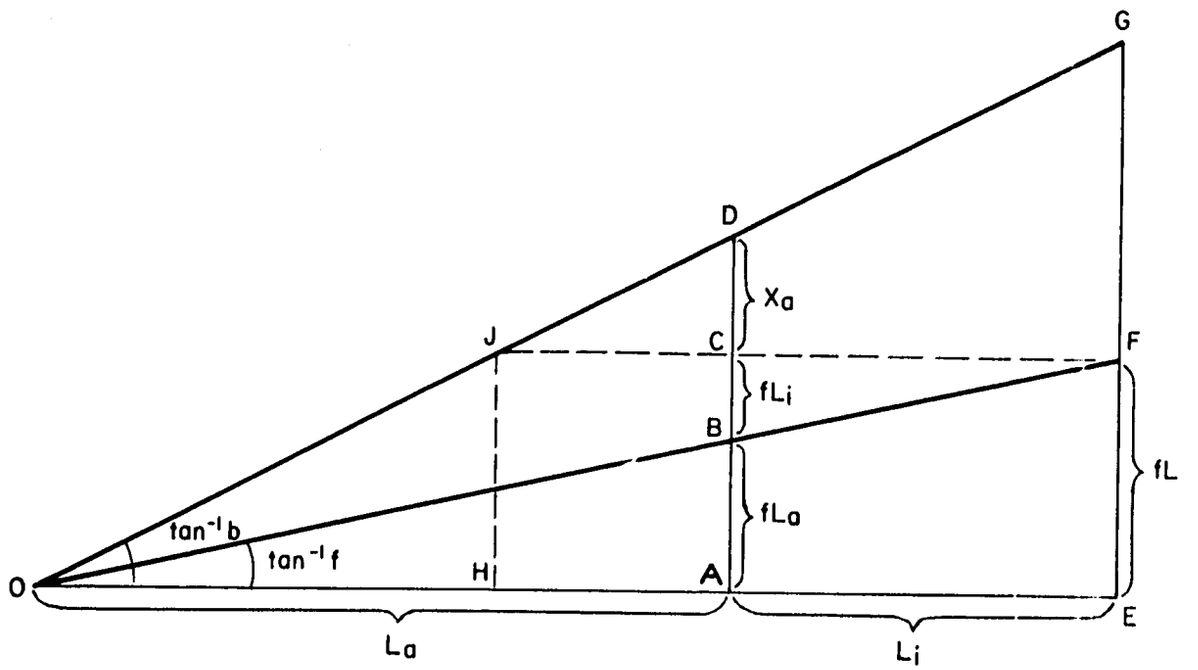
where L is the total labor force in the economy. (Although we shall loosely refer to $X_a$ as traditional sector exports, strictly $X_a$ is exports net of imports of foodstuffs.) The conventional concept of marketed surplus, covering also agricultural goods marketed within the traditional sector, does not appear in the dual economy model.

The total and exported surpluses are shown in Diagram 5 for the case of the pure land surplus. OA represents the agricultural labor force, $L_a$, and AD the total output of agricultural goods, $Y_a$, when this labor force cultivates the optimum land area. The gradient of the line OB is the food consumption per member of the labor force, f, so that AB represents total food consumption in the traditional sector. Hence, BD measures the total agricultural surplus. From the total surplus we then subtract the food consumed in the modern sector, $fL_i$ (where $L_i$ denotes the modern sector labor force), to leave the surplus available for export, CD. An important characteristic of the exported surplus which is clearly seen in Diagram 5 is that at any given time it is a function of the relative share of the labor force in agriculture and not of the absolute size of $L_a$. This fact will be examined in more detail below.

## THE MODERN SECTOR

In the modern sector of the economy, capital and labor are taken as the only factors of production. We assume that at the aggregate level there is no substitution between them. It should be recognized, however, that this zero substitutability does not preclude factor substitution at the

DIAGRAM 5



enterprise level. As was true of the production function in agriculture, decisions regarding factor combinations are made on the basis of an ex ante production function which may bear little resemblance to the realized (ex post) relation between inputs and output.[9] Nevertheless, in our view the actual possibilities for factor substitution in an underdeveloped country are more closely approximated by the assumption of fixed factors than by the unit elasticity of substitution of a Cobb-Douglas function.[10]

Denoting output by $Y_i$ and capital stock and labor by $K_i$ and $L_i$, respectively ($Y_i$ and $K_i$ measured in appropriate physical units and $L_i$ in man-years), we have the production function:

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[9]The distinction between ex ante and ex post production functions has been discussed in detail by Frankel. By a simple, though ad hoc, argument he shows how enterprises governed by Cobb-Douglas or CES functions can lead, on aggregation, to a realized production function with fixed coefficients. The necessary assumption is that the enterprise's production for given factor inputs is dependent on the "level of development" of the whole economy as measured by the total capital intensity. Marvin Frankel, "The Production Function in Allocation and Growth: A Synthesis," American Economic Review Vol. LII, No. 5 (December 1962).

[10]In support of this view see, inter alia, Benjamin Higgins' review of Fei and Ranis, Development of the Labor Surplus Economy in Economic Development and Cultural Change, Vol. XIV, No. 2 (January 1966), p. 239.

$$(9) \quad Y_i = mK_i = nL_i$$

where m and n are technologically determined coefficients. (m is, of course, the inverse of the familiar Harrod-Domar capital-output ratio.)

Technical progress is regarded as exogenous and autonomous. It is incorporated into Equation (9) by making m and n nondecreasing functions of time. Moreover, for simplicity we assume their respective growth rates, $\eta_m = \theta$ and $\eta_n = \phi$, to be constant. It would be more desirable, in fact, to introduce technical progress as embodied in new additions to capital stock. The analytical complications of such a procedure, however, are considerable--requiring, for example, the decomposition of capital stock by vintage and assumptions regarding obsolescence.[11] Also, the method actually adopted does permit increases in m and n to be interpreted partly as a result of economies of scale.

One advantage of the production function given by Equation (9) is the ease with which it enables us to treat bias in technical progress.

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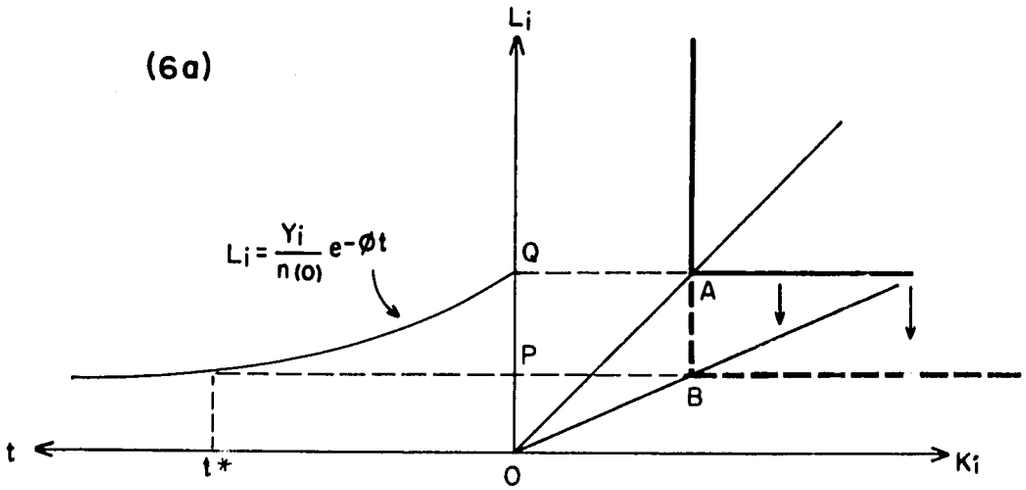
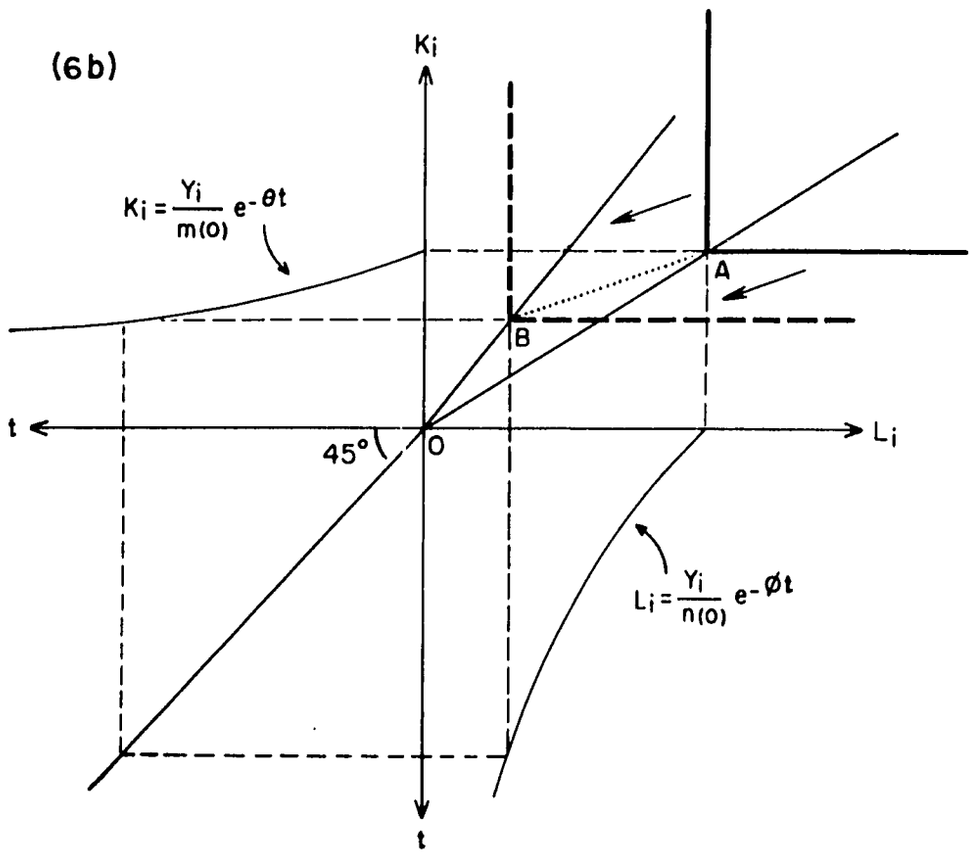
[11] The one-sector model analyzed by Solow, Tobin, Weizsacker, and Yaari is of this kind. Technical progress results in the progressive increase of the output/investment ratio or the output/labor ratio (or both) for the gross investment in each successive year. The capital of any single vintage is combined with labor in fixed proportions; but if labor is limited, it will work with newer capital in preference to the older. The latter is then obsolete. R. M. Solow, J. Tobin, C. C. von Weizsacker, and M. Yaari, "Neoclassical Growth with Fixed Factor Proportions," Review of Economic Studies Vol. XXXIII, No. 2 (April 1966).

Neutral progress, in the Hicksian sense, occurs when the growth rate of m equals that of n; i.e., $\theta = \phi > 0$. When $\theta = 0$ and $\phi > 0$, we have purely labor-saving (or labor-augmenting) technical progress, and when $\phi = 0$ and $\theta > 0$, purely capital-saving progress. These last two cases correspond to Harrod-neutrality and Solow-neutrality, respectively. In the general case, when both $\theta$ and $\phi$ are positive but not equal, we shall say that technical change has a labor-saving or capital-saving bias depending on whether $\phi > \theta$ or $\theta > \phi$.

Diagram 6 illustrates two types of technical progress: pure labor-saving, and progress with a labor-saving bias. Diagram 6a shows the first case: the effect of pure labor-saving progress is to shift the capital-labor isoquant defined by the point A in a direction parallel to the $L_i$ axis and towards the $K_i$ axis. The left-hand graph gives the time dimension during which this shift occurs under the assumption that $\phi$ is constant. The output/labor ratio increases exponentially over time according to the equation: $n = n(o)e^{\phi t}$. Holding $Y_i$ constant, the labor force required to produce this output declines exponentially from the

# DIAGRAM 6


(6a)
Li
Li = Yi/n(0) e-Øt
Q
A
P
B
t
t*
O
Ki


(6b)
Ki
Ki = Yi/m(0) e-θt
A
B
t
45°
O
Li
Li = Yi/n(0) e-Øt
t

initial level measured by OQ at $t = 0$ to OP at $t = t^*$. Diagram 6b is an analogous picture for the case when both $\theta$ and $\phi$ are non-zero. Here the isoquant is moved diagonally closer to both axes along the line AB. In the case of (Hicks-) neutral technical change, B would lie on the line OA. The labor-saving bias, however, reduces the labor force by a more than proportional amount so that the capital/labor ratio at B is greater than at A.

## LABOR ALLOCATION

In the traditional sector, we argued that of the two factors, land and labor, only labor was an independent variable (with respect to the sector). Similarly, in the modern sector, we regard capital as an independent variable and labor as not.[12] Thus Equation 9 could more properly be written: $Y_i = mK_i$; $L_i = Y_i/n$. The justification is that labor can always be drawn from the traditional sector, if required, by the offer of a suitable wage. In causal order, therefore, a given amount of capital stock determines the requisite modern sector labor force, which, in turn,

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[12] The implicit assumption here, made in most dual economy models, is that labor can allocate itself between sectors in a time period which is short compared to changes in industrial capacity. The opposite situation, of course, is also arguable: that it is precisely the relative immobility of labor that determines the structure of output.

determines the labor force in the traditional sector from the labor allocation equation:

$$(10) \quad L_a = L - L_i$$

where L is the total labor force. This equation, already implicit in the earlier discussion of Diagram 5, assumes no (or uniformly distributed) unemployment and perfect mobility. Depending on the relative magnitudes of the rate of labor absorption in the modern sector and the rate of natural increase of the labor force, there will be a positive, zero, or negative flow of labor into the modern sector. (The last of these, the backflow of labor into agriculture, is unlikely in any practical situation. A more appropriate assumption would be that under such conditions a pool of unemployed was formed in the modern sector.)

The determinants of labor absorption in the modern sector are simply derived from Equation 9. The relation between the growth rates of the variables is:

$$(11) \quad \eta_{Y_i} = \theta + \eta_{K_i} = \phi + \eta_{L_i}$$

from which we have the rate of labor absorption, $\eta_{L_i}$, given by:

$$(12) \quad \eta_{L_i} = \eta_{K_i} + (\theta - \phi)$$

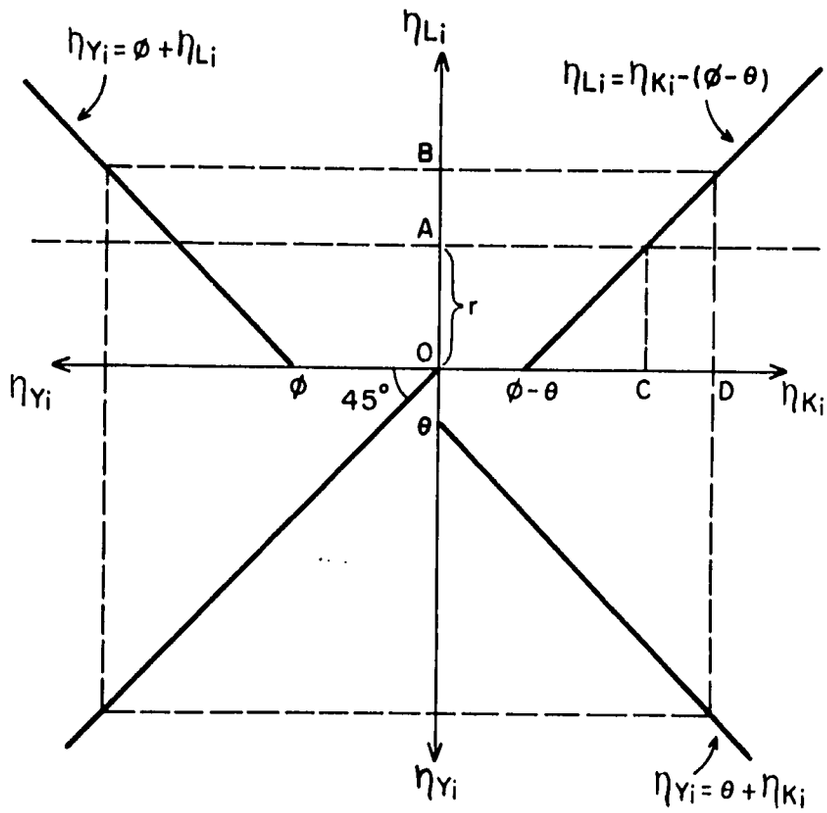
Labor absorption thus depends on the growth rate of capital stock and the extent of capital-saving bias in technical progress. If the natural increase of the total labor force, $\eta_L$, is a constant, denoted by r, the condition for a labor flow into the modern sector is that:

$$(13) \qquad \eta_{K_i} + (\theta - \phi) > r$$

The influence of biased productivity changes on labor absorption is illustrated in Diagram 7. The equations relating growth of output with growth of labor force and capital are sketched in the second and fourth quadrants. Equation 12 is plotted in the first quadrant for the case of a labor-saving bias; i.e., $\phi > \theta$. If OA represents the rate of natural increase, r, then $K_i$ must grow at a rate exceeding OC for there to be any labor inflow. If there is any labor-saving bias, it is not sufficient for $\eta_{K_i}$ merely to exceed r.

Assuming that modern sector growth is sufficiently rapid for some additional labor from agriculture to be required, the industrial entrepreneurs must offer a wage which is a function of what the worker could earn in the traditional sector. This would correspond to the marginal product of labor ( $\partial Y_a / \partial L_a$) if the agricultural structure were one of landlords and tenants, or to the average product ($Y_a/L_a$) if we envisaged a sector in which the entire product accrued to labor. For the case of a pure

DIAGRAM 7


$\eta_{Li}$
$\eta_{Yi} = \phi + \eta_{Li}$
$\eta_{Li} = \eta_{Ki} - (\phi - \theta)$
B
A
r
O
$\eta_{Yi}$
$\phi$
45°
$\phi - \theta$
C
D
$\eta_{Ki}$
$\theta$
$\eta_{Yi}$
$\eta_{Yi} = \theta + \eta_{Ki}$

land surplus, these are identical and are equal to the constant, b, of Equation 4. Whether an intersectoral wage differential is needed to attract labor from agriculture is not an important theoretical question. For simplicity we shall equate the wages in each sector, taking the marginal product as the agricultural wage. Writing w as the modern sector wage measured in units of industrial goods, we have:

$$(14) \qquad w = \tau(\partial Y_a/\partial L_a)$$

where $\tau$ is the intersectoral terms of trade (the number of units of industrial goods exchanged per unit of agricultural goods).

Unless the exported surplus is zero, the wage in agricultural goods ($w/\tau$) will exceed the average level of food consumption, f. The excess of the wage over f will correspond to the demand for manufactured goods by each modern sector worker. Because the workers consume both agricultural and industrial goods, the determination of the intersectoral terms of trade does not at first seem a trivial problem. We digress here to examine it in some detail.

## INTERSECTORAL TERMS OF TRADE

The simplest way to visualize the intersectoral commodity market is to suppose that the industrial entrepreneurs bargain directly with the farmers for the latter's total surplus, offering in return manufactured goods. The entrepreneurs then divide the purchased agricultural goods into the portion required to feed the industrial labor force and the remainder--which is to be exported to finance imports. We shall assume that the entrepreneurs do not themselves consume any food and, for the present, that neither do they consume any of their output of manufactured goods.

The complication in the bargaining process is that the industrial workers' wage, defined by Equation 14, is itself a function of the terms of trade. More precisely, the portion of the wage which comprises manufactured goods is a function of the terms of trade. The entrepreneurs cannot exchange the total output of manufactured goods for the agricultural surplus but must retain a part sufficient to keep the industrial wage (at the determined terms of trade) equal to marginal productivity in the traditional sector. We may imagine that both parties to the bargaining can perceive the unique exchange rate that will clear the market under these conditions. With any different rate, either the entrepreneurs or the

farmers would be left holding unsold stocks. If the rate were too low (from the viewpoint of the farmers), the demand for manufactured goods by farmers and industrial workers would exceed the supply; if it were too high, the demand for agricultural goods by the entrepreneurs would be unsatisfied. In either case the usual market equilibrating mechanisms would operate to adjust the price.

The procedure may be described more simply algebraically. The total agricultural surplus is $Y_a - fL_a$; i.e., output less sectoral food consumption. In exchange for this, the industrial entrepreneurs give up their output of manufactured goods, $Y_i$, less the quantity required by their workers, which is $(w^* - f)L_i$ in units of agricultural goods (where $w^* = w/\tau$, the wage expressed in units of agricultural goods) or $(w^* - f)L_i\tau$ in units of industrial goods. The terms of trade are, therefore, determined uniquely (although implicitly) by the equation:

$$(15) \quad \tau = \frac{Y_i - (w^* - f)L_i\tau}{Y_a - fL_a}$$

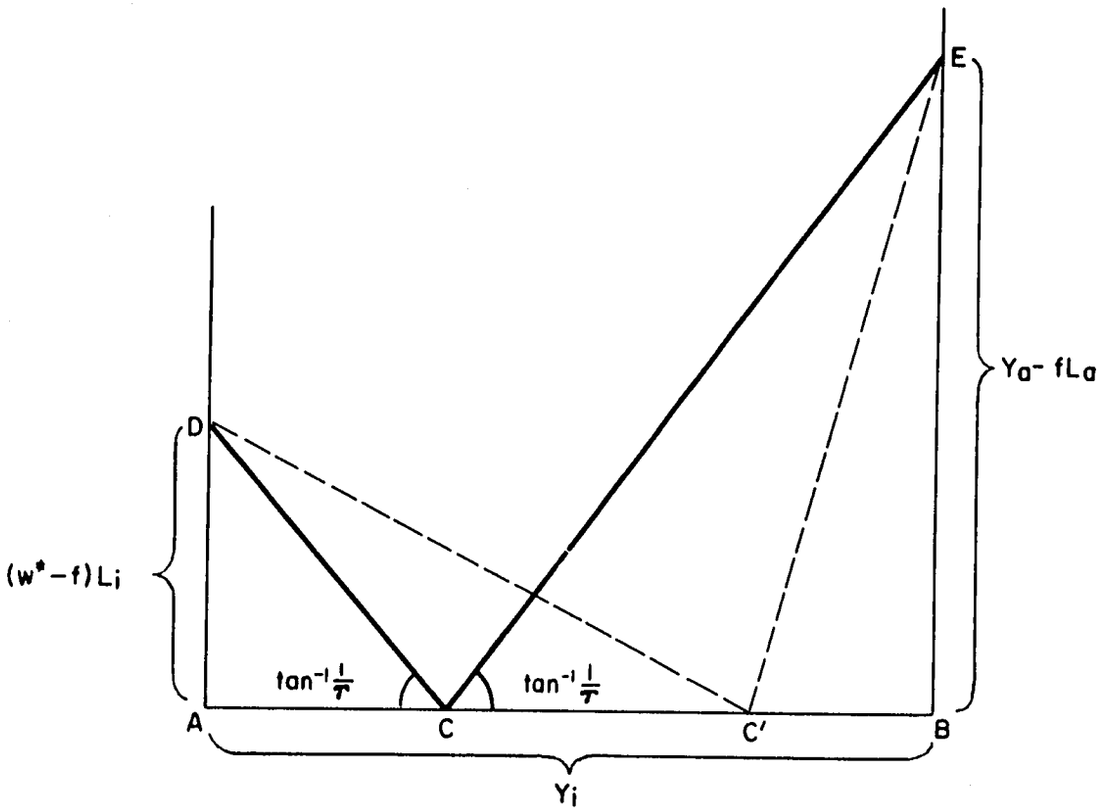
On rearranging, $\tau$ is given explicitly by:

$$(16) \quad \tau = Y_i/[Y_a - fL_a + (w^* - f)L_i]$$

In practical terms, from the viewpoint of the entrepreneur, the problem of determination of $\tau$ is seen as one of dividing $Y_i$ into two components such that one will satisfy the farmers so that they give up the surplus, $Y_a - fL_a$, and the other, the modern sector workers so that they receive a total real wage (including food) of $w^*$. The procedure is illustrated in Diagram 8. The vertical axes are in units of agricultural goods, the horizontal axis in industrial goods. BE represents the total agricultural surplus; AD, the nonfood component of modern sector payrolls; and AB, the total output of manufactured goods. Each of these three quantities is determinate in its respective units. The problem devolves into the simple geometric exercise of choosing a point C on the line AB such that the terms of trade given by the ratio AC/AD equal those given by CB/BE. The correct point, shown on the diagram, is that which makes the angle ACD equal the angle BCE.

For the case of the pure land surplus economy, $Y_a = bL_a$ and $w^* = b$. In both sectors the demand for manufactured goods per member of the labor force is equal to $b - f$, in units of agricultural goods. Hence, AD and BE in Diagram 8 reduce to $(b - f)L_i$ and $(b - f)L_a$, and the output of manufactured goods is divided between the modern and traditional sectors in direct proportion to their labor forces. Equation 16 becomes:

# DIAGRAM 8



(17) $\tau = Y_i/[(b - f)L]$

## IMPORT DEPENDENT GROWTH

### The Basic Model

The exchange of industrial for agricultural goods, discussed above, leaves the entrepreneurs, after having paid the industrial labor force, holding a quantity of agricultural goods equal to $Y_a - fL$, the surplus available for export. We assume, as is realistic for all except a few large underdeveloped countries, that there is no domestic capital goods industry. The growth of capital stock thus depends on the exchange of the exported surplus for capital goods on the world market. In this initial presentation we shall assume that the entire exported surplus is invested in this way. If the external terms of trade between agricultural goods and capital goods remain constant, we may write the following equations:

(18) $M = X_a$

(19) $I^* = M$

(20) $\dot{K}_i = I^*$

where M is imports (comprising capital goods only), I* investment, and $\dot{K}_i$ ($dK_i/dt$) capital accumulation. The asterisk on I* distinguishes investment measured in units of agricultural goods from I, measured in units of industrial goods (i.e., $I = \tau I^*$).

Equation 20 assumes that capital is infinitely durable. It would be possible, following Jorgenson,[13] to incorporate an allowance for depreciation by writing $\dot{K}_i = I - \delta K$, where $\delta$ is the rate of depreciation, but the refinement does not seem of great significance.

Although we have not explicitly specified an investment function, it is implicit in our earlier assumptions. Defining profits (P) as the total return to capital in the modern sector, i.e., output less total payrolls:

$$(21) \quad P = Y_i - wL_i$$

the assumptions that entrepreneurs are not consumers and that no manufactured consumer goods are imported imply that the investment function is given by:

$$(22) \quad I = P$$

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[13] Jorgenson, op. cit., p. 323.

This is a special case of the investment function postulated by Lewis:

$$(23) \quad I = sP$$

where s is the propensity to invest out of profits.[14] The rationale is that present profits may be regarded roughly as a proxy for future profits as well as being the source of investment funds. In a later elaboration of the model we shall consider the case when s is less than one.

We can summarize the model of the open, dual economy in its simplest form (the pure land surplus case) in eight basic equations:

$$(9) \quad \begin{cases} Y_i = mK_i \\ L_i = Y_i/n \end{cases}$$ Production behavior, modern sector

$$(10) \quad L_a = L - L_i$$ Labor allocation accounting equation

$$(4) \quad Y_a = bL_a$$ Production behavior, traditional sector

$$(8) \quad X_a = Y_a - fL$$ Export surplus (behavioristic relationship)

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[14] See Arthur W. Lewis, The Theory of Economic Growth (Homewood, Ill.: Richard D. Irwin, Inc., 1955), p. 225 et seq.

(18) $M = X_a$ Trade balance (accounting relationship)

(19) $I^* = M$ "Investment function" (behavioristic relationship)

(20) $\dot{K}_i = I^*$ Capital accumulation (accounting relationship)

These are listed here in their causal order of determination. The initial capital stock, $K_i(o)$, determines successively, $L_i(o)$, $L_a(o)$, $Y_a(o)$, $X_a(o)$, $M(o)$, and $I^*(o)$. The initial level of investment, $I^*(o)$, then determines capital in the next period, $K_i(1)$ (if time were discrete), or the growth rate of capital (for continuous time). The total labor force, L, is assumed to be increasing autonomously at the constant rate, r. Of the four coefficients, m, n, b, and f, the first two are constrained by the conditions: $\eta_m = \theta$ and $\eta_n = \phi$ and f is constant by assumption. We shall analyze first the case of stagnant productivity in agriculture, for which b is also constant.

The solution of this system of equations involves basically the integration of Equation 20. Substituting for I* in this equation, we have:

$$\dot{K}_i = Y_a - fL = bL_a - fL = (b - f)L - bL_i$$

whence we obtain the fundamental differential equation for the open dual economy:

$$(24) \quad \dot{K}_i = (b - f)L(0)e^{rt} - b[m(0)/n(0)]e^{(\theta - \phi)t}K_i$$

This is of the standard form $dy/dt + yg(t) = f(t)$, a first order linear differential equation, which has the formal integral:

$$y = e^{-\int g dt} \int e^{\int g dt} f \, dt$$

Hence, on integration of Equation 24, we obtain:

$$(25) \quad K_i = Ae^{-B\int e^{(\theta - \phi)t}dt} \int e^{B\int e^{(\theta - \phi)t}dt} e^{rt}dt$$

where $A = (b - f)L(0)$ and $B = bm(0)/n(0)$. This is the growth path of $K_i$, the explicit evaluation of which depends on the value we assign to the bias in technical change, $\theta - \phi$.

In the simplest case, that of neutral technical progress $(\theta = \phi > 0)$, we can obtain the explicit growth path of capital stock. For $\theta = \phi > 0$, Equation 25 reduces to:

$$K_i = Ae^{-Bt} \int e^{(B + r)t}dt$$

which, on evaluation, gives the expression:

$$(26) \quad K_i = K_i(0)[Ce^{rt} + (1 - C)e^{-Bt}]$$

where $C = A/[K_i(0)(B + r)]$.

The capital stock thus grows on a path asymptotic to $[A/(B + r)]e^{rt}$, its growth rate approaching the constant level, r. At time zero, the rate may be greater or less than r depending on the initial allocation of the labor force.

From Equations 11 and 12 we have the growth rates of modern sector output and labor force expressed in terms of $\eta_{K_i}$. The asymptotic rates are, respectively, $r + \theta$ and r. The latter result indicates that any early intersectoral labor flow will rapidly die away; modern sector labor requirements can ultimately be satisfied by the natural increase of its own labor force. Finally, we may derive the rate of change of the intersectoral terms of trade from Equation 17:

$$(27) \qquad \eta_\tau = \eta_{Y_i} - \eta_L = \eta_{K_i} + \theta - r.$$

The asymptotic value of $\eta_\tau$ is $\theta$. The terms of trade move in favor of the traditional sector at a rate approaching the growth rate of capital productivity (or, equivalently in the neutral case, labor productivity) in the modern sector.

The operation of the model can be described very simply. For the modern sector to expand it must draw on the resources of the traditional sector for capital goods (via the foreign sector) and for labor. The two requirements conflict, since migration out of agriculture lowers

the growth rate of exports. In Diagram 5, a movement of the point A (representing the sectoral division of the labor force) towards E simultaneously raises the exported surplus (CD), i.e., the increment to capital stock, and lowers the labor force ($L_i$) available to work with that capital. The converse occurs with a shift of A towards 0. For any given size of $L_i$ (determined by $K_i$), the increments to each factor must balance each other, and this is achieved by adjusting the point A. If the (exogenously given) technical progress in the modern sector is neutral, capital stock and labor in the modern sector must increase at the same rate, and with stagnant agriculture this rate cannot exceed the rate of natural increase, r. Rising output per worker in the modern sector, when contrasted with the constant productivity in agriculture, drives down the price of industrial goods in terms of agricultural goods.

Technical progress with a labor-saving bias ($\phi > \theta$) lessens the demand for labor in the modern sector and, therefore, enables exports to reach a higher level than before. The analysis of Equation 25 for this case, however, is lengthy and quite complex and will not be presented

here.[15] The dominant term in the expression for $K_i$ finally obtained is:

$$(A/r)e^{rt} - Be^{(\theta - \phi)t}/(\theta - \phi)$$

which shows that $\eta_{K_i} \to r - Be^{(\theta - \phi)t}$, and, since $\theta - \phi$ is negative, this tends to the constant value, r. The asymptotic value of $\eta_{K_i}$ may also be seen directly from Equation 24.[16] This result is of some interest: no matter how large the labor-saving bias, the asymptotic growth rate of capital can still not exceed the rate of natural increase, r. (It will, of course, approach this asymptote from above.) The reason is that if the labor absorption rate in the modern sector ($\eta_{L_i}$) approaches a constant value less than r, the consequent rate of labor outflow ($r - \eta_{L_i}$) is a <u>constant</u> proportion of $L_i$ and therefore a <u>diminishing</u> proportion of $L_a$. The traditional sector rate of inflow ($\eta_{L_a} - r$) approaches zero.[17]

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[15] Writing $\psi = \phi - \theta$ and $y = e^{-\psi t}$, Equation 25 can be reduced to:

$$K_i\, e^{-By/\psi} = -(A/\psi) \int e^{-By/\psi}\, y^{(r/\psi)-1} dy$$

which can be evaluated by expanding $e^{-By/\psi}$ as a power series in y.

[16] Divide through by $K_i$, assume $\eta K_i \to r^* \neq r$ and deduce a contradiction.

[17] $\eta_{L_a} - r = [z/(1-z)]\,(r - \eta_{L_i})$, where z is the share of the total labor force in the modern sector. z approaches zero.

In the two cases discussed above, neutral and labor-saving technical progress in the modern sector, there exist stable asymptotic growth rates for $K_i$ and $L_i$. For a capital-saving bias, however, this is no longer true. Any rate of labor absorption by the modern sector greater than r will result in the exported surplus declining to zero, as food consumption takes a steadily larger share of output, $Y_a$. This would appear in Diagram 5 as a shift in the point A towards 0. The minimum share of the labor force in agriculture consistent with total food demands being met is represented by the distance 0H. For that share, we have $Y_a = fL$, and the corresponding share in the modern sector, denoted by $z_{max.}$, is given by:

$$z_{max} = (b - f)/b$$

equal to the total agricultural surplus as a proportion of total output, $Y_a$. Conversely, if labor absorption is equal to or less than r, the exported surplus will be greater than is required to finance capital imports. The advantages of a capital-saving bias are only realized in a labor-surplus economy, or where there is technical change in agriculture to compensate for outmigration and maintain a growing exportable surplus.

The absence of a stable long-run equilibrium for the capital saving case is a result of our rather rigid assumptions that $\eta_m$ and $\eta_n$

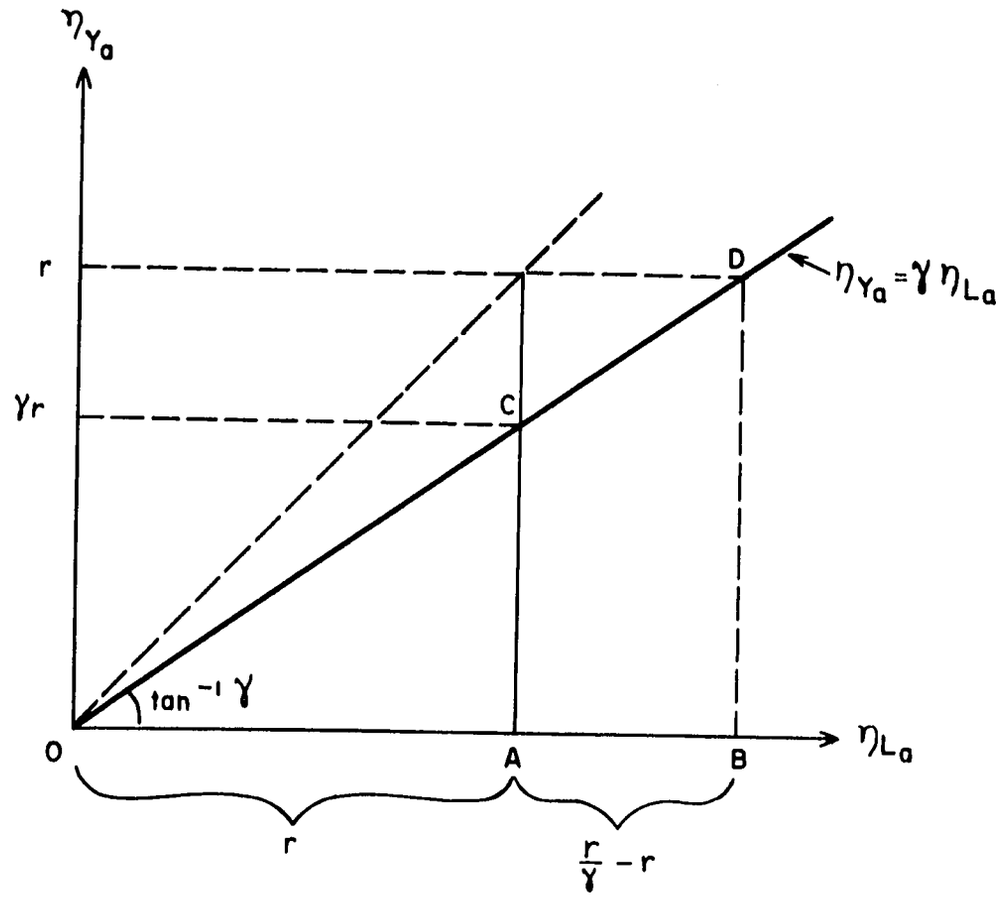
the rates of increase of the partial productivities in the modern sector, are constant, that labor is always fully employed, and that external trade is always in balance. Relaxing any of these constraints in a suitable manner would permit $\eta_{K_i}$ to approach a constant level less than r. In the last case, exports would exceed imports and foreign exchange reserves would be built up. Ultimately, however, we must take into account a more significant effect on growth--the necessary eventual exhaustion of the land surplus.

## Exhaustion of the Land Surplus

The basic growth model described above has the property that, under conditions of pure land surplus and no technical progress in agriculture, modern sector output can grow at a maximum asymptotic rate of $r + \theta$. It requires little further analysis to trace the constriction of this growth as possibilities for further expansion of cultivated area diminish.

We replace Equation 4 in the model by Equation 7, $Y_a = bL_a^{\gamma}$, and make $\gamma < 1$. The growth rate of output, $\eta_{Y_a}$, is therefore less than $\eta_{L_a}$. In Diagram 9, the line OCD represents the new relationship between $\eta_{Y_a}$ and $\eta_{L_a}$. For output to increase at a rate equal to or greater than r (which is necessary if the exported surplus is not

DIAGRAM 9

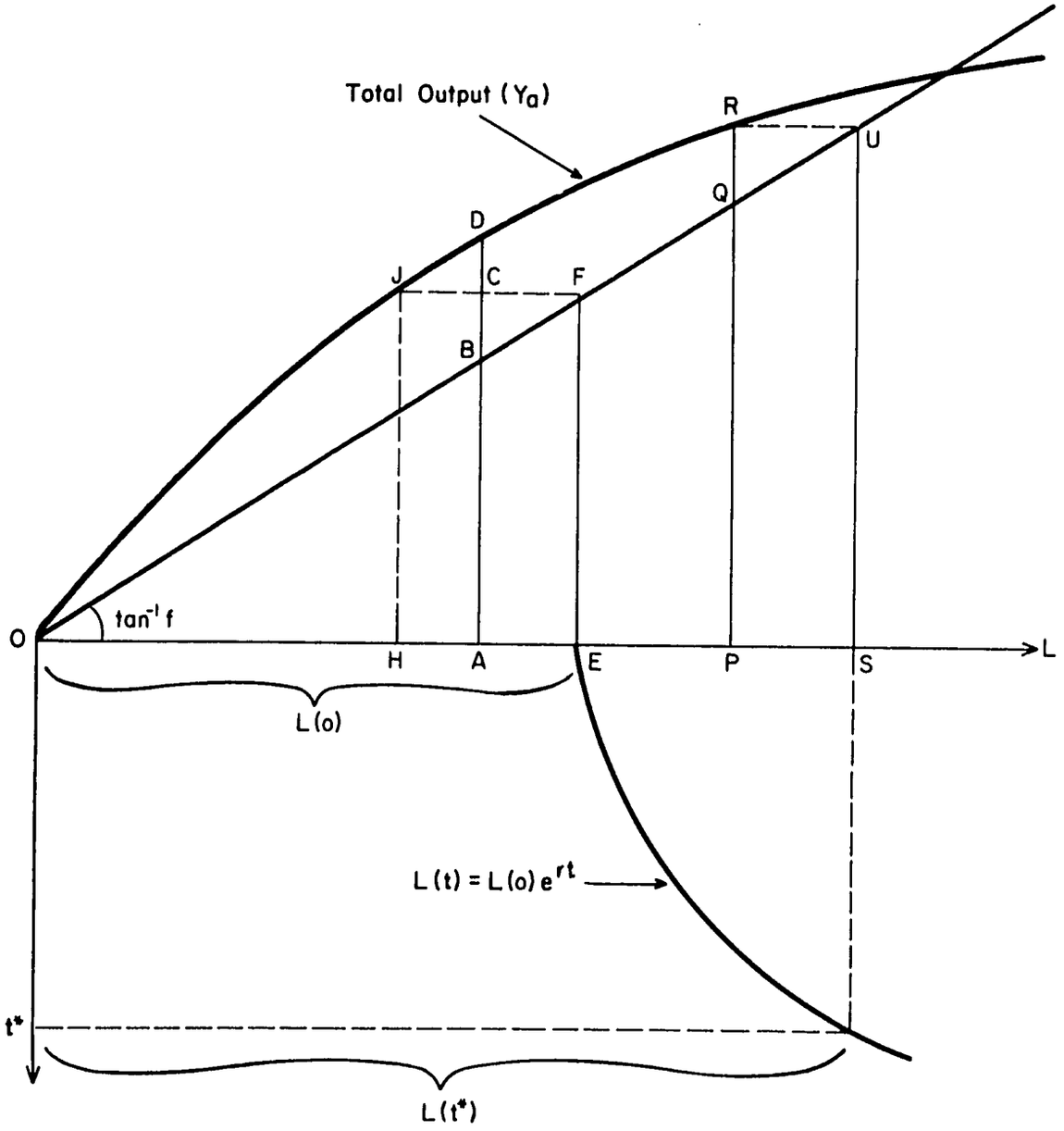

$\eta_{Y_a}$
r
$\gamma r$
D
C
$\eta_{Y_a} = \gamma \eta_{L_a}$
$\tan^{-1}\gamma$
O
A
B
$\eta_{L_a}$
r
$\frac{r}{\gamma} - r$

to be eroded) there must be migration into agriculture at a rate of at least $(r/\gamma) - r$ (AB in Diagram 9). If, as is far more likely, $\eta_{L_a}$ is at most equal to r, the resulting value of $\eta_{Y_a}$ cannot exceed $\gamma r$ (AC in Diagram 9).

The effect of a slowing of export growth and eventually an absolute decline in exports is to limit import (and hence investment) capacity and, thus, also modern sector growth. A capital-saving bias in technical progress, together with continuous reallocation of labor into the traditional sector, can reduce but not reverse the decline in $\eta_{X_a}$. Such a flow of labor, moreover, would itself be taken to indicate a reversion to a subsistence economy.

The situation is illustrated in Diagram 10, an extension of Diagram 5 for the case of diminishing returns. The curved line OJD shows total traditional sector output growing less than proportionately with labor; the straight line OBF represents food consumption, which increases at the same rate as the total labor force, L. The initial size of L is OE and of the traditional sector labor force ($L_a$), OA. The latter determines total output, AD, which is sufficient for food consumption (EF) leaving the exportable surplus, CD. If the relative share of L in the modern sector (i.e., the ratio AE/OE) remained constant, the natural increase of L over time would eventually reduce exports to zero. This is shown in

# DIAGRAM 10



the diagram as occurring at time t*, where $Y_a(t^*)$ and $fL(t^*)$ (the segments PR and SU, respectively) are equal. In fact, of course, the relative share of labor in the modern sector would have declined over this period, so that at time t*, $L_i$ would be smaller than PS and exports would still be positive. Both capital and labor in the modern sector could therefore still increase, although at a rate much less than r. Finally, the condition characterized by Jorgenson, following Leibenstein, as a low-level equilibrium trap, is approached.[18] Foreign trade ceases and the labor force in the modern sector declines absolutely. Malthusian forces assert themselves to depress the rate of population increase.

## Technical Change in Agriculture

The preceding analysis has described what we may regard as the underlying process of growth and stagnation in the dual economy. It is the process which obtains under conditions of import dependence, where there is no source of foreign exchange apart from traditional sector exports, and where increases in agricultural output are wholly accounted for by additional land and labor inputs. Import dependence we accept as a basic constraint on the development of most countries. The other two

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[18] Jorgenson, op. cit., p. 333; H. Leibenstein, Economic Backwardness and Economic Growth (New York: Wiley, 1957).

conditions, however, are clearly not necessary; indeed, it is by their relaxation that sustained growth becomes possible in the framework of the present model. Exports from the modern sector are introduced in a later part of this chapter. We shall here briefly study the effect of technical progress in agriculture.

In the pure land surplus case, the production function in the traditional sector may be written:

$$(28) \quad Y_a = b(0)e^{\varepsilon t} L_a$$

where $\varepsilon$ is the (constant) rate of technical progress. We choose to make $\varepsilon$ exogenously determined on the grounds that the factors contributing to it are complex, varied, and seldom amenable to quantitative treatment. It can be argued, however, that a shift in the domestic terms of trade in favor of agriculture would raise productivity. Fei and Ranis make this assumption, suggesting that when agriculture becomes more profitable landlords will be stimulated to make technological innovations.[19] The effect of adopting such an assumption is to introduce a mechanism tending to equilibrate the rates of productivity change in the two sectors and

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[19]Fei and Ranis, op. cit., p. 34.

dampen shifts in the terms of trade. If the terms of trade moved in favor of agriculture, for example, the innovation intensity in that sector would rise and thus offset the movement. Since empirical evidence of a precision necessary to demonstrate this hypothetical "technology adjustment mechanism" is lacking, the assumption is perhaps of more aesthetic than practical significance.

In general terms, we may describe the results of technical change in agriculture as follows. Rising agricultural productivity raises the exportable surplus and therefore the capacity to import. Assuming that entrepreneurs respond to the increase by raising their level of investment (i.e., assuming that they still purchase the entire surplus), imports and industrial output will rise. The higher level of industrial output requires additional labor which can be released by the more productive agricultural sector. The increase in the marginal product of labor in agriculture raises the real wage rate ($w^*$) in the modern sector and thus also the real income of the labor force in both sectors.

If Equation 28 is incorporated in the model, we obtain the fundamental differential equation (a generalization of Equation 24):

$$(29) \qquad \dot{K}_i = A_1 e^{(r+\epsilon)t} - A_2 e^{rt} - Be^{(\epsilon+\theta-\phi)t} K_i$$

where $A_1 = b(0)\,L(0)$, $A_2 = fL(0)$, and $B = b(0)m(0)/n(0)$.

For any value of the labor-saving bias in the modern sector ($\phi - \theta$) greater than or equal to $\epsilon$, the growth rate of capital stock asymptotically approaches $r + \epsilon$. If $\phi - \theta$ is less than $\epsilon$, we have an outcome similar to the case of a capital-saving bias where there is no technical change in agriculture. This case was described earlier: there is no asymptotic solution to Equation 29. Any rate of labor absorption in the modern sector requiring migration from agriculture would eventually reduce the agricultural labor force at a rate greater than could be offset by technical progress. A stable long-run growth rate of capital stock not exceeding r is attainable by permitting foreign exchange reserves to increase (or using them for other purposes than financing capital goods imports) or by forming a (growing) pool of unemployed. Neutral modern sector technical progress ($\theta = \phi$) is a special instance of this case.

Equation 29 can be integrated by elementary methods only for $\epsilon = \phi - \theta$, when the coefficient of $K_i$ in the last term is independent of t. We obtain the solution, analogous to Equation 26.

$$(30) \quad K_i = K_i(0)\,[C_1 e^{(r+\epsilon)t} - C_2 e^{rt} + (1 - C_1 + C_2)e^{-Bt}]$$

where $C_1 = A_1/[K_i(0)(B+r+\epsilon)]$ and $C_2 = A_2/[K_i(0)(B+r)]$.

The intersectoral terms of trade are influenced by rising agricultural productivity. From Equation 17 we have:

$$(31) \qquad \eta_\tau = \eta_{Y_i} - \eta_{(b-f)} - r \quad \rightarrow \quad \eta_{Y_i} - \varepsilon - r$$

Hence, whether or not the terms of trade move in favor of agriculture (as they did, in the long run, for $\varepsilon = 0$) depends on the response of the modern sector to the larger agricultural surplus. The asymptotic value of $\eta_\tau$ can be written as $(\eta_{L_i} - r) + \phi - \varepsilon$, since $\eta_{Y_i} = \eta_{L_i} + \phi$. The first term is the rate of migration into industry. If the conditions of growth in the modern sector are such that there is not a sustained requirement for migrant labor, the terms of trade will turn against agriculture if and only if $\varepsilon$ is greater than $\phi$, i.e., labor productivity in agriculture is increasing more rapidly than in industry.

When the stage of diminishing returns is reached in the traditional sector, technical change can act to offset otherwise declining average productivity. For $\gamma < 1$, average productivity is given by:

$$(32) \qquad Y_a/L_a = b(0)e^{\varepsilon t} L_a^{\gamma-1}$$

and therefore:

$$(33) \qquad \eta_{Y_a}/L_a = \varepsilon - (1 - \gamma)\eta_{L_a}$$

If there is no intersectoral migration, average productivity (and therefore the exportable surplus) rises if $\varepsilon > (1 - \gamma)r$. We shall not treat this

case in detail because it has been the main focus of analysis in closed dual economy models. The open economy in this instance is not essentially different.

## MODERN SECTOR EXPORTS

Thus far in the present discussion we have been concerned with a basic situation in which modern sector growth is entirely dependent on the size and growth of the exportable agricultural surplus. Prospects for continued growth were seen to hinge on the relative sizes of the rate of technical progress in agriculture and the elasticity of output with respect to labor--whether, in short, the sector could escape the "low level equilibrium trap." Where technical progress was insufficient, the eventual outcome as the land frontier closed was stagnation for the whole economy. We shall now examine the more realistic case in which there exists an alternative source of foreign exchange to finance capital goods imports; specifically, where part of the modern sector output can be exported.

We noted in Chapter 2 that for most underdeveloped countries a number of strong reasons militate against the development of manufactured goods exports on any significant scale. (These are discussed in more detail in Chapter 5.) This is certainly true for the countries of

chief concern here. We shall therefore assume that exports from the modern sector are restricted to the output of extractive industries (such as minerals and logs) which have only a small proportion of value added in processing.[20]

If the capital involved in extractive industries is largely foreign, the technology highly capital-intensive, and linkages with the remainder of the economy (for geographical or other reasons) relatively weak, then their role is, in effect, an exogenous injection of foreign exchange into the country's reserves, enabling a higher level of imports to be maintained. On the other hand, if the capital is domestically owned and the capital/labor ratio not too different from the average for the modern sector, we may extend our implicit assumption of homogeneity in that sector to cover also extractive industries. They would then form a subsector of the modern sector, distinguished from the remainder of the sector in that its output can be exported. It is the latter case that is mainly of interest here.

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[20] The grounds for including these industries in the modern sector were mentioned in Chapter 2. Basically they concern the role of capital and the level of labor productivity. (See also the discussion of the sectoral definitions applied to the Philippines in the following chapter.)

The most important characteristic of extractive industries for the present model is their dependence on a limited quantity of natural resources. In the case of minerals, the extent of reserves cannot be determined except with respect to present geophysical knowledge and level of technology, and known marketing possibilities. With forest reserves, of course, such ambiguity does not arise. However, ignoring this problem of definition and the equally intractable problems of homogeneity, we postulate the existence of a total quantity of exploitable reserves, R, such that, if all output is exported, $\int_0^\infty X_i(t)dt = R$, where $X_i$ is modern sector exports. Both the time span until $X_i$ finally declines below some given low level and the rough shape of the early growth path of $X_i$ are undetermined.

On purely a priori grounds, it is possible to argue for various different growth paths for $X_i$. For example, where reserves are under the control of the government or large corporations, decisions regarding investment would take into account the depletion of reserves and, hence, some policy of conservation may be adopted. On the other hand, where investment takes the form of a proliferation of competing enterprises, $X_i$ may grow very rapidly in the early stages and fall off equally rapidly

as exhaustion approaches.[21] Other factors, such as available skills, technology, and world prices, would also be expected to influence the growth path. We shall assume that, for some initial time period, $X_i$ increases at a constant rate, $\xi$, where $\xi$ is large in comparison with the population growth rate, r.

Where a country has substantial exploitable reserves and a high rate of investment can be maintained in the modern sector as a whole, it would be reasonable to expect $\xi$ to be of the same order of magnitude as $\eta_{Y_i}$. External factors could induce a shift in the composition of modern sector output without affecting growth rates in the long run. For example, a rise in export prices for extractives would raise profits and the profit rate for these industries significantly above the modern sector average. This would induce a higher level of investment, which would continue until the profit rate was reduced to its initial level.[22] (The fall in the profit rate could be caused by rising costs, or, if world demand were less than perfectly elastic, by reductions in prices.) The effect of the increase in export prices is, therefore, to raise the share of exports in industrial

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[21] The fall-off, for example, might resemble the usual exponential decay with a relatively short half-life.

[22] Profit-induced investment is assumed in the model.

output. However, the growth process induced by the price increase is only cumulative up to the point at which modern sector exports reach their new equilibrium share of output.

The introduction of modern sector exports into the formal model only requires the modification of Equation 18 to become:

$$(18') \quad M = X_a + X_i$$

where $\eta_{X_i} = \xi$. The differential equation determining the growth path of $K_i$ for the case of no technical change in agriculture (the generalization for $\varepsilon > 0$ follows immediately) is:

$$(34) \quad K_i = X_i(0)e^{\xi t} + Ae^{rt} - Be^{(\theta - \phi)t} K_i$$

where $A = (b-f)\,L(0)$ and $B = bm(0)/n(0)$, as in Equation 24. The first term is dominant under our assumption that $\xi > r$ and, hence, for neutral or labor-saving technical progress in industry, we have $\eta_{K_i} \rightarrow \xi$.

Under these conditions, traditional sector exports steadily decline in relative importance as a source of investment funds, while at the same time the modern sector can supply all or most of its labor needs without intersectoral migration. The closing of the land frontier in such a situation may have little effect on the modern sector. The productivity differential between sectors is increased. Real wages are depressed as

the characteristics of a labor-surplus economy appear, and income inequality is accentuated. The ultimate constraint on modern sector growth would probably come from the side of inadequate demand. This constraint is not taken into account in the present model, which permits the terms of trade to move indefinitely in favor of agriculture as the increasing supply of manufactured goods is exchanged for a diminishing agricultural surplus.[23]

If we have both modern sector exports and technical change in agriculture, it is easily shown that the long-run growth rate of capital stock is given by:

$$\eta_{K_i} \rightarrow \text{Max.}\ (\xi;\ r + \varepsilon)$$

provided modern sector labor requirements can be met without affecting the agricultural surplus. On the other hand, if there is neutral or capital-saving technical progress in industry, there is a sustained and ultimately substantial flow of labor into the modern sector, the growth of which is no longer wholly constrained by the exportable agricultural

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[23] It would, of course, be possible to introduce assumptions regarding investment behavior on the part of entrepreneurs or specific government policies on exchange rates which would slow or halt this movement against industry.

surplus. In the expression of Fei and Ranis, the economy's "center of gravity" is shifted from agriculture to industry.[24]

The latter case is the true "success" case in the framework of the present model. Real wages rise and there is an expanding market for modern sector output. Reduced costs and the development of greater technical and marketing skills improve the chances for exporting manufactured products. At the same time the level of import dependence may be reduced by the growth of a domestic capital goods industry. The model, as we have stated it, however, is inappropriate for tracing this outcome formally. The rigid assumptions we have made that technical progress proceeds at a constant rate in each sector become less realistic in the long term. (Technical change in agriculture, for example, would have to occur at an increasing rate if total food demands are to continue to be met from domestic production.) More fundamentally, the concomitant growth of new intersectoral and intrasectoral flows makes the structural simplifications of the model increasingly inadequate.

We noted earlier that the natural resources on which modern sector exports are based are necessarily limited, and that consequently $\eta_{X_i}$ could not indefinitely remain at its initial high level. The successful growth pattern postulated above still assumes a large degree of import

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[24] Fei and Ranis, op. cit., p. 112.

dependence and therefore requires continued export growth. Thus, if the eventual decline in extractive exports cannot be offset by rising exports of manufactured goods, a decline in modern sector growth is inevitable. The total foreign exchange generated by extractive exports represents a slack which can be used (more or less efficiently) to develop the modern sector industries necessary for sustained growth. Such industries could be directly export-oriented, indirectly export-oriented (by producing inputs for export industries or traditional agriculture), or import substituting (producing capital goods which previously had to be imported). Needless to say, the slack could also be dissipated by capital outflow, inessential consumer goods imports, or the establishment of inefficient industries.

## CONSUMER GOODS IMPORTS

The remainder of this chapter is concerned with elaborating the basic model described above to achieve greater realism. In the present section we allow for imports to comprise both capital and consumer goods, so that the process of import substitution can be examined. In the following section the role of savings in the open, dual economy will be discussed.

Let us suppose that the modern sector entrepreneurs consume some portion of their output of manufactured goods. We therefore introduce the specific investment function described earlier:

$$(23) \quad I = sP$$

where P is profits (modern sector output less payrolls), I investment in units of industrial goods, and s the propensity to invest, assumed constant.

The output of manufactured goods, $Y_i$, is now divided three ways instead of two as previously. Moreover, each part is dependent on the terms of trade--profits are not determinate unless the wage in industrial goods ($w = w^*/\tau$) is known. Thus, the procedure of determination of $\tau$, earlier discussed with reference to Diagram 8, is slightly more complex. The farmers must give up the total agricultural surplus for a smaller quantity of manufactures than before--specifically, total output, $Y_i$, less the quantity required by modern sector workers, $(w^* - f)L_i\tau$, less entrepreneurs' consumption, $(1 - s)P$ (all expressed in units of industrial goods). This exchange implicitly determines $\tau$, and gives the following explicit expression (a generalization of Equation 15):

$$(35) \quad \tau = sY_i/[Y_a - fL_a + (sw^* - f)L_i]$$

Apart from this difference in the terms of trade, the case is otherwise identical with that described previously. Our assumptions concerning the inelasticity of supply of the agricultural surplus and the absence of consumer goods imports imply that the farmers will always be prepared to give up the surplus in exchange for any proffered quantity of manufactured goods.[25] Hence, the level of real investment ($I^*$) is unaffected and the growth rate of capital stock undiminished.

This is no longer true, however, if we permit entrepreneurs to import manufactured consumer goods. We define H and $H^*$ analogously to I and $I^*$ as the level of (nonfood) consumer goods imports, in units of industrial and agricultural goods, respectively ($H = \tau H^*$). If the relative world prices of consumer and capital goods are constant, we have the two new equations:

$$(19') \quad I^* + H^* = M$$

$$(36) \quad H = uP$$

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[25] The propensity to invest, s, is a characteristic of the enterprise rather than the whole sector. Competition between entrepreneurs in the intersectoral commodity market is assumed.

where u is the propensity to import consumer goods out of profits. Equation 19', which replaces Equation 19, determines the composition of imports. Equation 36 is a behavioristic relationship similar to Equation 23. It seems reasonable that the demand for consumer goods imports will increase with the level of profits. It is not at all clear, on the other hand, how (aggregate) demand will vary with price (i.e., in the present context, the terms of trade).[26] We therefore assume that all these imports go to entrepreneurs. The coefficient u must, of course, satisfy the condition $0 \leq u < u + s \leq 1$; if $u + s = 1$, the entrepreneurs would not consume any domestically produced manufactures.

The shares of capital and consumer goods in total imports are given by $s/(s + u)$ and $u/(s + u)$, respectively. The process of import substitution (for consumer manufactures) is measured by a fall in the import content of total supplies (domestic production plus imports). We would expect such a fall to be associated with a decline in the share of consumer goods in imports.[27] For example, we may suppose that the

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[26] Demand is likely to be highly inelastic for luxury goods with no close domestic substitutes but elastic for products competing with domestic manufactures.

[27] Other factors, however, also affect the composition of imports, requiring the insertion of a ceteris paribus assumption.

share of consumer goods declines exponentially; i.e., if $x = u/(s + u)$,

$$(37) \quad x(t) = \bar{x} + [x(0) - \bar{x}]e^{-\lambda t}$$

where $\lambda$ is the rate of decline and $\bar{x}$ is the asymptotic value of x. Conceivably, $\bar{x}$ could equal zero so that import substitution proceeded until only a negligible quantity of consumer goods imports was needed. It is more likely that $\bar{x}$ would be some positive value, say, 20-30 per cent, reflecting the offsetting forces of growing domestically produced supplies and increasing demand for a wider variety of commodities.[28]

The important consequence of a declining value of x for the present study is that it enables investment to rise (for a time) more rapidly than total imports. Whereas previously we had the relation: $I^* = M$ (Equation 19), we now have:

$$(19') \quad I^* = (1 - x)M$$

If x is given by Equation 37, then the growth rate of (real) investment is:

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[28] It is not important for this argument whether or not such an asymptote actually exists. Clearly, each component of imports is better thought of as directly related to the domestic economy, and the observed relative shares in total imports as a resultant of these relationships.

$$(38) \qquad \eta_{I*} = \eta_M + \eta_{(1-x)} = \eta_M + \lambda/(ce^{\lambda t} - 1)$$

where $c = (1 - \bar{x})/[x(0) - \bar{x}]$, a constant greater than 1. Depending on the values of c and $\lambda$, the growth rate of investment may initially be well in excess of $\eta_M$. In the long run, however, $\eta_{(1-x)} \to 0$ ; further increases in investment and, hence, in capital stock are then wholly dependent on total import capacity.

## SAVINGS AND INVESTMENT

In the discussion thus far we have retained the assumption that imports equal exports. While in the long run this is clearly reasonable, its introduction as an accounting equation obscures several interesting points concerning the role of savings in the open, dual economy. We shall relax it here, writing:

$$(15'') \qquad M = \Sigma X - F$$

where F is the trade balance.

For the model extended in this way, it is no longer true that savings <u>ex post</u> are necessarily equal to investment <u>ex post</u>. Savings in a given period equal investment plus the addition to (or less the decline in) foreign exchange reserves; an increase in savings is a necessary but not a

sufficient condition for an increase in investment. We may, therefore, distinguish two separate constraints on the actual growth of capital stock: the import constraint, operative when the growth path of $K_i$ is determined by import capacity, and the investment constraint, where the determinant is ex ante investment decisions on the part of entrepreneurs.[29] Clearly, a decision to invest more can only be implemented if foreign exchange reserves can be drawn on. If they are already at a minimum, the effect will be only to raise the price of capital goods (i.e., move the terms of trade in favor of agriculture), leaving the volume of investment unchanged.

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[29] The distinction between these two constraints on growth is made in the work of Chenery, who contrasts "trade-limited growth" with "investment-limited growth." The separation is clearly appropriate for a model stated in a linear programming form. (See, for example, Hollis B. Chenery and Alan M. Strout, "Foreign Assistance and Economic Development," American Economic Review Vol. LVI, No. 4 (September 1966). McKinnon uses the same concepts in a Harrod-Domar type model, which resembles in some respects the modern sector of the present model. (Ronald I. McKinnon, "Foreign Exchange Constraints in Economic Development and Efficient Aid Allocation," Economic Journal [June 1964].) They are implicit in the study of Fei and Paauw (John C. H. Fei and Douglas S. Paauw, "Foreign Assistance and Self-Help: A Reappraisal of Development Finance," Review of Economics and Statistics, Vol. XLVII [August 1965).

It is often argued that, in the early stages of development, savings from the agricultural sector are an important part of the resources used for industrial growth. In the Fei-Ranis model, for example, the "dualistic landlord," an abstraction from the Japanese experience, serves as a financial intermediary in channeling agricultural savings into industrial capital formation.[30] In a closed economy model, such a transfer of savings can always raise investment provided the usual assumption is made that industrial goods can be used indifferently as consumer goods or capital goods. In the present open economy model, however, realized investment will rise only if the economy is not already pressing against the import constraint. The same is true of involuntary or forced savings from the traditional sector obtained, for example, by holding down the exchange rate.

The analysis of the role of savings becomes more interesting when an independent savings function is introduced. In the framework of the model, savings may take the form of foregone consumption of food, domestic manufactures, or imported consumer goods. A reduction in food

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[30]Fei and Ranis, op. cit., pp. 164-171.

consumption is the least likely; if it occurred, the result would be an increase in the exportable agricultural surplus, making possible a similar increase in investment. Savings which take the form of a reduction in demand for imported consumer goods would have the same effect of enabling realized investment to rise. If, however, the attempt to save takes the form--as it well might--of a reduction in demand for domestic manufactures, the consequences are quite different. Such an attempt to save would cause domestic investment to fall and leave realized savings unchanged.

This last result is intuitively plausible. In the Keynesian framework, reduction in demand for domestic manufactures would cause an accumulation of stocks and a slowing down of investment. In this sense, the present model is in the classical tradition because prices are flexible and therefore stocks will not accumulate. When the demand for domestic manufactures falls, the price of these goods also falls. The wage bill, however, is constant so profits are reduced, leading to a fall in investment and an increase in foreign reserves. As the fall in investment is equal to the increase in reserves, realized savings remain unchanged. In the physical units in which we have expressed the variables, the farmers can be regarded as saving by retaining possession of part

of their surplus. The entrepreneurs cannot reduce real wages, so the reduction in the total agricultural surplus appears as a diminished capacity to import.

## SUMMARY: THE PHILIPPINE CASE

The basic model presented in the early part of this chapter included most of what we considered the major variables and functional relationships of the open, dual economy, but, for ease of exposition, reduced to their simplest possible form. Out of the almost unlimited possibilities for elaboration of that initial structure, we selected a few that seemed of particular relevance for a study of Southeast Asian economies and, specifically, the Philippines. The summary given here will review the form of the model considered appropriate for an analysis of the Philippine economy, as a preliminary to the detailed empirical study in the following chapters.

In essence, the open, dual economy model put forward in this chapter is extremely simple. In the Harrod-Domar tradition, it assumes growth (in the modern sector) to be a result of increases in capital stock. The economy cannot produce its own capital goods but must rely on imports, which, it is supposed, are entirely financed by exports. Two distinct sources of exports are postulated: the traditional sector surplus

over and above total domestic food consumption, and a narrow range of products from modern sector extractive industries which are either raw materials or have undergone only minimal processing. The exported surplus from the traditional sector depends on the original output, a function chiefly of land and labor inputs, and on the size of the total labor force in both sectors which must be fed. Extractive exports require capital and labor as the major factors, but their growth is largely autonomous. Both types of export are, therefore, dependent to a considerable extent on physical inputs, respectively, land and forest or mineral resources, which exist in ultimately limited quantities.

In the early stages of growth, while there is still ample good quality land for agricultural expansion, labor is drawn into industry at the expense of reducing potential agricultural output. Since the traditional sector operates, in effect, as the supplier of both food and (indirectly) capital goods for the modern sector, a balance in the sectoral allocation of the labor force must be reached to enable growth with full employment to be sustained. As the land surplus is exhausted, the land/labor ratio in agriculture falls and the potential loss in agricultural output caused by a labor transfer into industry is smaller. The economy moves from a land surplus to a labor surplus. The absorption of labor by the modern sector, however, depends not only on the growth of capital

stock but also on the type of bias in technical changes in that sector. A strong labor-saving bias may reduce labor requirements to a level low enough to be met by the natural increase of the existing sectoral labor force with no migration from agriculture.

Modern sector output consists of manufactured consumer goods, which are partly consumed by the entrepreneurs and modern sector workers and partly offered in exchange for the agricultural surplus. The difficulties are such that it is unlikely that manufactured exports can be developed on a significant scale. Hence, if modern sector productivity outstrips that of the traditional sector, the terms of trade between the two sectors will move against industry, steadily raising the quantity of manufactured goods the farmers receive for their surplus. (Alternatively, the traditional sector could be "squeezed" by holding the exchange rate constant.)

During conditions of land surplus, modern sector growth can proceed most rapidly if it is accompanied by technical change with a labor-saving bias. A relatively smaller share of labor in industry permits a larger agricultural surplus and, therefore, a more rapid increase in capital stock. As the labor surplus develops, it becomes more efficient for the modern sector to substitute labor for capital--since the latter becomes scarcer as increased food consumption and diminishing returns to

labor in agriculture together erode the exportable surplus. Thus, innovations with a capital-saving bias are preferable. (It is possible, however, that modern sector exports could adequately finance necessary imports by this stage.) Despite the desirability of certain forms of technical change, we hold the view that the technical change which actually occurs is largely exogenous to the economy. Embodied changes are usually innovations originating in advanced technologies and frequently show a labor-saving bias. Moreover, even where the industrial entrepreneurs have the scope for determining the direction of technical progress, there is little reason to expect their decisions to be in accord with the optimum development strategy for the whole economy.

Continued reliance on imported capital goods means that, in the long run, prospects for growth are contingent on technical progress in both sectors. For some fortunate countries, mineral resources are sufficient to sustain a growing modern sector over long periods. Even here, however, a stagnant traditional sector implies rising inequality of income distribution and a perpetuation of the dualistic economic structure --the breakdown of which must be considered a concomitant of true development. But for most countries, the export of extractive industry products rapidly depletes available reserves. The foreign exchange generated by these exports can be regarded in some respects as similar

to a capital inflow which can postpone for a time the balance of payments difficulties that would otherwise arise. As the reserves are used up, the further growth of total exports depends on whether technical progress in the traditional sector can offset the diminishing returns to labor as land expansion slows.

The rigid link postulated in the model between modern sector capital formation and total exports is eased by several factors. Clearly, some part of total capital formation is domestically produced (construction, of course, is the major item), but we suppose this to be complementary to imported capital goods. The existence of an effectively irreducible minimum import content of investment is assumed.

The import of manufactured consumer goods provides another break in the link between exports and investment. When the modern sector is small, such imports may be the dominant component. In the process of import substitution, however, the proportion of consumer goods in the total can be greatly reduced. We may regard this process as the taking up of a slack in the capacity to import capital goods; the growth rate of exports is an asymptote that the growth rate of investment must eventually approach.

A third source of flexibility was discussed when we considered the operation of the investment constraint on growth. Here the propensity

to invest by the industrial entrepreneurs was such that capital goods imports were on a lower level than permitted by the availability of foreign exchange. Foreign reserves, therefore, increased (or were expended on consumer goods imports). A similar result was obtained if the farmers chose to retain a part of their total surplus instead of converting it all into industrial goods.

An important conclusion which we can draw from this analysis is that the past growth performance of the economy cannot be regarded as a reliable indicator of future growth prospects. To the extent that growth has resulted from the exploitation of a limited stock of natural resources or, in agriculture, from simple expansion of cultivated area, the eventual exhaustion of these inputs will constrict future growth. A vigorous policy of import substitution may for a short time disguise the import constraint of growth by inducing real investment to rise more rapidly than total imports but, unless the economy can progressively lower its dependence on imported capital goods, this constraint will ultimately reassert itself.

# CHAPTER 4

## TRADE AND GROWTH IN THE PHILIPPINES

In Chapter 3 a simple aggregate model was described which, we believe, captures some of the essential interrelationships of Southeast Asian-type economies. The final paragraphs suggested the variants of the general model which seemed most applicable to the Philippine case. In the present chapter we shall examine in detail the postwar experience of the Philippines in the framework provided by the model and endeavor to draw out the implications of the observed growth patterns by reference to the development criteria discussed earlier.

We do not aim to "test" the model in any formal sense--the word is inappropriate at this level of aggregation--but rather to structure Philippine economic data into the categories used and examine both the validity and the relevance of this structuring. The role of foreign trade in Philippine growth, the relating of the growth and changing composition of trade over time to the associated changes, whether causative or resultant, in the domestic economy, will be touched on at numerous points. This analysis is taken up on a more disaggregated level in the following chapter. We discuss first the major problems concerned with applying

the particular categories of the model in a case study. The basic series necessary for the analysis are then presented, and we attempt to justify the main assumptions adopted in Chapter 3 with reference to these data. Finally, we derive approximate estimates of the parameters of the model--which, insofar as the model approaches reality, can be used to summarize the observed growth patterns.

The period to be considered will be the years 1950-1966. The former year is the earliest to show the economy largely free of the atypical effects of postwar reconstruction (although it could be argued that an even later year should have been chosen); the latter is the last year for which data are available for most of the statistical series at the time of writing. It can be assumed that, in general, the data are more reliable over the last decade of this period--indeed, some important series are not available on an annual basis prior to 1956. Even a span of 17 years, however, is barely sufficient to evince conclusive trends. Hence, we shall often have occasion to link the postwar data to longer series, sometimes dating back to the first census of 1902. As with other countries in the region, the period of the war and postwar recovery can be usefully viewed as a brief interruption (albeit possibly an accelerant) to a long-term process of change. It will be one object of the present

analysis to attempt to separate these underlying processes from the short-term policy effects with which they are often confounded.

Inevitably a certain amount of space must be taken up reviewing the quality of the data. In a number of areas Philippine statistics are superior to those of many underdeveloped countries, particularly in allowing for independent checks on series and estimates of errors. However, many limitations remain which preclude their uncritical use. The major critical study of Philippine economic statistics is that of Emanuel Levy, IBRD Statistical Advisor in Manila, 1964-65.[1] This important work evaluates all the main official series, with particular emphasis given to discussing the National Economic Council's national accounts, and we shall have frequent recourse to it.

For some purposes a specific revision of data for the present study has proved necessary, but, where possible, we have preferred to make use of the critical work of other authors more familiar with particular fields. The work of Hooley on savings and long-term growth indices, of Hooley and Sicat on investment, and of Ruprecht on labor

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[1] Emanuel Levy, Review of Economic Statistics in the Philippines Interim Report and Interim Report-B (Manila: World Bank Resident Mission, 1964-65), mimeographed.

force statistics are instances of elaborate reworking and analyses of data which are utilized below. Data on aggregate production and intersectoral flows of goods are chiefly taken from the series assembled by Douglas S. Paauw for the National Planning Association (NPA) Project in the Philippines, on the basis of detailed revisions of official series.[2]

In the final analysis, however, even with the most reliable data, our expectations of fitting a simple dynamic model must be very modest. The insights and overall grasp of economic interrelationships attainable in such a model are, in a large part, due to its simplicity and are gained at the cost of obscuring a host of subtleties of varying degrees of significance. In attempting to observe its operation in a practical situation, we must be content with a broadly impressionistic picture of the economy.

## CATEGORIZATION PROBLEMS

In endeavoring to give an abstract model some empirical flesh, we immediately encounter a number of basic classification problems. The most important of these, the main sectoral divisions and the breakdown

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[2] Douglas S. Paauw, "The Philippines: Estimates of Flows in the Open, Dualistic Economy Framework, 1949-1965," (Washington: National Planning Association, Center for Development Planning, February 1968), mimeographed.

of imports and exports, will be discussed here. Other similar problems will be considered as they arise in the later analysis.

## Sectoral Divisions

The sectoral division in a dualistic model into a traditional and a modern sector can be made in various ways, none entirely satisfactory. Usually the traditional production sector is defined to coincide with the ISIC industry group 0 (agriculture, livestock, hunting, forestry, and fishing) so that almost no adjustment to existing data is required. Most of the conceptual problems concern the treatment of processing industries whose inputs are agricultural goods. If the value added in such industries is a minor part of total output (e.g., as with copra production), there is a good argument for including them with agricultural production. In other cases, for example, coconut oil manufacture, it might be more reasonable to allocate industries to the modern sector. In the Philippine case, sugar represents a difficult problem. Processing is a highly capital-intensive operation, but one which is nevertheless inseparably linked, geographically and temporally, to cane growing. In the National Planning Association classification framework, which we follow with only slight modifications, the processing, storage, transportation, and marketing services for any product are considered as inputs from

industry (i.e., nonagriculture), while in cases where goods are worked on by both sectors, they are assigned to the sector contributing the greater share of value, excluding storage, transportation, and marketing services.[3] As Paauw and Tryon comment, "classification of the origin of goods for final demand according to [this method] will reflect growing intersectoral flows between agriculture and industry if industrialization, in fact, requires increasing supplies of domestic raw materials. The alternative system of classification, where goods receiving any industrial processing at all would be shown to flow into the industrial sector and, hence, reckoned as industrial goods, greatly obscures this process."[4]

An instance of the serious overstatement of intersectoral flows caused by the latter scheme is the input-output table prepared by the Bureau of the Census and Statistics and the University of the Philippines.[5]

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[3]See Douglas S. Paauw and Joseph L. Tryon, "Agriculture-Industry Interrelationships in an Open Dualistic Economy: The Philippines, 1949-1964," in Richard W. Hooley and Randolph Barker (eds.), Growth of Output in the Philippines (Manila: University of the Philippines and IRRI, 1967), pp. 7-8.

[4]Ibid., pp. 8-9.

[5]Inter-industry Relations Study of the Philippine Economy--Partial Report (Manila: University of the Philippines, School of Economics, and Bureau of the Census and Statistics, 1968).

By valuing agricultural sector product at producers' prices, it excludes the contribution of trade and transport services. Again, all food processing industries (such as the important copra industry, to which coconuts contribute some 80 per cent of final production value) are assigned to manufacturing. As a result, the apparent share of agricultural value added in GNP is reduced by more than one half (see Table 4). While clearly there is some point in this form of disaggregation for input-output analysis, it is unacceptable in a two-sector scheme.

The only important departure we have made from the NPA sectoral division is to exclude forestry and logging from agriculture. It has been argued earlier that the productive process in logging bears an important resemblance to mining, particularly in the role of capital. Thus, we pool these two industries to form the subsector "extractive industries" of the modern sector.

Various commercial crops could also be classed with extractives with some justification, especially when grown on large estates not competing for land with smallholders. Estate rubber in Malaya and most of the estate crops (rubber, oil palm, tobacco, etc.) in prewar Sumatra should probably be excluded from the traditional sector if a similar analysis were applied to Malaysia or Indonesia. In the case of

TABLE 4

Gross Value Added in Agriculture and Nonagriculture as Percentage of Gross National Product, Philippines, 1961

| | | Agriculture | Nonagriculture |
|---|---|---|---|
| 1. | NPA Framework | 31.6 | 68.4 |
| 2. | NEC National Accounts | 29.5 | 70.5 |
| 3. | UP/BCS Input-Output Table | 12.1 | 87.9 |

Source: 1. Paauw, "The Philippines: Estimates of Flows in the Open Dualistic Economy Framework, 1949-1965."

2. Statistical Reporter Vol. VIII, No. 2 (April/June 1964).

3. Bureau of the Census and Statistics and the University of the Philippines, Inter-industry Relations Study of the Philippine Economy.

the Philippines, however, we have, for convenience, left the few large-scale plantations (coconut, pineapple, etc.) in the traditional sector.[6]

The problems of allocation of agricultural, mining, and manufacturing industries are more easily resolved than those relating to the later ISIC divisions, particularly services. In any dual model, unless one sector is merely defined residually (e.g., nonagriculture), there can be no satisfactory solution. Construction, transportation, communication, utilities, and commerce (together constituting about 23 per cent of net domestic product in the NEC estimates) would seem to have more claim to be regarded as "modern" than "traditional." Services, making up another 23 per cent (of which government services exceed one-third and domestic services, one-fifth) will arbitrarily be assigned to the modern sector also. However, with all these groups we shall retain sufficient flexibility to exclude them from consideration in instances where there is a likelihood they would obscure important relationships.

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[6]Technically a decision on sectoral allocation should depend not only on whether the land has a high opportunity cost but also whether other forms of (monetized) capital enter as significant factors of production.

## Exports

Once the broad line between sectors has been drawn, there is no great difficulty in classification of exports. In the detailed NPA framework, exports are allocated on the basis of which sector contributes the greater part of export value. Agricultural exports are those with ex-farm value exceeding 50 per cent of the final export value.[7] For our traditional exports we assume a similar though less rigorous definition, an important factor being the accessibility of the data in a form suitable for aggregation. Thus, we assign all food exports to the traditional sector despite the high degree of processing value added in a small part of this large and heterogeneous group. Other traditional sector exports are taken as the following commodity groups: tobacco; oilseeds, oilnuts, and kernels; crude textile fibers; animal and vegetable oils and fats; and miscellaneous crude animal and vegetable products. This allocation may be criticized as overly diminishing manufacturing exports, but it is certainly preferable to classifying all exports of processed agricultural goods in the modern sector. Extractive industry exports apart from minerals and logs, are assumed also to include lumber,

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[7]Paauw, op. cit., p. 48.

though not plywood and veneer. Finally, the few remaining modern sector exports are three groups: chemicals, manufactured goods (including plywood and veneer), and beverages. Total exports are taken net of re-exports, while service exports and exports of oil refinery products are excluded from consideration.

Imports

The third major problem of classification raised by the model is the treatment of imports. One of the more dubious simplifications the model makes is to reduce imports to only two categories, capital goods and consumer goods. Intermediate goods must be allocated to one or the other of these groups. To achieve this end we have used the ECAFE division of intermediate goods into "materials chiefly for capital goods" and "materials chiefly for consumer goods."[8] The breakdown is quite elaborate, allocation being based on the lowest level groups in the revised Standard International Trade Classification (i.e., distinguished by the fourth digit of the SITC code).

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[8]United Nations Economic Commission for Asia and the Far East, "Reclassification of Imports and Exports from the SITC" (Bangkok, March 1967), mimeographed.

Although this obscuring of the usual category of intermediate goods is obviously open to criticism, so also is the common practice of treating intermediate goods as a single homogeneous group. In defense of the former procedure (apart from its necessity in keeping the model simple), it may be argued that it avoids the exaggerated apparent reduction of consumer goods imports caused by trivial backward integration into final assembly of these products. In the conventional three-way classification, the imported inputs to this assembling process are regarded as intermediate goods, however small the real value added by assembly. (Another relevant consideration is the tendency, with the existence of multiple exchange rates or import licensing, to misclassify consumer goods as intermediate goods in customs declarations.) For many analytical purposes, the distinction between, for example, unwrought and worked base metals (the first intermediate goods, the second capital) may be less important than that between unwrought base metals and textile fabrics (most of the latter being also classed as intermediate goods).

## MAJOR STATISTICAL SERIES, 1950-1966

In this section the relevant data on the postwar Philippine economy are assembled, in a form appropriate for later analysis in the framework of the open dual economy model. Discussion of the tables is here largely restricted to commenting on sources, possible errors, and methods of adjustment. Where appropriate and feasible, we prefer to use physical units (e.g., for cultivated area, labor, and some output series); otherwise, the data are given in constant 1955 prices.

### Gross National Product

The NPA national accounts series, covering the years 1949-65, are basically revisions of the official Philippine accounts prepared by the National Economic Council (NEC).[9] They retain the basic NEC estimates of value added while incorporating independent estimates of certain other

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[9]The NEC series are published in the various April/June issues of the Statistical Reporter. A revised series for 1962-66, not comparable with earlier years, was published in the 1967 issue. Preliminary figures extending these revisions back to 1949 for some of the major aggregates are also available (National Economic Council, "Gross Domestic Product by Industrial Origin" [Manila, 1967], mimeographed). A third, independent set of national accounts was prepared by J. P. Estanislao for the Program Implementation Agency. These differ markedly in many respects from both the NPA and NEC series. They remain unpublished.

components.[10] The only adjustment necessary to fit the NPA production series into the framework of the present model is to transfer the forestry and logging component from the agricultural sector to industry, forming the aggregate modern sector.

Table 5 presents the resulting sectoral division of gross national product in constant 1955 prices. For 1956-66, the forestry and logging component was separated from agriculture using factors derived from the NEC accounts. Prior to 1956, estimates of forestry and logging value added were obtained by extrapolation, using an index of physical output. The figures for 1966 are based on the revised NEC data, which closely resemble the NPA series over the years for which they overlap (1962-65).

Foreign Trade

We discussed earlier the way in which the import and export data could be broken down into the broad categories used in the model. A further point of definition arises here. In Chapter 3, the (net) exportable surplus was defined as total traditional sector output less the food consumption of the whole population ($Y_a$ - fL). This was done in order to

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[10]For a full discussion of the methodology used in deriving these series, see Paauw, op. cit., pp. 68 et seq.

TABLE 5

Sectoral Distribution of Gross National Product, Philippines, 1950-1966
(million pesos in constant 1955 prices)

| Year | Traditional Sector[a] | | Modern Sector | | Total | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| 1950 | 2,127 | 34.0 | 4,137 | 66.0 | 6,264 | 100.0 |
| 1951 | 2,373 | 36.2 | 4,175 | 63.8 | 6,548 | 100.0 |
| 1952 | 2,595 | 36.8 | 4,448 | 63.2 | 7,043 | 100.0 |
| 1953 | 2,885 | 37.8 | 4,736 | 62.2 | 7,621 | 100.0 |
| 1954 | 3,052 | 37.3 | 5,122 | 62.7 | 8,174 | 100.0 |
| 1955 | 3,165 | 36.2 | 5,574 | 63.8 | 8,739 | 100.0 |
| 1956 | 3,131 | 33.0 | 6,355 | 67.0 | 9,486 | 100.0 |
| 1957 | 3,205 | 32.7 | 6,601 | 67.3 | 9,806 | 100.0 |
| 1958 | 3,392 | 33.8 | 6,636 | 66.2 | 10,028 | 100.0 |
| 1959 | 3,027 | 28.5 | 7,580 | 71.5 | 10,607 | 100.0 |
| 1960 | 2,938 | 27.0 | 7,956 | 73.0 | 10,894 | 100.0 |
| 1961 | 3,132 | 27.0 | 8,514 | 73.0 | 11,646 | 100.0 |
| 1962 | 3,082 | 25.7 | 8,918 | 74.3 | 12,000 | 100.0 |
| 1963 | 3,092 | 24.4 | 9,559 | 75.6 | 12,651 | 100.0 |
| 1964 | 3,259 | 25.1 | 9,729 | 74.9 | 12,988 | 100.0 |
| 1965 | 3,470 | 25.1 | 10,350 | 74.9 | 13,820 | 100.0 |
| 1966 | 3,634 | 25.2 | 10,767 | 74.8 | 14,401 | 100.0 |

[a]Forestry and logging included in modern sector.

Source: Based on data in Paauw, op. cit. (See text for details of adjustments.)

take account of the common alternative open to farmers of growing either food crops or export crops (where these differ). Thus, countries which have preferred to specialize in export crops and import a certain proportion of their basic food requirements (e.g., Malaya) can be compared with those, such as Burma and Thailand, which are self-sufficient in food. As a rough means of measuring "net" traditional exports, we have subtracted from the total f.o.b. value of traditional exports the f.o.b. value for food imports. Correspondingly, the import data must also exclude these food imports. One justification for this procedure is that food imports have been largely composed of cereals--mainly, wheat and rice. However, errors are introduced by the tendency for cereal imports to be concentrated in certain years (especially election years), to be stored for unknown periods, and even to be unrecorded in official import statistics.[11] It could be argued that tobacco imports should also be subtracted from traditional exports as being competitive with domestic production, but here the import data are so inaccurate that the errors introduced would outweigh the theoretical advantages.

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[11] On the latter point, see the report to the Director, Office of Statistical Coordination and Standards, National Economic Council, dated April 14, 1965, on the subject, "Philippine Milled Rice Imports, 1956 to 1963."

Finally, we should examine the accuracy of the official Philippine statistics. A study of the foreign trade statistics of the major trading partners revealed a considerable degree of understatement on the Philippine side (assuming, as seems reasonable, that the former sources are accurate).[12] Moreover, the errors are erratically distributed: exports are seriously under-recorded in certain years during the period of exchange controls (prior to 1962) and imports similarly after the 1960-62 decontrol measures (see Table 6). For this reason the officially recorded exports and imports in U. S. dollars were adjusted by the factors given in Table 6. The series thus obtained were deflated by the respective export and import price indices computed by the Central Bank and converted to pesos at the constant rate of ₱3.00 to U.S.$1.00.[13] The resulting constant price peso estimates of exports and imports by major category are given in Tables 7 and 8.

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[12]See George L. Hicks, "Philippine Foreign Trade, 1950-1965: Basic Data and Major Characteristics" and "Philippine Foreign Trade Statistics: Supplementary Data and Interpretations, 1954-1966" (Washington: National Planning Association, Center for Development Planning, 1966 and 1967), mimeographed.

[13]This is the estimated equilibrium rate for 1955 and corresponds closely to the average Hong Kong free-market rate for that year. See Paauw, op. cit., p. 33.

TABLE 6

Official Philippine Exports and Imports as Percentages of Totals Estimated from Statistics of Major Trading Partners (computed from f.o.b. values in U. S. dollars)

| Year | Exports | Imports | Year | Exports | Imports |
|---|---|---|---|---|---|
| 1950 | 102.0 | n.a. | 1959 | 100.1 | 91.4 |
| 1951 | 97.2 | n.a. | 1960 | 93.6 | 93.8 |
| 1952 | 98.1 | n.a. | 1961 | 86.3 | 89.1 |
| 1953 | 98.3 | n.a. | 1962 | 90.2 | 95.3 |
| 1954 | 94.4 | 99.1 | 1963 | 101.7 | 82.9 |
| 1955 | 92.5 | 101.7 | 1964 | 98.7 | 90.8 |
| 1956 | 91.3 | 92.9 | 1965 | 99.0 | 87.3 |
| 1957 | 85.2 | 92.3 | 1966 | 98.3 | 92.3 |
| 1958 | 102.8 | 98.2 | | | |

Source: George L. Hicks, "Philippine Foreign Trade, 1950-1965: Basic Data and Major Characteristics" and "Philippine Foreign Trade Statistics: Supplementary Data and Interpretations, 1954-1966" (Washington: National Planning Association, Center for Development Planning, 1967), mimeographed.

The breakdown of exports between traditional and modern sectors reveals very clearly their different growth dynamics. The data from Table 7 are plotted on a semilogarithmic scale in Diagram 11. Traditional exports showed only slight growth, averaging between 2 and 3 per cent per year. Extractive industry exports, on the other hand, increased by more than 15 per cent annually on average, and even after 1956, when their growth appreciably slowed, a rate of almost 10 per cent was maintained. Manufactured goods exports (particularly plywood and veneer) also showed rapid growth, albeit from a very small base.

The main trend in imports seen in Table 8 is a substantial rise in the share of capital goods and related intermediate goods. The average annual growth rates of the three series (taking 3-year averages for the end points) are 8.1 per cent for capital goods, 1.0 per cent for consumer goods, and 4.5 per cent for total nonfood imports.

The balance of (merchandise) trade can be seen from these series. If c.i.f. imports are assumed to be 10 per cent higher than f.o.b. (the average differential observed in the Philippine case[14]), it is clear that the

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[14]This is the fairly stable difference between the c.i.f. Philippine import data recorded in the IMF, International Financial Statistics and the f.o.b. figures published by the Central Bank. See George L. Hicks, "Philippine Foreign Trade, 1950-65," p. 28.

TABLE 7

Philippine Exports by Major Category, 1950-1966
(f.o.b. values in million pesos, constant 1955 prices)

| Year | Traditional Sector Products | | | Modern Sector | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Net[a] | | Extractive Products | | Manufactured Products | | Total[a] | |
| | Value | Value | % | Value | % | Value | % | Value | % |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1950 | 730 | 589 | 88.5 | 58 | 8.7 | 19 | 2.8 | 666 | 100.0 |
| 1951 | 897 | 664 | 83.4 | 108 | 13.6 | 24 | 3.0 | 796 | 100.0 |
| 1952 | 856 | 627 | 76.4 | 164 | 20.0 | 29 | 3.6 | 820 | 100.0 |
| 1953 | 794 | 606 | 75.6 | 162 | 20.2 | 34 | 4.2 | 802 | 100.0 |
| 1954 | 912 | 692 | 74.9 | 207 | 22.5 | 24 | 2.6 | 923 | 100.0 |
| 1955 | 993 | 691 | 70.0 | 266 | 26.9 | 31 | 3.1 | 988 | 100.0 |
| 1956 | 1,091 | 810 | 68.3 | 343 | 28.9 | 32 | 2.7 | 1,185 | 100.0 |
| 1957 | 1,093 | 752 | 66.6 | 342 | 30.3 | 35 | 3.1 | 1,129 | 100.0 |
| 1958 | 965 | 629 | 62.6 | 334 | 33.3 | 41 | 4.1 | 1,004 | 100.0 |
| 1959 | 953 | 760 | 64.8 | 350 | 29.9 | 63 | 5.3 | 1,173 | 100.0 |
| 1960 | 1,085 | 846 | 63.6 | 430 | 32.3 | 54 | 4.1 | 1,330 | 100.0 |
| 1961 | 1,082 | 757 | 57.3 | 497 | 37.5 | 69 | 5.2 | 1,323 | 100.0 |
| 1962 | 1,128 | 869 | 59.0 | 516 | 35.0 | 88 | 6.0 | 1,473 | 100.0 |
| 1963 | 1,233 | 894 | 56.9 | 579 | 36.8 | 99 | 6.3 | 1,572 | 100.0 |
| 1964 | 1,332 | 967 | 58.1 | 561 | 33.8 | 135 | 8.1 | 1,663 | 100.0 |
| 1965 | 1,286 | 813 | 51.2 | 642 | 40.5 | 131 | 8.3 | 1,586 | 100.0 |
| 1966 | 1,222 | 871 | 46.0 | 868 | 45.9 | 154 | 8.1 | 1,893 | 100.0 |

[a] Net of food imports (f.o.b.).

Source: Aggregated from data in Central Bank Statistical Bulletin, March 1967, using correction factors from Table 3. Deflated by Central Bank export price index and converted to pesos at ₱3.00 = U.S. $1.00.

TABLE 8

Philippine Imports by Major Category, 1950-1966[a]
(f.o.b. values in million pesos at constant 1955 prices)

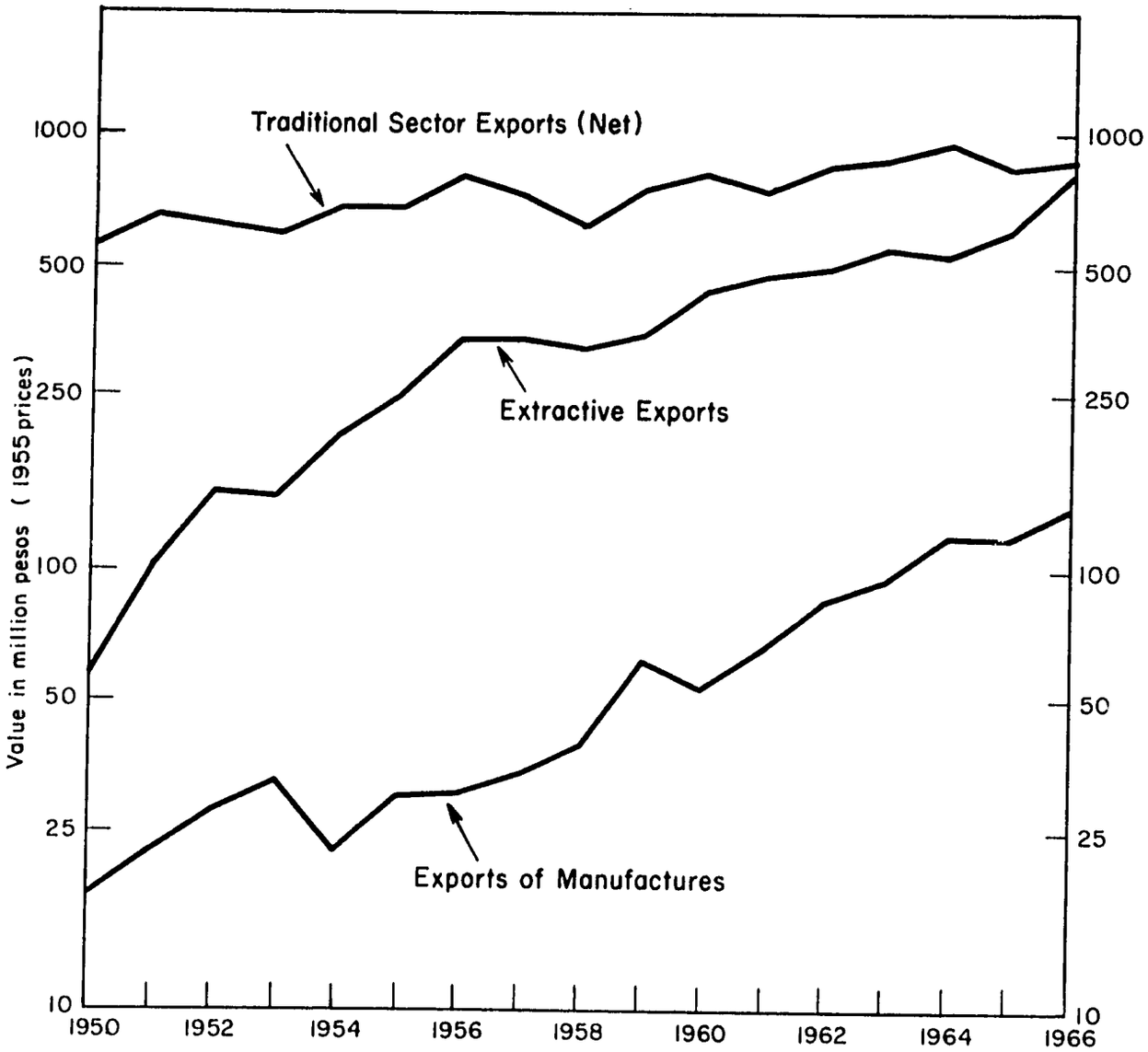
| Year | Capital goods and materials chiefly for capital goods | | Consumer goods and materials chiefly for consumer goods | | Total Non-food Imports | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| 1950 | n.a. | n.a. | n.a. | n.a. | 916 | 100.0 |
| 1951 | 373 | 36.4 | 652 | 63.6 | 1,025 | 100.0 |
| 1952 | 361 | 38.2 | 583 | 61.8 | 944 | 100.0 |
| 1953 | 435 | 39.8 | 657 | 60.2 | 1,092 | 100.0 |
| 1954 | 511 | 41.8 | 711 | 58.2 | 1,222 | 100.0 |
| 1955 | 586 | 44.6 | 728 | 55.4 | 1,314 | 100.0 |
| 1956 | 710 | 53.3 | 623 | 46.7 | 1,333 | 100.0 |
| 1957 | 847 | 53.9 | 725 | 46.1 | 1,572 | 100.0 |
| 1958 | 660 | 52.1 | 606 | 47.9 | 1,266 | 100.0 |
| 1959 | 724 | 54.5 | 605 | 45.5 | 1,329 | 100.0 |
| 1960 | 887 | 63.3 | 514 | 36.7 | 1,401 | 100.0 |
| 1961 | 920 | 60.8 | 593 | 39.2 | 1,513 | 100.0 |
| 1962 | 762 | 56.0 | 599 | 44.0 | 1,361 | 100.0 |
| 1963 | 881 | 58.3 | 630 | 41.7 | 1,511 | 100.0 |
| 1964 | 1,051 | 60.1 | 698 | 39.9 | 1,749 | 100.0 |
| 1965 | 1,082 | 61.1 | 689 | 38.9 | 1,771 | 100.0 |
| 1966 | 1,092 | 59.0 | 759 | 41.0 | 1,851 | 100.0 |

[a]Excluding food imports.

Source: Basic data from ECAFE, Economic Bulletin for Asia and the Far East, various issues. Deflated by import price index from Central Bank Statistical Bulletin (March 1967, p. 162) and converted to pesos at U.S.$1 = ₱3.00.

DIAGRAM 11

Philippine Exports by Major Category, 1950-1966



early unfavorable balance was steadily narrowed in the 1950s and approximate balance has been maintained in the 1960s. The early 1950s saw substantial capital inflows from the United States. Trade in invisibles has risen markedly in recent years, but total receipts and disbursements continue to show quite close parity.

The external terms of trade have slowly deteriorated over the period 1950-66. If the early years are ignored (export prices were abnormally high during the Korean War), the Central Bank's index of terms of trade declined from 100 in 1955 to 89 in 1966. Over these years both export and import prices increased, but the latter at more than twice the rate of the former.

## The Labor Force

The problems of estimating the labor force engaged in the two sectors are as much conceptual as practical. As we do not wish to become embroiled in discussion of underemployment in agriculture, we have simply used estimates of the employed labor force, regardless of the number of hours actually worked. The major source is the Philippine Statistical Survey of Households (hereafter referred to as the PSSH), the

data all being taken from the October surveys.[15] This series is available from 1956 to 1966 with the exception of 1964. For the missing year, an estimate was interpolated based on the May survey total of the same year and the average ratio of the October to May totals in other years. Prior to 1956 the series was extrapolated using as benchmarks the recorded labor forces in the 1948 and 1960 censuses, assuming a constant annual increase in the rate of growth of .025 percentage points.[16] The 1948-60 series thus obtained was spliced on to the PSSH data by adjusting it by the constant factor giving the best fit over the 1956-60 overlap. A precisely similar method was used to obtain the employment series for nonagriculture. Lastly, it was assumed that the small proportion of the labor force engaged in forestry grew at a uniform rate over the period, the absolute numbers involved being determined by the 1948 and 1961 census figures. These numbers were then subtracted from the agricultural labor force and added to nonagriculture. Table 9 shows the sectoral distribution of labor force thus derived.

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[15] The October series is used in preference to the May series or to some average of the two because it is not inflated by the large number of school children recorded in the labor force in May. See Rosario A. Henares, "Some Characteristics of the Economically Active Population," Statistical Reporter, Vol. I, No. 4 (October 1957), p. 7.

[16] This is Ruprecht's assumption for growth of the whole population over these years. See Theodore K. Ruprecht, "Philippine Labor Statistics: A Critique and Reconstruction of PSSH Data," Philippine Statistician, Vol. XV, Nos. 1 and 2 (1966), p. 80.

TABLE 9

Sectoral Distribution of Employed Labor Force, Philippines, 1950-1966
(in thousands)

| Year | Traditional Sector | | Modern Sector | | Total | | Employed Labor / Total Population |
|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | % |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1950 | 3,669 | 57.0 | 2,766 | 43.0 | 6,435 | 100.0 | 31.8 |
| 1951 | 3,786 | 57.1 | 2,847 | 42.9 | 6,633 | 100.0 | 31.8 |
| 1952 | 3,918 | 57.3 | 2,921 | 42.7 | 6,839 | 100.0 | 31.9 |
| 1953 | 4,049 | 57.4 | 3,004 | 42.6 | 7,053 | 100.0 | 31.9 |
| 1954 | 4,186 | 57.5 | 3,089 | 42.5 | 7,275 | 100.0 | 31.9 |
| 1955 | 4,329 | 57.7 | 3,177 | 42.3 | 7,506 | 100.0 | 32.0 |
| 1956 | 4,481 | 58.2 | 3,221 | 41.8 | 7,702 | 100.0 | 31.8 |
| 1957 | 4,922 | 60.0 | 3,276 | 40.0 | 8,198 | 100.0 | 32.8 |
| 1958 | 5,195 | 62.4 | 3,134 | 37.6 | 8,329 | 100.0 | 32.3 |
| 1959 | 5,213 | 60.8 | 3,362 | 39.2 | 8,575 | 100.0 | 32.3 |
| 1960 | 5,140 | 60.2 | 3,399 | 39.8 | 8,539 | 100.0 | 31.1 |
| 1961 | 5,424 | 59.6 | 3,671 | 40.4 | 9,095 | 100.0 | 32.1 |
| 1962 | 5,801 | 60.4 | 3,802 | 39.6 | 9,603 | 100.0 | 32.8 |
| 1963 | 5,682 | 58.2 | 4,084 | 41.8 | 9,766 | 100.0 | 32.3 |
| 1964[a] | 5,742 | 57.1 | 4,322 | 42.9 | 10,064 | 100.0 | 32.2 |
| 1965 | 5,625 | 55.7 | 4,476 | 44.3 | 10,101 | 100.0 | 31.3 |
| 1966[b] | 6,068 | 55.6 | 4,850 | 44.4 | 10,918 | 100.0 | 32.7 |

[a]Interpolated estimate.

[b]Preliminary data.

Source: 1950-55, extrapolations of PSSH data based on 1948-60 intercensal growth rates.
1956-66, October PSSH.

Considering the PSSH data alone, there is some evidence of a small labor transfer into industry over the period 1956/58-1964/66, with the modern sector increasing its share of total employed labor from about 40 per cent to 44 per cent. However, if the extrapolations back to 1950 may be trusted, the sectoral allocation of labor in 1966 was almost identical to 1950.

The final column of Table 9 gives total employed labor as a percentage of the estimated total population (based on the census benchmark years). The figures for 1950-55 are necessarily almost constant because the same method of extrapolation was used for both series.

Ruprecht has computed some elaborate corrections to the PSSH labor force data for 1956-62 to reconcile it with the 1960 census figures,[17] which were significantly larger. Although any detailed use of PSSH breakdowns should probably make this adjustment, for the present purposes, where growth rather than absolute size is of interest, the differences are not serious.[18]

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[17]See Ruprecht, op. cit.

[18]For example, index of agricultural labor force (1956 = 100):

| | 1956 | 1958 | 1960 | 1962 |
|---|---|---|---|---|
| October PSSH | 100.0 | 116.0 | 114.9 | 129.7 |
| Ruprecht's revisions | 100.0 | 115.7 | 114.1 | 128.8 |

## Traditional Sector Data

The basic variables of the traditional sector are output ($Y_a$), labor force ($L_a$), and cultivated area (T). Of these, output raises the most difficulties in measurement. Where we consider the aggregate sector, we shall use the national accounts series given in Table 2. There are, however, very real uncertainties in some of the underlying production data (to be discussed below). It would seem worthwhile for some purposes to use a more direct index of physical output and rely only on the national accounts data for corroboration.

The Central Bank computes an index of physical production in agriculture, constructed by weighting the quantity relatives of the various items by their 1952 production values. Food crops together are weighted 35 per cent (of which rice is 22 per cent); commercial crops, 20 per cent; livestock and poultry, 26 per cent; and fish production, 9 per cent. (Logs are also included in this index with a weight of 9 per cent. For our purposes it would be necessary to remove the forestry component, which, because of its rapid growth, slightly exaggerates the overall rise.) The changing composition of agricultural output has meant that the 1952 weights understate the contributions of rice and coconuts and overstate those of sugar and abaca for more recent years. However, the differences are not substantial. More serious is the question of the quality of the output data

itself. For the major crops, rice, corn, coconuts, and sugar, the production statistics are probably adequate, as the Department of Agriculture and Natural Resources' (DANR) crop and livestock surveys are largely oriented towards them. On the other hand, data on vegetables and most of the minor crops are far more dubious, while livestock and fish production are probably the most subject to error.[19] We have, therefore, computed an index of crop production only, based on a limited number of crops (rice, coconuts, corn, root crops, sugarcane, abaca, and fruits and nuts--together representing about 90 per cent of estimated total crop value) and using as weights the average production values over the

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[19]The Crop and Livestock Surveys do not cover livestock kept by nonfarm households (those with less than 20 head of livestock or 100 of poultry, which also farm less than 1,000 square meters), and correction for this factor is hazardous. (Independent estimates of gross value added in livestock made by the PIA were less than half the corresponding NEC estimates for each of the years available.) Fish production is calculated by a procedure which gives an effectively meaningless result. Levy reports: "It is estimated by the Fishing Commission that the reported catch does not, on average, represent more than 25%-33% of the true figure. The estimates of fish catch by commercial fishing vessels are consequently obtained by inflating the figures actually reported by an arbitrary factor of 3..." See Levy, Interim Report B, p. 26.

1958-62 period. This index (given in Column 1 of Table 10) we shall, in fact, rely on in much of the subsequent analysis of traditional sector variables.[20]

Data on cultivated areas are collected by the DANR. They, in fact, refer to harvested areas (since 1954) except for tree crops. Thus, where double and triple cropping is increasing, as in Central Luzon, the data reflect the change. Similarly, double counting of cultivated areas occurs with intercropping (e.g., coconuts and corn), although it may be doubted if the extent of this practice is accurately recorded.[21]

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[20] According to the NEC accounts, the contribution of livestock to gross value added in agriculture (excluding fishery) has declined from about one-third to one-quarter of the total. If this estimate is correct, the crop index will overstate the overall rise. However, new estimates prepared by Tryon suggest that livestock make up a smaller and roughly constant share of output value. Joseph L. Tryon, "The Behavior of Production, Prices and Productivity in Philippine Agriculture, 1949-1964" (Washington: National Planning Association, Center for Development Planning, July 1968), mimeographed.

[21] According to Levy (Interim Report, p. 35), crop area estimates are based largely on reports by farmers of quantity of seeds or cuttings sown, using fixed conversion factors to arrive at the resulting areas. Although in theory this technique corrects for both multiple cropping and intercropping, the possible errors introduced are considerable. Levy regards DANR area data as weaker than its production data and biased upwards.

TABLE 10

Traditional Sector Indices, Philippines, 1950-1966
(1955 = 100)

| Year | Output[a] | Labor | Land[b] | Output/ Labor | Output/ Land | Land/ Labor |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1950 | 72.7 | 84.7 | 79.6 | 86 | 91 | 94 |
| 1951 | 82.3 | 87.4 | 81.8 | 94 | 101 | 94 |
| 1952 | 86.0 | 90.5 | 88.1 | 95 | 98 | 97 |
| 1953 | 91.1 | 93.5 | 94.2 | 97 | 97 | 101 |
| 1954 | 95.9 | 96.7 | 95.4 | 99 | 101 | 99 |
| 1955 | 100.0 | 100.0 | 100.0 | 100 | 100 | 100 |
| 1956 | 103.1 | 103.5 | 106.0 | 100 | 97 | 102 |
| 1957 | 108.4 | 113.7 | 108.9 | 95 | 100 | 96 |
| 1958 | 107.2 | 120.0 | 108.8 | 89 | 99 | 91 |
| 1959 | 110.5 | 120.4 | 122.9 | 92 | 90 | 102 |
| 1960 | 112.8 | 118.7 | 118.1 | 95 | 96 | 99 |
| 1961 | 112.9 | 125.3 | 121.8 | 90 | 93 | 97 |
| 1962 | 125.7 | 134.0 | 123.1 | 94 | 102 | 92 |
| 1963 | 131.3 | 131.2 | 123.3 | 100 | 106 | 94 |
| 1964 | 133.1 | 132.6 | 123.7 | 100 | 108 | 93 |
| 1965 | 134.4 | 129.9 | 128.3 | 103 | 105 | 99 |
| 1966 | 134.1 | 140.1 | 128.9 | 96 | 104 | 92 |

[a]Physical output of crops.

[b]Harvested areas except for tree crops.

Sources: Column (1): Computed from DANR data (see text); Column (2): Table 9; Column (3): DANR data.

The data on employed labor force (from Table 9) and land area in the traditional sector, expressed as indices with 1955 as the base year, are presented in Table 10. Also in this table are computed indices of the three implicit ratios: output/labor, output/land, and land/labor. The implications of these ratios for the sectoral production function will be examined later in this chapter.

Traditional sector output is basically divided in three ways by demand use: final consumption in the traditional sector itself, final consumption in the modern sector, and exports. A precise definition of each of these categories, however, is less simple than this statement would imply. Traditional sector consumption consists both of direct consumption by the producers themselves and of output marketed for cash but still consumed by agricultural households. Traditional sector output consumed in the modern sector comprises food sold directly on the intersectoral commodity market and the "indirect" supplies of food obtained via the foreign sector from exports of commercial crops. Finally, exports include both the output exported directly or with only minor processing from the traditional sector and exports of agricultural commodities processed in the modern sector. Given the definition of the second category above, exports must, of course, be taken net of food imports.

An added complication which we shall largely ignore is the fact that a small proportion of the output of (non-food) commercial crops processed in the modern sector is consumed in that sector rather than exported.

In Table 5, we have data on total traditional sector output (gross value added), which, it may be recalled, include processing, storage, transportation and marketing costs. The appropriate export series is given in Column 2 of Table 7 in f.o.b. values which can be assumed to be priced at the same level as the output data.

To estimate the sectoral distribution of domestic consumption, two possibilities are open. First, we could use the expenditure data from the October 1961 PSSH, which provides a detailed breakdown of consumption items (enabling classification by sectoral origin) for urban and rural households--a rough approximation to the modern and traditional sectors.[22] Alternatively, it would be possible to estimate the distribution by end-use for each commodity at the farm level--using either constant ratios or ratios varying over time--and then make suitable adjustments for processing, transport, and marketing costs for each end-use category.

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[22] Philippine Statistical Survey of Households Bulletin, Series No. 14: Family Income and Expenditures: 1961 (Manila: Bureau of the Census and Statistics, 1964).

These methods have been used, respectively, by Paauw[23] and Tryon.[24] The advantage of the former method is that it avoids the necessarily somewhat arbitrary estimates of output allocation and mark-ups and takes into consideration food imports. Despite reservations on relying on a single survey of a type that often contains substantial biases, we have preferred to use the consumption survey estimates. To obtain the full series from the 1961 data, we anticipate a later result that per capita food consumption has been approximately constant and assume that the 1961 sectoral distribution of total consumption is maintained.

The distribution of output by demand use found in this way is shown in Table 11. The total agricultural surplus ($Y_a - fL_a$) is seen to average about 60 per cent of output over these years, which is divided between modern sector consumption and exports roughly in the ratio 3:2.

Modern Sector Data

The modern sector, as we have defined it for the Philippines, contains not only manufacturing and the extractive industries (mining and logging) but also the ISIC divisions 4 through 8--construction,

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[23]Paauw, op. cit., Appendix III-2.

[24]Tryon, op. cit., Appendix A.

TABLE 11

Distribution of Traditional Sector Output by Demand Use, Philippines, 1950-1966 (values in million pesos at constant 1955 prices)

| Year | Total Output | | Final Consumption in Traditional Sector | | Total Agricultural Surplus: Final Consumption in Modern Sector | | Total Agricultural Surplus: Exports ("net") | |
|---|---|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % | Value | % |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 1950 | 2127 | 100.0 | 834 | 39.2 | 704 | 33.1 | 589 | 27.7 |
| 1951 | 2373 | 100.0 | 926 | 39.0 | 783 | 33.0 | 664 | 28.0 |
| 1952 | 2595 | 100.0 | 1067 | 41.1 | 901 | 34.7 | 627 | 24.2 |
| 1953 | 2885 | 100.0 | 1235 | 42.8 | 1044 | 36.2 | 606 | 21.0 |
| 1954 | 3052 | 100.0 | 1279 | 41.9 | 1081 | 35.4 | 692 | 22.7 |
| 1955 | 3165 | 100.0 | 1341 | 42.4 | 1133 | 35.8 | 691 | 21.8 |
| 1956 | 3131 | 100.0 | 1258 | 40.2 | 1063 | 33.9 | 810 | 25.9 |
| 1957 | 3205 | 100.0 | 1330 | 41.5 | 1123 | 35.0 | 752 | 23.4 |
| 1958 | 3392 | 100.0 | 1498 | 44.2 | 1265 | 37.3 | 629 | 18.6 |
| 1959 | 3027 | 100.0 | 1228 | 40.6 | 1038 | 34.3 | 760 | 25.1 |
| 1960 | 2938 | 100.0 | 1134 | 38.6 | 958 | 32.6 | 846 | 28.8 |
| 1961 | 3132 | 100.0 | 1287 | 41.1 | 1088 | 34.7 | 757 | 24.2 |
| 1962 | 3082 | 100.0 | 1199 | 38.9 | 1013 | 32.9 | 869 | 28.2 |
| 1963 | 3092 | 100.0 | 1191 | 38.5 | 1007 | 32.6 | 894 | 28.9 |
| 1964 | 3259 | 100.0 | 1242 | 38.1 | 1050 | 32.2 | 967 | 29.7 |
| 1965 | 3470 | 100.0 | 1440 | 41.5 | 1217 | 35.1 | 813 | 23.4 |
| 1966 | 3634 | 100.0 | 1498 | 41.2 | 1265 | 34.8 | 871 | 24.0 |

Source: Column (1), Table 5; Columns (3)-(6), see text; Column (7), Table 7.

transportation, communication, utilities, commerce, and services. In terms of contribution to net domestic product, manufacturing and extractives make up only one-third of the whole sector. For some purposes the remainder of the sector can be thought of as complementary to these two components. In discussing intrasectoral phenomena, the gains--both conceptual and practical--of keeping some degree of homogeneity usually far outweigh those of complete coverage. Moreover, in terms of data, manufacturing and extractive industries represent the most accessible part of the sector. In this section we shall assemble data on a few basic characteristics for the aggregate modern sector and then examine these two components in more detail.

a. Aggregate Modern Sector

Table 12 gives the total and percentage distribution of (net) product in the modern sector by major industry groups. The totals (Column 9) differ from the series given above in Table 5 by estimates of indirect taxes and depreciation. The percentage distributions are taken from the latest revisions of the NEC accounts. It can be seen that manufacturing has substantially raised its contribution to the total over this period, while the share of services has fallen. The other components have remained approximately stable.

TABLE 12

Distribution of Modern Sector Contribution to Net Domestic Product, Philippines, 1950-1966 (values in million pesos, constant 1955 prices)

| Year | Manufacturing | | Extractive Industries | | Construction, Transport & Commerce | | Services | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % | Value | % | Value | % |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 1950 | 567 | 15.6 | 359 | 9.9 | 1122 | 30.8 | 1590 | 43.7 | 3638 | 100.0 |
| 1951 | 665 | 18.2 | 406 | 11.1 | 1090 | 29.9 | 1488 | 40.8 | 3649 | 100.0 |
| 1952 | 700 | 18.0 | 386 | 9.9 | 1162 | 29.9 | 1639 | 42.2 | 3887 | 100.0 |
| 1953 | 791 | 19.1 | 426 | 10.3 | 1161 | 28.0 | 1763 | 42.6 | 4141 | 100.0 |
| 1954 | 889 | 20.4 | 444 | 10.2 | 1189 | 27.3 | 1832 | 42.1 | 4354 | 100.0 |
| 1955 | 1001 | 20.8 | 462 | 9.6 | 1341 | 27.9 | 2000 | 41.6 | 4804 | 100.0 |
| 1956 | 1278 | 23.2 | 528 | 9.6 | 1888 | 34.3 | 1809 | 32.9 | 5503 | 100.0 |
| 1957 | 1317 | 23.0 | 532 | 9.4 | 1933 | 33.8 | 1934 | 33.8 | 5716 | 100.0 |
| 1958 | 1376 | 23.9 | 489 | 8.5 | 1853 | 32.3 | 2027 | 35.3 | 5745 | 100.0 |
| 1959 | 1607 | 24.1 | 619 | 9.3 | 2158 | 32.4 | 2278 | 34.2 | 6662 | 100.0 |
| 1960 | 1648 | 23.9 | 629 | 9.1 | 2228 | 32.3 | 2394 | 34.7 | 6899 | 100.0 |
| 1961 | 1750 | 23.9 | 659 | 9.0 | 2347 | 32.1 | 2562 | 35.0 | 7318 | 100.0 |
| 1962 | 1820 | 23.7 | 790 | 10.3 | 2402 | 31.3 | 2661 | 34.7 | 7673 | 100.0 |
| 1963 | 2006 | 24.5 | 950 | 11.6 | 2442 | 29.8 | 2798 | 34.1 | 8196 | 100.0 |
| 1964 | 2179 | 25.8 | 730 | 8.7 | 2562 | 30.4 | 2959 | 35.1 | 8430 | 100.0 |
| 1965 | 2242 | 25.4 | 761 | 8.6 | 2712 | 30.8 | 3108 | 35.2 | 8823 | 100.0 |
| 1966 | 2361 | 25.7 | 756 | 8.3 | 2790 | 30.4 | 3271 | 35.6 | 9178 | 100.0 |

Source: Totals from Paauw, op. cit., pp. 90-91, adjusting for inclusion of forestry and logging. Distributions derived from revised NEC accounts.

Data on the distribution of employed labor in the modern sector can be obtained from the PSSH since 1956. The series for selected years from 1956 to 1965 are presented in Table 13. An adjustment similar to that made in Table 9, to include the labor employed in forestry and logging with other extractive industries, was needed. No definite trends in the distribution are evident unless the recent increase in services and utilities (caused by rising government employment) and corresponding fall in manufacturing employment are significant.

The 1961 Economic Census of the Philippines provides a detailed cross-section picture of the modern sector for that year, but unfortunately we have little idea of the stability over time of the characteristics revealed. In Table 14 we assemble some important ratios computed from this source: the average factor shares in output, the propensity to invest out of profits, average wages, and the three ratios relating output (or margins), labor, and fixed assets. Some caution is necessary in interpreting these data. Returns to labor refer to payrolls only and may, therefore, be underestimated insofar as non-cash payments are not fully recorded. Profits are defined in Chapter 3 simply as output (value added) less total payrolls (i.e., $Y_i - wL_i$)--an admittedly rough procedure which will overestimate them to the extent that other production costs are significant. The census estimates of fixed assets are of dubious use

TABLE 13

Percentage Distribution of Employed Labor Force in Modern Sector by Major Industry Group, Philippines, Selected Years, 1956-1965.

| Major Industry Group | 1956 | 1958 | 1960 | 1963 | 1965 |
|---|---|---|---|---|---|
| Manufacturing | 29.6 | 29.3 | 30.9 | 28.0 | 24.8 |
| Extractive Industries | 3.2 | 3.5 | 3.4 | 3.1 | 2.8 |
| Construction | 6.2 | 5.2 | 6.9 | 6.7 | 6.6 |
| Commerce | 25.2 | 23.8 | 22.4 | 25.2 | 25.1 |
| Transport and Communications | 7.0 | 7.4 | 8.1 | 7.8 | 7.6 |
| Services and Utilities | 28.8 | 30.8 | 28.3 | 29.2 | 33.1 |
| Total Modern Sector | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Philippine Statistical Survey of Households (October data) and Table 9.

(except, perhaps, for comparison between industry groups) since they are based on original book value. No data on assets are available for establishments with less than 10 employees.

The final row of Table 14 gives the aggregated estimates for the modern sector. We can hope that the process of aggregation cancels out many of the errors in the individual components. Labor receives less than 30 per cent of output, capital 70 per cent, and out of the latter an average of 20 per cent is spent on new fixed assets.

The very low average return to labor in the Philippines has often been noted. Some suggestive evidence that the share has not been rising in recent years is given by the PSSH data on income distribution. The income and expenditure surveys held in 1957 and 1961 have been analyzed by Reyes and Chan.[25] In urban areas, which very roughly coincide with the modern sector, income inequality increased both absolutely and more rapidly than for rural areas. The top 5 per cent of urban households increased their share of total urban income from 19.4 per cent to 28.5 per cent over the period 1956-61 while the share of the bottom 40 per cent fell from 12.4 to 11.3.[26] More direct data for manufacturing (to be

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[25] Peregrino S. Reyes and Teresita L. Chan, "Family Income Distribution in the Philippines," Statistical Reporter, Vol. IX, No. 2 (April/June 1965).

[26] Ibid., p. 31.

TABLE 14

Selected Ratios for Major Industry Groups
in Modern Sector, Philippines, 1961

| Major Industry Group | Payrolls/ Gross Value Added (percent) | Profits/ Gross Value Added (percent) | Capital Expenditures/ Profits (percent) | Payrolls/ Paid Employees (₱1000) | Gross Value Added/Total Employees (₱1000) | Gross Value Added/Fixed Assets[a] | Fixed Assets/ Total Employees[a] (₱1000) |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Manufacturing | 25.7 | 74.3 | 25.7 | 1.80 | 5.90 | 1.23 | 6.13 |
| Extractive Industries | 38.7 | 61.3 | 32.1 | 1.86 | 4.47 | 0.83 | 6.04 |
| (Forestry) | (37.4) | (62.6) | (40.5) | (1.63) | (3.88) | (0.88) | (5.33) |
| (Mining) | (39.8) | (60.2) | (24.8) | (2.08) | (5.13) | (0.79) | (6.72) |
| Construction | 49.1 | 50.9 | 19.1 | 1.45 | 2.76 | 2.05 | 1.41 |
| Transport and Communications[b] | 48.0 | 52.0 | 33.9 | 1.59 | 2.82 | n.a. | n.a. |
| Commerce[b] | 24.0 | 76.0 | 3.9 | 2.06 | 3.27 | 2.69 | 4.26 |
| Utilities[b] | 26.5 | 73.5 | 52.3 | 2.62 | 9.71 | 0.21 | 54.32 |
| Services[b, c] | 33.4 | 66.6 | 10.8 | 1.32 | 2.44 | 1.80 | 2.65 |
| Total Modern Sector | 28.8 | 71.2 | 20.4 | 1.78 | 4.17 | 1.14 | 6.51 |

[a]Large establishments (10 or more employees) only.

[b]For "gross value added," read "gross margins".

[c]Excluding government and domestic services.

Source: Computed from BCS, Economic Census of the Philippines 1961.

discussed below) support this evidence.

The capital expenditures referred to in Table 14 cover payments for new buildings, new machinery, and new equipment but exclude expenditures on used fixed assets (including land) and inventories.[27] They also, of course, exclude investment achieved without monetary expenditures. A constant price series of total gross investment, based on Hooley's estimates of savings,[28] has been prepared for the NPA Project Report.[29] These estimates are considered superior in both completeness and accuracy to the NEC data. Making the usual minor adjustments to include investment in forestry and logging in the modern sector, we obtain the series given in Table 15. In 1961, total capital expenditures recorded in the census (deflated to 1955 prices by the NEC implicit deflator for durable equipment) were 20.0 per cent of the figure recorded in Table 15.

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[27] Expenditures on used fixed assets are less than 5 per cent of expenditures on new fixed assets (1961 Census).

[28] Richard W. Hooley, Saving in the Philippines, 1951-1960 (Quezon City: Institute of Economic Development and Research, University of the Philippines, 1963).

[29] Paauw, op. cit., p. 133.

TABLE 15

Estimated Gross Investment in Modern Sector, Philippines, 1950-1966 (million pesos at constant 1955 prices)

| Year | Investment | Year | Investment |
|---|---|---|---|
| 1950 | 462 | 1959 | 1272 |
| 1951 | 593 | 1960 | 1481 |
| 1952 | 511 | 1961 | 1863 |
| 1953 | 610 | 1962 | 1709 |
| 1954 | 751 | 1963 | 1792 |
| 1955 | 968 | 1964 | 1736 |
| 1956 | 1066 | 1965 | 2006 |
| 1957 | 1680 | 1966 | 1969 |
| 1958 | 1352 | | |

Source: Basic data from Paauw, op. cit., p. 133; adjusted for inclusion of forestry and logging in modern sector. 1966 estimate derived from NEC data.

b. Manufacturing

For most of the ratios given in Table 14, the manufacturing component is quite close to the sectoral average. This fact gives us some confidence in using manufacturing as a proxy for the whole sector.

Data on Philippine manufacturing in the postwar years are both more plentiful and more reliable than for most other parts of the economy. The basic source is the Annual Survey of Manufactures, held since 1956 except for 1961 and 1964. This survey, however, covers only "organized" manufacturing--defined as establishments with a minimum employment of five persons. Data on household industries are seldom available.

The three major series required for an initial study of manufacturing are value added, capital stock, and employed labor. Umana has derived constant price estimates of the first two of these up to 1960, using the censuses as benchmark years.[30] These data, converted to indices with 1955 as base, are given in Table 16. Subsequent years are computed directly from the Annual Survey reports. For value

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[30]Salvador C. Umana, "Growth of Output of Philippine Manufacturing: 1902-60," in Hooley and Barker (eds.), loc. cit.

TABLE 16

Manufacturing Sector Indices,
Philippines, 1950-1966[a]
(1955=100)

| Year | Output[b] (1) | Capital[c] (2) | Labor (3) | Output/ Capital (4) | Output/ Labor (5) | Capital/ Labor (6) |
|---|---|---|---|---|---|---|
| 1950 | 50 | 47 | 77 | 106 | 65 | 61 |
| 1951 | 64 | 62 | 81 | 103 | 78 | 76 |
| 1952 | 75 | 75 | 86 | 100 | 88 | 87 |
| 1953 | 84 | 86 | 90 | 97 | 92 | 96 |
| 1954 | 95 | 94 | 95 | 100 | 99 | 99 |
| 1955 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1956 | 111 | 102 | 105 | 108 | 105 | 97 |
| 1957 | 123 | 105 | 114 | 117 | 108 | 92 |
| 1958 | 144 | 120 | 117 | 120 | 123 | 103 |
| 1959 | 160 | 129 | 122 | 124 | 131 | 106 |
| 1960 | 173 | 151 | 127 | 114 | 136 | 118 |
| 1961 | 184 | 163 | 135 | 113 | 137 | 121 |
| 1962 | 198 | 169 | 143 | 117 | 139 | 118 |
| 1963 | 227 | 190 | 154 | 119 | 147 | 124 |
| 1964 | 225 | 201 | 158 | 112 | 142 | 127 |
| 1965 | 228 | 209 | 166 | 109 | 138 | 126 |
| 1966 | 239 | 222 | 168 | 108 | 142 | 132 |

[a]Data refer to manufacturing establishments employing five or more persons.

[b]Value added at constant prices.

[c]Fixed assets and inventory at constant prices.

Sources: Columns (1) and (2): 1950-60, S.C. Umana, op. cit.;1961-66, Annual Survey of Manufactures (see text); Column (3) see text.

added, the disaggregated survey figures were deflated by indices of wholesale prices of the respective industry group. The series on capital stock (referring to fixed assets and inventory) is based partly on the Annual Survey data on book value of fixed assets and capital expenditures, and partly on an index of corporate assets constructed by Hooley from a sample of manufacturing firms. After 1960, only the Survey data were used, deflated by means of the NEC implicit price indices for construction and durable equipment. The two missing years, 1961 and 1964, were interpolated using the NEC national accounts data on net value added in constant prices (for output) and the recorded increments to fixed assets from the Annual Surveys (for capital).

A note of caution may be necessary here concerning the index of capital stock in particular. Inevitably, to some extent it is a function of the price deflator employed, and it is possible that other deflating procedures, at least equally defensible, could significantly alter the results. Hence, the findings based on such series must be regarded as tentative unless supported by independent evidence.

The labor input indices in Column 3 of Table 16 are easily obtained from the Annual Surveys for 1956-66. The data refer to average employment during the year and cover owners and unpaid family workers as well as paid employees. Estimates for 1961 and 1964 were based on

the Central Bank index of manufacturing employment. Prior to 1956, the series was extrapolated assuming the uniform intercensal growth rate of labor force in manufacturing of 5.3 per cent.[31] Changes in actual average man-hours worked are for the time being ignored.

The last three columns of Table 16 show the three implicit ratios based on the main series. The following tentative observations may be made. The output/capital ratio has not shown a clear trend over the whole 1950-66 period, but there is some indication of a slight rise in the 1950s, followed by a decline. On the other hand, the output/labor ratio seems to have risen markedly until about 1960 and then remained fairly constant. Thus, the growth rates of both labor and capital productivities appear to have declined over the period, in the latter case perhaps even becoming negative.

A possibly serious statistical bias must be taken into account in evaluating this result. The falling off in productivity increases may be caused by progressive errors in deflating output. However, subsequent trials with other deflators (e.g., the NEC implicit price deflator for income from manufacturing), if anything, tended to suggest some degree of underdeflation. If true, this would accentuate the decline. Again, at

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[31] See "The Trend of the Labor Force," in First Conference on Population, 1965 (Quezon City: University of the Philippines Press, 1966), p. 500. (The 1956-66 Annual Survey data show approximately this growth rate.)

a more basic level, the increase in the scale of tariffs on finished consumer goods, with the consequent uncompetitive pricing of domestic manufactures, has led to a progressive overstatement of real value added. If allowance were made for this effect, it may be that much of the recorded increases in productivity would prove illusory.

It was mentioned above that the output of household industries excluded from the Annual Survey of Manufacturers has been declining relative to organized manufacturing. That this is so can be immediately seen by comparing the number of workers reported employed in manufacturing in the Annual Surveys with the number estimated by the PSSH.

The Program Implementation Agency has prepared estimates of the value added in unorganized establishments on the basis of a number of assumptions regarding the composition of the sector and thence of average value added per worker.[32] The Agency arrives at the result that organized manufacturing contributed only 40 per cent of total manufacturing value added in the early 1950s, rising to 70 per cent a decade later.

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[32] Program Implementation Agency, Trend and Structure of Philippine Manufactures, 1953-1963, OPS Monograph Series (n.d.), mimeographed. Value added per worker in establishments employing less than five persons is assumed to be ₱1260 (in 1961 prices), which can be compared with the 1961 census figure of ₱1452 for value added per worker in establishments employing less than 10 persons.

The decline in the unorganized component is evident from the labor force data, but its absolute size seems implausibly large. It is perhaps more realistic to assume that output per worker in household industries is comparable to the average level in the traditional sector (since small-scale manufacturing is often an alternative occupation for agricultural workers), about two-thirds of the PIA estimate. With this assumption the share of organized manufacturing increases from 64 to 82 per cent over the decade 1953-63. In constant prices, organized manufacturing grew at a rate of 9 per cent per annum over 1953-63; unorganized, at 2 per cent.[33] The aggregate growth rate of the whole manufacturing sector was therefore only 7 per cent, a less impressive figure than is suggested by the Annual Survey data.

The Annual Survey of Manufactures enables us to compute time series data for some of the ratios given for 1961 in Table 14. These are presented in Table 17. The factor shares are notable not only for the very small return to labor (lower than in many other underdeveloped countries) but more particularly for the trend over time revealed by the

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[33]The difference, of course, is brought about both by the expansion of many household industries to a size at which they are considered "organized" and by the demise of others due to increasing relative inefficiency.

TABLE 17

Returns to Factors, Propensity to Invest, and Average Payrolls in Philippine Manufacturing, Selected Years, 1956-1966[a]

| Year | Payrolls/ Value Added (percent) | Profits[b] Value Added (percent) | Capital Expenditures/ Profits (percent) | Payrolls/ Paid Employees[c] (₱1000) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| 1956 | 32.5 | 67.5 | 14.6 | 1.63 |
| 1957 | 31.3 | 68.7 | 19.3 | 1.59 |
| 1958 | 28.3 | 71.7 | 17.9 | 1.78 |
| 1959 | 28.3 | 71.7 | 15.5 | 1.75 |
| 1960 | 26.7 | 73.3 | 20.0 | 1.71 |
| 1962 | 24.9 | 75.1 | 27.6 | 1.65 |
| 1963 | 22.7 | 77.3 | 16.1 | 1.59 |
| 1965 | 26.5 | 73.5 | 21.3 | 1.72 |
| 1966 | 27.4 | 72.6 | 26.8 | 1.84 |

[a]Covers establishments with five or more workers.

[b]Value added less total payrolls.

[c]1955 prices.

Source: Computed from BCS, Annual Survey of Manufactures, 1959 and 1966. (Ratios based on current price series.)

data. The payroll/value added ratio was smaller in 1966 than a decade earlier. This perverse tendency runs counter to one of the major development indicators (found both in cross-section and time series studies) described in Chapter 2. An important part of the explanation for it, however, may probably be found in the changing structure of the manufacturing sector, with its rising median employment per establishment. The well-known inverse association between employment size and labor's share of output is also apparent in the Philippines. Thus, it is possible that returns to labor have been increasing within each specific employment-size group, while at the same time the aggregate ratio shows a decline.

When data are broken down by industry group, the payroll/value added ratio shows wide inter-industry variability both in absolute size and in its trend over time. Labor received only 8 per cent of value added in petroleum products but 40-50 per cent in furniture, leather products, and machinery. Similar, though usually less extreme, size variations occur in other countries. In the United States, for example, the ratio varies from 20 to 30 per cent for tobacco and chemicals to nearly 60 per cent for wood and leather products. The dominance of a few capital-intensive industries (such as sugar milling, cement, and petroleum refining) in Philippine manufacturing may do much to depress the aggregate ratio.

While the workers' share of total product has slightly diminished, the level of average payroll per paid employee has shown a small increase in real terms. This is probably attributable to rising quality of labor, through improved skills and education, since real wages at the lowest grades have tended to decline over this period.

The propensity to invest out of profits, shown in Column 3 of Table 17, does not seem very stable but averages about 20 per cent--a figure consistent with the sectoral average, based on the census data given in Table 14.

The composition of manufacturing output has shown slight but persistent changes in postwar years. The share of the dominant component, food manufactures, has fallen and that of chemicals (mainly coconut oil) and non-ferrous metal products has risen. The distribution by broad industry groups is seen in Table 18 for the three years 1956, 1961, and 1966. It is not possible from data classified in this way to make any definite statement on shifts in output by final use--whether or not, for example, investment goods are becoming more significant. (In the following discussion of import dependence, we adduce some evidence suggesting that they are not.) There is certainly more rapid growth in some of the later ISIC divisions, but these include automobile assembly, appliances, and other consumer-oriented industries as well as investment goods.

TABLE 18

Percentage Distribution of Value Added in Manufacturing by Industry Group, Philippines, Selected Years, 1956-1966

| ISIC code | Industry Group | 1956 | 1961 | 1966 |
|---|---|---|---|---|
| 20-22 | Food, Beverages and Tobacco | 43.6 | 39.2 | 37.6 |
| 23-24 | Textiles and Footwear | 10.6 | 8.8 | 8.8 |
| 25-26, 29 | Wood and Leather Products | 6.7 | 7.3 | 6.3 |
| 27-28 | Paper and Printing | 5.4 | 5.1 | 6.1 |
| 30-31 | Rubber and Chemicals | 10.2 | 13.7 | 15.7 |
| 33-35 | Metal and Nonmetalic Mineral Products | 8.6 | 9.0 | 12.6 |
| 36-37 | Machinery | 2.2 | 5.2 | 4.3 |
| 38 | Transport Equipment | 2.3 | 2.8 | 3.2 |
| 32, 39 | Miscellaneous[a] | 10.4 | 8.9 | 5.4 |
| | | 100.0 | 100.0 | 100.0 |

[a]Including petroleum products.

Source: 1956, 1966, Annual Survey of Manufactures; 1961, Census of Manufactures.

Despite these difficulties of interpretation, it is possible to calculate approximately the extent to which growth of consumer goods imports has been offset by import substitution, using the methodology of Maizels (see Table 1). Domestic output of manufactured consumer goods can be estimated roughly by taking the ISIC groups 20-29. An important adjustment which must be made in the Philippine case, however, is to exclude export products from Maizels' category of total supplies. A significant part of the value added estimates underlying Table 18 is contributed by sugar, a commodity which is not relevant to a study of import substitution.[34] We have excluded the whole category of food manufactures from the value added estimates. After making this allowance, we obtain a series for output of consumer manufactures for domestic use, using the Annual Survey data (1956-66). A value for 1955 was found by extrapolating the series by the Central Bank index of physical output of manufactures. (Unfortunately, we have no data prior to 1955.) The appropriate import series is that of Table 5, which includes intermediate inputs into the manufacture of consumer goods but excludes

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[34] Maizels makes the assumption that the import content of exports of manufactures is the same as the import content of production for domestic use. (Maizels, Industrial Growth and World Trade, p. 151.) This assumption would not be applicable to sugar.

food. To convert the f.o.b. data to c.i.f., the figures are inflated by a constant 10 per cent.[35] Total supplies of consumer manufactures (for domestic use) are then given by the sum of the two series. Using these data, we find that the import content of supplies apparently fell steadily from 70 per cent in 1955 to 51 per cent in 1966. (See Table 19.)

While this downward trend is meaningful, little significance can be attributed to the absolute size of the import content ratio.[36] The data on domestic output of consumer goods, in particular, are very likely to be underestimated due to the use of the ISIC categories. This would tend to exaggerate the import content. On the other hand, the c.i.f. values for imports should probably be marked up by a substantial amount to cover the importer's margin and tax. Clearly, a more precise breakdown by commodities would be necessary to obtain an accurate picture of import substitution.

Keeping in mind these sources of error, it is nevertheless of interest to analyze the observed change in the level of imports of consumer

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[35]See Footnote 14 of this chapter.

[36]Estimates by Paauw, for example, show the import content of total supplies of finished industrial goods (a wider category than that used above) declining from 20 per cent in 1949-51 to 13 per cent in 1963-65. Paauw, op. cit., p. 148.

TABLE 19

Import Substitution for Consumer Manufacturers, Philippines, 1955-1966
(values in million pesos, constant 1955 prices)

| Year | Imports of Nonfood Consumer Goods (c.i.f.) | Domestic Output of Consumer Manufactures | Total Supplies (1) + (2) | Import Content of Supplies (percent) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| 1955 | 801 | 341 | 1142 | 70.1 |
| 1956 | 685 | 392 | 1077 | 63.6 |
| 1957 | 797 | 423 | 1220 | 65.3 |
| 1958 | 667 | 467 | 1134 | 58.8 |
| 1959 | 665 | 512 | 1177 | 56.5 |
| 1960 | 565 | 545 | 1110 | 50.9 |
| 1961 | 652 | 563 | 1215 | 53.7 |
| 1962 | 659 | 605 | 1264 | 52.1 |
| 1963 | 693 | 643 | 1336 | 51.9 |
| 1964 | 768 | 691 | 1459 | 52.6 |
| 1965 | 758 | 719 | 1477 | 51.3 |
| 1966 | 835 | 785 | 1620 | 51.5 |

Source: Basic data from Tables 8 and 17, and Central Bank Statistical Bulletin (see text).

manufactures. Taking three-year averages for the end-points, imports have increased from ₱761 million per year in 1955-57 to ₱787 in 1964-66. If the import content of supplies had remained constant at 0.66, its average level for 1955-57, consumer imports would necessarily have risen by ₱215 million over this period. The difference between the predicted rise of ₱215 million and the observed rise of ₱26 million, i.e., ₱189 million, is the effect of expansion of domestic output "substituting" for imports.

The distribution of manufactured goods by sector is of less interest in the framework of the model than the distribution of traditional sector output discussed earlier. The flow of goods from the modern to the traditional sector involves two major commodity categories: agricultural chemicals used as inputs for traditional sector production and manufactured consumer goods. However, inputs of chemicals (mostly fertilizer) make up only a small part of the total.[37] In the exchange of industrial for agricultural goods, the intersectoral terms of trade have been moving steadily in favor of the traditional sector. The estimates of Tryon, given in Table 20, show approximate stability over the period 1950-56 and quite rapid increase in the decade following.

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[37]Tryon (op. cit., p. 18) has calculated the value of agricultural chemicals used (in 1955 prices) as about ₱20 million in 1950, rising to ₱70 million in 1964. Paauw's estimates of total agricultural sector consumption of industrial goods for the same two years are ₱1384 million and ₱2351 million (Paauw, op. cit., p. 118).

TABLE 20

Intersectoral Terms of Trade,[a] Philippines, 1950-1965 (index: 1955=100)

| Year | Terms of Trade | Year | Terms of Trade |
|---|---|---|---|
| 1950 | 100 | 1958 | 106 |
| 1951 | 97 | 1959 | 105 |
| 1952 | 99 | 1960 | 108 |
| 1953 | 101 | 1961 | 112 |
| 1954 | 101 | 1962 | 118 |
| 1955 | 100 | 1963 | 128 |
| 1956 | 101 | 1964 | 133 |
| 1957 | 103 | 1965 | 124 |

[a]Units of industrial goods exchanged per unit of agricultural goods.

Source: Joseph L. Tryon, "Internal and External Terms of Trade in Post-War Philippines," (Washington: National Planning Association, Center for Development Planning, April 1967) mimeographed.

c. Extractive Industries

In the data presented in Table 12, the manufacturing component of the modern sector shows the most rapid aggregate growth, quadrupling its output value in 1955 prices between 1950 and 1966 and substantially raising its share of sectoral output. Both extractive industries and the group comprising construction, transportation, and commerce have grown at about the average rate for the whole sector, maintaining almost constant shares. However, in recording aggregate output, the national accounts series obscure the true dynamism of a large part of the industries classed as extractives which is revealed by their performance in the export sector. The relevant data were given earlier in Table 7 and Diagram 11. Over the 16-year period (ignoring 1950), the growth of extractive exports has averaged 15 per cent per year, higher than the 9 per cent recorded for manufacturing output. Moreover, a considerable part of the increase in manufactured exports seen in Diagram 11 is accounted for by plywood and veneer, products which could with some justification be included with extractives.

Little time need be spent on demonstrating the capital intensity of extractive industries. This is clear from the data on fixed assets given in the 1961 Economic Census. The value of fixed assets per paid employee

in large establishments was ₱6720 for mining and ₱5330 for forestry and logging.[38] Only a very minor part of total output came from small establishments. These figures can be compared to the value for large manufacturing establishments of ₱6130 (see Table 15). Confirmation is provided by the level of labor productivity given in Column 5 of Table 15. Gross value added per member of the employed labor force in extractive industries is comparable to that in organized manufacturing establishments but much higher than in other parts of the modern sector except utilities.

Table 15 indicates that in both mining and forestry labor receives a larger share of output than it does in manufacturing. The propensity to invest out of profits is 25 per cent for mining and 40 per cent for forestry. On the basis of a single year, it is not possible to accept with much assurance the latter figure as an indication of average levels of investment in forestry, although it is known that much of the equipment used, for example, in logging operations has a life of less than ten years.[39]

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[38] On the assumption that establishments not reporting value of fixed assets had the same value on average as reporting establishments.

[39] This is true of logging trucks, yarders, loaders, etc. Sawmilling (where the capital equipment may be expected to have a longer life) is included under manufacturing, not forestry, in the census classification.

The very rapid growth rate of extractive exports noted above is a good indicator of the industry's profitability. The share of total output which is exported has been steadily rising over a long period. For postwar years, a smoothed export ratio series is given in Table 18: the ratio has trebled between 1951 and 1965.[40] Among the factors stimulating this growth have been the 1960 exchange decontrol measures and favorable world price movements. These are discussed in more detail in Chapter 5. It is notable, however, that exports of logs and lumber have been rising more rapidly than minerals, increasing their share of total extractive exports from less than one-half in the early 1950s to two-thirds in the mid-1960s.

## SPECIFIC ASSUMPTIONS OF THE MODEL

The open dual economy model presented in Chapter 3 inevitably makes many broad assumptions, both structural and behavioristic, concerning the operation of such economies. In some cases these are adopted for analytical simplicity and could be modified without altering

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[40]The absolute value of the ratio, however, should be treated with caution since the output data used have a high margin of error.

TABLE 21

Ratio of Extractive Exports to Gross Value Added in Extractive Industries, Philippines, 1951-1965[a]
(percent)

| Year | Export Ratio | Year | Export Ratio |
|---|---|---|---|
| 1951 | 25.2 | 1959 | 55.7 |
| 1952 | 31.3 | 1960 | 58.3 |
| 1953 | 37.3 | 1961 | 60.2 |
| 1954 | 41.7 | 1962 | 57.4 |
| 1955 | 49.6 | 1963 | 57.8 |
| 1956 | 54.4 | 1964 | 70.1 |
| 1957 | 57.2 | 1965 | 78.9 |
| 1958 | 54.4 | | |

[a]Computed from constant price export and output series expressed as three year moving averages.

Source: Basic data from Tables 7 and 12, using estimates of depreciation and indirect taxes from Paauw, op. cit., p. 90 .

the conclusions drawn. Certain assumptions, however, are of basic importance and clearly require justification if the model is to have validity in an empirical context. These would include the postulated rate of land expansion, the determination of the agricultural surplus, and the assumption of import dependence. Other assumptions, such as the particular form of the production and investment functions and the relation between wages in each sector, are less essential but nevertheless should also be examined.

Land Surplus or Labor Surplus?

In Chapter 3, we used the term "pure land surplus" to refer to a situation in which cultivated area (T) expanded at the same rate as the agricultural labor force ($L_a$). When the quality of the frontier land began to decline, we made the simplifying assumption that the land/labor ratio decreased exponentially over time. The equation relating land and labor was:

$$T = cL_a^{\,k}$$

where c was a constant and k the elasticity of land with respect to labor. The value of the parameter k would indicate how close the economy was to a condition of pure land surplus (k = 1).

The data on land and labor for Philippine agriculture over the period 1950-66 were given in Table 11. To estimate k, we can regress the logarithm of cultivated area on the logarithm of agricultural labor force.[41] The data are plotted in Diagram 12. The regression line, accounting for some 94 per cent of the variation in T, gives an estimate of k of 0.93 over this period.[42] Visual inspection of the data suggests that k has decreased since the early 1950s. To place the postwar estimate in perspective we should take a longer series.

Data on cultivated areas and labor force are available from the various censuses beginning in 1902. Despite the many problems of comparability, it is possible to obtain indices of these factors with a fair degree of consistency. Table 22 presents the indices constructed by Hooley from the censuses between 1902 and 1948, to which have been spliced the data from Table 10 on more recent years. Over the first 50 years of the century, land appears to have expanded at a considerably

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[41] Inclusion of the extrapolated 1950-55 labor force data adds to an already serious problem of multicollinearity (although the 1950 figure can be regarded as representing the 1948 census result) but does not materially change the estimates.

[42] The constant in the regression equation can be interpreted as a scale factor. It is not significant at the 5 per cent level. The estimate of k is highly significant.

DIAGRAM 12

Regression of Cultivated Area on Labor Force Employed in Agriculture, Philippines, 1950-1966

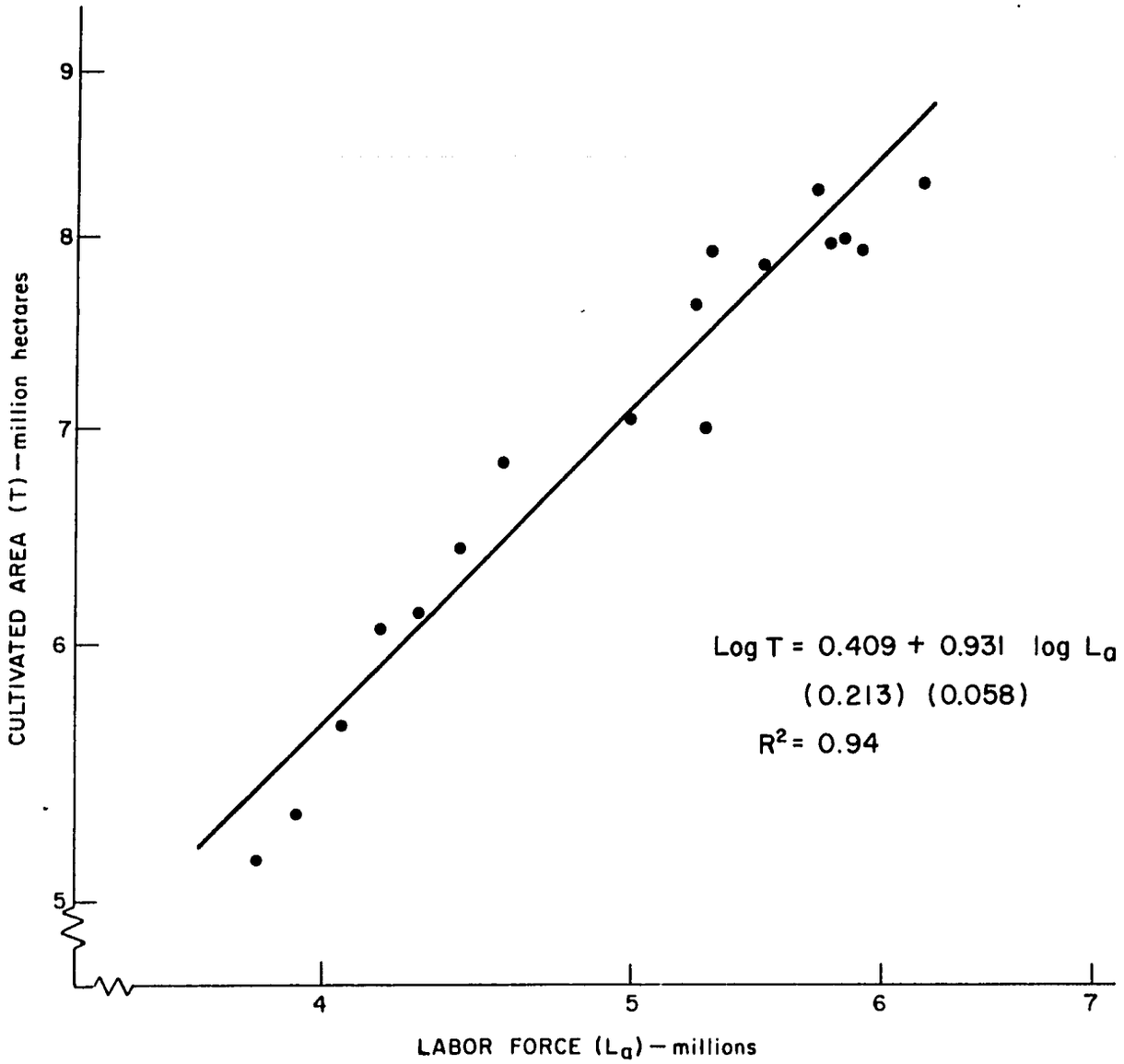

TABLE 22

Indices of Cultivated Area and Labor Force
Employed in Agriculture, Philippines, Selected Years, 1902-66
(1902=100)

| Year | Land | Labor | Land/Labor |
|---|---|---|---|
| | (1) | (2) | (3) |
| 1902 | 100 | 100 | 100 |
| 1918 | 227 | 161 | 141 |
| 1938 | 340 | 256 | 133 |
| 1948 | 359 | 243 | 148 |
| 1956 | 525 | 317 | 166 |
| 1960 | 585 | 363 | 161 |
| 1966 | 638 | 429 | 149 |

Sources: 1902-48: Richard W. Hooley, "Long Term Economic Growth in the Philippines, 1902-1961," in Hooley and Barker (eds.), Growth of Output in the Philippines, p. 25.

1956-66: Data from Table 10 spliced to 1948 census data.

faster rate than the agricultural labor force. A rough calculation puts k at about 1.4. In the middle to late 1950s the land/labor ratio stabilized, and then for the first time the rate of expansion of cultivated area fell behind the growth rate of agricultural labor.[43]

A value for the elasticity of land with respect to labor greater than one can be explained by the necessity to cultivate larger areas of non-irrigated land on the extensive margin (less labor-intensive techniques are required for crops such as corn and upland rice than for wetland paddy), and by the changing composition of crops in established areas in favor of land-extensive commercial crops like sugar and coconuts.[44] Only if crops were effectively homogeneous would k have a maximum of unity.

Closer analysis of postwar changes in land/labor ratios suggests that the aggregate ratio obscures several underlying but mutually offsetting trends. If the data are broken down into the three broad geographical regions, Luzon, the Visayas, and Mindanao, it is seen that the regions exhibit similar but temporally displaced patterns, in each case

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[43] In the absence of any corroborating evidence, we have disregarded the small apparent fall in $T/L_a$ between 1918 and 1938.

[44] Note, however, that labor intensification due to double and triple cropping should not in itself show up in the data as a falling land/labor ratio as the area data refer to harvested areas.

a steady increase to a peak, followed by a decline. But in Luzon and the Visayas, cultivated area per person in the agricultural labor force has been declining, at least since the mid-1950s, while in Mindanao the peak was probably reached around 1963 (see Table 23 and Diagram 13). Fonollera[45] has further analyzed these changes, showing, for example, that the decline in cultivated area per person in Central Luzon since 1959 has been partially offset by expansion in the Cagayan Valley, and in Mindanao a decline had begun in the northern and eastern region after 1960, although obscured in the aggregate ratio by a continued increase in the southwest.

Before we may conclude that the Philippines has showed (at least until the present decade) the characteristics of a land surplus economy, it is necessary to examine the nonagricultural labor force. It is possible that imperfections in the labor market are such that a large degree of unemployment in industry could exist side by side with virtually free land. Ruprecht, in particular, has argued, and other writers have more or less explicitly assumed, that the Philippines is a labor surplus

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[45]Raymundo E. Fonollera, "Labor and Land Resources in Philippine Agriculture: Trends and Projections," paper presented to an International Rice Research Institute seminar, May 28, 1966.

TABLE 23

Philippine Land/Labor Ratios, 1956-1966
(Area cultivated in hectares per person in the agricultural labor force)

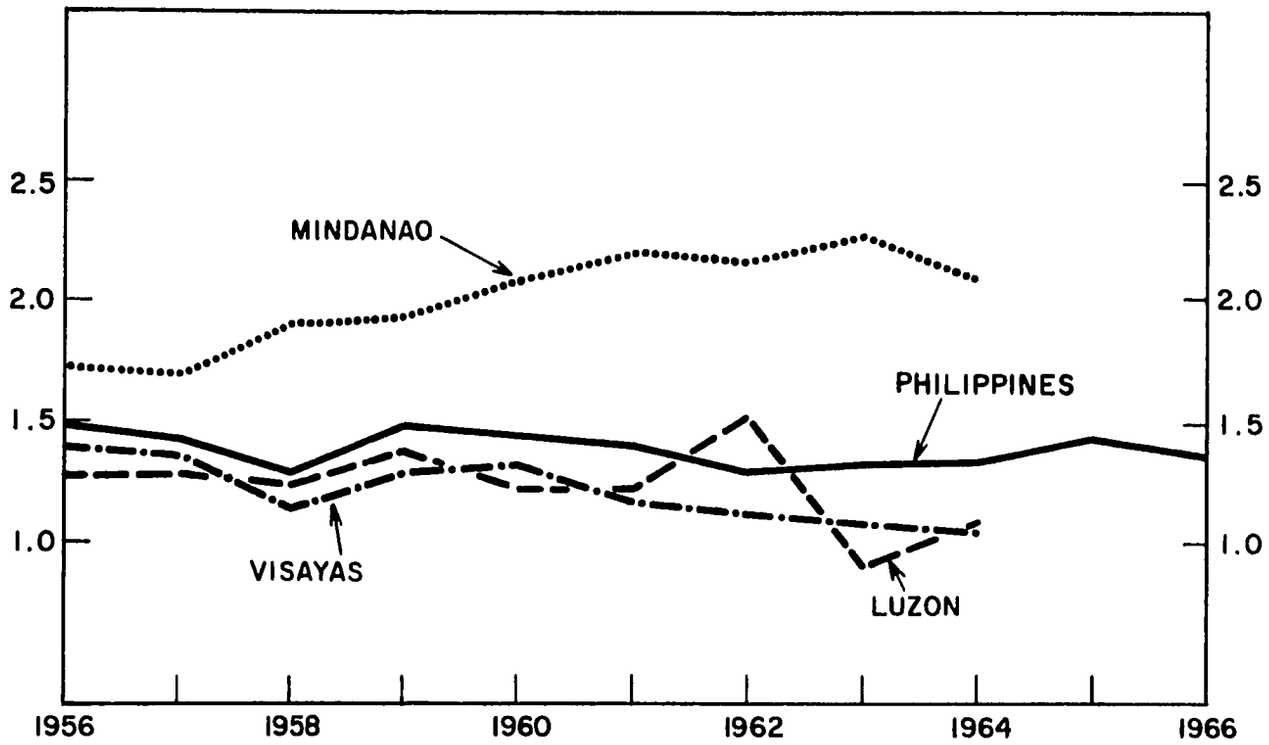
| Year | Luzon | Visayas | Mindanao | Philippines |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| 1956 | 1.30 | 1.41 | 1.77 | 1.50 |
| 1957 | 1.31 | 1.38 | 1.73 | 1.40 |
| 1958 | 1.23 | 1.14 | 1.93 | 1.33 |
| 1959 | 1.40 | 1.32 | 1.98 | 1.49 |
| 1960 | 1.27 | 1.37 | 2.16 | 1.45 |
| 1961 | 1.27 | 1.16 | 2.27 | 1.42 |
| 1962 | 1.56 | 1.13 | 2.21 | 1.34 |
| 1963 | 0.93 | 1.09 | 2.30 | 1.37 |
| 1964 | 1.09 | 1.07 | 2.13 | 1.36 |
| 1965 | n.a. | n.a. | n.a. | 1.44 |
| 1966 | n.a. | n.a. | n.a. | 1.34 |

Source: Columns (1), (2), (3): Raymundo E. Fonollera, "Labor and Land Resources in Philippine Agriculture," quoted in Richard W. Hooley and Vernon W. Ruttan, "The Agricultural Development of the Philippines, 1902-1965," in R. T. Shand (ed.) Agricultural Development in Asia (Canberra: ANU Press, forthcoming)

Column (4): Computed from Table 9 and DANR data on cultivated areas.

DIAGRAM 13

Cultivated Area per Person in
the Agricultural Labor Force (hectares)



economy in the sense of Lewis or Fei and Ranis.[46] However, while accepting the same basic data, we shall attempt to argue the contrary proposition.

Ruprecht has used the PSSH to compute a "surplus labor index," defined as the ratio of the number of equivalent fully unemployed nonagricultural workers (with 40 hours per week taken as full employment), plus the actual number of fully unemployed in agriculture, to the nonagricultural labor force.[47] Underemployed agricultural workers are excluded from the numerator on the grounds that they are mostly seasonal workers who would not, in fact, be available for full employment in industry. For the four years 1959-62 this computed ratio is almost constant at 20 per cent. It is Ruprecht's conclusion, at a first glance apparently inescapable, that such a magnitude clearly demonstrates the existence of an effectively unlimited supply of labor.

Since the labor force employed in the modern sector of the economy did not appreciably increase its share of the total labor force over the 1959-62 period (see Table 9), it is not possible to adduce the relative

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[46]Theodore K. Ruprecht, "Labor Absorption Problems and Economic Development in the Philippines," Philippine Economic Journal, Vol. V, No. 2 (1966).

[47]Ibid., pp. 291-293.

constancy of the surplus labor pool in support of unlimited labor. Indeed, the quality of the labor force data would probably not bear such an analysis even with substantial labor absorption by the modern sector. As an alternative approach we will look more closely at the surplus pool over the period for which the data exist (1956-65) in order to determine some of the major characteristics of Philippine unemployment.

For convenience of comparison, we retain Ruprecht's definition of the surplus labor pool (i.e., all the fully unemployed, plus the underemployed in nonagriculture converted to fully unemployed equivalents). However, as his revisions of the PSSH data are only available for 1956-62, we have used throughout the unrevised data. The focus at present is on distributions, which are only marginally affected by the errors in inflating factors that Ruprecht corrects for. Table 24 shows the breakdown of the surplus labor pool for selected years by sex and two further characteristics: fully unemployed as against underemployed and experienced unemployed as against those who had never held a job. The final row of the table is the surplus labor index. All the data are based on the October rounds of the survey for the reasons given earlier (see Footnote 15 of this chapter).

The breakdown is of interest for various reasons. First, the totally unemployed constitute about four-fifths of the pool, with the result

TABLE 24

Percentage Composition of the "Surplus Labor Pool"[a]
for Selected Years, 1958-1965
(Data in fully unemployed equivalents)

| | 1958 | 1960 | 1963 | 1965 |
|---|---|---|---|---|
| Male: | | | | |
| Unemployed | 41 | 44 | 41 | 42 |
| (experienced) | (24) | (23) | (22) | (17) |
| (never worked) | (17) | (21) | (19) | (25) |
| Underemployed in non-agriculture | 8 | 6 | 9 | 9 |
| Female: | | | | |
| Unemployed | 42 | 39 | 36 | 37 |
| (experienced) | (25) | (21) | (17) | (10) |
| (never worked) | (17) | (18) | (19) | (27) |
| Underemployed in non-agriculture | 9 | 11 | 14 | 12 |
| Total surplus labor pool | 100 | 100 | 100 | 100 |
| Surplus labor as a proportion of labor in non-agriculture (percent) | 25.4 | 20.8 | 15.2 | 19.2 |

[a]See text for definition.

Source: Computed from October PSSH data.

that underemployment in nonagriculture appears to be relatively insignificant by comparison. Secondly, males and females contribute approximately equal numbers to the pool. It is quite likely that many female unemployed are either not actively seeking work (although this is supposedly a necessary condition for inclusion in the PSSH category) or have unduly specific job requirements. In both cases, the female component would be overstated insofar as it cannot be fully drawn upon. More important, however, is the division between experienced and inexperienced unemployed. An increasing proportion of the labor pool is composed of people who have never held a job for more than two weeks. Given the Philippine age distribution, these are almost certainly young people, many of them high school or college graduates who are seeking positions at levels appropriate to their own conception of their qualifications. Where there is a lack of job opportunities at such levels, they may well prefer unemployment to positions of lower status.

If we now examine the "hard core" of the surplus labor pool, the experienced totally unemployed, a significant fact emerges. The median time spent looking for work in nonagricultural industries by people in this category in the years covered by the PSSH ranged from 7 to 9 weeks. When it is considered that the Philippines has no organized labor market, that diffusion of information on job opportunities is poor, and that the

population is relatively immobile compared to more developed countries, such a period seems quite short. The size of the experienced unemployed component of the labor pool can perhaps better be regarded as reflecting market imperfections rather than as a serious unemployment problem.

The recorded level of underemployment also may to some extent reflect the consequences of administrative inefficiency, poor organization, and lack of information--resulting in an inability to make full use of presently employed labor--as well as a surplus labor phenomenon.

The above arguments are admittedly based on data whose reliability may legitimately be doubted. The figures on unemployment are probably the weakest part of the PSSH labor statistics. Nevertheless, there would seem less reason to question the breakdown of unemployed given in Table 24 than, say, the aggregate ratios in the last row of the table. Thus, the evidence suggests that Philippine unemployment can largely be accounted for in terms of the market frictions endemic to underdeveloped countries.

The indirect evidence of wages in industry has sometimes been used to support the labor surplus hypothesis. Sicat, for example, claims that the fact that wages in manufacturing did not tend to increase (prior

to the 1965 rise in the minimum wage) proves an infinite elasticity of supply.[48] The data on wages will be examined in more detail later in this chapter. For the present, we would observe that such evidence is hardly conclusive. The existence of any legal minimum wage above its equilibrium value must to some degree dampen the effect of a labor surplus on average wage levels. This, of course, is not to dispute the undoubtedly important effect that the minimum wage law has had as a disincentive to labor absorption in manufacturing.

On the basis of this discussion of land/labor ratios in agriculture and of unemployment in industry, we can conclude that, in broad terms, the Philippines may with justification be regarded as a land-surplus economy in the sense of Chapter 3. Since about 1960, however, there are indications that the elasticity of land with respect to labor (k in Equation 4 of the previous chapter) has dropped below one. This downward trend is likely to be irreversible.

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[48]Gerardo P. Sicat, "Analytical Aspects of Two Current Economic Policies," Philippine Economic Journal, Vol. IV, No. 1 (1965), p. 119.

## Sectoral Production Functions

From the previous observations about the land/labor ratio, we accept a production function with labor force ($L_a$) as the only factor, acting as proxy for land (T) as well. The estimate of 0.93 obtained above for the postwar elasticity of land with respect to labor (k) indicates that unless there are increasing returns to scale when both $L_a$ and T are taken into account, then the estimated value of $\gamma$, the elasticity of output with respect to labor, is also less than one. Indeed, we may reasonably assume that $\gamma$ does not greatly differ from k.[49] In practice, however, the meager data available do not permit the testing for goodness of fit of any production function. The furthest we can go in this direction is to demonstrate that the exclusion of the factor T from a Cobb-Douglas function (using the data from Table 10) does not appreciably increase the unexplained residual variation in output. No more positive result than this should be expected, as the conceptual and practical difficulties of aggregation largely preclude analysis on this level.

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[49] For output governed by Cobb-Douglas function, $Y_a = cL_a^{\alpha} T^{1-\alpha}$, which we took in Chapter 3 as an acceptable approximation for values of k less than one, we had that: $Y = \alpha + (1 - \alpha)k$. The smaller is $\alpha$, the closer is $\gamma$ to k.

It is appropriate at this point to examine the effect of price changes on total agricultural output, since it is assumed in the model that they are negligible. Various studies have demonstrated that changes in the relative hectarage devoted to different crops can be explained as responses to changes in the price of one crop relative to its major competitor or to all alternative crops. Mangahas, Recto, and Ruttan have estimated price elasticities with respect to hectarage for rice and corn by regression of harvested area on various lagged relative price indices.[50] Their results for the decade 1953-54 to 1963-64, although not significant at the conventional levels, indicated that elasticities are greater in areas with strong commercial markets or (for rice) a high proportion of irrigated land.[51] The overall shift from food crops to export crops which has taken place since 1960 is a direct consequence of the increased export crop profitability caused by the exchange decontrol measures of 1960-62. Treadgold and Hooley[52] show a strong linear relationship between the

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[50] Mahar Mangahas, Aida E. Recto, and Vernon W. Ruttan, "Market Relationships for Rice and Corn in the Philippines," Philippine Economic Journal, Vol. V, No. 1 (1966).

[51] Ibid., p. 18.

[52] Malcolm Treadgold and Richard W. Hooley, "Decontrol and the Redirection of Income Flows: A Second Look," (Discussion paper; University of the Philippines, Institute of Economic Development and Research), pp. 13-15.

proportion of crop area devoted to commercial crops and a lagged moving average of the relative wholesale price of export products compared to domestic consumption products. Almost 82 per cent of the variability in the relative share of commercial crops can be accounted for by these price changes.

While there is thus conclusive evidence of the effect of price on hectarage allocation between crops, any similar price effect on yield has yet to be demonstrated. Mangahas could find no measureable yield response to price for rice or corn.[53] Similar negative results have been found for other countries in Southeast Asia.[54] Of the important commercial crops, only sugar cane can possibly be adduced as an example of price responsive yield increases. We can, therefore, find little support for the type of "technology adjustment mechanism" postulated by Fei and Ranis, by which agricultural innovation intensity can be made a function of the relative price of output.[55] The important conclusion which

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[53] Mangahas, et al., op. cit., p. 26. Note, however, that price may have an indirect adverse influence on yield due to the negative association between hectarage and yield.

[54] Randolph Barker, "The Response of Production to a Change in Rice Price," Philippine Economic Journal, Vol. V, No. 2 (1966), p. 265.

[55] John C. H. Fei and Gustav Ranis, "Agrarianism, Dualism, and Economic Development," in Adelman and Thorbecke (eds.), The Theory and Design of Economic Development, p. 34.

follows is that, although the composition of agricultural output may vary considerably, aggregate output is relatively price inelastic.

As we found for the agricultural production function, the assumption of fixed factors in the modern sector is also difficult to validate. Ideally, we should attempt to estimate the elasticity of substitution between capital and labor, for example, by fitting a CES production function, and determine whether it is greatly less than one. However, it has not been possible to estimate this elasticity with any precision in the Philippine case. The necessary time series data are not available over a sufficient period. Attempts to fit a CES function to cross-section data from the Annual Survey of Manufactures founder on the fact that the wage rates (to a large extent not market-determined) show little inter-industry variation. Moreover, the use of cross-section data rests on very dubious theoretical grounds in assuming an identical elasticity of substitution in each industry division.[56]

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[56] Sicat has computed the logarithmic regressions of labor productivity on wages, using two-digit ISIC cross-section data for each year 1956-59. Although he obtained statistically significant estimates for the elasticity of substitution, only 40 per cent on average of the variation in productivity was explained. The elasticities lay in the range 1-1.5. Gerardo P. Sicat, "Production Functions in Philippine Manufacturing: Cross-Section Estimates, 1956-59," Philippine Economic Journal, Vol. II, No. 2.

For the subsector of manufacturing, more success has, in fact, been found in fitting a Cobb-Douglas function although its assumption of unit elasticity of substitution bypasses the problem of estimation. Using a combination of cross-section and time series data for the period 1956-59, giving a total of 74 observations, the following estimates were obtained (standard errors in parentheses):[57]

$$Y_i = 1.793 + \underset{(0.073)}{0.729} \log K_i + \underset{(0.081)}{0.276} \log L_i \quad (R^2 = 0.87)$$

where $K_i$ and $L_i$ are the capital and labor inputs. The implied shares received by the factors, 73 per cent to capital and 27 per cent to labor, are roughly consistent with the actual shares computed in Table 17 (which average 70 and 30 per cent, respectively, for the same period, 1956-59). But if, as we have argued, the aggregate production function allows a smaller degree of substitutability between factors than Cobb-Douglas, we can still retain the Cobb-Douglas allocation principle at the firm level. As was explained in Chapter 3, there is no necessary conflict between an aggregate (ex post) function incorporating fixed factors and neoclassical factor allocation at lower levels.

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[57] This result, based on data from the Annual Survey of Manufactures, differs from Sicat's (ibid., p. 118) which showed elasticities for $K_i$ and $L_i$ of 0.553 and 0.504, respectively.

Since we do not have the data on the aggregate modern sector which would enable us to distinguish between the various forms of production function, the most we can do is to estimate the parameters in a given function. Our postulated inelasticity of factor substitution must remain intuitively based. This inconclusive result for the Philippines is hardly surprising, however, when the range of estimates for the same elasticity in U. S. manufacturing is considered. Although most estimates are significantly less than one and greater than zero, different methods of fitting give rise to a wide range of results.[58]

## The Agricultural Surplus

In Chapter 3 we distinguished two types of surplus from the traditional sector: the total agricultural surplus (over local sectoral food consumption) and the exported surplus (over total domestic food consumption). Both were specified by making the major simplifying

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[58]See, for example, the summarized results given by Bodkin and Klein. Of their own findings (for the U. S. private, nonfarm sector, 1909-49), they write: "The estimates of the elasticity of substitution from our CES model vary from approximately zero to approximately unity..." Ronald G. Bodkin and Lawrence R. Klein, "Nonlinear Estimation of Aggregate Production Functions," Review of Economics and Statistics, Vol. XLIX, No. 1 (February 1967), pp. 35 et seq.

assumption that food consumption per member of the labor force, or, equivalently in the Philippine case, per capita, is constant, and incidentally that it is identical in the two sectors.

There is little doubt that per capita food consumption in the Philippines has remained fairly constant over a long period in the face of significant changes in real income and in the relative price of foodstuffs. Two studies may be cited, both based on the disappearance method.[59] Golay and Goodstein[60] have computed the apparent per capita absorption of cereals (milled rice, milled corn, and wheat flour, combined by weight) over the entire period since 1910. Their results are summarized in Table 25. In the postwar period particularly, the annual data show remarkable stability with the single exception of 1965, an election year, in

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[59] I.e., estimation of consumption as production plus imports less exports less net additions to inventories less allowances for losses and alternative uses.

[60] Frank H. Golay and Marvin E. Goodstein, Rice and People in 1990 (Manila: USAID, 1967), pp. 24-32.

TABLE 25

Apparent Per Capita Direct Absorption of Cereals[a], Philippines, 1910-1965 (Five year averages; index 1951-55=100)

| Period | Index | Period | Index |
|---|---|---|---|
| 1910-14 | 88.8 | 1935-39 | 97.5 |
| 1915-19 | 102.1 | 1947-50 | 92.0 |
| 1920-24 | 118.3 | 1951-55 | 100.0 |
| 1925-29 | 121.4 | 1956-60 | 102.1 |
| 1930-34 | 105.3 | 1961-65 | 104.4 |

[a]Milled rice, milled corn equivalent, and wheat flour equivalent.

Source: Based on data in Golay and Goodstein, op. cit., P.55.

which there was a large importation of rice.[61] This picture is reinforced by some data for 1955-64 from the Program Implementation Agency's series of national accounts, quoted in an unpublished paper by Williamson.[62] When expressed in constant prices, apparent per capita expenditures on food show almost no change over this decade although total per capita consumption expenditures rose by an average of 1 per cent per year.

A comparison of the two PSSH family income and expenditure surveys, held in 1957 and 1961, tends to give a contrary impression. In real terms, the mean family income increased at an average rate of 1.6 per cent per year while family expenditure on food (deflated by the

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[61] A rather surprising finding in the Golay and Goodstein study is that per capita consumption of cereals is some 5-10 per cent below the recommended annual nutritional requirement of 120 kg. per year. This observation perhaps raises some doubt as to the accuracy of the absolute levels of consumption estimated from the supply side, although not necessarily affecting year-to-year comparisons. An independent estimate of rice and corn absorption from the consumption side in 1960 gave a result of 148 kg. for per capita consumption of these two cereals alone. (Computed from PSSH October 1960 data for direct consumption in one week in October. Volumes converted to weights using the factors: 1 ganta clean rice = 2.30 kg; 1 ganta shelled corn = 2.34 kg.)

[62] Jeffrey G. Williamson, "Consumption Patterns in the Philippines, 1955-1964," (Quezon City, April 1967), mimeographed.

consumer food price index) showed an annual rise of over 7 per cent.[63] A possible explanation for this anomalous result is increased consumption of higher priced, processed food items, the income elasticity of demand for which may be supposed to be quite high. Rises in median expenditures on food are probably much lower than average expenditures.[64] It is more likely, however, that faults in the surveys themselves either in coverage or in respondent errors--especially in the earlier survey--effectively preclude their use to show changes over time.[65]

Constancy of food consumption in itself says nothing about the price or income elasticity of demand for food nor of the price elasticity of home consumption of food producers. On the last mentioned, nothing

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[63] Computed from PSSH Bulletin No. 14, p. xiii et seq. Within each survey, the data show the expected inverse relation between family expenditure and the proportion of it spent on food items.

[64] Median family income increased only at 1.1 per cent per annum over 1957-61.

[65] A household survey of metropolitan Manila held by the Central Bank in 1954 is consistent with the 1961 PSSH but strongly in conflict with the 1957 results. Food expenditures in Manila averaged 43.7 per cent of total expenditures in 1954 and 42.3 per cent in 1961; for cereals the proportions were 13.1 per cent and 10.8 per cent. Central Bank, Annual Report, 1954, p. 23.

is known in the Philippines. Mangahas, Recto, and Ruttan[66] suppose it to be negative but small enough to be ignored, and, hence, that it is possible to estimate the elasticity of the marketed surplus by simply raising the output elasticity by a constant factor, the inverse of the average proportion of output which is marketed. As we discussed previously, there is no evidence to suggest that yield elasticities are of much significance, although they are presumably non-negative. Hence, the elasticity of cultivated area may be used as a proxy (and a lower bound) for the elasticity of output. On these assumptions, Mangahas has derived the surplus elasticities for rice and corn with respect to expected price. The results suggest high elasticities for corn in the Visayas and Southern Tagalog. For rice, these regions stand out less clearly and are joined by Central Luzon and Bicol. However, the legitimacy of this method is open to question. Barker[67] has criticized the relationship assumed between output elasticity and hectarage elasticity on the valid grounds that yields and hectarage are inversely correlated. To the extent that this correlation is significant, the estimates obtained are exaggerated. The

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[66] Mangahas, et al., op. cit., p. 20.

[67] Barker, op. cit., p. 268. (See also the discussion of agricultural productivity later in this chapter.)

results are, therefore, inconclusive. Mears and Barker comment, for the case of rice: "The empirical evidence either for or against a positively sloping [supply] function for marketed surplus is not convincing. It may well be that the slope changes, being positive over some price levels and negative over others."[68]

If we can conclude from the above discussion that the assumption of zero price elasticity of supply for the total agricultural surplus is not unreasonable, it is another question when we consider the exported surplus. In the latter case, the price and income elasticities of demand for food are of crucial importance. Various estimates of these elasticities exist. An FAO estimate of income elasticity based on the period 1950-60 is 0.75.[69] Williamson, using the Program Implementation Agency data for 1955-64 mentioned above, obtains an income elasticity of demand for food of 0.95 and price elasticity of -0.6137.[70] The former estimate may be

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[68] Leon Mears and Randolph Barker, "Effects of Rice Price Policy on Growth of the Philippine Economy--An Analytical Framework" in Hooley and Barker (eds.), Growth of Output in the Philippines, p. 28.

[69] Quoted by Williamson, op. cit., p. 19.

[70] Ibid., pp. 16, 18.

inflated in terms of quantity changes insofar as increased expenditure on foodstuffs is directed towards higher quality items. Two studies of the income elasticity of demand for cereals concluded that it was very low or negative for rice and negative for corn. Only for wheat flour was the elasticity found to be positive.[71] These results, however, are based on absorption data similar to those quoted above and so are not independent estimates. Nevertheless, we would expect that, at least in quantity terms, the income effect on demand for traditional sector output of food crops would be quite small. Moreover, if the intersectoral terms of trade are moving against the modern sector (as they have been), a negative price elasticity would further retard the growth of modern sector demand for this output.[72]

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[71] AGRECO, The Philippines: Long-Term Projection of Supply and Demand for Selected Agricultural Products (U. S. Department of Agriculture, ERS-Foreign-34), p. 96; and H. L. Cook, et al., Long Range Requirements for Selected Foods in the Philippines (Manila: International Cooperation Administration, 1957), p. 18; cited by Golay and Goodstein, op. cit., p. 30.

[72] It is likely, however, that the demand for cereals is relatively price inelastic (as well as income inelastic) and, hence, that a reduction in demand for traditional sector cereal output could take place only if cereal imports (such as wheat flour) were available at lower prices. On demand elasticities for rice, see Mears and Barker, op. cit., pp. 30-32.

## Import Dependence

In the discussion of development indicators in Chapter 2 it was shown on the basis both of time series and cross-section data that small countries can never expect to develop an extensive capital goods industry. The cross-section result was that, in the course of development, the import content of investment (as measured by the ratio of imported producers' equipment to total investment in such equipment) would fall from about 80 per cent to around 60 per cent. Subsequently, this finding was incorporated into the model as representing a fundamental constraint on growth. It is clearly essential to justify making such an assumption for the Philippine case, as many of the results predicted by the model are directly contingent on it.

Data on total imports of durable equipment can be assumed to be quite reliable although this is not the case for domestic production.[73] The NEC estimates of gross capital formation in durable equipment are derived from c.i.f. import values, marked up 50 per cent, and Central Bank data on domestic output, marked up 25 per cent. Of the total supplies of durable equipment at purchasers' prices thus obtained, a fixed

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[73] See Levy, op. cit., p. 26.

proportion is assumed to be investment goods.[74] Unfortunately this procedure does not permit us to disaggregate the investment data into its imported and locally produced components. Levy, however, on the basis of his own examination of the data, puts the value of investment in locally produced equipment (mostly transportation equipment and agricultural machinery) at about 10 per cent of the total in the early 1960s.[75] Accepting this estimate we can observe the past trend in the size of the import content from indices of imports and domestic production of durable equipment. (This admittedly gives only a rough indication, since the level of investment has risen more rapidly than either imports or domestic output of equipment, indicating that the share of consumer durables in both the latter has fallen.) Table 26 gives these indices: Column 1 is based on Central Bank import data deflated by the import price index, while Column 2 is the bank's index of physical production of durable equipment. The latter index is generally thought to understate the actual

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[74] Ibid.

[75] Ibid., p. 25.

TABLE 26

Indices of Imports, Domestic Production and Investment in Durable Equipment, Philippines, 1955-1965
(Three-year moving average, 1954/56=100)

| Year | Imports[a] (1) | Domestic Production[b] (2) | Investment[a] (3) |
|---|---|---|---|
| 1955 | 100 | 100 | 100 |
| 1956 | 116 | 107 | 124 |
| 1957 | 121 | 109 | 147 |
| 1958 | 125 | 106 | 156 |
| 1959 | 144 | 94 | 175 |
| 1960 | 164 | 100 | 194 |
| 1961 | 172 | 112 | 209 |
| 1962 | 164 | 133 | 219 |
| 1963 | 177 | 160 | 188 |
| 1964 | 195 | 164 | 269 |
| 1965 | 214 | 164 | 293 |

[a]Constant 1955 prices.

[b]Physical production.

Source: Columns (1) and (2), basic data from Central Bank, Statistical Bulletin; Column (3), NEC National Accounts data.

rise. It is clear that there is little evidence of any decline in the import content of investment over the period 1955-65.[76]

Investment in durable equipment is, of course, only a part of total gross investment. From the data presented earlier in Table 15, we find that the ratio of investment in equipment to total modern sector investment varies between about 30 and 50 per cent. The proportion has shown some tendency to increase over the postwar years. If we now extend our definition of investment goods imports to cover not only durable equipment but also related intermediate goods (i.e., the classification used in Table 8), we can compute an aggregate import content of investment. This ratio, although not very stable, has averaged 64 per cent over the period 1950-66 and shows no systematic trend.

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[76]An interesting distinction obscured in the data presented in Table 26 is that between investment in fixed assets and additions to inventory. There is some suggestion that imported inputs into the manufacturing sector have been growing faster than manufacturing value added. The proportion of gross output contributed by value added has shown a steady decline from 44 per cent in 1956 to 38 per cent in 1966 (computed from Annual Survey of Manufactures data), although this may at least partly be due to rising relative prices of inputs. The decline is more marked for heavy industry, i.e., the later ISIC divisions.

## The Investment Function

The constant price data on gross investment given in Table 15 and used above in discussing import dependence correspond to what we termed real investment (I*) in Chapter 3. Under the operation of the import constraint, the level of real investment was determined (to a large extent) exogenously to the modern sector by total import capacity. The propensity to invest out of profits, on the other hand, is a behavioral characteristic of the individual entrepreneur. Such individual ex ante investment decisions are reconciled with the availability of foreign exchange by changes in the price of capital goods. We wish here to examine our assumption that (ex ante) investment is profit-determined.

The only substantial study of investment functions in the Philippines is that by Hooley and Sicat for the manufacturing sector.[77] Using 1961-62 data, derived from a stratified sample of some 200 firms, they attempt to fit a number of linear, logarithmic, and ratio-type investment models. The explanatory variables considered are net profits, sales (current and past), retained earnings, capital stock, and depreciation.

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[77] Richard W. Hooley and Gerardo P. Sicat, "Investment Demand in Philippine Manufacturing," School of Economics, University of the Philippines, Discussion Paper 67-2, 1967 (mimeographed).

Regressions were carried out for firms classified by size of assets and by industry group as well as for the pooled data. The results of most interest for the purposes of the present study pertain to the linear model. In fitting the function:

$$I(t) = a_o + a_1 P(t) + a_2 K(t - 1)$$

(where I is gross investment--i.e., accumulation of fixed capital, P net profits, and K end-year capital stock, all measured in million pesos) to the pooled data, the coefficients were estimated as follows (standard errors in parentheses):

$a_o = -3.0$ (125.5)

$a_1 = 0.7833$ (0.1205)

$a_2 = -0.0369$ (0.0270)

The estimate of $a_1$ is highly significant, that of $a_2$ not significant. The correlation coefficient was 0.54.[78] When other variables were introduced, the coefficient of P was little changed and remained highly significant. Profits are thus clearly the major determinant of investment, given the

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[78] Ibid., p. 108.

assumption of linearity. On the basis of all the regressions on the pooled data, Hooley and Sicat conclude, inter alia, that "manufacturing investment displays a strong profits-push type of behavior. In all the fits, at least half--and generally much more than half--of explained variance is traceable to profits or retained earnings rather than to sales pull."[79]

When the firms were grouped into five classes by size of assets, some further interesting results emerged. For the smallest class, profits were dominant in the linear-type function, the coefficient rising to 1.4 and the correlation coefficient to 0.7.[80] However, in progressing to larger size firms other variables, particularly depreciation, became important and the role of profits diminished. At the same time the linear model fit became poorer and that of the ratio model improved.

A similar grouping by industry allowed a more detailed analysis of investment behavior by reducing within-group variation. Industries with positive and significant profit coefficients (using the linear model) were: tobacco and beverages; textiles, wood products, furniture, and fixtures; paper, paper products, and printing; rubber, chemicals, and petroleum products; and metal products. Of the other groups, food is

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[79] Ibid., pp. 47-49.

[80] Ibid., p. 111.

dominated by the sugar mills, which because of the quota arrangements have had little reinvestment over a long period; heavy industry (ISIC groups 36, 37, 38), on the other hand, consists largely of assembly plants in which investment in fixed assets is outweighed by investment in inventory (excluded from the analysis). With the industry group of footwear, wearing apparel, and leather products, profits were also not significant in determining investment, but here the authors suggest that the small optimum size of firms in this group results in low investment requirements which usually can be financed out of depreciation.[81] Analysis of investment behavior by firm is, therefore, inappropriate.

In the whole manufacturing sector it is estimated that about one-half of total output is contributed by firms with assets (in 1961) of less than ₱3 million (corresponding to the two smallest size classes in the above study).[82] Hence, the Hooley-Sicat finding of profit-pushed investment behavior in small firms lends some degree of support to the use of a simple reinvestment-type model (I = sP) if any one function must be chosen to cover the whole sector.

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[81] Ibid., pp. 73-74.

[82] Rough calculation by Richard W. Hooley.

## Intersectoral Wage Differentials

Comparable data on wage rates in the two sectors are not directly available. The Central Bank compiles data on wages of various skilled and unskilled workers in industrial establishments in Manila and suburbs, based on information for some 800 selected private firms. The wage rate for "common laborers" is the lowest of these and is the most appropriate to use from the viewpoint of intersectoral labor transfers. Real wages are obtained by deflating the money wage by the Manila consumer price index. However, as with the Central Bank employment and production data, a possibly serious bias is introduced by the systematic nature of the sample used. For example, compliance with the minimum wage law is likely to be much less complete in the small marginal establishments overlooked in the sample.

The problems involved in determining wage rates in the traditional sector of the economy are more complex than in industry. The Department of Agriculture and Natural Resources records the daily money wages of four categories of farm workers (plowmen, planters, harvesters, and common laborers) in nine geographical regions. As each of these occupations is relatively unskilled and susceptible to unemployment, the average wage weighted by the numbers in each category is used. There are two important problems of adjustment: first, to allow for payment in

kind, usually taken as two meals per day for each worker, and second, to find a suitable price deflator for rural areas. The first of these can be resolved by reference to the 1961 PSSH survey of family incomes and expenditures. From Table 16 of the survey report, we can compute the ratio of wages in cash to wages not in cash paid to workers in the agricultural sector. It shows that some 78 per cent of total wages are in cash and 22 per cent in kind. Thus, the cash wage can be inflated by the factor 100/78 = 1.28 to allow for payment in kind.[83] To convert the wage series to real 1955 prices, a composite index was formed consisting of the consumer price index for regions outside Manila (available since 1957) spliced on to the Manila price index for domestic consumer goods (1955 = 100) for the period 1950-57.

The real wage series for agriculture and industry are contrasted in Table 27. As was mentioned in the earlier discussion of the labor surplus, in neither sector has there been any inclination for real wages to rise. Of more interest at present is the marked apparent differential between sectors: this clearly merits further analysis.

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[83] Williamson, by different reasoning, deduces an inflating factor of 1.5. The difference is not important. Jeffrey G. Williamson, "Economic Growth in the Philippines: 1947-1965: The Role of Traditional Inputs, Education and Technical Change," Discussion Paper No. 67-8, School of Economics, University of the Philippines, 1967, p. 67.

TABLE 27

Real Daily Wage Rates in Agriculture and Industry
(pesos, at 1955 prices)

| Year | Industry[a] | Agriculture[b] | Year | Industry | Agriculture |
|---|---|---|---|---|---|
| | (1) | (2) | | (1) | (2) |
| 1950 | n.a. | 2.05 | 1959 | 4.94 | 2.33 |
| 1951 | 3.96 | 1.95 | 1960 | 4.73 | 2.28 |
| 1952 | 4.47 | 2.28 | 1961 | 4.76 | 2.24 |
| 1953 | 4.82 | 2.59 | 1962 | 4.65 | 2.19 |
| 1954 | 4.96 | 2.73 | 1963 | 4.64 | 2.23 |
| 1955 | 5.18 | 2.75 | 1964 | 4.30 | n.a. |
| 1956 | 5.12 | 2.38 | 1965 | 4.50 | n.a. |
| 1957 | 4.97 | 2.39 | 1966 | 4.52 | n.a. |
| 1958 | 4.81 | 2.37 | | | |

[a]Common laborers in industrial establishments.

[b]Agricultural laborers (weighted average of farm wage rates adjusted for payments in kind.)

Source: Column (1) Central Bank Statistical Bulletin; Column (2) basic data from Central Bank Annual Reports; see text for method of adjustment.

One partial explanation for this differential is the difference between the cost of living in urban and rural areas. Little information is available on this point as most price statistics are gathered in urban areas. Retail food prices are generally higher in Manila than in provincial cities, although, significantly, the price of rice is often lower.[84] It is unlikely, however, that this explains more than a small part of the observed difference.

Probably of more significance is the effect on industrial wage levels of the minimum wage law. The legal minimum wage was ₱4 prior to 1965, increased to ₱6 in April of that year. It may be supposed that compliance with the law was more complete for large establishments. This is strongly suggested by data from the 1961 Census of Manufacturing. Average payrolls per paid employee can be computed from the census for both large establishments (10 or more workers) and small establishments (less than 10), and making a number of rough assumptions we may derive the equivalent average daily wage. The results are given in Table 28. Differences in average wages between large and small establishments are

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[84]See BCS, Journal of Philippine Statistics.

TABLE 28

Estimated Average Wage Rates Based on the 1961 Census of Manufacturing

| Item | Large Establishments[a] | Small Establishments | Total |
|---|---|---|---|
| Total payrolls (₱1000) | 507,258 | 36,094 | 543,352 |
| Number of paid employees | 258,088 | 43,328 | 301,416 |
| Average income per employee (₱) | 1,965 | 833 | 1,803 |
| Equivalent average daily wage (₱) | 6.55 | 2.78 | 6.01 |
| Real average daily wage (₱ at 1955 prices) | 5.79 | 2.46 | 5.31 |

[a]Establishments with 10 or more workers are classified as large, the remainder as small.
[b]Assuming 300 working days per year.

Source: Payroll and employment data from BCS, Economic Census of the Philippines 1961, Vol. III.

seen to be very substantial.[85] Moreover, there is evidence that the census seriously undercovered small establishments so that the weighted average wage in Table 25 is almost certainly overstated.[86] Our conclusion, therefore, is that the Central Bank wage series is an accurate reflection of wages in the larger establishments but may be more than twice the average wage in establishments with less than 10 employees. The significance of such a finding is that it is the latter wage which is the more correct comparison with agricultural wages in the intersectoral labor market.

The picture of the labor market which emerges from this brief discussion is, therefore, one in which there is no sharp distinction between the traditional and modern sectors. Rather, the former

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[85]This finding is confirmed by the wage data implicit in the Annual Survey of Manufactures. Establishments employing more than 20 persons showed average daily wages in 1955 prices of ₱6.0 - 6.5 over the period 1956-66; those in the size group 5-19 workers, ₱3.1 - 4.0.

[86]The October 1961 PSSH shows a total of 487,700 wage and salary workers in manufacturing (excluding self-employed and unpaid family workers), compared to the 301,416 recorded in the census. It is reasonable to suppose that most of the disparity is due to under-recording of small establishments (in particular, household industries) in the census. If this is the case, and payrolls per worker in the unrecorded industries are similar to those in small establishments (a "high" assumption), then the average daily wage in 1955 prices given in the last column of Table 28 is reduced from ₱5.31 to ₱4.22.

agricultural laborer who turns his hand to small-scale manufacturing can initially expect only marginally increased wages. It is only in the more organized parts of the sector that wages are appreciably higher, and even here higher living costs may partly vitiate the increase. Manufacturing, of course, is not the whole modern sector, but in most other parts of it median wages are approximately the same.[87]

## ESTIMATION OF PARAMETERS AND GROWTH RATES

In the above discussion we have argued that the major structural and behavioral relationships postulated in the model of Chapter 3 can be meaningfully interpreted in empirical terms for the Philippine case. Inevitably, however, the form this discussion has taken has been one of a series of separate analyses of specific topics. We are now in a position to consider the model as a whole as it applies to the Philippines and to derive estimates of the model parameters.

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[87]This is true, for example, of construction, transportation, commerce, and services other than government and domestic services. Government services have a higher median wage, and for domestic services no meaningful estimate is possible. See PSSH Bulletin No. 3: October 1956 to October 1957. (Note that such comparisons can be made only from sex-specific data, due to the wide differences in wage levels for males and females. The average wage recorded in Column 4 of Table 14 shows somewhat more variability.)

The substantial quantity of data assembled in this chapter can be summarized by computing the initial value and average growth rate of each of the major variables. For data from such a variety of sources with differing degrees of reliability it would be unreasonable to expect complete internal consistency, but it may be shown that the relationships between these growth rates predicted by the model are, in the main, well borne out.

## Productivity

In Table 10 we have seen that the two partial productivity indices (output/labor and output/land) for the traditional sector show no apparent increase over the period 1950-66. Moreover, if the NPA-based estimates of GNP originating in the whole traditional sector (Table 5, Column 1) are used in place of the index of crop output, both partial productivities show a slight decline. In the modern sector we have equivalent data only for manufacturing (Table 16); the trends revealed there suggest a steadily rising output/labor ratio and an almost constant output/capital ratio. Because of the crucial role of productivity changes in determining long-run growth prospects in the open dual economy, these apparent trends should be examined with care.

The pioneering work of Hooley in constructing long-term indices of output and factor inputs for the Philippines allows us to place the recent observations in historical perspective. For agriculture, Hooley finds that over the period 1902-61, the output/labor ratio rose at the average rate of 0.3 per cent per annum while output/land fell by 0.8 per cent per annum. The two other minor factor inputs he considers, animals and machinery, also increased at a faster rate than output, with the result that total productivity in agriculture (measured as output over a weighted average of the four inputs) showed a slight fall.[88] For manufacturing, the average increase in the output/labor ratio over 1902-61 was 0.7 per cent and output/capital declined by approximately 0.3 per cent a year. An index of total productivity, obtained by combining the values of the capital and labor inputs, showed an overall decline in this period.[89] These indices for agriculture and manufacturing are shown in graphical form (on a logarithmic scale) in Diagrams 14 and 15.

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[88]Hooley, "Long Term Economic Growth in the Philippines, 1902-1961," p. 25. The factor shares are given as: labor, 47 per cent; land, 43 per cent; animals, 9 per cent; and machinery, 1 per cent. The use of 1902 as base year tends to bias upwards the observed changes in productivities, since 1902/03 was a period of extreme drought. See R. W. Hooley and V. W. Ruttan, "The Agricultural Development of the Philippines," in R. T. Shand (ed.), Agricultural Development in Asia (Canberra: ANU Press, forthcoming), p. 17 fn.

[89]Hooley, op. cit., p. 32. In deriving these rates we have ignored the 1948 data on the grounds that capacity utilization was still abnormally low after the war.

DIAGRAM 14

Productivity in Philippine Agriculture, 1902-1961

(indices, 1902 = 100)

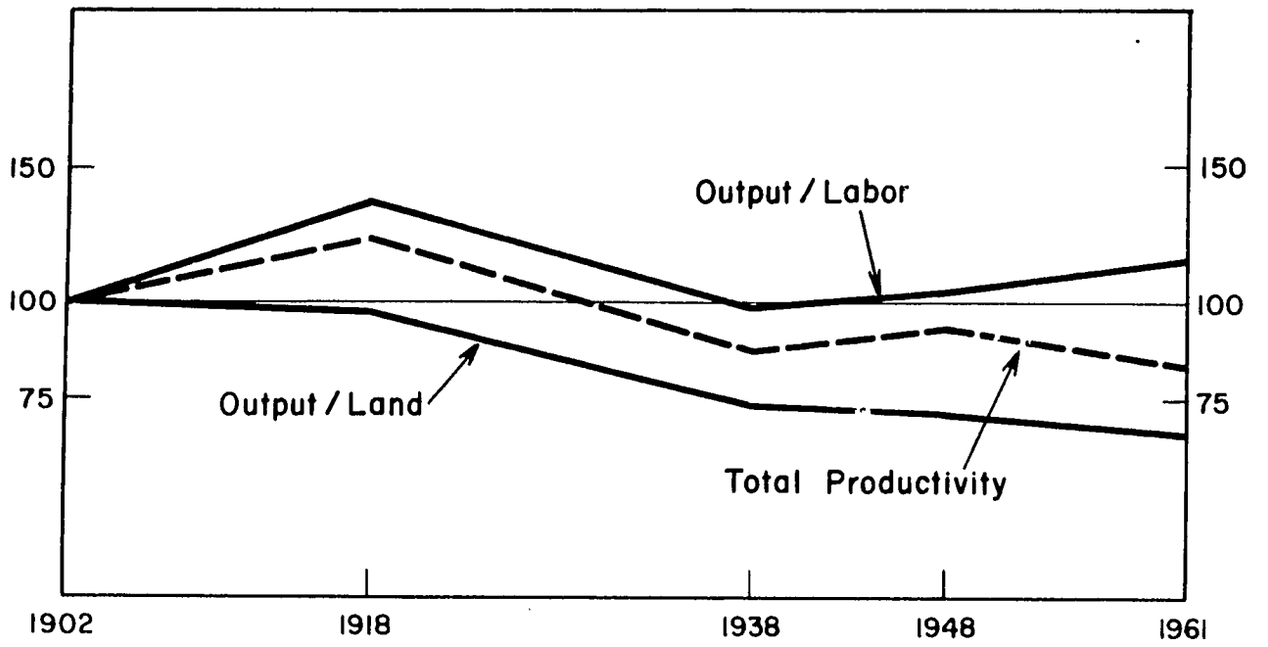
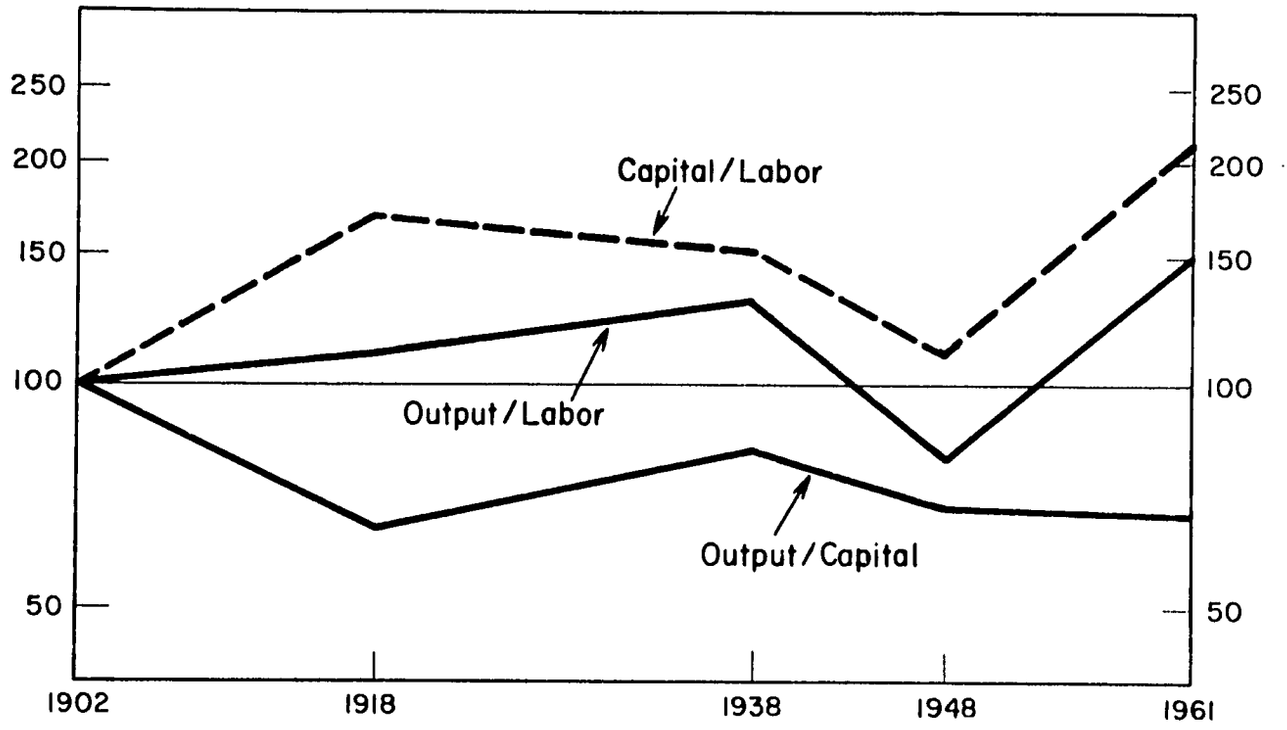


DIAGRAM 15

Productivity in Philippine Manufacturing, 1902-1961

(indices, 1902 = 100)



The productivity changes in the postwar period would seem to be a continuation of long established trends. Agriculture has been relatively stagnant throughout the present century, with growth of output accounted for largely by land and labor inputs. Lawas, who has analyzed in detail the sources of farm output growth over the last intercensal period (1948-60), confirms the small contribution of technical progress. His results, given in Table 29, show that half the increase in output is accounted for by simple areal expansion and 65 per cent by land and labor inputs combined. The residual attributed to improved technology is only 11 per cent.[90]

In manufacturing, the postwar increase in labor productivity is seen to be part of a trend over most of the century. That this increase was not achieved by technical progress but rather by substituting capital for labor is indicated by Hooley's results, mentioned above, that total productivity has not risen. Factor substitution is reflected in the substantial and sustained rise in the capital/labor ratio. In recent years the same phenomenon may at least partly account for the rising capital/labor ratio recorded in Table 16. Sicat, in a study of the effects of the

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[90] Jose M. Lawas, "Output Growth, Technical Change and Employment of Resources in Philippine Agriculture: 1948-1975," unpublished Ph.D. dissertation, Purdue University, 1960.

TABLE 29

Sources of Growth in Farm Output, Philippines, 1948-1960

| Item | | Percentage of output growth accounted for |
|---|---|---|
| Non-irrigated land | | 41.18 |
| Irrigated land | | 9.41 |
| Labor services | | 14.41 |
| Farm equipment services | | 2.65 |
| Farm building services | | 5.88 |
| Current expenses | | 15.29 |
| | Total resource inputs | 88.82 |
| | Technology | 11.18 |
| | Total | 100.00 |

Source: Lawas, op. cit., p. 82. Quoted in Hooley and Ruttan, op. cit.

1960-62 devaluation on manufacturing, has computed the changes in labor productivity and changes in employment over 1962-66 for each two-digit ISIC division (using the Central Bank indices of employment and physical production). He finds a highly significant negative correlation between gain in labor productivity and gain in employment. (The largest productivity gain, for example, was 157 per cent, recorded by electrical machinery--in which employment fell by 53 per cent.)[91]

Many reasons have been adduced to explain this continuing substitution of capital for labor in a relatively labor-abundant economy. Undoubtedly there are a number of contributing factors, some less real than others. Among the former may be mentioned the declining role of unorganized manufacturing establishments (those with less than five employees), which are presumably highly labor-intensive, other structural changes in the composition of the sector,[92] and the statistical effect of undervaluation of capital. A largely unknown influence on the recorded capital/labor ratio are variations in the degree of capacity utilization. As an indicator of the type of technology used, the capital

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[91] See Gerardo P. Sicat, "The Manufacturing Sector after Decontrol" (Discussion Paper No. 67-9; University of the Philippines, School of Economics, 1967), p. 41.

[92] For example, the rapid growth of petroleum refinery plant in the 1960s.

coefficient, i.e., the capital/capacity output ratio, is more appropriate than the capital/labor ratio. But probably more significant than these effects are the very real consequences of disequilibrium in factor prices. A complex of regulations involving exchange controls, import licensing, interest rates, and capital taxes has kept the price of capital well below its true scarcity value, at least until 1960, while minimum wage laws may have raised the market price of labor above its opportunity cost.

Productivity changes in the remaining parts of the modern sector are much less well documented than in manufacturing. The basic difficulty is that we have no satisfactory estimate of total capital stock. We do, however, know that the share of services in modern sector output has been declining in postwar years (see Table 12) and that the output/capital ratio in this subsector is considerably greater than the sectoral average (see Table 14). Hence, the effect of this structural shift within the sector would tend to lower the aggregate ratio. If we can assume that within each subsector the output/capital ratio has not significantly altered (a generalization based on the manufacturing component), then the sectoral ratio must have shown a slight decline. As a conservative estimate, we shall assume that the ratio (m in Equation 8 of Chapter 3) has remained constant.

To estimate very roughly the absolute value of m, we note the results of two studies. For the whole economy, Sicat has estimated the incremental capital/output ratio in the range 1.34-2.06 (averages for 1949-58),[93] and in a subsequent paper bases projections on output/capital ratios of 0.50, 0.60, and 0.75.[94] For manufacturing, Umana's constant price estimates put the latter ratio in the range 0.62-0.79 over the years 1950-60.[95] Since it is intuitively reasonable that the ratio for the modern sector should lie between that for manufacturing and that for the whole economy, we accept the range 0.50-0.80 for the modern sector output/capital ratio.

Estimation of the output/labor ratio for the whole modern sector (n in Equation 8 of Chapter 3) raises fewer data problems. Table 30 assembles the implicit output/labor ratios for the main industry groups

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[93]Gerardo P. Sicat, "Some Aspects of Capital Formation in the Philippines," Ph.D. dissertation, Massachusetts Institute of Technology, 1963.

[94]Gerardo P. Sicat and Rosa L. P. Tidalgo, "Output, Capital, Labor, and Population: Projections from the Supply-side," in First Conference on Population (Quezon City: University of the Philippines Press, 1966), p. 359.

[95]Salvador C. Umana, "Growth of Output in Philippine Manufacturing: 1902-60," Table IV. His estimates of value added/fixed assets ranged from 0.76 to 1.20, rather lower than the 1961 census figure of 1.23. The latter, however, is in current prices, whereas Umana's results are based on 1938 prices.

TABLE 30

Output[a] per Employed Person by Major Industry Group in Modern Sector, Philippines, Selected Years, 1956-1965

(thousand pesos at constant 1955 prices)

| Year | Manufacturing | | Extractives | Construction, Transportation, Commerce | Services | Total Modern Sector |
|---|---|---|---|---|---|---|
| | Organized | Total | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1956 | 4.8 | 1.3 | 5.1 | 1.5 | 2.0 | 1.7 |
| 1958 | 5.6 | 1.5 | 4.5 | 1.6 | 2.1 | 1.8 |
| 1960 | 6.2 | 1.6 | 7.0 | 1.8 | 2.5 | 2.0 |
| 1963 | 6.7 | 1.8 | 7.6 | 1.5 | 2.4 | 2.0 |
| 1965 | 6.3 | 2.1 | 6.2 | 1.6 | 2.1 | 2.0 |

[a]Net value added.

Source: Column 1, Annual Survey of Manufactures; Columns 2-6, Tables 12 and 13.

in the modern sector, computed from data presented earlier. The similarity between labor productivity in organized manufacturing and extractive industries has already been commented on. More remarkable is the disparity between these productivity levels and those for all manufacturing and the other groups. In part, this can be explained by statistical errors--in particular, the overstatement of extractive industry output.[96] More precise data, available from the census, suggest that the labor productivity differential between different parts of the modern sector is, in fact, less extreme (see Table 14, Column 5). If the sectoral average is taken as 100, the productivity of the components ranges from 58 for services and 68 for transport and communication to 141 for manufacturing and 233 for utilities.[97]

In Table 30, it appears that aggregate labor productivity in the modern sector has been increasing slightly, although less rapidly than in manufacturing. This trend is seen more clearly in Table 31, using the data from Tables 5 and 9. The numerator now is gross value added.

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[96] It is very possible that value added in forestry and logging, as estimated in the NEC accounts, is greatly overstated. This is indicated by comparison of the 1961 NEC estimates with the census results for that year. If so, the output/labor ratio for extractives in Table 30 is also to some extent overstated.

[97] The high labor productivity for utilities is expected, owing to their high capital intensity.

Output/labor has increased at an average annual rate of 3.0 per cent over the period 1950-66.[98] (As was the case for organized manufacturing, most of the rise took place before 1960.) Thus, our estimate of $\phi$ (i.e., $\eta_n$) is 0.030. This rate, when combined with the growth rate of modern sector labor, $\eta_{L_i}$, of 0.034 (from Table 9), gives the growth rate of modern sector output, $\eta_{Y_i} = 0.064$.

Using the same data from Tables 5 and 9, we may also derive formal estimates of the output/labor ratio in the traditional sector. These are given in Column 2 of Table 31. The average growth rate of labor productivity (i.e., $\eta_{Y_a/L_a}$) is found to be -0.003. The intersectoral differential in labor productivity is calculated in Column 3 of Table 31: modern sector labor is apparently about three times as productive as traditional sector labor. The differential increased markedly in the 1950s and has remained fairly stationary in the 1960s.

In the framework of the model, the growth rate of labor productivity in the traditional sector may be broken down into two components (see Equation 30 of Chapter 3):

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[98] Unless otherwise specified, all growth rates computed in this and the following sections are average annual geometric rates taking three-year averages as end-points.

TABLE 31

Gross Output per Employed Person by Sector, Philippines
1950-1966
(values in pesos at constant 1955 prices)

| Year | Modern Sector (1) | Traditional Sector (2) | Ratio (1)/(2) (3) |
|---|---|---|---|
| 1950 | 1496 | 580 | 2.58 |
| 1951 | 1466 | 627 | 2.34 |
| 1952 | 1523 | 662 | 2.30 |
| 1953 | 1576 | 713 | 2.21 |
| 1954 | 1658 | 729 | 2.27 |
| 1955 | 1754 | 731 | 2.40 |
| 1956 | 1973 | 699 | 2.82 |
| 1957 | 2015 | 651 | 3.09 |
| 1958 | 2117 | 653 | 3.24 |
| 1959 | 2255 | 581 | 3.88 |
| 1960 | 2341 | 572 | 4.09 |
| 1961 | 2319 | 577 | 4.02 |
| 1962 | 2346 | 531 | 4.42 |
| 1963 | 2341 | 544 | 4.30 |
| 1964 | 2251 | 568 | 3.96 |
| 1965 | 2312 | 617 | 3.75 |
| 1966 | 2220 | 599 | 3.71 |

Source: Tables 5 and 9.

where $\varepsilon$ is the rate of technical progress (the innovation intensity, $\eta_b$ ), $\gamma$ the elasticity of output with respect to labor, and $\eta_{L_a}$ the growth rate of employed labor in agriculture. In the earlier discussion of the traditional sector production function we showed that, under our assumptions, $\gamma$ was greater than k, the elasticity of land with respect to labor. For the Philippines in the postwar period, k was estimated to average 0.93. From Table 9 we can calculate the average rate of increase of $L_a$, which is 3.1 per cent per annum. Hence, we have that:

$$\varepsilon < \eta_{Y_a/L_a} - (k - 1)\ \eta_{L_a}$$

$$= -.003 - (.93-1)(.031)$$

$$= -.001$$

The average innovation intensity in Philippine agriculture for 1950-66 is apparently negative. If, for example, $\gamma$ was equal to 1 (the pure land surplus case), then $\varepsilon$ must have averaged -.003. Such a calculation, of course, is very sensitive to the output series chosen--in itself one of

the weaker parts of our data. However, we have found no evidence to support a positive value of $\varepsilon$.[99]

We may summarize this discussion on productivity by listing the various estimates we have obtained. All refer to the time period 1950-66, and 1950 is taken as t = 0. (The initial values are corrected by a line of best fit passing through the 1950/52 average value.) For simplicity we shall put $\gamma = 1$, so that b can be identified with traditional sector labor productivity.[100]

| | |
|---|---|
| b(0) = ₱625 | $\varepsilon = -.003$ |
| m(0) = .50 - .80 | $\theta = 0$ |
| n(0) = ₱1450 | $\phi = .030$ |

The variant of the model appropriate for describing the Philippine experience over 1950-66 is already almost specified. Agriculture is stagnant, even regressing, while the modern sector is growing quite rapidly but with a strong labor-saving bias in its productivity changes.

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[99] In Chapter 5, the data on productivity in agriculture are disaggregated, and it is seen that a single value for $\varepsilon$ must obscure a complex set of compositional shifts and individual crop yield changes. The above computation is of more formal than practical significance.

[100] All peso values in these and subsequent estimates are in constant 1955 prices.

As a consequence, there is very little need for an intersectoral labor transfer. The rates of increase of the total and sectoral labor forces are given by:

$$r = .032$$

$$\eta_{L_i} = .034$$

$$\eta_{L_a} = .031$$

The growth rates of output are already implied in the estimates given; explicitly, the totals and rates are:

$Y_a(0) = ₦2290$ million $\qquad \eta_{Y_a} = .028$

$Y_i(0) = ₦4010$ million $\qquad \eta_{Y_i} = .064$

<u>The Foreign Sector</u>

The growth rates of the two major components of exports, $X_a$ and $X_i$, are obtained from Table 7. For the period 1950-66,

$$\eta_{X_a} = .025$$

$$\eta_{X_i} = .139$$

Total exports grew at an average annual rate of 6.0 per cent.

In the model of Chapter 3, traditional sector exports do not, in general, increase at a constant rate. The observed rate depends on the relative sizes and growth rates of sectoral output, $Y_a$, and total food consumption, fL (where f is food consumption per member of the labor force). Under our assumption (justified earlier in this chapter) that f is constant, total food consumption increases at the same rate as the total labor force, i.e., .032. Traditional sector output, on the other hand, was seen to have increased at a rate of only .028. The combined effect was to cause $X_a$ to grow at a slightly lower rate than $Y_a$.[101]

We can estimate the value of f from the data in Tables 5, 7, and 9. From the equation $f = (Y_a - X_a)/L$, a transformation of Equation 7 of Chapter 3, f is estimated as ₦274, with a standard error of ₦36. Since the labor force constitutes, on average, 32 per cent of population (Table 9), this corresponds to a per capita value of ₦88.[102]

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[101]The actual relation between $\eta_{X_a}$ and $\eta_{Y_a}$ is given by:

$$\eta_{X_a} = (\eta_{Y_a} - rq)/(1 - q)$$

where $r = \eta_L$ and $q = fL/Y_a$, the proportion of traditional sector output required to feed the whole population. (q, of course, is not a constant.)

[102]Because we have ignored all consideration of marketing costs and mark-ups, it is not possible to compare this figure directly with estimates from the PSSH consumption surveys.

The high growth rate of modern sector exports (13.9 per cent) is accounted for almost entirely by extractive industry products. Thus, the continuation of rapid growth is closely dependent on the amount and quality of remaining reserves. For forests, at least, the exhaustion of reserves is clearly foreseeable, hastened by rising domestic demand for lumber. A detailed treatment of this topic is deferred until the following chapter.

In the earlier presentation of the data, we noted that the trade balance had been progressively narrowed in the 1950s and the substantial net capital inflows of the immediate postwar years eliminated.[103] Total imports increased at a lower average rate than exports, namely, 4.5 per cent (Table 8). Imports of capital goods (a category we have taken to include also related intermediate goods) were enabled to grow much more rapidly than the total because consumer goods imports showed almost no rise. The respective average annual growth rates of these two groups for the period 1950-66 were 8.1 and 1.0 per cent.

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[103] We recall that, in the model framework, the trade balance refers to total merchandise exports (less food imports) and nonfood merchandise imports.

If we denote the share of consumer goods in total imports by x (as in Chapter 3), then over 1950-66 x declined from about 0.64 to 0.39. The rate of decline of x, however, has been diminishing.[104] This fact could be interpreted to suggest either that the process of import substitution for consumer goods is slowing or that fewer capital goods imports are required (for example, because of the growth of a domestic capital goods industry). The evidence we reviewed in our previous discussion of import dependence, although not conclusive, suggests that the latter is not the case in the Philippines.

It is not possible on the basis of the available data to make any definite statement on the potential for further import substitution in the future. The import data in Table 8 disguise an important shift from finished consumer goods to intermediate inputs for domestic manufacture; in the mid-1960s, finished goods (excluding food) made up only a quarter of the total, compared with two-thirds in the early fifties. It is quite likely, however, that further reduction in this proportion would be

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[104]If we fit to x the exponential function suggested in Chapter 3:

$$x = \bar{x} + (x(0) - \bar{x})e^{-\lambda t}$$

where $\bar{x}$ is the asymptotic value of x, then we obtain (for example) $\lambda = .058$ for $\bar{x} = .20$ and $\lambda = .034$ for $\bar{x} = 0$.

difficult. Sicat has computed the 1953-63 income elasticities of import demand for detailed commodity divisions and shows very clearly the wide variability between different consumer items.[105] The considerable inequality in income distribution, which even seems to be increasing, may do much to maintain a demand for luxury finished imports.[106] Continued import substitution by backward integration of existing industries, while undoubtedly possible, may prove to be extremely inefficient. This question, however, is more one of industrialization policy, the course of which it would be hazardous to predict.

Modern Sector Growth

As we have seen, the growth rate of capital goods imports averaged 8.1 per cent during 1950-66. Total investment in the modern sector, according to the data given in Table 15, increased at 9.7 per cent. Considering the probable order of accuracy of the latter series and the fact that investment in durable equipment is only a relatively small

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[105] Gerardo P. Sicat, "Notes on Import Demand in the Philippines," EDR Discussion Paper No. 67-1, School of Economics, University of the Philippines, 1967.

[106] The little available data on income distribution in the Philippines was noted earlier in the present chapter.

part of total gross investment, these two rates are not inconsistent with our finding of no significant reduction in the import content of investment.

The existence of a durable capital stock breaks the direct link between growth of capital goods imports and growth of output in the modern sector. If, as we accepted earlier, there is no change in capital productivity, the respective growth rates are only equal asymptotically.[107] Both the growth rates reached a peak in the mid-1950s and fell appreciably in the 1960s. Output increased at an average annual rate of 7.2 per cent over 1950-59 but only 5.1 per cent over 1960-66. The corresponding rates for capital goods imports were 10.0 per cent and 5.0 per cent.

Since modern sector output has grown much more rapidly than traditional sector output, we should expect, according to the model, that the intersectoral terms of trade have moved in favor of the traditional sector. For the case of the pure land surplus, no productivity increases in agriculture, and no change in the propensities to import capital goods

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[107] From the model, we can derive the relation between the growth rates of capital goods imports ($M_K$) and output ($Y_i$) for constant capital productivity:

$$\eta_{M_K} = \eta_{Y_i} + (\dot{\eta}_{Y_i} / \eta_{Y_i}).$$

If output grows at a constant rate, then the last term is zero.

or consumer goods on the part of the industrial entrepreneurs (i.e., constant s and u), the rate of increase in the terms of trade is given by Equation 24 of Chapter 3: $\eta_\tau = \eta_{Y_i} - r$. This would suggest that $\tau$ increased by over 3 per cent per annum during 1950-66, whereas the data given in Table 20 show a growth rate of 2.0 per cent. The small discrepancy is probably accounted for by the fact that u did not remain constant but declined over this period; one effect of import substitution is to raise the share of modern sector output consumed within the sector and, therefore, reduce the potential quantity of industrial goods available for purchase by the traditional sector. (This argument, of course, relies on our assumption that consumer goods imports are directed to the modern sector.)

The shift in the terms of trade could be expected to raise the modern sector wage rate in terms of industrial goods but not in real terms. We assumed that real wages were related to the marginal productivity of labor in agriculture. Since the latter has remained almost constant over 1950-66 (for the pure land surplus, marginal productivity equals average productivity, which was seen to be stable), the model would predict little change in real wages. The data presented in Table 27 confirm this result: real wages in both sectors have shown no increase over the entire period. These data, however, refer to wages at the lowest skill levels.

Although in the model we did not distinguish between average and base-level wages, clearly the growth of a skilled industrial labor force would raise average real wages. This is seen for manufacturing in the data on average payrolls per worker given in Table 17. The increase for the whole modern sector is almost certainly smaller.

Despite the probable slight rise in average payrolls per worker in industry, we argued above that, on the basis of income distribution and the data for manufacturing, labor's share of output in the modern sector was not increasing over the postwar years and may even have been declining. Profit levels have remained substantial despite the squeeze which followed the 1960-62 devaluation. Hooley's sample data of manufacturing corporations, referred to earlier, showed profits (as a percentage of sales after tax) of 10 per cent in 1959, declining to 6 per cent in 1965.[108] If the propensity to invest out of profits has not been falling (and our data for the manufacturing sector, given in Column 3 of Table 17, suggest that it has been approximately stable), then we may

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[108] Treadgold and Hooley, op. cit., pp. 6-7. (The 6 per cent profit on sales corresponded to approximately 20 per cent profit on net worth.) For a detailed analysis of this data by industry group, directed mainly at studying the effect of tax exemption on profit rates, see Gerardo P. Sicat, "Rates of Return in Philippine Manufacturing," School of Economics, University of the Philippines, Discussion Paper 65-4, 1965 (mimeographed).

probably conclude that modern sector growth is not constrained by insufficient entrepreneurial savings. Rather, we may attribute the recent decline in the growth of output to the corresponding decline in the growth of capital goods imports--the latter being a result of the slowing of the process of import substitution. We would, therefore, expect that future modern sector growth will be at a level close to the growth rate of capital goods imports and that the latter will approach the growth rate of total exports. (We are here assuming that modern sector productivity changes remain of the labor-saving type and that there is no substantial and sustained net capital inflow. (Both assumptions would seem to be realistic.)

If future modern sector growth is indeed limited by export capacity, our attention must be focused on the export sector as the key to Philippine development. We have seen that traditional exports have barely kept up with the growth rate of the agricultural labor force in the 1950-66 period. Extractive exports have increased rapidly, but in the process forest reserves have been seriously depleted. Exports of manufactures have so far not been of much importance (with the exception of plywood, which is, in fact, a highly processed extractive industry product). To be able to make any prediction as to the future growth of the Philippines in the framework of the model we must study in more detail the structure and dynamics of the export sector. This is pursued in the following chapter.

# CHAPTER 5

## EXPORT GROWTH

In the previous chapter we have attempted to demonstrate that a simple model of an open, dual economy can, in broad terms, account for the postwar growth experience of the Philippines. The picture that emerges is of an economy with a modern sector enabled to grow rapidly because of a rising ability to import capital goods but with little evidence of progress in reducing dependence on these imports. Moreover, this rapid growth is achieved without significant transfer of labor from agriculture to industry. The foreign exchange necessary to finance capital goods imports is generated by a relatively stagnant traditional sector surplus and by the export of resource-intensive extractive industry products. Exports of manufactures have been almost negligible.

This linking of modern sector growth to export capacity we see not as a necessary (accounting) relationship but rather as a particular pattern of development that the Philippines has followed. We have, nevertheless, argued that alternatives to it are not easily (or quickly) to be found: for the Philippines, at least, it has become effectively a "rule of

growth." It is evident, therefore, that the export sector plays the crucial role in determining prospects for future growth.

In this chapter we shall study the dynamics of export growth in the Philippines. The main topics of interest relate to the relative importance of resource inputs compared to non-resource inputs in exports: the past trends in these relative shares, the problems connected with altering them, and the magnitudes of the exploitable reserves of resources. On the basis of the discussion of these points we are able to make some tentative statements concerning the likely future growth path of exports--and, implicitly, of the whole economy.

For some purposes our broad division between modern and traditional sector exports can be retained, but in most of the analysis we must work at a less aggregated level. We recall, however, our definition of the exportable agricultural surplus as aggregate output ($Y_a$) less food consumption (fL). For given food consumption, any increase in output (whatever the type of crop causing it) will raise traditional sector exports. Thus, the whole traditional sector may be regarded as belonging to the export sector and all parts of its output are relevant to this analysis. The changing composition of crops and the interactions between hectarage and yields mean that emphasis on individual crop performances may often give misleading results.

## DUALISM AND THE EXPORT SECTOR

The distinction between the modern and traditional sector as applied to exports is useful for an analysis of their growth and relation to the development of the economy as a whole. The fundamentally different form of the production function in the two sectors lies at the root of their contrasting growth dynamics and differing impact on the economy. Before exploring the major implications of this dualistic structure, however, it is instructive to contrast our categories with the more conventional distinction between commercial (export) crops and food (subsistence) crops.

Commercial and food crops are the usual broad categories employed in discussing agriculture in underdeveloped countries.[1] In the Philippine context, subsistence crops include rice, corn, fruits, and root crops, while commercial crops comprise coconuts, sugar, abaca, and tobacco. The distinction between them appears at first sight to be both obvious and useful, implying a contrast between traditional, non-monetary farming[2] and price responsive, monetized commercial farming. The

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[1] See, for example, R. W. Hooley and V. W. Ruttan, "The Agricultural Development of the Philippines, 1902-1965" in Ritishand (ed.), Agricultural Development in Asia (Canberra: ANU Press, forthcoming).

[2] In this usage, subsistence farming implies self-sufficiency rather than the minimum level compatible with survival.

stereotype of this dichotomy is that of "noneconomic" subsistence farmers who grow rice and corn primarily to satisfy their own needs with the secondary aim of marketing the small surplus above these requirements, contrasted with the commercial farmers--"economic men" who practice comparative advantage through specialization in the production of crops which are sold on the world market.

The research of the last two decades has, of course, thoroughly destroyed this straw man. Subsistence farmers as well as commercial farmers have been shown to be responsive to price incentives.[3] On the side of supply there now seems to be no significant distinction between subsistence crops and commercial crops.[4] The fact that a large part of the subsistence crops are retained for home consumption is of limited analytical importance.

It might be argued, however, that there remains a difference on the demand side: for commercial crops, the world price is basically effective, whereas for food crops, the price is determined by domestic demand and supply. In a fully open economy, such a distinction could not

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[3]There is general agreement that price incentives effectively allocate resources among crops but that productivity does not respond to price changes. See the discussion of the Philippine case in Chapter 4.

[4]As most farmers who grow commercial crops also grow subsistence crops, the conclusion is not very surprising.

exist because trade in, say, rice and corn (either exports or imports) would be as free as that in coconuts and sugar, and all prices would, therefore, be determined by world prices. In the Philippines, for example, although government control over the rice trade breaks the short-run connection between world prices and domestic prices, nevertheless, over a period of more than a few years, the average Philippine rice price is close to the average world price. Substantial imports are made in times of shortages and high prices, and small exports are made in times of surplus.[5] If production of rice expanded markedly, then there would seem to be little difficulty in expanding exports. Effectively, therefore, food crops are similar to commercial crops on the side of demand as well as supply, and it is surely difficult to argue, as Hooley and Ruttan do, that "it is possible...that the heavy dependence of rice or corn on a relatively stagnant domestic market has dampened incentives to achieve rapid productivity growth while the significance of export markets in the case of copra and sugar has encouraged technical change and innovation leading to productivity growth."[6] Once we recognize the basic similarity of

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[5]Some 30,000 tons were exported to Indonesia in 1967-68.

[6]Hooley and Ruttan, op. cit., p. 22. The commercial/subsistence dichotomy is useful, however, to the extent that government policies cause a sustained price discrepancy between food crops and export crops. In the Philippines, this occurred, for example, over 1960-65 when the prices of export products increased relative to food products and production shifts responded accordingly (ibid., p. 69).

subsistence and commercial crops on the side of demand as well as supply, then there is little to be gained by continuing to define them as separate categories.

In our dual economy approach, we identify only one category of exports from the traditional sector without distinguishing between food and nonfood crops. Moreover, the definition ($X_a = Y_a - fL$) makes allowance for the fact that some countries specialize in producing nonfood crops while importing part of their food requirements. A rapid increase in commercial crop output, resulting, for example, from a price-induced hectarage shift in favor of these crops at the expense of food crop production, may necessitate a corresponding rise in cereal imports. In such an instance, $X_a$ would not record a rapid rate of growth.

The two broad categories of exports we consider, $X_a$ and $X_i$, are distinguished by their different production functions.[7] Exports from the traditional sector by and large involve little capital but are land and labor using. Their production functions fit the available factor supplies.

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[7]For a discussion of the actual allocation of export commodities between sectors in the Philippine case, see the section on Categorization Problems in Chapter 4.

In contrast, modern sector exports (extractive industry products and manufactures) make heavy demands on the scarce factor capital but generate little employment for the abundant factor labor.[8]

The consequences of this difference in the production functions are similar to those analyzed by Baldwin in his Rhodesia study.[9] The input requirements of the mining and logging industries do not fit the existing factor supplies and require, for example, extensive training and upgrading of a small labor force.[10] The technological nature of the modern sector production function induces an improvement in the quality of the input labor, but the total employment generated is not substantial. As a result, the modern sector export industries may have relatively little impact on domestic demand. The opposite holds true for traditional exports

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[8]It is conventional to argue that capital is the scarce factor in underdeveloped countries, but the claim that it is scarce in the modern sector must be reconciled with rising capital/labor ratios and the access of this sector to foreign capital.

[9]R. E. Baldwin, Economic Development and Export Growth: A Study of Northern Rhodesia, 1920-1960 (Berkeley: University of California Press, 1966).

[10]For readers unfamiliar with the logging industry it should be stressed that the skill requirements, while not generally as demanding as those of mining, are quite considerable. Felling, bucking, scaling, yarding, loading, and especially skylining, require skilled labor--as, of course, does the processing of plywood and veneer.

where the factor requirements fit the existing relative factor conditions and a substantial volume of employment is generated for an essentially unskilled labor force. Most of the traditional sector income can be expected to be spent domestically.

Another aspect of dualism which has economic significance is the different role played by foreign enterprise in the two sectors. The greater skill and capital requirements of the modern sector are closely associated with the much greater role played by foreign enterprise. In the Philippines, foreign enterprise is of greatest importance in mining where the skill and capital requirements are the most demanding.[11] It also plays a significant role in the logging industry.[12] In the traditional sector, however, foreign enterprise plays a very limited role,[13] largely

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[11] The large mining companies are either American or part American. The Philippine constitution prohibits foreign interests other than American from exploiting natural resources. Therefore, foreign enterprise in logging, plywood, and mining is all American.

[12] In 1965-66, timber license agreements by area totaled 1.2 million hectares. Fourteen per cent of the licensed area was held by American interests and 28 per cent by joint American-Filipino companies. (Source: Forest Management and Sawmills and Licenses Division, Bureau of Forestry.)

[13] Foreign agricultural enterprise is essentially restricted to two pineapple plantations, two rubber plantations, and one coconut plantation. The absence of a plantation economy in contrast to that of Malaya and North Sumatra is the result of a number of factors, among which are American rule and the law (dating from 1902) restricting individual and corporate holdings to a maximum of 1024 hectares.

restricted to the processing of agricultural products where the skill and capital requirements are those typical of the modern sector.[14] In general, foreign management is more frequently found than foreign capital. This is particularly true of mining, logging, and sugar manufacture. Partly this is a consequence of government policies, but it also reflects a greater scarcity of domestic skills than of domestic capital.

Foreign enterprise reinforces the tendency, noted above, for the modern sector export industries to generate relatively little domestic expenditure. Where profits accrue to foreign owners, it is reasonable to expect that a greater share will be remitted abroad than in the case of domestically owned profits. Similarly, income accruing to the salaried foreign labor force adds little to domestic demand because of high propensities both to save and to consume imported goods. Thus, foreign enterprise lowers the domestic multiplier associated with the modern sector. Extractive industry exports generate the supply of foreign exchange needed by the modern sector but make less contribution to the demand for

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[14] Foreign (American and Spanish) enterprise in sugar milling lost its early dominance in the 1920s and has declined greatly in the postwar period. In coconut processing, however, American, British, and Chinese interests continue to dominate.

domestic industrial output. The extractive sector has some of the characteristics of true enclave dualism with its substantial independence of the domestic economy.

A further contrast between modern and traditional sector exports is the much greater import dependence of the former. Extractive exports are dependent not only on the import of capital goods but also on intermediate products such as materials, chemicals, and fuels. In a previous study, we estimated that every $100 of traditional exports required imported inputs of $5 or less. The percentage import component of extractive exports, however, ranged from 14 per cent to 24 per cent.[15] The net contribution of extractives to foreign exchange earnings is, therefore, considerably less than that indicated by the gross figures.

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[15] George L. Hicks, "The Growing Import Dependence of Philippine Exports," (Washington: National Planning Association, Center for Development Planning, 1967). The percentage import component of the various products was estimated as follows: copra, zero; coconut oil, 0.7; desiccated coconut, 1.4; sugar, 5.7; logs, 14.0; plywood, 18.8; minerals, 23.6.

## DYNAMICS OF EXPORT GROWTH

The growth dynamics of extractive and traditional exports in the Philippines differ in many respects, but they share the common feature of "resource intensive" growth. Essentially, export growth is based on the progressive exploitation of previously unemployed natural resources--land in the case of traditional agriculture and forests and minerals for the extractive sector. The key questions to be asked relate to the future of this vent for surplus type of growth and the issues involved in reducing the resource content of exports.

Before turning to these questions, we should stress the differences in the growth engines of traditional and modern sector exports. A characteristic of modern sector growth is its dynamism in contrast to the "static expansion" of the traditional sector. Growth in the modern sector is essentially based on investment. Expansion is a function of prices, costs, and profits and takes place within a largely corporate structure. Capital is a major factor of production, and technology and productivity improve in response to the import of improved equipment and the learning of new skills. One role of capital and advanced technology is to make possible rapid increases in output in response to flexible, profit-oriented resource flows.

The traditional sector, however, is static and inflexible. Given surplus land, growth of output depends less on profits, capital accumulation, and technical change, than on the increase in the agricultural labor force. Little capital is used in production, and the stable land/labor ratios are in response to the static technology. The composition of traditional sector output is responsive to relative price changes, but the ceiling on aggregate output is set by the size of the employed labor force.[16]

One consequence of these different growth mechanisms is that total output in the traditional sector rises at a steady rate, little influenced by changes in prices. For example, despite the great changes in the relative prices of food and manufactured goods between 1920 and 1935, the total output of traditional agriculture and exports rose steadily.[17] In sharp contrast, production and export of gold (the major pre-war extractive export) responded dramatically to price incentives. Gold production

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[16]The evidence relating to the price elasticity of output in traditional agriculture is discussed in Chapter 4.

[17]In 1921-22 and from 1929 to 1934 the domestic terms of trade moved catastrophically against agriculture. The period 1915-40 was marked by great agricultural price changes in contrast to relatively stable prices in the postwar period.

climbed slowly until 1929 and then rose rapidly until 1939.[18] The price of Philippine gold relative to other commodities began to rise in 1930 as a result of the collapse in the general price level.

Sustained demand for minerals and logs in the postwar period has induced annual increases in output far in excess of that of traditional agriculture and almost the same as that of the modern sector as a whole (see Table 9). Whether modern sector exports will continue to expand rapidly in the future depends partly on imponderables, such as world prices for the relevant minerals and wood products, but it also depends on the forest and mineral resources. Future expansion of traditional exports, if land productivity remains stable, will be a function of the quantity and quality of the currently unutilized land.

In order to reduce this dependence on limited natural resources, two main avenues of approach are possible. So long as the same products are exported, then the only possibility is to increase the efficiency of natural resource use. This implies raising the productivity of land and forests. An alternative is to change the composition of exports, either by exporting manufactured goods which have a low natural resource content or by subjecting existing exports to a greater degree of industrial processing.

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[18] Production in 1915 was 63,000 oz.; 1929, 163,000 oz.; and 1939, one million oz. C. P. Roa, The Gold Mining Industry in the Philippines (Manila: Bureau of Mines, 1967).

## PROBLEMS OF REDUCING THE RESOURCE CONTENT OF EXPORTS

### Manufactured Exports

The Philippines, in common with many open economies, has been unable to develop a substantial export market for manufactured goods. The share of manufactured products in total exports rose throughout the postwar period, but by the mid-sixties they had reached only 8 per cent (see Table 7). Moreover, manufactured exports, excluding plywood and veneer, are an insignificant 1.5 to 2.0 per cent of total exports and show virtually no trend. Easily the most important of this residual amount is the category "chemical elements and compounds," which consists almost entirely of glycerine. This product is manufactured by foreign firms from coconut oil and essentially reflects Philippine comparative advantage in coconut production. Beer is the only other manufactured export of any significance.[19]

The advantages to the Philippines of exporting manufactures are both numerous and weighty, but they are more than matched by the difficulties. The major advantages are as follows:

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[19] See Foreign Trade Statistics of the Philippines (Manila: Bureau of Census and Statistics, published annually). In our definition sugar, coconut oil, and similar products are excluded from manufactures as they involve only basic processing of agricultural products.

(1) An increase in the share of manufactured exports will lower the resource content of total exports. This may be desirable in order to prevent serious depletion of limited natural resources. (See section following.)

(2) Exports enable an industry's growth rate to exceed the ceiling otherwise imposed by the limited size and slow rate of growth of the domestic market.

(3) Manufactured exports would raise the ceiling on growth imposed by the foreign exchange constraint.

(4) Manufactures are generally thought to have a variety of favorable linkage effects. The processing of manufactured products stimulates demand for a wide variety of commodities and services.

(5) Competition in world markets is conducive to efficiency.

These are the usual arguments, but Sicat has added the further interesting proposition that:

(6) Competition among foreign and domestic producers for a given domestic market results in a "conflict situation" which induces "negative nationalism." Emphasis on export expansion may channel restrictive nationalism into more constructive directions.[20]

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[20] Gerardo P. Sicat, "A Design for Export Oriented Industrial Development" (Discussion Paper No. 67-5; Quezon City: University of the Philippines, School of Economics, 1967).

Despite these potential advantages, the practical difficulties are such that there is little immediate prospect of the Philippines developing exports of manufactures on a significant scale. The list of these difficulties is also well-known since they apply to most of the economies that have gone through the process of "successful" import substitution. (As described in Chapter 2, such "success" is almost always associated with an inability to export manufactures.) Hirschman recently summarized the arguments in an article referring to the Latin American experience:

"The new industries have been set up exclusively to substitute imports, without any export horizon on the part of either the industrialists themselves or of the government; the foreign branch plants and subsidiaries, which have taken an important part in the process, often are under specific instructions not to compete abroad with the products of the parent company; even more decisive than these obstacles deriving from attitudes and institutions is the fact that the new industries, set up behind tariff walls, usually suffer from high production costs in countries that are, moreover, permanently subject to strong inflationary pressures--hence, there is no real possibility of these industries competing successfully in international markets even if they were disposed to do so."[21]

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[21] A. O. Hirschman, "The Political Economy of Import-Substituting Industrialization in Latin America," Quarterly Journal of Economics (February 1968), p. 25.

Except for the reference to strong inflationary pressures, these arguments apply equally well to the Philippines. Sicat, for example, has noted that the import substitution policy "caused Philippines industrialists to be unwillingly drawn into highly restrictive contracts covering the use of foreign trademarks and manufacturing processes. These restrictions prevented Filipino manufacturers from exporting these products or from developing their own."[22] Power has argued extensively that import substitution has caused high costs and inefficiency.[23]

In the Philippine context, the incentive to export manufactures was certainly not encouraged by the long period of exchange control, associated with a substantially overvalued exchange rate. Ever since the virtual ending of exchange control in 1962, it has been argued that high tariffs cause the peso to continue to be overvalued.[24]

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[22]Sicat, "A Design for Export Oriented Industrial Development," p. 7.

[23]John Power, "Import Substitution as an Industrialization Strategy," Philippine Economic Journal, Vol. V, No. 2 (1966).

[24]John Power, "A Note on Estimation of Overvaluation of the Philippines Peso" (Discussion Paper No. 67-18; Quezon City: University of the Philippines, School of Economics, 1967).

Hirschman argues that in addition to these conventional points, and perhaps of even greater significance, is a reluctance of industrialists to commit substantial resources to an export drive.[25] This is because exporting manufactures involves special risks and new costs which cannot be recovered in the short run. Therefore, an industrialist will consider exporting only when he is confident that the basic institutions and policies which affect his interests are stable and responsive to his interests. In practice, industrialists do not "feel securely in control of vital economic policies affecting them. Policy-makers positively cultivate unpredictability and distance from interest groups; at the same time, they are highly manipulative."[26] This description is equally relevant to the Philippines and other Southeast Asian countries and provides an additional forceful reason for their demonstrated inability to export manufactures.

It was argued in Chapter 2 that, based on historical experience, the capacity to export a significant quantity of manufactures was not an essential requirement for development. The alternative, however, is to base export expansion on products where the comparative advantage is substantial. This issue as it relates to the Philippines will be discussed

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[25] Hirschman, op. cit., p. 28.

[26] Ibid., p. 29.

later in this chapter. It is sufficient to note at this point that the barriers to exporting manufactures are substantial and give considerable a priori plausibility to growth models which ignore them.[27]

## Processing of Exports

Plans, policies, and recommendations for greater processing of Philippine exports are frequently advocated. Sicat, for example, in a recent paper argues that "the more a product undergoes processing prior to its export, the greater is the gain of the domestic economy."[28] Despite this perennial argument, the facts indicate that exports today are as little processed as they were 10 or perhaps even 50 years ago.

Before turning to an analysis of the economics of processing, it is well to note that processing is a form of manufacturing and that a highly processed product such as plywood is for most purposes best classed as a manufactured good. The catalogue of arguments listing the advantages that are said to follow from the export of manufactured goods may equally

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[27] In addition to the internal barriers discussed above, there are also external barriers such as tariffs and quotas.

[28] Gerardo P. Sicat, "Domestic Economic Gains Foregone by Exports of Logs and Lumber" (Discussion Paper No. 68-5; Quezon City: University of the Philippines, School of Economics, 1968), p. 1.

be applied to the gains from the processing of primary products. But, as many examples of "hothouse" import substitution have shown, the costs of certain forms of industrialization are high and may even result in negative value added. The same range of possibilities applies to processing.

The processing of exports increases the industrial value added component and lowers their resource content. Assuming that natural resources are limited, a movement away from the vent-for-surplus pattern of growth is, to this extent, advantageous. In addition, it has been argued that large gains in income and employment are possible through greater processing of primary products. In fact, however, the issues involved are exceedingly complex, and it is far from certain that the Philippines stands, on balance, to gain from the greater processing of agricultural products. The technical potential for greater processing is very substantial: copra can be converted into coconut oil; centrifugal sugar into refined sugar; logs into plywood; and mineral ores can be refined. The economics of realizing this potential is another matter.

On the demand side, the problems of greater processing can be reduced to an analysis of the effect of processing on prices. Many processed products--e.g., coconut oil, plywood, and refined sugar--face tariffs and quantitative restrictions in the importing countries which are

not applied to the primary product. It is possible, therefore, that the value of a processed export may be less than the value of the primary input. Even if this is not the case, the value of domestic resources absorbed in processing may well result in the net value added being negative. This could be caused by a number of problems on the side of supply. Economies of scale, inefficient labor, and the whole complex of factors that cause costs to be high, may well mean that the gains from processing are outweighed by the costs. Decisive examples of potential loss from greater processing occur in the case of sugar, minerals, and plywood.

Since 1934, the Philippines has had an annual U. S. quota for refined sugar of 74,483 short tons.[29] Refined sugar exported in excess of this quota could only be sold as part of the raw sugar quota. In this example the potential loss associated with greater exports would be equal to the additional cost of processing.

The processing of minerals is an example of a loss induced from the supply rather than the demand side. The Philippines exports a wide

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[29] J. Bernhardt, The Sugar Industry and the Federal Government, a Thirty-Year Record (1917-47) (Washington: Sugar Statistics Service, 1948), pp. 162-65.

range of mineral ores which include copper, iron ore, and manganese. With the possible exception of copper, the scale of production does not justify the smelting of the ores, and the attempt to do so would increase the value of output but yield a negative product.

Similar forces operate on the side both of supply and demand for plywood production. Japan takes some 80 per cent of Philippine log exports but virtually no plywood. Log exports are more profitable partly because there is no tariff, whereas the rate on plywood is 20 per cent.[30] The attempt to export plywood rather than logs to Japan would, therefore, result in a worsening of relative prices. On the supply side, Philippine labor costs as measured by wage rates are lower than in Japan.[31] The lower wage rate, however, is largely negated by the generally lower productivity of labor. Other elements in the cost structure

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[30] Japan Tariff Association, Customs Tariffs Schedules of Japan, 1966.

[31] J. G. Landgrebe, "The Philippine Textile and Timber Trades," Philippine Economic Journal, Vol. V, No. 1 (1966), p. 160. According to Landgrebe, Japanese labor engaged in plywood manufacture earns $55 (U. S.) per month compared with $34 in the Philippines, $23 in South Korea, and $21 in Taiwan.

are higher than in Japan. The lack of a large domestic market for plywood means that small pieces and "odd ends" cannot be used in the Philippines and the recovery rate is, therefore, lower than in Japan.[32]

The high cost of producing plywood in the Philippines causes profit rates to be low and usually very much lower than the prevailing rates in logging.[33] It could be argued, however, that there is a conflict between private and social gain. Social gains from processing include external economies associated with linkages and labor training, while social costs include the effects of the more rapid denudation of the forests caused by specialization in logging. The question of the gains and losses from the processing of logs is a complex one that cannot be answered without further study.[34]

The coconut industry is perhaps the best illustration of our thesis that there is not a long-run tendency for Philippine exports to be

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[32] Ibid., p. 153.

[33] This statement is based on interviews in 1966/67 with company managers and officials of various logging enterprises in Mindanao.

[34] In his paper, Sicat has counted the gains from processing but not the costs. He estimates the total gains both of value and employment that would be made if all logs were processed into plywood. This adds an estimated 2 per cent to GNP in 1960-66. Sicat, "Domestic Economic Gains Foregone by Export of Logs and Lumber."

subject to more processing and that it is not possible to advance, as a firm proposition, that more processing is desirable. The argument--where it can be made--that more processing should take place during the course of development, does not of itself support policies to induce greater processing. In the case of the coconut industry, however, we would argue that there is a close coincidence of private and social gain, that the industry is responsive to profit opportunities, and that the processing that occurs is approximately the optimum.

The extraction of coconut oil from copra has always been the major form of processing of coconut products.[35] Both the oil and the copra are mostly exported, and it is the world price that determines the domestic price of both products.[36] The incentive to extract and export oil rather than copra depends on the cost of extraction and the relative price of copra and oil. Extraction costs are fairly stable, but the relative oil/copra price has shown substantial fluctuations in response to both domestic and international changes.

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[35] The only other significant processing is the manufacture of desiccated coconut directly from fresh nuts.

[36] The argument in this section is based on the study by G. L. Hicks, "The Philippine Coconut Industry: Growth and Change, 1900-65" (Washington: National Planning Association, Center for Development Planning, 1967), pp. 117-165.

During and immediately after the first world war, the oil price was highly favorable relative to copra. Not surprisingly, the industry responded by exporting most of the copra in the form of oil. The situation was reversed in the 1950s. American and European tariffs on oil discouraged processing. Of even greater importance was the discrepancy between the official and free market rate for the peso during the period of exchange control. It was relatively easy to smuggle or underdeclare copra and thus obtain an effective exchange rate higher than the official rate. Oil exports, however, were easy to control and suffered severely from the overvaluation of the peso. Consequently, little copra was processed prior to export.

Between 1960 and 1965, oil processing experienced a remarkable recovery, with oil exports rising from $15 million to $68 million. Despite this increase, the share of copra output processed in the mid-sixties was still well below the level of 1919-20. This increase in processing was the result partly of decontrol in 1960-62, which virtually eliminated the discrepancy between the official and free rate. More important, however, was the fall in ocean freight rates for oil caused by the introduction of bulk tankers which broke the shipping conference monopoly. The fall in the freight rate for oil, but not for copra, raised the effective oil/copra price.

This case study is an example of the way essentially fortuitous factors have influenced the incentives and the actual processing of coconut products. Unpredictable external forces as well as the vagaries of domestic policies explain the actual course of processing more than do internal forces of the growth process.

## PRODUCTIVITY AND NATURAL RESOURCES

In the preceding sections we argued that the Philippines is unlikely in the near future to be able to export a significant volume of manufactures or to subject existing exports to much increased processing. Some additional processing of copra may well occur, but simple processing of this type adds little to final value. When substantial processing is involved, as in the manufacture of plywood, then both domestic and international difficulties may well preclude any dramatic increase in output.

If the future export of manufactures and processed products is at best uncertain, then the possibility of reducing the resource content of exports depends on success in increasing efficiency in the use of the primary inputs. Specifically, unless the productivity of land and forests rises, there is no escape from dependence on vent-for-surplus expansion and the inevitable eventual decline in exports that this implies.

## Productivity and Traditional Agriculture

The historical constancy of yields in agriculture was discussed on the aggregate level in Chapter 4. We shall here examine the performance of the major crops individually and then evaluate the prospects for future increases in yields.

### a. Past Trends in Yields

Indices of country-wide average yields for six major crops over 1954-66 are given in Table 32.[37] Rice, corn, coconuts, and sugarcane have accounted for 37, 8, 24, and 5 per cent, respectively, of total crop value in recent years. Abaca and tobacco make up a further 4 per cent.[38] Together these crops take up nearly nine-tenths of the total cultivated area. Over the 13-year period 1954-66, rice and corn show only negligible yield increases and coconuts, no clear trend. Only sugar (until 1963) and the two relatively unimportant commercial crops, abaca and tobacco, evinced any substantial increase--averaging at most about 2.5 per cent a year.

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[37] Data for the years 1950-53 are considered much less reliable.

[38] Statistical Reporter, Vol. XI, No. 2 (April/June 1967), p. 8.

TABLE 32

Average Yield Indices for Major Crops,
Philippines, 1954-1966
(Average Yields 1954/56=100)

| Year[a] | Food Crops | | Commercial Crops | | | |
|---|---|---|---|---|---|---|
| | Rice (1) | Corn (2) | Coconuts[b] (3) | Sugar[c] (4) | Abaca (5) | Tobacco (6) |
| 1954 | 100.1 | 116.6 | 90 | 101.3 | 90.1 | 103.8 |
| 1955 | 100.4 | 92.8 | 103 | 97.8 | 97.5 | 103.7 |
| 1956 | 99.4 | 90.6 | 108 | 100.9 | 112.4 | 92.4 |
| 1957 | 100.6 | 83.8 | 115 | 100.0 | 112.4 | 114.5 |
| 1958 | 84.6 | 103.2 | 115 | 116.8 | 130.9 | 106.0 |
| 1959 | 92.1 | 80.6 | 115 | 121.5 | 117.3 | 103.0 |
| 1960 | 94.2 | 105.6 | 110 | 115.2 | 109.2 | 121.1 |
| 1961 | 96.4 | 98.9 | 103 | 107.6 | 133.1 | 119.4 |
| 1962 | 102.4 | 105.0 | 110 | 116.3 | 129.0 | 125.7 |
| 1963 | 104.5 | 109.2 | 105 | 108.4 | 142.3 | 125.8 |
| 1964 | 103.7 | 113.9 | 93 | 102.3 | 129.2 | 123.4 |
| 1965 | 103.9 | 114.2 | 95 | 81.6 | 136.1 | 109.1 |
| 1966 | 109.1 | 109.6 | n.a. | 80.9 | 138.4 | 122.9 |

[a]Crop year ending June 30.

[b]Nuts per bearing tree.

[c]Piculs of sugar per hectare.

Source: Columns 1, 2, 5, 6: Implicit average yields computed from DANR data on harvested areas and production; Column 3: George L. Hicks, "The Philippine Coconut Industry: Growth and Change, 1900-1965" (Washington: National Planning Association, Center for Development Planning, 1967), p. 175; Column 4: Philippine Sugar Association.

Rice yields in the Philippines have been remarkably stable over most of the present century.[39] One important reason is the combination of yield increases in established, irrigated areas (due to the new varieties and improved technical inputs such as fertilizer) and expansion of rice land into poorer upland areas. Partly, however, the observed yield increases are merely caused by changes in the average quality of the land cultivated as some of the marginal land is transferred to other crops. Barker has shown a strong negative correlation between rice hectarage and yield both in the long run and the short run.[40] Thus, for example, the decline in the rice hectarage in Central Luzon and the Western Visayas, which resulted from the expansion of sugar cane into marginal rice growing areas, led to higher average rice yields, while the rapid expansion of hectarage in Mindanao and the Cagayan Valley was associated

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[39] In 1920-24, aggregate yield averaged 1.10 metric tons rough rice (paddy) per hectare; in 1960-64 it was 1.20. Golay and Goodstein, Rice and People in 1990 (Manila: USAID, 1967), p. 46.

[40] Randolf Barker, "The Response of Production to a Change in Rice Price," Philippine Economic Journal, Vol. 2 (1966), pp. 267-269. In the long-run case, he uses regional cross-section data on area and yield changes over 1952/54-1960/62, fitting the function $(Y + k) = a(X + k)^b$, where Y is percentage change in harvested area, X percentage change in yield, and k is a scale constant. The estimate of b is -1.76. A doubling of harvested area over this period was associated with an absolute decline in yield of 18 per cent, or 22 per cent below the yield that would have been attained with no change in area.

with substantial falls in yields.[41] These yield changes are seen in the data for 1954-66 presented in Table 33. Clearly, the aggregate yield data must be interpreted with caution if they are to be used to measure technical progress.

Yields of corn have also shown little change over a long period. The average yield in 1961/62, for example, was 0.67 metric tons (shelled corn) per hectare, compared with 0.69 in 1928/30.[42] Unlike rice, corn shows higher yields on newly opened land. However, yields tend to decline after a period of several years.[43] Hence, the relative constancy observed results from high yields in areas where cultivation is expanding rapidly, offset by declining yields elsewhere.

Coconuts have shown an apparent long-term increase in yield (as measured in nuts per bearing tree) between 1918 and 1960 of nearly 30 per cent, or 0.6 per cent per year.[44] Almost a quarter of the increase,

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[41] Ibid., p. 267.

[42] DANR data quoted by Hooley and Ruttan, op. cit., p. 38.

[43] Ibid., p. 46.

[44] George L. Hicks, "The Philippine Coconut Industry: Growth and Change, 1900-1965," p. 175. Strictly, a more suitable indicator is nuts per hectare of bearing trees, which shows a rise of 13 per cent over the years 1948-60 (ibid., p. 177). Data for other than these census years are not available.

TABLE 33

Rice Yields for Selected Regions, Philippines, 1954-1966

(Metric tons rough rice per hectare harvested area)

| Year[a] | Central Luzon (1) | Cagayan Valley (2) | Southern & Western Mindanao (3) | Philippine Average (4) |
|---|---|---|---|---|
| 1954 | 1.33 | 1.59 | 3.18 | 1.20 |
| 1955 | 1.50 | 1.30 | 1.93 | 1.21 |
| 1956 | 1.50 | 1.30 | 1.93 | 1.21 |
| 1957 | 1.61 | 1.25 | 1.36 | 1.21 |
| 1958 | 1.41 | 1.08 | 1.03 | 1.02 |
| 1959 | 1.51 | 1.28 | 1.04 | 1.12 |
| 1960 | 1.39 | 1.38 | 1.03 | 1.13 |
| 1961 | 1.57 | 1.09 | 1.13 | 1.16 |
| 1962 | 1.79 | 1.21 | 1.14 | 1.23 |
| 1963 | 1.82 | 1.28 | 1.27 | 1.25 |
| 1964 | 1.86 | 1.13 | 1.26 | 1.24 |
| 1965 | 1.82 | 1.21 | 1.04 | 1.25 |
| 1966 | 1.98 | 1.52 | 1.05 | 1.31 |

[a]Crop year ending June 30.

Source: International Rice Research Institute, quoted by Golay & Goodstein, op. cit., p. 23.

however, is accounted for by the southward shift in the geographical distribution of trees from Luzon to the higher yielding regions in Mindanao.[45]

Sugarcane, as with rice and to a lesser extent with coconuts, shows a pronounced negative association between hectarage expansion and yields. The transfer of marginal rice lands in Central Luzon and the Western Visayas to sugarcane in the 1960s had the effect not only of raising average rice yields on the remaining land but also of depressing cane yields. There is evidence that technological improvements in cane growing--new varieties, wider use of fertilizer, and some degree of mechanization--were responsible for the yield increases in the 1950s and thus it is possible that the slowing of hectarage expansion after 1965 will be followed by renewed gains in aggregate productivity.[46]

Even from this brief survey of the major crops, it is clear that there are difficult problems of measurement inherent in any index of agricultural productivity. Nevertheless, we have found little evidence that

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[45] Ibid., p. 176. Mindanao more than doubled its share of coconut trees between 1948 and 1960. Note, however, that a major reason for the high output per tree in Mindanao is the low density of trees.

[46] See Hooley and Ruttan, op. cit., pp. 60-64. Note that the yield measured in piculs of sugar per hectare depends both on cane yields and on the recovery rate in processing. Both segments declined in the 1960s.

would contradict the picture of stagnation described in Chapter 4. Rice yield increases on the good quality land would appear to be largely offset by diminishing returns on the poorer land being brought under cultivation. For corn, the offsetting trends are different but have had an equivalent effect. Yield measurement for coconuts is particularly intractable, but here also increases have been barely perceptible. Only for sugar have yield increases apparently been accounted for mainly by technical inputs, but again there is the offsetting trend of diminishing returns.

b. Closing of the Land Frontier

If average yields remain close to their present levels in the future, then a drastic decline in the rate of growth of agricultural output cannot for long be postponed. The imminent closing of the land frontier has been noticed by many observers.[47] The marked decline in the rate of increase in cultivated area that has occurred since 1959 (see Table 10) suggests that the land surplus may be almost exhausted. Declining yields

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[47]See, for example, R. E. Huke, Shadows on the Land (Manila: Bookmark, 1963); F. L. Wernstedt and J. E. Spencer, The Philippine Island World (Berkeley: University of California Press, 1967); Golay and Goodstein, op. cit.; International Rice Research Institute, Department of Agricultural Economics, Annual Report 1965 (Los Banos: IRRI, 1966).

on the new areas for all the main crops except coconut[48] imply that the Philippines has entered the phase of diminishing returns at the extensive margin.

The evidence of the virtual exhaustion of the land surplus is clearest for Luzon and the Visayas. It is frequently argued that there are still large reserves of potential agricultural land in Mindanao. This, however, is questionable. A study by Huke concludes that the potential cultivable area in Mindanao is 4.44 million hectares.[49] This figure is based on the total area of Mindanao of 9.87 million hectares, less the 2.11 million hectares with slopes of over 20 per cent, less the estimated area which is unsuitable for farming because of swamps, rock outcrops, and thin or eroded soils. A further 5 per cent of the gross area of the island is deducted for land that will be required for nonagricultural uses. The 1948 census showed that the total farm area in Mindanao was 1.5 million hectares. By the 1960 census, the farm area had risen to 2.50 million hectares, an average annual increase of 4.9 per cent. Moreover,

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[48] As a tree crop, coconuts can grow on slopes of from 10 to 20 per cent, land which is too steep for rice, corn, or sugar. There is still a relative surplus of this type of land, especially in Mindanao where coconut yields are higher than in Luzon and the Visayas.

[49] Huke, op. cit., pp. 150-152.

even this high rate was considerably lower than the population growth rate, which averaged 6.5 per cent over the same period. If the farm area continued to grow at 4.9 per cent a year, then the land surplus based on Huke's estimate would be exhausted by 1972.

In practice, however, the land frontier is approached asymptotically, with a progressive decline in the rate of increase of cultivated area. The area under cultivation is certain to expand--probably for many decades--but necessarily much more slowly than the rates observed in the past. From 1902 to 1938 and from 1938 to 1960 the cultivated area expanded at an average rate of 3 per cent a year. Golay bases his projections of future rice supplies on an assumed expansion rate over the period 1965-90 of only 1 per cent per year.[50] In fact, the rate is likely to be both low and declining over time.

Based on the U. S. Department of the Interior's River Basin Surveys, Golay[51] estimates that the total potential agricultural area in the Philippines is about three times the 3.1 million hectares available in the

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[50]Golay and Goodstein, op. cit., pp. 65-66.

[51]Ibid., p. 65. These reports, based on recent surveys, are a valuable addition to the literature on Philippine land resources. They cover the following river basins: Central Luzon, Cagayan River, Cotabato River, Agusan River, Bicol River, and Ilog-Hilabanyan River.

major river basins. The average area under cultivation in 1964-66 was 7.5 million hectares.[52] Assessing a 1 per cent growth rate, this will reach 9.6 million hectares by 1990.

It is not necessary to accept any particular prediction concerning the future rate of expansion of cultivated area in order to draw one main conclusion: that exhaustion of the remaining land surplus will expand the agricultural base by little more than 25 per cent. Without land productivity increases, the combination of a continued high rate of population growth and a limited land surplus implies an inevitable decline in the exportable surplus of traditional agriculture, followed in turn by a rising demand for imported foodstuffs.

c. Prospects for Future Yield Increases

It is sometimes suggested that the existence of a land surplus is closely linked with the failure to raise agricultural productivity. Myint, for example, argues as follows:

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[52]The 1964-66 estimated surplus land, according to Golay, is therefore about 2 million hectares. If this is compared with our estimate, based on Huke and the Agricultural Census, of a 1960 surplus in Mindanao of 1.9 million hectares, it is clear that almost all the remaining land must be in Mindanao.

> "The fact that peasant export production has not shown any technical improvements in the past does not mean that it is inherently incapable of improvement if adequate resources are ploughed back into it. The past pattern merely shows that these opportunities for improvements have been neglected because, with unused land easily available, it was so much easier to expand along existing lines than to try to introduce improved methods of production."[53]

The implication of this argument is that, with the exhaustion of the land surplus, opportunities for land improvements are less likely to be neglected than in the past. There is little historical evidence, however, to suggest that the exhaustion of the land frontier has been a turning point with respect to productivity trends. In Taiwan, for example, yields began to rise in the early 1920s, but the area under cultivation expanded substantially until the land frontier was effectively closed in 1950.[54] Java, on the other hand, had effectively "filled up" by the beginning of the present century; and although yields on the irrigated rice fields have risen slowly, this has been in response to factor substitution brought

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[53] H. Myint, The Economics of the Developing Countries, p. 52. See also E. Boserup, The Conditions of Agricultural Growth (London: George Allen and Unwin, 1965).

[54] International Rice Research Institute, Annual Report for 1966 (Los Banos: IRRI, 1967).

about by a rising ratio of labor to land. In effect, this has involved technical change, but of a wholly labor-intensive type.[55]

It could well be argued, with perhaps better historical support, that, if the yield take-off is to be achieved at all, it should begin prior to the exhaustion of the land surplus. As long as there is a surplus, the agricultural economy has a certain amount of "slack" and the per capita output above the minimum subsistence level is still significant. The approach of the land frontier causes output of labor to fall and, with it, the potential to invest and raise productivity.

Despite arguments of this sort, a satisfactory connection between productivity and a land surplus has yet to be demonstrated. Modern research suggests that institutional and technological factors are of major importance.[56] In the opinion of the leading authorities the prospects for the Philippines of raising productivity in the future depend on scientific advance and the possibility of changes in cultural practices,[57]

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[55]Clifford Geertz, Agricultural Involution: The Processes of Ecological Change in Indonesia (Berkeley: University of California Press, 1963).

[56]See, for example, S. C. Hsieh and V. W. Ruttan, Technological Institutional and Environmental Factors in the Growth of Rice Production: Philippines, Thailand, and Taiwan (Stanford: Food Research Institute, forthcoming).

[57]Cultural practices refer primarily to the use of insecticides, fertilizer, weed control, and water management. See IRRI, Annual Report for 1966. This IRRI report and the Hsieh-Ruttan paper form the basis of our discussion relating to rice.

infrastructure, and institutions. Recent interest has focused on the development and introduction of improved varieties of rice. Substantial research has been directed towards the complex of factors needed to complement the improved varieties. Very much less research has been done on the other major crops--corn, sugar, and coconuts.

Rice and corn differ significantly from sugar and probably coconuts inasmuch as their technology is highly location specific; that is, agricultural research and development must be done "where the biological and economic environment approximates that where the innovation will be employed."[58] The IRRI Annual Report for 1966, for example, notes that:

> "It is increasingly recognized that there is little if any improved rice production technology from the United States or Japan or even Taiwan that can be immediately transferred to Southeast Asia."[59]

This inability to transfer technology is one of the major factors explaining the failure to raise rice yields in contrast to the long-term success in raising sugar yields. Sugar technology is not location specific,

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[58]Hsieh and Ruttan, op. cit., p. 2.

[59]IRRI, Annual Report, p. 9.

and much, if not most, of the increase in yields has been in response to the improved varieties developed outside of the Philippines.[60] The POJ varieties developed by the Dutch in Java in the 1920s revolutionized sugar yields not only in Java but also in the Philippines and in much of the sugar producing world. Postwar yields have responded to varieties introduced from Hawaii. Sugar is one of the few cases in Philippine agriculture where it has proved possible to import technical change.

Coconut technology, as with that of other tree crops such as oil palm and rubber, is also universal rather than location specific. Unlike these other tree crops, however, practically no basic research has been directed towards developing a higher yielding coconut palm.[61] The limited research effort of the Philippines has been almost entirely directed towards combatting the major diseases. The successful research on rubber and oil palm is largely because of direct European and

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[60]The relatively "tight" structure of the sugar industry with mill supervision, geographic concentration, and large farms is more favorable to technical advance than most of traditional agriculture.

[61]The classic study in this area is K. P. V. Menon and K. M. Pandalai, The Coconut Palm, A Monograph (Ernakulan, S. India: Indian Central Coconut Committee, 1960). Ceylon and India have been the leaders in coconut research since the 1920s. A summary of Philippine research is found in Compilation of Research and Development on Coconut Conducted in the Philippines (Manila: National Science Development Board, 1967).

American interests in the growing side of these crops. Coconuts, however, have always been largely a smallholders' crop, and few growing interests are large enough to justify expensive research.

Unlike the other major crops, an integrated intensive research effort has been focused on rice since the early 1960s. A number of new varieties, markedly superior to the traditional ones, have been bred for specific Philippine conditions. The first large-scale planting of the leading new variety (IR8) took place in the wet season (second half) of 1967. This is the first time that enough seed was available to make possible widespread planting. It is too early as yet to assess fully the likely impact of the new varieties on the national rice scene. However, the effect on the limited number of farms which adopted IR8 in 1966 and the dry season of 1967 has been analyzed in the IRRI Annual Report for 1967. These results are important because they show for the first time the impact of the new varieties under actual farming conditions in contrast to the "test tube" or, at best, simulated environment under which the new seeds were first tested.

The three surveys reported all show conclusively that the yield from IR8 is substantially higher than that of the traditional varieties. The other major finding is that both the net return and expenditure on inputs are also very much higher for the improved varieties.

Table 34 summarizes the results obtained from a sample of lowland rice farms in Rizal Province. The yields, costs, and returns for IR8 approach twice that for the local variety. All the major components of total cost are higher for the IR8. Fertilizer expenditure, for example, averaged ₱146 per hectare for IR8 and only ₱39 for the local variety. The absolute difference in costs was even higher for costs in kind, which include harvesting, threshing, and seeds.

A survey in the provinces of Pampanga and Bataan yielded similar conclusions. This survey covered the 1966 wet season and the 1967 dry season. It also distinguished between owner-operated and tenant farmers. Yields on the owner-operated farms are considerably higher than on tenant farms, but in both cases yields were close to twice as high for the IR8 variety.

A further test was conducted in Laguna Province among 155 predominantly tenant-operated farms which had changed from the local to the IR8 variety. Yields which had averaged 2.4 metric tons per hectare in the 1966 wet season rose to 4.2 metric tons in 1967. An interesting result of this survey was the data on costs, which showed an increase from ₱106 to ₱277. The farmers who switched to IR8 began to spend four to five times the amount they had previously spent on fertilizer, weedicides, and insecticides. The farmers who made this change are

TABLE 34

Rice Yields, Costs and Returns: Improved and Traditional Varieties, Rizal Province, Philippines, 1967 Dry Season

| | IR 8 | Local Variety[a] |
|---|---|---|
| Number of farms in sample | 200 | 127 |
| Yield (metric tons rough rice per hectare) | 5.9 | 3.2 |
| Gross Return (₱1000) | 2.13 | 1.15 |
| Total Costs[b] (₱1000) | 0.78 | 0.38 |
| Net Return (₱1000) | 1.35 | 0.77 |

[a]Local variety is Binato, known also as Thailand.

[b]Includes fertilizers, chemicals, other cash costs, and costs in kind.

Source: International Rice Research Institute, Department of Agricultural Economics, Annual Report for 1967 (Los Banos: IRRI, 1968), p. 8.

clearly relatively progressive and able to accept not only the new variety but a whole new "package" of inputs. Without these increased inputs the yield differential is very much less.

The total area planted to IR8 during the first large-scale planting in the wet season of 1967 is estimated by the IRRI Annual Report to be about 200,000 hectares, or 10 per cent of the wet season lowland rice area. This is only about 3 per cent of the total rice area, but already the intensive educational and distribution campaign is thought to have reached a substantial share of the progressive farmers. Future gains are likely to be harder to win although only guesses are possible as to the share of farmers who may prove able and willing to accept IR8 and the associated "package deal."

There is some evidence that initial enthusiasm can easily turn to disillusion. Some 44 per cent of the farmers growing IR8 rice in the Laguna sample said that they would not plant that variety again. IR8 is certainly more prone to typhoon damage than the local varieties. Even more important to the farmers were complaints of its low price, high cost of production, lack of disease resistance, and inferior eating quality.[62] At this point it can probably only be concluded that IR8 has

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[62]IRRI, Annual Report for 1967, pp. 13-16.

proven yield potential, but there is as yet no certainty that it will have a large impact on the nation's rice production.

A narrow emphasis on one aspect of technical change, in this case varietal improvement, gives an unbalanced view of the potential for future yield increases. Technical change without changes in infrastructure, institutions, and cultural practices is likely to prove of limited value. Admittedly, little is known of the effect on yield of using improved varieties without increased inputs. The IRRI report states that if improved varieties are used with existing practices then:

> "the limited available evidence suggests that yields would be no worse than for local varieties under most conditions."[63]

In the broader historical context, the experience of countries which have raised yields is that this is one of a complex of mutually reinforcing changes. Thus, for example, in the case of Taiwan the yield increases, beginning in the 1920s, were closely associated not only with technical changes but also with the development of infrastructure, institutions, and cultural practices.[64] In the Philippines, the potential

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[63] Ibid., p. 17.

[64] This argument is elaborated in Hsieh and Ruttan, op. cit.

benefit from varietal improvements is greatly limited by the capacity of the irrigation system. The literature on Philippine agricultural development cites many important factors outside the sphere of technology which are relevant to any effort to improve yields. Perhaps the present situation can best be summed up by stressing that investment in research and development has not opened up a new low cost route to achieving increases in yield. Yield increases may occur in the near future, but in the present state of knowledge they require a complex of dynamic changes inconsistent with the historic pattern of "static expansion."

The potential for raising productivity in traditional agriculture may be summarized as follows. Among the crops with a location-specific technology there has been a major advance in the development of improved rice varieties. Technical change, however, is only one of the requirements for sustained yield advances. No similar technical advance has been made for corn. For crops such as coconuts and sugar, where imported technical change is possible, there is little indication of any past break with historical trends. Genetic research with a tree crop, such as coconut, takes a decade or more to affect output appreciably, and as yet nothing has been started. Sugar yields may well continue their slow upward trend, but this crop now accounts for a very small part of

traditional agriculture. For the sector as a whole, the chances of substantial, nation-wide yield increases over the next decade to not appear to be very favorable. Yield increases for rice in the lowland irrigated areas are likely to occur, but there will be inevitable offsetting yield declines on the extensive margin.

If overall productivity remains approximately constant, or rises enough to offset the effect of slowing land expansion, and the share of the labor force in agriculture remains stable, then traditional exports may continue to follow the postwar trend--increasing at approximately the same rate as total population. Successful development implies a rising share of the labor force in nonagriculture; for this to occur, labor productivity in agriculture must rise if a decline in the growth of traditional exports is to be avoided.

## Extractives: Resources and Utilization

### a. Forest Resources

The rapid growth in the export of wood products (mainly logs) explains about half of the absolute growth in total exports since 1950. Accounting for less than 5 per cent of exports in the early 1950s, wood products grew to 27 per cent by 1966. If this growth rate is maintained

in the future, then the rate of growth of total exports and the potential rate of growth of the economy will rise.

On the supply side, the continued growth of wood products will depend largely on the quantity and quality of forest resources. Based on estimates for 1963/65, Philippine commercial forests total about 12.6 million hectares, of which 6.3 million are in Mindanao and 3.8 million in Northern Luzon. The average quality and density of the forest reserves in Mindanao are very much higher than in the rest of the country so that, in terms of volume of standing timber, some 60 per cent of reserves are in Mindanao.[65] Production, and especially exports, are overwhelmingly concentrated in Mindanao.

The future of Philippine wood production and, in particular, the future of log exports, depend largely on the reserves in Mindanao. These reserves are subject to several forms of depletion apart from authorized logging. These include losses through illegal logging and clearing for shifting cultivation, squatting, and authorized extension of the

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[65] Of the total reserves of 1.8 billion cubic meters, 1.1 billion are in Mindanao. (Unless otherwise stated, the statistics in this section are from unpublished reports of the Bureau of Forestry, Manila.)

agricultural area for permanent settlement. Statistics based on legal logging are, therefore, quite inadequate as a measure of the rate of decline of forest area.

Reliable estimates of the rate of decline of forest area can be based only on aerial photography. Such photography is available for Mindanao although not for the other major forest areas. It was long thought that Mindanao did not suffer severely from illegal logging. The aerial surveys, however, have clearly exposed the gravity of the situation. Photographs taken in 1952 and again in 1963 show that the commercial forest area declined from 7.3 million hectares in the former year to 6.3 million hectares in 1963.[66] This is an average annual decline of 92,000 hectares, or a timber drain of 20.1 million cubic meters. Of this annual loss, only 4.8 million cubic meters was a consequence of authorized logging. Land clearing, shifting cultivation, and illegal logging, therefore, accounted for 15.3 million cubic meters.[67]

Although we do not have similarly accurate data for Luzon, it is thought that the illegal drain on forests in Northern Luzon is as severe as

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[66]B. C. Agaloos, Forest Resources of Mindanao (Manila: Bureau of Forestry, USAID/NEC Forest Development Project, 1965), p. 15.

[67]Ibid., p. 17.

in Mindanao. Both shifting cultivation and illegal logging are widespread. Some 60 per cent of the Luzon forests have been cut-over, and it is thought that more than half of this area will not regenerate to high forest. Farquhar estimates the annual loss of forest area in Northern Luzon at 40,000 hectares.[68]

The land that has been deforested has almost all been converted to cropland and pasture, and only an insignificant part to open land or other uses. Basically, this rapid deforestation is caused by the increase in the agricultural population. In response to this pressure the authorities have released large areas of forested lands for agriculture. Official releases of land have frequently exceeded 100,000 hectares per year. Even without such authorized sanction, however, it is very doubtful if the demand for new farming land could be resisted.

Not only was forest land turned into farm land but also most of the increases in farm land were at the expense of forest. This is shown clearly by the data in Table 35. The increase in cropland and pasture of 1.095 million hectares is closely matched by the decline in forest area

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[68] J. D. Farquhar, Demonstration and Training in Forest, Forest Range, and Watershed Management (Manila: United Nations Development Programme, 1967), pp. 24-25.

TABLE 35

Land Utilization in Mindanao, 1952 and 1963
(thousand hectares)

| | 1952 | 1963 | Change |
|---|---|---|---|
| Forest | 7,320 | 6,313 | -1,007 |
| Non-Forest | | | |
| Cropland and Pasture | 1,126 | 2,221 | +1,095 |
| Open Land | 990 | 874 | - 116 |
| Marsh and Small Water | 82 | 78 | - 4 |
| Urban and Other Areas | 25 | 57 | + 32 |
| Total | 2,223 | 3,230 | +1,007 |

Source: B. C. Agaloos, Forest Resources of Mindanao, p. 15.

of 1.007 million hectares. Farm land expanded slightly faster than the forest area declined because a small amount of open land was converted to cropland and pasture. The open land declined slowly because much of it is marginal for agricultural uses, with eroded soils, rock outcrops, and other deficiencies. Most of the remaining potential farm land is forested area. Based on Huke's estimate, noted above, of a potential cultivable area in Mindanao of 4.4 million hectares, it follows that the potential cropland and pasture in 1963 was some 2.2 million hectares, or double the area then cultivated.[69] About 2 million hectares of this must consist of forest area.

It is likely that the rate of decline in the forested area observed over the period 1952-63 increased in the years which followed. If the rate of growth in the farm population remained constant, then the annual absolute decline in the forested area would show an upward trend. The cutting and export of logs in the period 1963-67 was at a rate almost twice as high as that in the period 1952-63. However, as we have seen, authorized logging accounts for only about 30 per cent of the cutting drain.

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[69]This is not inconsistent with the 1960 census estimate of 2.5 million hectares of farm area. The latter includes about 300,000 hectares of forest area and some "other land."

The remainder is caused basically by the extension of farming area, and part of this extension takes place in areas that have been cut over by authorized loggers. Another factor that may have operated to reduce the forest drain is the possible decline in migration into Mindanao in recent years. If the cropland and pasture only increased at the same rate after 1963 as it did in the earlier period and this increase took place mostly at the expense of forests, then the forest reserves would be reduced by about 2 million hectares between 1963 and 1973. This would exhaust the forest land suitable for agriculture while still leaving two-thirds of the 1963 forest area intact.

The depletion of the remaining forested areas would take longer and depend on the growth in log production and exports. Well before the whole forested area was destroyed, however, the ecological consequences of massive deforestation--e.g., erosion and watershed destruction--would probably reduce the cultivable area and adversely affect the productivity of much of the remaining farm area. If the full consequences of this ecological imbalance are to be avoided, then, at the very least, the expansion of the cultivated area and the growth of log production must slow drastically in the near future. It is not possible for logs to continue long in their role as the mainspring of Philippine export expansion.

b. Minerals

Mineral exports, mainly of gold, copper, iron ore, and chromite, have grown considerably in the postwar period but have not markedly increased their share in total exports, which has fluctuated around 10 per cent. Assuming that world prices remain generally favorable, the future expansion of Philippine mineral exports will depend largely on the size and quality of reserves. The geology of much of the Philippines is moderately favorable for the occurrence of minerals, but only a little more than 10 per cent of the total area has been systematically surveyed. However, the mining companies have generally surveyed their own concessions and most of the regions where geological formations are particularly favorable.

One estimate of economic reserves is that made by the mining companies as reported in the Census. The 1961 Census of Mining and Quarrying estimated the value of total reserves of metallic minerals at ₱3,693 million. This was equal only to about 18 years' production at the 1961 level or 9 years' output at the 1966 level. This estimate has since been proved too conservative, but there is little evidence to suggest that the Philippines has vast mineral resources. The known reserves of gold, the mainstay of Philippine mineral production for over a century, have been considerably depleted.

A survey of the company reports of all the major mining companies does not suggest a period of great expansion in the near future. Easily the largest mining establishment is the Atlas Consolidated Mining and Development Corporation which produced 40 million pounds of copper in 1958, rising to 66 million in 1967. The company plans to raise this to a maximum of 100 million pounds by 1969. Having reached this ceiling, no further expansion is planned or, indeed, would be possible without massive new investment with a gestation period of five years or more. This company accounts for about 30 per cent of Philippine mineral output and is considered by many to be the dynamic production leader. Few other companies are likely to initiate a period of sustained rapid expansion which would be needed to make Philippine minerals an engine of rapid export expansion. Moreover, starting from a small base, even a rapid rate of growth of, say, 10 per cent per year, would have little impact over the next decade on the rate of growth of total exports. Known reserves and the production plans of companies do not suggest that such a high and sustained rate of growth is likely or even possible. It is most probable that the past steady but not sensational rate of growth will be maintained.

## SUMMARY:
## PAST GROWTH AND THE FUTURE OF PHILIPPINE EXPORTS

Attempts to forecast future growth trends almost inevitably involve errors which range from the large to the spectacular. However, the relatively simple structure of Philippine exports and the importance of exports for the future growth of the whole economy together pose a temptation to predict the future which we have not tried to resist.

Analysis of the postwar period showed that the Philippines failed to develop an export market for manufactures or to increase the processing of primary exports. The evidence points to a likely continued inability to develop along these lines. The only remaining way to reduce the resource content of exports is to increase the productivity of the primary inputs. The two major inputs for present exports are land and forests. The more important input is land where productivity has remained fairly constant for decades. There are exciting prospects for raising the productivity of rice-growing land, which in the mid-sixties accounted for about one-third of the total farmed area. These prospects, however, are based on technical advances (varietal improvements) which will have only a limited impact unless they are accompanied by changes in infrastructure, institutions, and cultural practices. There is little prospect of significantly raising the productivity of coconuts and most of the other crops

which account for the bulk of the cultivated area. The possible increases in rice yields, moreover, may well be largely offset by the already observed diminishing returns at the extensive margin.

The rate of extension of the cultivated area is almost certain to be very much slower in the future than in the past, and total cultivated area can only increase by about 2 million hectares over the 7.5 million reached in the mid-sixties.

Most of the increase in the cultivated area will continue to take place at the expense of forest land, further narrowing the base of the other major export product. Squeezed by both farming and logging, the past rate of growth of log production must fall substantially in the not too distant future as the forest reserves are being rapidly eroded. Mineral exports may well continue on their past upward trend, but the resource base is probably not large enough to support a high sustained rate of growth.

It is clear that, on balance, it is most unlikely that the postwar rate of growth of exports can be maintained for long. The following assumptions appear to be realistic for projecting factors affecting future Philippine export growth:

(1) Population growth remains high (about 3.2 per cent per annum) and per capita food consumption stable.

(2) No dramatic change in the share of the labor force in agriculture. (In Chapter 4 it was seen to have remained quite stable in the postwar period.)

(3) Increasing yields for rice, but largely offset by diminishing returns at the margin. Stagnation for other crops. The outcome may be that overall average yields remain approximately constant as in postwar years. (See Table 10.)

(4) An increase in the already rapid rate of diminution of forested area.

If these predicted forces are correct, then the rate of growth of both traditional and extractive exports must decline substantially in the future, the former in response to slowing land expansion and the latter with the exhaustion of forest reserves.

This analysis is supply oriented as virtually nothing has been said about likely future trends in world demand. Any softening of commodity prices will, of course, hasten the decline in the total value of exports. Predicting prices is even more hazardous than predicting supply, but a worsening in the terms of trade does not appear very likely. World demand for extractives, in particular, is likely to remain strong, and there are no overwhelming reasons to expect falling prices for

coconuts and sugar. Rather, the crucial problems are on the side of supply, where traditional resources exploited through trade are approaching exhaustion.

In the following chapter we shall combine these features of the export sector with the findings from Chapter 4 on the structure and characteristics of other parts of the domestic economy, particularly those relating to import dependence and modern sector productivity changes. We shall then be in a position to draw conclusions regarding future Philippine development on the basis of the open, dual economy model.

# CHAPTER 6

## CONCLUSION: GROWTH, TRADE, AND THE OUTLOOK FOR THE FUTURE

In this chapter we summarize the argument as a whole and draw implications both for the future of Philippine growth and for an appropriate development strategy.

### OPEN ECONOMY GROWTH: THEORY AND PHILIPPINE EXPERIENCE

The model presented in Chapter 3 describes a form of open economy growth which we think is useful in highlighting some of the essential relationships in the growth process. Given continued stability of the underlying structure (introduced in Chapter 2), the model may be used as an analytical tool and as a means of projecting likely future trends. In this study, the model is applied to the case of the Philippines although examples are occasionally drawn from other Southeast Asian economies which have basically similar growth dynamics.

## The Theory

The postulated structural framework underlying this study is the triangular flow of goods among agriculture, industry, and the foreign sector (see Diagram 1a). Together with this structure, we posit as a rule of growth the necessity to import much essential capital equipment. We accept that, for small countries at least, investment in durable equipment has a high and relatively stable import content, showing little reduction in the course of development. The evidence on which this assertion is based is admittedly drawn largely from cross-section studies (see the discussion of the import content of investment in Chapter 2), but it is in accord with the Philippine experience.

The modern sector grows through the accumulation of capital and is, therefore, dependent on imports. These imports are paid for by the exportable agricultural surplus--the residual output of traditional agriculture left after feeding the whole population--and possibly also by the export of resource-intensive primary products from the modern sector. The export of the agricultural surplus and the import of capital goods form two sides of a triangular flow, linking agriculture to industry via the foreign sector. The circuit is completed by the sale of domestically produced manufactured goods to the agricultural sector in

exchange for both the import of capital goods and the necessary purchases of food from the agricultural sector.

Of greater interest than this static framework of resource flows is the way in which this particular type of open, dual economy grows over time. If we consider first the simplest case in which all exports originate in the traditional sector (and there is no other source of foreign exchange), then the basic exogenous forces which determine the growth paths of the variables are the constant rate of natural increase of total population and the rates of productivity increase in the two sectors. Assuming, as has been the case over long periods in most of Southeast Asia, that agricultural productivity is stagnant, then the agricultural surplus increases as a result of a rising labor force and the expansion of cultivated area. The growing surplus allows exports to rise also (unless the share of the labor force in industry is increasing very rapidly) and, hence, imports are enabled to grow. If the entrepreneurs take advantage of the investment opportunities offered by this import capacity, then the growth of the modern sector is ultimately constrained by the growth of exports. Modern sector productivity increases may be such as to raise output at a higher rate than capital stock, but we noted that historically it was more commonly the case that only labor productivity increased appreciably. In this case modern sector labor absorption may be little,

if at all, in excess of the rate of natural increase of the existing labor force.

In this basic form of the model, there was a stable asymptotic solution under which exports and capital stock increased at the population growth rate, provided the land surplus continued and modern sector productivity changes did not show a capital-saving bias. As the limits of cultivable area were approached, however, modern sector growth was constricted and eventually agricultural output was sufficient only to feed the population with no surplus available for export. Only increases in labor productivity in agriculture could offset this tendency to revert to an agrarian economy.

There are a number of variants of this basic model. The most likely possibility is that, in one way or another, a country will be able to find additional ways of financing imports. In the case of Thailand, for example, foreign military expenditures and foreign aid supplement the agricultural surplus as a source of financing imports. Restricting ourselves to domestic resources which supplement the agricultural surplus, the list is much more limited. Few early developers export manufactured goods. Mineral exports, however, are often significant. Sharing some essential features with mineral exports are the log exports of the Philippines and Malaysia. Minerals and logs form a category of

modern sector exports which are, nevertheless, primary products. We have called them for convenience, extractives.

The growth of extractive exports must be analyzed, for the most part, independently of the rest of the economy, depending as they do on world demand and the supply and quality of resources in the country concerned. Earnings from extractive exports are best thought of as exogenously given and are treated as an addition to the surplus of traditional agriculture. The main function of extractives is to make possible a higher level of imports than would otherwise be possible. If extractives grow faster than traditional exports, then they raise the ceiling on the growth rate which would otherwise be imposed by the agricultural surplus.

The variant of the model relevant to the Philippine experience in postwar years is one in which these extractive exports play a major role. The other important phenomenon which must be taken into account in describing Philippine growth is the process of import substitution. In the model we incorporated this process by assuming a steady fall in the share of consumer goods in total imports.

## Dynamics of Philippine Growth

In Chapter 4 it was shown that the structural and behavioral relationships assumed in the formal presentation of the model could be meaningfully applied to the case of the postwar Philippines. We attempted to demonstrate that the behavioral assumptions were broadly valid. On examining the data, we found that labor productivity in agriculture had remained almost constant while technical change in the modern sector was of the extreme labor-saving type.

Over the 1950-66 period, imports roughly kept pace with exports. The growth of capital goods imports, however, was considerably more rapid than that of total imports because of the very slow increase in the consumer goods component (caused by import substitution). If the shares of capital and consumer goods in imports had remained at the 1950/52 level, then in 1964/66 capital goods imports would have been only 43 per cent of the value actually observed. In this sense we may say that 57 per cent of the growth in capital goods imports was due to the falling share of consumer goods in the total. As this fall slowed in the 1960s, so also did the growth rate of capital goods imports.

The growth of capital goods imports at some 8 per cent per year made possible a growth in the output of the modern sector of about

the same rate.[1] Although substantial, this rate of growth of the industrial sector, combined with labor-saving technical change, was not rapid enough to shift the center of gravity of the economy and raise the share of the labor force in the modern sector. This share remained at about 42 per cent (see Table 9).

At the aggregate level, traditional sector exports increased at a rate slightly below the growth rate of the agricultural labor force. Although the assumption of a pure land surplus (under which the land/labor ratio remains constant as labor increases) proved a satisfactory approximation for the years 1950-66, there was evidence that land expansion was slowing towards the end of this period. The average value of k, the elasticity of land with respect to labor, for 1950-66 was 0.93, and the data on land/labor ratios presented in Table 23 indicate that k first fell below 1 in the 1960s. There was little evidence that technical progress had acted to offset this decline.

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[1]The modern sector, as a whole, grew at an average annual rate of 6.4 per cent. The services sector, which has low capital requirements, grew much slower than manufacturing where the capital-output ratio is much higher (Table 14). As a consequence of this structural shift, the capital-output ratio of the sector, as a whole, may have been rising, thus requiring the rate of growth of capital goods imports to be higher than the growth of total output.

While traditional sector exports have therefore been stagnant, total exports were enabled to grow at a satisfactory rate (6.0 per cent on average for the period 1950-66--based on the constant price peso estimates in Table 7) because of the very rapid increase in extractives (averaging 13.9 per cent). As seen in Diagram 11, by 1966 extractive exports had become as important as traditional exports in the total; and if that part of manufactured exports obtained by processing extractive products is included also, extractives form the dominant component.

To a considerable extent the growth of extractives was an alternative to raising agricultural productivity. That agricultural output was able to increase the way it did was because of the existence of a land surplus. It is far from clear whether growth based on these factors represents satisfactory development, and a fuller assessment of the Philippine performance is therefore required.

## PERFORMANCE OF THE PHILIPPINE ECONOMY, 1950-1966

Evaluation of the performance of the Philippine economy in the postwar period is best made with reference to the set of development indicators outlined in Chapter 2. The Philippine record with respect to these indicators was largely covered in Chapter 4, but it may be useful to draw the findings together and assess the quality of the overall performance.

## Income and Its Distribution

Both gross national product and real per capita income rose significantly over the period 1950-66 (see Table 36). GNP at constant prices increased at an average annual rate of 5.4 per cent, population at 3.2 per cent, and per capita income at 2.2 per cent. However, the performance was much less satisfactory in the second half of the period with per capita income growing at only 1 per cent per year between 1956-58 and 1964-66.

In the manufacturing sector, the share of income accruing to labor showed a slight but appreciable downward trend over the period for which the data exist (1956-66). As a development indicator, this may be regarded as an unfavorable sign, contrary to the well established findings reported in Chapter 2.

A decline in labor's share is implied by the growth model used to analyze the Philippines. The wage level in manufacturing is determined by the marginal productivity of labor in agriculture, which, in the effective land surplus case of the Philippines, is the same as average productivity. Constant agricultural productivity kept the real wage level of unskilled labor in industry virtually stable over the period (Table 27). At the same time, however, technical change was raising the

TABLE 36

Per Capita GNP, Philippines, 1950-1966

| Year | GNP (million pesos at 1955 prices) (1) | Mid-year Population (x 1000) (2) | Real Per Capita Income (pesos) (3) |
|---|---|---|---|
| 1950 | 6264 | 20230 | 310 |
| 1951 | 6548 | 20832 | 314 |
| 1952 | 7043 | 21456 | 328 |
| 1953 | 7621 | 22105 | 345 |
| 1954 | 8174 | 22778 | 359 |
| 1955 | 8739 | 23479 | 372 |
| 1956 | 9486 | 24206 | 392 |
| 1957 | 9806 | 24962 | 393 |
| 1958 | 10028 | 25748 | 390 |
| 1959 | 10607 | 26566 | 399 |
| 1960 | 10894 | 27414 | 397 |
| 1961 | 11646 | 28302 | 412 |
| 1962 | 12000 | 29231 | 411 |
| 1963 | 12651 | 30205 | 419 |
| 1964 | 12988 | 31224 | 416 |
| 1965 | 13820 | 32293 | 428 |
| 1966 | 14401 | 33406 | 431 |

Source: (1) Table 4 ;
(2) Revised estimates by Ruprecht [see "Philippine Labor Statistics," Philippine Statistician Vol. XV, No. 1/2 (1966), p. 81.]

productivity of labor in industry, thus increasing the profit share and diminishing that of labor. This tendency would have been partially offset by the shift in the domestic terms of trade in favor of agriculture, which raises the wage measured in industrial goods. Another offsetting factor, which cannot be treated in the model, was the increase in average skill level. This raised the average wage, despite constancy at the unskilled level.

### Productivity

The productivity of labor in the traditional sector failed to rise at all over the 1950-66 period, but in the modern sector labor increased its productivity at an average rate of 3.0 per cent (Table 31). This caused a substantial increase in the ratio of modern sector to traditional sector labor productivity. Such a trend would tend to strengthen the dualistic structure of the economy, in sharp conflict to the development indicator which points to a long-run narrowing of the intersectoral productivity differential.

The Philippines also performed poorly with respect to land productivity, which did not rise over the period. Thus, the traditional sector, with constant productivity of both land and labor, failed to measure up to the development tests. In contrast, the modern sector,

with apparent constancy of capital productivity and rising labor productivity, performed satisfactorily. It should be pointed out, however, that increases in labor productivity in the modern sector did not continue after 1960.

## Sectoral Distribution of Product and Labor Force

The share of gross national product originating in the traditional sector fell significantly over the period 1950-66. The fall was from about 35 per cent in the early 1950s to 25 per cent in the mid-1960s (Table 5). This favorable structural shift in the distribution of the product was not matched by a similar shift in the allocation of the labor force. The share of the labor force in the traditional sector was estimated to be 57 per cent in the early 1950s and 56 per cent in the mid-1960s (Table 9). It is not possible to be fully confident of this conclusion, however, because the data on allocation of the labor force over the period 1950-56 were based on extrapolation using the 1948 census as a benchmark. This census is not fully comparable with the more recent annual data. If the analysis is restricted to the period 1956-58 to 1964-66, then the share of the labor force in agriculture falls from 60 per cent to 56 per cent. There may, therefore, have been a modest fall in the share of the labor force in agriculture, but it was less

marked than the structural change in the composition of output. This result is not consistent with the development indicator noted in Chapter 2, showing a more rapid reallocation of labor than of output. It is an obvious consequence, however, of constant labor productivity in agriculture, combined with rising labor productivity in manufacturing and the modern sector as a whole.

## Foreign Trade

There are few changes in the foreign trade sector that are systematically associated with the course of economic development. The trade ratio, for example, has limited significance because of its high level of aggregation. Whether the ratio rises or falls depends on the outcome of a number of contrary forces. Some of the determinants of the ratio are of little significance--for example, the increase in the ratio caused by a shift from food crops to commercial crops, which raises exports and food imports.

A major determinant of the ratio is the factor of country size as measured by GNP. Kuznets showed that if the effect of this factor on the trade ratio is excluded, the trade ratio should increase with development. The Philippine trade ratio remained fairly stable at around 40 per cent in the 1950-66 period. As GNP grew during this period, which

in itself would tend to lower the ratio, the trade ratio excluding the factor size must have increased.

Changes in the composition of imports are even less useful as an indicator of economic development. As Maizels' research showed so clearly, success in import substitution, which usually raises the share of capital goods in total imports, is inversely correlated with the rate of growth. A change in the composition of imports can be either a consequence of the natural growth process, in which case it is a success indicator, or a consequence of policies of forced import substitution which usually stifle the bases for sustained growth.

In the Philippines the share of capital goods and materials chiefly for capital goods in total imports rose during the period 1950-66 from 36 per cent to 60 per cent (Table 8). It is likely that most of this shift is a consequence of policies which encouraged import substitution rather than the outcome of the natural process of growth.

A less ambiguous indicator is that development is usually associated with a rise in the share of manufactured exports in total exports. The Philippines performs poorly on this basis. The growth in manufactured exports recorded in Table 7 (from 3 per cent to 8 per cent of total exports over the period 1950-66) was almost entirely accounted for by plywood and veneer exports, closely associated with extractive industries.

The final indicator connected with foreign trade which was discussed in Chapter 2 referred to a fall in the import content of investment. The Philippines also appears to fail by this standard although we cannot regard the evidence as conclusive. Data reliability is not high, and only a slow fall in the import content of investment can be expected in a small economy.

We can sum up the Philippine performance by concluding that it was a very uneven one. Average per capita income grew significantly over the period, but it was associated with only some of the changes which usually occur during the development process. Productivity growth occurred in industry but not in agriculture, and a sectoral shift occurred in terms of output but not labor.

These changes do not, however, tell the whole story. It is not only the observed changes and the rates of growth which are important but the sources of growth and the quality of the growth process. Analysis of some of these further dimensions of the growth process suggests that the Philippine performance and the outlook for the future are much less promising than these development indicators imply.

## VENT-FOR-SURPLUS EXPORT GROWTH

The postwar growth in Philippine exports is largely explained by the growth in the input of natural resources. This dependence on increased inputs of land for traditional agriculture and forests for extractive exports is a "once over," vent-for-surplus pattern of growth. A continuation of this pattern as the population increases leads inevitably to a decline, not only in the rate of growth but eventually in the absolute level of exports.

In Chapter 5, we estimated the size of the surplus of cultivable land and forests remaining to be vented through trade. The total remaining agricultural area in 1966 was of the order of two million hectares, a little over 25 per cent of the area then being cultivated. Total reserves of commercial forests were estimated at the same time to be about 12.6 million hectares, of which a significant proportion was on potential agricultural land. The rate at which this surplus will be depleted can only be conjectured. However, only a major departure from the historical and postwar pattern of agricultural and export expansion can prevent a decline in export growth over the next decade.

On the basis of the assumptions listed at the end of Chapter 5, we might expect that growth of traditional sector output could be maintained

close to its average postwar rate of 2.8 per cent. If, at the same time, food consumption increased at 3.2 per cent, the resulting rise in the exported surplus would average 1.6 per cent per annum over the period 1964/66-1975 and 1.3 per cent over 1975-85. A more optimistic assessment might allow for yield increases sufficient to raise output to the population growth rate of about 3.2 per cent. On this assumption, output could keep pace with food demands, and exports would grow at a constant rate.

Future exports of logs are influenced by policy decisions as well as the other unpredictable forces discussed in Chapter 5. Farquhar, however, has made projections of log exports in 1975 and 1985 based on a number of assumptions regarding allowable timber cuts and domestic demand.[2] Principally, he assumes that commercial forest area can be stabilized at a minimum of 6 million hectares and that the demands of domestic industry are met before logs are exported. His three projections (high, medium, and low estimates) for 1965-85 are given in Table 37, converted to average annual rates. Although the range of

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[2] J. D. Farquhar, Demonstration and Training in Forest, Forest Range, and Watershed Management (Manila: United Nations Development Programme, 1967), pp. 43-44.

TABLE 37

Past and Projected Average Annual Growth Rates of Philippine Log Exports, 1955-1985[a] (percent)

| Period | Average Growth Rate | | |
|---|---|---|---|
| 1955-1965 | 11.5 | | |
| | High | Medium | Low |
| 1965-1975 | 5.0 | 2.4 | -1.0 |
| 1975-1985 | 1.0 | -3.3 | -15.0 |

[a]Based on data in physical units.

Source: Computed from estimates and projections by Farquhar, op. cit., Table 3.4 and pp. 43-44.

estimates is necessarily wide, a drastic decline in the growth rate is clearly predicted and, by 1975, a probable cessation of growth.

Little can be said on the probable future growth of mineral exports. In Chapter 5 we argued that, on the basis of known reserves and the production plans of the major companies, little change was likely in the past rate of growth. Over 1950-66, this averaged 9.1 per cent per annum and for 1960-66, 7.6 per cent.

If we accepted the medium projected growth rate for logs and a rate of 8 per cent for minerals, the category of extractive exports would show a growth rate of 4.6 per cent over 1964/66-1975 and 3.3 per cent over 1975-85. In the late 1970s, minerals would overtake logs as the major component of extractives.

Exports of manufactures, plywood and veneer, showed an average annual growth rate of 9 per cent in the period 1950-66. The difficulties of processing logs for export were described in Chapter 5. When the depletion of the forest resource base is also taken into account, it seems likely that plywood and veneer will not for long sustain manufactured exports at this rate. As an extremely optimistic assumption, however, we might suppose that other manufactures could progressively take their place and maintain the same overall growth rate.

Combining the rates suggested in the preceding paragraphs, we find that they imply that total exports would grow at a rate of 4.3 per cent over 1964/66-1975 and 4.2 per cent over 1975-85 if traditional exports maintained the constant rate of 3.2 per cent. If traditional output increased at only 2.8 per cent, total exports would grow at 3.6 per cent in 1964/66-1975 and 3.5 per cent in 1975-85.

The purpose of computations of this sort is not to predict future growth rates but rather to draw out the consequences of the pattern of export development which has been followed in the past. A decline in the growth rate of total exports is clearly implied in this pattern, even in the unlikely event that exports of manufactures can continue to increase at their past average rate.

## IMPORT DEPENDENT INDUSTRIAL GROWTH

The adverse consequences of a decline in the growth rate of exports are heightened by the structure of the industrial sector and the nature of its growth. Continued inability to produce more than a small fraction of required producer durables and continued dependence on imported intermediate goods will tie the rate of growth of industrial output to the growth of capital goods imports. As we have seen, this close relation between capital goods imports and modern sector output held

over the period 1950-66. In view of the likely decline in the rate of growth of exports and therefore imports, this import dependence may well prove a severe constraint on future modern sector growth.

In fact, however, the situation is more acute than that suggested by the foregoing discussion. Over the period 1950-66 capital goods imports grew at the high rate of 8 per cent per year, mainly through increasing their share in total imports and only secondly through the increase in imports as a whole. As was pointed out earlier in this chapter, about 57 per cent of the growth of capital goods imports was due to the changing composition of imports and only 43 per cent to total import growth. The changing composition of imports enabled the modern sector to grow more rapidly than would otherwise have been possible.

It is unlikely that the share of capital goods imports can continue its past substantial rise. In fact, this ratio appears to have reached a ceiling in 1960, and over the 1960-65 period it fluctuated around 60 per cent. As a result, the rate of increase in capital goods imports has slowed markedly in recent years despite the continued growth of total imports. As we have seen, there is little evidence to suggest that this slowing is a consequence of the beginning of a process of import substitution for capital goods. Rather, the growth of the whole modern sector has been slowed. If in the future the composition of imports

remains stable and the total rate of growth of imports remains the same as in the 1950-66 period, then capital goods imports will grow not at 8 per cent but at closer to 4 per cent. If the import content of investment remains high, the outlook in the long run is for a substantial decline in the rate of industrial growth.

## TOWARDS STAGNATION?

There are several factors which suggest that a satisfactory growth rate may be more difficult to maintain in the future than it has been in the past. Because of the approaching exhaustion of surplus land and forest resources, the present pattern of export growth, based on extractives or vent-for-surplus products, cannot continue for long. Indeed, even to maintain exports at the 1965-66 level for the following decade may well prove difficult.

On the side of imports needed for industrial growth, the difficulty arises from the probable exhaustion of the potential for further import substitution. This is usually viewed as the difficulty of further reducing the share of consumer goods imports but can equally be seen as a problem of raising the share of capital goods imports. If the composition of imports remains stable in the future, then this alone cuts by nearly half the future growth rate compared with that of the 1950-66

period. If, as appears likely, the rate of growth of exports and, therefore, total imports decline, then capital goods imports and long-run industrial growth will be further adversely affected.

The moderately successful growth performance of the postwar period has been largely based on vent-for-surplus export growth and consumer goods import-substituting industrial expansion. Both are of a once-and-for-all nature; and if the economy is to avoid stagnation, new patterns of future growth must be found.

## DEVELOPMENT STRATEGY

This study is focused on theory and analysis rather than development strategy and policy. Analysis must lay the basis for policy, but the highly aggregated and selective approach of this study can do little more than point in the general direction of an appropriate development strategy. Detailed lines of policy with operational relevance require disaggregation, short-run analysis, and constant reference to the economic, political, and institutional framework. Despite the obvious limitations of the present study, it is our thesis that a long-run, growth-oriented approach clarifies the underlying dynamics of the Philippine economy. An understanding of these fundamental relationships at least indicates the outlines of an appropriate development strategy. In this case

study, therefore, a broad strategy outline is implicit in the analysis of the growth process.

In essence, the Philippines in the period 1950-66 sought and found an "easy" path to growth. The substantial growth in total output and per capita income was based largely on the exploitation of previously unutilized natural resources and the policy of import substitution. The using up of the surplus of land and forests was an easy process in that it did not basically require productivity increases, technical change, or substantial upgrading of skills. In short, growth was not accompanied by the difficult, dynamic, and surely indispensable changes associated with true development.

The growth of modern manufacturing was to a large extent based on import substitution of consumer goods. There was little backward integration towards capital goods and the import content of investment remained high. Import substitution caused a rapid change in the composition of imports which made it possible for capital goods imports and, therefore, industrial output to rise rapidly. This, too, is now well recognized as an essentially easy process, bringing considerable growth with relatively little learning of difficult skills. Labor productivity increased but probably in response less to indigenous innovation than to

rising capital/labor ratios and technical change embodied in imported capital equipment.

The venting of natural resources through trade and import substitution are both of a non-repeatable nature and lay the basis for future stagnation rather than sustained growth. A development strategy for the Philippines must seek a radical break with this ultimately self-defeating growth pattern. A successful strategy should be directed towards the following four major areas:

(1) Natural resource content of exports and agricultural output.

(2) The import dependence of investment.

(3) Bias in technical change.

(4) Population growth.

The natural resource content of exports can be lowered through increasing the basic productivity of land and forests, increased processing of exports, and diversification through the growth of manufactured exports. Raising basic agricultural and forest productivity is probably the most urgent priority, but the other alternatives are also important. Some of the problems of greater processing and the exporting of manufactures were discussed in Chapter 5.

The lowering of the import dependence of investment through domestic manufacture of a wider range of industrial intermediate goods and

producers' durables would raise the ceiling on growth imposed by the level of imports and exports. There may also be many other favorable effects associated with extending import substitution backward to non-consumer goods, stemming from the rising level of skills and inter-industry demand.

The postwar labor saving bias in the industrial sector's technical change has severely restricted the flow of labor from agriculture to industry. Detailed research should be directed towards an analysis and evaluation of this biased technical change. Although the undesirable consequences of extreme labor-saving technical change are easily recognized, we know little about alternative patterns.

The advantages of a lower rate of population growth are well known, but in terms of this analysis they center on the slowing down of the rate of exhaustion of a limited natural resource surplus.

A development strategy which succeeded in these objectives would transform the basic dynamics of growth and the outlook for the Philippine economy.