

SOME APPLICATIONS OF NATIONAL INCOME ACCOUNTING

WITH SPECIAL REFERENCE TO CHINA

by

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P R E F A C E

The present study has been the result of my Ph.D. research on China's national income accounting begun in 1960 at Edinburgh. Initially I had hoped to estimate China's national income for the period 1958-62 based on the conventional national income accounting system. Owing to lack of statistical data, the project was virtually abandoned after two years most of which period had been spent on going through the original Chinese sources as well their English translations available to me in the United Kingdom and, at the same time, hopefully waiting for release of more relevant statistical information in one form or the other by the Chinese on the mainland. The result of these two years' of ground work eventually took the form of a very crude estimation of China's national income aggregates for the period 1960-62, which is now incorporated as part of the present study. The work on the study in its present form, which involves a change from construction of a set of national income accounts to applications of national income accounting began in 1962 and the problem of non-availability of non-Chinese national income series has been made easier through passage of time, for the Chinese national income studies by T. C. Liu and K. C. Yeh on behalf of the RAND Corporation and also by Y. L. Wu and associates on behalf of the Stanford Research Institute were available to me in 1964, which provide the necessary empirical data to strengthen the application aspects.

Research on the Chinese economy may sometimes be fascinating but the amount of ground work which needs to be done can also be tedious, frustrating, and time-consuming for any one

individual without any assistance. The output is usually extremely low in relation to the effort put in.

The present study would not have seen the light of day had it not been for the encouragement and advice from my supervisor, Mr. Ian G. Stewart, Reader in Economics of University of Edinburgh. I would also like to thank my supervisors from 1960 to 1962, Professor Alan T. Peacock and Dr. D. N. Winch, now of University of York and University of Sussex respectively, for their unfailing help and guidance, especially the former, who, through his interest in my field of study, was instrumental in my coming to Edinburgh. Thanks are due to the staff and colleagues of the then Department of Political Economy, University of Edinburgh, with whom I had had stimulating discussions on topics of mutual interests, especially Dr. Jindrich Veverka, now of University of Leicester, from whom I learned more about the Soviet-type economies.

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INTRODUCTION

The primary concern of this paper is with the theoretical and practical implications of the concept of national identity, and particularly its relationship to the concept of national development. In a number of respects, national identity is a concept of national development. In a sense, national identity is a concept of national development. In a sense, national identity is a concept of national development. In a sense, national identity is a concept of national development.

National Identity

I N T R O D U C T I O N

The concept of national identity has been defined in a number of ways. Some have defined it as a sense of belonging to a particular nation, while others have defined it as a sense of shared history and culture. In this paper, we will explore the concept of national identity in relation to national development. We will argue that national identity is a concept of national development. In a sense, national identity is a concept of national development. In a sense, national identity is a concept of national development. In a sense, national identity is a concept of national development.

The present study is concerned with applications of national income accounting with reference to China.¹ Our particular interests are the use of national income aggregate as a measure of economic welfare and national income accounting as a tool of economic planning. More specifically, we first examine the problem of national income aggregate as an economic welfare measure, and hence of national income change as a measure of economic welfare change, in an economic system whose institutional setting is radically different from that tacitly assumed in the hypothesis that national income is a welfare measure. We attempt to show that, under these circumstances, personal consumption and saving tends to be a more appropriate measure than national income. Secondly, we examine the planning application of national income accounting and intend to show that, given certain conditions, national income accounting is a useful tool of economic planning in an economic system such as China's just as much as that in the West despite their differences in ideological and other institutional factors. This view is contrary to that held by the Chinese on the mainland who capitalize on their economic system being ideologically different and who ignore the usefulness of the "capitalist" tool and all that goes with it as a matter of course. We shall attempt an academic exercise, showing the use of national income accounting in the formulation of a Chinese economic plan with increase of economic welfare as the objective of Chinese economic policy.

Applications of national income accounting with reference to China so far appear to have been limited to structural and growth analyses, and to the study of the country's economic potential. Eckstein, limited by the fact that his national income estimate was for one year only, employed his national income accounting data to analyze the resource-use pattern in the Chinese economy, and compared the latter with those in India and the Soviet Union. He also compared the aggregate and per capita product of China with those of India and the United States, as well as the structure of the Chinese economy with those of India and the Soviet Union. He further examined the pricing and valuation problems in relation to industrial structure in an economy of the Soviet-type. Liu and Yeh's application was essentially a growth analysis, for they had estimated national income for 1933, 1952-59. Wu and his associates revised Liu and Yeh's figures and projected them to 1970. They were primarily concerned with the study of China's economic potential with the view to evaluating the country's military potential. Other studies on China's national income accounts hardly touched upon other aspects of national income accounting application. The two applications concerned in the present study are therefore being examined for the first time.

We consider our present study timely. With the national income index up to 1959 published by the Chinese government's State Statistical Bureau and the detailed national income accounts by non-Chinese scholars now available, we are better able to consider the other uses of national income accounting.

Work on China's national income is a time-consuming task.² Oftentime bold assumptions had had to be made in order to make the estimates. When these estimates are used for work on applications of national income accounting, their limitations, due largely to assumptions used in estimation, can be brought out more clearly.

One may question the particular applications of national income accounting we propose to examine in the present study. It is true that in the West there are doubts as to the value of national income as a measure of economic welfare. However, we are examining the whole problem in the light of a different institutional setting which to the best of our knowledge is a field of research still untouched, at least as far as China is concerned. As regards national income accounting as a tool of economic planning, one may also doubt the value of the effort expended on discussing a problem against a background different from that traditionally assumed. The Chinese themselves had jeered the value of national income accounting as a tool of economic planning in the West and on ideological grounds would probably be reluctant to admit the applicability of such a tool in China. Against this, economists in the West might find it hard to swallow when the whole question applied to China seems like putting a square peg into a round hole. Further, they might argue that unless any exercise such as ours would be taken up in a serious vein by the Chinese planners, it has little practical value. However, it is not our intention to tell the Chinese planners how to formulate their economic plans,

our aim is merely to show that, given the available national income accounting data, it is possible to determine the limits of expansion even for an economic system such as China's, given the objective and constraints. In any event, national income accounting is an objective tool, and as such should transcend institutional differences.

The present study begins with a survey of the available China's national income estimates and national income accounts (Chapter I). This survey provides a background for our discussion on problems in the two particular applications of national income accounting with reference to China. Also this would provide a timely inventory of the work done on that country's national income accounting. Since estimates, even for one single year, vary between estimators, comparisons are made of these estimates, with due attention paid to conceptual and definitional differences.

Chapter II is concerned with functions of pricing system and pricing of outputs and factors in theory and practice in China. It provides the background to the chapters on valuations of national income, national income and welfare, and national income accounts and economic planning.

Chapter III examines the problems of valuating physical outputs for accounting purposes. It brings to the fore the problem of alternative methods of valuation in national income accounting, namely, market price and factor cost. Earlier

discussions on valuation are reviewed in the light of a different institutional framework such as China's. The relation between the alternative valuations with government as a separate entity and that between the valuations with the government incorporated into the enterprise sector are discussed with reference to circumstances which are different from those tacitly assumed in the earlier discussions. In short, instead of a situation which has been a product of economic laissez-faire, there is one which controls, regulates, and directs economic activity from the centre. Given the criteria of intermediate and final products under these circumstances, market price and factor cost valuations are in turn re-examined.

National income as a measure of economic welfare has been treated with some suspicion in the West. Our discussion of it in Chapter IV will lead to further doubts on this application. Little has already indicated that personal consumption and saving would be a better measure of economic welfare than national income. We concur with him, but for a different reason. In his case, he was analyzing the problem under conditions of laissez-faire, we are considering it under less-than-ideal conditions as regards the relation between the economic system and allocation of commodities and resources. Under those circumstances, national income seems to be a less appropriate measure of economic welfare. In the same chapter we illustrate the change of national income and of personal consumption and saving in China. In the course of our illustration, we shall show the limitations of the change of the aggregates based on

our knowledge of the pricing system in China. The indexes employed in deflating the current price aggregates are artificial in that change of prices is not necessarily a reflection of relative scarcity of supply and demand. Any rise or fall of prices may have been the result of deliberate action of the pricing authorities for effecting other policy measures.

Chapters V and VI are concerned with the other application of national income accounting considered in the present study. The first of these examines the limits of national income accounting as a tool of economic planning. We first establish that national income accounting plays a role in the formulation of a consistent economic plan for an economy which is depicted in terms of a model. Thus, we may look into the limitations of national income accounting with reference to the use of particular models, especially macro-economic models, in plan formulation in both Western countries and China. Having dealt in summary fashion the use of national income accounting as a tool of economic planning, we attempt in Chapter VI an analysis of the economic performance during the First Five-Year Plan period (1953-1957) with the aid of a simple macro-economic model. With the parameters thus derived from the analysis, we evaluate in general terms the performance during the Second Five-Year Plan period (1958-1962). And finally, assuming that the objective of economic policy of the Chinese government be increase in economic welfare, the latter having been defined in Chapter IV, we examine the measure which the government should

take in order to attain the assumed goal. In this chapter, we reiterate that national income accounts provide the basic data for variables considered in a simple macro-economic model, that they may also provide data for more complex models of the macro-economic type as shown in Chapter V, given the availability of detailed national income accounting data. But we also show that even in the case of China national income accounting has some use for plan formulation based on a simple macro-economic model and that macro-economic aggregates aid in showing the limits of expansion of the economy, given the objective. What we have done is not to show the Chinese planners that we have arrived at a solution which they did not have, but merely what they can do with the national income accounting data they have at their disposal in the field of economic planning.

A comparison between Eckstein's and Hollister's national income estimates for 1952, employing the former's accounting structure, is given in Appendix A which is related to Chapter I. Appendix B presents our own estimation of net domestic material product for 1960-1962. The estimation was done during 1960-1963. Since then, in 1965, independent estimates of net domestic material product for 1960-1962 by non-Chinese scholars in Hong Kong have been published.³ The methods of estimation were not disclosed, but their estimates for 1960 and 1962 were almost identical to ours. It is unusual that two independent estimates could be this close. However, the components of the aggregates might be different. Unfortunately, neither the

methods of estimation nor the detailed breakdown of the aggregates were available to us for comparison. A number of the known economic models formulated in mathematical terms, which we refer to in Chapter V, are given in Appendix C.

C H A P T E R I

A SURVEY OF AVAILABLE ESTIMATES OF CHINA'S NATIONAL INCOME

Introduction

Concepts and definitions of national income

Development of national income accounting in China

State Statistical Bureau's national income aggregates - difficulties in determining the exact form of national income aggregate - national income statistics.

Development of China's national income accounting outside China

National income aggregates - estimation method: Cheng - Wu - Szczepanik - United Nations - Li - Luey - Hollister - Eckstein - Liu and Yeh - Wu and associates.

A comparison of national income estimates for 1952

Comparisons of different estimates of national income for 1952-62

Levels of national income - national income growth rates

Concluding remark

INTRODUCTION

The present chapter is a survey of the available estimates of China's national income. The purpose of the survey is to provide a background to our later discussions on national income accounting applications. The survey might be construed as a timely inventory of the work done in the field of China's national income accounting. Included in the survey is our own estimate of China's national income for the period 1960-62, which we completed in early 1963. The estimation was done at a time when national income figures for those three years were not available. We have since discovered that non-Chinese scholars in the United States had been estimating the national income for those years round about the same time as we, but we were not aware of this and we did not have access to their documents until late 1964.¹

The survey will be divided into four main parts: development of national income in China, development of China's national income accounting outside China, a comparison of the various independent estimates of China's national income for 1952, and, finally, a comparison of the different estimates for the period 1952-62.

In the survey we shall inevitably touch upon the different concepts of national income. Since concepts and methodology have been competently and more exhaustively dealt with by Studenski in his columinous work, only their summary will be presented in the present chapter.² Special conceptual problems,

relevant to interpretation and uses of national income data, however, will be discussed in the appropriate chapters of the present study.

CONCEPTS AND DEFINITIONS OF NATIONAL INCOME

In broad terms national income is the flow of goods and services available for consumption and addition to existing productive assets valued in money terms. It may also be defined as the accruing claims of owners of productive services (or factors of production) on consumer goods and services and addition to wealth valued in money terms. Basically three concepts of national income can be distinguished, which are based on three corresponding concepts of production. However, whether the production concept employed be comprehensive, material or market, the general definition of national income remains the same, though the interpretation of national income figures could vary according to the production concept used.³ For example, national income based on the comprehensive production concept is a measure of not only the production of physical commodities but also the production of all services as well, whereas national income based on the material production concept refers only to the production of physical commodities. In both cases, the general definition in terms of final use or accruing claims remains unchanged.

In practice national income may be more specifically defined, which is largely determined by the estimation method and also by the concepts and conventions employed in estimating

the components of national income as well as the overall figure. For example, national income may be estimated by the product, income or the expenditure approach, hence the specific definition of national income is National Product (NP), National Income (NI) or National Expenditure (NE), respectively.⁴ However, whichever method is employed, mutatis mutandis, the magnitude of national income is the same. The rationale of the identities, i.e. $NP=NI=NE$, lies in the income-product flows thesis in which income is also always equal to expenditure. Hence, the measurement of the magnitude of, say, NP can be estimated by the method measuring either of the other two aggregates, namely, NI or NE. National income may be estimated on a "gross" or "net" basis, depending on the concept employed for estimating the component capital formation. It may be valued at "market prices" or "factor cost". And finally, it may be estimated on a "geographical" (or "domestic") or a "national" basis, depending on whether the owners of productive services considered are those within a given geographical boundary at a particular time or those of a given nationality.⁵ The first two dichotomies are determined by economic factors, while the last is distinguished on a legal basis.

In addition to the terminology used in conventional national income accounting of the Western type, there is "Material Product" (MP) which stems from the fact that the restricted or Marxian material production concept of national income is adopted. Material Product may also be estimated on a gross or net as well as on domestic or net basis.

DEVELOPMENT OF NATIONAL INCOME ACCOUNTING IN CHINA

National income accounting in China is the sole responsibility of the State Statistical Bureau (SSB). National income figures may have been quoted in official documents, articles or monographs written by individuals or institutions which might or might not have direct relations with the central government. Nevertheless we shall consider them to be official estimates, which implies that whether or not the sources of data are acknowledged by the individuals or the institutions concerned, the national income statistics are construed as official figures.⁶

The SSB adopts a national income accounting framework based on the Marxian schema $C+V+S$ where C is the depreciation of fixed capital plus the raw materials used in the process of production, V is the payment for labour services, and S is the net profit or surplus value. National income is represented by $V+S$. The aggregate of $C+V+S$ (which is equal to M) is Gross Social Output, or what a Marxist would call, Gross Social Product. The schema applies only to output covered by the Marxian material production concept.

National income is estimated in the main by product or value added approach. While the procedure followed in estimating the value added in China is no different from that in the West, the emphasis placed on the key aggregates is different. In Western national income accounting, double-counting or intermediary flows are first eliminated and the key aggregates are

gross or net value added. In the Chinese system, the key aggregates are the Gross Social Product (which is equivalent to Gross Social Value Output in Chinese terminology) and Net Material Product.

The calculation of gross value output is described in detail in Yueh Wei's article in Ching-chi Yen-chiu (Economic Research) published in 1956. Since the method is essentially the same as that in the Soviet Union and also it has been reproduced by the non-Chinese scholars in English, only the essentials are repeated here.⁷ For industry and agriculture, gross value output is an aggregate of the product of price and quantity. Ex-factory prices are used for computation of industrial gross value output while average local prices are used for that of agricultural gross value output. In practice, it appears that government procurement prices are used in the case of products sold in the market, i.e. commercialized products, and "either the average market prices less transport cost, production costs, or prices of similar products" are used for the valuation of products not sold at the village level and for home consumption on farm.⁸ It has been suggested by Dr. C. M. Li, at present the Vice-Chancellor of The Chinese University of Hong Kong, that the average of prices used for computation of agricultural gross value output was probably a national average.⁹ The average current price is converted into 1952 price by a conversion factor, which applies to both industrial and agriculture gross value output.

Gross value output of construction is calculated on the basis of the actual cost incurred in installing, building, repairing, and also in architectural services and geological prospecting. These include wages, costs of construction materials, depreciation of construction equipment, transport costs, and administrative expenses, but exclude the value of machinery and equipment to be installed. Gross value output of transportation is calculated on the basis of proceeds from transportation from one place to another, while the gross value output of posts and telecommunications is calculated on the basis of that part of gross receipt which is derived from serving material production. In calculating the gross value output of trade, the gross purchases are first subtracted from gross sales.

Net value added is obtained by deducting from the gross value output not only the production materials and fuels consumed, the services performed by other sectors, value of semi-finished goods and cost of repair, but also depreciation of fixed "productive" assets. It should be noted that this is contrary to C. M. Li's suggestion that depreciation of "non-productive" assets is deducted from the national income based on Chinese methodology.¹⁰ Yueh Wei specifically stated that depreciation of non-productive assets such as workers' mess halls, recreation clubs, and dwelling houses is included in the consumption fund. The net value added thus derived, strictly speaking, is still "gross". The usual practice of estimating net value added involves a one-stage process, i.e. without first estimating the gross value added as in Western national income accounting.

International accounts are considered only when 'distribution of national income produced' between accumulation and consumption is estimated. The estimation of national income from the expenditure side necessarily implies that the aggregate is on a "national" rather than "domestic" basis. Accumulation can be estimated by estimating the value of fixed investment for reproduction and for non-productive assets, and consumption is a residual of "national income for final disposal" less accumulation. The national income for final disposal would include depreciation of non-productive assets in the consumption component, hence, it is, in Western national income accounting terminology, comparable to Gross National Material Expenditure, or to be precise, between Net National Material Expenditure (NNME) and Gross National Material Expenditure (GNME).

The two aggregates - 'national income produced' and 'national income for final disposal' - form parts of the social accounting framework. Social accounts consisting of income produced from material production ('national income produced' by industrial origin and also by types of ownership, namely, state, joint state-private, private-corporate, cooperative, and individual), 'distribution of income' before transfers, distribution of income after transfers by legal or fiscal means, i.e. 'redistribution', and finally, 'disposal of income produced' (divided into accumulation and consumption funds), all presented in a "parade state", are described in Yueh Wei's article.¹¹

A comparison of the national income methodology used in the Soviet Union and China would show that there is no basic difference between the two. In fact, Soviet "leadership" in this field was openly acknowledged by Yueh Wei.¹² We do not know the extent to which the principles laid down are followed in actual computation. Through a former staff working in the planning and statistics unit at the central government level, we have been given to understand that before 1957, the Soviet models for planning and statistical work were to be adopted in China without question.¹³ There was little, if any, discussion on controversial problems such as whether all forms of transport should be included in Material Product. It appears that even since 1957 the SSB had been following the orthodox Soviet practice to the letter, despite the academic discussions that were going on in the Eastern European countries and the Soviet Union. The methodology used in Western national income accounting and its underlying principles, which Eastern Europe hoped to arrive at some form of compromise, was dogmatically attacked from ideological viewpoint in China.¹⁴ One striking feature in the critique of Western national income accounting seems to be the lack of understanding of the initial and implicit economic assumptions underlying the methodology. Lo Chih-je attacked the inclusion of government expenditure as part of national income in the West.¹⁵ He argued that if government expenditure were to be included in the calculation of national income, then any reduction in the former would result in a reduction in the latter. He wrote: "For example, if the Soviet

Union government services were to be included in national income calculation, would not the recent demobilization of the 1.2 million troops mean a reduction of government services, and therefore a reduction in national income? Clearly, this is not so."¹⁶ Lo's attack bore the tacit assumption that economic resources were unlimited in supply. He did not bring out the logic of including defence as part of the activity contributing to national income, nor did he point out that the Red Army did not just fade away but reappear, engaging in another form of economic activity which contributes to national production. It appears that ideological implications of government expenditures had been used as a basis of attack on national income accounting concepts known in the West, hence it is not possible to refute the reasons that Lo had given: an attack on the interpretation of social implications would lie beyond the realm of body economic. In any event, Lo did not elaborate on the subject in greater detail as to how he arrived at the conclusion that reduction in the size of the Red Army had not shown an effect on total economic activity.

State Statistical Bureau's national income aggregates

SSB's 'national income' is equivalent to Net Domestic Material Product (NDMP), if we are willing to accept that 'national income' is equal to 'national income produced.' As far as the national income aggregates for the period 1952-56 are concerned, there is no doubt that they are NDMP. And since it is unlikely that the SSB would change the particular form

of national income aggregate in later publications on national income, it may be safely assumed that official releases of aggregates or their increases in percentage form are NDMP. The proof that the aggregates are likely to be NDMP is found in the Peking Review article on China's national income.¹⁷ Lu Kuang stated in that article that the increase of 'disposable national income' over the period 1952-56 amounted to 25,300 million yuan. At the same time he also mentioned that the increase of 'national income produced' was 27,620 million yuan over the same period. The latter is consistent with the set of figures on 'national income' for the years 1952 to 1956. The difference between 'national income produced' and 'national income for disposal' is the balancing item in the international payments accounts. This is in line with the methodology outlined in the Ching-chi Yen-chiu article in 1956.¹⁸

Difficulties in determining the exact form of national income aggregate

However, ambiguity sets in when 'national income' is derived from ratios related to national income. The ratio of budget revenue to national income and the ratio of accumulation to national income are cases in point. In principle, the 'national income' in the latter case should be Net National Material Product (NNMP) since accumulation is part of 'national income for final disposal'. To what extent this is actually the case is not known. It is possible that 'national income produced' is actually used for deriving the accumulation to national

income ratio. With the basic data available, we have not been able to say conclusively that NDMP is or is not used for the calculation of such ratios. It is equally possible that both NNMP and NDMP are used. As shown in Table I there are two sets of ratios based on 1952 prices, the larger ratio may well have been based on NNMP and the smaller on NDMP. This is of course true only when NNMP is smaller than NDMP. Lu Kuang's NNMP increase for the period 1952-56, and also the NDMP increase for the same period as mentioned above, suggest that this is indeed the case. If we had data on NNMP for either 1952 or 1956, we would have been able to test the different sets of ratios of accumulation to national income as to whether NNMP or NDMP is used.

Another case of ambiguity arises from the derivation of national income aggregate from the ratio of financial or budget revenue to 'national income', given revenue data. If the ratio is to have any meaning, there should be common elements between the numerator and the denominator. In the case of, say, ordinary measurement, the common element is the unit of measurement. In the present case, the coverage represented by the numerator should be consistent with that represented by the denominator. In other words, if the national income component of the ratio specifically is Gross Domestic Product at current market prices, then the revenue -- in this particular instance -- should include funds allocated to replacement capital, be gross of international payments, and be valued at current prices.

TABLE 1. RATIOS RELATING TO NATIONAL INCOME

(percentage of national income)

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
<u>I. Estimates of accumulation fund</u>							
<u>Current prices:</u>							
A. SSB	18.2	21.4	22.3	20.9	22.5	21.0	
B. Lu Kuang, Yang Po, and Niu Chung- huang	18.2	21.4	22.3	20.9	22.5		
<u>Unspecified prices:</u>							
C. Po I-po	15.7	18.3	21.6	20.5	22.8		
D. Yen I-sheng, Yang Po	19.7	22.4	22.7	21.6	24.4	23.7	
E. Li Lin-ku	19.8					24.3	
<u>1952 prices:</u>							
F. Niu Chung- huang	16.1	17.4	21.9	20.4	22.8		
G. Hsu Ti-hsin	18.2	22.4	23.5	22.9	26.1	24.0	
<u>II. Budget revenue</u>							
H. Lu Kuang, SSB	27.2	27.6	31.2	29.5	29.6		
I. Hsu Ti-hsin	27.6	29.2	32.4	31.9	31.5	32.04	33.3
J. Yen I-sheng		27.93	31.77	29.96	29.52	30.00	
K. Po I-po, Niu Chung-huang	27.6	29.2	32.4	31.9	31.5		

Sources: Line A: State Statistical Bureau, Report on Fulfillment of the National Economic Plan of the People's Republic of China in 1955, pp.6 and 12.

Line B: Lu Kuang, "China's National Income," Peking Review, April 8, 1958, p.8; Yang Po, "On the Distribution of National Income in China," Ching-chi Yen-chiu (Economic Research), No.6, 1957, p.5; Niu Chung-huang, Accumulation and Consumption in China's National Income (in Chinese), p.5ln.

Line C: Po I-po, "On the Correct Handling of the Problems of Relationship Between Accumulation and Consumption," Hsin-hua Pan-yueh-k'an (New China Semi-monthly), No.20, October, 1956, p.74.

Line D: Yen I-sheng, "My Viewpoints on the Production of Means of Production and Materials for Consumption in Relation to the Government Revenue and Expenditure," Ching-chi Yen-chiu (Economic Research), No.7, July 1959, p.8; Yang Po, "The Relations Between Accumulation and Consumption in China's National Income," Jen-min Jih-pao (People's Daily), Peking, October 13, 1958.

Line E: Li Lin-ku, "The Structure of Socialism and the Population

- Problem," Hsin Chien-she (New Construction), No.4, 1960, p.51.
- Line F: Niu Chung-huang, op.cit., p.51.
- Line G: Hsu Ti-hsin, An Analysis of China's National Economy During the Transition Period (in Chinese), p.262.
- Line H: Lu Kuang, loc. cit.; State Statistical Bureau, op.cit., p.12.
- Line I: Hsu Ti-hsin, op.cit., p.227.
- Line J: Yen I-sheng, op.cit., p.9.
- Line K: Po I-po, loc.cit.; Niu Chung-huang, op.cit., p.47.

Alternatively, if the budget revenue excludes net income flows from abroad, then the 'national income' derived would be a national product; or if it excludes provision for depreciation, it would not be a gross product but a net product. The numerator is said to be incompatible with the denominator if the former is, say, a gross concept whereas the latter is a net concept; or the former is a domestic concept, but the latter is a national concept; and so on.

With this practical criterion we may still make a blunder in deciding the type of national income aggregate implied in the ratios to national income. The term 'financial revenue' is the Chinese translation for kuo-chia yu-suan shou-ju (國家預算收入) which should, strictly speaking, be translated as national budget revenue.¹⁹ Financial revenue suggests actual revenue, which is not inherent in the Chinese term. Suffice to say that the original Chinese connotation should be taken. Even the, as F. H. Mah now of University of Washington pointed out, 'budget revenue', unmodified, may mean any one of the following:²⁰

- a. Planned budget revenue, including previous year's surplus;
- b. Planned budget revenue, excluding previous year's surplus;
- c. Actual revenue, including previous year's surplus;
- d. Actual revenue, excluding previous year's surplus.

We append to this list:

- e. Planned budget revenue, including foreign loans;

- f. Planned budget revenue, excluding foreign loans;
- g. Actual revenue, including foreign loans;
- h. Actual revenue, excluding foreign loans;
- i. Planned budget revenue, including net income flows from abroad;
- j. Planned budget revenue, excluding net income from abroad;
- k. Actual revenue, including net income from abroad;
- l. Actual revenue, excluding net income from abroad.

From these possible interpretations of budget revenue, we could list further the possibilities, for example, (a) combined with either (e) or (f), (b) with either (e) or (f), and so on; or (a) with either (i) or (j), (b) with either (i) or (j), and so on.

Added to the problem of definition of revenue is that the definition of the numerator component reacts upon that of the denominator. If the budget revenue is such that part of it is allocated to maintaining capital intact and depreciation, as it normally does, then national income in the denominator must be a gross product. If the revenue component is net of foreign loans or of net income from abroad, then national income being a national aggregate should be considered. If the revenue includes previous year's surplus, then it is overstating its importance in relation to national income. Whether revenue is a budget estimate or actual is immaterial as long as we know which one we are dealing with. But unfortunately, we do not really know.

Economists making use of these ratios invariably assume that the national income derived is an aggregate at current prices. Like accumulation to national income ratios, we have not been able to prove that these ratios are consistent with the budget revenue, data or national income data, however both of them are defined.

Yet another problem with the data published by the SSB on accumulation is whether the accumulation component is expressed in terms of constant prices or current prices, whether the national income component is expressed in terms of constant prices or current prices, and whether both are expressed in terms of constant prices when the ratio of accumulation to national income is said to be expressed in terms of constant prices. We attempted to check the consistencies of the different possibilities, but we have not been able to arrive at a satisfactory solution. This checking process has been prompted by the fact that there are two different sets of ratios of accumulation to national income at constant prices. When we have another set of ratios but expressed in terms of current prices, the checking becomes more complicated and indeterminate.

National income statistics

The frequency of official publication of national income data cannot be said to be regular. The first reference to national income in Chinese sources was in September 1956 by Po-I Po, the chairman of the State Economic Commission.²¹ At the Eighth National Congress of the Chinese Communist Party,

before which Po made his speech, the Second Five Year Plan proposal was adopted. In this proposal, the 'national income' was estimated to increase by 50 per cent over the second plan quinquennium 1958-62.²²

Earlier writers on national income obtained their data from the SSB or the State Economic Commission. In 1957, references to national income data were made by Ho Wei, Ma Yin-ch'ü, Niu Chung-huang, and Yang Po.²³ The earlier references were mainly percentages of accumulation (and/or consumption), or of budget revenue, to national income. In January 1958, the SSB released national income aggregates at "comparable prices" for the period 1952-56.²⁴ The same set of figures, but at 1952 constant prices, was given in Peking Review in April the same year.²⁵ Yang Po had previously mentioned the figures for 1952 and 1956 at "comparable prices", and Niu Chung-huang did the same but he referred to them as "computed at 1952 constant prices". Both also made available the percentage distribution of national income of 1952 and 1956 by industrial sectors and by types of ownership.²⁶ Hsü Ti-hsin in his monograph made known the increase of national income in 1957 over 1956 in percentage form.²⁷ The results of the First Five Year Plan revealed also the distribution of national income by types of ownership in 1957.²⁸

The "Great Leap Forward" period 1958-59 saw the massive quotes of statistics, and national income data were no exception. From the speeches of Li Fu-chun, the absolute increase as well

as the relative increase for 1958 were known.²⁹ The communique on the economic achievements of 1959 also revealed the percentage increase in national income.³⁰ The annual communiqués for 1958 and 1959 gave figures in terms of 1957 prices. However, in the Ten Great Years, the first and the only statistical handbook to date, are contained the percentage increase for 1949-58 at 1952 constant prices.³¹

Data on national income aggregates at current prices are scanty. Po I-po in 1958 estimated that the 'national income at current prices' for the first plan quinquennium amounted to 421,400 million yuan.³² The national income aggregate at current prices for individual years had had to be derived indirectly from ratios relating to national income. Even then, it is by virtue of the fact that the other component of the ratio is usually expressed in terms of current prices that the national income component is similarly valued. The ratios referred to are, for example, budget revenue to national income, with certain deductions explicitly stated in one of the cases; administrative and defence spending to national income; and capital construction appropriation to national income. The 1958 Peking Review article did mention in the relevant context that current prices' referred to 'financial revenue' or to 'national income'. The dilemma is self-evident in the text;³³

"Between 1952 and 1956, China's financial revenue, in terms of current prices for the years concerned, amounted to some 30 per cent of the national income."

Apart from the national income total, data on accumulation and consumption, at 1952 as well as current prices, were published in the same sources. As referred to in the previous section the accumulation (and therefore consumption) can be estimated by applying the ratios to the respective national income. Unfortunately, direct estimation from the ratios is not possible because we do not have data on 'national income for disposal' for the years concerned. The different ratios for 1952 are confusing enough, although according to Liu and Yeh, the 18.2 per cent seems to be the correct one because it is the only ratio which is the same whether valued at both 1952 prices or at current prices.³⁴ This is a reasonable deduction except for the fact that Niu not only stated 18.2 per cent at 1952 prices but 16.1 per cent at current prices in the same source.³⁵ There is the possibility that, if 'national income produced' is greater than 'national income for disposal', the percentage on the basis of current prices (18.2 per cent) would be greater than that based on 1952 prices (16.1 per cent) provided it can be proved that the former is a percentage of 'national income for disposal' and the latter one of 'national income produced'. On the basis of scanty data on aggregates, the testing of the various ratios has not borne out whether the hypothesis is right or wrong. It certainly leaves much room for speculation.

DEVELOPMENT OF CHINA'S NATIONAL INCOME ACCOUNTING OUTSIDE CHINA

Owing largely to lack of data non-Chinese estimates of national income made prior to 1956 were merely simple aggregates with no breakdowns. Some of them were extrapolations based on pre-war data. Western national income concepts were implied in these estimates. Contributions to national income accounting work began in 1957 when more economic statistics were available to the non-Chinese scholars.

National income aggregates

The national income aggregates estimated by non-Chinese scholars may be summarized as follows:

<u>Estimator</u>	<u>Period</u>	<u>Forms of national income aggregate</u>
1. Chu-yuan Cheng	1952	NNP at factor cost; GNP (?); NDMP (?)
2. Yuan-li Wu	1953	NNP at factor cost
3. Edward F. Szczepanik	1954	NI
4. United Nations	1952-56	NDMP at current market prices
	1949-57	NDMP at 1952 prices
5. Choh-ming Li	1952-57	NNP at 1952 prices
6. Paul Luey	1952-59	NDMP at 1952 and at current prices
	1960-62	NDMP at 1952 prices
7. William W. Hollister	1950-57	GNP at 1952 and at current prices
	1958-60	GNP at 1952 prices
8. Alexander Eckstein	1952	GNP at market prices

9. Ta-chung Liu & Kung-chia Yeh	1933, 1952-59	GDP, NDP at market prices (1933, 1952 and 1957 prices)
	1952-57	GDE and NDE at 1952 prices
10. Yuan-li and associates	1952-62	GNP and GNE at 1952 prices

Estimation method

1. Cheng. In his Income and Standard of Living in Mainland China Cheng made three estimates of national income for 1952, each employing a different method.³⁶ His first estimate, NNP at factor cost in U.S. dollars, was an extrapolation of national income for 1936 made by Pou-san Ou to 1952 on the basis of fragmentary industrial and agricultural output data reported in the Chinese communist press.³⁷ The implicit assumptions appear to be that gross value output of industry and agriculture increased over the period 1936-52 at the same rate as NNP at factor cost and that the ratio of gross value output of industry to agriculture remained unchanged throughout the period. He next attempted to estimate national income (presumably NI) by distributive-share method. On the basis of employment data embodied in the First Five-Year Plan and of collected data on per capita annual income he estimated the income of employees and workers. This, together with the income of the 'bourgeoisie', constituted the income of the non-agricultural sector.³⁸ Income of agricultural sector was estimated by the same method, i.e., total wage bill equals income per head times population. The third and last category was the income of state enterprises.

Judging from the classification he employed, his third estimate appears to be based on the official methodology. Although he did not neglect to consider that services are part of national income, the method he employed was in line with the official practice. The economy was thus divided into six sectors, i.e. the five sectors by Chinese classification and the service sector.³⁹ He assumed that the value added from services constituted 5 per cent of the total national income.

2. Wu. National income for 1953 estimated by Ou was employed for his extrapolation to 1953.⁴⁰ He made use of a production index which he had devised and the assumptions used were similar to those employed by Cheng.

3. Szczepanik. He merely assumed a per capita income of US\$40 and arrived at NI by multiplying the per capita income with the total population.⁴¹

4. United Nations. In the 1956 report of the Economic Commission for Asia and the Far East were the national income at current market prices for the period 1952-56.⁴² They were based on the official ratios of state revenue to national income and figures on state revenue. The Commission explicitly stated that the aggregates were valued at market prices. The aggregates at 1952 prices for the period 1949-57, published in the annual report of 1961, were based on the national income index published in the Ten Great Years.⁴³ They were converted into net product by adding a mark-up of 20 per cent onto the Net

Material Product, the reason for this procedure was similar to that given by C. M. Li, which we shall describe presently. It is of interest to note that the NMP derived were different from the official aggregates, probably due to an error in the aggregate for the given year to which the index was applied.

5. Li. The procedure adopted by Li in his reconstruction of the Chinese national income accounts was first to complete the series of NDMP for the period 1952-57 and then add an assumed value for services to arrive at NDP.⁴⁴ 1952 prices were maintained throughout. Official data at the time of his writing were by no means complete. He only had data on gross value output and net value added of some of the industrial sectors and national income total for some years to contend with. Gross value output of industry and agriculture was available and the gaps were filled in by applying the net to gross ratios to the appropriate gross value output. NDMP was converted into NDP by applying a conversion factor 1.1905, which was based on the assumption that services constituted 16 per cent of the NDP as in the India case. The NDP was then net of international payments to arrive at NNP.

6. Lucy. The estimates of NDMP at 1952 prices for the period 1952-59 were made in 1960.⁴⁵ At the time NDMP for 1952-57 were available from Chinese sources as well as from non-Chinese national income studies. During the First Five-Year Plan period (1953-57), the NDMP was reported to have increased by 53.2 per cent. Figures at 1952 prices were given for 1952

through 1956 and therefore the NDMP for 1957 could be derived. As for 1958 and 1959 information available were limited to the rates of increase of NDMP in these years and the absolute increase between years at 1957 prices.⁴⁶ Thus it was necessary to determine first the NDMP at 1957 prices for 1957. This could be done easily. The aggregates at 1957 prices for 1958 and 1959 were then derived by applying the annual rates of increase of the respective years to NDMP at 1957 prices for 1957.

In order to convert these figures from 1957 to 1952 prices, we employed the conversion factor 0.9858 which was derived by dividing the NDMP for 1957 at 1952 prices by that at 1957 prices. NDMP for 1958 and 1959 at 1952 prices were obtained by applying the conversion factor to the figures at 1957 prices. The result for 1958 was later confirmed by the SSB which gave a national income index at 1952 prices for the period 1952-58 in Ten Great Years.

NDMP at current prices were also estimated for 1952-59. We made three estimates, but none of which could be conclusively said to be more reliable than the other two. Two sets of ratios to national income were used in deriving the estimates: (a) state revenue to national income, and (b) state revenue net of surplus brought forward from the previous year to national income. In view of the possible ambiguities in interpreting the ratios, which we described earlier, we applied ratio (a) to actual revenue as well as to actual revenue net of foreign loans, and ratio (b) to actual revenue net of foreign loans.

As regards NDMP at 1952 prices for 1960-62, we only had scanty data to contend with. On the basis of available information on grain output and increase of industrial gross value output for 1960-62 we made projections of the figures, available for the period 1952-57, for the various components of NDMP. The estimation was done between 1960 and 1963 and the results as well as the methods of estimation are presented in Appendix B.

7. Hollister. The framework of accounts was patterned after that of the U.S. Department of Commerce with some modifications.⁴⁷ The economy was divided into agricultural business sector, non-agricultural business sector, household sector, and government sector. Two general departures from the U.S. system were made: a sector account each for the agricultural and the non-agricultural business sectors, instead of a consolidated business sector account for both; the rest of the world account was omitted on account of inadequate information, and transactions with the rest of the world were put under non-agricultural business sector account. The division into agricultural and non-agricultural sectors make it possible to show the interrelationships between the two sectors. Following the U.S. system, all state enterprises were incorporated into the business sector. Such practice would reduce government activity to merely providing economic and social services, which seems inappropriate in the case of a planned economy.

Hollister used the final sales method in his national income estimation. By this method, he relied heavily on budget data and retail sales data, both of which constituted more than

half of the GNP for 1952. Imputed value of farm home consumption and the value of house rent and consumer services, constituting 32 per cent of the GNP had to be estimated by indirect means, so were the private investments and inventory change.⁴⁸ Rather than leaving private investment to be estimated by using the residual method, Hollister attempted to estimate it by using fixed asset data. He estimated inventory change by means of data on the changes in stocks of state trading enterprises, in capital of private trading enterprises, and data on working capital of state industry. Whereas Eckstein rejected value data on changes in stocks, Hollister made full use of them.⁴⁹

The aggregates were valued at current prices. The GNP at constant prices were converted from the current price aggregates by using retail price indexes, computed price indexes, wholesale price indexes, and unit cost indexes. For consumption expenditure, price index derived from figures on average money wage and average real wage for industrial workers for 1950 and for the socialized sector for 1952-57. Exact derivation method was not given. Imputed farm home consumption and farm house rent, which were also part of the consumption expenditure, were converted by price index for farm sales of all agricultural products. Government purchases were deflated by indexes of world prices in U.S. dollars from indexes of exports and imports of countries with roughly the same commodity composition of exports and imports. However, the exact method employed again was not given. As regards gross domestic investment, imputed

farm investment expenditures were deflated by price index for farm procurement; farm investment purchases from non-agricultural sector was deflated by wholesale price index; increase in inventory was also deflated by wholesale price index; whereas construction was deflated by unit cost index.

Hollister up-dated his estimates to 1960. The method of estimation, though published, is not available.⁵⁰

8. Eckstein. The accounting approach was adopted. The form of accounts he adopted was in essence that used by Bergson and his associates in their Soviet national income studies. The basic concept and definitions were those used by the U.S. Department of Commerce.⁵¹ The economy was divided into the household, the private business, and the public sectors. There should be an account for each sector, but because of the relative insignificance of the private business sector in a "partially commercialized area such as that of Mainland China", the business sector account was merged with the household account. Three sector accounts were presented: the household and private sector account, the public sector account, and the gross national product account.

Eckstein estimated the GNP at market prices by a hybrid method. For the agricultural sector, value added approach was used, but for the non-agricultural sector, distributive share method was employed. In estimating the agricultural product, apart from calculating the gross value output by the sum product

of price and quantity, the material inputs expended on agriculture were estimated in detail. Owing to lack of data, data of pre-war era were used. The wage bill of non-agricultural sector was based on his research on employment and average annual wage. Estimates of transfer income as well as enterprises earnings were based on published data in scattered sources. Although there were both GNP and GNE, Eckstein's contribution was the GNP since GNE was not entirely an independent estimate.

9. Liu and Yeh. Value added approach was used in estimating GDP and NDP for 1933, 1952-57.⁵² As for GDE and NDE, they were partially estimated by the expenditure approach and partially by value added approach. Thus they were not independent estimates. The aggregates were valued at 1933, 1952 and 1957 prices. The estimates for 1958 and 1959 were 'conjectural estimates', in the sense that they were extrapolations of the 1957 figures on the basis of information known on the increases of output in the various sectors of the economy.

10. Wu and associates. Wu and associates revised Liu and Yeh's national income figures for 1952-59 and also made GNP and GNE estimates at 1952 prices for 1960-62.⁵³ While both Wu and associates and we ourselves were working on the estimation for 1960-62 at about the same time, neither of us were aware of each other's work. Wu and associates made adjustments to Liu and Yeh's figures for agriculture, manufacturing, utilities, handicraft and mining. The revision was to be used as

the basis for projecting beyond 1957. The reappraisal of the agricultural sector was centred on grain output from 1949-62. The value added in the industrial sector was revised on the basis of progress in consumption of electricity in industry and in finished steel production. The reappraisal of utilities value added was limited to 1960 and after; for the period 1952-59, Liu and Yeh's figures were retained. As regards, value added of mining, Liu and Yeh's figures were revised on the basis of figures for coal mining given in Wu and Ling's study on energy resources.⁵⁴ Handicraft value added was revised using 1933 as a point of reference; the basic data for 1933, 1952-59 were obtained from Liu and Yeh's study.

On the expenditure side, they extended Liu and Yeh's estimates on domestic investment beyond 1957 by correlating with machine availability (1958-62), assuming that in 1961 and 1962, domestic investment was one-third of that in 1960.

With regard to government consumption, Liu and Yeh's figures for 1952-56 were retained. Wu and associates revised the 1957 estimate on the basis of a separate investigation. The figures for 1958, 1961 and 1962 were projections of the 1957 expenditure estimate, on the assumption that expenditure varied with population. Government consumption expenditure for the period 1959-60 was taken from Hollister's other studies.⁵⁵

Personal consumption expenditure for the period 1952-57 was estimated on the basis of (a) minimum maintenance level of

consumption -- 'personal consumption I', and (b) actual grain consumption -- 'personal consumption II'. That for 1958-62 was estimated on the assumption that increase of personal consumption I or II was at the same rate as that of population. Personal consumption I or II gave rise to the estimates GNE (I) or GNE (II) respectively.

A COMPARISON OF NATIONAL INCOME ESTIMATES FOR 1952

The table below shows the different estimates of national income for 1952.⁵⁶ We have excluded the estimates made before 1957 because they were extremely crude estimates. The estimate given by ourselves in our estimation of NDMP for 1952-59 was the official figure and therefore would be excluded from the list.

<u>Estimator</u>	<u>Forms of aggregate</u>	<u>Value in million yuan</u>
SSB	NDMP	61,130
Li	NNP	72,900
Eckstein	GNP at market prices	71,255
Hollister	GNP at market prices	67,860
Liu and Yeh	NDP	71,410
	GDP	74,670
Wu and associates	GNP at market prices	75,600
	NNP at market prices	72,400

The SSB estimate is used here as the standard while non-Chinese estimates are used as an alternative to the standard. Our immediate concern is how much difference there is between

the standard and the alternative. There are two ways of approaching the comparison of aggregates based on different coverage, one is to reduce the comprehensive aggregate to the level comparable to the material aggregate and the other is to expand the material aggregate to the level of the comprehensive aggregate.

Taking the first course, Eckstein's GNP at market prices is converted into GDP at factor cost which amounts to 64,606 million yuan, from which are subtracted the value added due to modern banking and insurance, dwelling services, government services, defence, and others which total 9,185 million yuan, the resultant figure is 55,421 million yuan which is the GDMP at factor cost. The GDMP at factor cost would be the lower limit since it is not certain that all the value added due to "others" is not material product. Furthermore, in the computation of value added of services that contribute to material production, the prices used might possibly include indirect taxes. On the other hand, because the aggregate is in gross terms, it is ceteris paribus, higher than the official aggregate. In purely statistical terms, the derived GDMP at factor cost is 5,710 million yuan below the official NDMP; and if it is on a net basis, the gap could be considerably widened.

Hollister's GNP at market prices after deducting 7,900 million yuan for government purchase of goods and services would be reduced to 59,860 million yuan. Since the GNMP at market prices includes allowances for capital consumption, and also it has eliminated net foreign export and property incomes, it

is to be expected that the NDMP converted thus should be lower, hence in comparison with the official NDMP, it is lower by more than mere 7,000 million yuan (net export earnings and property incomes amounted to 920 million yuan which must be deducted to arrive at GDMP).

The NDP as estimated by Liu and Yeh, being 71,410 million yuan, includes value added due to government administration, finance, personal services, and residential rent. These may be classified as non-productive activity and thus be excluded from calculation of material product. These amount to 7,500 million yuan. The NDMP is thus 63,900 million yuan which is higher than the official NDMP by 2,600 million yuan.

Wu and associates' estimate (i.e. the revised and extended Liu and Yeh estimate) of NNP is given as 72,400 million yuan. To convert it into NDP, it is necessary to subtract inflow from and add outflow of income to abroad, i.e.

$$NDP = NNP + (M-E)$$

where M is outpayment and E inpayment. M consists of (a) imports, (b) employment of foreign experts, and (c) expenditure of Chinese communist diplomatic, cultural, and trading missions abroad. E comprises (a) loans from abroad, (b) export trade earnings (both legal and illegal), remittances from abroad, and (c) foreign diplomatic, cultural and trading missions' expenditure in China. Hence,

$$\begin{aligned}
 \text{NDP} &= 72,400 + (1,050 - 1,396) \text{ million yuan} \\
 &= 72,400 - 346 \text{ million yuan} \\
 &= 72,054 \text{ million yuan}
 \end{aligned}$$

The adjustments necessary are concentrated on the "non-productive" sectors, namely, government administration, finance, personal services and residential rents. These, being parts of the nine minor sectors in Liu and Yeh's estimate, have not been adjusted by Wu and his associates. Hence the deductions from the NDP are of the same magnitude as those from Liu and Yeh, namely, 7,500 million yuan. The resultant, being the NDMP, is $72,054 - 7,500 = 64,554$ million yuan.

As regards Li's NNP, since it is derived by a mark-up of about 20 per cent of the NDMP, the NNP converted NDMP is irrelevant in this case.

The calculations suggest that the NDMP is overstated according to standards set by Eckstein and Hollister, but according to those by Liu and Yeh the official NDMP is lower. One might suggest that the value added of industry must have been over-estimated since relative prices have been said to be in favour of industry rather than agriculture. However, an examination of the value added of the component figures would show that, definitional differences apart, the value added of agriculture and industry in the official NDMP is 47,190 million yuan as against the 45,170 million yuan in Eckstein's GNP at market prices.⁵⁷ The official value added figure lies between

the two non-Chinese value added of agriculture and industry. Furthermore, the ratio between the industrial and agricultural value added also indicates the uncertainty about the implications of the price structure at the time. The official data give a ratio of value added of agriculture to industry of 3.3:1, Eckstein's is 2.2:1, Liu and Yeh's is 2.7:1, Hollister's comes to 3.5:1, and finally Wu and associates' is 4:1. If there were any suggestion that value added of industry had been overestimated, then Eckstein's and Liu and Yeh's estimates rather than the official estimate substantiated the statement, which then leaves the higher magnitude of the official NDMP unexplained. Hollister's ratio would be more favourable than the official one in disproving the suggestion, especially when in absolute terms the value added of both agriculture and industry are larger than those of the official estimate. We have thus far assumed that the baskets of goods and services in the value added of agriculture and industry had been the same in all these calculations. The extent to which this assumption can be held depends on the quantity data employed. Since we have not been able to deduce the way in which the official value added was derived apart from the fact that gross value output was first estimated and then intermediate product output value and capital allowances were deducted from it, any further deduction must be guesses, which is no use for our present purpose of establishing the magnitude of error.

A closer examination of other value added within the national income aggregate reveals that trade occupies a substantial share of the national income estimated by the SSB. The following table illustrates the magnitude of value added of trade and its share in the NDMP or GDMP:⁵⁸

Estimator	Form of aggregate	Value added of trade (million yuan)	% share in variant of value added in trade
Official	NDMP	9,660	15.8
Eckstein	GDMP	5,380	10.0
Hollister	GDMP	6,630	11.0
Liu & Yeh	NDMP	9,700	15.1
Wu and associates	NDMP	9,700	15.02

It would seem that the discrepancies in the national aggregates lie in the value added of trade of the different estimates. If the information on labour force in trade and the net value added per worker in trade could be relied upon as indicators, then it is possible to deduce that the official estimate of the value added of trade has not been overestimated. This negative approach assumes that the net value added per worker in trade could be used as a guide, possibly the upper limit of the true value added if it were not the true value. The value added of trade for 1956 might be arrived at by simple product of the labour force (6,482,000) and net value added per worker (2,499 yuan), which gives 16,420 million yuan.⁵⁹ The value added of

trade in the official NDMP gives only 14,246 million yuan.⁶⁰ The net value added per worker per year is therefore 344 yuan too high according to the official national income data. If we assume that the net value added were half that of the 1956 level, namely, 1250 yuan per year, in 1952, and the labour force engaging in trade were 8,014,000 as reported, the value added of trade would have been in the order of 10,000 million yuan.

However, it must be borne in mind that the traders in the private sector were mainly single operators. The following table shows the size of and the number of people employed in the establishments:⁶¹

<u>Category</u>	<u>No. of units</u>	<u>No. of personnel</u>
Resident trade	1,820,000	4,012,000
Itinerant trade	300,000	329,000
Stalls, small merchants and peddlars	2,180,000	2,427,000

If the traders were mainly single operators, then their earnings would be much higher than the workers in industry. Only the resident merchants and the stall owners had fixed establishments and had more than one person operating. Even then, the value added could not have been such that the non-wage portion being twice that of the wage portion in the value added. Should that be the case, there should have been an influx into the trade business, particularly when the wages in industry were on

the average 560 yuan a year. There is no confirmation that there was such a transfer of labour resources. A possible check might be made on the basis of the data on direct taxes paid by the private enterprises engaging in trade. However, since most traders were lone operators, their earnings were regarded as personal income. Although they were subject to income taxation, such levy had not been carried out in practice.⁶² In that event, whatever he earned, even as much as more than 1,250 yuan a year, he escaped the tax; hence, we would not find data in the state tax revenue to determine the size of earnings. It was not until later when these traders were members of cooperatives that they had to pay income taxes.⁶³

As regards trade in the public sector, if the net value added per worker of 1,250 yuan really meant for state enterprises only, the large share of non-wage earnings in it is possible, though very unlikely. Even if it were so, with a labour force of 1,246,000, the resultant total value added of trade would not reach the level of 9,660 million yuan.

It therefore seems that one is skeptical of the value added of trade in the NDMP. However, Liu and Yeh present a close estimate of that sector of 9,700 million yuan. But it seems for the moment, we have not enough evidence to prove that the official estimate is incorrect. We can only bear in mind that the missing link lies in the trade sector and we are aware of it.

The tentative conclusion to be drawn from the analyses is that the official NDMP seems to be reasonable. Independent estimates have shown that the NDMP could be understated as well as overstated. While the coverage of services which the Chinese define as non-productive might not conform to that which we have deducted from Eckstein's, Hollister's, and Liu and Yeh's estimates of China's national income, one significant point has been brought out, namely, the NDMP is not necessarily overstated, as evidenced by the fact that not all three of the non-Chinese estimates are below the official NDMP in magnitude.

The conversion of NDMP into NNP, however, shows that even Liu and Yeh's estimate is low. Since the 20 per cent markup on the NDMP is based on analogy, and is added to it by a non-Chinese estimator,⁶⁴ the NNP thus derived offers no real basis for comparison.

The non-Chinese estimates, as has been shown, are of varying magnitude. The coverage seems to have been partly responsible. Comparing with Eckstein's findings, Hollister's national accounts might be adjusted as follows:⁶⁵

	<u>Eckstein</u>	<u>Hollister</u>
	(million yuan)	
Income from farm households	37,505	36,790
Compensation of employees and self-employed	16,515	10,084
Rental incomes	2,800	3,720
Enterprise earnings:		
private	1,525	7,490
public	6,270	6,970

Indirect taxes	6,640	4,470
Gross national product at market prices	71,255	69,524

The procedure for readjustments is found in Appendix A. The readjustment has brought Hollister's GNP at market prices up by 2,624 million yuan. Hollister has an item called "imputed consumer services" which we could not find a place in Eckstein's national accounts. If this value, which amounts to 1,880 million yuan, were included in the adjusted Hollister GNP, the total would have come close to Eckstein's GNP. The imputed consumer services probably have been included in rental income in Eckstein's Table 2. The three independent estimates thus are less in disagreement in total magnitude than is imagined. The methods by which Hollister arrived at his data for the national accounts might be questioned. His estimate has been regarded as "very ingenious, but artificial"; his assumptions of stable input-output relationship have been said to be questionable; and the possible margins of error have not made known, and finally, he has not critically examined the implications of the official price and wage indexes which he employs in his construction. In so far as the comparison of the magnitude of national income for one single year is concerned, the comments are not reasonable. Eckstein has also resorted to expedients, such as the use of pre-war data in his calculation of agricultural production, and scattered data on non-agricultural wages on which the value added of non-agriculture are heavily based.

The possibility of overlapping sectors cannot be ruled out. Since his study is focussed on 1952 only, he does not have to make use of price indexes, nor does he have to close the gaps, and his data, of course, could not be used for analysis of growth. There are limitations using the final sales approach, particularly with the kind of price system as existed in China, but these have little significance in comparing the national totals for one year, especially 1952 which is the base year for all three estimates. Margins of error are important, where exact measure is not available, the approximate magnitude should be made known. However, it must also be borne in mind that in making appraisal of one set of data by another set, it is necessary to make certain that the standard set of data is not itself subject to variations. We need hardly emphasize that consistency of data does not necessarily mean they are reliable. There is such a thing as consistent errors. To appraise statistics on the basis of qualitative information suffers from the exercise of inherent bias of the estimator. Therefore, unless it can be proved on statistical terms that data are unreliable, any estimation of margin of error is subject to the implicit assumption that the standard set of data are reliable and perfect.⁶⁶

Liu and Yeh's estimates would be subject to the same kind of criticisms accorded to Hollister when analysed on the basis of time series.

In conclusion, it should be expected that the four estimates approximate one another. The sources of data were common, and undoubtedly some had been used by all four estimators. The state budget data were accepted almost without question, at least in Hollister's and Eckstein's case. It should also be expected that the statistical reliability would be a problem. China could not be expected to develop an efficient and competent statistical organization overnight. Statistical inaccuracy could have originated from genuine incompetence than from political manipulations. The institutional set up of the Chinese statistical system, as described by C. M. Li is based on the Soviet pattern in which the national government is responsible for the whole statistical machinery.⁶⁷ This entails a chain of problems running through the bureaucratic organization which can be solved only through time and experience and also through less intervention of politics and ideology. As far as 1952 is concerned, the SSB was at its infancy. By 1956 when national income data were published, the quality of data in general had been improving. Data covering the earlier period were revised, although revision was not always made known in all cases. Internal inconsistencies were numerous, especially among the value data which are required in national income and accounts.⁶⁸ The effects of inconsistencies can be revealed in both Eckstein's and Hollister's works. In the estimation of non-farm wage bill, the wages used were different. In the estimation of agricultural production, the

farm prices used were also not the same. Neither could really prove that his own estimates were the correct ones.

COMPARISON OF DIFFERENT ESTIMATES OF NATIONAL INCOME FOR 1952-62

Levels of national income

Estimates of national income by SSB, Hollister, and Liu and Yeh have been compared in Wu and associates' study.⁶⁹ Liu and Yeh had also compared the official estimates with their 'adjusted official estimates', i.e. official estimates which had been adjusted to Western national income accounting concepts, and also with their own product and expenditure estimates.⁷⁰ In the present section we shall exclude the estimates made by the United Nations and by C. M. Li, as well as that by us for 1952-59, because in the first case breakdowns are not given and in the last two cases the estimates are SSB estimates essentially.

For comparison, Liu and Yeh present a table showing the estimates made by them, together with the adjusted estimate of domestic product, for the period 1952-57, both at 1952 prices. This is reproduced in Table 2. They also produce a table on reconciliation of adjusted estimate and the communist estimate of net domestic material product for the period 1952-57 (Table 3). Adjusted estimate of domestic material product is communist data adjusted to Western concepts of national income accounting. The comparison of official figures and the adjusted estimate

TABLE 2. COMPARISON OF LIU & YEH AND ADJUSTED ESTIMATES OF GROSS DOMESTIC PRODUCT

	(Liu & Yeh data reduced to zero)						(1,000 million 1952 yuan)
	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1952-57</u>
1. Agriculture	-2.59	-2.76	-2.84	-1.35	-0.21	+3.02	-6.73
2. Modern manufacture	0	+0.36	+0.57	+0.57	+1.18	+1.27	+3.95
3. Handicraft	-0.31	-0.36	-0.39	-0.18	-0.05	+0.35	-0.94
4. Transport and communications							
a. Modern	0	+0.22	+0.39	+0.42	+0.83	+1.01	+2.87
b. Old fashioned	+0.41	-0.14	-0.27	-0.12	-0.22	0	-0.71
5. Trade (ex. peddlars)	0	+0.60	+1.03	+1.61	+2.61	+2.96	+8.81
6. Finance	0	+0.20	+0.04	+0.09	+0.09	+0.27	+0.61
7. NDE	-2.86	-2.06	-1.47	+1.04	+4.33	+8.88	+7.86
8. Depreciation	-0.08	+0.01	+0.03	+0.08	+0.28	+0.45	+0.77
9. GDP	-2.94	-2.05	-1.44	+1.12	+4.61	+9.33	+8.63
<hr/>							
10. <u>Adjusted GDP aggregate</u>	74.67	78.99	83.31	86.57	97.28	100.82	521.64
11. <u>(9)/(10) x 100%</u> :	-3.94	-2.60	-1.73	+1.30	+4.74	+9.26	+1.66

Source: F.C. Liu & K.C. Yeh, The Economy of the Chinese Mainland: National Income and Economic Development, 1933-59, Vol. I, Table 68.

TABLE 3. LIU & YEH'S RECONCILIATION OF ADJUSTED ESTIMATE AND
THE OFFICIAL ESTIMATE OF NET DOMESTIC PRODUCT

(1,000 million 1952 yuan)

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
A. Reconstructed official figures	61.13	70.04	73.88	78.80	88.75	95.53
B. Adjustment due to diff- erence in concept	+5.18	+4.70	+5.21	+5.84	+6.99	+7.52
C. Unexplained balance	+2.24	-1.47	-1.28	-1.30	+0.67	+3.17
D. Adjusted estimate	68.55	73.27	77.81	83.34	96.41	104.22

Source: T.C. Liu & K.C. Yeh, The Economy of the Chinese
Mainland: National Income and Economic
Development, 1933-59, Vol. I, Table 70.

shows that after allowance has been made to the former with respect to differences in concepts, lack of data on old-fashioned transportation which is included in the adjusted estimate, and difference in the structure of industrial classification, the unexplained discrepancy between the two estimates is relatively small. This suggests that there is some internal consistency in the official estimates and the raw data on which the estimates are based.

With regard to the comparison between Liu and Yeh's and the adjusted estimates of domestic product (Table 2), no observations are made by Liu and Yeh on their table showing the two sets of figures. The GDP figures indicate that for 1952-54, Liu and Yeh's estimates are higher than the adjusted figures, but for 1955-57, the reverse is true. Taking the period 1952-57 as a whole, it can be seen that the adjusted estimates is only higher than Liu and Yeh's by 1.66 per cent of the latter. The change of the adjusted estimate from a negative to a positive with respect to Liu and Yeh's figure in 1955 seems to have derived from two factors. One is the narrowing of the gap (negative) between the adjusted and Liu and Yeh's estimates for agriculture and for handicraft and the other is the widening of the gap (positive) between the two estimates for trade stores and restaurant.

With respect to domestic expenditure (material production concept), the unexplained difference between the adjusted estimate and the official estimate after reconstruction and

allowance for difference in concepts is larger than that for domestic material product (Table 4). For the period 1952-57, the lowest figure is +2,080 yuan (1954) and the highest is +5,930 million yuan (1956) in the case of domestic expenditure, while the corresponding figures are -1,470 million yuan (1953) and +3,170 million yuan (1957) in the case of domestic product.

As regards the comparison of domestic expenditure as between the adjusted and Liu and Yeh's estimates, a similar picture as that of the comparison between the two estimates of domestic product is obtained (Table 5). For the period 1952-57, the adjusted estimate is higher than Liu and Yeh's by 1.68 per cent of the latter. Also, prior to 1955, Liu and Yeh's estimates are higher than the adjusted ones, but in 1955 and after, the reverse is the case. The change of the adjusted estimate from negative to positive with respect to Liu and Yeh's estimate in 1955 may be attributed to the narrowing of the gap (negative) between the adjusted and Liu and Yeh's estimates for food and also the widening of the gap (positive) between the two estimates for miscellaneous personal consumption expenditure. There is no significant difference between the two estimates for either government consumption or net domestic investment.

It is interesting to note that Liu and Yeh pay little attention to tables showing the adjusted and their own estimates of GDP and of GDE. Their study in two volumes comprises

TABLE 4. LIU & YEH'S RECONCILIATION OF ADJUSTED ESTIMATE AND THE OFFICIAL ESTIMATE OF NET DOMESTIC EXPENDITURE

(1,000 million 1952 yuan)

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
A. Official estimate	62.86	71.09	74.25	78.96	88.15	92.51
B. Adjustment due to difference in concept	+2.87	+0.32	+1.86	+3.35	+1.78	+6.37
C. Unexplained balance	+4.56	+2.91	+2.08	+2.21	+5.93	+4.39
D. Adjusted estimate	70.28	74.32	78.19	84.52	95.86	103.27

Source: T.C. Liu & K.C. Yeh, The Economy of the Chinese Mainland: National Income and Economic Development, 1933-59, Vol. I, Table 94.

TABLE 5. COMPARISON OF LIU & YEH AND ADJUSTED ESTIMATES OF GROSS DOMESTIC EXPENDITURE

(Liu & Yeh data reduced to zero)

(1,000 million 1952 yuan)

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1952-57</u>
1. Personal consumption	-2.86	-2.06	-1.48	+1.02	+4.28	+6.77	+5.67
a. Food	-2.70	-2.77	-2.70	-0.73	+2.06	+3.97	-2.87
b. Clothing	+0.09	+0.20	+0.25	+0.20	+0.32	+0.18	+1.24
c. Miscellaneous	-0.25	+0.51	+0.97	+1.55	+1.90	+2.62	+7.30
2. Government consumption	0	0	+0.01	+0.02	+0.05	+0.07	+0.15
3. Net domestic investment	0	0	+0.02	+0.02	+0.05	+2.11	+2.20
4. Net domestic expenditure	-2.86	-2.06	-1.46	+1.06	+4.38	+8.95	+8.01
5. Depreciation	-0.08	+0.01	+0.03	+0.08	+0.28	+0.45	+0.77
6. Gross domestic expenditure	-2.94	-2.05	-1.43	+1.14	+4.66	+9.40	+8.78
7. <u>Adjusted GDE aggregate</u>	76.40	80.04	83.68	87.73	96.68	99.80	524.33
8. <u>(7)/(8) x 100%</u>	-3.85	2.56	-1.71	+1.30	+4.82	+9.42	+1.68

Source: T.C. Liu & K.C. Yeh, The Economy of the Chinese Mainland: National Income and Economic Development, 1933-59, Vol. I, Table 93.

946 pages, and yet no comment is made on these tables apart from references to conceptual differences in estimation. It cannot be said that space has prevented them from this necessary task. Probably they find that observations made on them will contradict their earlier opinion of the official national income figures. Their evaluations are valid in the discussion on rates of growth. The high rates of growth as claimed by the Chinese are due to their low estimate for the base year, and also to overstating the performance in the post-1955 period. Liu and Yeh, with their own estimates, have shown this very well. The rates of growth are summarized in Table 10.

However, as borne out by Tables 2 and 5, Liu and Yeh cannot say that the Chinese communist estimates have been overstated or understated to a significant degree. The differences between their own and the adjusted estimates are less than 2 per cent either way of their GDP. Granted that differences might be greater as between the estimates for the component items, the dissatisfaction over Chinese communists' arises over the national income total rather than the component items. Liu and Yeh make the observation that there is a fair degree of internal consistency within the official estimates but that does not mean their estimates are accurate. Since the national incomes in absolute terms approximate each other, it cannot be said that the official figures (after conceptual adjustments) are to any significant degree inaccurate. Liu and Yeh's statement is at best applied to certain components of national income. The extent to which their own estimates are reasonably accurate thus remains an open question.

As part of the examination on the available data on GNP of China, Wu and his associates compare the various estimates of national product and expenditures. Only Liu and Yeh's, Hollister's, and the official estimates come into the purview of the comparison. Eckstein's estimate, though derived from national accounts, cannot be and is not included because it refers only to 1952 whereas Wu and his associates are interested in series.

In Tables 6 and 7 are the various product and expenditure estimates, each in its original form of aggregate. Three series are included under Liu and Yeh: NDP, GDP, and GDE. It should be noted that the SSB national income for 1952 is given as 61,250 million yuan instead of the official figure of 61,130 million yuan, published in January 1958. The reason is not known, probably the data not being available to Wu and his associates at the time.

The comparison of these product and expenditure estimates is made with the following views in mind: (a) relative reliability and accuracy in quantitatively showing the Chinese communist economic development, (b) points of agreement in spite of conceptual and methodological differences, and (c) points of disagreement.

We shall first of all compare some of the observations made by Liu and Yeh, on the one hand, and by Wu and his associates on the other, with the latter used as a point of departure.

TABLE 6. ESTIMATES OF COMMUNIST CHINA'S NET AND GROSS DOMESTIC/NATIONAL PRODUCT AT 1952 PRICES

1952 - 1962
(1,000 MILLION YUAN)

	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
1. Agriculture	A 31.60	32.06	32.56	34.40	36.76	40.18	51.08	56.00			
	L 34.19	34.82	35.50	35.84	36.97	37.16	40.09	42.13			
	W 35.10	34.80	34.60	35.50	36.80	37.20	38.40	36.10	30.30	32.70	35.30
2. Modern Manufacture	A 6.45	8.64	10.15	10.93	15.69	17.26	30.35	43.56			
	L 6.45	8.28	9.58	10.36	14.51	15.99	18.93	25.06			
	W 6.40	8.50	9.80	10.40	14.20	15.40	18.00	25.20	30.00	9.10	8.60
3. Handicrafts	A 4.41	4.45	4.59	4.94	5.20	5.73	7.76	8.69			
	L 4.72	4.81	4.98	5.12	5.25	5.38	6.00	6.48			
	W 4.80	4.80	4.80	5.10	5.20	5.40	5.80	5.90	5.40	4.80	4.80
4. Mining	A 1.47	1.46	1.82	2.32	2.38	3.07	5.55	7.16			
	L 1.47	1.46	1.82	2.32	2.38	3.07	4.19	5.34			
	W 1.37	1.35	1.63	2.06	2.19	2.80	4.22	5.76	7.05	1.91	1.85
5. Utilities	A 0.31	0.37	0.43	0.48	0.59	0.71	0.97	1.32			
	L 0.31	0.37	0.43	0.48	0.59	0.71	0.97	1.32			
	W 0.47	0.55	0.70	0.82	1.05	1.23	1.73	2.42	3.08	0.89	0.89
6. Construction	A 1.83	2.28	2.68	2.93	4.97	4.62	6.24	7.77			
	L 1.83	2.28	2.68	2.93	4.97	4.62	6.24	7.77			
	W 1.83	2.28	2.68	2.93	4.97	4.62	6.24	6.24			
7. Modern Transportation & Communications	A 2.10	2.77	3.29	3.52	4.35	4.83	6.66	9.07			
	L 2.10	2.55	2.90	3.10	3.52	3.82	4.13	5.17			
	W 2.10	2.55	2.90	3.10	3.52	3.82	4.13	4.13			
8. Old-fashioned Transportation	A 2.69	2.31	2.08	2.22	2.26	2.43	3.72	3.56			
	L 2.65	2.45	2.35	2.34	2.48	2.43	2.87	2.83			
	W 2.65	2.45	2.35	2.34	2.48	2.43	2.87	2.87			
9. (a) Trades, Stores & Restaurants	A 7.66	8.47	9.57	10.56	12.32	12.97	19.31	23.47			
	L 7.66	7.87	8.54	8.95	9.71	10.01	12.38	13.56			
	W 7.66	7.87	8.54	8.95	9.71	10.01	12.38	12.38			
9. (b) Trades, Peddlars	A 2.00	2.10	1.73	1.54	1.44	1.44	+	+			
	L 2.00	2.10	1.73	1.54	1.44	1.44	+	+			
	W 2.00	2.10	1.73	1.54	1.44	1.44					
10. Government	A 3.27	3.70	3.95	4.07	4.76	5.03	4.87	6.11			
	L 3.27	3.70	3.95	4.07	4.76	5.03	4.87	6.11			
	W 3.27	3.70	3.95	4.07	4.76	5.03	4.87	4.87			
11. Finance	A 1.31	1.41	1.51	1.61	1.89	2.04	2.91	3.58			
	L 1.31	1.39	1.47	1.52	1.70	1.77	2.00	2.29			
	W 1.31	1.39	1.47	1.52	1.70	1.77	2.00	2.00			
12. Personal Services	A 0.55	0.55	0.54	0.54	0.51	0.51	0.51	0.51			
	L 0.55	0.55	0.54	0.54	0.51	0.51	0.51	0.51			
	W 0.55	0.55	0.54	0.54	0.51	0.51	0.51	0.51			
13. Residential Rent	A 2.28	2.32	2.37	2.44	2.48	2.55	2.60	2.67			
	L 2.28	2.32	2.37	2.44	2.48	2.55	2.60	2.67			
	W 2.28	2.32	2.37	2.44	2.48	2.55	2.60	2.60			
14. Work Brigades	A 0.62	0.38	0.44	0.75	0.81	0.85	2.50	3.27			
	L 0.62	0.38	0.44	0.75	0.81	0.85	2.50	3.27			
	W 0.62	0.38	0.44	0.75	0.81	0.85	2.50	2.50			
15. (Nine Minor Sectors = (6) - (14) †)									37.20	24.20	24.20
16. Net Domestic/National Product	A 68.55	73.27	77.81	83.34	96.41	104.22	144.97	176.65			
	L 71.41	75.33	79.28	82.30	92.08	95.34	108.28	124.52			
	W 72.40	75.40	78.30	82.00	91.70	94.80	104.80	112.00	112.50	73.20	75.40
17. Depreciation	A 3.18	3.67	4.06	4.35	5.48	5.93	8.97	11.73			
	L 3.26	3.66	4.03	4.27	5.20	5.48	6.45	7.91			
	W 3.20	3.50	3.90	4.10	4.90	5.20	5.90	7.10	8.20	8.90	9.50
18. Gross Domestic/National Product	A 71.73	76.94	81.87	87.69	101.89	110.15	153.94	188.48			
	L 74.67	78.99	83.31	86.57	92.78	100.82	114.73	132.43			
	W 75.60	78.90	82.20	86.10	96.60	100.00	110.70	119.10	120.70	82.10	84.90

LEGEND: A: Adjusted estimate (official data - Western concepts)

L: Liu and Yeh's estimate

W: Wu and his associates' estimate

† included in Line 9 (a) but both subsume under general heading "Trade"

TABLE 7. ESTIMATE OF COMMUNIST CHINA'S NET AND GROSS DOMESTIC/NATIONAL EXPENDITURE AT 1952 YUAN

1952 - 1962

(1,000 MILLION YUAN)

	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
1. Personal Consumption											
A	51.74	49.78	53.48	58.01	66.88	71.26					
L	54.60	51.84	54.96	56.99	62.60	64.49					
H	50.77	55.27	57.16	61.23	68.70	68.71	74.71	77.63	83.30		
W-1	52.30	53.50	54.70	55.90	57.10	58.60	60.20	61.50	62.70	63.80	64.60
W-2	57.40	58.60	60.40	61.50	62.70	58.60	66.20	58.00	44.50	41.60	42.80
(a) Food											
A	30.38	30.82	33.71	35.62	38.70	42.36					
L	33.08	33.59	36.41	36.35	36.64	38.39					
(b) Clothing											
A	7.98	8.99	8.68	8.02	10.72	9.80					
L	7.89	8.79	8.43	7.82	10.42	9.62					
(c) Fuel & Light											
A & L	5.11	5.22	5.35	5.46	5.58	5.72					
(d) Housing											
A & L	3.04	3.10	3.16	3.25	3.31	3.40					
(e) Miscellaneous											
A	5.23	1.65	2.58	5.66	8.57	9.98					
L	5.48	1.14	1.61	4.11	6.67	7.36					
2. Communal Services											
A & L	1.98	2.45	2.46	2.32	3.26	3.29					
3. Government consumption											
A	5.34	6.64	5.50	6.13	5.28	5.99					
L	5.34	6.64	5.49	6.11	5.23	5.92					
H	7.92	9.52	9.49	9.63	10.04	9.21	8.73	11.04	13.10		
W	7.30	9.10	8.00	8.40	8.50	10.30	10.60	11.00	13.10	11.20	11.40
4. Net Domestic Investment											
A	11.26	15.45	16.75	18.06	20.44	22.73					
L	11.26	15.45	16.74	18.04	20.39	20.62					
H	10.09	12.94	15.65	15.38	18.62	24.47	42.75	53.86	61.66		
W	14.50	19.00	20.60	22.10	25.30	25.80	29.90	40.30	52.80	17.60	17.60
5. Net foreign investment											
H	-0.92	-0.67	-0.38	-0.83	-0.15	+0.03	+0.04	+0.04	+0.05		
W	-1.00	-1.10	-0.40	-1.20	+1.30	+0.50	-0.10	-0.60	-1.10		
6. Total Investment											
W	13.50	17.90	20.20	20.90	25.60	26.30	29.80	39.70	51.70	17.60	17.60
7. Net Domestic expenditure											
A	70.28	74.32	78.19	84.52	95.86	103.27					
L	73.14	76.38	79.65	83.46	91.48	94.32					
8. Depreciation											
A	3.18	3.67	4.06	4.35	5.48	5.93					
L	3.26	3.66	4.03	4.27	5.20	5.48					
9. Gross Domestic National Product											
A	73.46	77.99	82.25	88.87	101.34	109.20					
L	76.40	80.04	83.68	87.73	96.68	99.80					
H	67.86	77.06	81.92	85.41	97.21	102.42	126.23	142.57	158.11		
W-1	73.10	80.50	82.90	85.20	91.20	95.20	100.60	112.20	127.50	92.60	93.60
W-2	78.20	85.60	88.60	90.80	96.80	95.20	106.60	108.70	109.30	70.40	71.80
W-3	75.70	83.10	85.80	88.00	94.00	95.20	103.60	110.50	118.40	81.50	82.70
av.											

Legend A: Adjusted estimate (official data - Western concepts)

L: Liu and Yeh's Estimate

H: Hollister's Estimate

W-1: Wu & Associates' Estimate based on personal consumption at minimum maintenance level

W-2: Wu & Associates' Estimate based on Actual personal grain consumption

W-3: Average of W-1 & W-2

Wu and his associates note that owing to the different production concept used in national income accounting, the official figures are and should be lower than either Hollister's or Liu and Yeh's product estimates.⁷¹ However, even allowing for differences in concepts as the cause of discrepancy, they think the official estimates are still too high, especially for post-1957 when consumption and possibly investment expenditure are overstated. Not enough information is known about the way the official estimates are computed, "one would be well advised to take the official data with a grain of salt," especially for post-1957.⁷² It is observed, that both Hollister's and Liu and Yeh's estimates approximate each other until 1957. For 1958 and 1959, Hollister's estimates follow the trend of SSB figures.

There is no doubt that the official estimates beyond 1957 are overstated. But the general statement that "the official estimates are still too high" do not tally with Liu and Yeh's findings for 1952-57. It will be recalled that for the period preceding 1955, Liu and Yeh have shown that the official estimates after adjustments with regard to concepts are lower than their own estimates. It is only for 1955 and after that the official estimates are higher. Even so, the difference is less than 2 per cent.

It is true that the exact procedure followed by the SSB in national income estimation is not known, but Liu and Yeh,

through their comparison of the adjusted estimate and the official data with conceptual adjustments, for 1952-57, have shown that the official estimates score fair in internal consistency. The steps followed by SSB in national income accounting are assumed to be those described generally in 1956 article on estimation method. To the official estimate for each year is added items that are not included in the aggregate and the estimate is reconstructed according to Western industrial classification. The estimate is then compared with adjusted estimate derived on the basis of official data on component items included in national income estimation. If the difference is slight, which happens to be the case, the methods which the SSB uses in national income accounting work are to a large extent confirmed through reconciliation between the official and adjusted estimates. Hence, that one might as well take the official data with a grain of salt may be regarded as an exaggeration.

While it is possible to compare the SSB and Liu and Yeh's figures -- because they both employ the value added approach -- it is not possible to do the same for Hollister's and Liu and Yeh's except on the aggregate level. It is true that for the years through 1957, Hollister's estimate follows closely that of Liu and Yeh, but it also follows even closely the official estimate from the point of view of rate of growth. It is not possible to compare the SSB and Hollister's product estimates using value added approach, but Hollister's estimate not only

approximates the adjusted estimate but the official rate of growth as well. This may also suggest that Hollister confirms that the official estimates are internally consistent, not only that, but the official rates of growth are reasonable as well, at least up to 1957.

Wu and his associates analyse the factors exaggerating the growth rate in the SSB estimate under (a) inherent bias in 1952 prices, (b) "new product" effect and underpricing of farm products, and (c) underreporting of production in the 1952 base years.⁷³ We are not concerned with (a) or (b) since the problems apply to both Hollister and Liu and Yeh. The underreporting of production in 1952 varies between Hollister and Liu and Yeh. Hollister made adjustments to food crops, but the net effect is insignificant. Liu and Yeh are said to have partially corrected the underreporting. The results are that Hollister's GNP estimate for 1952 is low while Liu and Yeh's is high. The effect on subsequent development is significant as Hollister's estimates for the post-1952 period are made to compare with a low figure for the base year while Liu and Yeh's are compared with a higher product estimates. The rates of growth will be higher in the first case than in the second case, given the same or more or less the same magnitude of the national income of the comparing year in both cases.

For the post-1957 period, comparison is difficult because both Hollister and Liu and Yeh made assumptions at a time when reliable data were scanty. From the quantitative viewpoint,

Liu and Yeh's figures are lower than Hollister's, both absolutely and relatively.

With regard to national expenditure and its allocation, except 1952, Hollister's and Liu and Yeh's estimates came close. Wu and his associates suggest accuracy of these two independent estimates is thus quite high. If this is the case, it further affirms that in absolute terms the Chinese estimates in effect also are reasonably accurate. We now compare Wu and his associate's with Liu and Yeh's GNP. The former's GNP is a revised estimate of the latter; the methods of adjustments have been described earlier. The revised GNP and GNE are shown in Tables 6 and 7. While GDP and GDE may differ, GNP and GNE do not. The estimates of GNP and GNE do not correspond except for the year 1952. We assume that Wu and his associates are only interested in the average of the GNE (I) and GNE (II). If we consider GNE (I) and GNE (II) separately with GNP, the discrepancy still exists, even for 1952.

The discrepancy can be attributed to the fact that the product and expenditure estimates are revised independently. However, accuracy is not warranted for the revised estimates.

Nevertheless when we compare the Wu's product estimates with Liu and Yeh's, we find that except for 1952, the former is lower than the latter, particularly so for 1958 and 1959. The discrepancy is due to the downward revision of value added of agricultural sector.

As regards expenditure estimates, all components except personal consumption are based on Liu and Yeh, hence discrepancy lies between the estimate for personal consumption by Wu et al and by Liu and Yeh. Liu and Yeh's estimate for the period 1952-57 does not fall between Wu's; personal consumption (I) and personal consumption (II).

Finally, while breakdowns have been made available for our estimates of NDMP for the period 1960-62, because of the particular methods employed in estimation, we have not been able to adjust our estimates like Liu and Yeh adjusted the SSB estimates to conform with Western national income accounting concepts. For this reason, no attempt has been made to compare Wu and associates' estimates with ours. However, our estimates will be used in the comparison of the different rates of national income growth in the following section.

National income growth rates

On the whole, there is a change in national income in an upward direction since 1949 (Table 8), though the rates of growth of the different estimates vary. For the period 1933-52, Liu and Yeh's GDP estimates in 1952 prices show an increase of 21.1 per cent, but the GDP in 1933 prices show only an increase of 13.2 per cent. It is possible that during the period 1949-51, China's national income for any one year was below the 1933 level. As shown in Table 9, the State Statistical Bureau NDMP

TABLE 8. CHINA'S NATIONAL INCOME AT 1952 PRICES

(1,000 million yuan)

	Hollister	Liu & Yeh	SSB	Li	Luey	Luey	Wu et al
	(1) GNP	(2) NDP	(3) NDMP	(4) NNP	(5) NDMP	(6) NNP	(7) GNP
1949	-	-	36.84	-	-	-	-
1950	55.02	-	42.72	-	-	-	-
1951	62.85	-	49.98	-	-	-	-
1952	67.86	71.40	61.13	72.90	-	72.76	75.60
1953	77.06	75.33	70.04	80.20	-	83.37	78.90
1954	81.92	79.29	73.83	86.60	-	87.96	82.20
1955	85.41	82.30	78.80	93.80	-	93.80	86.10
1956	97.21	92.08	88.75	107.30	-	105.60	96.60
1957	102.42	95.34	93.65	111.80	-	111.50	100.00
1958	126.23	108.00	125.50	-	-	149.40	110.70
1959	142.57	125.00	152.50	-	-	181.50	119.10
1960	158.11	-	-	-	154.70	184.20	120.70
1961	-	-	-	-	121.70	144.80	82.10
1962	-	-	-	-	139.60	166.20	84.90

Notes: GNP: Gross National Product at market prices
NDP: Net Domestic Product
NDMP: Net Domestic Material Product
NNP: Net National Product

- Sources: Col. 1: W.W. Hollister, China's Gross National Product and Social Accounts 1950-1957, pp. 132-33, and W.W. Hollister, "Estimates of the Gross National Product, 1958-59," in Realities of Communist China, ed. Yuan-li Wu. Figures are also quoted in Yuan-li Wu, F.P. Hoerber and Mabel M. Rockwell, The Economic Potential of Communist China, Table 29.
- Col. 2: Ta-chung Liu and Kung-chia Yeh, The Economy of the Chinese Mainland: National Income and Economic Development 1933-59, Vol. 1, chapter 2.
- Col. 3: State Statistical Bureau, The Ten Great Years, p. 20, for Index with 1952 as base year; Lu Kuang, "China's National Income," Peking Review, April 8, 1959, p. 8 and sources given in P. Luey, "Social Accounting in Communist China," Contemporary China, Vol. IV, ed. E.S. Kirby, p. 124, for aggregates.
- Col. 4: C.M. Li, Economic Development of Communist China: An Appraisal of the First Five Years of Industrialization, p. 106.
- Col. 5: Appendix B, Table B-30.
- Col. 6: A mark-up of 20 per cent on SSB's NDMP. The difference between Col. 4 and Col. 6 for 1952-57 is due to the fact that Li did not have the benefit of data given by Lu Kuang, "China's National Income," Peking Review, April 8, 1959.
- Col. 7: Yuan-li Wu, F.P. Hoerber and Mabel M. Rockwell, The Economic Potential of Communist China, Vol. I, Table 51.

index gives 59, 70, and 82 for 1949, 1950, and 1951 respectively, given 1952 as 100. Within one year in 1952, the NDMP in 1952 prices increase had been 18 per cent. Since the SSB's NDMP adjusted to GDP according to Western concepts is only 3.94 per cent below Liu and Yeh's corresponding figure (Table 2), the GDP for the period 1949-51 would have been below the 1933 level, whether in 1933 or 1952 prices. Crude estimates made by Wu, Cheng, and Mah seem to confirm Liu and Yeh's results.⁷⁴ Wu's NNP at factor cost in 1933 prices gives an increase of over 30 per cent for the period 1933-53, while Cheng's gives a 20 per cent increase for the period 1936-52. Mah's estimate of the NNP in 1936 prices during the period 1936-56 is 39 per cent. If the SSB's NDMP index for the period 1952-57 is applied to Mah's estimate of the change, the NNP in 1952 would be below the 1936 level.

During the First Five Plan period (1953-57), the change of national income in 1952 prices varies with different estimates (Table 9). Liu and Yeh's estimate of national income change for the period 1952-57 is 34 per cent (NDP) or 35 per cent (GDP), while Hollister's is 51 per cent (GNP), and SSB's is 53 per cent (NDMP). Wu and associates' revised figures give an overall increase of 30.5 per cent for the same period or an annual rate of 6.6 per cent.

With regard to the national income growth of the period after 1957 in 1952 prices, the SSB's NDMP for the period 1957-59 shows an increase of 68.9 per cent or an annual growth rate of

TABLE 9. INDEX OF NATIONAL INCOME IN 1952 PRICES
(1952=100)

	<u>Hollister</u>	<u>Liu & Yeh</u>	<u>SSB</u>	<u>Li</u>	<u>Luey</u>
1949			59		
1950	81		70		
1951	93		82		
1952	100	100	100	100	100
1953	114	105.4	114.6	109.9	114.6
1954	121	111.1	120.9	118.8	120.9
1955	126	115.3	128.9	128.6	128.9
1956	143	129.0	145.2	147.2	145.2
1957	151	133.3	153.2	153.4	153.2
1958		151.2	205.3		205.3
1959		175.1			249.5
1960					253.1
1961					199.1
1962					228.4

Notes: When converted into indexes, Cols. 5 and 6 in Table 8 give the same figures, hence only one series under Luey.

Source: Table 8.

28 per cent; Liu and Yeh's NDP and GDP overall growth rates are 31 and 32 per cent, annual rates being 14.5 and 14.9 per cent respectively; Hollister's GDP overall growth rate for the period 1957-60 is 54.4 per cent, that is an annual rate of 15.5 per cent; and finally, Wu and associates' GNP change over the period 1957-62 is as follows:

<u>Period</u>	<u>Overall growth</u>	<u>Annual growth rate</u>
1957-59	23 per cent	10.9 per cent
1957-60	24.7	7.6
1957-62	-10.5	-2.4
1959-62	-27.6	-10.2

We have also estimated the national income for 1960-62 on the assumption that the reported grain output data were accurate (Appendix B). This is intended to be an extension of the SSB's NDMP series in 1952 prices. If the estimation were reasonable, the overall growth rate of NDMP during 1957-62 would be 49 per cent or an annual rate of 8.2 per cent. During the period 1959-62, the NDMP is estimated to have fallen by 8.4 per cent or a negative annual rate of 2.9 per cent.

Table 10 illustrates the change in the Liu and Yeh's and the official estimates of China's national income per capita during 1952-62. Comparing the two estimates for the 1952-62 period, namely, Wu and associates' GNP and our extended NDMP, the divergence in growth is large, the former being only 12.3 per cent while the latter 128.4 per cent. The respective

annual rates of growth are 1.2 per cent and 8.6 per cent. Since population is increasing at 2.1 per cent per annum, the population in 1962 would have been 23.9 per cent over the 1952 level.⁷⁵ Even if Wu and associates' most conservative estimate of China's population would have given an increase of 1.9 per cent.⁷⁶ Per capita product increase over the same period based on this population projection would have been negative, that is, per capita product in 1962 would have fallen by 7.9 per cent below the 1952 level. On the other hand, if the extended NDMP series were accepted, then per capita product would have increased at an annual rate of 6.3 per cent over during period of 1952-62.

It is possible that Wu and associates have understated the GNP growth, particularly for the post 1957 period. The cause of the negative GNP growth during the period (1958-62) depicted by them lies perhaps in their estimation of the value added of agriculture. Doubtless, the official data on agricultural production, particularly grain production, may have been overstated. On the other hand, Wu and associates' revised grain output data lead ultimately to a per capita consumption of grain during the period 1957-62 (except 1958) which is below what they themselves regarded as minimum maintenance level.⁷⁷ Admittedly 223 kg. of processed grain per adult per year as minimum maintenance level is appreciably higher than mere survival or near-starvation consumption level as Wu and associates have aptly pointed out, yet ^{to} infer that for the difficult years

of 1960-64 the level of grain consumption being between 145 to 150 kg. per adult per year is ceteris paribus above survival or starvation level lacks credibility.⁷⁸ In May 1962, when there was an influx of illegal immigrants to Hong Kong from the Chinese mainland, there were reports of food shortages but no widespread starvation was known. The influx of Chinese from the mainland seems to have been due to the fear of worsening of economic situation in China rather than fleeing from starvation.

The change ^{in the} overall picture of the period 1952-62 perhaps is unfavourable for China since 1962 was a year of economic crisis due to weather conditions. If the period 1952-57 is considered instead, China's per capita product growth does not seem to be low vis-a-vis some Asian countries. The annual rate of per capita product growth during the period is 3.9 per cent for both Taiwan and the Philippines, and 1.0 per cent for Burma.⁷⁸ Liu and Yeh give a lower estimate for China of 3.6 per cent per annum while the SSB estimate is higher, i.e. 6.6 per cent per annum (Table 10). If the former is taken to be the lower limit, while the latter the upper limit, the probable mean rate of per capita product growth may be higher than that of either Taiwan or the Philippines.

CONCLUDING REMARK

We have made a survey of the available estimates of China's national income published in China as well as those made by non-Chinese scholars. We have also included in the survey

TABLE 10. PER CAPITA INCOME GROWTH

LIU & YEH

SSB

	Population (1952=100)	Per capita NDP	Per capita NDP (previous year = 100)	Per capita NDMP	Per capita NDMP (previous year = 100)
1949	94.26			62.61	-
1950	96.03			72.9	116.4
1951	97.95			83.71	114.8
1952	100.00	100	-	100.00	119.5
1953	102.3	103.0	103.0	112.0	112.0
1954	104.7	106.1	103.0	115.4	103.1
1955	106.9	107.7	101.6	120.5	104.5
1956	109.2	118.1	109.5	132.9	110.1
1957	111.4	119.6	101.4	137.5	103.9
1958	113.9	132.8	111.0	180.4	130.4
1959	116.2	150.6	113.3	214.6	119.4
1960	118.8			268.3	125.0
1961	121.3			164.2	61.2
1962	123.9			184.4	112.3

1952-57
(annual
rate %)

3.6

6.6

1952-59
(annual
rate %)

6.0

11.5

1952-62
(annual
rate %)

6.3

Sources: Ta-chung Liu and Kung-chia Yeh, The Economy of the Chinese Mainland: National Income and Economic Development 1933-59; State Statistical Bureau, "Press Communiqué on the Growth of China's National Economy in 1959," peking Review, January 26, 1960; Appendix B, for national income figures. Population figures from "Chinese Population Statistics, 1949-56," Tung-chi Kung-tso (Statistical Work), June 1957, pp. 24-25 - population for 1957-62 based on projection at 2.10 per cent per annum.

our estimates of NDMP for the period 1960-62 which has been a part of our present research. Since there are more than one estimates of national income for any given year, we attempted to make comparisons of the various independently estimates aggregates as well as the growth rates of the different national income series for a given specified period. In the comparison of the different estimates for 1952, we have found that, after adjustments for conceptual and definitional differences, the estimates made by the non-Chinese scholars as well as by SSB approximate one another in magnitude. In the case of other years, the same conclusion could be drawn. Since we do not know the margin of error of each estimate, all we can say is that the absolute difference between any two alternative estimates is slight. We also found that the rates of growth among the alternative series varied, which is not unexpected since no one estimate is consistently higher than the other.

One striking feature resulting from the survey is that while national income estimates made before 1957 were in one way or the other based on the SSB estimates, thus in effect there was not much choice but to use SSB figures, since and after 1957, there were too many alternative estimates. A researcher interested only in citing national income figures may be bewildered by the number he can choose from. There is urgent need to reconstruct and reconcile the alternative estimates, which is tantamount to yet another appraisal of the methods of estimating the components of national income, so that the divergent

rates of growth given by the different estimators may be eliminated. This is of course an area for further research.

Introduction

Printing in dispersed form of indicators

Four various indicators - including under conditions of pure competition a perfectly planned economy - of the economic type - possibility of growth in a centrally planned economy of the industrial type - developing economy of the industrial type - also also a possibility of growth in a developed economy of the industrial type. A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z. A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.

Printing in two or three indicator systems

Printing of indicators - level of complexity price determination in theory, money wage, capital, labor, land, etc. - indicators of growth in a centrally planned economy of the industrial type - developing economy of the industrial type - also also a possibility of growth in a developed economy of the industrial type. A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.

Printing in one indicator system

Printing of indicators - level of complexity price determination in theory, money wage, capital, labor, land, etc. - indicators of growth in a centrally planned economy of the industrial type - developing economy of the industrial type - also also a possibility of growth in a developed economy of the industrial type. A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.

Conclusion

PRICING IN THEORY AND PRACTICE WITH REFERENCE TO CHINA

Introduction

Pricing in different types of economies

Free market economy - pricing under conditions of pure competition - centrally planned economy of the communist type - functions of prices in a centrally planned economy of the communist type - developing economy of the communist type; China case - functions of prices in a developing economy of the communist type; China case; aggregating and accounting functions - allocation functions - coordinating function - factor and commodity differentiating functions.

Pricing in theory: Chinese discussions

Pricing of commodities - types of commodity price determination in theory: wage-profit ratio method - cost-profit ratio method - capital-profit ratio method - criticisms against the different methods - determination of agricultural price - pricing of factors - some observations on the discussions - price formation in practice.

Price developments in China

Producer and consumer goods prices - prices in rural areas.

Concluding remark

INTRODUCTION

The present chapter is concerned with the functions of prices and pricing of outputs and factors with reference to a centrally planned economy such as China's. The purpose is two-fold. First, it provides an introductory to Chapter III in which we consider the problem of valuing physical outputs for accounting purposes with reference to an economy such as China's. Secondly, it sets a perspective against which we examine in Chapter IV the thesis that national income series is an indicator of the change in economic welfare.

It should be noted at the outset that neither Eckstein, Liu and Yeh, nor Wu and associates paid sufficient attention to the nature of the Chinese price system.¹ Among them, only Eckstein discussed the valuation problem. Liu and Yeh ought to have given a fuller account of the Chinese price system than the one they had presented, since interpretation of their product and expenditure estimates would demand in the first instance an understanding of the method employed in pricing physical output in China.² Wu and associates hardly touched upon this aspect at all. The same criticism could be directed against Hollister.³ He constructed China's national income accounts in terms of current prices, yet he made no reference to the nature of the price system in China. We are not in a happier position when we look elsewhere for a description or an analysis of the Chinese price system. It is true that there is a special study on pricing in China, but it is limited to price control during

the period 1949-52.⁴ Perkins recently published a paper based on part of his Ph.D. dissertation on price formation in China, but the article itself did not touch on price formation.⁵ Some non-Chinese scholars in the United States are engaging on the study of Chinese pricing, but the findings have as yet to be published. It might be argued that one could refer to literature on Soviet pricing since the Chinese have been said to follow the Soviet model in their planning.⁶ However, while in both the Soviet Union and China, the theoretical principles might have been evolved from the economics of Marx, the study of the problems emanated from the application of Marxian principles appears to have been developed independently in the two countries. This is at least true since 1956. For example, the Chinese began to study the problem of theory of commodity price formation in or about 1962, but the Soviets have been reported to have had a debate over the same issue before then.⁷ All these have led us to the conclusion that we must look into the primary sources ourselves for an account of the nature of prices in China.

The chapter is divided into three parts. First, we examine the pricing of outputs and factors in different types of economy. We begin with abstract models of economic system and then examine the nature of prices in these systems. These provide the scope for our analysis in general terms of the institutional framework of the Chinese economy and the functions of prices in Chinese planning. The second part is concerned with Chinese discussions on pricing in theory. And finally, we examine the price developments in China.

PRICING IN DIFFERENT TYPES OF ECONOMIES

The characteristics of a price system depends on the economic system under whose aegis the price system operates. One may refer to Bye for the different types of price systems corresponding to the different forms of societies.⁸ He classified the price systems into four main types: (1) natural (or free) price system, which exists in a free enterprise economy, (2) protected price system, which exists in an economy with indirect controls (e.g. labour legislation, anti-trust laws, etc.), (3) normalized price system, which exists in a centrally planned economy, and (4) manipulated price system, which exists in an economy with government directly controlling and influencing the economic activity on an ad hoc basis. Bye would place the Soviet price system under type (4) on the ground that wages of labour and other costs are arbitrarily fixed and that the principle of equating prices of goods with costs of their production is frequently violated.⁹ Since corresponding to every type of economic system is a price system, Wiles' eight allocation models -- ranging from "full market" to "central command" -- and also Balassa's four blueprints of centralized planning would suggest that in each model or blueprint the price system has its particular characteristics.²⁰

While we are aware that the functioning of price system varies according to the type of economic system within which prices operate, an analysis of the many different types of economic systems falls outside the scope of the present study,

which in any case is more competently dealt with elsewhere.¹¹ Nevertheless, we need to have some theoretical framework against which we describe the Chinese economic system and appraise the role of prices and the methods of pricing physical outputs and factors in that economy. For our purpose, we first re-state the basic working principles of a free market economy, which sets a framework for examining the salient features of a diametrically opposed system, namely, a centrally planned economy of the communist type. Only a resume of the former is necessary here for a fuller exposition will be given in Chapter IV. We are aware of the fact that these two systems are abstract in character and are not devoid of weaknesses. While no economy in the real world resembles either of them, the models nevertheless form the bases of our analysis of the price system in China.

Free market economy

The free market economy, which is a model of capitalism and operates under conditions of pure competition, is characterized by the following assumptions: (1) The private sector owns the factors of production and production is attributed to the initiative of private enterprise and is consumption-oriented. (2) Income is derived from sale of services of factors of production and also through profit of private enterprise, both in monetary form. (3) There is freedom of choice with respect to consumption, occupation, saving and investment. (4) The economy is not planned, controlled or regulated by the government,

the latter, while satisfying collective wants, does not compete with the private enterprise, tell people where to work, or what to produce.

Analytically, therefore, the economy may be divided into two sectors, consumption and production. The former consists of household units and the latter firms or enterprises. Each micro unit trades on two markets, i.e. commodity and factor markets. The household is a buyer of consumer goods and a seller of productive services while the enterprise is a buyer of productive services and a seller of intermediate goods to other enterprises and a seller of consumer goods to households. Both the consuming and producing units are thus dependent on exchange and they attempt to get as much as they can out of exchanges: all seller of goods and services attempt to obtain the highest price possible while all buyers of goods and services try to pay the lowest price possible. Against the acquisitive tendency (or utility and profit maximization) is the fear of competition which may result, when necessary, in the willingness of the sellers in accepting lower prices and of the buyers in paying higher prices. Competition is pure and perfect. The two driving forces, acquisitiveness and competition, give rise to establishment of prices which equilibrate supply and demand on both the commodity and factor markets and which result in efficient allocation of scarce resources among competing ends.

Functions of prices in a free market economy

Prices in such an economy perform allocating and coordinating in addition to the obvious aggregating and accounting functions. Suffice to say that they allocate efficiently commodities among consumers and factors of production among competing uses and at the same time coordinate consumption, production and resource-supply. In short, through price mechanism, the ex post allocation and coordination should be such that the relative prices of any two goods correspond to the marginal rate of substitution between the goods, and at the same time, correspond to the relative marginal costs of producing these goods, which in turn correspond to the inverse of marginal rates of transformation.

Pricing under conditions of pure competition

It follows from the last analysis that when the economy is at a state of equilibrium, given the conditions of pure competition, prices are scarcity prices and are determined by scarcity of resources, production functions, and the desired final bill of goods which express the preferences of the consumers. Their determination may be visualized as solving a set of simultaneous equations representing consumers' demand functions, producers' production or transformation functions, and resource-holders' supply function.¹² To be more precise, the data for determining a consistent set of (scarcity) prices are utility and production functions of all consumers (who are also the resource-holders) and producers, and the initial

endowments of factors and/or commodities of these consumers and producers, while the variables are the prices of all factors and commodities and the quantities bought and sold by each consumer and producer. The behavioural assumptions, which we have stated earlier, are utility and profit maximization. And every market, whether factor or commodity, must be cleared, i.e. aggregate demand equal aggregate supply, and in the long-run profit must also equal zero in every enterprise. The equilibrium depends on relative rather than absolute prices, and is reached when there is no incentive to reshuffle further production or consumption. In bringing about the economy to a state of equilibrium, an enterprise, in order to maximize its profit (or minimize its total cost) tends to equate the price of the commodity with the marginal cost and pays the resource-holder a price which is equal to the revenue of marginal product of the factor in question. At the same time, the household as a consumer tends to maximize its utility by paying a price for the commodity which is equal to the marginal utility of the commodity and as a resource-holder, tends to equate the price offered with the marginal disutility of releasing the factor for hire.

Centrally planned economy of the communist type

It should be noted at the outset that centrally planned economy of the communist type is an ideal system and does not correspond to the actual centrally planned economy of the Soviet-type. Here, "communist" has an ideological rather than

a geographical connotation. The characteristics of such an economy are diametrically opposed to those of a free market economy: (1) It is a centrally planned economy; the government owns the material factors of production. (2) The government decides what is to be produced, how much of each commodity is to be produced, how to produce, and who should have what. (3) Skilled labour is assigned to areas by the government where the talent of individual labour is best suited and unskilled labour is allocated as if it were homogeneous in quality over space where it is needed. (4) Households have no freedom of choice with respect to consumption, occupation or saving, and enterprises themselves have no freedom of choice with respect to saving and investment. All these decisions are made by the government. (5) The government operates through a central physical plan. Allocation is done in physical terms without the use of prices. (6) Money, if allowed to exist, serves as an accounting unit and has no command over commodities and factors.

While the economy may be functionally divided into two sectors as in the case of the free market economy, acquisitiveness and competition at the base level are by definition absent. The equilibration of supply and demand of each commodity or factor is achieved through the use of physical balances. Given the final bill of goods, the central authority or central planning board would have to estimate resource requirements on the assumption of known constant technological coefficients.

By the method of "successive approximation" or other trial and error methods, and with adjustments, if necessary, of the planners' preferences, the resource-demand due to a given bill of goods may be equilibrated with the supply of resources. Resources would then be allocated physically, so would be the commodities produced. The final bill of goods which express the planners' preferences may or may not coincide with consumers' preferences. The planners tend to weed out or reduce the quantity of the items on the lower priority if they find the resources available inadequate to produce all the goods originally listed.

The process of computing an overall balance is a time-consuming one. Of course, the equilibrating process of aggregate supply with aggregate demand might be speeded up if "all the economic categories of the old regime.....: prices, salaries, interest, rent, profit, saving, etc." were available and used instead of the trial and error method employed in absence of any past price data. With historical prices as data, the central planning board could theoretically solve the set of simultaneous equations, a function which is performed mechanically by price mechanism under conditions of pure competition. This view had long been suggested by Barone.¹³ Whether allocation of resources by the central planning board is as efficient as by price mechanism depends on a number of factors, such as whether collecting and processing of economic data can be done instantaneously, whether the computation process itself employs

part of the already scarce resources, etc. But we shall not pursue this aspect here.

Functions of prices in a centrally planned economy of the communist type

Prices are superfluous in a centrally planned economy of communist type in the sense that they have no operational significance.¹⁴ Since production and allocation can be carried out without the use of prices, prices have no allocating or coordinating function. However, we have said that money might be used, in which case, prices merely serve for aggregating and accounting purposes. Whatever price is fixed for a commodity or factor, it has no influence on the economic decisions of either the planners, the resource-holders (the government), the enterprises or the households. In fact, price data need not appear in the accounts of the enterprises or households.

Developing economy of the communist type: China case

China has not reached the stage where its institutional framework is compatible with that for a centrally planned economy of the communist type.¹⁵ Thus, we may refer the Chinese economy as a developing economy of the communist type.

It is difficult to enumerate precisely the institutional assumptions of a developing economy of the communist type as exemplified by the Chinese economy. Any attempt in this direction implies a thorough knowledge of the structure of the economy

at every stage of its development since 1949. Since a detailed study on the institutional aspect for the period since 1949 is not yet available, it appears that we would have to make a thorough survey of the institutional structure and its development ourselves. However, this would be a piece of research in itself and would fall outside the scope of the present study. What we shall do is to depict the salient features with reference to the institutional assumptions inherent in either the free market economy or the centrally planned economy of the communist type. Generalization is inevitable but general statements may be qualified as we go along.

As an economy of the communist type, China subscribes to central planning. Implicit in the rationale behind central planning under such circumstances is ownership of factors of production by the government. However, not all factors are under state ownership in China. Unlike the Soviet Union, China embarked on the First Five-Year Plan with some of the productive resources under private ownership. In the urban areas, socialist transformation of industry was virtually completed only by 1956 (the fourth year of the first plan quinquennium).¹⁶ Even then, because socialist ownership covers joint state-private ownership as well as full state ownership, legally speaking, households still have claims over productive resources, though in practice they are silent partners. In the rural areas, except in the case of state farms, ownership has been vested in the households (even during the mutual-aid teams era), lower

agricultural production cooperatives, higher agricultural cooperatives, and rural people's communes in chronological order.

In the urban areas, the government decides what to produce, how much of each commodity is to be produced, and how to produce. However, only key commodities of both heavy and light industries are subject to these government decisions. As regards distribution, capital goods (particularly key products such as machines and machine products, major raw materials etc.) are subject to state allocation. In the rural areas, the government may decide what major commodities are to be produced and how much of each is to be produced, but not how to produce, the last being a decision to be made by the producing units, namely, households, mutual-aid teams, lower agricultural production cooperatives, higher agricultural cooperatives, rural people's communes, production brigades, production teams in chronological order.

Households have limited freedom of choice with respect to consumption in the sense that they may choose among the alternatives offered and their decisions in no way influence production decisions made by the government. They have freedom of occupation, though there may be legal restrictions governing mobility of labour between urban and rural areas.¹⁷ The households may also have freedom to save.¹⁸ On the whole, enterprises have no freedom of choice with respect to saving and investment, since such decisions rest with the government.

The government operates through a central plan in which targets are set for major sectors and key products. Planning is said to be patterned after the Soviet model during the first plan quinquennium. While there were proposals for the Second Five-Year Plan, there was no formal Five-Year Plan for the period in question, only ad hoc annual plans of which there were only three we knew anything about.¹⁹

Production on the whole is geared to planners' preferences. Coordination between aggregate supply and aggregate demand is said to be done by means of physical balances, though none has ever been published.

Since physical allocation of commodities and factors are not universal, money and therefore exchange with the use of money are permitted to exist. Prices, however, are made to serve certain purposes, which is made possible by the fact that prices are fixed by the government.²⁰ It would be erroneous to assume that throughout the period since the eve of the First Five-Year Plan there were no free markets for both commodities and factors. It will be recalled that socialist transformation in the urban areas was only virtually complete by 1956 and at certain stages free market was allowed.²¹ Until China achieves full communism, prices have a role to play. We now turn to the functioning of price system in planning in China.

Functions of prices in a developing economy of the communist type: China case

(1) Aggregating and accounting functions: Since China is in essence a physically planned economy, the aggregating and accounting functions of its price system are relatively more important than they appear. These functions are taken for granted in a free market economy. While in principle the Chinese subscribe to physical allocation of commodities and factors without prices, prices are necessary in that the performance of the economy as a whole has had to be measured.²² In China, material balances have been claimed to be the bases of economic planning, and for such balances, physical measures of commodities such as tons, catties, tan, feet, bushels, etc. are sufficient. It has been acknowledged that quantitative measures in physical terms do not lend themselves to aggregation which is necessary in computing Social Product. It is also acknowledged that, without prices, physical measures have limited uses in economic accounting. It is known that only with prices can the relationships between producer and consumer goods, or between capital accumulation and consumption funds be shown. In any event, financial budgeting (or "financial planning") requires the use of prices.

(2) Allocation functions: In a pure competitive economy, pricing mechanism ensures efficient allocation of consumer goods among consumers, of productive factors among producers, and of productive factors among alternative uses. At the same time, it coordinates the supply and demand in both the commodity and factor markets. On a priori grounds, allocation functions of pricing system in a planned economy do not exist since allocation is carried out first in physical terms, and given the prices,

the material allocation is then expressed in value terms. In Chinese economic planning, an enterprise is to produce a pre-determined types of goods from a pre-determined combination of inputs stipulated in the enterprise plan. Any changes in types of commodities produced or in the types of inputs used require the permission of the superior organs. However, certain types of consumer goods, owing to their large number and quality, are not assigned specific quantity targets.²³ The enterprises concerned are obliged to fulfill only the value output targets. Thus, it is possible for the enterprises to produce the goods which yield the highest profits at the prevailing commodity prices.

In the agricultural sector which is not subject to central physical planning in toto, agricultural purchasing prices might influence the allocation of resources in the following ways. First, the change in relative purchasing prices for grains and industrial crops might influence the proportions of cultivated areas for the production of each. Second, when no specific ruling on procurement is made with regard to "private plots", individual peasants might divert their energy to their "private plots" than to collective production. Finally, the level of purchasing prices of agricultural subsidiary products might also influence the level of production. In 1957, it was officially admitted that when the purchasing price for live hogs was raised, the number of hogs increased subsequently. In the previous year, 1956, the shortage of pork had been attributed to the low procurement price of hogs.²⁴

(3) Coordinating functions: In principle, the Chinese pricing system has no automatic coordinative significance. Material balances are supposed to be means of equilibrating the supply and demand of material products and services directly connected with material production. However, it is not clear how such balances have actually been drawn up.²⁵ In any event, they would be drawn up only for key products and services, such as basic raw materials and key consumer goods. It is virtually impossible to draw up balances for all goods, particularly consumer goods which are not subject to state production plans, unified purchase, or planned supply and purchase. These consumer goods are so numerous in number that they defy material balancing. It is in this area that price might play a role of automatic coordination.

However, what coordinating function the Chinese pricing system performs, it is in essence different from a pure competitive pricing system. It does not automatically coordinate economic activities as in a free market, it requires an agency (e.g. the state) to implement coordination. Of course, coordinating function of prices could be dispensed with by substituting for it a rationing system as is done in the case of basic consumer goods.

Coordinating function of prices in China is such that coordination between economic activities at micro-level is subordinate to coordination between economic activities at the macro-level.

(4) Factor and commodity differentiating functions:

These are the minor functions which are taken for granted in a competitive price system, but must be explicitly mentioned in a physically planned economy. According to Ho Chiang, prices perform functions which are beyond the capability of physical measures, such as differentiating the degrees of quality among final products, the variety of uses of intermediate products, and the degrees of labour productivity.²⁶ In a free enterprise economy, these are built-in characteristics of productive factors or commodities and such characteristics do not require conscious identification by differential prices. In a planned economy like China's, where each commodity or productive factor is assigned a price by the central authorities, the differentiating functions of price system become significant. It is generally the rule to assign a higher price to a good of superior quality, and a lower price to one of inferior quality. In spite of the Chinese economists' reverence for the differentiating functions, these may be regarded as corollaries of the aggregating and accounting functions rather than some functions peculiar to a pricing system of a planned economy. For example, sugar crops may be used for oil or sugar extraction, and the value of the crop varies with the utility of it. Hence, a physical measure tan which would give equal weights to both uses is unsuitable as unit of account. When the performance of sugar industry is to be analysed, the aggregating and accounting functions of price system make it possible for an overall assessment, and also by virtue of these functions, the difference in quality and use of commodities or factors can be taken into account.

PRICING IN THEORY: CHINESE DISCUSSION

Since prices are necessary in a developing economy of the communist type, there is then the question of pricing commodity outputs and factors. In what follows we shall examine the theoretical discussions on price determination in China.

Pricing of commodities

Discussions on theory of pricing is a recent development in China. They have been part of the discussions on economic problems which began with the blessing of the state in or about 1961. The price theory discussions centred on commodity pricing.

A controversy over pricing of commodities began in December 1963 when Yang Chien-p'ai published an article in Ching-chi Yen-chiu (Economic Research), in which he advocated price be determined, inter alia, by "capital-profit ratio" which we shall return to presently.²⁷ This was not the first article on pricing nor was it the first on pricing employing this particular method, but it provided more information on the price discussions on which our present analysis is based and it was the article which triggered off the debate.²⁸

As is customary, proposed methods of price determination must be compatible with Marx's law of value if they are to be accepted at all.

Social value must be the basis of the socialist price system. It is against this background that a proponent of a

particular method of pricing is required to prove that the proposed method is consistent with Marx's law of value.²⁹ Unfortunately, Marx did not provide a set of empirical rules for determining prices. The Chinese admitted that a "completely scientific method" of measuring value has not been found.³⁰ Although Marx stated that price was the monetary expression of value in a commodity, because value is "incalculable" and is "an indeterminate quantity", complete equality between price and value is impossible and unnecessary.³¹ All that is required is a price approaching value. That there is a heated debate is not surprising, since each method claims to have fulfilled the general theoretical requirement laid down by Marx by defining the indeterminate notion of value to suit the method.

Types of commodity price determination in theory

It is commonly acknowledged that a commodity can have only one price, irrespective of the region, province, etc. It is also agreed that in theory the price of a commodity should be at a level which will cover not only the cost of product, $(c + v)$, but also guarantee a certain level of profit. This condition applies to all sectors. Finally, it is tacitly assumed that the State fixes prices for all goods.

The calculation of $(c + v)$ is assumed to be possible. The problem at hand is what size profit is supposed to be.³² The different methods of price determination are related to the ways in which the size of profit is calculated.

1. Wage-profit ratio method

The first method is represented by $c + v + (v \cdot \frac{S}{V})$, $\frac{S}{V}$ being wage-profit ratio.³³ The argument put forward in favor of this method is that, according to Marx, only living labour can create new value. Since wage and profit have inverse relationships, if wage is given, profit can be determined. Material labour is only value created by other production departments and transferred without any change to the commodity in consideration. This compares with Balassa's description of price system of the value type in Soviet-type economies.³⁴

2. Cost-profit ratio method

The second method, known as cost-profit ratio, is represented by $c + v + \left[(c + v) \cdot \frac{S}{C + V} \right]$, where $\frac{S}{C + V}$ denotes the average cost-profit ratio, that is, relation between cost of product and profit.³⁵ The principal argument for this method appears to be that the consumption of material labour in any department implies the consumption is effected at a certain level of technology which influences the value created by living labour through a certain level of labour productivity. Living labour under favoured technological conditions can create more value and therefore more surplus value (profit). Balassa denoted this type as the price system of production price.³⁶

3. Capital-profit ratio method

The third method, known in China as the production price method, is expressed in $c + v + \left[(k' + k'') \frac{S}{K' + K''} \right]$ where

$(k' + k'')$ is capital invested in fixed assets and in material inputs and labour inputs respectively, and $\frac{S}{K' + K''}$ is the average capital-profit ratio.³⁷ The ratio indicates the expected return (profit) from investment in any production department. The merit of the capital-profit ratio method is that under highly advanced socialism, where scale of operation is large, labour is integrated to a high degree, division of labour is extensive, and the production departments are mutually inter-dependent, living labour can create more new value, and therefore profit, through higher productivity derived from the use of capital, particularly fixed capital assets of the department concerned. It appears that this method demands "equalization of profit" to equal quantities of investments.

Criticisms against the different methods

All these methods have been subject to criticisms, especially the capital-ratio method. Opponents to the wage-profit ratio method hold that it has limited application for such a method assumes labour productivity being more or less the same in all departments. Once it is acknowledged that there exists a difference in technological levels in different departments (e.g. the different levels of technology between the Chinese industry and agriculture), there will be a difference in labour productivity, and the wage-profit ratio method has little practical value. The main criticism against the cost-profit method centres on the thesis that material labour cannot create new value and ignores the effect of the role of material labour.

The capital-profit ratio method receive attacks from those who suffer from "capitalistphobia". Yün Hsi-liang insisted that such a method does not exist in a socialist economy.³⁸ His fear that socialist system adopting such a price system would degenerate into a capitalist system was shared by Huang Chih-hsien and Ts'ai Chien-hua.³⁹ They and a host of others attacked from the standpoint of the consequences of adoption of the capital-profit method but failed to criticize the method per se as to how it was not suitable.⁴⁰

It should be noted that Yang Chien-pai, whose article in December 1963 advocating price based on capital-profit ratio has become the subject of controversy, foresaw these criticisms.⁴¹ He held that up to the present time, in a socialist society like China's, terms used in capitalist society are still in currency. Commodity, money, value, price, wage, cost of product, and other terms are often used in China, and he could see no reason for the fear of the use of terms such as profit and production cost. The key point to note, he stressed, is not the use of these terms per se but the different economic systems under which they are being used:⁴²

"Profit under capitalist system belongs to the capitalists, and reflects capitalists' exploitation (of labour). But under socialist system, it belongs to the people as a whole... and is used directly and indirectly for the welfare of all members of the society. Again, production cost, under the capitalist system, reflects the economic relations among the capitalists. But under the socialist system, it reflects the economic relations between the society and the departments, and between the departments themselves."

Other criticisms have been levied against the various methods, suffice it to mention here that they have no relation to price formation under a socialist economy, or for that matter, under a "Marxist-Leninist" system. Some attempt to analyze the merits (or demerits) of the different methods, and use commonsense examples to illustrate their points.

Determination of agricultural price

The foregoing methods of price determination assume existence of state-ownership, that is, all means of production are owned by the state and allocated by it through unified plans (comprehensive planning). However, China today is far from this level of socialism. All heavy and some of the light industry are state-owned; part of the light industry is jointly operated by the state and former capitalists; and agriculture is owned and operated by collectives, namely, rural people's communes. Under these conditions, the three methods of price determination can be said to have applications at best in the industrial sector which is under direct state control. A different method would then be required for the agricultural collectives. In determining the price of agricultural product, there are two schools of thought.⁴³ One proposes that the price of an agricultural product should be determined in accordance with its value and the departmental cost of product under average conditions. The proponents assume, of course, that agricultural production is carried out under the state directly through state plans and that the agricultural sector is also

owned by the state. The other school recognizes that, with the exception of the production in state farms, agricultural production is operated by collectively owned economic units. Hence, the method proposed by the first school of thought is not suitable. The second group proposes that the "differential rent" should be considered. Instead of under average conditions, inferior conditions should be the state considered in price determination. According to the second group, price of an agricultural product should be determined by the labour expenditure on its production and the departmental cost of product under inferior conditions. The reason for this proposal is that even the inferior units should be allowed to operate in such a way that not only $(c + v)$ is recovered but also profit is realized.

Pricing of factors

Pricing of factor services appears to be limited to labour. Land and capital in theory have no place in pricing discussion. In practice, charges are made for the use of these factors under certain circumstances but these are nominal rather than economic. In urban areas, the State undertakes the construction of urban housing which presumably is subject to state allocation and charges a nominal rent for its occupancy. As regards capital and credit supply, this is subject to government control through the People's Bank. There is no charge for long term investment capital but there is nominal interest charge (which incidentally is quite high: ranging from 0.48

to 1.35 per cent per month as at March 1, 1956) for circulating capital and for agricultural credit in rural areas.⁴⁴

Wage level in urban areas is supposedly based on the "principle of each according to his work".⁴⁵ The wage structure takes into account of the different levels of skill and training and it provides for the workers exceeding the labour productivity norms. Collective bargaining is absent; trade unions do not perform functions such as wage bargaining or pressing for better working conditions, nor are they allowed to strike. Wage level in rural areas is also supposed to be based on the "work" principle. During the initial phase of the rural people's commune movement, the principle of "from each according to his ability, to each according to his need" was attempted, but it was withdrawn because such a distribution system resulted in too much waste.⁴⁶ The wage structure in the rural areas is planned, but the size of the individual wage packet depends on the harvests.

Entrepreneurship as such has no place in an economy of the communist type, though former private entrepreneurs have been employed to run the state or joint state-private enterprises. Bonuses for fulfillment or overfulfillment of targets do not accrue to individual factory managers but to the organization of the factory as a whole.⁴⁷ There are of course non-material incentives such as banners or an audience with Chairman Mao. If planners could be termed state entrepreneurs, then we are not aware of any special material reward given for correct

and accurate planning. It is difficult to place profit. In one sense, it is a surplus, and in another, a tax. It certainly does not appear to be a charge for use of factor services.

Some observations on the discussions

It can be observed from the foregoing account of the theoretical discussions on pricing that price is cost-determined, with price implicitly equal to some vague concept of value. From this it is assumed that the cost components, however defined, are given as data. The wage component may be conceivably be calculated on the basis of the current wage scales, but it is difficult to appreciate how the prices of the items included in the component constant capital are first determined. To explain it away as the result of past labour does not eliminate the practical difficulties involved, especially when the material inputs are not necessarily the direct result of simple labour but of number of processes between the use of simple labour and the final result. To assume the cost components to be known obviously throws the whole idea of commodity price determination overboard.

Assuming that the components $C + V$ are given as data, there is still the question of the correct ratio relating to profit. Nothing has been said of the determination of the rate of profit, however defined, in the debate.

It is clear that marginal costing has been left out of discussion. The ex ante price is made to equate the average total cost in all the three methods of commodity price determination and is made at the industry level rather than at the enterprise level. As regards factor pricing, the price offered to factor labour does not appear to equate with the revenue of marginal product, at least not at the enterprise level. In any event, decisions on production are in physical terms rather than in value terms, and decisions on labour inputs are determined by production requirements rather than, though not independently of, the wage bill. It is conceivable that additional labour inputs are hired, given the budget constraint, until marginal physical productivity equals average physical productivity of labour.

Price formation in practice

The recent debate on commodity pricing in theory has not produced any unique solution, from which we may infer that commodity pricing in practice probably has little theoretical basis. When Hsüeh Mu-ch'iao, Vice Chairman of the State Planning Commission, stated that the price of a commodity must approach its value and that this "law" is applicable in all communist countries, he was paying lip service to the principle. Our contention is supported by the fact that it has been acknowledged that no empirical counterpart has been found for this basic pricing principle.⁴⁸

Prices commonly referred to in relevant literature have been ex-factory price, agricultural purchasing price, and retail price. Wholesale prices of trading organizations are scarcely mentioned after 1958. The State Statistical Bureau (SSB) appears to have stopped reporting on the wholesale price index for post-1958 period.⁴⁹ However, wholesale trade prices are not abolished. The ex-factory price (or agricultural purchasing price) and retail price are of operational significance in that they are means of control, whereas wholesale price of commercial enterprises is a simple mark-up on ex-factory (or agricultural purchasing) price appears to have little to do with the control of operation and management of enterprises or the control of retail markets.

The structure of official prices in China at the end of 1958 appears to be as follows:⁵⁰

Industrial products

Agricultural products

Depreciation
Material and fuel costs
Labour costs
Enterprise profits

AGRICULTURAL PURCHASING PRICE

Consolidated industrial and commercial tax

EX-FACTORY PRICE

Wholesale distribution costs
Wholesale trade profit

WHOLESALE PRICE

Retail distribution costs
Retail trade profit
Consolidated industrial and commercial tax
(3% of retail sales)

OFFICIAL RETAIL PRICE OF INDUSTRIAL
(OR AGRICULTURAL) PRODUCT

The basic determinant of the official price of a commodity is enterprise cost, that is, direct expenditures on material inputs and labour. The price must be at a level which guarantees a reasonable margin of gross profit (that is, tax and net profit) for the producing enterprise. The crux of the problem in the value approaching pricing principle is what is considered as a reasonable margin of gross profit. Since no satisfactory solution to the whole question on correct profit margin has been found, the size of planned profit must have been based on historical experience or a value judgment of the pricing authorities.

Historical prices extending back into the pre-1949 period form the bases of post-1949 pricing of some commodities. This can be seen from the pricing policy concerning the "scissors problem" (price differentials between industrial and agricultural products).⁵¹ Historical prices are necessary as points of departure if any effective implementation of a policy on closing the gap between the two prices is to be carried out. Where historical prices are not available, especially in the case of "new products", arbitrary prices seem to be the alternative. It is true that the general practice is to price the "new" product on the basis of the price of an "old" product which has more or less the same utility, in the event of a large disparity in production costs, arbitrary pricing seems inevitable.⁵²

Factors affecting the relative prices of commodities such as the following are supposed to be considered at the ex-factory price level: (1) products which are basically different in nature but have the same utility, for example, soap and soap detergent, (2) varieties of products with the same utility, for example, rubber shoes, leather shoes, etc., (3) products with different specifications, for example, a large, medium, or small size battery torch.⁵³ In determining the ex-factory prices of products, reasonable price differentials are maintained between finished and semi-finished goods, finished goods and raw materials, superior and inferior quality goods, principal and joint products, and principal and by-products.⁵⁴ While in principle, there should be one ex-factory price for one commodity, departures from the standard national average are allowed for reasons such as industrial location, difference in natural resource endowment, proximity to raw materials, difference in scale of production, degree of specialization, and degree of capital intensity in production methods.⁵⁵ All these contribute to the large disparity in enterprise costs, which in turn influence the level of selling prices.

Adjustment of prices for the purpose of clearing the market seems to be at the retail level, and is generally made on the basis of supply situation. If there is a surplus at a time when warehouse space is urgently needed, prices might be lowered in order to encourage sales. And if there is a shortage retail prices might be raised to curb consumption. Of course,

ration system might be substituted for rise in prices. Prices at the retail level may also be revised for the purpose of implementing other economic policy decisions, such as controlling the purchasing power of wage earners.

Agricultural purchasing prices, as noted in the earlier part of the chapter, are in theory based on the same principle as ex-factory prices net of tax. However, since these are monopolistic prices, they may have no relation with the actual costs of production. The agricultural products subject to state purchase are sold through the usual channels in the urban areas at prices which include consolidated industrial and commercial taxes at comparable ex-factory level and at retail level.

As regards factor prices, as noted earlier, only wages are relevant. There is a difference between the nature of wages between the urban and the rural areas. Wages are not dependent on the total output sales of the enterprises in the urban areas. In the rural areas, except in state farms, part of the wages is paid according to work points in the form of an advance, the balance is paid when harvest is sold and is paid according to the work points each individual farmer has earned. It is not known how interest rates are fixed, but only circulating capital is charged a nominal interest.

It is erroneous to assume that all prices are fixed by the state. Industrial enterprises producing minor producer goods such as minor chemical materials, some specified types of

machines, and other products which have numerous specifications are permitted to bargain with the commercial enterprises.⁵⁶ The industrial enterprises are supposed to fix a price which takes into account the costs plus a "reasonable" margin of profit and which is acceptable to the commercial establishments.⁵⁷ In the minor consumer goods category are numerous number and varieties of products produced by handicraft cooperatives. At one time, they could be sold in the free markets, but since 1956, they are first purchased from the producers by the state through its commercial network and sold to the consumers through its retail stores.⁵⁸ The so-called goods in the third category can be sold in the local rural markets at free market prices. The state reserves the right of control in the event of inflationary prices, and except for the period between December 1957 and June or July 1958, when local rural markets were suspended in favour of contract system, it permits free market forces to operate in these limited localized markets.⁵⁹ Only goods in the first and second categories which are subject to the state unified purchase and planned purchase and supply systems fall under price control.⁶⁰ Black markets as against free markets have also been found to exist in urban areas. Free market forces obviously operate in such markets.

On the whole, there is no functional relationship between the various official prices. The urban and rural markets are separated such that supply control can be effectively implemented. Price differentials are arbitrarily determined in the

sense that they are subject to the wise (or unwise) decisions of the pricing authorities.

PRICE DEVELOPMENTS IN CHINA

Producer and consumer goods prices

We now turn to de facto prices and their developments in China. Comparing with the price levels of pre-1949 era, it has been admitted that the prices of producer goods during the first plan quinquennium were high. For example, with 1936 as the base, producer good prices rose by about five times, but commodity prices rose only by three times, and agricultural prices rose by two-fold.⁶¹

There is no doubt that there were inflationary prices for producer goods during the 1949-52 period. For example, in Shanghai, with 1949 as the base year, the market prices of thirty-three types of metal products rose by 97 per cent in 1950, and by 178 per cent in 1952.⁶² At the time, there was no unified pricing. The cause of this inflationary pricing was attributed to lack of experience in production and management of producer goods, coupled with the increased demand for strategic materials for the Korean War. This had caused a diversion of resources by private enterprises from consumer good and producer good production, as evidenced by the large number of small-scale private industrial establishments in Shanghai and Tientsin which are the major industrial cities.⁶³ Only in 1953 did the state institute price control over producer goods by

introducing a dual system of pricing: a uniform allocation (or transfer) price for state industrial enterprises, and a state wholesale price which included a large gross profit margin for private enterprises.⁶⁴ The state deliberately lowered the prices of machine products, but raised those of timber and steel products. The private enterprises were made obliged to turn to the state wholesale establishments for input requirements. When the private enterprises were almost completely transformed into state or joint state-private enterprises, the dual system was abolished, and henceforward, all enterprises were subject to transact at ex-factory prices. It should be noted that free market pricing existed as long as private enterprises were in existence. Thus, when there was a virtual socialist transformation in 1956, free market pricing of producer goods faded out of the picture. There were debates at non-government level over the question of whether producer good prices were too high. Even after the dual system and free market prices had been abolished, this question still remained topical.⁶⁵

Maintaining commodity price stability has always been one of the objectives of China's policy. For obvious reasons -- ideological, political, as well as economic -- the hyper-inflation of pre-1949 period cannot be permitted to recur. Major consumer goods probably did not rise significantly over the period 1952-63, if retail price index could be used as an indicator.⁶⁶ Since the control of prices of consumer goods is connected with the control of purchasing power of urban and

rural households, it is likely that when supply of consumer goods is increasing at a slower pace than wages, the prices of those goods whose income elasticity of demand is high are raised, and rationing is introduced where demand is price inelastic.

The consolidated industrial and commercial tax rates at ex-factory level are generally high for consumer goods and low for producer goods. The same tax at the retail level is at a flat rate of 3 per cent.⁶⁷ All are computed on the basis of sales volume of the enterprises concerned. The tax rates do not give any indication as to the prices of the taxed commodities.

Prices in rural areas

The establishment of agricultural purchasing prices began with the commencement of planned purchase and planned supply of foodgrains in November 1953.⁶⁸ Later, in March 1955, the State was to fix norms for production, purchase, and sale of foodgrains.⁶⁹ The pricing aspect was considered in State Council's Directive on the Planned Purchase and Supply of Foodgrains of November 19, 1953 in which it was stated that prevailing official purchasing prices and official retail prices which were too high or too low and which were conspicuously out of line should be properly readjusted.

In line with the policy of improving the living standards of the farm households and also of reducing the price differentials between industrial and agricultural products, the official

prices paid to the agricultural producers by the State for their products not permitted to be sold in the local rural free markets were to increase steadily over time. The following shows the increase in purchasing prices for agricultural products.⁷⁰

Agricultural purchasing price index

(1952 = 100)

1954	110.1
1954	113.8
1955	113.2
1956	116.6
1957	122.4
1958	125.1
1959	129.0

A recent report state that between 1951 and 1963, the increase in agricultural purchasing price was 57.4 per cent, and that in grain purchasing price was 61.4 per cent.⁷¹ Thus, except in 1955, agricultural purchasing prices have been rising, which is supported by R. Hsia's compilation on these prices. Of the fourteen major agricultural products, only sugarcane maintained a steady price throughout the period 1953-56, and cured tobacco and tea experienced a price rise in 1955.⁷²

Producer goods were not allocated among but sold to agricultural cooperatives or the later rural people's communes. The State appears to have a special pricing policy for sales of

industrial goods in rural areas. On the basis of production needs and to encourage improvement in production techniques, the State might consider lowering the prices of those producer goods to agricultural production. Available evidence shows that these goods are sold to the production units at retail rather than wholesale prices. The intermediary is the supply and marketing cooperatives and their lower organs. While it has been at least in policy to lower whenever possible the prices of chemical fertilizers, irrigation pumps, agricultural machines and other equipment, some of the prices did not seem to have changed during the period since 1954-55. For example, the retail price index of ammonium sulphate, with 1950 as 100, for 1951 was 93, for 1953 was 78, and for 1954 until at least 1959, was 69.⁷³ The retail price for insecticide spray was 29 per cent lower in 1956 than in 1952, and had remained at the same in 1959.⁷⁴ Another example could be taken from the case of medium size double ploughshare: the retail price in 1955 was 38 per cent lower than the 1954 level, and remained the same in 1959.⁷⁵

The retail prices of consumer goods (industrial products) in rural areas also rose. However, with the general policy of improving the living standards of the peasants, and at the same time, tapping the buying potentials of the peasants, prices did not rise as high as the urban retail prices. Comparing the agricultural purchasing price index and the retail price index of industrial goods in countryside, the latter was made to

increase at a lower rate to ensure at least the apparent purchasing power of income earned in the rural areas.

A comparison between the agricultural purchasing price index and the urban retail price index for 1952-58 would show that while the former increases by 25 per cent, the latter only by 8.3 per cent.⁷⁶ Yang Po reported that between 1951 and 1963, the prices paid by the State for agricultural products were raised an average of 57.4 per cent and for grain by 61.4 per cent, while retail prices of industrial goods sold by the state in rural areas rose on an average by only 13.7 per cent.⁷⁷ When indexes of agricultural purchasing prices and urban retail prices are compared, the changes for any one year are different.⁷⁸ Of course, it is possible that the input structure of consumer good production might have changed, but in the short run, particularly in a planned economy, frequent changes in state production plans are unlikely.

Free markets for all agricultural products were allowed for one year between 1956 and 1957, and for goods in the third category since 1949 except during a brief period between 1958-59. It is apparent that at least up to 1964, elements of private enterprise and therefore free markets persisted in the rural areas.⁷⁹ The fact that private ownership is permitted gives rise to other aspects of free enterprise such as free market and automatic distribution of income.

Individual operations within the communes can be found, such as the activities on the privately owned land of the commune members. These peasants also engage in subsidiary occupations and also domestic handicrafts which are purely for their self-interests. Associated with the ownership of land, the peasants own small farm implements, odd pieces of production equipment (for example, animal pens), animals which among other things are the source of manure, certain fruit trees and bamboos, and above all, the right to use the land in whatever manner they wish, though not the right to sell, mortgage or transfer, and to make profit out of their economic pursuits arising from their own land.⁸⁰

The produce from the private plots are sold in the rural trade fair (the local rural (free) market). Inasmuch as the central government wishes to claim that it is different from the capitalist free market and that it is a necessary supplement to socialist State-operated commerce and the commercial activities of the supply and marketing cooperatives, there is evidence that a local free market for products gives greater incentives to peasants to produce. Chiang Huai noted that free market prices influence the level of production.⁸¹ In 1956, it was common knowledge that production in private plots increased at a faster rate than collective production in general. Local rural commerce also results in a re-distribution of income in favour of those whose means of production are larger in quantity and higher in quality, available funds are simple, labour

problem does not exist, management of operations is good, and the power and state of individual's selling activities is better. While in collective production, distribution of income according to labour is the general rule and ensures to a limited extent that distribution is in accordance to needs, the presence of private ownership production, and commerce often times upset the appécart as regards the basic distribution principle of a socialist economy.

CONCLUDING REMARK

With a price system which is basically not oriented to resource and output allocations or to automatic coordination of economic activities, and in which subjective price decisions are made by some impersonal authorities such as the government, it is to be expected that on the whole ex ante prices have little or no correspondence with prices in a free market economy. In theory, efficient allocation can be carried out without the use of prices, but in practice, unless communications between producers and consumers are simultaneous, it is difficult to see efficient allocation could even be made in blueprint form. In the case of a developing economy of the communist type such as China's, prices in principle have no operational effects. It is conceivable that the possibility of equating supply of inputs to the demand for them derived from planners' demand for final bill of goods can be reached without any change in prices, ex ante or ex post, since prices are in principle extraneous to physical allocations. From the foregoing account of price

developments, and also from the ancillary analysis of the degree of physical allocation of resources and outputs by the government, prices to a certain degree have certain effects. The price adjustments, for incentive or clearing of the market reason, may not have affected the planners' decisions on production and allocation in the current period but they may well have affected these decisions somewhat in the ensuing period. It is, of course, difficult to assess analytically the magnitude of the effects of the rather arbitrarily determined prices.

The Chinese method of price determination will have effects on valuation of physical outputs for national income accounting purposes. In orthodox national income accounting, valuation at cost is derived from valuation at market price by subtracting indirect taxes (less subsidies) from the latter. The underlying assumption of this practice is that indirect taxes (less subsidies) are not accounting charges for factors. However, as we shall show in the next chapter, the method of price determination followed by the Chinese may render the assumption invalid given certain assumptions with respect to the accounting framework.

Needless to say, the de facto prices and also the indexes computed on the basis of these prices should be interpreted with the method of price determination well in mind. The necessity can be shown with reference to welfare implications of national income accounting, which we shall consider in Chapter IV.

VALUATIONS OF NATIONAL INCOME FOR ACCOUNTING PURPOSES WITH
REFERENCE TO CHINA

Introduction

Scope of valuation

End of economic activity - intermediate
and final products - final product of government.

Valuing physical outputs for accounting purposes

Earlier discussions on alternative valuations of
national income

Government and alternative valuations of national income

Alternative valuations of national income with
government as a separate entity - alternative
valuations of national income with government
incorporated into the enterprise sector.

Alternative valuations with reference to China

Concluding remark

INTRODUCTION

In Western national income accounting, national income is valued either at market price or at factor cost. The task of the present chapter is to consider some of the conceptual problems of valuing physical outputs for accounting purposes with reference to China.

The purpose of this chapter is to bring to the fore the valuation problems with reference to China, which may affect the usual interpretation of national income aggregates. The discussion in the next chapter on national income as a measure of economic welfare is intended to be developed with an awareness of the problems considered in the present chapter.

We shall first consider what products are to be valued. Having established in principle the type of goods and services to be valued, we shall look into how the products might be valued in practice. Then we shall analyze past discussions on the relationships between the alternative valuation methods, namely, market price and factor cost. Next we shall examine the effects on alternative valuations when we define the government sector in a certain way. And finally, we shall turn to the alternative valuations with reference to China.

SCOPE OF VALUATION

Valuation of national income implies valuing final products only. Therefore, we may first consider the end of

economic activity. Since this problem has been treated in general terms in literature on national income accounting, we shall confine ourselves to a discussion with reference to China.

End of economic activity

What is the end of economic activity? Is it national power in terms of military strength? Certain statements made by Mao Tse-tung and also those made in China's First Five Year Plan and its Proposal for the Second Five Year Plan seem to imply that this is so. Mao was reported to have said that "without industry, there can be no solid national defence, no people's welfare and no national prosperity and power."¹ In both five-year plans, heavy industry was said to be the basis of a strong economy and national defence. The order of words may be taken to be the degree of emphasis to the effect that national military power is of primary importance in China's economy. The end of economic activity may be what Schwartz called the "Maoist vision"?² If it is, this is at best a value judgment and would be true in the case of China alone.

Reminiscence of what Kuznets advised us that end of economic activity was not to be found in "constitution, charter, or any other basic documents", some hypothesis about the end of economic activity is necessary.³ The hypothesis that people would like to have as many goods and services as possible for final consumption seems reasonable and might be applied in

general to all societies in the real world. The problem arises when we consider whether the individuals' and the state's preference system go in the same direction. No government is likely to admit that it is not doing its best for its people or that it is not doing what the people as a whole want or that it is not thinking in terms of the welfare of the community. Thus, whether there is any conflict of preferences between the individuals and the state is a polemic issue. In the case of China, the present political structure based on a virtually mono-party dictatorship with no real opposition seems to be such that it is difficult to say that such conflict does not exist. Even if there were conflicts, the state would have pursued its own ends anyway, be they military power, higher level of living, "Maoist vision" or otherwise. However, where value judgment is inevitable, we would choose the hypothesis that the end of economic activity is to make available as many goods and services for final consumption.

In what follows, the expedite exposition, we retain such terms as enterprise sector and government sector and the nomenclature of activity attributed to these sectors, but at the same time, we bear in mind that enterprise and government sectors subsume under one main production sector (or the state sector).

Intermediate and final products

Goods destined to be used for ultimate consumption are here defined as final products, the rest are intermediate

products, given the area of production. Final products in national income accounting include not only goods and services for ultimate consumption but also goods and services which lead to final consumption after a conventional time period of one year. The convention thus separates the intermediate products which are for current intermediate consumption and that which are for future intermediate consumption, the latter being defined as ultimate consumption from the standpoint of the capital formation sector.

The criterion of final product is essentially Kuznet's. The convention used by the U.S. Department of Commerce involves conceptual problems one of which has been that "products purchased not for resale" may well extend to raw materials purchased by the enterprise sector for intermediate consumption. This convention has been exhaustively dealt with by Kuznets.⁴

The products of the enterprise sector can be easily distinguished into intermediate and final products. However, the difficulty arises, when the criterion is applied to products of the government. In Western national income accounting, government product has been defined as final product. This, however, has not won unanimous approval. Hicks, Colm, for example, favoured the inclusion of government products as final products while Matolosy and Varga in the 1930's considered all government products intermediate products.⁵

Final product of government

Products of government for current intermediate consumption are conventionally regarded as intermediate products. The goods and services of the government sector for ultimate consumption on payment of a prescribed sum or for ultimate consumption collectively, are final products. Of the first group, the price may not be determined on the market, and the price is merely a monopoly price regardless of output. Nevertheless, the products are final products by virtue of the fact they are purchased by final consumers. In addition, there are products which are not priced, such as free state education, free medical and health services, etc. These are final products by virtue of the accepted notion that they are necessary for human existence and that they contribute to the welfare of the people.

There are other free services of government, such as administration, maintenance of law and order, defence from external attack, and other such means to ensure that the existing institutional framework continues to function. These are generally regarded as final products in Western national income but they are a subject of controversy for the theorists. The difficulty seems to arise from the question as to whether social framework is a final product. The goods and services, so far defined as final products, can be subject to individual choice. With this criterion, one could argue that the action in courts of law resulting from a complaint of injustice or a crime by

the people is final product. However, whether the action of the courts resulting from a person charged with treason by the state is final product depends on the acceptance that the state represents the people as a whole. This question is difficult to resolve. If the state is such that it does not represent the people as a whole, according to the individual choice criterion, such action cannot be final product. In any event, one could argue that if the legal action is not a direct result of people's complaint, but only an indirect one via the state, it is not a final product.

Maintaining the institutional framework can be considered an end purpose when a country is at war.⁶ People have been found to be patriotic enough to fight for their country. In this case, national defence can be classified together with goods and services for ultimate consumption as the goal of economic activity, hence a final product. Short of an outright war, it is reasonable to assume that people in general are less concerned with military production than with goods and services for ultimate consumption, and therefore, national defence should be classified as an intermediate product. Since we have stated earlier that the aim of economic activity is to make available as many goods and services for ultimate consumption of the people, any means achieving toward that end should be regarded as intermediate products. In the case of China, national defence, any administration and maintenance of law and order connected with the upholding the institutional framework should therefore be

regarded as intermediate products. This implies that such goods and services as are available for final consumption are possible only through upholding the institutional framework. Had the political framework collapsed, either through war with foreign countries or through internal revolt, the whole economic system, with all its methods of improving the level of living of the people, would have had collapsed also. Whether the people actually prefer the present system of government is a moot point, but accepting the present government is here to stay, any activity contributing to maintaining it status quo must be intermediate product rather than final product.

If the services just described are intermediate products, there are nevertheless conceptual problems. The China's People's Liberation Army (PLA), though under the command of the Ministry of Defence, is unique in that it performs functions which are away from what is normally conceived as the function of armed forces, namely, national defence, and also, as in some Asian states, the henchmen of the government. In China, the armed forces perform non-military functions in peace time, not only "consolidating internally the people's democratic dictatorship, preserving social order," but also "carrying out all kinds of construction work" as well.⁷ While armed forces carrying out relief work in time of peace during emergency situations is not peculiar to China alone, the PLA is unique in that it undertakes normal economic activity. It is an army which at times produces its own food, and on some occasions, supplement the

local supply in the markets. In the year of the "Great Leap Forward" (1958), a year of dramatic upsurge in economic activity, the PLA had been reported to have had carried out projects in industry and agriculture totalling 59 million man-days, and in 1959, more than 44 million man-days had been devoted to construction in agriculture, industry, communications and transportation, and civic projects.⁸ The PLA also had been reported to have been pioneering in the frontier provinces of Sinkiang where troops stationed there formed Production and Construction Corps under the Sinkiang Military Command in December 1954.⁹ Thus, the PLA has a dual economic personality like a farmer, being a producer of services for final consumption as well as for intermediate consumption.

Similar conceptual problem arises when we consider the militiamen who are well known for their work in the early phase of Chinese communist movement and who are civilian armed forces ancillary to the PLA. The principal feature is that the members are engaging in their own professions and trades. "In the rural areas within the counties ... the members are predominantly peasants, organized into non-specialized units of the regular militia corps. In the suburban districts within the principalities, the membership contains a mixture of workers and peasants, organized into units of a so-called suburban military corps. Within the regular urban districts, where workers predominate, specialized units of the so-called Workers' Supervisory Corps have been set up."¹⁰ These are supplemented by military

protection corps or self-protection corps. By virtue of "unity of labor and arms", that is, employed civilians charged with military responsibilities, the state does not have to draw large resources from the treasury. In theory, militiamen are not drafted. Whether in practice "voluntary participation" principle is carried out is an open question. If it is a voluntary service, charged in times of peace with duties such as population census-taking, assisting public security organs, transmitting intelligence reports, protecting state properties, carrying out land reform programmes, assisting the Anti-American Aid Korea drive, counterrevolutionary campaigns, and production drives; or in times of war, with functions such as supporting the regular armed forces, maintaining law and order in the rear areas, rendering logistic services and curbing activities of the enemy in the home front, such service may not be vital for sustaining the institutional framework. However, since many people might have enlisted in an atmosphere where there is what Walker has called psychological mass coercion, voluntary participation would lose its original meaning.¹¹ One of the characteristics of psychological mass coercion is the effect of mutually spying which is an effective check to any reactionary tendency among the people.¹² Then under this condition, militiamen indirectly perform a function similar to that of the PLA: sustaining the existing institutional framework. As militiamen, people become the instruments of the Chinese Communist Party, and they should be classified as engaging in Government activity.

In a similar situation is the cadre. Cadres are thought of as dynamic elements of the Chinese Communist Party and are the transmission belts among the Party, the government, and the people. They come from all walks of life. A cadre may be a Party official, a Party member, a Young Communist League member, or a non-Party "activist".¹³ The procedure of training cadres is considered to be the most important part of psychological mass coercion. Through criticism and self-criticism based on six principal themes, the cadre is brainwashed with a bias for the Party and performs functions which are to the interest to the Party.¹⁴ The activities of the cadre should therefore be included under government activity.

Since both the militiamen and the cadres are instruments to keep the existing form of government status quo, their services should be considered as intermediate products; expenditures on militia and cadres should be costs to the economy.

However, because the services of the three groups are of a dual nature, some practical criterion is necessary to delineate them into intermediate and final products. It is best to use the normal services provided by the group as an empirical rule. Thus, PLA services are intermediate products, the services of the militiamen and the cadres are intermediate products if they are production-promoting and final products if they are final consumption-promoting. Goods and services consumed by the PLA will be intermediate products, but those consumed by the militiamen and the cadres will be final products. Goods and services

consumed in the course of administration should be treated in the same way as PLA's consumption because administration is part of the state machinery which must be maintained if the means towards the economic welfare of the community is to remain status quo.

There is nothing too new about the maintaining of the institutional framework being a cost to the economy, for Kuznets has dealt with this more than a decade ago. But there is more urgency now than ever before because with China now being included in the communist camp and also with the cold war between the West and the communist countries (particularly China), the defence of a particular ideology must be a cost to the economy.

The above exposition resembles the Matolcsy and Varga's approach to distinction between intermediate and final products. However, they treated all government products as intermediate while we only consider those services such as administration, maintenance of law and order internally, and national defence as intermediate.¹⁵ The present approach also seems to be in accord with the market concept of production. However, we include those goods and services which are not sold on the market but have a market analogue (for example, production of grain for own consumption by farmers).

As far as national income accounting is concerned, intermediate products which last for more than a year are final products, not from the standpoint of the people as consumers,

but from that of the capital formation sector. This is retained in our approach, which implies that changes in stock of military goods are also final products.

VALUING PHYSICAL OUTPUTS FOR ACCOUNTING PURPOSES

If the scope of valuation were as described above, valuing physical outputs for accounting purposes would depart from the usual practice.

In welfare economics, and also in macro-economic analysis, market price national income aggregate is an important variable. Actual prices being the basis of valuation, market price aggregate forms the component part of consumption function (that is, propensity to consume). Whether the actual prices of goods correspond to their respective marginal utilities is a moot point, but at least given the equality, market price valuation of national income can be estimated directly on the basis of de facto prices.¹⁶ Factor cost aggregate, on the other hand, is estimated indirectly. Instead of aggregating the factor cost of production of each final product, the modus operandi consists of deducting from the market price aggregate indirect taxes net of subsidies. The factor cost national income aggregate is supposed to conform to the efficiency standard, to use Bergson's phrase: the prices of any two products are inversely proportional to the corresponding marginal rate of transformation, and correspond to the respective marginal costs.

Certain final products of the government are not priced. Instead of imputation, we suggest that they remain unvalued. Since the use of these products does not involve the income at the disposal of the individuals directly, these free goods and services do not come under individuals' choice decisions. As far as the people-qua-final consumers are concerned, they are free goods. Marginal cost equal price principle in their view would be irrelevant. One way of interpreting this situation is that the consumers in demand for these free goods are not aware that they have actually paid for them. They may have paid more than their due share or gain more than what they have paid, but they are not aware of this. Individual choice is assumed to be a conscious choice. He is conscious of what he is doing when he is choosing between two goods at the given prices. By purchasing these goods at given prices, he may not be conscious at the time that he is also buying an unknown bundle of goods which may comprise one or more free government products (public parks, borough library, and the like) and which he may consume when occasion requires (free state education, free medical and health facilities). Of course, a parallel can be found even in the enterprise sector, for example, buying a "Crocodile Brand" shirt (which is what is wanted) but also being given a coupon for mending a shirt collar or cuff (which is not wanted immediately but may be required in the future or which is not wanted at all).

people for the same products is

Imputation of a value on such a product would assume that this "unknown" product forms part of an individual's choice decision. This creates the problem of the possibility of altering the whole value system, which Frankel has pointed out.¹⁷ Unquestionably, it involves the use of scarce productive resources, but this is compensated for when the buyer purchases the known product. The price which he pays covers the factor cost or production of not only the known product but the unknown product(s) as well. If the price paid by him does not cover the factor cost of the compound products, then the same price paid by another buyer may more than cover it to the extent that it covers the factor cost of the compound products purchased by the first individual which has not been accounted for. It follows that, for the economy as a whole, the use of scarce resources would be totally accounted for.

The calculation of factor cost of products, both known and unknown, may not be a difficult problem if the factor cost is to be calculated on a product by product basis. What is difficult is the calculation of factor cost per unit compound product directly, unless it is acceptable to add an average factor cost of the all unknown products to that of the known product. Given the aggregate demand schedule, the marginal cost equal price principle can be assumed, which means the services provided free by the state^{are} equal to those demanded by the people. In the event that only the preference system of the people for the known products is known, the principle is at

best applicable to only these products, and it would not be possible to know whether the use of resources for producing all final products conforms to the efficiency standard.

What we have been in fact implying is that if we considered valuing final product in the described fashion, there would be no difference between market price and factor cost aggregates. We have of course avoided the question of factor cost national income being interpreted as an efficiency standard on a product by product (whether "known" and "unknown") basis.

It appears that if we were to change the system of national income accounts to conform to a particular concept of the government sector, the valuation of physical outputs might also be made to depart from the usual practice. But first let us refer to past discussions on the alternative valuations of national income to provide us with a basis for discussion.

EARLIER DISCUSSIONS ON ALTERNATIVE VALUATIONS OF NATIONAL INCOME

The two alternative valuations of national income, namely market price and factor cost, are supposed to serve their individual purposes. For the measure of economic welfare, the market price valuation is used; and for the measure of productivity or production potential, the factor cost valuation is employed. To employ Bergson's terminology, adjusted market price national income conforms to the welfare standard, and adjusted factor cost national income conforms to the efficiency

standard.¹⁸ The alternative valuations have been in dispute for some time, a review of which will give us an insight of the casual factors and also a lead into an alternative set of operational definitions for China's national income accounting.

The participants in the controversy include Hicks, Mrs. Hicks, Studenski, Ruggles, Kuznets, Clark, Frisch, Rolph, Musgrave, Colm, Haberler, Hagen, Lindahl, Ohlsson, Nicholson, etc.; and also Bergson, Wiles, Mrs. Robinson, Hodgman, Granik, and Holzman with reference to Bergson's adjusted rubles approach to Soviet national income valuations.¹⁹ Those who accepted the dichotomy comprise Hicks, Mrs. Hicks, Kuznets, Nicholson, Studenski, Ruggles; those who were against factor cost concept include Clark, Frisch, Musgrave, Colm, Haberler, Hagen; and those who were against the factor cost concept and failed to see the need for the distinction between the two valuations found an ally in Rolph. The debate was rather confused in that not all were oriented towards the same theme in their arguments. The discussion might have been an offshoot of the controversy over (a) the role of government in an economic system, (b) incidence of taxes, especially indirect taxes, (c) macro-economic analysis, (d) actual computation of factor cost, (e) meaning of factor cost, whether it is contribution by factors to national product or remuneration to factors, (f) valuation of government services in practice, or (g) invariant argument of factor cost concept over time. While there were some

who questioned the utility of factor cost aggregate, others were concerned with the practicability of estimating factor cost national income aggregate directly.

It is evident that all these issues stemmed from the fact that all were aware of the fact that the economy in the real world is a mixed economy with the government playing an economic role, contrasted with an ideal economy divided into functional sectors (production and consumption) employed in economic theory, as a result of which the government's taxation policy designed for some purpose might affect that national income valuations at a given point of time. It appears that, had there been no indirect taxes net of subsidies, there would be no distinction between factor cost and market price national income aggregates. Much then depends on the operational definition of indirect tax in national income accounting. Hardly any government does not impose an indirect tax of some kind, indirect tax being defined as a tax on consumption. The concepts of direct and indirect taxes have as yet to be resolved, which therefore complicates the problem of factor cost and market price valuations. For example, Clark had likened indirect tax, conventionally defined, to be a monopoly profit to a monopolist. If monopoly profit were to be included in factor cost aggregate, why should indirect tax accrued to a gigantic monopoly -- that is, the state and local authorities -- be excluded?²⁰ The opposite view is taken by Bergson in the Soviet case. Soviet profit is not a part of factor cost aggregate because it is an indirect tax and can be shifted to the buyers.

Even "unplanned profit" is excluded because it is a counterpart of the windfall gain under a free enterprise system and thus has no place in Bergson's adjusted factor cost standard. He contended that prices were in principle fixed in such a way that they not only covered all accounting charges for factors but also "planned profit" for producers.²¹ The gross profit (or surplus) was channelled to the state coffers, either through taxation or planned profit submitted to the state. For this reason, planned profit resembled turnover tax, and therefore was excluded from factor cost valuation.

In our view, if the role of government is treated differently from that assumed in Western national income accounting, it is possible to reconcile the two alternative valuations. If instead of being a final consumption sector, it is a production sector; and instead of being merely a producer of goods and services not normally provided efficiently by the conventionally defined producers, it is a giant monopoly, indirect tax takes a different meaning. We therefore return to a system in which there is just a production, (or State) sector and a household sector instead of one where there are an enterprise sector, a household sector, and a government sector.

GOVERNMENT AND ALTERNATIVE VALUATIONS OF NATIONAL INCOME

The case where government is regarded as a separate and distinct sector from the rest is first considered.

Alternative valuations of national income with government as a separate entity

Assuming that an economy is based on the model of capitalism described in Chapter II, it could be shown that if the rates of indirect tax were not uniform throughout for all products, ceteris paribus, the marginal rate of transformation of one product for the other would not be proportional to the inverse of ratio of the corresponding prices net of indirect taxes, which means that valuation at cost in practice does not conform to the efficiency standards, and that while the marginal costs may be equal between industries, given the prices in a situation where no indirect tax is imposed, they are not equal to their respective market prices of the products net of indirect taxes. Uniform rates of indirect taxes for all products are not considered here because they have the same effects on consumers' behaviour as direct taxes, in which case, cetris paribus, factor cost valuation conforms to the efficiency standard.

In Fig. 1, x and y are any two products, PP is the price line representing the ratio of price of x and y in a situation where no indirect tax whatsoever is imposed. E is the equilibrium combination of outputs of x and y from both the producers and consumers' viewpoints at the prices represented by PP. To the producers, that equilibrium output represents the maximum they can attain at the given prices, given the availability of economic resources. And to the consumers, given their income, PP also

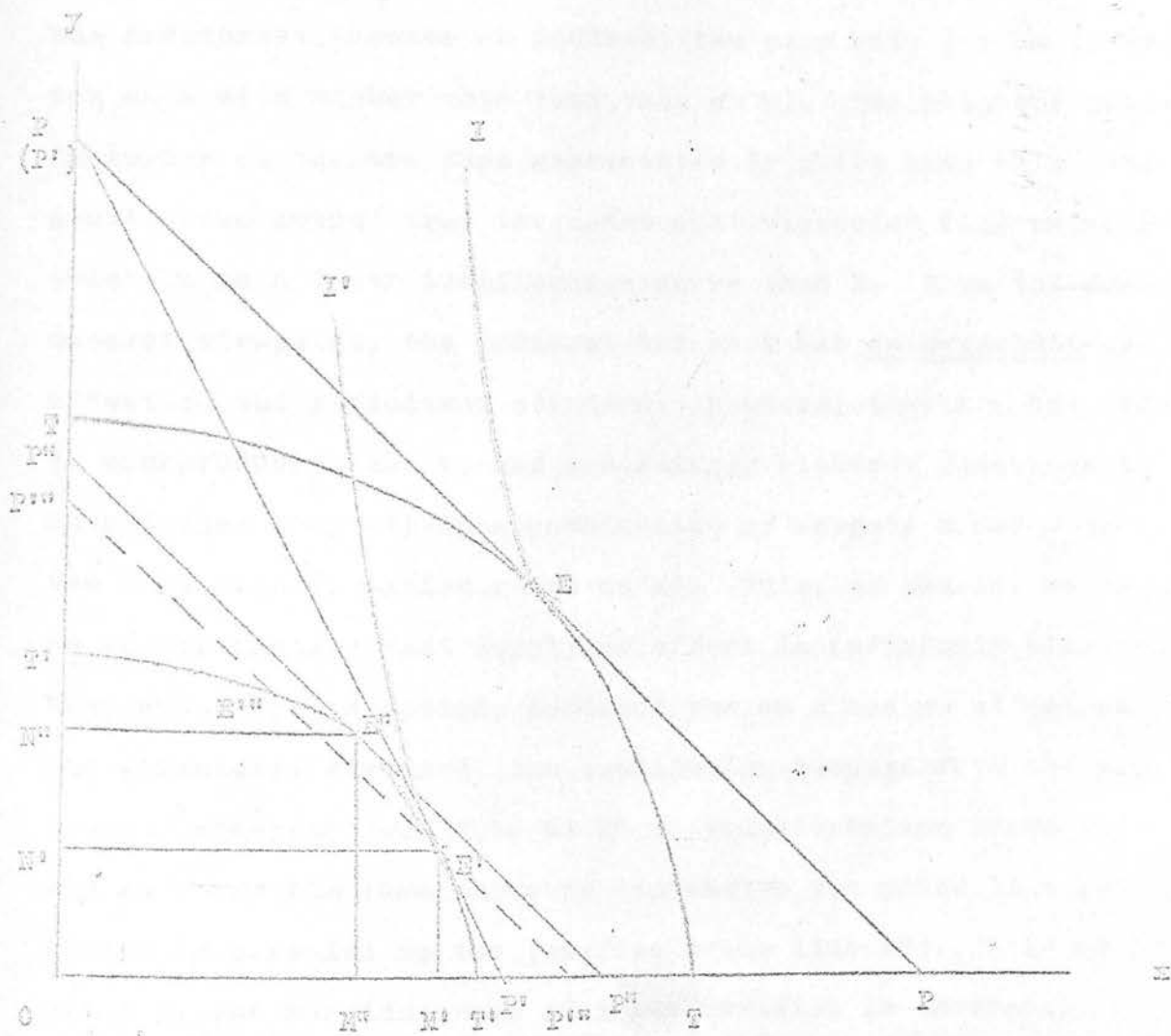


Fig. 1

represents the upper limit of the quantities of products they can purchase at the given prices.

Next, we introduce into the system the government, and the government imposes an indirect tax on x only (or an indirect tax on x at a higher rate than that on y). The relative prices inclusive of tax are then represented by price line PP' . The equilibrium output from the consumers' viewpoint will be at E' which is on a lower indifference curve than E . From the producers' viewpoint, the indirect tax on x has ex hypothesi no effect on the efficiency standard. However, they are not likely to overproduce x and y , and accordingly withdraw resources to the extent that they attain a combination of outputs x and y on the same transformation curve as E' . This, of course, rests on the assumption that supply of effort is infinitely elastic.²² Now, since by assumption, indirect tax on x has no effect on the efficiency standard, the equilibrium outputs from the producers' viewpoint would be at E'' on transformation curve TT' and at which the same curve is tangent to the price line PP'' (which is parallel to the tax-free price line PP). Like at point E , the marginal rate of transformation is inversely proportional to the ratio of price of x (net of indirect tax) to price of y at E'' .

In evaluating national income, while there are alternative methods of valuation, the quantities of x and y must be the same in both cases. Therefore, if OM'' of x and ON'' of y are produced, they will be insufficient to meet the effective

demand of the consumers represented by the budget line PP' in a situation where indirect tax is imposed on x . And if OM' of x and ON' are produced, while transformation curve TT' is tangent to the indifference curve II' at E' , and only through which price line PP' passes, the producers' relative marginal costs of x and y will be proportional to relative prices of x (inclusive of tax) and y instead of relative prices of x and y exclusive of tax, which ex hypothesi is inadmissible. And if the producers produce these quantities of x and y at tax-free situation prices, then the price line PP'' (which is parallel to PP or PP'') cuts the transformation curve at two points, E' and E'' . Since the actual combination of output demanded is at E' , and if producers produce accordingly, the equality of the ratio marginal costs of x and y and the ratio of their respective tax-free situation prices does not hold, and also the marginal rate of transformation at that point does not equal to the inverse ratio of the corresponding pre-tax situation prices. It therefore follows that given the demand situation and given the tax-free situation prices, producers cannot conform to efficiency standard, which is represented by E'' .

The indirect tax revenue collected may have been employed to absorb the surplus economic resources unused by the producers due to contraction of output just described. The government may be producing services which are priced and produced according to marginal cost equal price principle. This necessarily assumes that its services are priced at factor cost, and that producers produce a combination of output which is to the left

of PP' so that given the same incomes, consumers are left with surplus purchasing power to purchase government products. Implicit in these assumptions are that consumers have an effective demand for government products at marginal costs (which are equal to market prices), and that the marginal utilities of goods and services purchased from the enterprise sector and the government are equal to their respective actual prices. Since we have, on the basis of the last analysis, shown that the derived factor cost aggregate for enterprise sector does not necessarily conform to the producers' efficiency standard, even if government as a producer conforms to that standard, the factor cost aggregate for the whole economy does not necessarily conform to the efficiency standard.

Alternative valuations of national income with government incorporated into the enterprise sector

If instead of a system with government as a separate entity, we have a system with the government and the enterprise sectors incorporated into one production sector with the state as a giant corporation, indirect taxes and subsidies as such would lose their original meaning, as a result of which there is not distinction between factor cost and market price aggregates.

The accounting system would then consist of two sectors instead of three, namely, the state (or government) and the household sectors instead of the state (government), the enterprise, and the household sectors. The state is assumed to control production, distribution, consumption, and other forms

of economic activity directly or indirectly. In short, it is an accounting system for the ideal centrally planned economy of the communist type.

The state is assumed to have a perfect knowledge of the consumer demand. The central planning body allocates resources efficiently, given the final bill of goods. What are known as indirect taxes are in fact partly factor cost and partly current expenditures (that is, expenditures on administration, internal law and order, and defence). It is implied that the central planning board will adhere to the marginal conditions.

The question of discrepancy between the two valuations of national income noted in the last section does not arise because the equivalents of the former enterprise sector and the government sector are not competing for resources, given the area of activity in each. The discrepancy arises from the fact that there are a pre-tax and post-tax positions for the former enterprises and also the contention that the indirect tax does not alter the production function of the producers. Such discrepancy does not exist with the elimination of the tax. In other words, the situation of the pre-tax position in Fig. 1 is implied for both the state and the household sectors, with x and y each containing a certain amount of free final products.

ALTERNATIVE VALUATIONS WITH REFERENCE TO CHINA

Valuing physical outputs for accounting purposes, under the usual national income accounting framework, in the China

case presents theoretical difficulties. Chapter II reveals that de facto prices in China are not necessarily equilibrium prices. They are even less so when rationing system is introduced to control supply (and therefore to control consumption) to the extent that effective demand cannot be satisfied. The only area where market prices probably approximate equilibrium prices are the free market prices in the local rural markets. Given the prices, whether they be equilibrium or state prices, consumers can allocate their incomes among the different expenditures. And as noted in chapter II, their demand has no influence on the producers in most cases. However, since main commodities are subject to ration, their effective demand is probably not met. If rationing system remains unchanged over a reasonably long period of time, consumers may adjust their consumption behaviour accordingly. If it changes once or twice within a year, marginal conditions are not likely to be attained.

With regard to factor cost, if it is interpreted as contribution to national product, the accounting charges for factors calculated by the state are not factor costs. It has been said that increase in wages does not appear to keep up with increase in labour productivity. And returns to non-labour factors are more likely than not based on arbitrary rules. No interest is charged on long-term capital, and only nominal interest is charged for working capital. Planned profit realized may be taken as return to capital, but this can only be so viewed when wages per se are returns to labour factor. It

therefore appears that factor cost as remuneration to factors has more validity than as contribution to product, in which case the wages, interest charges, rent, and profit retained by the producers are remunerations to productive factors. As a matter of fact, it will be recalled that the theoretical discussions on commodity price determination as described in Chapter II made no reference to opportunity-cost. The Chinese discussants produced illustrations of price fixing by each of the three methods in turn, but the examples of the commodities used in any one illustration were treated as autonomously determined. The commodities had had to be produced for reasons other than economic rationale, e.g. use value, products to be produced under a given plan, etc. Substitution of factors in different uses was ruled out implicitly. In any case, in certain lines of production at least, substitution of factors were not permitted once the plans for the enterprises were finalized and became law. Hence, opportunity-cost does not appear to be the basis of valuation and there is therefore the difficulty of resolving the question of valuation at factor cost right from the very beginning.

If we were to adopt the two-sector system of accounts, the equality between factor cost and market price aggregates would be a working hypothesis, given the role of central planning board to be efficiently allocating resources. At the product level, the equality holds only when the final product is a compound product consisting of the marketed good and a bundle

of free final products, given the assumption that the amount of actual consumption of the free goods by each individual is not a condition. We have assumed that part of the indirect taxes finances the free final products and also that they are the only means of finance. It is possible that the rates of indirect taxes might be raised, but in a two-sector system, they can be construed as a rise in factor cost attributed to more free final products being made, as a result of which, real national income rather than money national income is raised.

CONCLUDING REMARK

The available estimates of China's national income made by scholars in the United States, which we described in Chapter I, are based on U.S. concepts and methodology, the adoption of which implies the acceptance of the formal difference between factor cost and market price valuations by exclusion of the former but inclusion of the latter of indirect taxes, less subsidies. The adjusted factor cost and adjusted market price standards introduced by Bergson in the studies on Soviet national income are also based on the same premises and they depart from the conventional valuations only in the particular empirical definition of indirect tax. In this chapter we have attempted to show that there is no difference between factor cost and market price aggregates if government product is differently defined, and if the government sector is not a separate and distinct sector from the other sectors of the accounting system but a sector which is part of the enterprise sector. It is true

that the national income accounting concepts, both theoretical and operational, are supposed to be such that they are applicable to all economies, but bearing in mind that the Western national income accounting system and the concepts behind it are primarily designed for a 'free' society rather than for a 'communist' society, the Western system does not transcend the different economic and social organizations over time and space any more than the two-sector system we put forward in the present chapter. We therefore refrain from claiming universal application of the two-sector system.

We differ from Rolph, who maintained that there was no need for a distinction between factor cost and market price valuations, in that it is not because of the technical difficulty in reconciling the two alternative valuations as to that there is no case for it.²³ Our argument has been that there are only two institutional sectors as opposed to Rolph's implicit assumption of a three-sector system. The invariant argument of factor cost valuation over time regardless the change in tax policy is valid only when charges on consumption exist, a situation which is eliminated through the acceptance of the indirect tax conventionally defined being partly a surrogate of factor cost, the rest being current expenditure and having no place in national income valuation.²⁴ This also implies that Frisch's worry over our not knowing how indirect taxes operate (whether they can be shifted on to the consumer, to the labour factor, or whether they reduce profits, or all three) becomes irrelevant.²⁵

The implications of our suggestion that there is no difference between factor cost and market valuations of national income -- on the assumption of a revised classification of institutional sectors - would be that factor cost national income aggregate (if it could be calculated) could be regarded as a welfare standard just as much as a market price aggregate.

The present chapter touches upon only the fringes of the complex problem of application of national income accounting system to an economic system whose concept is basically alien to that assumed in the conventional system. The proposal we have put forward for re-examining the framework of national income accounts and accounting concepts is only meant to stimulate further thoughts on the question, for, as it is, it obviously leaves much to be desired.

Concluding remark

NATIONAL INCOME AND ECONOMIC WELFARE WITH REFERENCE TO CHINA

Introduction

National income as a measure of economic welfare

National income and economic welfare in a centrally planned economy of the communist type - social and private cost and benefit and national income as a measure of economic welfare - national income change and change in economic welfare - national income and economic welfare in a developing economy of the communist type with reference to China - personal consumption and saving and economic welfare

Welfare implications of national income accounting

Personal consumption and saving with reference to China

Concluding remark

INTRODUCTION

This chapter is concerned with one aspect of the application of national income accounting, namely national income as a measure of economic welfare, with reference to a centrally planned economy such as China's. The first part deals with some of the theoretical problems involved in the use of national income as a welfare measure. The other part is an application of the observation with respect to an economic system such as China's made at the end of the theoretical discussions. In the application, reference will be made to the observations made in Chapters II and III. The accounting data we employ will be those estimated by some of the non-scholars whose work we have surveyed in Chapter I.

NATIONAL INCOME AS A MEASURE OF ECONOMIC WELFARE

The use of national income for measuring economic welfare began only in the present century. When national income was first estimated in the 17th century, it was for a different purpose. William Petty, the pioneer in national income estimation, estimated the national income of England with the view¹

"to prove mathematically that the State could raise a much larger revenue from taxes to finance its peace and wartime needs, and that it could do so by more equitable and less burdensome form of taxation."

It is evident that national income as a measure of productive capacity or production potential was implied. Gregory King's national income estimates for England, the Netherlands, and

France, were not for the purpose of measuring economic welfare either. The calculations in his manuscript entitled Natural and Political Observations and Conclusions upon State and Conditions of England (1696) meant to be an estimate of England's war potential.² It was not until 1920 that national income was formally associated with economic welfare. Economists owe an intellectual debt to Pigou who used it as a tool for theoretical discussions on welfare economics. He led the later economists in seeking "Social Income as an index of economic welfare, of the wealth of nations."³ He put forward the view that national income is the objective counterpart of economic welfare of a community, and said that "economic welfare is that part of the total welfare which can be brought directly and indirectly into relation with the measuring rod of money."⁴ The two concepts, national income and economic welfare, were described by Pigou as coördinate. The parallels were depicted in his chapter on National Dividend:⁵

"Generally speaking, economic causes act upon the economic welfare of any country, not directly, but through the making and using of that objective counterpart of economic welfare which economists call the national dividend or national income. Just as economic welfare is that part of total welfare which can be brought directly or indirectly into relation with a money measure, so the national dividend is that part of the objective income of the community....which can be measured in money ... Any description of the content of the one of the two concepts implies a corresponding description of the content of the other The concept of economic welfare is essentially elastic. The same measure of elasticity belongs to the concept of national dividend."

This view seems to have been accepted by later economists, such as Hicks, Kuznets, Little, Samuelson, Abramovitz, Bergson, and others.⁶ Although discussions had been subsumed under the heading "valuation of social income" or "evaluation of real income", the terms "social income" and "economic welfare" had been used interchangeably.⁷

National income and economic welfare in a centrally planned economy of the communist type

The theory behind national income as a measure of economic welfare in a free enterprise economy may alternatively be approached from an analysis of the free market economy or pure competitive equilibrium, for economic welfare is initially based on the same premise. By the same token the theory behind national income as a measure of economic welfare in a centrally planned economy may justifiably be approached from an analysis of the equilibrium reached under centrally planned economy of the communist type. (Since a centrally planned economy of the communist type, as defined by us in Chapter II, functions without the use of prices, we have had to assume that in such an economy prices are used, though they may be determined by the central planning board through economic calculations. That being the case, such an economy would correspond the collectivist system put forward by the early socialists. Our later references to pure collectivist system are assumed to be those for a centrally planned economy under full communism.)⁸ Thus, given the same assumptions,

a central planning board may be just as efficient as price mechanism in allocation of resources, given the final bill of goods. Instead of price mechanism coordinating the consumption function, production function, and resource-supply function, the central planning body may arrive at the same situation through solving the simultaneous equations representing these functions, given certain assumptions concerning the existence of a central planning body and its not involving the use of scarce resources, etc., which we have discussed in Chapter II. In short, we regard the following assumptions for the pure competitive case applicable to the pure collectivist case:⁹

1. Market demand for final products is perfect.
2. The satisfaction which any individual consumer derived from a given combination of commodities is not influenced by anyone else's consumption in any way, that is, absence of external economies and diseconomies in consumption.
3. All the goods in the economy at any given time are uniquely allocated by the market among the consumers.
4. Tastes and state of technology are given.
5. Given the state of technology and know-how, resources are employed as efficiently as possible toward any particular end(s).
6. At any time, there is a given level of employment of resources.
7. Within the range of goods available, none of them has been consumed to satiety, that is, everyone considers "the more the merrier."
8. The community indifference curves, like the individual indifference curves, do not intersect one another.

9. External technological economies and diseconomies are absent, that is, absence of divergence between marginal private and marginal social costs of a firm.

Consider a two-commodity, one producer, one consumer case, in which prices are determined by the central planning board. Given the initial allocation of goods x and y and the level of their respective publicly-determined prices p_x and p_y , every consumer who tries to be as well off as he can (assumption 7) is at the highest level of satisfaction at the point E on the individual's indifference curve II_2 , through which the indifference curve is tangent to the price line PP' (Fig. 2). The central planning board aims at the equilibrium quantity-combination of x and y , given their set of accounting prices because at that point, they anticipate that from the individual consumer's viewpoint, the marginal rate of substitution of good x for good y is equal to the ratio between their respective prices p_x and p_y .

At the same time, the central planning board realizes that the individual producer has a range of possibilities of output combinations which can be produced with the given quantity of resources, given the state of technology and know-how (assumption 5), which is represented by the transformation curve or production-possibility line TT' in Fig. 2, but the board would aim at the output combination at point E which is on the transformation curve TT' and through which the curve TT' is tangent to the price line PP' because at that point, from the individual producer's viewpoint, the marginal rate of transformation of

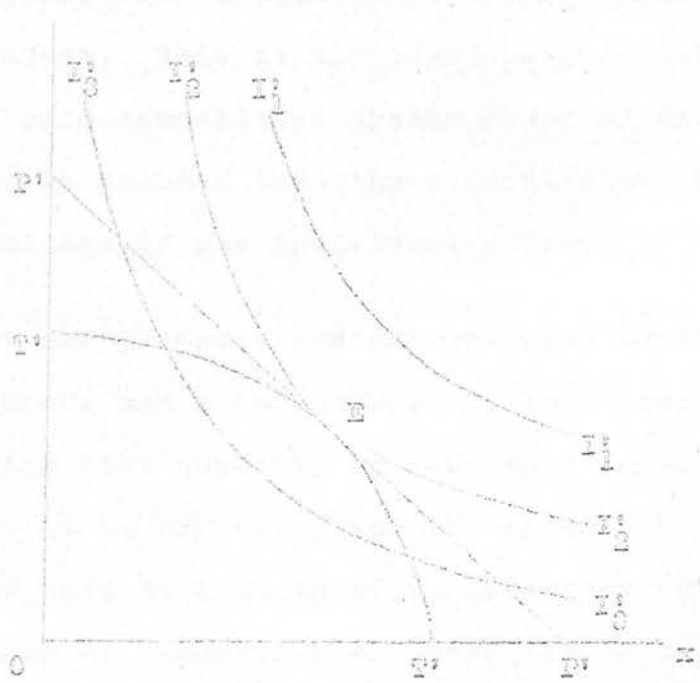


FIG. 2

factors of production of goods x and y is equal to the inverse ratio of prices of these goods. In essence, the planners' decision for the producer is the same as Lerner's rule that marginal cost equals price.¹⁰

The equilibrium output combination is therefore at point E since at the point, both the indifference curve and the transformation curve are tangent to the price line PP' and are tangent to one another. This is the ideal output, which is the same as that in a pure competitive system shown by Baumol.¹¹ Needless to say, it is assumed that the central planning board has an exact knowledge of the individual consumer's preference system.

The one-producer and one-consumer case can be extended to n producers and n consumers. By assumption, every consumer is consuming that quantity of each good which makes him as better off as he can be, given the prices, and the central planning board sees to that that the individual consumer is satisfied. Since by assumption 2, there are neither external economies nor diseconomies of consumption, it follows that the community as a whole is consuming the quantities of goods which make it as well off as possible, given the same limitations. Given the distribution of goods, the central planning board sees to it that the output combination is one on the community indifference curve which is tangent to a line which has a slope equal to the ratio between the accounting price p_x and accounting price p_y . Diagrammatically, using also Fig. 2, community indifference curves

are II's, price line is PP' , and the equilibrium output combination from the community's viewpoint is at point E.

As regards production, as under perfect competitive conditions, the producers must ensure that the ratio between the marginal costs of the two goods equals the ratio of prices p_x and p_y . By assumption 9, marginal private (that is, enterprise) costs equal marginal social costs. Hence, the ratio between the marginal private costs of both goods is equal to that between the marginal social costs of the two goods. It follows that the slope of transformation curve at any one point represents the ratio of two marginal social costs. Equilibrium will be at the point where the output combination is one for which the slope of transformation curve is equal to the slope of a price line, that is, the price line through the equilibrium point must be tangent to the social transformation curve.

It follows that the social transformation curve and the community indifference curve must both be tangent to a line which has a slope given by the price ratio. Thus, these two curves must be tangent to each other, which is the condition of ideal output.

Again, it is assumed that the central planning board has an exact knowledge of the community's preference system.

Now, national income as a statistical measure is computed on the basis of $\sum pq$ formula, p and q being respectively the ex post price and quantity of a good included in national income

calculation. Under pure competitive or pure collectivist conditions, the community's ideal output is at point E. National income of an economy in that situation would be the aggregate of the product of price and quantity of x and y, denoted in Fig. 2 by the point E, and reflects the maximum economic welfare.

Social and private cost and benefit and national income as a measure of economic welfare

Having established that national income measures maximum economic welfare at ideal output situation, whether attained under pure competitive or pure collective conditions, we now consider national income as a measure of maximum economic welfare in practice. How well national income performs this function depends on the degree of approximation of the output of an economy to the ideal output, which in turn means that it depends on the validity of the assumptions governing the ideal output situation. National income of any country is still defined statistically as $\sum pq$, but whether this represents welfare at any particular time period is another matter. Since no free enterprise economy resembles the pure competitive economy in toto nor any centrally planned economy in the real world is a replica of the pure collectivist economy, a priori, national income measure is at best an approximation to maximum economic welfare.

Let us consider two of the assumptions employed in the last analysis, namely, absence of external economies and dis-economies in consumption and production (assumptions 2 and 9),

and examine their effects on the welfare measure of national income. Ceteris paribus, any divergence between marginal social and marginal private cost (or benefit) implies that the output is short of the ideal situation. Since we have stipulated that national income measures maximum economic welfare if the output is an ideal output, a departure from the ideal output would render national income short of an ideal measure of maximum economic welfare.

We should first note that private cost and benefit are motivated by self-interest and that social cost and benefit are motivated by social interest however defined. The objectives of individuals and the community at large may not be similar, and the time span which the individuals and the society as a whole allow for the attainment of their respective ends may also be different. In the analysis of divergences between social and private cost and benefit of the pure competitive economy, private cost and benefit are used as the bases of observation. The reverse is the case for pure collectivist economy. Divergence between marginal social and private cost (or benefit) is taken to mean that an individual's marginal activity involves undesirable effects on the society without his remuneration being decreased as a result or vice versa.¹²

It has been shown by welfare economists such as Pigou, Baumol, etc. that divergence between marginal private and social cost and benefit exists in an economy which permits monopoly and

monopolistic practices.¹³ Even without imperfect competitions, the existence of external economies and diseconomies of large-scale production would cause a departure from the ideal output situation under pure competitive conditions. If x is produced under conditions involving relatively large external economies, the price line would have been EE' and the point of equilibrium will not be at E but at B , as shown in Fig. 3. On the other hand, if x is produced under conditions which involve relatively large external diseconomies, the price line would have been DD' , and the point of equilibrium will be at point C . Given the demand situation, both equilibria are inferior to ideal output at E because they appear on lower indifference curves. National income computed on the basis of ex post data provided at point B or C would not represent the maximum economic welfare for neither of the equilibria coincides with ideal output at E where marginal social and private cost and benefit are equal.

In the pure collectivist case, motivated by social interest, divergence between marginal social and private cost and benefit should be absent at the outset. Prices are publicly determined for the community, and individuals are made to adhere to marginal principles in their production and consumption activities. By definition, external economies and diseconomies of production and consumption are absent, which also implies monopoly and monopolistic practices are absent. National income reflects maximum economic welfare at point E , as in the case of pure competitive economy.

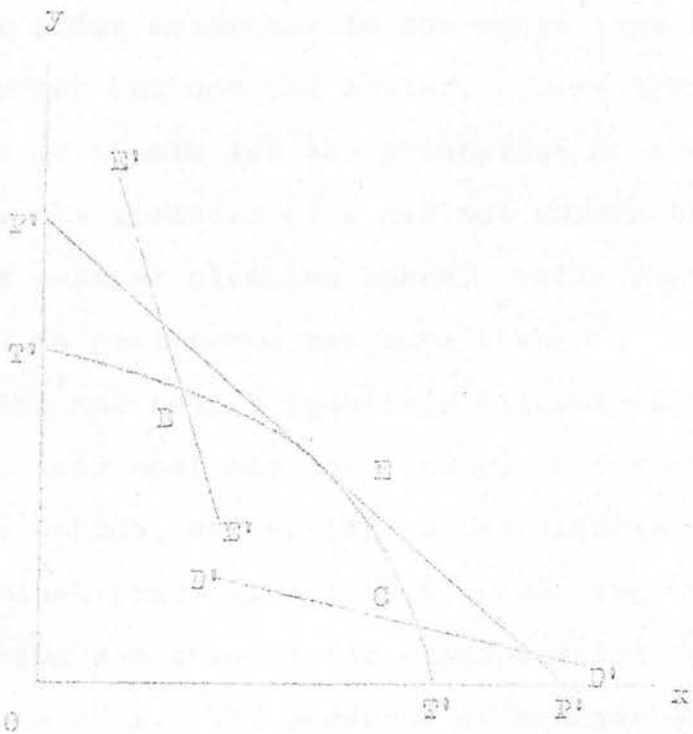


FIG. 3

However, it is possible that while prices are determined for the community by the central planning board, once they are determined, they are not likely to be altered until sometime has elapsed despite changes in other circumstances. The communication system between the central planning board and the economic decision units is unlikely to be a perfect substitute of the free market price mechanism in the sense that time is a factor for the former but not the latter. Where there is a change in the nature of inputs for the production of x discovered at the base level, the producer of x may not adhere to the rule laid down by the central planning board. While money prices are unchanged, prices in real terms may have changed. A discrepancy between the marginal social (publicly determined) and private (real enterprise) cost may then occur. External economies or diseconomies emerge, reflecting the defects in the rigid publicly-determined price arrangement, resulting in the producer of x not being compensated (or compensating) for what it does to the producer of y . The producer of x under conditions of external economies (or diseconomies) should be confronted with a price line such as EE' (or DD') in Fig. 3. National income computed for the external economies (or diseconomies) situation would have been an aggregate of the product of publicly-determined price and quantity (which departs from the ideal quantity) of x and y , the latter at point B (or at point C). Again, national income for either situation does not measure the maximum economic welfare, given the actual supply and demand situations.

Another source of divergence between marginal social and private cost may stem from organizational change in one line of production. It is well known that as a firm increases in size, it benefits from external economies.¹⁴ Such a possibility may not be envisaged when prices are determined for the community by the central planning board; when it does happen, the board is unable to make immediate adjustments.

Given the supply situation, divergence between marginal social and private benefit may occur in a pure competitive economy in which industrialists tend to be concerned with only the private rather than social benefit of their own operations or individual consumers consume their goods in such a way that causes other individuals to enjoy less the goods the latter consume. In a pure collectivist economy, the divergence between marginal social and private benefit may stem from the same sources. In production, owing to the particular incentive system such as monetary or non-material rewards for fulfillment or overfulfillment of production targets in value terms, producers may endeavour to produce a larger but poorer quality output at the publicly-determined prices. The China example, which we shall consider later, is a case in point.¹⁵ Divergence between social and private benefit will then be in real terms. In consumption, the case in a pure competitive economy just described may well apply, unless the central planning board legislates on how goods should be consumed. Thus, national income cannot provide an adequate measure of maximum economic welfare on the same grounds as in the case where demand situation is given.

In the previous chapter we have pointed out that in a centrally planned economy such as that in China, where prices are determined on the basis of average conditions given the state of technology, divergence between social and private cost seems obvious.¹⁶ The rule that marginal cost equals price at best can only be adhered by the firm producing under average conditions, given the state of technology, while the high cost firm may operate at a loss at the given official prices if necessary as long as the physical output targets are fulfilled, and also the low cost firm may operate at a profit without additional effort at the same given prices. Given the supply situation, divergence between social and private benefit exists when certain industrial enterprises are required only to fulfill the value output targets rather than the physical output targets, the factory managers may attempt to utilize the given resources for the production of goods which yields higher benefit to themselves rather than to the community (as seen by the central planning board).¹⁷ Another source of divergence may arise from the inaccurate community's preference system drawn up by the central planning board for its economic decisions. The board's preference system for the community may diverge from the community's social preference system. While the relative prices determined by the board are such that the price line is tangent to the board's social indifference curve at a given point of time at the point representing the ideal output, the same price line may only be tangent to the community's social indifference curve at the same point of time at a point other than the ideal output (E^*).

It can be said that the board's preference system is analogous to a social preference system and the community's social preference system to a private preference system, and since by definition marginal social and private cost and benefit are equal in ideal output situation, there is a divergence between marginal social and private cost and benefit, though of a different sort. This is shown in Fig. 4 where II^* s are community's social indifference curves derived from the viewpoint of the society as a whole rather than based on planners' preferences. National income computed on the basis of official prices and actual quantities bought, again, does not measure the maximum economic welfare.

We may conclude that national income computed statistically by the $\sum pq$ formula cannot be a measure of maximum welfare of an economy operating under non-ideal output conditions. This conclusion has been spelt out by Kuznets who regarded national income as only an approximate measure of economic welfare. In view of the fact that economies in the real world do not resemble the hypothetical models described above, national income is at best an approximate measure of maximum economic welfare, given the conditions for the ideal output. There is no empirical way of determining the degree of divergence between marginal social and private cost and benefit. Marginal social values can only be described qualitatively and are not quantifiable.

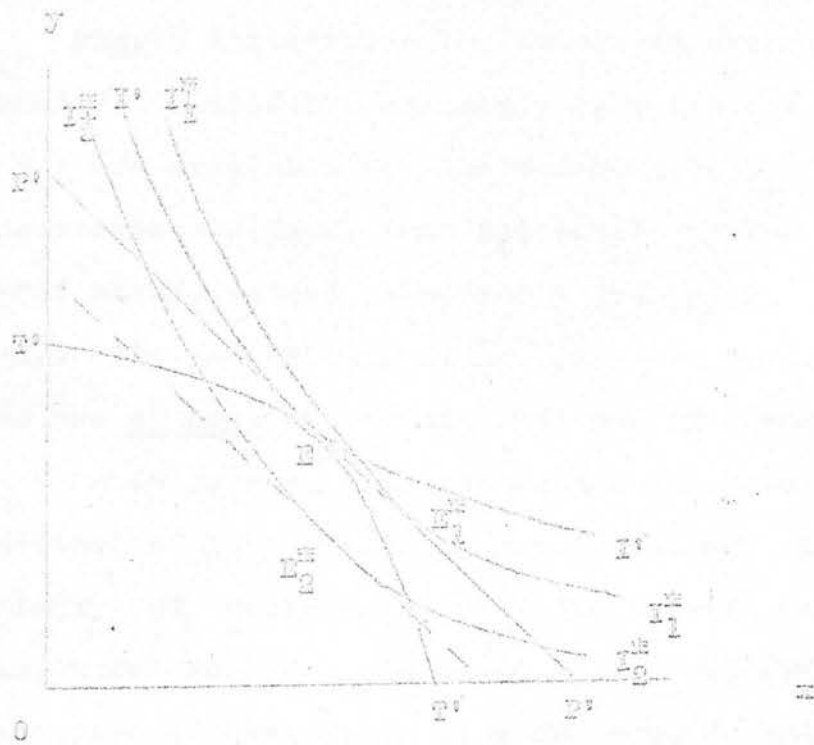


Fig. 4

National income change and change in economic welfare

Given the concept of national income as an approximate measure of maximum economic welfare, we may now consider the change in national income as an indication of a change in economic welfare.

Fig. 5 illustrates the change in economic welfare of community. Consider a community in which two types of goods x and y are available for the demand market. OV_1 and OV_2 are composite-commodities, that is, totals of the value of quantities of goods, valued at period I and period II prices respectively. PP' and PP'' are price lines for period I and period II, which are ex post phenomena. II' and II'' denote the community indifference curves. ON_1 represents a constant ratio between quantities of goods x and y , which includes the point V_1 . Similarly, ON_2 represents the ratio between quantities of these goods, which includes the point V_2 . W_1 denotes the alternative combination of quantities of x and y to V_1 and is on the same indifference curve II' as V_1 . W_2 is an alternative to V_2 on the same indifference curve II'' as the latter. OW_1' (or OW_2') is a hypothetical composite-commodity based on the same quantity ratio between x and y as OV_2 (or OV_1) and period I (or period II) prices. OW_1'' (or OW_2'') designates the hypothetical composite-commodity based on the same quantity ratio between x and y as OV_2 (or OV_1) and period II (or period I) prices. The assumptions for Fig. 2 community case still hold in Fig. 5.

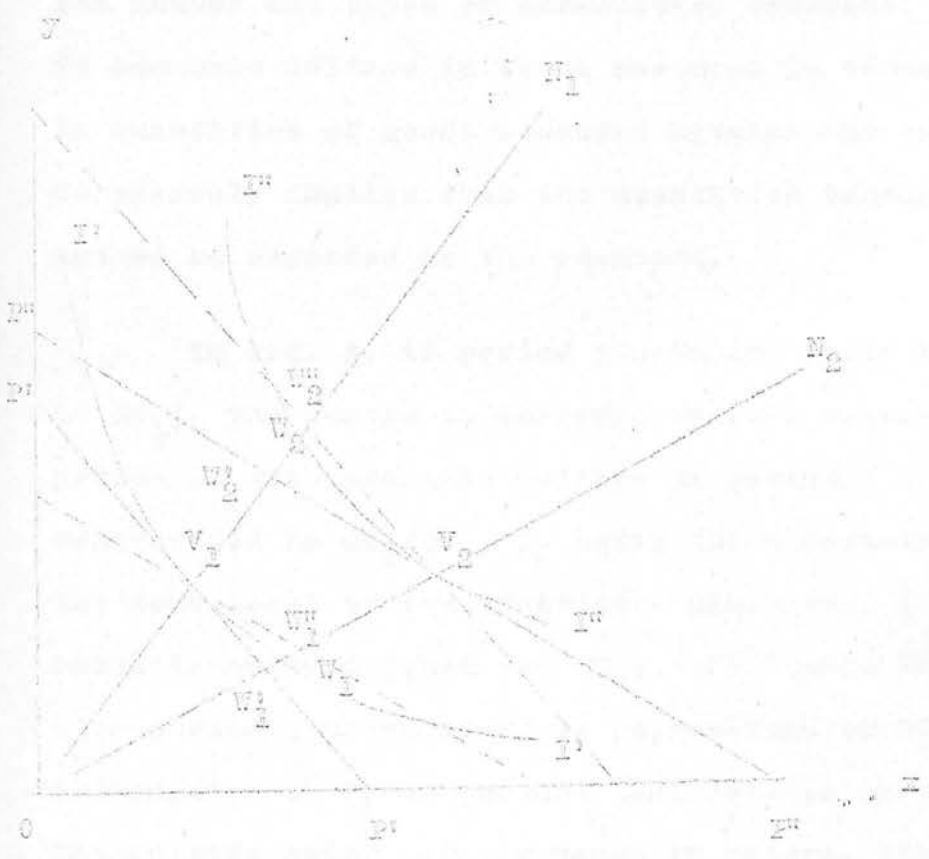


FIG. 5

Although OV_2 should be compared with OV_1 , because there are changes in both the quantity ratio and prices, they cannot be compared directly. The composite-commodity OV_2 may be the result of changes in prices, tastes, or distribution of income. To compare the economic welfare of the two periods, it is necessary to assume prices, tastes and distribution of income, and the number and types of commodities constant. In short, change in economic welfare is to be measured in terms of the change in quantities of goods consumed between the two periods, which necessarily implies that the quantities consumed in one period are to be regarded as the standard.

In Fig. 5, if period I quantity ratio is assumed (that is ON_1), the change in economic welfare between period I and period II with economic welfare in period I as standard is represented by OW_2/OV_1 , W_2 being the alternative to V_2 yielding the same level of satisfaction. Similarly, if period II quantity ratio is assumed (that is, ON_2), the change in economic welfare with period I as standard is represented by OV_2/OW_1 , W_1 being an alternative to V_1 on the same indifference curve II' . However, commodities being heterogeneous in nature, they need to be translated into one common denominator, namely, value. Thus, prices of a standard period are required, which in turn means the use of index numbers. The measurement of change in economic welfare between the two periods may be summarized as follows:¹⁸

<u>Basis of change</u>	<u>Standard period</u>	<u>Change in terms of ratio</u>
A. <u>Actual change</u>		
(i) ON_1	I	$\frac{OW_2}{OV_1}$
(ii) ON_2	I	$\frac{OV_2}{OW_1}$
B. ON_1 and PP'	I	$\frac{OW_2''}{OV_1}$
C. ON_1 and PP''	I	$\frac{OW_2'}{OV_1}$
D. ON_2 and PP''	II	$\frac{OV_2}{OW_1''}$
E. ON_2 and PP'	II	$\frac{OV_2}{OW_1'}$

Two alternative index number formulae may be used. In one case, the outputs of both periods are valued in period I prices, while in the other, the outputs of both periods are valued in period II prices; that is,

$$\frac{\sum p_1 q_2}{\sum p_1 q_1} \quad (1)$$

and

$$\frac{\sum p_2 q_2}{\sum p_2 q_1} \quad (2)$$

Where p and q denote in the usual way the price and quantity of a commodity and subscripts denote the time periods to which p and q refer. Hence, formula (1) shows the change in the quantity between two composite-commodities in value terms at period I prices. Formula (2) shows a similar change but at period II prices. In short, the ratios (B) and (E) can be transformed into Formula (1) type of index, and the ratios (C) and (D) into Formula (2) type of index. As the statistical concept of national income is expressed by the formula of the $\sum pq$ type, national income change is also depicted by index number formula appropriately weighted, in which case p and q are respectively the price which buyers actually pay and the total quantity bought by the buyers of a commodity and subscripts denote the periods.

It is obvious that national income indexes give only approximation to actual change in economic welfare of a community even under ideal output conditions between the two periods. The choice of a particular ratio or index number formula therefore depends on the degree of approximation it can give. On the basis of a situation given in Fig. 5, ratio (B) is preferred to ratio (C) because the former is closer than the latter to the actual economic welfare change ratio (A). In short, given period I quantity ratio ON_1 , formula (1) is superior to formula (2). Similarly, ratio (E) is preferred to ratio (D) because of the same reason but with reference to the actual economic welfare change ratio (A ii). This shows that formula (1) is

still superior to formula (2), given the quantity ratio ON_2 . The shape of the community indifference curves given is a major determinant of the degree of approximation. For if ratio (C) is equal, or closer than ratio (B), to ratio (A i), formula (2) would be superior to formula (1). The same analogy applies to ratios (D) and (E).

In addition to the two assumptions, we have followed Pigou in assuming, in the first instance, that no new products have been introduced and no products have been withdrawn from circulation between periods I and II, and also that the periods are at one year interval.¹⁹

However, the basic criterion that economic welfare of a community has increased is that when national income (or "dividend" as he called it) in period II is greater than in period I, "the items that are added to it in period II are items to conserve which they would be willing to give more money than they would be willing to give to conserve the items that are taken away from it in period II".²⁰ The measures for this criterion are found in

$$\sum p_2 q_2 > \sum p_2 q_1 \quad (3)$$

and

$$\sum p_1 q_2 > \sum p_1 q_1 \quad (4)$$

$\sum p_2 q_2 > \sum p_2 q_1$ in (3) is the same as (2) with the latter greater than unity, and (4) is a measure for the criterion of increase in economic welfare using period I price weights. We are aware of the changes in people's tastes and also in the distribution of income in actual life. If tastes

vary between periods, Pigou had shown that there would be a paradox. People in period II with period I tastes might pay less for the commodities added than for the items taken away, and also that those with period II tastes might pay more for these added items than for those withdrawn. The measures would make national income in period II both greater and smaller than that in period I. The same paradox could arise if the distribution of income varies between periods. An assumption which is not realistic would invalidate the thesis. But Pigou dismissed the possibility of invalidity by saying that if tastes and distribution of income do change, they "usually constitute a change in the same direction from the point of view of period II."²¹ He further maintained that "most causes will increase the dividend from both points of view or diminish it from both points of view".²² He made use of the probability thesis without empirical evidence.

The conditions set out in (3) and (4) may yield different results for the period under observation, namely period II. While it can be argued that for a given period, say period II, the index number based on period I price weights as well as that based on period II price weights may show an increase and therefore the economic satisfaction will have increased, the increase in economic welfare is absolute only when the magnitudes of the index number change based on the price weights of the two different periods are identical. If one is larger than the other, then "from an absolute point of view", the change is not measurable.²³

While national income is the objective counterpart of economic welfare, the change of national income as reflected by index numbers does not necessarily point to a change in economic welfare in the same direction proportionately. Pigou said that proportionality was not required. All that was necessary was to show that there was some increase. He seemed to imply that the exact magnitude of the size of increase of economic welfare was unimportant.

What has been just described is concerned with indexes (1) and (2) greater than unity. It can be applied to the case of indexes (1) and (2) being less than unity, that is, conditions set out in (3) and (4) in the reverse. Economic welfare is, according to the criterion stated in the reverse, diminished when national income is diminished in period II from both points of view, that is, using both period I and period II weights.

$$\text{If } \frac{\sum p_2 q_2}{\sum p_2 q_1} > 1 \quad (5)$$

$$\frac{\sum p_1 q_2}{\sum p_1 q_1} > 1 \quad (6)$$

but

$$\left| \frac{\sum p_2 q_2}{\sum p_2 q_1} < 1 \right| \left| \frac{\sum p_1 q_2}{\sum p_1 q_1} > 1 \right| \quad (7)$$

This refers to the case where for period II, national income shows a decrease when period II price weights are used but an increase when period I price weights are employed, and also the decrease is greater than the increase when these respective weights are used. In this case, the economic welfare has probably diminished. If conditions of an opposite character are the case, then economic welfare probably has increased.²⁴ The two index (5) numbers and (6) are limiting expressions. There is no intermediate expression between the two limits which indicates that the economic satisfaction will probably increase or decrease in period II according to whether the expression is greater or less than unity.

Only when both indexes show an increase or decrease that an intermediate expression can be found. Pigou recommended the use of ideal index number. The merits of this index number are recognized, namely, the index satisfies the factor reversal test and also the time reversal test. He probably would have included the circular test had he not been concerned with a two-period case.²⁵

As regards the assumption that the number and types of commodities are constant over the period in question, for short period consideration such as two years, the assumption that no new products are introduced and no withdrawal of old products from circulation between period I and period II is reasonable. But for a longer period extending more than two years, this assumption may become unrealistic and will invalidate the

results as a consequence. However, Pigou recommended the use of link index.²⁶ In this way, when period II is compared with period I, if period I tastes are used, period II tastes are ignored; when period II is compared with period III, period II tastes are used but period III tastes ignored; and so on. Using the simple conversion method, the link indexes may be turned into an index using period I as the base. Obviously, small errors would be attached to each individual comparison of the pairs. Pigou said that the errors would likely be in the same direction. He was aware that if the chain or link index extended over a long time horizon, the cumulative errors might become large.²⁷ His conclusion was that if the link index showed that there was an increase between period I and period II, it was probable that the economic satisfaction was greater in period II than in period I. But he could not say with any confidence, unless the magnitude was large, that the economic satisfaction was less in period II than in period I when the link index showed a decrease.²⁸

National income and economic welfare in a developing economy of communist type with reference to China

Against the case just described which refers to ideal output situation, let us consider an economy in which prices are not determined by free forces of the market or rational economic calculations, but by administrative decisions. We could visualize the Chinese economy belonging to this type of economy on the basis of the planning procedures.²⁹ In the

first instance, we assume that these pricing decisions are meant to lead to a state of equilibrium which is comparable to that under a pure competitive economy. We uphold the working hypothesis that individual consumers would maximize their individual wants as much as they could. However, instead of being the "ultimate king", consumers are assumed to have only freedom of choice among goods made available to them at publicly-determined prices, and they have no influence on the producers' decisions as regards what to produce and how much to produce. In other words, given the publicly-determined prices, a set of community indifference curves can be drawn up from the consumers' viewpoint. Since production and price decisions are made by planners, we assume that the planners have their own estimation of the community needs at the publicly-determined prices, and thus draw up a set of community indifference curves which they think to be the same as the consumers' community indifference curves. In both cases, we assume, as usual, that community indifference curves do not intersect. Owing to an assumed inefficiency in communication between the planners and the final consumers, the planners' and the consumers' sets of community of indifference curves may not coincide. (If they coincide, the planners then have succeeded attaining the equilibrium comparable to that under pure competitive conditions without the allocating and coordinating functions of the pricing system.) The present case is shown in Fig. 6.

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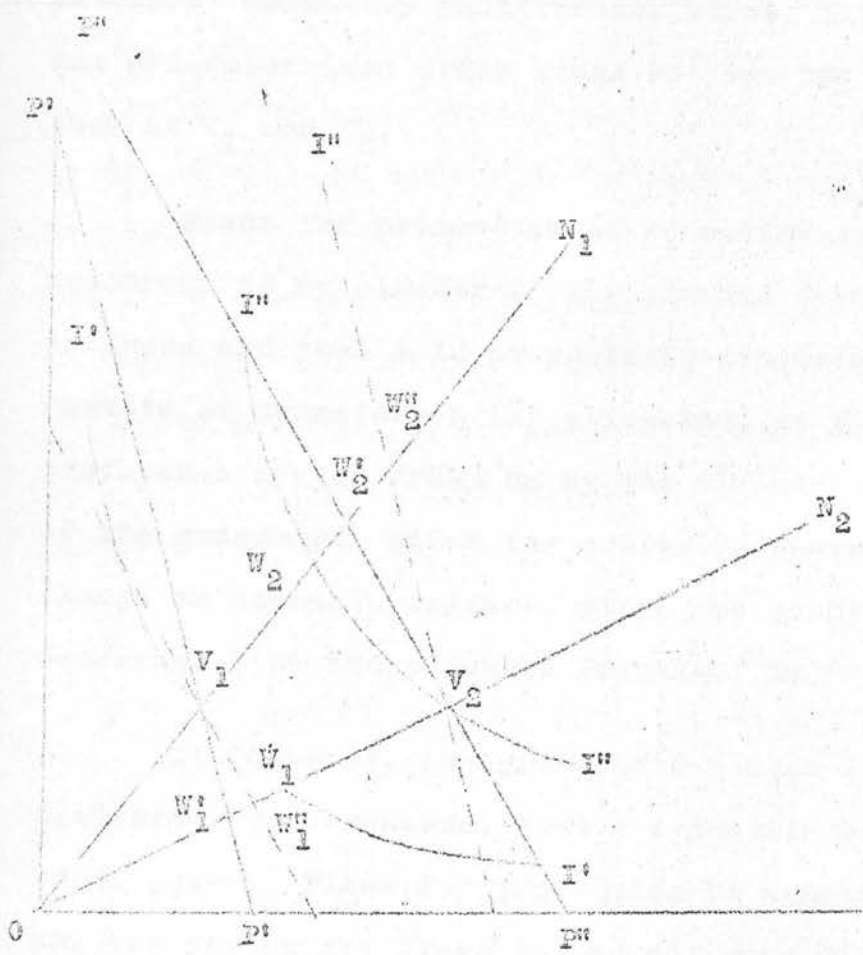


Fig. 6

X

Notations in Fig. 6 are the same as in Fig. 5. The planners' community indifference curves are left out in order to avoid unnecessary confusion in the figure. In short, the planners' community indifference curves lie to the right of the pre-determined price lines PP' and PP'' and are tangent to them at V_1 and V_2 .

Plans for production of composite-commodities V_1 and V_2 are drawn up by planners. The planned quantities of goods are produced and then sold at publicly-determined prices in the markets or transferred (or allocated) at these prices. If the preference system drawn up by the planners coincides with that of the consumers, given the publicly-determined prices, the change in economic welfare, given the usual limitations of its measurement by index number formulae, is revealed in Fig. 5.

If, however, the preference system drawn up by the planners were erroneous, then a situation as given in Fig. 6 would occur. Plans for production of composite-commodity in any one period are drawn up and all commodities are sold at publicly-determined prices as predicted. On the basis of the situation described in Fig. 6, it can be shown that at the given publicly-determined prices, the highest satisfaction from the standpoint of the community's consumers has not been reached in either period I or period II. Because the community indifference curve is not tangent to the price line at the point V in the period concerned, consumers' wants are not satisfied.

The actual change in economic welfare as illustrated in Fig. 6 therefore may be overstated or understated despite the allowance for the approximations given by index number formulae, the latter depending on the curvatures of the community indifference curves. The conclusion drawn from the figure is that if points V_1 leaves the consumers dissatisfied, then either formula (that is (1) or (2)) exaggerates the actual change even further; in other words, the change is less than V_1W_2 . The same analogy holds for the case where V_2 denotes a composite-commodity which is less than the highest satisfaction that can be attained at the given pre-determined prices. Of course, in the case where both V_1 and V_2 are below the optimal level, as in Fig. 6, the exaggeration, if any, becomes a matter of degree.

It is also plausible that in China, prices are not determined by administrative decisions with attaining equilibrium prices in mind. If a manipulated pricing system (the nature of which is described in Chapter II) is adopted, the principle of equating marginal rate of substitution and relative price ratio is irrelevant.³⁰ The planners may fix the price of one type of commodity relatively higher than they should. In China, it has been said that producer goods are priced relatively higher than consumer goods.³¹ In this situation, the index number change and therefore national income growth might be inflated. Such a situation can be seen when Fig. 6 is superimposed on Fig. 5. The distance between V_1W_2'' is longer in the presence case as compared with the pure competitive case, if we consider

on the basis of period I quantity ratio ON_1 , between, say, producer goods x and consumer goods y . As long as the gradient departs from that for the equilibrium position in Fig. 5, the index number will show a change in economic welfare with a larger margin of error.

Personal consumption and saving and economic welfare

The China case causes us to enquire into whether there is an alternative measure of economic welfare, given the definition of economic welfare. Initially, we have implicitly assume that economic welfare is defined in terms of individual choice, and that the final bill of goods planned by the central planning board corresponds to what people would get had the central planning board been replaced by free market price mechanism. National income as an approximate measure of economic welfare has been derived on that basis. In the same analysis, consumer sovereignty is assumed. However, it has been pointed out that in the China case, the preference system of the central planning board may not be identical with that of the society at large. The central planning board has been assumed to formulate plans which it thinks fit for the society rather than like in the pure collectivist economy where consumer sovereignty as such still exists. In this case, the central planning board would have produced plans which include goods and services which in the eyes of the people are not for their immediate benefit. It will be recalled that people are concerned with their current wants

and it is on that basis they judge whether their welfare has increased. Whether the central planning board plans with the future interests of the people in mind is irrelevant for the latter's individual choice is exercised among goods and services currently available to them. We concur with Little's contention that economic welfare is "concerned with what people get, and not why they get it, and with what work they do, and not how they are paid for it," to which we would supplement that not only why they get it is irrelevant, how it is brought about is also irrelevant.³² Therefore, only consumer goods and services over which the people exercise their freedom of individual choice are relevant. Given their income, they also choose between current consumption and saving with the view of accumulating purchasing power of future goods of the kind currently available. This necessarily excludes producer goods (or investment) since people as final consumers are not confronted with this kind of goods in their decisions. Total personal savings are unlikely to be equal to total investments.³³ The difference, if any, between total personal savings and total investments is forced savings through direct and indirect taxes plus other means of finance, all of which are beyond the purview of individual choice. In any event, decisions to save are in the main independent of decisions to invest. This is contrary to Kuznets' view that decisions to save should correspond to decisions to invest, and that the value of producer goods is theoretically a discounted value of their future yields.³⁴ His

In the last analysis we have suggested that personal consumption and saving tend to be a more appropriate welfare

contention that investment should be included as part of the content of economic welfare thus has little meaning even in a free society.

Nevertheless, given the definition of economic welfare in terms of individual choice, only goods and services purchased by the people (as final consumers) and personal saving are the objective counterpart of economic welfare.

Given the defined concept and scope of economic welfare, the personal consumption expenditure and saving measure has an advantage over the national income measure in that it transcends all forms of societies. Whether resources are rationally allocated or whether the end of economic activity is rational is irrelevant. For a planned economy such as China's, where investment deploys a sizeable quantity of economic resources at the discretion of the state through its planners, national income aggregate is less appropriate a measure of economic welfare than personal consumption expenditure and saving.³⁵

Valuation of real personal consumption and saving, however, encounters similar problems as real national income aggregate. The index number problem applies to personal consumption expenditure and saving just as to national income. This will be discussed presently.

WELFARE IMPLICATIONS OF NATIONAL INCOME ACCOUNTING

In the last analysis we have suggested that personal consumption and saving tends to be a more appropriate welfare

measure than national income, especially in a developing economy of the communist type with reference to China. Having established in principle that personal consumption and saving is a welfare standard, we may infer that a change in this constituent of national income accounting ex post indicates a change in economic welfare. However, there are still conceptual problems arising from welfare interpretations of national income accounts ex post. These problems may be analyzed with reference to our findings in Chapters II and III.

First, since personal consumption and saving is to be a welfare standard (or measure), it is essential that the empirical findings on personal consumption and saving be consistent with the theoretical basis of the measure. In Chapter II, we have pointed out that it is difficult to assess the proximity of the Chinese price system to the ideal price system operating under ideal conditions, which thus implies that there may be discrepancies between the estimate of personal consumption and saving and the theoretical counterpart. One might then proceed to argue that it would probably be meaningless to attach any welfare significance to national income accounts ex post. However, as long as we are aware of this limitation of welfare interpretation of national income accounts ex post and until there is a better alternative welfare measure other than the one we have put forward, it is legitimate to infer that a change in personal consumption and saving as a change in economic welfare.

Secondly, the personal consumption and saving as revealed in China's national income accounts may to a certain extent be a manifestation of the planners' preferences, especially when there have been indications that goods produced are short of or more than what are demanded. We have observed in Chapter II that in China there have been reports of black market activities and that key products are subject to rationing. Under these circumstances, personal consumption and saving would merely be the objective counterpart of maximum welfare the planners allow the community to have rather than that which the community has attained with the incomes at their disposal and at the initial prevailing free or official prices. Thus, the possible divergence between the planners' version of community preference system and the community's own preference system derived from individual choice should be well borne in mind when welfare interpretation of China's personal consumption and saving is to be made. In the present analysis of accounting data on personal consumption and saving, we assume that they are the result of economic activity based on planners' preferences.

Thirdly, given that personal consumption and saving be an appropriate indicator of economic welfare, it should be pointed out that change in this constituent of national income accounts over time does not reflect the change in welfare of the community unless the aggregate is reduced to per capita terms. In our theoretical analysis, we have implicitly assumed that the population remains unchanged, hence increase in personal

consumption and saving would indicate increase in economic welfare of the people. The per capita consumption and saving, however, is not without conceptual problems. We would have to tacitly assume that the tastes and other factors affecting choice of the people not previously included are the same as the people already included. Such an assumption may well be unrealistic since the tastes would vary with the age and sex structure of the population. Nevertheless, personal consumption and saving on a per capita basis would be more appropriate than on aggregate terms as an indicator of welfare.

It will be noticed that the previous chapter on valuations of national income lends support to our present discussion on welfare implications of ex post national income accounting. Our theoretical discussions on the relationship between national income and economic welfare have been based on an implicit assumption of an economic system consisting of two sectors, namely, producers and consumers. The Chinese national income estimates which we shall consider presently are based on the conventional accounting system, i.e., it consists of three sectors at least, namely, producers, consumers and government. If the two-sector system of accounts suggested in the last chapter were adopted (which would be consistent with our theoretical analysis of national income and welfare), the national income estimates would approximate the personal consumption and saving estimates derived from the national income accounts based

on the conventional system. The adoption of such a system of accounts, however, would imply that the final product so defined would in the main be a compound product, embodying not just the commodity bought on conscious choice but also an "unknown" or a number of "unknown" commodities bought unconsciously at the time of purchase. In short, ex post data on purchase might well conceal some of the goods consumed, i.e. the "unknown" goods which are not priced, those which are not consumed at the time of purchase of the "known" goods, and those which use up part of the scarce resources for their production. In what follows we shall make no attempt to reconstruct the national income accounting data to fit in with the two-sector system since our primary purpose is to consider the uses of national income estimates based on conventional national income accounting concepts.

Change in personal consumption and saving with reference to
China

The available estimates of personal consumption expenditure, with the exception of Liu and Yeh's adjusted SSB and their own estimates, show that there has been an increase throughout the period 1952-57 (Tables 11 through 15). Wu and associates' second estimate based on actual grain consumption shows a decline in 1957, but it is still higher than the 1952 level. The annual rate of growth varies from 0.4 per cent (Wu and associates' second estimate) to 6.9 per cent (SSB's estimate). On the whole, the rate of growth of personal con-

TABLE 11 GROWTH OF PERSONAL CONSUMPTION EXPENDITURE
 BASED ON LIU & YEH'S DATA, 1952-57

	Aggregate in 1,000 million 1952 yuan	Index 1952 = 100	Link index
1952	54.60	100.0	-
1953	51.84	94.9	94.9
1954	54.96	100.7	106.1
1955	56.99	104.3	103.6
1956	62.60	114.7	109.8
1957	64.49	118.1	103.0
1952-57 (annual growth rate)		3.4	

Source: T.C. Liu & K.C. Yeh, The Economy of the Chinese Mainland: National Income and Economic Development 1933-1959, Vol. I, Table 10.

TABLE 12. GROWTH OF CONSUMPTION EXPENDITURE (I)
 BASED ON HOLLISTER'S DATA, 1950-57

	Aggregate in 1,000 million 1952 yuan	Consumption expenditure		Per capita consumption expenditure	
		Index 1952=100	Link Index	Index 1952=100	Link Index
1950	20.25	75.1	-	78.2	-
1951	23.04	85.4	113.7	87.2	111.5
1952	26.97	100.0	114.4	100.0	114.7
1953	30.75	114.0	114.0	111.4	111.4
1954	34.14	126.6	111.0	120.9	108.5
1955	36.41	135.0	106.2	126.2	104.3
1956	41.86	155.2	115.0	142.1	112.6
1957	42.24	156.6	109.4	140.6	98.9
Annual rate of growth:					
1950-57		11.1		8.7	
1952-57		9.3		7.0	

Note: This is an estimate of consumption expenditure of the nonagricultural sector. Hollister estimated it on the basis of retail sales and nonagricultural services.

Source: W.W. Hollister, China's Gross National Product and Social Accounts 1950-57, pp.132-33.

TABLE 13. GROWTH OF CONSUMPTION EXPENDITURE (II)
 BASED ON HOLLISTER'S DATA, 1950-57

	Consumption expenditure			Per capita consumption expenditure	
	Aggregate in 1,000 million 1952 yuan	Index 1952=100	Link index	Index 1952=100	Link index
1950	23.11	97.1	-	101.1	-
1951	25.00	105.1	108.1	107.3	106.0
1952	23.80	100.0	95.2	100.0	93.3
1953	24.52	103.0	103.0	100.7	100.7
1954	23.02	96.7	93.9	92.4	91.7
1955	24.82	104.3	107.8	97.5	105.5
1956	26.84	112.8	108.1	103.2	105.9
1957	26.47	110.9	98.6	99.8	96.7
Annual rate of growth:					
1950-57		2.0		- 0.18	
1952-57		2.1		- 0.05	

Note: This is an estimate of consumption expenditure of the agricultural sector. Hollister estimated it on the basis of imputed farm home consumption and agricultural purchases of services.

Source: See Table 12.

TABLE 14. GROWTH OF PERSONAL CONSUMPTION EXPENDITURE (III)
 BASED ON HOLLISTER'S DATA, 1950-57

	Consumption expenditure			Per capita consumption expenditure	
	Aggregate in 1,000 million 1952 yuan	Index 1952=100	Link index	Index 1952=100	Link index
1950	43.36	85.4	-	88.9	-
1951	48.04	94.6	110.8	96.6	108.6
1952	50.77	100.0	105.7	100.0	103.5
1953	55.27	108.8	108.8	106.4	106.4
1954	57.16	112.6	103.5	107.5	101.1
1955	61.23	120.6	107.1	112.8	104.8
1956	68.70	135.3	112.2	123.9	109.8
1957	68.71	135.4	...	121.4	98.1
Annual rate of growth:					
1950-57		6.8		4.6	
1952-57		6.3		5.0	

Note: This is an estimate of total consumption expenditure based on the consumption expenditures of both the nonagricultural and agricultural sectors, which have been separately shown in Tables 12 and 13.

Source: See Table 12.

TABLE 15. GROWTH OF PERSONAL CONSUMPTION EXPENDITURE
BASED ON WU & ASSOCIATES' DATA, 1952-62

	Estimate I			Estimate II		
	Aggregate in 1,000 million 1952 yuan	Index 1952=100	Link index	Aggregate in 1,000 million 1952 yuan	Index 1952=100	Link index
1952	52.3	100.0	-	57.4	100.0	-
1953	53.5	102.3	102.3	58.6	102.1	102.1
1954	54.7	104.6	102.2	60.4	105.2	103.0
1955	55.9	106.9	102.2	61.5	107.2	101.8
1956	57.1	109.1	102.1	62.7	109.2	102.0
1957	58.6	112.0	102.7	58.6	102.1	93.5
1958	60.2	115.1	102.8	66.2	115.3	113.0
1959	61.5	117.6	102.2	58.0	101.0	87.6
1960	62.7	119.9	102.0	44.5	77.5	76.7
1961	63.8	122.0	101.7	41.6	72.5	93.5
1962	64.6	123.5	101.3	42.8	74.6	102.9
Annual rate of growth:						
1952-57		2.3			0.4	
1957-62		2.0			- 6.1	
1952-62		2.1			- 2.9	

Notes: Estimate I is based on per capita personal consumption at minimum maintenance level in 1957 multiplied by mid-year population of the year concerned. The 1957 figure given by Wu & associates is 92 yuan at 1952 prices.

Estimate II is based on actual grain consumption in 1957 times the grain consumption index (1957=100) for the year concerned. The 1957 figure is 58,600 million yuan at 1952 prices.

The two estimates are linked together for the year 1957 on the assumption that personal consumption (58,600 million yuan at 1952 prices) was at the minimum maintenance level.

Source: Y.L. Wu et al, The Economic Potential of Communist China, Vol.I, Table 80.

consumption expenditure is lower than that of national income, the latter being shown in Table 9. If change in personal consumption expenditure were a sufficient indicator of change in economic welfare, then the change in economic welfare in China would be negligible if Wu and associates' personal consumption expenditure index were used and it would be fairly reasonable if the SSB index were adopted.

At this juncture, we would have to make a choice among the various personal consumption indexes if we were to have one unique index only. Alternatively, we could easily settle with a range of possibilities with an upper and a lower limits. In any case, we should examine the bases on which the various real personal consumption expenditures are estimated.

It will be noticed that Hollister's estimates for the 1952-57 period approximate the SSB estimates except for 1956 and 1957, the cause of which may be attributed to the fact that Hollister adopted the final sales method of national income estimation.³⁶ The GNP and component estimates have been estimated in current prices initially and subsequently converted into 1952 prices using various price indexes as deflators. For example, retail sales and non-agricultural services in current prices -- one component of personal consumption expenditure -- for the period 1950-57 have been deflated by a price index which is derived from figures on average money wages and average real wage (Table 12). The price index for the period

1952-57 has been derived from average money wages and average real wages in the state, state-private, and cooperative establishments in the urban areas:³⁷

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
<u>Average money wage index:</u>	100.0	110.1	114.9	119.4	133.5	139.4
<u>Real wage index:</u>	100.0	104.3	107.5	111.3	122.0	125.1
<u>Price index:</u>	100.0	105.6	106.9	107.3	109.4	111.4

The real wage index in turn is the average money wage deflated by the cost of living index. The other component of personal consumption expenditure is imputed farm home consumption and agricultural purchases of services in current prices, which is deflated by the official price index for state purchase of agricultural products (Table 13). The index for 1952-57 is as follows:³⁸

<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
100.0	110.1	113.8	113.2	116.6	120.9

It will be recalled from chapter II that official prices may be raised or lowered to clear the consumer markets, and at the same time rationing system may be employed to control demand. Given the elasticity of demand, a consumer may find his wants are not satisfied at a particular price level owing to the interference through the rationing system into the amount he can purchase. The price index employed is based on cost of living index. Any price index, including cost of living index, may eliminate

change in money prices, and the deflated values should then be the real personal consumption expenditures. However, in the China case, the effects of rationing are still concealed in the deflated values with the result that real expenditure cannot be shown. It is possible that the purchasing power left over through effective demand not being satisfied in one direction may be transferred to the purchase of other consumer goods. However, this may be restricted by the fact that other consumer goods may also be subject to ration, particularly in periods of short supply. It may also be restricted by satiety of demand for these other goods, with the result that purchasing power is either used in the direction of black market purchase or left unused. Any black market activities would not have appeared in the official price index. The nature of cost of living index might also affect the resultant values. One may question the validity of the index as being representative of the whole of China when in fact it is constructed on the basis of data for only twelve cities. However, this problem is not peculiar to China.

The state agricultural purchasing price index suffers a problem which is different from that inherent in the cost of living index. It is partially applied to consumption which does not go through the markets. The home consumed products on farms are imputed a value net of price changes which are in most cases not connected with disequilibrium of demand and supply situation. As noted in chapter II, certain categories of agricultural products are not subject to state planned

purchase and planned supply or to state unified purchase, such as the goods in the third category (except during the period December 1958 - June and July 1959). These are traded in the local rural markets at free market prices, which are not covered by the state agricultural purchasing price index.

It stands to reason that since official indexes are used as deflators of sales data obtained from official sources, Hollister's and the official estimates of personal consumption expenditure should approximate each other. While this component of GNE should in principle be estimated from the expenditure viewpoint rather than from the commodity flow approach, in the China case, the reverse is recommended to eliminate conceptual problems relating to prices.

The decline of personal consumption expenditure in Liu and Yeh's estimate is attributed to their contention that the situation in 1952 has been underreported. Wu and associates' two estimates give relatively lower rates of growth, which is probably due to the method of estimation which in turn seems to have a downward bias. For the period 1957 and after, Hollister's estimates appear to have been in line with official claim. His annual rates of growth for 1952-57, 1952-60, and 1957-60 vary only by 0.3 point between the highest (1957-60) and the lowest (1952-57). Wu and associates' first estimate based on minimum maintenance level gives annual rates of increase centred around 2 per cent, and their second estimate

yields annual growth rates varying from a negative 6.1 per cent for 1957-62 to negative 2.9 per cent for 1952-62. Even for the period 1952-57, the corresponding rate is only 0.4 per cent.

Per capita personal consumption expenditure index gives an even more pessimistic picture (Table 16). It is expected that the official, Hollister's, and Liu and Yeh's adjusted official estimates on a per capita basis are relatively higher. Wu and associates' first estimate suggests an annual per capita growth of about 0.1 to 0.2 per cent. Their second estimate yields a decline in most cases except for 1952-58 when an annual rate of increase of 0.2 per cent is shown. In absolute terms, the picture shown by the estimates based on actual grain consumption is dismal. From 1959 onwards, the per capita personal consumption expenditure has been shown to be almost increasingly below 90 per cent of the 1952 level. This may be consistent with the common notion that China has never recovered from the agricultural crisis due to bad weather conditions during 1960-62, but the almost negligible increase (and even decrease) as compared with 1952 during the years of the First Five Year Plan, as suggested by Wu and associates, seems incredible, and implies that the increase in consumer good production over the years has been siphoned to foreign markets.

We have established earlier that personal consumption expenditure and saving are a measure of economic welfare. Lack of data on saving prevents use from presenting a full picture

TABLE 16. INDEXES OF CHINA'S PER CAPITA PERSONAL CONSUMPTION EXPENDITURE

	<u>SSB</u>	<u>Adjusted SSB</u>	<u>Hollister</u>	<u>Liu & Yeh</u>	<u>Wu et al (I)</u>	<u>Wu et al (II)</u>
(1952=100)						
1952	100.0	100.0	100.0	100.0	100.0	100.0
1953	104.4	84.3	106.4	92.8	100.0	99.8
1954	107.4	88.5	107.5	96.2	99.91	100.5
1955	113.7	94.0	112.8	97.6	99.97	100.2
1956	118.7	106.0	124.0	105.0	99.97	100.0
1957	125.2	110.9	121.5	106.0	100.6	94.7
1958	--	--	129.2	--	101.0	101.3
1959	--	--	131.6	--	101.2	86.9
1960	--	--	138.0	--	100.9	65.3
1961	--	--	--	--	100.6	59.8
1962	--	--	--	--	100.4	60.2
(1957=100)						
1957	--	--	100.0	--	100.0	100.0
1958	--	--	106.3	--	100.5	110.5
1959	--	--	108.2	--	100.6	94.8
1960	--	--	113.6	--	100.3	71.2
1961	--	--	--	--	99.97	65.2
1962	--	--	--	--	99.1	65.7
<u>Annual growth rate (%)</u>						
1952-57	4.6	2.1	4.0	1.2	0.1	-1.7
1952-62	--	--	--	--	0	-4.9
1957-62	--	--	--	--	-0.2	-8.1
1952-58	--	--	4.3	--	0.2	0.2
1952-59	--	--	4.0	--	0.2	-2.0
1952-60	--	--	4.1	--	0.1	-5.1
1957-60	--	--	4.3	--	0	-10.7

Sources: Based on Tables 11 to 15.

of the change in personal saving. We may refer to Perkins for the fragmentary data he has collected on bank deposits and bond purchase.³⁹ However, these are mostly forced savings. According to state regulations, savings deposits and bond subscription are to be voluntary, but in practice, people are said to be pressured by the communist cadres to place money in savings deposits with the banks or credit cooperatives and to subscribe bonds. The extent of coercion is such that it almost takes on the form of a tax. Interest on savings deposits does give incentive to save, but with the relative poverty of the country-folk and the traditional suspicion of banks and bonds by the peasants, it is wondered whether such savings deposits in rural banks and cooperative and bond purchase in the rural areas could have been voluntary. Whatever personal savings there are, they probably constitute a small proportion of personal incomes. Hollister has made a direct estimate of personal saving for 1950-57, but unfortunately he has not described the method of estimation.⁴⁰ In any event, assuming that voluntary saving is negligible, personal consumption expenditure would have been sufficient indication of the state of economic welfare.

To reiterate, if personal consumption expenditure as estimated is consistent with the theory behind it as a measure of economic welfare, then the change in economic welfare of the people in China since 1952 has been insignificant or moderate, depending on the estimate of personal consumption expenditure

employed. It should be reminded that we have assumed that production and allocation decisions are based on planners' preferences and thus the magnitude of the change in personal consumption expenditure, whether large or small, would reflect the planners' decision with regard to the amount of goods and services the household sector should consume.

CONCLUDING REMARK

The present chapter may be viewed as an attempt to re-examine the whole question of the traditional use of national income as a welfare measure when the welfare of a community in a planned economy, instead of in a free market economy, is being considered. The contention that personal consumption and saving tends to be a more appropriate measure than national income of economic welfare for a planned economy such as China's has so far been based on the assumption that the conventional national income accounting system is used and that economic welfare is viewed from the household sector standpoint only. Under ideal output conditions, efficiency in resource allocation is assured. In the case where we consider personal consumption and saving to be a welfare measure we have so far relegated the efficiency question to the background. As far as the China case is concerned, part of the difficulty in resolving this question has been that production is supply rather than demand-oriented. Further thoughts are required if the contention that consumption and saving is a better measure of welfare than national

income is to be put forward as a general proposition instead of a measuring device which has not taken the efficiency aspect into consideration.

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Types of planning - planning in various countries - planning in socialist countries

Techniques of planning

Chain of techniques and models of planning - economic models

Role of national income accounting in economic planning

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INTRODUCTION

The present chapter and the next are concerned with the other application of national income accounting considered in the present study, namely, national income accounting as a tool of economic planning. In the present chapter, we shall examine (1) nature of economic planning, (2) techniques of planning, (3) role of national income accounting in economic planning, and (4) the use of national income accounting in economic planning in China.

The first two sections are necessary in that they set the stage for the role to be played by national income accounting. And the whole of the present chapter may be viewed as an introductory to the application of national income accounting as a tool of economic planning with reference to China in the next chapter.

NATURE OF ECONOMIC PLANNING

By economic planning we mean economic planning at the centre. A plan containing quantitative targets is implied and it is formulated by a special agency of the central government or an independent national institution, which we shall call the central planning board. The procedure of formulating the plan may involve all levels of the planning hierarchy, but as long as the final plan is issued by the central planning board, it is economic planning at the centre. Government departments and agencies, whether they are at the central, regional, provincial

or municipal level, may formulate their individual plans on an ad hoc basis: such economic planning does not concern us here. However, if the central planning board formulates plans for the individual central or local government departments or agencies on an ad hoc basis, this will come under our definition of economic planning. In short, the definition is essentially an institutional one.

Examples of central economic planning include planning in the Soviet Union and other communist countries; and in India, Japan, the Netherlands, France, to name a few.¹ The reorganization of the British rail transportation system initiated under the Tory government or planning by the Hong Kong Government Social Welfare Department is considered here as economic planning by individual government department or agency.

Planning is a means to achieve the objectives of economic policy of the central government. The objectives may originate from the government, the parliament, congress or the like, or directly from the electorate. These objectives may include one or more of the following: a certain rate of GNP growth, achieving and maintaining price stability, achieving and maintaining full employment, achieving and maintaining balance of payments equilibrium, a less unequal distribution of incomes, modernization, change of economic organization structure from private to state or semi-state ownership, etc. These objectives may be contradictory to one another. For example, in India's Third Five Year Plan, among the objectives are a rise in national

income of over 5 per cent per annum, on the one hand, and bringing about a reduction of inequalities in income and wealth, on the other.² Given the circumstances in India, these may be contradictory because a GNP growth of that magnitude may well involve a sacrifice of the reduction of income and wealth inequality objective.

Once the objectives have been decided upon, the central planning board is given the responsibility of translating them into quantifiable terms in its plan. The exact targets should be able to be achieved with the given information on known resources, state of technology, institutional circumstances, and also on their possible changes during the planned period. The roles played by the political process and the central planning board in planning procedure are not necessarily independent of each other. In making policy decisions, the political process might have the advice of the planning board on the feasibility of achieving the proposed aims and on the consistency of the aims in view. However, it is also possible that the central planning board is at the receiving end only, in which case, it formulates either a plan without internal consistency or one which fulfills as much as possible the requirements laid down by the political process.

Types of planning

When the final plan has been adopted, it might become a legal document in that individual economic organizations are bound by law to fulfill as much as possible the targets fixed

for the economy as a whole, which implies that individual organizations will have their specific targets. This involves a transmission of microeconomic targets to economic organizations at various level of the administrative hierarchy, hence called administrative planning.

If the final plan is merely used as a guide, and it is up to the individual economic organizations to make decisions which lead to fulfillment of the plan, we call this type of planning indicative planning. The basis of this type of planning is the belief that enterprises and households know best as regards decisions which lead to efficiency and attainment of the national targets, which implies no targets are fixed for the individual organization. However, in practice, certain activities come under government direction or control, in which case, machinery is available for implementation of planning in these areas. Between these two types of planning is competitive planning. In this case, the overall plan is an estimate of production and distribution over the planned period and is devoid of compulsory character except for the income in the sector under public ownership. The difference between indicative planning and this type of planning is that in the latter, plans are formulated by the individual economic organizations which are to be the bases of the overall plan. The link between the autonomous (micro) plans of the economic organizations and the national plan is secured at some intermediate administrative

level. Competitive planning differs from administrative planning in the planning organization structure. In the former, the planning organs below the apex of the planning hierarchy are responsible to the central planning board, whereas in the latter, the planning organs below the central planning board are independent planning authorities in charge of preparation of plans but without operative authority. Soviet planning is basically administrative planning. Economic activities are planned in detail from a central planning authority, except for consumption and peasant agricultural production, in which only delivery and agricultural taxes are planned. Indian planning may be regarded as an example of indicative planning, and Yugoslav planning after 1952 an example of competitive planning.³

In all cases, the degree of planning depends on the stage of economic development of the country concerned. Technically, it also depends on the availability of relevant statistical data. The two factors usually go hand in hand, though in recent years, through technical assistance from international agencies or institutions of developed countries, statistics have been made available for sophisticated type of planning even for developing countries which are usually characterized by absence of such data. The size and quality of planning body also determine the techniques employed. Unless the organization is extensively developed, collection of data per se may be a time-consuming task, let alone drafting an ambitious technical plan. China, though still a developing country, has at least a large network of statistical agencies, though the quality of it is doubtful.⁴

The format of the plan itself depends on the technique used. In a comprehensive plan, inter-relations among the various sectors composing the economy are taken into account. The techniques used is usually the input-output model or inter-industry models of the Chenery type.⁵ However, macroeconomic plans emphasize the macroeconomic aggregates and their rates of growth, and are usually formulated on the basis of macroeconomic models of varying degrees of sophistication. In addition to these, there are the partial plans which include projects, programmes (which are coordinations of projects), regional plans, and other open-ended plans.⁶ These are plans for priority objectives, which, like the overall plans, may consist of targets for final output or of targets for both inputs and final outputs. There are implications on the unplanned sectors, hence the term open-ended plans, which are recognized but not considered in the plans themselves. The technique used depends on the degree of sophistication required, subject to data availability, as in the case of overall plans. Between overall plans and partial plans, there are the overall plans with priority attention given to certain sectors. The functional relations between the priority and the less important sectors are known, but detailed planning is imparted on the priority sectors. These relations, however, may be approximations and may lead to an overall plan without internal consistency, given the aim be planning for the economy as a whole.

Planning in Western countries

Economic planning in Western countries is essentially indicative planning. Machinery for implementation of the plan is at best limited to the sector under direct control of the government. The government may employ other means which indirectly encourage the fulfillment of planned targets, such as fiscal or monetary policy. But the enterprises are free to act and the opportuneness of their decisions are not subject to control. Depending on the individual countries concerned, the plans may be comprehensive, macroeconomic, or partial.

Planning in communist countries

The major communist countries such as the Soviet Union and China adopt administrative planning. Their overall plans cover inputs and outputs. However, in the agricultural sector, only compulsory delivery of agricultural produce and agricultural taxation are subject to central planning. Machinery for implementation of plan is present. Enterprises in the main are given control targets and their individual plans formulated on the basis of the plans of their superior organs cannot be changed without prior approval of the authority concerned. The plans are comprehensive with priority given to industrial sector and macroeconomic aggregates are conspicuously absent in the China case.⁷

Yugoslav planning adopted Soviet type of planning before 1952, after which date, it adopted competitive planning. In the Second Five Year Perspective Plan (1957-61), the plan was a

result of the combination of the administrative and competitive planning based on interindustry model.⁸

TECHNIQUES OF PLANNING

We have stated earlier that the format of a plan depends on the technique of planning employed. Techniques of planning may be said to be associated with the models employed. Models are necessary if internal contradictions are to be avoided, on which we shall say more presently. Since techniques may be broadly divided into input-output techniques and macroeconomic techniques, models would similarly be classified into input-output and macroeconomic types. The use of a particular technique, however, is not necessarily limited to a particular type of economy. While the balance method, which is a version of the input-output technique, is usually associated with the economies of the U.S.S.R. and Eastern Europe, it should be noted that planners of these countries (even the Soviet Union!) have begun to think in terms of macroeconomic aggregates. An increased interest has also been developed in the West in the input-output techniques of planning.⁹

Choice of techniques and models of planning

An ideal comprehensive plan taking into the inter-relations among the various sectors into account may take advantage of both the input-output and macroeconomic techniques and therefore the corresponding models in its formulation. In practice, the central planning board might be confronted with a choice between

the two main types of techniques and models, and within each type, with a choice between alternative prototype models.

In Western countries, given the objective of planning to be income growth, the choice of the type of prototype model for plan formulation depends on a number of factors. The models presented earlier may require modifications to suit a particular stage of development existing in a given economy.

The availability of relevant data is an important consideration. Developing countries are usually statistically poor countries, and therefore, their choice might be limited to simple models, probably of the macroeconomic type. However, in recent years, even in these countries, more data have been made available to the extent that input-output analysis can sometimes be made. One might argue that this is tantamount to saying that the applicability of economic models depends mainly on what sort of statistical data are available. If this were the case, it might be further argued that this would beg the question of the underlying nature of the economy since an economy produces the kind of statistics it deserves. It should be pointed out, however, that our question is concerned with the choice of a model among given prototype models. It is doubtful that applicability of a model depends on the availability of statistical data. Availability of data apart, all models are applicable to a given economy provided that they are relevant to the problems confronting the economy in question.

Whether statistical data are available has nothing to do with the hypotheses implied in the models, nor with the applicability of these models. If data were not available, all that that amounts to would be that the models in practice could not be tested, and that the models themselves might still sometimes be applicable in theory. As to an economy producing the sort of statistical data it deserves, it all depends on the exact nature of the economy. If the economy in question were classified as a developing economy, the state of development in making available economic statistics might well be more advanced than one might imagine. Whether they would be utilized or exploited to the fullest extent, say, in economic planning, may not necessarily be a question of the state of development of the economy: it may well be a question of the whole ideological or philosophical outlook of the government or planners. A country may have the relevant statistical data for planning purposes, the right kind of people to be planners, and yet its economy may still be classified as a developing economy. India is a case in point.

The choice of the type of models in communist countries, however, is dictated by ideological consideration. The Soviet and Chinese thinking on economic planning is very much influenced by Marx's reproduction schema, though the Soviets are less so than before. China patterned after Soviet experience in planning in latter's early planning era. Consequently, the Chinese probably followed their counterpart in the Soviet Union in rejecting the Feldman model for perspective planning. There

are indications that China's economic plans are not based on any model which covers the economic phenomena of the entire economic system. First, while the balance method has been said to be in use, none has been published. In any event, this method can be represented by the rows of the input-output model, and it shows the uses of output of each industry rather than the input structure of a particular industry, since even in the experience of the Soviet Union, only key products are balanced. Secondly, macroeconomic models have been rejected, as evidenced by the criticisms of the U.S. trained economist Ma Yin Ch'u who was accused of being a neo-Malthusian.¹⁰ Further evidence could be found in articles on the subject of social accounting. The Chinese rejected the use of national income accounts in planning in Western countries, and recently, criticized input-output analysis and the interindustry models of the Chenery type.¹¹ Suffice it to say that the criticisms are ideologically inclined. It is interesting to note that the Chinese do not appear to have noticed the interest developed in the Soviet Union in social accounting techniques. Finally, China still holds to the central physical allocation principle. Whether, in practice, the allocation is efficient is another question, but the recent criticisms of Yang Chien-pei's view in favour of equalization of profit rate suggest that the Chinese planners are unwilling to change their thinking on physical allocation with value playing a secondary role.¹² Obviously, the Yugoslav's experience in economic planning is not adopted by the Chinese planners, particularly when the two countries are not ideologically aligned,

The use of a combination of Marxian reproduction schema, input-output analysis, and social accounting in formulation of economic plans by the Yugoslav planners for the period 1957-61 would under the present circumstances not be acceptable to China.

Economic models

It will be recalled that we stated that models are necessary in consistent planning. An economic model itself is internally consistent if properly constructed. A model is taken to be a set of relations among a set of economic variables if it is constructed to show the interrelations among the various economic phenomena.¹³ The complexity of models may be associated with the complexity of the mathematical techniques employed. If all the relations are linear, we have a linear model. If one or more of the relations are nonlinear, we have a nonlinear model. Linear models are much easier to handle than nonlinear models since mathematical difficulties in the latter can be numerous. While linear models give approximations if they are used within a limited range, they have been used in short-term planning. Because the relations are held simultaneously, time does not play an explicit role, such models -- whether linear or nonlinear -- are static. If time plays an explicit role in the system, the models are dynamic. There are, however, two types of dynamic models: continuous and sequence. The first type involves the use of differential equations, the variables are taken to change continuously through time with observations being taken at certain points of time. The second type, on the other hand, involves the use of finite difference

equations, because it deals with quantities that are relevant to definite time periods. In this case, the variations are discontinuous or discrete. These two approaches are alternatives, for by making time periods smaller and smaller, the second type may be manipulated to approach the situation of the continuous variables. The second method has relatively more practical use, because economic data usually are presented in a form which is more suited to the sequence models. It is therefore not surprising that in economic planning, models employing less complex mathematical techniques are adopted. In both models of the input-output and macroeconomic types there are varying degrees of mathematical sophistication.

The economic models of the input-output type include models such as the simple input-output model, the Marxian simple and expanded reproduction schema, Ichimura's three sector model (henceforward known as the three-sector model) and the like. Models of the macroeconomic type may be exemplified by the Harrod model, the Domar model, the Ichimura macroeconomic model of the Harrod and Domar type (henceforward known as the Ichimura model), Ichimura's two-sector model (henceforward known as the two-sector model), the Feldman model which we referred to earlier, etc. The mathematical formulations of examples of these two main prototypes of economic models are given in Appendix C.

ROLE OF NATIONAL INCOME ACCOUNTING IN ECONOMIC PLANNING

To what extent is national income accounting useful in economic planning if one of the prototype economic models listed in Appendix C is adopted as the basis for the formulation of an economic plan? This question may be examined with reference to the nature of national income accounting system and to national income accounting data.

National income accounting system and economic models

We have so far implied that the model for plan formulation and national income accounting are independent of each other until the latter is used in connection with the former. For certain models there may be some element of truth, but not for models of the macroeconomic type. Macroeconomic models and national income accounting system are complementary. The accounting framework provides data in such a way that macroeconomic models such as income-generating models may be constructed. The increasing sophistication of a macroeconomic model may in turn demand a modification of the national income accounting system such that the data required by the improved model could be made available. The chain reaction repeats itself.

A simplified system of national income accounts reduced to matrix form shows the data that can be made available for macroeconomic models:¹⁴

Payments by	Enterprises	Households	Government	Capital formation	Total
Payments to					
Enterprises	-	C	G^G	I	Y^m (NP at MP)
Households	F	-	R	-	Y^p
Government	T_i	T_d	-	-	T
Capital formation	S^e	S^h	S^G	-	S
Total	Y^m (NI at MP)	Y^p	G	I	-

- Symbols:
- C households consumption expenditure at market prices
 - C^G government expenditures on goods and services
 - I investment
 - F factor payments
 - R transfer payments
 - T_i indirect taxes net of subsidies
 - T_d direct taxes
 - S^e enterprises' savings
 - S^h households' savings
 - S^G government savings
 - Y^m national product (or income) at market prices
 - Y^p personal income or personal expenditure at market prices

- T government income
- S saving
- G government expenditure
- I investment

From the above social accounting matrix, national income and related aggregates can be derived, not only for the economy as a whole, but for the constituent sectors as well. It provides information on the variables in the basic macroeconomic models, such as models of the Harrod and Domar type. In the case of one point of time, data for predetermined variables can be obtained. For example, the values of I_0 , C_0 and Y_0 are given (although C_0 would in this case include C^G) for the Domar model. The matrix may be modified to the extent of separating C^G into consumption expenditure and investment expenditure of the government sector, and also of introducing a rest of the world sector to show exports and imports, such that the parameters in the Ichimura model may be calculated.

If the system were modified to the extent that the sectors were divided into producer good and consumer good sectors, statistics might be made available for all the parameters and variables of the Feldman model.

If a macroeconomic model were to be the basis of an economic plan, the role of national income accounting as a tool of economic planning is self-evident. The model could be tested with ex post facto data and in its proper form it could be used for prognostic purposes.

However, if the model for plan formulation were one of the input-output type or one of the interindustry models of the Chenery type, one could argue that the model and national income accounting are two independent elements. Even then, the fact that national income accounting could be of some use, which we shall say more in the next section, may result in some new models along the lines of interindustry models or some synthesis of the input-output accounting and the national income accounting. In parentheses, input-output models and input-output accounting have a relationship analogous to that between macro-economic models and national income accounting.

National income accounting data and economic models

While input-output accounting provides most of the relevant figures for models of the input-output type, national income accounting data are still required. The variables composing the final demand are national income accounting data. The input-output model requires not only figures for total output of each industry, the input from a given industry used in the production process of another industry in all cases, but ^{also} the net output of a given industry flowing to the final demand sector. In the three-sector model, the intersectoral relations (namely, agriculture, heavy industry, and light industry) are only part of the model, for statistical data for income accounting to each sector are also required, which could be obtained from national income accounts ex post. Similarly, national income

accounting data would be needed in Marx's simple and expanded reproduction schema, if only for checking the values of the Marxian equations.

It should be noted that even in planning based on macroeconomic models, national income accounting plays a role which is not without limitations.

Limitations of national income accounting

The limitations of using national income accounts in model building are partly due to the nature of national income accounting itself. National income accounts record income and expenditure flows but not the stock. In income-generating models where long-run phenomena are considered, national income accounts are inadequate in that data on capital stock at any period are not provided. Given national income accounts for different periods are available, these at best provide information for the calculation of the change of capital stock between any two prescribed periods. Marginal input-output ratios can be calculated, but not the average capital-output ratios, the latter requiring data on capital stock.

National income accounts do not provide sufficient information for solving a macroeconomic model for another reason, namely, whereas a model is a set of equations showing the functional relations between the variables at a particular point of time or over a period of time, national income accounts show only the accounting relationships. By themselves, the

accounts do not suggest how any event has come about but only that it has taken place. A model is concerned with ex ante functional relationships, but national income accounts reveal only the ex post accounting relationships. That a consumer spends only 90 per cent of his disposable income at a particular time is a functional relation between income and consumption expenditure and is a postulate in an economic model. This may be shown in the national income accounts if all consumers behave in the same way. But, given an increase in disposable income, the consumer may consume only 60 per cent of the increase in income. This functional relation is not shown in the national income accounts. The consumption function in the income-generating model may include an exogenous variable which is not separately shown in the national income accounts, such as the constant a in the following:

$$C = a + cY$$

While this can be obtained elsewhere, it involves resources in addition to those required to compile data for the national income accounts.

National income accounting records net flows. Therefore, the accounts do not provide intersectoral data which are necessary in input-output models. In theory, the net flows can be arrived at by the direct method, namely, recording the gross flows by stages as in communist countries where double counting is deliberate. In this case, input-output data would have been

collected in the course of calculating the net flows. However, in practice, the indirect method is employed, namely, the gross value output is first estimated and then is netted of material costs.

Another limitation is that national income accounts are a descriptive tool. They do not suggest that the data pertain to full employment situation or any economic situation for that matter. If one of the assumptions of the macroeconomic or any other economic model is a full employment situation, national income accounts data require evaluation before they can be used. Whether the economy in question is at full employment level is beyond the scope of national income accounts, and an answer to this question has to be sought elsewhere.

Conceptual problems in national income accounting may also affect the use of national income accounts in model building. The system of national income accounts has been an invention of the economically advanced countries and are used as a tool in the analysis of these countries. Therefore, the concepts find relevance in those countries but not necessarily in, say, the developing economies. Modifications are necessary and have found to be so when the system is used by economic planners in developing countries. Where modifications are not made by national income accounts^{ant}, these have to be done by those who devise or apply a particular model. Furthermore, in the course of revision of the original framework, much depends on whether the revision is relevant to the model. It is possible that the

revised version is still not suitable for its use in the model. This is not at all surprising because national income accounts may be improved with a purpose other than economic model or planning in mind.

USE OF NATIONAL INCOME ACCOUNTING IN ECONOMIC PLANNING IN CHINA

The type of planning adopted by China has been said to be administrative planning. The scope of planning in practice and the periods for which Five-Year Plans had been designed and published have been discussed in Chapter II, and therefore require no repetition here. The technique of planning is said to be the balance method, and the model for plan formulation is probably, at least in principle, the Marxian simple and expanded reproduction schema. Among the economic balances (comprehensive balances) there is a balance which shows the national income produced, distribution, re-distribution, and final disposal of national income produced.

It appears that national income accounting is not used in economic planning in China in the same sense as in Western countries. In spite of the narrower concept of national income -- which is equivalent to the Western definition less services not related to material production -- and the difference in the form of presentation, national income accounts in China are basically of the same nature as those in Western countries: they give a description of the state of performance. As we have examined in Chapter II, the price system in China plays a secondary role in

allocation of resources, from which it can be inferred that value planning has no place in China. The five-year plans contain targets, which through hindsight have shown to be fixed without due consideration to the resources available or to other sectors which are not rigidly planned. In any event, the targets are in physical terms and are fixed for the key products. Industrial production has been more carefully planned than other types of production. Supply and demand for the key planned commodities are supposed to have been estimated by the balance method, and technological coefficients have probably been used in estimating the input requirements in the main lines of industrial production. National income aggregates have been estimated as an indicator of past performance, but national income accounts -- or national income balance, to use the Chinese terminology -- exist in theory but none has really been known to be published, especially the primary distribution of income produced account, the redistribution of income account, and the income for disposal account.¹⁵

However, in theory, as in Western countries, national income accounts should provide the necessary information for the predetermined variables in Fel'dman's model, provided the model is adopted.

However, neither the Western nor the Chinese system of national income accounts supply data on value added of the producer goods and the consumer goods sectors, nor on investment in the respective sectors.

Recalling that national income data are employed in analysis of China's economic performance, it should be noted that the data as they are do not indicate whether the results have been due to efficient planning, nor to any measures adopted by the state which lead to a larger (or smaller) national income aggregate than would have been had there been no arbitrary and sudden interference contrary to the policy at the time of formulating the economic plan. If producer goods are relatively higher priced than consumer goods, and if, for some unexpected reason, resources are suddenly diverted from the production of consumer goods to producer goods, national income aggregate at constant official or established prices would have been magnified. One example can be taken from the production by indigenous methods of iron and steel during the years of the Great Leap Forward (1958-59) which increased the iron and steel output in physical terms, and the value added from these industries might have been calculated on the basis of physical output and 1952 prices regardless of the quality of output.¹⁶ Experts on China's economy have times and times again suggesting that national income aggregates published by the Chinese government contain an inflated element through higher pricing of producer goods. One could therefore speculate that national income accounts are not used in China in planning because of the arbitrary pricing policy and of the day-to-day decisions on production and distribution.

CONCLUDING REMARK

With the national income accounts ex post based on Western concepts made available by non-Chinese scholars, one could analyze China's economic performance in terms of GNP by using a macroeconomic model. We have pointed out earlier that, subject to other limitations, all prototype models are applicable to a given economy provided that they are relevant to the problems at issue. We have also stated that there is no reason for associating a particular technique of planning with a particular type of economy. Hence, national income accounting as a tool of economic planning may be put into application with reference to China, given the objective of the plan (or model). Of course, in so doing, one should bear in mind not only the limitations of national income accounting as a tool of economic planning but also the limitations of the macroeconomic model selected. Since the usual macroeconomic models are based on, inter alia, the assumption of the existence of free market mechanism, one should also take note of the nature of the Chinese price system which we have discussed and analyzed in Chapter II. Ceteris paribus, with the machinery for implementation of planning in China, one might reasonably expect that there would be a strong correlation between the planned targets and actual results, if macroeconomic type of planning -- in which national income accounting plays a major role -- were adopted. An exercise on the use of national income accounting in economic planning with reference to China will be attempted in the next chapter.

C H A P T E R VI

CHINA'S NATIONAL INCOME ACCOUNTING AND ECONOMIC PLANNING

Introduction

Reliability of statistics

Macroeconomic analysis: First Five-Year Plan period
(1953-57)

National income and related aggregates.

Evaluation of the Second Five-Year Plan period on
the basis of a model

Model - incremental capital-output ratio.

Use of national income accounts in planning for the
period 1963-70

Objectives - increase in productive capacity
- increase in economic welfare.

Concluding remark

INTRODUCTION

The previous chapter deals in a summary fashion with the use of national income accounts in economic planning, the latter being assumed to have been based on a theoretical model of some kind. We have suggested that China's economic plans were not based on any model, and if they were, then, for ideological reasons, they were probably based on the Marxian reproduction schema. Again, if any growth model were used, the model which could meet the ideological requirements would probably be the Fel'dman model. We have also suggested that there was no reason that a model of the Harrod-Domar type could not be used in the analysis of the Chinese economic performance. We were of the opinion that, ceteris paribus, the actual results would probably be achieved as predicted in a Western macroeconomic model since China had the benefit of a machinery for control and implementation of an economic plan. The task of the present chapter is three-fold. First, we analyze the economic performance of the First Five-Year Plan period (1953-57) with the aid of a simple macroeconomic model. With the parameters derived from the analysis, we evaluate in general terms the performance of the Second Five-Year Plan period (1958-62), which is our second objective. And, finally, assuming that the objective of economic policy is to increase the economic welfare of the people in terms of real private expenditure and saving -- the concepts of measure of economic welfare change having been discussed in Chapter IV -- we examine the various measures which can be taken by the government if it wishes to attain that goal.

RELIABILITY OF STATISTICS

But first, we should comment on the reliability of Chinese statistics. China is classified as a developing country because of its low per capita product. Much has been written on the reliability of statistical data of the developing countries and therefore requires no repetition here. The question of reliability of Chinese statistics, however, has been unique for the researchers in that the data cannot be statistically assessed. In spite of the numerous discussions on data reliability, the non-Chinese scholars in Chinese studies could only make overall qualitative assessments from an institutional standpoint -- which we shall return to shortly -- and, where reliability of specific data are concerned, the scholars had had to resort to other Chinese data for checking.

Instead of a quantitative estimation of the quality by statistical methods, the assessment of reliability is based mainly on an analysis of consistency among data obtained from different sources or from the same source but published at different time periods. The attitude towards data reliability taken by students of Chinese economy has been, from the start, one of reluctance to accept the data as they are. There is always the advice on their part to treat Chinese statistics with caution.¹ Information on the Chinese economy is obtained in fragmentary form from press reports, official speeches, periodicals, and official statistical publications. As far as newspapers are concerned, experts rank provincial newspapers

above national newspapers, and non-Communist Party to Communist Party newspapers as reliable sources of statistics. The People's Daily, a national newspaper and a Party organ, is said to be more inclined to conceal events that are not in the Party's favour. The provincial papers, being local in character, are less susceptible to censorship since local readers know the local conditions first hand in any case. Reliability of statistical data therefore forms a piece of research by itself!

As regards official assessment of the quality of statistics, it is generally accepted by the Chinese themselves that industrial statistics are more reliable than non-industrial statistics, those concerning the state enterprises more than those relating to non-state enterprise, and those referring to centrally-controlled enterprises more than those about the locally-controlled enterprises. The Director of State Statistical Bureau (SSB), Hsueh Mu-ch'iao, in 1955, rated the reliability of statistics thus: "(a) in terms of functional fields, industry was fair; trade worse; agriculture, worst; (b) in terms of sectors, the state sector was fair; the capitalist sector, worse; and the individual sector (craftsmen and family agriculture), worst; (c) in the state sector, the locally controlled enterprises were worse than those centrally-controlled; and nonbasic activities (such as industrial statistics of nonindustry ministries, trade statistics of nontrade ministries) were much worse than basic industries; and (d) in terms of indicators, physical output and value output were fair; labour and wages, worse; finance and cost, worst."² Further, even statistics of

state enterprises in industry were reliable only to a limited extent. Physical output and value output and labour force data were better than statistics for indicators such as those for experimental manufacturing, output quota, and utilization of equipment.³ According to Dr. C.M. Li, it was doubtful that the latter category of data was ever computed at all.⁴ It is interesting to note that although the 1953 population census was supposed to provide sufficiently reliable data for economic use, population data had been rated as having weak foundation.⁵ Of the data for the agricultural sector, data on sown area, cultivated area and production by crops and by economic classes were the weakest; so were the data on the size and the increase of livestock.⁶ The above assessment appears to have persisted at least until 1961.

The checking of reliability of data by non-Chinese scholars in national income of China studies or in studies on the Chinese economy is mainly based on whether there is internal consistency among data relating to the particular commodity or category. It should be noted, however, that the fact that there is internal consistency does not necessarily indicate that the data in question are reliable. In all probability, in view of the weak statistical organization in China, consistency check would show the weakness of data if we were to assume inconsistencies being a sign of poor quality. Whether internal inconsistencies are the result of statistical manipulations cannot be determined unless an on-the-spot enquiry is made. Without

an acknowledgement to such malpractices by the SSB, one could presumably interpret internal inconsistencies as a deliberate act. However, while reliable data should be internally consistent, unreliable data could be made consistent through statistical manipulations. In fact, unreliable statistics could be consistent. If internal consistency were the criterion of reliability, then such unreliable statistics would be rated reliable!

Caution and skepticism are justifiably essential in using Chinese statistics for another reason. In China, classification of products or product groups is often found to be not uniform. The problem is particularly serious when the quality of product is not specified. The year 1958 saw the decentralization of industrial and financial management. The movement gave sanction to unplanned production which resulted in widespread "backyard" production employing indigenous methods. The output of coal, pig iron and steel by the indigenous methods of production were added to the respective output by the conventional methods in 1958, though this practice was later rectified in 1959 when output by each method was listed separately.⁷

Another contributing factor to statistical inaccuracy which non-Chinese scholars on China appear to have overlooked is the weight and measure system. Weights and measures were not standardized legally until 1959. There were confusions of terms as well as of the lack of uniformity in the use of one particular standard. The State Council on June 25, 1959 decreed that all weights and measures should be standardised to the

metric system, but the use of both the Chinese and the metric systems persisted even after the State Council directive. The Chinese terms for unit weights and measures had been standardized and yet implementation took place only gradually. For example, the term kung-fen (斤 分) means gram (old usage) as well as centimetre, the former is obsolete and yet it is still in use.⁸ Whether the dual systems and the ambiguity of terminology did actually cause a large scale inaccurate statistical reporting at the base level is a moot point. However, it must be admitted that even if they did, this would not be peculiar to China alone for this probably would happen in underdeveloped countries as well.

Apart from lack of uniformity in classification, another possible source of error is statistical reporting at base level. Falsification of data might occur at base level units for fear of reprisal from the superior organs to the effect that the former have not fulfilled targets set for them. At the same time, inaccurate reporting might have been the result of over-enthusiasm. The Great Leap Forward of 1958-59 seemed to suffer most from this kind of error, while in earlier years, the first type of inaccuracies had been found. The unreliability of data in this case is reflected by the defects of the statistical system of China. The defects of the organization can be judged by commonsense. For instance, competent statistical personnel cannot be trained within a short period of time; data are of dubious quality because it is known that less qualified persons are given the charge of collecting statistics. To qualify these

simple notions one may resort to scrutinizing carefully the reports on criticisms of the existing statistical system or the letters to the editor. One may also infer from official statements on proposed improvement of the system that the government implicitly recognizes the inadequacies of the existing system. One would therefore associate questionable agricultural statistics with a statement in a newspaper editorial on the tasks in statistical work for the ensuing year towards the end of 1962: "strengthening agricultural statistical work, especially on the production of major crops and subsidiary products".⁹ This is the qualitative approach we mentioned in the earlier part of this chapter and is used by Dr. C.M. Li in his study on China's statistical system. Dr. Li appears to have approached the problem by looking at it from the institutional standpoint. If the organizational pyramid is under central control, if the lower end of the hierarchy is conscientiously responsive to the higher level, and if statistical personnel are competent, statistical data collected are likely to have a high degree of reliability. On the basis of this approach, Dr. Li concluded that statistics published prior to 1955 were unreliable, those published during 1955-57 were more reliable, and those for 1958 and after should be viewed with skepticism.¹⁰ The study could not find any evidence that there was a double standard -- one for internal use and one for publication. The general impression seems to be that what is unfavourable is not published rather than falsified.¹¹

Between 1960 and 1965 scarcely any data concerning key products and industries were published. Scholars on China frequently relied on refugee interviews as source of information. The Chinese refugees to Hong Kong could probably reveal truthfully the local economic conditions. However, national aggregates based on data obtained in this way are just as liable to an unknown degree of error as published information. Another source of information is interview with Chinese officials by foreign correspondents or visitors. The grain output during 1960-61 claimed by the Chinese leaders was made available through this medium.¹² If the Chinese statistical system had been weak as described earlier, what was revealed by the officials to any foreign visitor should be taken with the unsatisfactory state of statistical service in China in mind.

MACROECONOMIC ANALYSIS: FIRST FIVE YEAR PLAN PERIOD (1953-57)

In the present analysis we shall use the official data as much as possible. It should be noted that our using Chinese statistics does not imply we are satisfied with the quality of the data. We share Dr. C.M. Li's views on the subject. However, we attempt to show that even with Chinese official statistics, the growth capability of the Chinese economy is not as rosy as the Chinese would like to imagine. In any event, the major non-Chinese estimates of China's national income and product appear to be more suitable for long-term growth analysis. Liu and Yeh in their estimates of China's national income had

assumed that grain production in physical terms increased at the same rate as population.¹³ In this way, the fluctuations of grain output were reduced to a trend. Since agricultural value added constituted a large proportion of NDP, such a method of estimating agricultural value added would not show correctly the change of NDP between any two years. Wu and associates used food balance sheet to estimate the actual grain consumption, on the basis of which they estimated one of the two estimates of personal consumption and of GNE.¹⁴ This also tends to smooth out any fluctuations in increase in GNE between any two years. Their alternative estimate was based on the rate of population growth, given the population and per capita consumption at the minimum maintenance level of 1957.¹⁵ This is also like the Liu and Yeh estimate in that it conceals the fluctuations of inter-year increase of GNE.

National income and related aggregates

In order to avoid methodological issues inherent in the non-Chinese estimates of China's national income, we employ the official estimate in the present analysis. It is recognized that the SSB adopts the material production concept of national income, and that the national income as defined by them excludes services which are not directly related to material production. The use of the official estimate, apart from being convenient, is consistent with our present objective which is stated earlier.

The NDMP aggregates are shown in Table 8 in Chapter I. The rates of growth of both the official series and the extended series made by us were discussed in the same chapter (see Tables 9 and 10). In terms of per capita product, China ranks high in rates of growth during the First Five Year Plan period (1953-57) among countries such as Japan, Taiwan, Philippines, and Burma:¹⁶

Annual rate of per capita growth
1952-57^{*}

China	6.6 per cent
Japan	6.3
Taiwan	4.1
Philippines	3.9
Burma	1.0

(* At 1953 prices except for China in which case at 1952 prices.)

The high rate of growth in both aggregate and per capita terms should be viewed with the following factors in mind. First, as we have noted in Chapter II, it has been officially admitted that producer goods were priced relatively higher than consumer goods during the first plan quinquennium. The effect of this on the rate of growth has been discussed in Chapter I. During the first plan period, emphasis was placed on industry, especially heavy industry. Because of the high prices for producer goods, the NDMP growth would be inflated. Secondly, there is a general consensus of opinion among the China experts that agricultural output prior to 1956 was under-reported.¹⁷ The NDMP in 1952 at 1952 prices should have been higher than what it was. The use of 1952 as the base year would give a

higher rate of growth during the first plan quinquennium with the under-reporting of agricultural output not accounted for. The low rate of growth of NDP, as computed by Liu and Yeh or Wu and associates, was due to the upward revision of agricultural output for 1952.¹⁸ Thirdly, there can be no doubt that China's rapid growth over a short period of five years was partly due to production of new products. These products were not in existence in 1952. The new product effect on index numbers is not peculiar to China alone. It is not difficult to appreciate the significance of this effect in the case of China since new product manufacturing was a priority in the development of heavy industry during the first plan quinquennium. These three factors contribute to the thesis that the large increase of NDMP was statistical rather than real during this period.¹⁹ Nevertheless, even if Liu and Yeh's or Wu and associates' estimates of China's national income were more realistic than the official estimate, the growth was still impressive.

The casual factors of this impressive economic growth may be traced to China's economic policy as regards capital accumulation, to Soviet aid and to the use of labour-intensive techniques of production as a supplement to capital-intensive techniques. The high rate of capital formation, officially claimed to be between 22 to 26 per cent of the NDMP during the period 1953-57, was made possible through effective utilization of available human resources in formation of social overhead capital. The price policy of agricultural products subject to

state purchase and supply plans was such that the state purchasing prices were much lower than the retail prices of these products, with the result that funds were made available for financing capital formation. We have pointed out in Chapter II that between the agricultural purchasing price and the retail price are the consolidated industrial and commercial taxes levied on the products at the purchasing station level and at the retail level, the trading profits at wholesale and retail trade level and distribution costs. The taxes and a major part of the enterprise profit are channelled to the state coffers, which eventually are used for financing capital formation. The implementation of policy on institutional and organizational changes also resulted in effective exploitation of economic resources for the purpose of capital formation. Efficiency in management in rural areas was increased to some extent through cooperativization and collectivization of the former individual and small units. In urban areas, the former individual handicrafts and service trades were encouraged to form cooperatives. The results of these changes were that surplus labour was mobilized to effective use and also distribution was made more efficient.

As a result of Soviet aid -- in the form of complete sets of equipment, installation services, technical training -- China had the benefit of a nucleus for its economic development programmes. The number of projects covered by Soviet aid was 166. Most of the projects constructed with Soviet aid were

equipped with machinery imported from the Soviet Union. Among these projects included the three large iron and steel complexes in Anshan, Wuhan, and Paot'ou; the Peking electronic tube plant; the Harbin precision instrument and tool plant; the giant hydroelectric power plants including the Sanmen Gorge; the major coal mines in Fushing, Chiamussu, Fengfeng, Hsian, Chihsi, Hwainan, and Fushun; the Kirin chemical fertilizer plant, the Kirin carbide plant, and the Kirin dye plant; and so on.²⁰

Finally, where capital equipment could be reserved for modernization, labour-intensive techniques were used in areas which were on a lower priority. This policy was furthered to a greater extent in the ensuing plan period.

Table 17 shows the accounting relationships between the component aggregates and the net domestic expenditure aggregate (based on material production concept of national income) while Table 18 illustrates the net domestic material product and its increase between years. From Table 17 we know that capital formation in China formed a large share of the NDMP during the plan quinquennium under consideration:

1952	18.2 per cent
1953	22.4
1954	23.5
1955	22.9
1956	26.1
1957	24.0
1952-57	23.1

TABLE 17. OFFICIAL ESTIMATE OF NET DOMESTIC EXPENDITURE, 1952-57

	(1,000 million 1952 yuan)				
	<u>Personal consumption</u>	<u>Communal services</u>	<u>Government consumption</u>	<u>Net domestic investment</u>	<u>Net domestic expenditure</u>
1952	47.87	0.82	2.73	11.44	62.86
1953	51.11	1.23	2.83	15.92	71.09
1954	53.78	1.14	1.88	17.45	74.25
1955	58.15	0.91	1.82	18.08	78.96
1956	62.02	1.47	1.65	23.01	88.15
1957	66.78	1.39	2.14	22.20	92.51
1952- 1957	339.71	6.24	13.05	108.10	467.82

Source: T.C. Liu & K.C. Yeh, The Economy of the Chinese Mainland: National Income and Economic Development, 1933-59, Vol. I, Table 94.

TABLE 18. NET DOMESTIC MATERIAL PRODUCT, 1952-59

	(1,000 million yuan at 1952 prices)	
	<u>Net domestic material product</u>	<u>Incremental net domestic material product</u>
1952	61.13	
1953	70.04	8.91
1954	73.88	3.84
1955	78.80	4.92
1956	88.75	9.95
1957	93.65	4.90
1958	125.49	32.84
1959	152.52	27.03

Sources: Lu Kuang, "China's National Income," Peking Review, April 8, 1958, p.8; State Statistical Bureau, Ten Great Years, p.20; State Statistical Bureau, "Communique on the Growth of China's National Economy in 1959," Peking Review, January 26, 1960.

The high rate of investment every year was supposed to be responsible for the increase of NDMP (see Table 18). The annual growth rate during 1952-57 of NDMP was 8.9 per cent or an overall increase of 53.2 per cent over 1952-57, while that of capital formation was 14.2 per cent or an overall increase of 94.1 per cent.

EVALUATION OF THE SECOND FIVE YEAR PLAN PERIOD ON THE BASIS OF A MODEL

The Second Five Year Plan period (1958-62) was characterized by the Great Leap Forward of 1958-59 and the "Great Leap Backward" or downturn of 1960-62 precipitated by an agricultural crisis due to adverse weather conditions beginning from 1960. During the first two years of this plan quinquennium, aggregate and per capita NDMP rose to a great height (see Tables 6 to 10).

The Great Leap Forward could be interpreted as a movement or a new development strategy to speed up economic growth. The campaigns launched in 1958-59 were accompanied by the spirit aiming at "maximizing current output by utilizing the scattered resources (particularly labour) wherever possible."²¹ The use of labour-intensive techniques referred to earlier found expression in the movement. Small-scale operations employing indigenous methods were encouraged. It was officially claimed that three-quarters of China's coke, one-half of its iron ore and pig iron, one-third of its crude steel, and one-sixth of

its cement produced in 1959 attributed to the employment of labour-intensive techniques.²² The "backyard" industrial units were characteristics of this movement.

The adverse weather conditions beginning from the second half of 1960 precipitated the downturn of the Chinese economy. If our own estimates of NDMP were any guide (see Tables B-30 in Appendix B), in per capita terms, the 1961-62 situation was worse than that of 1959 (see Table 10). Wu and associates estimated that the GNP of those two years were lower than that of 1952! (see Table 6), and that per capita product in 1962 was 7.9 per cent below the 1952 level.

It has been said that the Great Leap Forward hindered the operation of the planning system. The mushrooming of the local industrial units was not a part of any plan: it was the result of Great Leap politics. Given the national income accounting data of the first plan quinquennium, one could approach an analysis of the development of the second plan period on the basis of a simple model. We attempt this as an exercise on the use of national income accounts for analysis based on a model.

Model

We may use a simple capacity creating model of the Domar type, the basic equation being:

$$\Delta Y = bI$$

where Y is national product, I investment and b capital coefficient.

The reason for using a simple capacity creating model rather than one of the prototype input-output or interindustry models in Appendix C is not difficult to explain. Since we are concerned with application of national income accounting, the choice of prototype models is limited to macroeconomic models. While national income accounts might serve input-output type of model building, we are not able to show the application of national income accounting with reference to economic planning based on an input-output or interindustry model because we would require input-output data as well and such data are not available.

It follows that the logical choice would be a macroeconomic model. And among the various prototypes of macroeconomic models in Appendix C, the Fel'dman model should have been the ideal choice. Unfortunately, national income accounting data in the form required for that model are not readily available. National income classified into valued added of producer goods and consumer goods only is required but the available national income estimates surveyed in Chapter I are classified by industrial origin, final use, or distributive shares and are not suitable for analysis or projection based on the Fel'dman model. This brings us back to a point we made in Chapter V where we suggested that the choice among the various prototype models depended on the availability of the relevant statistical data. It should be pointed out that we are not saying that national income in the form required is not

available in China. It is probably available. What concerns us here is whether such data are available to us outside China. And in this respect, we say that none is known to us.

We are then left with the models of the Harrod-Domar type. Our simple capacity creating model is based on such prototype models. Again, availability of the relevant statistical data determines the degree of sophistication of the model. In the next section, it will be noticed that we shall be forced to modify the prototype macroeconomic model of the Domar type. Instead of an average capital-output ratio we shall use the incremental capital-output ratio. Obviously assumptions governing the use of the model will have to be made and conclusions will have to be drawn with the assumptions well in mind. It should be reminded once again that the emphasis is the use of available national income accounting data in economic planning and not the type of model to be used in plan formulation in a given country. In short, the fact that we are using a simple capacity creating model of the Domar type does not imply that on its own merits it is more appropriate than, say, the Fel'dman model. Of course, if the SSB or non-Chinese scholars could produce a set of national income accounts which would provide data in the form required for the Fel'dman model, we would have used the Fel'dman model instead.

Having selected the simple capacity creating model as the basis of our evaluation of the performance of the Second Five-Year Plan period (1958-62), we now turn to consider the incremental capital-output ratios.

Incremental capital-output ratio

We shall first consider the parameter b . Capital coefficient is the reciprocal of capital-output ratio. Data on total capital stock in China are not available, though those of particular industries (some manufacturing, mining, utilities; trading stores and restaurants; modern transportation and communications; and construction) are available.²³ We therefore calculate the incremental capital-output ratio (ICOR) instead. This we do on the basis of the national income data presented in Table 18.

The ICOR's are presented in Table 19. There are three sets, each with a different time-lag. If we consider the total investment during the period 1952-56 and the change of net domestic material product over the period 1953-57 (that is, with one-year lag), the ICOR will be 2.64.

We have said in the last chapter that national income accounts merely describe the state of the economy and do not suggest whether the economy is at full employment situation at any given year. Thus, the ICOR's calculated from the accounting data are subject to the same limitations. A low ICOR is usually associated with the generation of income through a relatively small investment at full employment situation. A low ICOR at less than full employment situation conceals the fact that the economy is under-utilizing its productive capacity when investment is made. In short, under conditions of less than full employment of resources, NDMP might increase without any addition to the existing capacity.

TABLE 19. INCREMENTAL CAPITAL-OUTPUT RATIOS

	Incremental capital-output ratios (ICOR)		
	One-year lag	Two-year lag	Three-year lag
1953	1.283	*	*
1954	4.147	2.980	*
1955	3.546	3.236	2.325
1956	1.818	1.754	1.601
1957	4.696	3.690	3.560
1958	*	0.701	0.551
1959	*	*	0.851

Notes: * not computed.

ICOR = net investment at time (t) \div change of NDMP between (t) and (t + n) where n = 0, 1, ... 3.

Sources: Tables 17 (net domestic investment) and 18.

The interpretation of ICOR is also subject to the choice of gestation period. The choice depends on the scale of the investment projects, some of which require more than the mere two or three years. If the gestation period is five years, increase in capacity will not take place before the five years are out.

The ICOR implies that the change of national income is solely due to increase in capital stock. But output may be increased through labour-intensive techniques, in which case, an increase in labour inputs through population increase would increase the productive capacity but it would be concealed by the ICOR.

On conceptual ground, the use of the net domestic investment data in Table 17 (which, in Chinese terminology, is accumulation) suffers from the defect that accumulation includes not only fixed investment but also inventory change. Hence, the ICOR calculated from national income data as presented does not show a direct relationship between the increase in capital stock and the resultant increase in productive capacity.

ICOR also assumes that the state of technology does not change. But in a developing economy, particularly when capital goods are imported, the state of technology varies, depending on the productivity of the capital imported. Any changes in this direction will be concealed.

Therefore, the use of the ICOR's presented in Table 19 is subject to the limitations described. The ICOR's are calculated on the basis of the investment in a given year and the changes of NDMP after the gestation of one, two or three years (the changes of NDMP are shown in Table 18).

For our purpose we should assume that the gestation period is three years since installation of large plants and construction of big projects would take about that length of time. However, we select the ICOR with a two-year lag for 1957 as the representative ratio, that is, a ratio of investment in 1955 to a NDMP change in 1957. The choice is determined by accepting the contention that statistics for 1955-57 are more reliable. But it should also be borne in mind that limitations of ICOR computed from national income data still apply even though the latter relate to a three-year period.

The change of NDMP resulting from investment two years earlier during the second plan quinquennium is shown in Table 20. It is assumed that $NDE = NDMP$, which implies that the rate of investment is in terms of NDMP rather than NDE (as in Table 17). Furthermore, the rate of investment of 1957 (24 per cent) is assumed for the ensuring five-year period.

The numerical illustration shows that had China pursued a conservative policy based on the performance of the last three years of the first plan period, instead of adopting a virtually no-plan policy during the 1958-60 period, the change

TABLE 20. CAPACITY-CREATING MODEL FOR THE SECOND FIVE YEAR PLAN PERIOD

(1,000 million 1952 yuan)

	<u>Net domestic investment</u>	<u>△ NDMP</u>	<u>NDMP</u>
1956	23.01		88.75
1957	22.20		93.65
1958	23.97	6.24	99.89
1959	25.42	6.02	105.91
1960	26.98	6.50	112.41
1961	28.63	6.89	119.30
1962	30.39	7.31	126.61
<u>Rate of growth, 1957-62 (%)</u>			
a. Overall	36.9		35.2
b. Annual	6.5		6.3

Notes: ICOR = 3.69, thus b(capital coefficient) = $\frac{1}{3.69}$.
 Rate of investment = 0.24 of NDMP.

Sources: 1955-57: net domestic investment from Table 17;
 NDMP from Table 18.

ICOR: Table 19.

Rate of investment: see text.

of NDMP would have been an average of 6,130 million yuan at 1952 prices a year instead of 29,935 million yuan as claimed by the Chinese government.²⁴ Had the planners not been hindered by the agricultural crisis during the remainder of the second plan period, they would have seen that the overall increase of NDMP over the five years was 35.2 per cent above the 1957 level. In the Proposal for the Second Five Year Plan, the planners envisaged an overall increase of 50 per cent over the 1957 level by the end of 1962.²⁵ Given the ICOR with a two-year lag of 3.69 and also the same rate of unemployment throughout the period 1958-62 as in 1955, this planned rate could be achieved, provided that the rate of investment increased to 24.57 per cent of the NDMP by 1962.

The large discrepancies between the calculated and the actual growth of NDMP of the two years, 1958 and 1959, had been the result of factors which were not foreseen in 1956, the year when the Second Five-Year Plan proposal was adopted. The exceptional good harvest of 1958 was attributed to good weather condition, to greater efficiency in farming through amalgamating smaller production units (from agricultural cooperatives to higher agricultural producer cooperatives, and from higher agricultural producer cooperatives to rural people's communes), and to the greater attention paid to agricultural production. To a large extent, the high output had no direct relation with the investment in agriculture. Agricultural techniques in China are mostly labour-intensive. The increase in output of

major industrial commodities are largely due to effective utilization of human resources and to employing indigenous (and therefore labour-intensive) methods of production. In the case where output could be increased through intensive use of labour, workers increased their average output per man-hour by extending their working hours. The pattern of investment envisaged in 1956 could hardly be suited to the needs arising from the unforeseen increase in output later, particularly in transportation. China experienced a bottleneck in its transportation during the years of the Great Leap Forward. Instead of an orderly development of the various lines of investment activity, a change of pattern on an ad hoc basis resulted. Resources were diverted from long-term projects to short-term activities. Instead of paying more attention to schemes which would prevent the agricultural sector from the effects of adverse weather conditions, resources were poured into the industrial sector, especially heavy industry, in a greater quantity than the latter deserved. This was done with the view of changing China into a modern industrial power by "going all out and aiming high to achieve greater, quicker, better and more economical results in building socialism."²⁶ The transformation was to be completed not in the course of time, but now!

We shall not look into the actual causal factors which led to the divergence between the expected and actual results. for we can refer to the literature by the China specialists.²⁷

All that we are concerned with here is that national income accounts can be used for Chinese planning in terms of macro-economic aggregates, even though the Chinese have objected to macroeconomic planning. The Great Leap Forward and the agricultural crisis that followed could not have been foreseen by the planners in 1956 and they should have been anticipated if long-term planning were to have any meaning. A numerical model based on data obtained from national income accounts, which we have presented earlier, shows the limitations of the utility of national income accounting data. Not only the statistical data themselves do not convey anything beyond the actual results and the relationships among the components of the aggregate, they do not tell us the functional relationships among the components.

USE OF NATIONAL INCOME ACCOUNTS IN PLANNING FOR THE PERIOD 1963-70

The Second Five-Year Plan has never been formally published. The Proposal could ^{have} been used as a working basis, but no results for the entire plan period 1958-62 are available. The reason is obvious: the natural calamities had thrown the whole plan -- if it could be called at that from the beginning -- overboard. In fact, the five years (1961-65) have been described as a "transitional period". The Third Five-Year Plan period began on January 1, 1966, but its Plan has as yet to be published. In the exercise below, we shall assume that planning begins from the year 1963.²⁸

Objectives

During the period of transition, China witnessed a policy reorientation. Instead of emphasis on industry, especially on heavy industry, top priority was given to agriculture.²⁹ This was a departure from the policy pursued during the first plan period and the Great Leap Forward of 1958-59. The transition period also saw a greater relaxation of controls and consideration for economic incentives and greater realism in handling economic problems. Higher esteem was given to technical and professional men because self-reliance had become the key word. Also there was an expansion in economic relations with Western countries at the expense of the Soviet Union, which could be traced to the strain relations between the Soviet Union and China. As an academic exercise, let us assume that the objective is to increase the economic welfare of the people. A plan for the period 1963-70 is to be formulated with this aim in view. The plan is to be subject to constraints, namely, self-reliance and a certain rate of investment. As regards the latter, it should be higher towards the second half of the plan period than at the beginning. Accordingly, we assume that it is 15 per cent of the NDMP during 1963-65 and 20 per cent during the remainder of the period. These assumptions are not unrealistic in view of the natural calamities of 1961-62 and the consequential low overall output of the economy in the ensuing few years. Hollister estimated that, in 1961, the level of investment was about 50 per cent below the 1959 level.³⁰

While 15 per cent appears to be on the high side, it is unlikely that China would, for ideological reasons, peg the rate more than 10 per cent from the ideal 25 per cent rate.

Increase in productive capacity

Assuming the same factor proportions as for 1952-57, a period of comparative stability, an ICOR of 3.69 with a two-year lag is employed to estimate the productive capacity for the period 1963-70. Since estimates for net domestic investment and NDMP of 1961 and 1962 are available, the change of NDMP and the NDMP for 1963-70 can be estimated by the model

$\Delta Y = bI$. (See Table 21). The increase of net domestic investment over the period 1963-70 is 74.8 per cent or 8.3 per cent per annum, and that of NDMP over the same period is 31.2 per cent or 4.0 per cent per annum.

Increase in economic welfare

In Chapter IV, economic welfare has been defined in terms of individual choice. We have said that personal consumption and saving tends to be a more appropriate measure of economic welfare than the national income aggregate. Since the aim of the plan for 1963-70 is assumed to be one of increasing the economic welfare of the people, the target for personal consumption and saving has to be fixed. However, there may be other objectives, such as communal services and government consumption, which also demand scarce economic resources.

TABLE 21. NET DOMESTIC MATERIAL PRODUCT, 1961-70

(1,000 million 1952 yuan)

	<u>Net domestic investment</u>	<u>△ NDMP</u>	<u>NDMP</u>
1961	18.27		121.68
1962	19.44		139.62
1963	21.70	4.95	144.57
1964	22.49	5.27	149.94
1965	22.61	5.88	150.82
1966	31.38	6.10	156.92
1967	32.61	6.13	103.05
1968	34.31	8.50	171.55
1969	36.08	8.84	180.39
1970	37.94	9.30	189.69

Notes: Rate of investment: 1961-65: 15% of NDMP
 1966-70: 20% of NDMP

National income change calculated on the basis of $\Delta \text{NDMP} = bI$ where b is the inverse of ICOR with a two-year lag. Thus, change of NDMP at time $(t + 2)$ is due to investment of time period (t) . The ICOR is 3.69.

Source: NDMP in 1961 and 1962 taken from Table 8.

Table 22 presents a projection of the final demand for 1963-70, in which communal services are assumed to increase at the same rate as population (see Table 17) and government consumption is assumed to be a constant proportion of NDMP for the year in question (2.313 per cent). This implies that the rates are the same as for the period 1953-57. If the target to be fixed for personal consumption were 2.1 per cent per annum, per capita personal consumption would not have increased since 2.1 per cent per annum is also the assumed rate of annual increase of population. In this connection, we have omitted the variable savings because of lack of data. Table 22 shows that except for 1966 and 1967, productive capacity (which is shown in Table 21) is sufficient to cope with the demand. If, however, the target for personal consumption were to be fixed at 4.2 per cent per annum, thereby giving a per capita increase of 2.0 per cent per annum, productive capacity as estimated would be insufficient to cater for the demand (see Tables 21 and 23). In that event, if the rate of investment were to be maintained at the pre-determined rates during the period 1963-70, communal services and government consumption would have had to be reduced. Since communal services could be by definition included under personal consumption, as we have discussed in Chapter III on valuation of national income in a centrally planned economy, then government consumption would have had to be curtailed. However, we cannot make this supposition for this would mean that government consumption is a cost and has no place in final demand. Nevertheless, it is clear that if the final demand is

TABLE 22. PROJECTION OF FINAL DEMAND, 1963-70 (I)

(1,000 million 1952 yuan)

	<u>Personal consumption</u>	<u>Communal services</u>	<u>Government consumption</u>	<u>Investment</u>	<u>NDE</u>
1957	66.78	1.89	2.14	22.20	92.51
1962	115.41	1.54	3.23	19.44	139.62
1963	117.60	1.57	3.35	21.70	144.22
1964	120.30	1.61	3.47	22.49	147.87
1965	122.80	1.64	3.49	22.61	150.54
1966	125.40	1.67	3.63	31.38	162.08
1967	128.00	1.71	3.77	32.61	166.09
1968	130.70	1.74	3.97	34.31	170.72
1969	133.50	1.78	4.17	36.08	175.53
1970	136.20	1.82	4.39	37.94	180.35

Notes: Rate of growth of personal consumption is assumed to be the same as the rate of population growth (i.e. 2.1% per annum). The same assumption applies to communal services. Government consumption is assumed to be maintained at 2.313% of NDMP (productive capacity). Investment is maintained at 15% of NDMP during 1963-65 and 20% during 1966-70. NDE is an aggregate of the four branches of demand.

Sources: 1957: Table 17.

Other years: investment and NDMP: Table 21.

TABLE 23. PROJECTION OF FINAL DEMAND, 1963-70 (II)

(1,000 million 1952 yuan)

	<u>Personal consumption</u>	<u>Communal services</u>	<u>Government consumption</u>	<u>Investment</u>	<u>NDE</u>
1963	120.3	1.57	3.35	21.70	146.92
1964	125.4	1.61	3.47	22.49	152.97
1965	130.7	1.64	3.49	22.61	158.44
1966	136.2	1.67	3.63	31.38	172.88
1967	142.0	1.71	3.77	32.61	180.09
1968	148.0	1.74	3.97	34.31	188.02
1969	154.3	1.78	4.17	36.08	196.33
1970	160.8	1.82	4.39	37.94	204.95

Notes: Assumptions being the same as for Table 22 except rate of growth of personal consumption which is 4.2% per annum here.

Source: See Table 22.

depicted as in Table 23, the personal consumption target may or may not be achieved, depending on whether the targets for communal services and government consumption are or are not to be maintained. If personal consumption includes communal services and government consumption, which resembles the case presented in the Chapter III, then, while the target for personal consumption could be achieved, rate of investment could not, given the pre-determined rate for the given year. However, the productive capacity estimated for the period 1963-70 has been based on the assumption of a rate of investment of 15 per cent of the NDMP during 1963-65 and 20 per cent during 1966-70. Therefore, the target for personal consumption is not consistent within the model. Given the constraint of rate of investment, personal consumption expenditure increases only 23.5 per cent during the period 1963-70 or 3.0 per cent per annum.

A rate of investment of 15-20 per cent might appear high, but given the assumption of a capital coefficient of $1/3.69$ with a two-year lag, personal consumption increases only moderately. In short, in terms of goods and services for personal consumption, economic welfare of the people in China under these given conditions cannot be expected to increase to any significant extent.

In personal consumption were to increase at the rate of 4.2 per cent per annum, then the policy of self-reliance would have to be dropped so that productive capacity might be increased to the extent desired through import of capital goods (made

available, presumably and hopefully, through foreign aid). We have so far assumed that factor proportions remain the same as those during the first plan period. But it is possible to increase capacity through employment of surplus labour, as had been done in the years of the Great Leap Forward. However, instead of channelling labour resources to production of capital goods, incentives should be given to the people to produce consumer goods which do not require the use of the already scarce capital resources.

CONCLUDING REMARK

National income accounts provide the basis data for variables in a simple model. They may also provide data for more complex macroeconomic models as shown in the previous chapter, provided that national income accounts themselves are detail in their construction. In the case of China, we have shown the usefulness of national income accounting data in economic planning based on a simple macroeconomic model of some kind. The macroeconomic aggregates aid in showing the limits of expansion of the economy against the given objectives. While they do not show functional relationships, national income aggregates nevertheless provide the basis for computing parameters, though the interpretation of both the aggregates and the parameters is subject to other considerations. Our exercise on the use of national income accounts in Chinese planning is not meant to show that the Chinese planners should take up the solutions we have worked out, thereby solving what is in practice

a more complex problem. Nor do we intend to imply that macro-economic models based on national income accounting data are the only working bases of formulating an economic plan. We have only shown that national income accounts are useful in planning even in the case of China where national income accounts have so far been used as statements of past performance. The use of other forms of social accounts in planning is equally, if not more, practicable. These have been left out because they are beyond the scope of the present study on applications of national income accounting. Even among macroeconomic models, there are alternatives which take into account of possible uncertainties. We have omitted them because of the lack of relevant data at our disposal.

Eckstein's national accounts data were first reported in Tables A-1 to A-6a. Hollister's data were reported in the same tables with the structure A P P E N D I X A. However, in order to make comparisons between the two sets of data, some adjustments have been made to the original structure of Eckstein's data.

A COMPARISON BETWEEN ECKSTEIN'S AND HOLLISTER'S
ESTIMATES OF CHINA'S NATIONAL INCOME FOR 1952

Notes of Comparison: Eckstein's data are based on the 1952 Chinese Great National Account and are reported in the following tables:

A-1 COMMUNIST CHINA'S GROSS PRODUCT IN 1952

Eckstein's national accounting data have been reproduced in Tables A-1 to A-6a. Hollister's data are adjusted to fit in with the structure of accounts and supporting tables devised by Eckstein. However, in order to make comparison possible, new items have been added to the original structure of accounts and these are denoted by their parentheses, namely / /.

Eckstein's data are taken from his monograph, The National Income of Communist China while Hollister's are taken from his China's Gross National Product and Social Accounts 1950-1957.

Table A-1

1. Value added in industry and construction	2,200	18,400
2. Value added in farm households for sale	375	
3. Farm production value less inputs	2,300	
	- 1,000	
4. Total gross output value		18,600
5. Less: inputs for (1) to (3)		12,170
6. Total farm product (from (1) to (3))	27,303	21,270
(a) Total farm output value	21,400	18,400
7. Value of farm output sold less production expenses	12,310	12,310
	- 1,100	- 1,000
(b) Net farm income to sold	26,315	21,270

A-1 COMMUNIST CHINA'S FARM PRODUCT IN 1952
(million yuan)

	<u>Eckstein</u>	<u>Hollister</u>
1. Value added in agricultural production	30,100	
(a) Gross crop production value	28,610	32,400
(b) Gross silk production value	130	
(c) Gross livestock production value	6,720	6,090
Total gross production value	35,460	38,490
Less: Inputs	- 5,360	
2. Value added in fishing	330	
Gross production value	367	
Less: inputs	- 37	
3. Value added in subsidiary production	6,200	10,400 ^a
4. Value added in farm handicrafts for sale	875	
Gross production value	2,500	
Less: inputs	- 1,625	
5. /Total gross output value/		48,890
6. /Less: Inputs for (1) to (3)/		12,100
7. Total farm product (from (1) to (6))	<u>37,505</u>	<u>36,790</u>
(a) Net farm money income	11,190	10,410
Value of farm output sold	12,310	12,310
Less: production requisites purchased	- 1,120	- 1,900
(b) Net farm income in kind	26,315	26,380

Note: a. Includes forestry in Hollister's figure.

A-2a NON-FARM CIVILIAN EMPLOYMENT IN 1952
(in thousands)

	Public Sector		Private Sector	
	Eckstein	Hollister	Eckstein	Hollister
1. Mining & Manufacturing	3,358	2,863	9,070	7,789
a. Industry	3,140		2,057	2,542
b. Handicraft (non-farm)	218		7,013	5,247
2. Construction	(1,021)	1,021	n. a.	30
3. Transport	596	716	4,584	191
4. Post & Telecommunications	120			
5. Trade	1,247	1,134	8,218	2,320
6. Banking & Insurance	305	305		
7. Government	3,896	3,846		
a. Administrative culture	1,573	1,523		
b. Education	2,282	2,282		
c. Urban public utility	41	41		
8. Miscellaneous		829	n. a.	367
9. GRAND TOTAL	10,543	10,714	21,872	21,021

A-2b NON-FARM CIVILIAN WAGE STRUCTURE IN 1952
(yuan)

	Public Sector		Private Sector	
	Eckstein	Hollister	Eckstein	Hollister
1. Mining & Manufacturing		540		
a. Industry	560		560	425 ^a
b. Handicraft (non-farm)	210		210	300
2. Construction	n.a.	500		434 ^b
3. Transport	550			
a. Modern			550	
b. Native		530	210	
c. Hauling, etc.			380	
4. Post & Telecommunications	550			
5. Trade	450	425		
a. Resident			400	
b. Itinerant			550	261 ^c
c. Stalls & small merchants			250	
d. Catering			195	
6. Banking & Insurance	720	425		
7. Government Services	430			
a. Administration		300		
b. Culture, education & health		400		
c. Urban public utility		500		
8. Miscellaneous		450		

Notes: a. .85 of 500 yuan

b. .85 of 510 yuan

c. .85 of 425 yuan

See Hollister's text on p. 73 and p. 76.

A-2c NON-FARM CIVILIAN WAGE BILL IN 1952
(million yuan)

	Public Sector		Private Sector	
	Eckstein	Hollister	Eckstein	Hollister
1. Mining & Manufacturing	1,804.2	1,546	2,624.7	
a. Industry	1,758.4		1,151.9	
b. Handicraft (non-farm)	45.8		1,472.7	1,600
2. Construction	n.a.	510	n.a.	
3. Transport	327.8		1,239.4	
a. Modern		379	227.7	
b. Native			707.7	
c. Hauling, etc.			304.0	
				2,000
4. Post & Tele-communications	66.0			
5. Trade	561.2	482	2,675.3	
a. Resident			1,604.8	
b. Itinerant			180.95	
c. Stalls & small merchants			606.75	
d. catering			282.75	
6. Banking & Insurance	219.6	130		
7. Government Services	1,675.3	1,391		
8. Miscellaneous		265	2,400.0	200
9. GRAND TOTAL	4,654.0	4,799	8,939.3	3,800

A-3 HOUSEHOLD AND PRIVATE SECTOR ACCOUNT IN 1952
(million yuan)

	<u>Eckstein</u>	<u>Hollister</u>
A. INCOMES		
1. Incomes of Farm households	38,910	38,990
a. Net money income from agriculture & handicraft production	11,190	10,410
b. Net income in kind from agriculture & handicraft production	26,315	26,380
c. Imputed net rent on farm dwellings	1,405	1,950
/d. Imputed consumer rent/	-	2,200 ^a
2. Non-farm wages & salaries including incomes of self-employed	15,015	8,634
a. Direct wages, salaries & incomes	14,890	8,599
b. Supplementary incomes in kind	125	35
3. Private business earnings	1,490	7,490
4. Rental income (imputed & monetary) from private non-farm dwellings	1,395	1,770
/Consumer services/		1,630
5. Pay & subsistence of armed forces	1,500	1,450 ^b
6. Total income currently earned	58,310	59,964
7. Transfer receipts	900	620
a. Rural relief	145	
b. State unemployment relief	40	243
c. Veterans' benefit	210	
d. Stipends of students	320	120
e. Pensions, allowances & other benefits	50	208
f. Amortization of bonds & savings deposits	135	49
8. Total income	59,210	60,584

	<u>Eckstein</u>	<u>Hollister</u>
B. EXPENDITURES		
1. Retail sales to households	20,995	23,050
2. Farm consumption in kind	21,600	21,600 ^c
3. Expenditure on housing services	3,425	
a. Farm	1,875	1,950 ^d
b. Non-farm	1,550	2,400
4. Consumption of subsistence of armed forces	1,000	970
5. Trade union and other dues	65	38 ^e
6. Expenditure on miscellaneous services	2,900	1,830 ^f
7. Total household expenditure for goods and services consumed	49,985	51,838
8. Gross investment	3,765	2,100
a. Fixed capital	2,345	
b. Inventory	(1,420)	
9. Total current expenditures on consumption and investments	53,750	53,938
10. Transfer outlays	4,185	5,698
a. Increase in bank deposits of households	320	318
b. Direct taxes	3,775	5,380
c. Gifts	55	
d. Private enterprises contribution to social insurance	35	
11. Other transfers and statistical discrepancies	1,275	948
12. Total expenditure	59,210	60,584

A-4 PUBLIC SECTOR ACCOUNT IN 1952
(million yuan)

		<u>Eckstein</u>	<u>Hollister</u>
A. INCOMES			
1. Earnings of government enterprises & organizations		5,980	6,110
a. paid into budget	5,450		5,728
b. retained earnings	530		380
/c. direct taxes of state enterprises/			860
2. Profits of co-operation		200	-
3. Receipts of social insurance funds (incl. trade union funds)		125	-
4. Indirect taxes less subsidies		6,640	4,470
5. Total charges against current product		12,945	11,440
6. Transfer receipts		6,055	6,068
a. Private enterprise contribution to social insurance	35		
b. gifts	55		5,380
c. money savings by households	320		318
d. direct taxes by private sector			
agricultural tax	3,300		
business income tax	475		
e. other transfers	1,870		370
7. Total income		19,000	17,508

A-4 (continued)

	<u>Eckstein</u>	<u>Hollister</u>
B. EXPENDITURES		
1. Government administration (including local gov't)	2,110	1,922
2. Defence	4,370	4,371
3. Community services (health, welfare and education)	1,195	836
4. Gross public investment	4,085	7,070
a. fixed capital	5,015	5,580
b. inventory change	n.a.	2,410
c. net foreign investment	- 930	- 920
5. Total outlays net of transfers	11,760	14,199
6. Transfer outlays	990	620
a. unemployment benefits	40	
b. pensions allowances & other benefits	50	208
c. veterans benefits	210	243
d. stipends to students	320	120
e. interests and amorti- zation on bonds and interest on savings deposits	135	49
f. disaster relief	145	
g. public contribution to insurance funds	90	
7. Statistical discrepancy	6,250	2,689
8. Total expenditures	19,000	17,508

A-5 GROSS NATIONAL PRODUCT ACCOUNT IN 1952
(million yuan)

	<u>Eckstein</u>	<u>Hollister</u>
A. INCOMES		
1. Incomes of farm households	37,505	36,790
2. Compensation of employees and self employed	16,515	11,964 ^a
3. Rental incomes	2,800	3,720
4. Enterprise earnings		
a. Private	1,525	7,490
b. Public	6,270	6,970
5. Indirect taxes	6,640	4,470
6. Gross national product at market prices	71,255	71,404
B. EXPENDITURES		
1. Household consumption	49,985	52,138
2. Community services	1,195	836
3. Government administration	2,110	1,922
4. Defence	4,370	4,371
5. Gross investment		
a. In fixed capital	7,360	7,680
b. In inventories	n.a.	2,410
c. Net foreign investment	- 930	- 920
6. Statistical discrepancy	7,165	2,967
7. Gross national expenditure at market prices	71,255	71,404

Note: a. Includes consumer services.

A-6 GROSS DOMESTIC PRODUCT AT FACTOR COST BY
INDUSTRIAL ORIGIN IN 1952
(million yuan)

(Percentages in parentheses)

	<u>Eckstein</u>	<u>Hollister</u>
1. GDP at factor cost	64,606 (100.0)	68,927 (100.0)
2. Agriculture	30,430 (47.1)	39,000 (56.58)
3. Industry	14,740 (22.8)	11,156 (16.19)
4. Construction	1,850 (2.9)	803 (1.16)
5. Transport & Telecommunications	3,020 (4.7)	4,237 (6.15)
6. Trade	5,380 (8.3)	6,625 (9.61)
7. Modern banking and insurance	420 (0.7)	130 (.19)
8. Dwelling services	2,800 (4.3)	3,720 (5.38)
9. Government services	1,675 (2.0)	1,391 (2.01)
10. Defence	1,500 (2.3)	1,450 (2.10)
11. Others	2,790 (4.3)	465 (.67)

A-6a WAGE BILL AND NONWAGE EARNINGS IN 1952
 (BASED ON HOLLISTER)
 (million yuan)

	<u>Public</u>		<u>Private</u>		<u>Total</u>
	<u>Nonwage</u>	<u>Wage</u>	<u>Nonwage</u>	<u>Wage</u>	
1. Industry	3,000	1,546	2,730	1,080	8,356
2. Handicrafts				2,800	2,800
3. Construction	275	510	5	13	803
4. Transport and Telecommunications	1,525	379	130	83	2,117
5. Native transport and handling					2,120
6. Trade	1,910	482	3,395	838	6,625
7. Banking and insurance	130	130			260
8. Dwelling services					3,720
9. Government services		1,390			1,390
10 Defence		1,450			1,450
11. Others		265		200	

The Net Domestic Product for the period 1960-62 was estimated at a time when data were scarce. The methods of estimation employed obviously developed estimates as they appeared and it thus had to be assumed that the estimates in this case are revised for the first time since the origin of errors. The estimates of national income were based on the available data on output and value added in the manufacturing and construction sectors. The estimates of national income for 1960-62 are presented in the following table.

A P P E N D I X B

ESTIMATES OF CHINA'S NATIONAL INCOME FOR 1960-62

Estimates of gross value added in agriculture

Data on gross value added in agriculture and subsidiary occupations (hereafter referred to as gross value added in agriculture) in both absolute and relative terms are available for the period 1949-59.

For the period 1949-57, the value added is expressed in 1957 prices. 1957 prices have been used for the period covered by the Second Five-Year Plan (1958-62). Since the value added for 1957 is expressed in 1957 and 1958 prices, a conversion factor for converting 1957 to 1958 prices can be derived. The value added for 1957 is 50,310 million yuan in 1957 prices and is 55,700 million yuan in 1958 prices, the conversion factor is derived by dividing the former by the latter giving 1.107. That is, the year in 1957 prices is equivalent to 1.107 yuan in 1958 prices. The conversion factor can be applied to agricultural gross value added and implicit

The Net Domestic Material Product for the period 1960-62 was estimated at a time when data were scanty. The methods of estimation employed obviously left much to be desired. They were so crude that we did not bother to even think of estimating the margin of errors. The methods of estimating the gross value output and value added of agriculture and of gross value output of consumer goods industry are described in greater detail, but those of estimating the gross value output and value added of other sectors are described under notes to the individual tables.

Estimating gross value output of agriculture

Data on gross value output of agriculture and subsidiary occupations (hereafter referred to as gross value output of agriculture) in both absolute and relative terms are available for the period 1949-59.

For the period 1949-57, the value output is expressed in 1952 prices. 1957 prices are used for 1957 and for the period covered by the Second Five-Year Plan (1958-62). Since the value output for 1957 is expressed in both 1952 and 1957 prices, a conversion factor for converting 1952 to 1957 prices can be derived. The value output for 1957 is 60,350 million yuan in 1952 prices and is 53,700 million yuan in 1957 prices, the conversion factor is derived by dividing the former by the latter giving 1.124, that is, one yuan in 1957 prices is equivalent to 1.124 yuan in 1952 prices. The conversion factor can be applied to agricultural gross value output only and implicit

in the factor is the assumption that the coverage of both the value output figures cited above for 1957 is the same, and also that methods of production and processing as well as distribution mark-ups are identical in 1952 and in 1957. It is reasonable to assume that the coverage of agricultural production proper remains the same, although there might be quality differences. More roundaboutness in production means that the gross value output would be enlarged since duplications are not eliminated in the figure. However, unlike industry, the production process in agriculture is relatively simple and is unlikely to change radically within a short time period. The size of subsidiary occupations varies relatively more than agricultural production proper since the former consists of service trades and also they are elastic in supply whereas production of crops is relatively inelastic in the short run, even within the year.

Gross value output of agriculture has to be estimated for 1960-62. According to the annual economic plan for 1960, the gross value output was to be increased by 12 per cent over the preceding year. However, owing to adverse weather conditions which had affected agricultural production unfavourably in 1960 it is unlikely that the target was fulfilled.

The gross value output is to be estimated on the basis of output in grain production. An examination of past data shows that there is almost a perfect correlation between the trends of gross value output of agriculture and grain production over time. Table B-1 compares the indexes of gross output

value of agriculture and grain production using 1952 as base. The agreement between the two indexes is striking. Using grain production index as standard, deviation of the value index from it is at most 6 points. Disregarding signs, the total deviation is 21.6 points, giving an average of 2.7 points. If we take into account of signs, the total deviations is 12.1 points, or an average of 1.5 points. Percentagewise, the largest deviation is only 4.3 percentage points. The total deviation is 17.4 percentage points, that is, an average of 2.18 percentage points. Taking into account the signs, the total is 11.7 percentage points or 1.46 percentage points per year. The correlation coefficient is therefore not less than 97 per cent. The close agreement between the two indexes is to be expected since the components of the value output of agriculture are in fairly constant proportions to the latter over the years.¹

Since grain production is to be indicator of gross value output of agriculture, it is necessary to estimate the size of food crops for 1960-62. No official communique has been released giving the total output of grain production during the period 1960-62. The adverse weather conditions affected 60 per cent of farmland in 1960.² If the 1959 production could be maintained had it not been for the drought, one might infer that the gross value output in 1960 would be scaled down accordingly by 60 per cent of the 1959 output level, that is, 23,190 million yuan in 1952 prices. However, this would be assuming that all crops in the affected areas were lost. Since some of the areas would be worse hit than others, the tenet that all crops were lost

could not be taken seriously. We must look for other sources for data on food output.

From reports of interviews with Chinese communist officials, the grain production for 1960 was given as between the 1957 and the 1958 level according to one source,³ that is between 185 and 250 million metric tons, and as 150 million metric tons, according to another.⁴

The latter source also gave the probable output of grain for 1961. While summer harvest was still poor, the autumn crops were said to be more encouraging. The figure was given at a 10 million metric tons increase over the 1960 level, that is, 160 million metric tons.⁵

The harvest in 1962 was normal and was better than in 1961.⁶ It was reported that in some areas, production was still at low level owing to natural calamities, but on the whole, agricultural production had increased in 1962.⁷ If 180 million metric tons of grain were to be expected of a normal harvest,⁸ then it is possible that the level of grain production in 1962 was in the region of 180 million metric tons. This estimate is adopted in the present study.

Using the normal harvest criterion, and since the harvests in 1960 and 1961 had not been regarded as normal, we shall adopt the figure of 150 million metric tons for 1960 rather than that between 185 and 250 million metric tons.

Table B-2 gives the grain output for the period 1952-62, and Table B-3 shows the gross value output of agriculture for the period 1952-59. On the basis of the food crop index (1952 = 100) derived from Table 1, the gross value output of agriculture can be estimated for 1960-62. The assumption is that the trend of the gross value output is the same as that of grain production. (See Table B-4).

Estimating value added of agriculture

Value added of agriculture is obtained by applying the net-gross ratios to the gross value output. The intermediate products were reported to have accounted for 25.2 per cent and 26.4 per cent of the gross value output of 1952 and 1956 respectively.⁹ The latter figure presumably was based on an expected gross output value, as when the final gross output value figure of 58,290 million yuan is used, the percentage is slightly higher. The net value added of agriculture obtained from applying the ratio of the share of agriculture in net domestic material product to the net domestic material product of that year. The ratio was given as 59.2 per cent in 1952 and 48.1 per cent in 1956.¹⁰ With the net domestic material product for both 1952 and 1956 given, the net value added of agriculture for the two years are obtained. The gross value output of agriculture for 1952 and 1956 were given at 48,392 and 58,290 million yuan at 1952 prices respectively, and the implicit net-gross ratios are obtained by dividing the net by the gross value output. The ratios thus arrived are 74.8 per

cent for 1952 and 73.23 per cent for 1956, that is the value of intermediate products constitutes 25.2 per cent for 1952 and 26.77 for 1956. The 1952 ratio derived is the same as the reported figure, but the derived ratio for 1956 is slightly higher than the reported figure. For our purpose, the derived ratios are used.

We calculate the net value added of agriculture for other years on the basis of the implicit ratios. We assume that they decline steadily on a straight line with the increase in gross value output.

Let y be the gross value output, and x be the net value added, the constants a and b can be derived if the values of x and y are given for the following regression line equation:

$$y = ax \pm b$$

With the gross value output and net value added of agriculture for 1952 and 1956, which are given, a is found to be 1.524 and b is -6,728. With a and b now taken as given, and since gross value output is given for all years, the corresponding net value added can be obtained. The results are shown in Table B-5.¹¹

It is possible that the net-gross ratio would be smaller as from 1960 onwards. The material inputs put into agricultural production in the years of natural disasters must have risen sharply. If that is the case, then value added for those years would have an upward bias.

Estimating the gross value of consumer goods

Gross value output of consumer goods are given for the period 1952-59. It remains necessary to estimate the gross output value of these goods for the period 1960-62.

There is a casual relationship between consumer goods and agricultural production. Consumer goods industry depends on agriculture for 80 per cent of its raw materials.¹² Table B-6, which shows the link indexes of the gross value output of consumer goods industry and of the gross value output of agriculture, illustrates the casual relationship. When the gross value output of agriculture increased by 15.3 per cent in 1952, this was followed by an increase in the value output of consumer goods of 26.8 per cent in 1953. When the agricultural value output dropped to 103.1 per cent of the 1952 level in 1953, the consumer goods value output also dropped and fell to 114.1 per cent of the 1953 level in 1954. In 1955, agricultural production took to a better turn, and consumer goods industry increased its value output in 1956.

Table B-7 shows clearly the trends of gross value output of agriculture over time compared to that of consumer goods. The consumer goods industry increases more than proportionately when agriculture production increases, but it also declines much more rapidly than agriculture when the latter decreased. Several factors have been given for the different growth rates.

While we have so far assumed the effects of the size of agricultural output on consumer goods industry will take place after one period lag, the harvests will also affect the industry in the same year. Also, the composition of crop production might vary although total agricultural output does not. Economic crops might grow at a faster rate, thus causing consumer goods industry to increase its rate of growth, while agricultural production as a whole has changed little.¹³ Although consumer goods industry obtains its raw materials mainly from agriculture (being 80 per cent in the First Five-Year Plan period), its output might vary on account of its raw materials being obtained from the non-agricultural sector, thus the increase in its output might not be reflected in an increase in the agricultural output of the preceding period. And finally, utilization of agricultural raw materials might also vary, a fuller utilization would lead to an increase in the size of consumer goods output.

It has been shown earlier that when there is an increase in the agricultural output, the increase in consumer goods output does not take place until one time period after. The data of both kinds of output suggest that there is a strong correlation between the two values. To estimate the value output of consumer goods, we first calculate the relation between value of consumer goods and that of agriculture on the basis of consumer goods value output for the time period 1953-59 and agricultural value output for the period 1952-58 by means of regression line of consumer goods on agricultural production.

Using the formula

$$Y - \bar{y} = b (x - \bar{x}) \text{ where } b = \frac{\sum (x_i - \bar{x}) y_i}{\sum (x_i - \bar{x})^2}$$

and Y being the theoretical value of the variable (that is consumer goods), x a given variable (agricultural output), \bar{x} and \bar{y} mean of the observed x_i 's and y_i respectively, and b is a parameter to be determined, we estimate the value output of consumers goods for 1960-62.

The regression coefficient of y on x (that is, b) is found to be 1.671 and y is 42,470 million yuan.

Table B-8 incorporates the result of applying the formula to the gross value output of agriculture for the period 1959-61 to arrive at value output of consumer goods for 1960-62.

B-1 RELATION BETWEEN GRAIN PRODUCTION INDEX AND VALUE OUTPUT
OF AGRICULTURE INDEX AT 1952 PRICES FOR PERIOD 1952 - 1959

<u>Year</u>	<u>Grain production index</u>	<u>Value of output of agriculture index</u>	<u>Deviation of (2) from (1)</u>	<u>Deviation of (2) from (1) as percentage of (1)</u>
	(1952 = 100)			
	(1)	(2)	(3)	(4)
1952	100.0	100.0	0	0
1953	101.6	103.1	1.5	1.5
1954	103.9	106.6	2.7	2.6
1955	113.2	114.8	1.6	1.4
1956	118.2	120.4	2.2	1.9
1957	119.9	125.0	5.1	4.3
1958	161.9	155.9	- 6.0	- 3.7
1959	175.0	171.5	- 3.5	- 2.0

B-2 GRAIN PRODUCTION

	<u>Production</u> <u>(million metric tons)</u>	<u>Index (1952 = 100)</u>
1952	154.4	100
1953	156.9	101.6
1954	160.4	103.9
1955	174.8	113.2
1956	182.5	118.2
1957	185.0	119.9
1958	250.0	161.9
1959	270.0	175.0
1960	150.0	97.2
1961	160.0	103.6
1962	180.0	116.6

Notes: Figures for 1952-59 were originally expressed in 1957 prices. They have been converted into values in 1952 prices by the use of a conversion factor table. (See text.) Index for base two years has been set at 100.

Sources: 1952-57: SSB, Communique 1955, p. 31, Communique 1956, p. 40, and H. Yin & Y. C. Yin, Economic Statistics of Mainland China, Table 7, p. 30.

1958: Jen-min Jih-pao August 27, 1959.

1959: New China News Agency January 21, 1960.

1960-61: Sunday Times, September 1961.

1962: See Text.

B-3 GROSS VALUE OUTPUT OF AGRICULTURE

AT 1952 PRICES, 1952-59.

	<u>Production</u> <u>(million yuan)</u>	<u>Index (1952 = 100)</u>
1952	48,390	100
1953	49,910	103.1
1954	51,570	106.6
1955	55,540	114.8
1956	58,290	120.4
1957	60,350	125.0
1958	75,430	155.9
1959	82,970	171.5

Notes: Figures for 1958-59 were originally expressed in 1957 prices. They have been converted into values in 1952 prices by the use of a conversion factor 1.124. (See text.) Index for these two years have been adjusted accordingly.

Sources: SSB, Ten Great Years, p. 118.

B-4. GROSS VALUE OUTPUT OF AGRICULTURE

AT 1952 PRICES, 1960-62

Year	Grain Production index (1952=100)	Gross value output of agriculture (million yuan)
	(1)	(2)
1952	100.0	48,390
1960	97.2	47,030
1961	103.6	50,120
1962	116.6	56,430

Notes: Gross value output for 1952 is given. The figures for other years have been estimated on the basis of the grain production index in column 1.

Sources: Col. (1): See Table B-2
Col. (2), 1952: SSB, Ten Great Years, p. 119.

B-5 NET VALUE ADDED OF AGRICULTURE

AT 1952 PRICES, 1952-62

<u>Year</u>	<u>Net value added (million yuan)</u>
1952	36,190
1953	37,180
1954	38,290
1955	40,890
1956	42,690
1957	44,040
1958	53,940
1959	58,910
1960	35,310
1961	37,330
1962	41,470

Notes: Method of derivation is given in the text.

Sources: 1952 and 1956: Lu Kuang, "China's National Income," Peking Review, April 8, 1958.
Other years: computed.

B-6 RELATIONSHIP BETWEEN THE AGRICULTURAL VALUE OUTPUT INDEX
AND THE CONSUMER GOODS VALUE OUTPUT INDEX, 1952-59

(Link Indexes)

Agriculture		Consumer goods	
<u>Year</u>	<u>Index</u>	<u>Index</u>	<u>Year</u>
1952	115.3	126.8	1953
1953	103.1	114.1	1954
1954	103.3	.03	1955
1955	107.6	119.8	1956
1956	105.0	105.5	1957
1957	103.5	134.0	1958
1958	125.0	134.0	1959
1959			

Notes: Indexes are computed on the basis of official absolute data except that for consumer goods for 1955 which is taken from another source (see sources).

Sources: SSB, Ten Great Years.
Jung Wen-cho, "The Question of Sources of Materials and Raw Materials for Light Industry", Ching-chi Yen-chiu (Economic Research), June 17, 1962.

B-7 INDEXES OF AGRICULTURAL VALUE OUTPUT AND
OF CONSUMER GOODS VALUE OUTPUT, 1952-59

(1952 = 100)

<u>Year</u>	<u>Agriculture</u>	<u>Consumer goods</u>
1952	100.0	100.0
1953	103.1	126.7
1954	106.6	144.7
1955	114.8	144.7
1956	120.4	173.3
1957	125.0	183.0
1958	155.9	244.7
1959	171.5	327.7

Notes: 1958 and 1959 were originally given in 1957 prices.

Sources: SSB, Ten Great Years.

Jen-min Jih-pao, August 27, 1959.

Peking Review, April 5, 1960.

Peking Review, April 21, 1959.

New China News Agency, January 23, 1960.

B-8 GROSS VALUE OUTPUT OF CONSUMER GOODS

AT 1952 PRICES, 1952-62

<u>Year</u>	<u>Production</u> (million yuan)	<u>Index</u> (1952 = 100)
1952	22,110	100.0
1953	28,020	126.7
1954	31,980	144.7
1955	31,980	144.7
1956	38,320	173.3
1957	40,450	183.0
1958	54,080	244.7
1959	72,460	327.7
1960	96,610	436.9
1961	36,550	165.3
1962	41,720	188.7

Notes: 1958 and 1959 data were originally in 1957 prices. They have been converted into values in 1952 prices using the conversion factor of 1.081.

1960-62 value output are estimated by means of regression line of consumer goods on agricultural output using the regression coefficient of 1.671. See text.

Sources: 1952-57: SSB, Ten Great Years.
 1958-59: based on SSB, Communique 1959.
 1960-62: Estimated. See text.

B-9 GROSS VALUE OUTPUT OF PRODUCER AND CONSUMER GOODS AT 1952 PRICES

Year	Producer goods gross value output			(1,000 million yuan) Consumer goods gross value output		
	Total	Excluding handicraft manufactured	Handicraft manufactured	Total	Excluding handicraft manufactured	Handicraft manufactured
	(1)	(2)	(3)=(1)-(2)	(4)	(5)	(6)=(4)-(5)
1952	12.22	10.73	1.49	22.11	16.28	5.83
1953	16.68	14.67	2.01	28.02	20.91	7.11
1954	19.99	17.60	2.39	31.98	23.94	8.04
1955	22.89	20.58	2.31	31.98	24.17	7.81
1956	32.04	29.17	2.87	38.32	29.50	8.82

Sources: Col. and Col. 4: SSB, Ten Great Years.

Col. 2 and Col. 5: 1952-55: SSB, Communique 1955, p.24.

1956: Communique 1956, pp. 28-29.

B-10 NET VALUE ADDED OF HANDICRAFTS

AT 1952 PRICES, 1952-56

(million yuan)

<u>Year</u>	<u>Producer goods</u>	<u>Consumer goods</u>
1952	432.1	1,690.0
1953	597.8	2,114.0
1954	728.5	2,451.0
1955	704.1	2,381.0
1956	916.8	2,818.0

Notes: Derived by applying the following net-gross ratios to Cols. 3 and 6 in Table B-9:

1952	.29
1953	.2974
1954	.3048
1955	.3048
1956	.3194

Sources: See Table B-9.

For ratios, see C. M. Li, Economic Development of Communist China, Table XIX, p. 94.

B-11 VALUE ADDED OF PRODUCER GOODS
AT 1952 PRICES, 1952-56

(million yuan)

<u>Year</u>	<u>Factory manufactured</u>	<u>Handicraft manufactured</u>	<u>Total</u>
	(1)	(2)	(3)=(1)-(2)
1952	5,468	432	5,900
1953	7,391	598	7,989
1954	8,764	729	9,493
1955	10,131	704	10,835
1956	14,191	917	15,108

Sources: Col. 1: C. M. Li, Economic Development of Communist China, Table XVIII, p. 91.

Col. 2: Table B-10.

B-12 IMPLICIT NET-GROSS RATIOS OF VALUE
OF PRODUCER GOODS AT 1952 PRICES, 1952-56

<u>Year</u>	<u>Net value added</u> (million yuan)	<u>Gross value output</u>	<u>Implicit net-gross ratios</u>
	(1)	(2)	(3) = (1)/(2)
1952	5,900	12,220	.4828
1953	7,989	16,680	.4789
1954	9,493	19,990	.4747
1955	10,835	22,890	.4737
1956	15,108	32,040	.4718

Sources: Col. 1: Table B-11
Col. 2: SSB, Ten Great Years

B-13 VALUE ADDED OF CONSUMER GOODS
AT 1952 PRICES, 1952-56

(million yuan)

<u>Year</u>	<u>Factory manufactured</u>	<u>Handicraft manufactured</u>	<u>Total</u>
	(1)	(2)	(3)=(1)+(2)
1952	3,257	1,690	4,947
1953	4,181	2,114	6,295
1954	4,787	2,451	7,238
1955	4,834	2,381	7,215
1956	5,898	2,818	8,716

Sources: Col. 1: C. M. Li, Economic Development of Communist China, Table XVIII, p. 91.
Col. 2: See Table B-10.

B-14. IMPLICIT NET-GROSS RATIOS OF VALUE
OF CONSUMER GOODS AT 1952 PRICES, 1952-56

<u>Year</u>	<u>Net value added</u> (million yuan)	<u>Gross value output</u>	<u>Implicit net-gross ratios</u>
	(1)	(2)	(3) = (1)/(2)
1952	4,947	22,110	.2238
1953	6,295	28,020	.2247
1954	7,238	31,980	.2263
1955	7,215	31,980	.2256
1956	8,716	38,320	.2275

Sources: Col. 1: See Table B-13
Col. 2: SSB, Ten Great Years

B-15 PROPORTIONS OF PRODUCERS GOODS AND CONSUMER GOODS IN
GROSS VALUE OUTPUT OF INDUSTRY AT 1952 PRICES, 1952-62

<u>Year</u>	<u>Producer goods</u>	<u>Consumer goods</u>
1952	.356	.644
1953	.373	.627
1954	.385	.615
1955	.417	.583
1956	.455	.545
1957	.484	.516
1958	.588	.412
1959	.604	.396
1960	.551	.449
1961	.551	.449
1962	.551	.449

- Notes: 1958-59: The figures are first converted into 1952 prices from 1957 prices using the respective conversion factors. These when added up do not agree with the total gross value of industry converted from 1957 prices by its own conversion factor. Therefore, instead of using the gross value output of industry as the denominator, the sum of the gross value of producer goods and consumer goods converted into 1952 prices by their respective conversion factors is used instead. The published proportions are .573 and .427 for producer goods and consumer goods respectively.
- 1960: The denominator is arrived at by multiplying 1.185 to the gross value output of industry at 1952 prices. The ratio is derived from the information that 1958-60 period saw a growth of 40 per cent annum.
Gross value of consumer goods is arrived independently (See Table B-8). Gross value output of producer goods is residue of the total gross output of industry less that of consumer goods.
- 1961-62: Assumed to be the same as for 1960.

Sources: 1952-57: SSB, Ten Great Years
1958-59: Based on SSB, Ten Great Years, and SSB, Communique 1959.

B-16 GROSS VALUE OUTPUT OF PRODUCER GOODS AT 1952 PRICES, 1952-62

<u>Year</u>	<u>Production</u> (million yuan)	<u>Index</u> (1952 = 100)
1952	12,220	100.0
1953	16,680	136.5
1954	19,990	163.6
1955	22,890	187.3
1956	32,040	262.2
1957	37,940	310.5
1958	77,050	630.3
1959	110,400	903.3
1960	118,590	970.7
1961	81,410	666.2
1962	92,920	760.3

Notes: 1960: Derived on the basis that during the period 1958-60, the annual rate of increase of industry in terms of gross value output being 40 per cent, the gross value output of industry is derived for 1960 from which the gross value output of consumer goods (which is independently estimated) is subtracted to arrive at the gross value output of producer goods.

1961-62: Derived from data on gross value output of consumer goods and its proportion in the gross value output of industry. See Table B-15 and text.

Sources: 1952-58: SSB, Ten Great Years.
 1959: SSB, Communique 1959.
 1960-62: See text.

B-17 VALUE ADDED OF CONSUMER GOODS AT 1952 PRICES, 1957-62

<u>Year</u>	<u>Net value added</u> (million yuan)	<u>Gross value output</u>	<u>Implicit net-gross ratios</u>
	(1)	(2)	(3) = (1)/(2)
1957	9,207	40,450	.2276
1958	12,385	54,080	.2291
1959	16,670	72,460	.2300
1960	22,302	96,610	.2309
1961	8,440	36,550	.2309
1962	9,632	41,720	.2309

Notes: Net value added is derived from application of regression line of value added on gross value output on 1952-56 data for 1957-60. The regression coefficient is .2331 and the mean of the net value added for the period 1952-56, 6,882 million yuan at 1952 prices.

Net value added for 1961-62 is based on the implicit net-gross ratio derived for 1960 and is the product of the implicit ratio and the gross value output for the particular year.

Sources: Col. 2: See Table B-8.

B-18 VALUE ADDED OF PRODUCER GOODS AT 1952 PRICES, 1957-62

<u>Year</u>	<u>Net value added</u> (million yuan)	<u>Gross value output</u>	<u>Implicit net-gross ratios</u>
	(1)	(2)	(3) = (1)/(2)
1957	17,854	37,940	.4704
1958	36,035	77,050	.4677
1959	51,555	110,400	.4671
1960	55,345	118,590	.4666
1961	37,980	81,410	.4666
1962	43,350	92,920	.4666

Notes: Net value added derived from application of regression line of net value added on gross value output on 1952-56 data for 1957-60. The regression coefficient is .465 and the mean of the net value added for the period 1952-56 is 9,865 million yuan at 1952 prices.

Net value added for 1961-62 is based on the implicit net-gross ratio derived for 1960 and is the product of the implicit ratio and the gross value output for the particular year.

Sources: Col. 2: See Table B-16.

B-19 ESTIMATED GROSS VALUE OUTPUT OF INDUSTRY AND AGRICULTURE
AT 1952 PRICES, 1960-62

(million yuan)

Year	Gross value output of agriculture	Gross value output of consumer goods	Gross value output of producer goods	Gross value of output of industry and agriculture
	(1)	(2)	(3)	(4) = (1)+(2)+(3)
1960	47,030	96,610	118,590	262,230
1961	50,120	36,550	81,410	168,080
1962	56,430	41,720	92,920	191,070

Sources: Col. 1: Table B-4
Col. 2: Table B-8
Col. 3: Table B-16.

B-20 ESTIMATED RETAIL SALES AT 1952 PRICES, 1952-59

(million yuan)

Year	<u>Retail sales at current prices</u>	<u>Retail price index (1952=100)</u>	<u>Retail sales at 1952 prices</u>	<u>Retail sales at 1952 prices index (1952=100)</u>
	(1)	(2)	(3)=(1)/(2)	(4)
1952	27,680	100	27,680	100
1953	34,800	104.2	33,730	121.8
1954	38,110	105.5	36,120	130.5
1955	39,220	106.3	36,900	133.2
1956	46,100	106.3	43,370	156.7
1957	47,420	108.6	43,660	157.7
1958	54,800	108.3	50,600	182.8
1959	63,800	108.3	58,910	212.8

Notes: Retail price index for 1959 is assumed to be the same as for 1958.

Sources: Col. 1: SSB Ten Great Years.

Col. 2: SSB Ten Great Years.

B-21 ESTIMATED RETAIL SALES AT 1952 PRICES, 1960-62

<u>Year</u>	<u>Retail sales</u> (million yuan)
1960	58,190
1961	45,310
1962	48,750

Notes: Retail sales for this period are derived from the application of regression line of retail sales on gross value output of industry and agriculture of 1952-59 at 1952 prices. The regression coefficient is .1496 and the mean value of retail sales for the period is 141,780 million yuan at 1952 prices.

Sources: See Tables B-4, B-8 and B-16.

B-22 GROSS VALUE OUTPUT AND NET VALUE ADDED OF TRADE AT 1952 PRICES,
1952 and 1956

Year	Net domestic material product	Share of Trade in net domestic material product	Net value added of Trade	% share of intermediate products in gross value output of trade	% share of net value added of Trade in its gross value output	(million yuan)	
						(1)	(2)
1952	61,130	15.8	9,658	20.2	79.8		
1956	88,750	15.4	13,670	24.4	75.6		
Year	Gross value output of Trade	Gross output of Trade as % of retail sales	Net value added of Trade as % of retail sales				
	(6) = (3)/(5)	(7)	(8)				
1952	12,110	43.72	34.89				
1956	18,070	41.66	31.52				

Sources: (1): See Lu Kuang, "China's National Income," Peking Review, April 8, 1958.
 (2): Ibid.
 (4): See Niu Chung-huang, Accumulation and Consumption in China's National Income (in Chinese), p. 25.
 (7) and (8): Retail sales figures based on Table B-20.

B-23 ESTIMATED NET VALUE ADDED OF TRADE AT 1952 PRICES, 1960-62

<u>Year</u>	<u>Net value added (million yuan)</u>
1960	18,340
1961	14,290
1962	15,370

Notes: Based on the product of .3152 (which is the ratio of net value added of trade to retail sales in 1956) and the retail sales of the given year.

Sources: For basic data, see Table B-21.

B-24 GROSS VALUE OUTPUT AND NET VALUE ADDED OF TRANSPORT
AND COMMUNICATIONS AT 1952 PRICES 1952 and 1956

(million yuan)

Year	Net domestic material product	% share of Transport and communications in net domestic product	Net value added of Transport & Communications	% share of intermediate products in gross value output of Transport and Communications
	(1)	(2)	(3) = (1) x (2)	(4)
1952	61,130	4.0	2,445	28.3
1956	88,750	4.4	3,905	36.8

Year	% share of net value added of Transport & Communications in its gross value output	Gross value output of Transport & Communications	Gross value added of Transport & Communications as % of freight turnover over by modern means of transport	Net value added of Transport & Communications as % of freight turnover by modern means of transport
	(5) = 100-(4)	(6) = (3)/(5)	(7)	(8)
1952	71.7	3,410	.04767	.03418
1956	63.2	6,179	.04061	.02567

Sources: (1): See Lu Kuang, "China's National Income", Peking Review, April 8, 1958.
 (2): Ibid.
 (4): See Niu Chung-huang, Accumulation and Consumption in China's National Income (in Chinese), p. 25.
 (7) and (8): For freight turnover figures, see SSB, Ten Great Years.

B-25 FREIGHT TURNOVER AND VOLUME OF GOODS CARRIED BY MODERN
MEANS OF TRANSPORT, 1952-58

<u>Year</u>	<u>Freight turnover (million ton-km.)</u>	<u>Volume of goods (million tons)</u>	<u>kilometers carried</u>
	(1)	(2)	(3) = (1)/(2)
1952	71,540	168.59	424.2
1953	93,010	212.27	438.1
1954	113,830	264.67	429.9
1955	125,120	278.43	449.3
1956	152,060	372.15	408.7
1957	172,930	411.71	420.0
1958	236,400	633.76	373.0
1952-58 average			420.5

Notes: 1952-58 average is computed.

Sources: SSB, Ten Great Years.

B-26 NET VALUE ADDED OF TRANSPORT AND COMMUNICATIONS

AT 1952 PRICES, 1960-62

<u>Year</u>	<u>Value added (million yuan)</u>
1960	9,305
1961	5,441
1962	6,384

Notes: Derived from multiplying the estimated freight turnover by the net value added per ton-kilometer for 1956, that is, .02567 yuan at 1952 prices.

B-27 ESTIMATED FREIGHT TURNOVER FOR 1960-62*

<u>Year</u>	<u>Volume of goods carried (m. tons)</u> (1)	<u>kilometers per ton carried</u> (2)	<u>Freight turnover (million ton-kilometers)</u> (3) = (1)x(2)
1960	862.1	420.45	362,400
1961	504.1	420.45	211,900
1962	591.5	420.45	248,700

* by modern means of transport

Notes: Volume of goods carried is estimated by applying the regression line of volume of goods carried on gross value of industry and agriculture of 1952-58. The regression coefficient is 3.803 and the mean value of volume of goods carried is 334.5 million tons.

Freight turnover is derived by multiplying the volume of goods carried by the average kilometer per ton of goods carried during the period 1952-58.

Sources: Col. 1: SSB, Ten Great Years for 1952-58 data.
Col. 2: See Table B-25.

B-28 GROSS VALUE OUTPUT AND NET VALUE ADDED OF CONSTRUCTION AT

1952 PRICES, 1952 & 1956

(million yuan)

Year	Net domestic material product	Share of construction in net domestic material product	Net value of construction	% share of intermediate products in gross value output of construction
	(1)	(2)	(3)=(1)x(2)	(4)
1952	61,130	3.0	1,834	59.8
1956	88,750	5.6	4,970	65.4
Year	% share of net value added of construction in its gross value output	Gross value output of construction		
	(5) = 100÷(4)	(6) = (3)÷(5)		
1952	40.2	4,562		
1956	34.6	14,360		

Sources: Col. (1): See Lu Kuang, "China's National Income," Peking Review, April 8, 1958.
 Col. (2): Ibid.
 Col. (3): See Niu Chung-huang, Accumulation and Consumption in China's National Income (in Chinese), p. 25.

B-29 ESTIMATED NET VALUE ADDED OF CONSTRUCTION

AT 1952 PRICES, 1960-62

<u>Year</u>	<u>Net value added (million yuan)</u>
1960	14,070
1961	18,100
1962	23,410

Notes: Based on the assumption that the annual rate of increase of value added in construction during 1952-56 (29 per cent) applies to 1960-62. The net value added of construction in 1952 was 1,834 million yuan.

B-30 NATIONAL INCOME AT 1952 PRICES, 1960-62

	<u>1960</u>	<u>1961</u>	(million yuan) <u>1962</u>
Agriculture	35,310	37,330	41,470
Industry:			
Consumer goods	22,302	8,440	9,632
Producer goods	55,345	37,980	43,350
Construction	14,070	18,100	23,410
Transport & Communications	9,305	5,441	6,384
Trade	18,340	14,290	15,370
NMF	154,662	121,681	139,616

Sources: Tables B-5, B-17, B-18, B-23, B-26, B-29.

NOTES

1. See C.M. Li, Economic Development of Communist China, Table XI, p. 58 and Appendix Table 17, p. 242., in which crop growing and animal husbandry were shown to contribute a steady proportion to the gross value output over the years 1952-56. Subsidiary occupations also formed a fairly constant proportion of the gross value output, although handicraft work done for other consumers who supply the raw materials showed some slight variation as a component of the gross value output of subsidiary occupations. See Table below:

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>
	(in percentage of total)				
Gross agricultural value output of which:	100.00	100.00	100.00	100.00	100.00
Crop growing	79.5	78.6	78.8	78.7	{ 68.2
animal husbandry					
Subsidiary occupations	20.5	21.4	21.2	21.3	20.8
1. For own use	15.7	16.6	16.3	15.9
2. For other consumers	4.8	4.8	4.9	5.4

Also, (a) according to a survey of 228 typical agricultural producer cooperatives in 24 provinces and regions in 1957, the proportion of net income originating from family subsidiary occupations has been estimated as follows:

<u>Region</u>	<u>1956</u>	<u>1957</u>
	(% of net income)	
NW & IM	13.7	18.6
NE	17.4	25.2
Central	18.4	20.1
South	27.1	33.6

Net income formed 70 per cent of the total income. This means that the proportion of subsidiary occupation's contribution to total income is as follows:

<u>Region</u>	<u>1956</u>	<u>1957</u>
	(% of total income)	
NW & IM	9.6	13.0
NE	12.2	17.6
Central	12.9	14.1
South	19.0	23.5
Weighted average		16.6

The extent to which these figures are representative of the 700,000 agricultural producer cooperatives in 1957 is an open question.

(NW & IM: Northwest and Inner Mongolia - 2 provinces and 2 autonomous regions, 34 co-ops.

NE: Northeast - 3 provinces, 31 co-ops.

Central - 5 provinces, 56 co-ops.

South - 10 provinces, 107 co-ops.)

- (b) According to a survey of a rural people's commune in Shansi, percentage of income from crops production declined from 92.3 in 1952 to 74.6 in 1956, 73.0 in 1957, and 70.0 in 1958.
- (c) All these do not necessarily point to the fact that subsidiary occupations are not a constant proportion of the gross value output of agriculture. There are instances of variations apart from the above. With the amalgamation of the agricultural producer cooperatives into rural people's communes in 1958, rural occupations might well have expanded in scope. But these activities would be classified as non-agricultural activities, hence the decline in the share of income would have little bearing on the proportion of subsidiary occupations in gross value output.

It seems therefore that we are much safer in taking the official data.

See, for (a) Statistical Research Data Office, "Income and Distribution of Agricultural Producer Cooperatives," Tung-chi Yen-chiu, August 23, 1958. For (b), Li Lin, "Vast Changes in Hsikon Ts'un (Shansi) in Recent Ten Years," Peking Ta-Kung Pao, September 2, 1959.

2. See Far Eastern Economic Review Yearbook 1962, p. 58. This source reported that "some 150 million acres or nine-sixteenths of the cultivated area were affected by one kind or another of natural disaster, ninety million 'seriously'".
3. An American journalist Edgar Snow, interviewed Chou En-lai on November 15, 1960. Chou was quoted to have said that the 1960 harvest was less than 1959 and 1958 level, but more than the 1957 level. See A.R. McGuire, "China's Food Shortage and its Repercussions," Far Eastern Economic Review, February 9, 1961.
4. Field Marshall Lord Montgomery visited Communist China in 1961, and in his articles which appeared in the Sunday Times in September 1961, he gave the grain production figures. See also Far Eastern Economic Review, November 2, 1961, p. 259.
5. Ibid.
6. Jen-min Jih-pao, Peking, January 1, 1963.
7. In the Peking Kuang-ming Jih-pao, it was reported that the chance of fulfilling the 1962's task of purchasing farm and sideline products was favourable. This was surmised on the basis that agricultural production had increased during that year. See Kuang-ming Jih-pao, December 6, 1962.
8. Field-Marshal Montgomery, op. cit.
9. See Niu Chung-huang, Accumulation and Consumption in China's National Income (in Chinese), p. 25.
10. Compare the figures compiled by C.M. Li in his Economic Development of Communist China, Table XVII, p. 88. The straight line method on the basis of 1952 and 1956 data put Li's figures for 1953 and 1954 below ours, and 1955 and 1956 data above ours. The 1952, 1953 and 1956 of Li's were taken from Chinese sources. He assumed a pro rata decline in the ratio for 1954 and 1955. His 1956 (actual) figure was based on the ratio for the 1956 expected gross value output and final value added. Our ratio for 1956 is different from Li's in that it is derived from final gross value output and final value added.

11. See Doak Barnett, Communist Economic Strategy: The Rise of Mainland China, pp. 17-18.
12. Such as cotton, oil seeds, tobacco, flax, sugar, fruits, medicinal herbs, etc.

The Harrod model

Capital is the most scarce resource in all developed countries. Hence the model does not take the growing population in these countries in the Harrod model. The Harrod model may be depicted as follows:

A P P E N D I X C

$$Y_t = \alpha Y_{t-1} + \beta Y_{t-2}$$

$$Y_t = Y_{t-1}$$

E C O N O M I C M O D E L S

In the above system of equations (1), (2) and (3), national income (Y_t), and investment (I_t). The parameters are α and β , the constant of each term.

$$\alpha > 0$$

$$\beta > 0$$

and the initial condition of the variable Y_0 is

$$Y_0$$

The system may be written as $Y_t = Y_{t-1}$.

$$Y_t = \alpha Y_{t-1} + \beta Y_{t-2}$$

$$Y_t = \left(\frac{\alpha}{1-\alpha} \right) Y_{t-1}$$

The solution of the differential equation (5) is

$$Y_t = \left(\frac{\alpha}{1-\alpha} \right)^t Y_0$$

The Harrod model

Capital is the most scarce factor in most developing countries, hence the model best suited for planning purposes in these countries is the Harrod-Domar model. The Harrod model may be depicted as follows:

$$S_t = \alpha Y_t \quad (1)$$

$$I_t = \beta [Y_t - Y_{t-1}] \quad (2)$$

$$S_t = I_t \quad (3)$$

In the above system of equations, the variables are savings (S), national income (Y), and investment (I). The parameters are α and β , the conditions of which are:

$$\alpha > 0$$

$$\beta > 0$$

and the initial condition of the variable Y is

$$Y_0$$

The system can be solved for Y_t thus:

$$\alpha Y_t = \beta Y_t - \beta Y_{t-1} \quad (4)$$

or

$$Y_t = \left(\frac{\beta}{\beta - \alpha} \right) Y_{t-1} \quad (5)$$

The solution of the difference equation (5) is therefore

$$Y_t = \left(\frac{\beta}{\beta - \alpha} \right)^t Y_0 \quad (6)$$

since it expresses Y_t in terms of α and β (the parameters) and the initial value of Y . It gives the growth path of Y_t through time, which depends on the constant A

$$A = \frac{\beta}{\beta - \alpha} \quad (7)$$

The final solutions for I and for S are as follows:

$$I_t = S_t = \alpha \left(\frac{\beta}{\beta - \alpha} \right)^t Y_0 \quad (8)$$

The general behavior of Y_t over time, as has been indicated, depends on the value of A . The constants α and β are respectively the saving ratio and the capital coefficient. The following are the possible cases of the behavior of Y_t :

- | | |
|-----------------|--------------------------------------------------------------------------|
| 1. $A = 1$ | Y_t equals Y_0 for all future periods, viz. a stationary economy |
| 2. $A > 1$ | Y_t increases without limit by ever increasing amount |
| 3. $0 < A < 1$ | Y_t decreases by ever decreasing amounts approaching zero as its limit |
| 4. $-1 < A < 0$ | Y_t oscillates but these oscillations dampen in the course of time |
| 5. $A < -1$ | Y_t experiences explosive oscillations |
| 6. $A = -1$ | Y_t is alternatively $-Y_0$ and Y_0 , period after period |

The Domar model

The equations are

$$S(t) = \alpha Y(t) \quad (9)$$

$$I(t) = \beta Y'(t) \quad (10)$$

$$S(Y) = I(t) \quad (11)$$

where the variables, all functions of time are savings (S), investment (I), and national income (Y). Y' is the rate of change of income with respect to time (t), the parameters are α and β , the conditions for them being

$$\alpha > 0$$

$$\beta > 0$$

The solution of equations (9) to (11) gives

$$Y'(t) - \frac{\alpha}{\beta} Y(t) = 0 \quad (12)$$

The solution of this differential equation is

$$Y_t = Y_0 \exp\left(\frac{\alpha}{\beta} t\right) \quad (13)$$

The notation of $\frac{1}{\beta}$ in Domar's original model is σ , which is the potential social average productivity of investment. Hence equation (13) becomes

$$Y(t) = Y_0 e^{\alpha \sigma t} \quad (14)$$

The solutions for I and for S in the model are accordingly given as:

$$I(t) = S(t) = \alpha Y(t) = Y_0 e^{\alpha \sigma t} \quad (15)$$

or

$$I(t) = I_0 e^{\alpha \sigma t} \quad (16)$$

Ichimura model

The models of Harrod and Domar are simple aggregate models in so far as economic planning is concerned. Ichimura's model considers also the consumption and investment activities of the private and government sectors, and the influence of other economies through exports and imports of goods and services. His model is one of the many extensions which can be derived from the models of Harrod and Domar.

$$Y^m = C^P + I^P + C^G + I^G + (E - M) \quad (17)$$

$$Y^m = Y^f + T^i \quad (18)$$

$$Y^f = Y^P + T^d \quad (19)$$

$$Y^G = T^i + T^d \quad (20)$$

$$Y^m = Y^P + Y^G \quad (21)$$

$$A = M - E \quad (22)$$

These are the balance equations, where the variables are

C^P	private consumption
C^G	government consumption
I^P	private investment
I^G	government investment
E	exports of goods and services
M	imports of goods and services
Y^m	national income at market prices
Y^f	national income at factor cost
T^i	indirect tax net of subsidies

T^d	direct tax net of transfer payments
Y^p	disposable private income
Y^g	disposable government income
A	foreign loan and grant

The following are the parameters:

$s^p = \frac{Y^p - C^p}{Y^p}$	average propensity to save in the private sector
$t^d = \frac{T^d}{Y^f}$	ratio of direct tax to income
$t^i = \frac{T^i}{Y^f}$	ratio of indirect tax to income
$m = \frac{M}{Y^f}$	average propensity to import
$g = \frac{C^g + I^g}{Y^g}$	ratio of government expenditure to disposable government income
$i = \frac{I^g}{C^g + I^g}$	ratio of government investment to government expenditure
$s^g = \frac{Y^g - C^g}{Y^g}$	average propensity to save in the government sector
$\frac{1}{\lambda} = \frac{I^p(t) + I^g(t)}{Y^f(t+1) - Y^f(t)}$	increment capital-output ratio

By definition,

$$s^g = 1 - (1 - i)g \quad (23)$$

$$t^g = t^i + t^d \quad \text{where } t^g \text{ is total (24) taxes as a ratio to income}$$

Denoting

$$\frac{Y^f(t+1) - Y^f(t)}{Y^f(t)} = r \quad (25)$$

the following

$$r = \sigma s^p (1 - t^d) + \sigma [1 - (1 - i)g] (t^d + t^i) + \sigma (m - \frac{E}{Y_f}) \quad (26)$$

$$= \sigma s^p (1 - t^d) + \sigma s^g t^g + \sigma (m - \frac{E}{Y_f}) \quad (27)$$

or

$$r = \sigma s^p + \sigma [(s^g - s^p)t^d + s^g t^i] + \sigma (m - \frac{E}{Y_f}) \quad (28)$$

is derived.

Two-sector model

Instead of a system of equations, in terms of national income and related aggregates, a model can be derived in terms of agricultural and industrial value added, or in terms of outputs of any two sectors, however defined, composing the economy. The following is a model for an economy divided into agricultural and industrial sectors:

$$Y = Y^a + Y^i \quad (29)$$

$$Y^a = c_{aa} Y^a + c_{ai} Y^i \quad (30)$$

$$Y^i = c_{ia} Y^a + c_{ii} Y^i + b_a \Delta Y^a + b_i \Delta Y^i \quad (31)$$

where Y national income

Y^a income from agricultural production

Y^i income from industrial production

c_{mn} n -th's sector's propensity to consume the m -th's sector's output

s_a saving ratio in agricultural sector

s_i saving ratio in industrial sector

b_a capital-output ratio in agricultural sector

b_i capital-output ratio in industrial sector

It is assumed that the output of the agricultural sector is not invested. By definition,

$$s_a = 1 - c_{aa} - c_{ia} \quad (32)$$

$$s_i = 1 - c_{ia} - c_{ii} \quad (33)$$

From the equations, we can get the growth rate of the industrial sector

$$\frac{\Delta Y^i}{Y^i} = \frac{(1 - c_{aa}) s_i + c_{ai} s_a}{(1 - c_{aa}) b_i + c_{ai} b_a} \quad (34)$$

Three-sector model

If a three-sector model is devised, matrices will have to be employed in the solution. In the model below, we take into account of the intersectoral relations which have been left out in the previous examples. Assuming that there are three sectors, namely, agriculture, heavy industry, and light industry, the balance equations are given as:

$$Y^1 = a_{11} Y^1 + a_{12} Y^2 + a_{13} Y^3 + c_{11} y_1 + c_{12} y_2 \quad (35)$$

$$Y^2 = a_{21} Y^1 + a_{22} Y^2 + a_{23} Y^3 + c_{21} y_1 + c_{22} y_2 + \Delta K_2 \quad (36)$$

$$Y^3 = a_{31} Y^1 + a_{32} Y^2 + a_{33} Y^3 + c_{31} y_1 + c_{32} y_2 + \Delta K_3 \quad (37)$$

$$y_1 = a_{41} Y^1 \quad (38)$$

$$y_a = a_{42} Y^2 + a_{43} Y^3 \quad (39)$$

$$K_2 = b_{21} Y^1 + b_{22} Y^2 + b_{23} Y^3 \quad (40)$$

$$K_3 = b_{31} Y^1 + b_{32} Y^2 + b_{33} Y^3 \quad (41)$$

where Y^i level of production in the i -th sector

y^i income accruing the i -th sector

- a_{4j} ratio of factor payments to level of production in j -th sector ($j = 1, 2, \dots, 3$)
- a_{ij} amount of i -th sector's output used in production of one unit of j -th sector's output
- b_{ij} intersectoral capital-output ratio of the j -th sector for i -th sector's output
- c_{ij} j -th sector's average propensity to consume i -th sector's output
- K_i stocks of capital goods of the type i

From equations (35) to (39), we have

$$\begin{aligned}
 (1 - a_{11} - c_{11}a_{41})Y^1 - (a_{12} + c_{12}a_{42})Y^2 - (a_{13} + c_{12}a_{43})Y^3 &= 0 \\
 - (a_{21} + c_{21}a_{41})Y^1 + (1 - a_{22} - c_{22}a_{42})Y^2 - (a_{23} + c_{22}a_{43})Y^3 &= \Delta K_2 \dots (42) \\
 - (a_{31} - c_{31}a_{41})Y^1 - (a_{32} + c_{32}a_{42})Y^2 + (1 - a_{33} - c_{32}a_{43})Y^3 &= \Delta K_3
 \end{aligned}$$

By denoting

U a determinant consisting of the elements of (42)

U_{ij} cofactor of (ij) element in the matrix U

$$\frac{U_{ij}}{U} = A_{ij}$$

the system in (42) becomes

$$\begin{aligned}
 Y^1 &= A_{21} \Delta K_2 + A_{31} \Delta K_3 \\
 Y^2 &= A_{22} \Delta K_2 + A_{32} \Delta K_3 \dots (43) \\
 Y^3 &= A_{23} \Delta K_2 + A_{33} \Delta K_3
 \end{aligned}$$

By substituting (43) into (40) and (41), we have

$$\begin{aligned}
 K_2 &\geq (b_{21}A_{21} + b_{22}A_{22} + b_{23}A_{23}) \Delta K_2 + (b_{21}A_{31} + b_{22}A_{32} + b_{23}A_{33}) \Delta K_3 \\
 K_3 &\geq (b_{31}A_{21} + b_{32}A_{22} + b_{33}A_{23}) \Delta K_2 + (b_{31}A_{31} + b_{32}A_{32} + b_{33}A_{33}) \Delta K_3 \\
 &\dots \quad (44)
 \end{aligned}$$

or

$$\begin{aligned}
 K_2 &\geq B_{22} \Delta K_2 + B_{23} \Delta K_3 \\
 K_3 &\geq B_{32} \Delta K_2 + B_{33} \Delta K_3 \\
 &\dots \quad (45)
 \end{aligned}$$

If weights are attached to ΔK_2 and ΔK_3 at a future date, say, $p_2(t+1)$, $p_3(t+1)$, optimal path of capital accumulation can be found by maximizing

$$p_2(t+1) K_2 + p_3(t+1) \Delta K_3 \quad (46)$$

But the optimal path depends on the weights used in (46). The varying rates will give a set of optimal rates of capital accumulation of each capital stock called the efficient locus, on which choice of investment decisions must be made. Obviously, this locus is not always the one of full capacity of both stocks of capital. The maximal rate of steady growth of capital accumulation can also be found, and the problem becomes one of linear programming.

Input-output model

A simple static input-output model may be expressed as follows:

$$X_i = \sum_{j=1}^n x_{ij} + x_i \quad (i = 1, \dots, n) \quad (47)$$

where X_i total output of industry i
 x_{ij} input from industry i used in production process of industry j
 x_i net output of industry i flowing to autonomous sector (final bill of goods for industry i)

The amount of input from industry i for the production process of industry j (x_{ij}/X_j) being constant, it then follows that a_{ij} ($= x_{ij}/X_j$) represents the technical (or input) coefficients, and formula (47) can be rewritten:

$$X_i = \sum_{j=1}^n a_{ij} X_j + x_i \quad (i = 1, \dots, n) \quad (48)$$

or in matrix form

$$X_i = AX_i + x_i \quad (49)$$

or, when defining x_i ,

$$x_i = (1 - A)X_i \quad (50)$$

The structural interdependence in the system may be expressed in terms of costs of factor inputs plus value added, in which case, the value of total output may be defined by the formula:

$$p_j X_j = \sum_{i=1}^n p_i a_{ij} X_j + Y_j \quad (51)$$

where $p_j X_j$ value of output of industry j
 $p_i a_{ij} X_j$ ($= p_i X_{ij}$) j 's purchases from other firms
 ($p_1 X_{11} + p_2 X_{21} + \dots + p_n X_{n1}$)
 Y_j value added accruing to industry j (that is, wages, profits, taxes, etc.)

The final bill of goods x_i may be divided into groups by use, for example,

$$x_i = C_i + C_i^G + I_i + J_i + E_i - M_i \quad (52)$$

where C_i household consumption
 C_i^G government consumption
 I_i fixed capital formation
 J_i net increase in inventories
 E_i exports
 M_i imports

And if capital coefficients are given, a dynamic input-output system may be expressed as follows:

$$(1 + m_i)X_i - \sum a_{ij}X_j - I_i = C_i + C_i^G + E_i \quad (53)$$

$$\sum b_{ij}X_j + \bar{b}_{ij} \leq K_i$$

where m_i ($= M_i/X_i$) ratio of imports to domestic output of competing goods in industry i
 b_{ij} ($= \Delta K_{ij} / \Delta K_j$) capital coefficient
 \bar{b}_{ij} constant

Again, in order to determine the optimal path of capital accumulation, it is necessary to introduce some criterion for the choice of a particular combination of I_i among all the possibilities, which thus requires the use of linear programming technique.

Marx's simple and expanded reproduction schema

The physical output of the economy X is divided into two categories according to whether the goods are produced by producer goods industries (sector I) or by consumer goods industries (sector II), that is, into X_1 and X_2 respectively. Each output is equal to depreciation plus raw materials used (C), wage bill (V), and surplus value (S). The model attempts to show the mutual interdependence of the components of each output and the demand and supply of producer and consumer goods in simple reproduction and expanded reproduction, the former under conditions of zero net investment and the latter under conditions of positive net investment. The model is expressed by the following equations:

$$\begin{array}{rcl} C_1 + V_1 + S_1 & = & X_1 \\ C_2 + V_2 + S_2 & = & X_2 \\ \hline C + V + S & = & X \end{array} \quad (54)$$

In each stationary situation, the output of sector I must be equal to the capital consumption and raw materials used up in both sectors I and II, that is, $C_1 + C_2$, while the output of sector II must be equal to the wage bill and surplus of both sectors I and II. The necessary and sufficient condition for simple reproduction is therefore when the demand for producer goods of sector II is equated with the demand for consumer goods of sector I, that is, on the supply side we have

$$\text{sector I} \quad C_1 + V_1 + S_1$$

$$\text{sector II} \quad C_2 + V_2 + S_2$$

and on the demand side, we have

$$\text{producer goods } C_1 \quad \text{from sector I}$$

$$C_2 \quad \text{from sector II}$$

$$\text{consumer goods } V_1 + S_1 \quad \text{from sector I}$$

$$V_2 + S_2 \quad \text{from sector II}$$

And equating demand and supply we get

$$C_1 + C_2 = C_1 + V_1 + S_1 \quad (55)$$

$$V_1 + S_1 + V_2 + S_2 = C_2 + V_2 + S_2 \quad (56)$$

or

$$C_2 = V_1 + S_1$$

In order to have expanded reproduction, the first condition is that output of sector I must be larger than $C_1 + C_2$, which in turn means that output of sector II will be smaller than $V_1 + V_2 + S_1 + S_2$. This can be realized when part of the surplus from sector I is used for consumption of goods from sector II, while the rest is invested in buying additional producer goods and labour power, that is, S_1 is divided into S_{1c} , S_{1v} , and S_{1k} representing respectively surplus for buying additional producer goods, labour power, and consumer goods for consumption of sector I. Similarly, the surplus of sector II may be divided into S_{2c} , S_{2v} and S_{2k} . Then, on the supply side we have,

$$\text{sector I} \quad C_1 + V_1 + S_{1c} + S_{1v} + S_{1k}$$

$$\text{sector II} \quad C_2 + V_2 + S_{2c} + S_{2v} + S_{2k}$$

and on the demand side we have

$$\text{producer goods} \quad C_1 + S_{1c} \quad \text{from sector I}$$

$$C_2 + S_{2c} \quad \text{from sector II}$$

$$\text{consumer goods} \quad V_1 + S_{1k} + S_{1v} \quad \text{from sector I}$$

$$V_2 + S_{2k} + S_{2v} \quad \text{from sector II}$$

Equating demand and supply we get

$$C_1 + S_{1c} + C_2 + S_{2c} = C_1 + V_1 + S_{1c} + S_{1v} + S_{1k} \quad (57)$$

$$V_1 + S_{1k} + S_{1v} + V_2 + S_{2k} + S_{2v} = C_2 + V_2 + S_{2c} \quad (58)$$

or

$$V_1 + S_{1k} + S_{1v} = C_2 + S_{2c} \quad (59)$$

which is the necessary and sufficient condition for expanded reproduction.

The model assumes constant returns to scale; the ratio between C and V (organic composition of capital) remains unchanged; the ratio between V and S also remains unchanged. Thus, given the expansion of C and V by an increment of each, the total output of both sectors I and II in the second round will in turn increase in fixed proportion according to S/V , so that the expanded output at the second round will be equal to

$$C' + V' + S' = X_1' + X_2' = X' \quad (60)$$

It will be noted that given the definition of national income to be NDMP, it is equal to wage bill plus surplus:

$$\text{NDMP} = V + S \quad (61)$$

while X in (54) is the gross social value output or gross social product. The model shows that given the initial conditions for expanded reproduction, the allocation of an increment of investment $S_{1k} + S_{1v}$ out of total surplus S_1 generates net income to the amount of

$$(1 + s_1)S_{1v} + (1 + s_2)S_{2v} \quad (62)$$

where s is a constant ratio (S/V) of each sector.

Fel'dman growth model

The Fel'dman growth model is ideologically based on Marx's reproduction schema. In the model, only final output is considered. There are two sectors: investment goods sector and consumer goods sector. The assumptions are that output of the investment goods sector serves to increase productive investments and that output of the consumer goods sector is directed entirely toward consumption. The consumer goods sector is further assumed to be completely independent of the other sector as far as simple reproduction is concerned. The model is to show the different growth paths which will be generated when the fraction of investment goods allocated to investment goods sector itself varies, but at certain critical level, which will

not be reached until after a long time according to Feldman's numerical demonstration, the increase in the ratio between the capital stocks of the two sectors will not push the total income growth rate beyond a certain limit, given the assumption of constant capital coefficients.

The basic equations in the model are:

$$I_t = I_0 \left(1 + \frac{r}{V_1}\right)^t \quad (63)$$

$$C_t = C_0 + \left(\frac{1-r}{r}\right) \frac{V_1}{V_2} I_0 \left[\left(1 + \frac{r}{V_1}\right)^t - 1\right] \quad (64)$$

$$Y_t = Y_0 + \left[\left(\frac{1-r}{r}\right) \frac{V_1}{V_2} + 1\right] I_0 \left[\left(1 + \frac{r}{V_1}\right)^t - 1\right] \quad (65)$$

- where
- I annual rate of net investment
 - C annual rate of output of consumer goods
 - Y annual rate of output of the whole economy
 - r fraction of total investment allocated to sector I
(investment goods sector)
 - V₁ the marginal capital coefficient of sector I
 - V₂ the marginal capital coefficient of sector II
(consumer goods sector)

Sources

- The Harrod model: R.F. Harrod, "An Essay in Dynamic Theory," Economic Journal, March 1939.
- The Domar model: E.D. Domar, "Expansion and Employment," American Economic Review, March 1947; "The Problems of Capital Accumulation," op.cit., December 1948.
- Ichimura model: United Nations, Programming Techniques for Economic Development, Appendix to Chapter II.
- Two-sector model: Ibid., Appendix to Chapter III.
- Three-sector model: Ibid.
- Input-output model: Ibid., Appendix to Chapter V; P.G. Clark & H.B. Chenery, Interindustry Economics, Chapter 2.
- Marx's simple and expanded reproduction schema: N. Spulber, The Soviet Economy: Structure, Principles, Problems; S. Tsuru, "Keynes versus Marx: The Methodology of Aggregates," in Post-Keynesian Economics, ed. Kenneth K. Kurihara.
- Fel'dman growth model: E.D. Domar, "A Soviet Model of Growth," in Essays in the Theory of Economic Growth, ed. E.D. Domar.

Introduction

1. The first chapter of this book is devoted to the study of the history of the development of the theory of the structure of the atom.
2. The second chapter is devoted to the study of the structure of the atom and the study of the properties of the atom.

CHAPTER NOTES

1. The first chapter of this book is devoted to the study of the history of the development of the theory of the structure of the atom.
2. The second chapter is devoted to the study of the structure of the atom and the study of the properties of the atom.

Our first objective in this chapter is to study the history of the development of the theory of the structure of the atom.

1.1 THE HISTORY OF THE DEVELOPMENT OF THE THEORY OF THE STRUCTURE OF THE ATOM

1. The first chapter of this book is devoted to the study of the history of the development of the theory of the structure of the atom. The first part of this chapter is devoted to the study of the history of the development of the theory of the structure of the atom. The second part of this chapter is devoted to the study of the structure of the atom and the study of the properties of the atom.
2. The second chapter of this book is devoted to the study of the structure of the atom and the study of the properties of the atom. The first part of this chapter is devoted to the study of the structure of the atom and the study of the properties of the atom. The second part of this chapter is devoted to the study of the structure of the atom and the study of the properties of the atom.
3. In addition to these two chapters, there are two more chapters in this book. The first of these two chapters is devoted to the study of the structure of the atom and the study of the properties of the atom. The second of these two chapters is devoted to the study of the structure of the atom and the study of the properties of the atom.
4. In order to study the structure of the atom and the study of the properties of the atom, it is necessary to study the structure of the atom and the study of the properties of the atom.
5. The purpose of this book is to study the structure of the atom and the study of the properties of the atom. The first part of this book is devoted to the study of the structure of the atom and the study of the properties of the atom. The second part of this book is devoted to the study of the structure of the atom and the study of the properties of the atom.

INTRODUCTION

1. 'China' refers to 'Communist China', 'Chinese Mainland', 'Mainland China', or 'People's Republic of China' excluding Taiwan (Formosa).
2. Professor Eckstein's estimate of China's national income for 1952 has been the result of five year's work. Professors Liu and Yeh's study for the RAND Corporation on China's national income 1933, 1952-59 was planned as early as 1955 or thereabout and was not released as a RAND research memorandum until 1963. (These information were supplied by Professors Eckstein and Liu.)
3. The following are estimates of Net Material Product at 1952 prices released by Professor Ronald Hsia in (121), p.26:

1960	154,310 million yuan
1961	104,930 million yuan
1962	139,350 million yuan

Our own estimates of Net Domestic Material Product are given in Appendix B, Table B-30.

I. A SURVEY OF AVAILABLE ESTIMATES OF CHINA'S NATIONAL INCOME

1. The estimates of China's national income covered by the survey are divided into two groups: 'official' or 'Chinese' and 'non-Chinese'. By official or Chinese estimates we mean national income estimates which are published on the Chinese mainland. By non-Chinese estimates we refer to those estimates made by individuals or research institutions outside China. Non-Chinese thus designates the place where the work is done or being done rather than the nationality or race to which the individual belongs, or the nation to which the institution is affiliated. Hence, a national income estimate made by a Chinese scholar in the United States is regarded as non-Chinese by virtue of the fact that it has been estimated outside China.
2. Studenski (246). See particularly Part I on History, and Part II on Theory and Methodology which presents a detailed account of the different national income concepts, especially in Chapters 11 to 15.
3. In addition to these production concepts, there are the modified versions of these concepts, for example, the Marxian production concept, etc. See Studenski (246), pp.183-187.
4. In order to avoid confusion, 'national income' in small letters denotes national income generally and 'National Income' or NI denotes national income aggregate estimated by the income method.
5. The coverage of 'domestic' and that of 'geographical' are the same. For the use of 'geographical', see Reddaway (216).

6. See note 1.
7. See inter alia Nove (200) for the Soviet case. Yueh Wei's description of the method was reproduced by Li in (156) and summarized in Luey (179). See also (194) and Su Shao-chih and Hu Chien-mei(248).
8. Yueh Wei (297), pp.52-56.
9. Li (156), p.56.
10. Ibid, p.76.
11. Yueh Wei (297), p.60. See also Su Shao-chih and Hu Chien-mei (248).
12. Yueh Wei (297), p.48.
13. There is no reason to suspect that this 'refugee' has been trying to provide the answer to my question in the way I wanted it. The information was given voluntarily.
14. See inter alia Nove (200); Kaser (141), (142); Jackson (134), Holesovsky (107) for national income accounting in the Soviet Union and the Eastern European countries. For Chinese criticism of Western national income accounting and applications, see Lo Chih-ju (176). Lo was one of those Western-trained economists who were outspoken about the status of economics in China in 1957. See Cheng (39), p.252 and Ch'en Cheng-fan et al (36).
15. Lo Chih-ju (176), p.17. See also Su Shao-chih and Hu Chien-mei (248).
16. Lo Chih-ju (176), p.17.
17. Lu Kuang (178), p.9.
18. Yueh Wei (297).
19. Kuo-chia yu-suan shou-ju is officially translated as 'financial revenue'. For 'budget revenue' and kuo-chia yu-suan shou-ju, see (52).
20. Mah (186), p.62.
21. Po I-po (210).
22. See (214).
23. Ho Wei (104), Ma Yin-ch'u (182), Niu Chung-huang (198), and Yang Po (286), (287), (288) and (289).
24. SSB (239).
25. Lu Kuang (178), p.8.

26. Yang Po (289) and Niu Chung-huang (198), p.23.
27. Hsu Ti-hsin (124), p.249.
28. SSB (238) and Hsueh Mu-ch'iao et al (129), p.154.
29. Li Fu-chun (159).
30. SSB (242).
31. SSB (243), p.20.
32. Po I-po (213).
33. Lu Kuang (178), p.9.
34. Liu & Yeh (174) and (175).
35. Niu Chung-huang (198), p.51.
36. Cheng (38), Vol. I, Chapter 3.
37. Loc. cit. Table XIII.
38. Loc. cit. Table XIV.
39. Loc. cit. Table XVII.
40. Wu (281), p.246.
41. Szczepanik (250).
42. United Nations (260).
43. United Nations (261).
44. Li (156), Chapter IV.
45. Luey (179).
46. Ibid., pp.120-121.
47. Hollister (109).
48. Ibid., p.xxiii.
49. Eckstein (68), p.53 and Hollister (109), pp.61-68.
50. Hollister (110) was not available to me at the time of writing. See cross reference in Wu et al (282).
51. Eckstein (68) and (72).

52. Liu & Yeh (174) and (175), and Liu (173).
53. Wu et al (282).
54. Wu (280).
55. Hollister (110).
56. For Liu & Yeh, the most recent estimates from (174) are employed.
57. See Appendix A. Table A-6.
58. Official figures are derived from data given in Lu Kuang (178), p.8. Other figures are taken from Appendix A, Table A-6, Liu & Yeh (174), and Wu et al (282).
59. For labour force in trade, see SSB (236). For net value added per worker engaged in trade see Niu Chung-huang (198).
60. Lu Kuang (178), p.8.
61. Chien Hua (43), pp. 52 and 123.
62. Po I-po (212), GAC (83) and see also Chao (35), Vol.I, p.184.
63. Chao (35), Vol.I, p.185.
64. Li (156), Chapter IV.
65. Under Hollister, compensation of employees and self-employed exclude consumer services, which accounts for the difference between the figures for this item and for the GNP at market prices given here and those in Appendix A.
66. It has since been found that K. Chao concurs with our view. See Chao (32).
67. Li (157).
68. Much depends on the data available to the individual estimators. Where there are no official data available, an estimator would have to use whatever fragmentary information he could lay his hands on. Oftentime such fragmentary price data refer only to local rather than national average prices.
69. Wu et al (282), Vol.I, Chapter 8.
70. Liu & Yeh (174), Vol.I, Tables 70 and 94.
71. Wu et al (282), Vol.I, p.158.
72. Ibid.

73. Ibid., pp.161-163.
74. Wu (246), p.246; Cheng (38), Vol.I, Tables XIII, XIV, and XVII; and Mah (186), pp.72-74.
75. Basic population figures for 1952-57 are given in (45).
76. See Wu et al (282), Vol.I, p.28, Table 3. The figures are based on the assumption of a severe, prolonged food deficiency, approaching famine, for the period 1957 and after.
77. Ibid., Chapter 5.
78. Wu et al (282), Vol.II, pp.18-20.
79. Derived from Luey (179), p.127, Table V.

II. PRICING IN THEORY AND PRACTICE WITH REFERENCE TO CHINA

1. However, Eckstein did discuss in general terms the problems of valuation and imputation with reference to an "underdeveloped Soviet-type economy". See his (68), pp.18-27.
2. See Liu & Yeh (174), Chapters II and III. The characteristics of the Chinese price system were brought out indirectly through their discussion of the usefulness of the Chinese official price indexes.
3. It appears that Hollister was more concerned with constructing a set of national income accounts than with the finer points of concepts.
4. Hsia did attempt to examine the formation of price during that period. See Hsia (120).
5. Perkins (206). Even then, he did not examine the nature of price system in China nor did he show how prices were fixed. However, his doctoral dissertation for Harvard University was on price formation in China, which we have so far not been able to obtain a copy.
6. Bergson (19) passim; Balassa (7), Chapter 4; Dobb (58), Chapter I; Jasny (136); Nove (199), Chapter 4; Montias (187); Wiles (275), Chapters 5 and 6. See also Goldman (84); Bergson (18); Granik (87); Holzman (112); Montais (188); Spulber (229); Wellisz (273); Hirsch (98); Wiles (274), (276), and (277); and Zauberman (299).
7. See Balassa (7), pp.99-101 and Bornstein (25).
8. Bye (27), Chapter I.
9. Ibid.

10. Wiles (274), Chapter 4, and Balassa (7), Chapter 4.
11. For example, Halm (90).
12. See any basic texts on microeconomics. For example, Dorfman (63) or J.M. Henderson and R.E. Quandt, Microeconomic Theory - a Mathematical Approach (New York 1958).
13. See Barone (11).
14. For an excellent analysis of functions of price in a centrally planned economy, see Montias (187) passim and Balassa (7), Chapter 4.
15. The Chinese on the mainland admit that their society is still not a communist society.
16. Hsueh Mu-ch'iao et al (128).
17. See Li (156), p.24.
18. But sometimes they are being forced to save. See Perkins (206).
19. Li (154), p.3.
20. See Yang Po (285).
21. Hsiao Lin and Hsu T'ing-fang give a very clear picture as to the types of goods to be sold on the free market in their (123).
22. Ho Chiang (99), pp.19-20 on the basis of which most of the present section is written.
23. Hsiao Lin and Hsu T'ing-fang (123).
24. Chao (34), p.229.
25. Donnithorne (60), p.112.
26. Ho Chiang (99).
27. Yang Chien-p'ai (283).
28. See inter alia Ho Chien-chang et al (100) which was published in April 1962.
29. For Marx's law of value, see The Capital, especially, Vol.I, Chapter 1, pp. 1-3; Chapters 3, 6, 7 and 8; and Vol.III, Chapter 10.
30. Yu Lin (296).
31. Chin Li (46) and Yu Lin (296).
32. Yu Lin (296).
33. Ibid.

34. Balassa (7), pp.99-100. See also Bornstein (25).
35. Yu Lin (296).
36. Balassa (7), pp.100-101. See also Bornstein (25). This should not be confused with the Chinese concept of production price which is based on the capital-profit ratio method.
37. Yang Chien-p'ai (283) and Yu Lin (296). The most recent discussion related to this method can be found in the Economist, February 26, 1966, pp.782-786.
38. Yun Hsi-liang (298).
39. Huang Chih-hsien (130) and Ts'ai Chien-hua (255).
40. Ch'ai Yen (30), Chiang Ch'uan-kuei and Li Shih Ch'uan (40), Ch'en Chi-yuan et al (37), Ho Kuei-lin (102), and many others.
41. Yang Chien-p'ai (283), pp.47-48.
42. Ibid.
43. Chin Li (46) gives a resume of the two schools of thought.
44. Chao (35), Vol.I, p.194.
45. Actually the "work" principle is applied to industrial wage system. An excellent treatment of wage policy is given by Schran in (224).
46. This was also applied to a few enterprises, but apparently with disastrous results. See Schran (224), pp.250-251.
47. SC (233).
49. The last official reference to wholesale price index was given in SSB (243).
48. Hsueh Mu-ch'iao (127), p.7.
50. The structure of official prices is constructed on the basis of scattered sources on pricing. It is not clear whether the Chinese ex-factory price corresponds to the Soviet wholesale price of industry or to the Soviet wholesale price of enterprise, or to neither. The ex-factory price and wholesale price of industry are common in that production costs, industrial profit, and tax constitute the price. Ex-factory price has been defined by Tan Ku as the price at which an industrial enterprise sells its products to commercial organs, but we fail to see the correspondence between the Chinese ex-factory price and the Soviet wholesale price of enterprise because the latter excludes tax. Tan Ku stated further that there were two sales prices:

ex-factory price and retail price. While his statement might be construed as that there are only two sales prices, this does not necessarily mean that there is no wholesale price. On the contrary one could argue that the ex-factory price is also the wholesale price, but the question would then be: whether ex-factory price is a wholesale price of industry or of enterprise. See Exhov (75), p.65; Nove (199), pp.128-134 and Tan Ku (251), p.1.

51. Jen Po (138) and Yu Kuang-yuan (295).
52. "New" products may well be simply priced at cost.
53. Tan Ku (251).
54. Ibid. See also Hsueh Mu-ch'iao (127).
55. Yang Po (285), p.7; Hsueh Mu-ch'iao (127), p.8.
56. Hsiao Lin and Hsu T'ing-fang (123).
57. Wang Ch'ung-kuang (269) and (270), and Hsueh Mu-ch'iao (127).
58. Hsiao Lin and Hsu T'ing-fang (123).
59. Donnithorne (61) and (62) give the best account available.
60. Goods in the first category were those placed under the planned purchase and planned supply system, those in the second category were those placed under the unified purchase system. Goods in the third category were those not included in either of the above systems. The first two categories vary from time to time. But according to the Regulations on Certain Agricultural and Other Products Subject to Planned Purchase or Unified Purchase by the State and not Permitted to be Sold on Free Market in Hsin-hua Pan-yueh-kan (New China Semi-monthly), No.116, 1957, pp.207-208, goods in the first category included foodgrains, edible oils and raw cotton, cotton yarn, cotton cloth, and those in the second category included a wide range of agricultural products such as sugar, tobacco, coarse fibres, live pigs, silk cocoons, wool, hides and skins, varieties of medicinal herbs, etc.
61. Fan Jo-i (77).
62. Ibid.
63. Ibid. See also Li (156), p.232.
64. Fan Jo-i (77).
65. Fan Jo-i (77), Lo Keng-mo (177), Nan Ping and Soh Chen (192).
66. Yang Po (285), p.7.
67. SC (232).

68. Chao (35), Vol.II, p.3.
69. Ibid.
70. For 1954-58, see SSB (243), p.172. For 1959, see Liao Hsiu-feng (166), p.219.
71. Yang Po (285), p.7.
72. Hsia (116), p.49, Table 15.
73. Chiao Yu-po (42), p.31.
74. Ibid.
75. Ibid., p.32.
76. SSB (243), p.173.
77. Yang Po (285), p.7.
78. Link index:

	<u>Retail price</u>	<u>Purchasing price for agricultural produce</u>
1953	103.2	110.1
1954	105.5	113.8
1955	106.3	113.2
1956	106.3	116.6
1957	108.6	122.4
1958	108.3	125.1

From SSB (243), p.173.

79. Liu Shih-pai (172).
80. For an analysis of the economics of "private plot", see Walker (267).
81. Chiang Huai (41), p.18.
82. Yen Ku-hsing (292).

III. VALUATIONS OF NATIONAL INCOME FOR ACCOUNTING PURPOSES WITH REFERENCE TO CHINA

1. (79), p.16.
2. Schwartz (225), pp.9-11.

3. Kuznets (145).
4. U.S. Department of Commerce (265) and Kuznets (145), pp.181-184.
5. Studenski (246), pp.194-203.
6. Kuznets (145), pp.184-192.
7. Joffe (139), pp.55.
8. Ibid., p.58.
9. Ibid., p.57.
10. For an analysis of the role of militia, see Tang (252), pp.349-352.
11. Walker (268), Chapter 3.
12. Ibid., p.75 and also Tang (252), pp.107-113.
13. Tang (253), p.13 and also Tang (252), p.107 and Walker (268), p.51.
14. The six principal themes were: unimportance of individual by himself, only as part of an organization which he accepts does he have strength; the Party knows all; the past is always bad, and only future under the Party is bright and good; service to the country; the Party always wins; reorganization of class struggles. See Walker (268), pp.62-64.
15. Studenski (246), pp.196-197.
16. Subsistence output would require imputation of prices. With the state control of sales of agricultural produce through the planned purchase and planned supply and also the unified purchase system, the imputation of subsistence output does not present too much of a problem, for actual prices of the portion which must be sold to the state can be obtained. The goods in the third category can be sold on the free market and thus actual market prices can be obtained for the portion of these goods retained by the households. Of course, the imputation of prices would still lead to cutting across the secondary distinction between factor cost and market price valuations. But this is less serious than in the case where no market analogue at all is found for the subsistence output.
17. Frankel (80).
18. Bergson (19), p.26. See also his other studies on Soviet national income.
19. Hicks (93), (94), and (92); Hicks and Hicks (96); Studenski (246); Ruggles and Ruggles (220); Kuznets (148); Clark (48); Frisch (82); Rolph (218); Musgrave (191); Colm (50); Haberler and Hagen (89); Lindahl (168); Ohlson (202); Nicholson (197). See also Bergson (18); Bergson and Heyman (22); Wiles (274), (276); Robinson (217); Hodgman (105); Granik (87); and Holzman (112).
20. Clark (48), Chapter 3 et passim.

21. Bergson (19), p.105.
22. Little (169), Appendix D.
23. Rolph (218).
24. For the basis of invariant argument, see Haberler and Hagen (89), Musgrave (191), Rolph (218).
25. Frisch (82).

IV. NATIONAL INCOME AND ECONOMIC WELFARE WITH REFERENCE TO CHINA

1. Studenski (246), pp.27-28.
2. Ibid., pp.30-36.
3. Hicks (93), pp.106-107.
4. Pigou (209), p.11.
5. Ibid., p.31. Italics are ours.
6. Hicks (93), (94); Kuznets (148); Little (171); Samuelson (222); Abramovitz (1); and Bergson (19).
7. Little (171), p.14.
8. ~~Of~~ it corresponds to an economy which adopts Balassa's blueprint for centralized market solution with (without) sovereignty. See Balassa (7), Chapter 4.
9. Compare Baumol (14), p.25 and Bergson (20), pp.310-311.
10. Lerner (152), pp.128-131.
11. Baumol (14), Chapter 3.
12. Pigou (209), Part II, Chapters 2, 3, 4 and 9; and Baumol (14), pp.32-36.
13. Pigou (209), pp.196-200 and Baumol (14), pp.36-47.
14. Baumol (14), p.33.
15. See Chapter II, section on pricing in theory: Chinese discussions.
16. This is based on an (optimistic) assumption that marginal cost principle is being used.
17. Hsiao Lin and Hsu T'ing-fang (123).
18. Compare Bergson (19), pp.31-34. He made use of production possibility curves.

19. Pigou (209), p.49.
20. Ibid., p.52.
21. Ibid., pp.53-54.
22. Loc. cit.
23. Loc. cit.
24. Ibid., p.65.
25. Ibid., pp.68-69.
26. Ibid., p.70.
27. Ibid., p.71.
28. Ibid., pp.70-73.
29. This will be discussed further in Chapter V where we distinguish between the different forms of planning.
30. Bye (27), p.43.
31. See Chapter II, section on prices of producer goods.
32. Little (171), p.25.
33. This may be explained by the fact that decisions to invest rest mainly with the state. See Chapter II, section under centrally planned economy of the communist type.
34. Kuznets (145).
35. It should be noted that production and allocation decisions based on planners' preferences are implied here.
36. Hollister (109), p.xxii.
37. Ibid., p.134.
38. Ibid., p.130.
39. Perkins (206).
40. Hollister (109), Chapter 7.

V. NATIONAL INCOME ACCOUNTING AND ECONOMIC PLANNING

1. Tinbergen (254), Appendix.
2. Government of India (85), p.11.
3. For Yugoslav planning, see Bicanic (23).
4. A scholarly evaluation of China's statistical system is given in Li (157).
5. Clark and Chenery (49).
6. Tinbergen (254).
7. The only references to them have been the rates of investment (or consumption).
8. Bicanic (23), p.63.
9. Tinbergen (254), p.5.
10. Walker (267).
11. Wu Chia-pei (278).
12. See Chapter II, section under centrally planned economy of the communist t, pe.
13. Beach (15), Chapters 1 to 3 passim.
14. Compare Edey and Peacock (73).
15. Yuch Wei (297).
16. While the quality of iron, steel, and coal was specified in terms of method of production in 1960, the revision in method of reporting physical output data was not accompanied by any change in the value output figures for industry as a whole in so far as 1959 was concerned. See Contemporary China, Vol.IV, section III on Statistics.

VI. CHINA'S NATIONAL INCOME ACCOUNTING AND ECONOMIC PLANNING

1. See inter alia Liu & Yeh (174), Vol. I, pp.55-60; Hsia (117); Eckstein (68), pp.11-16.
2. Li (157), pp.63-64.
3. Li (157), p.64.
4. Li (157), p.64.
5. Hsueh Mu-ch'iso (126).
6. (196).
7. See Contemporary China, Vol.IV, section III on statistics.
8. For the relevant directive, see State Council, "Directive on Unification of Weights and Measures," June 25, 1959.
9. Survey of China Mainland Press (American Consulate General, Hong Kong), No. 2746, p.3.
10. Li (157), Chapter XIII.
11. Ibid., p.149.
12. See notes 3 and 4, Appendix B.
13. Liu & Yeh (174), Vol.I, p.74.
14. Wu et al (282), Vol.I, Chapter 9.
15. Loc. cit.
16. Luey (179), p.126, Table V.
17. Hsia (114), p.298; Wu et al (282), Vol.I, Chapter 9; Liu & Yeh (174), Vol.I, Chapter 2.
18. Liu & Yeh give 6 per cent per annum while Wu et al give 6.6 per cent per annum. The official rate is 8.9 per cent per annum.
19. Hsia (114), p.298.
20. See C.Y. Cheng, Economic Relations Between Peking and Moscow: 1949-63 (New York 1964), Chapter 3.
21. Hsia (114), p.303.
22. Ibid., p.301.
23. Liu & Yeh (174), p.138.
24. Derived on the basis of NDMP of 61,130 million yuan for 1952 and a 53.2 per cent increase over the period 1952-57.

25. See (214), p.12. The figure is derived on the basis of a 50 per cent increase over the 1957 level.
26. Hsia (114), p.303.
27. Li (154); Hsia (99); Eckstein (57); Buck (26); (44); Dawson (54); (56); and Freeberne (81).
28. The exercise was attempted before any information on the date of commencement of the Third Five-Year Plan was available.
29. Hsia (114).
30. Hollister (108), p.51.

The list of references is arranged in the order in which they are mentioned in the text and the references are given in the form of the publication as it appeared in the original language of the work.

All references are in English unless otherwise stated. However, in a few cases articles are published in Chinese. These can be identified by means of the publications as mentioned above with the following abbreviations in parentheses following them.

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The listing is confined to the publications cited in the text and the appendices, and also to some of the publications consulted in the preparation of the text.

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