ON THE ACCURACY OF PHILIPPINE NATIONAL INCOME ACCOUNTS

GERARDO P. SICAT

1. INTRODUCTION

The national income accounts are an important set of information regarding the ability of an economy and its sectors to produce goods in any given year. It has become fashionable to think of an economy's growth in terms of year-to-year changes in national income. In the Philippines, postwar growth of the economy is described with referrence to the growth of either the gross national product or the national income. This paper aims to examine the accuracy and the analytical uses of the national income data made available to the public.

Philippine national income data are available only for the postwar period.[1] The first task of compiling national income statistics for 1946 to 1951 was done by the Department of Economic Research of the Central Bank under the direction of William I. Abraham.[2] The work was carried on by the Central Bank until 1957 when the function was transferred to a branch of the National Economic Council. Lately, the NEC made a promise that an "extensive revision of the existing estimates for a period of at least the last ten years is programmed for 1963 to include all pertinent recommendations of the [National Economic Council] for improved, more reliable and more realistic figures."[3] Such results are to be awaited. This paper is confined to an assessment of the published estimates.

2. ESTIMATION PROCEDURES[4]

In the Appendix to this paper a brief sketch of the tabular and algebraic schema used in the estimation of Philippine national income accounts is made. The actual estimation procedure used by the builders of national income estimates will be outlined in this section. The qualitative value of the resulting estimates will be discussed in the succeeding section.

Philippine national income accounts are built essentially from estimates of national income at factor costs. The value-added originating from each sector is computed. All the sectoral value-added are then summed together, and the result is an estimate of national income at

factor costs. The space available does not permit a detailed discussion of the estimation techniques for value-added originating in all the sectors. However it may be interesting to describe the procedures in brief here.

There are seven broad categories into which the economy is classified for purposes of measuring national income by industrial origin — agriculture, mining, manufacturing, construction, trade, transportation and communications, and services. Of course, each one of these broad categories is subdivided into as many sub-sectors as possible. For instance, in agriculture, the four sub-sectors are agricultural crops, livestock and poultry, fishing and forestry; manufacturing is split into sectors based, with minor modifications, on 2-digit classification along the lines of the International Standard Industrial Classification for manufacturing activities; and services into government, personal, professional, owner-occupied dwellings, and a catchall "other" services category."

The building up of national income estimates requires the use of various basic data from many sources. The sources of data for some sectors are oftentimes government agencies charged with administering certain functions that enable them to collect data useful for the national income. Some such agencies are the Bureau of Mines, Bureau of Forestry, the General Auditing Office, Bureau of Public Works, the Sugar Quota Administration. Certain government institutions charged with the collection of primary data have of course been important sources of data.[5] The Central Bank, the Agricultural Economics Divisions of the Department of Agriculture and National Resources, the Bureau of the Census and Statistics periodically gather data on different types of industrial undertakings.

The techniques used in estimating value-added originating in a sector would depend largely on the availability of direct data, of surveys, and the degree to which reliance on benchmarks and imputations are made. Value-added estimations often start with a computation of total value of production. Here a great deal of imputations and extrapolations are made not only as a *modus operandi* in national income estimation but also because basic data are either often lacking or in bad shape. With the value of production known, the next task is to compute value-added in that sector (which is equivalent to the sector's total value of production minus purchases from other sectors). But instead of estimating in detail the amount of materials purchased from other sectors, total value of production is multiplied by fixed ratios (of value added to total value of production) to obtain value-added estimates. The ratios employed are mostly those derived and used by Abraham in compiling the first national income esimates. The basic question having to bear on the results is the accuracy of the assumptions, the benchmarks, the ratios, and the indexes used in making the sectoral

estimates. The value-added originating in a sector is often a composite of these techniques, depending on the number of subsectors into which that sector is divided and the availability of data in each of them. A short description of these procedures can unduly extend the discussion, but the interested reader is referred to the relevant methological papers and the critical work regarding them.[6]

After national income at factor costs is known, the next task is to split this aggregate into the shares of the factors. Two items are presumed to be known before all the other shares are found — private corporate income and the property income of government. Private corporate income (which is referred to in the accounts as "other private income") is a measure of the undistributed profits of private corporations and of the taxes they *paid* during the year. However, these estimates consist only of straight-line projections of taxable net income and tax assessments, *not* really estimates based on actual corporate accounts. To measure undistributed profits an allocation ratio of 74 per cent is used on net corporate income (i.e., after taxes are *paid*); the remainder are assumed as *distributed* profits. Taxes *paid* by corporations are not really taxes paid but only tax assessments on corporations.

The property income of government consists of the net profits (i.e., after administrative, operating, and other expenses are subtracted from gross profits) of about 25 corporations either owned or controlled by the government. The losses of government corporations are listed as subsidies.

Private (non-corporate) income is now made rather easy to get as soon as the two previous items are known. To arrive at it, private and government corporate incomes are deducted from the national income at factor costs. This residual (which was 95.8 per cent of national income in 1961 and 95.4 per cent in 1962!) is then split between wage income or "compensation of employees" (44 per cent of total), and non-wage income, or "entrepreneurial and property income of persons" (56 per cent of total). These allocation ratios were used by Abraham when he compiled the first national income estimates for the Philippines. The factor shares originating in agriculture are derived by splitting the *value-added* in agriculture in the ratio 28-72 per cent between (1) wage and (2) non-wage earners, respectively. The residual of these factor shares are assumed to be the shares of wage and non-wage earners in the non-agricultural sectors.

At this point it would be interesting to mention the method used in the derivation of private disposable income, which is considered the main variable determining private consumption expenditures in the theory of national income determination. Personal direct taxes, which

are estimated from the fiscal accounts, corporate income of government and undistributed private corporate income are deducted from national income at factor costs. When transfer payments and net donations from abroad are added to the difference, private disposable income is derived.

The accounts are now built up to produce the gross national product and its expenditure components — private (i.e., personal) consumption expenditures, government expenditures, gross domestic investment and net foreign investment. Gross national product is arrived at by adding the estimates of depreciation and indirect taxes-less-subsidies to national income at factor costs. Depreciation on durables are based on current replacement costs, using a straightline depreciation method on the assumption that durables have a life of 10 years. While government equipment is depreciated along the same line, no depreciation allowance is given to government construction. For private construction a fixed depreciation allowance of ₱230 million has been in use ever since the national income accounts were constructed! Indirect taxes are taken from the fiscal accounts and are the sum of all taxes not levied on corporate or personal income.

Except for private consumption expenditures, all the expenditure components are estimated somewhat more directly. Government expenditures are derived from the fiscal accounts while net foreign investment from the balance of payments. Gross domestic investment is estimated by the following method. All goods with an expected durability of two years are allocated either as consumer or capital goods, according to ratios determined by the Central Bank. The capital goods allocation ratio varies from 10 per cent to 100 per cent depending on the type of the equipment. A mark-up of 50 per cent of the c.i.f. cost of imported goods and 25 per cent of the factory price of domestically produced durables are used for adjusting for market valuations. Changes in agricultural and livestock inventories are estimated by the Department of Agriculture and Natural Resources and the Sugar Quota Administration. The non-agricultural inventories are computed by the application of *fixed* percentages of gross sales or production.

The construction component of gross domestic investment includes private as well as government construction. The permit values for private construction in Manila and other areas are derived from the Bureau of the Census and Statistics. It is assumed that the private construction in Manila is 30 per cent of total private construction and that farm construction is fixed yearly at ₱10 million. The Bureau of Public Highways, the Bureau of Public Works and the General Auditing Office provide data for government construction.

Deducting government expenditures, gross domestic investment and net foreign investment from the gross national product leads to an estimate of private consumption expenditures. It should be pointed out that private consumption expenditures comprise a big share of gross national product, around 85 per cent. It is therefore somewhat strange, as in the case of the share of private non-corporate income in the national income at factor costs, that no attempt has been made to measure this component at least by a more direct method.

The discussion of the estimation procedures for some components of national income in the Philippines was made only for a few specific aggregates. It is impossible to discuss the estimation procedures without getting into details not intended here.

3. ACCURACY AND ANALYTICAL USES

Although the description of the procedure of national income estimation is sketchy and touched only on major items, questions cannot be avoided about the level of precision of the accounts, and consequently, about the analytical uses that may be made of the income aggregates.

The accuracy of the income accounts would depend on the nature of the estimation procedures and the size of the errors resulting. If the errors arising are random, then they would tend to cancel each other out, when all estimated items are added together to form larger aggregates. But this can be true only when these items have fairly equivalent weights relative to each other, which is not the case. But allowance may be made for this. Even in countries with the most advanced statistical systems, items in the national income accounts have varying levels of accuracy.

An early study made by Simon Kuznets,[8] one of the foremost authorities on national income, showed that items comprising about 29.6 per cent of US national income had margins of errors of 5 to 10 per cent, 40.4 per cent margins of errors of 11 to 20 per cent. The remaining components had larger margins of errors. However, when balanced by certain omissions in income estimation and when the errors offset each other in the total aggregate, Kuznets suggested that the average margin of error of US accounts is 10 per cent.[9]

If the margins of error for a country with a highly developed statistical system can be that high, then the Philippines which has a relatively much poorer statistical system may be expected to have larger margins of errors. It is not possible to make detailed sector by sector studies about the deviation of reported estimates in the national income accounts and re-estimated values for these items as Kuznets and his colleagues had done. In fact it is not the aim of this

paper to make even any re-estimation. But evidence on the matter for at least a few estimates of some national income estimates is available, and it will be cited when the occasion arises.

Broadly, two types of errors may be outlined for the estimates of Philippine national accounts. The first category of errors are those that result from adding up all the estimates of items that lead to the major aggregates — income originating in major sectors, national income at factor costs, and the largest aggregate, gross national product. Since all sectoral estimates are to be estimated first and all these estimates are summed up, any errors resulting from each estimation procedure have effects on each of the major aggregates mentioned.

The second category of errors arises from the breaking down of the major aggregates built from the estimates of national income at factor costs and of gross national product. In determining the value of certain aggregates, it often turns out that "allocation" ratios are used to distinguish one item from another. The amount of direct measurements of the item is minimal since large aggregates are split up into minor aggregates by just multiplying them by allocation ratios derived from the 1948 Census.[10] Moreover, it is not uncommon to find that where there are more than two large aggregates forming a "super" aggregate, the method used is to estimate the smaller items and then derive the value of the larger items by computing them as "residuals." Thus, suppose that there are errors arising from per sector and subsector estimation procedures. Assuming further that allocation ratios used have wide error margins. Therefore, it is not unreasonable to expect all residual measures to be widely off from their correct values. So far as the national accounts are concerned, no estimation attempts have been made of these large residual items since the first accounts have been put up.

The above errors can make the national income aggregates in any given year yield measurements with wide margins of errors. Hence, it may also be expected that changes are also subject to errors.

In the remaining discussion, certain items will be discussed by putting them in an analytical framework and examining the results later. Two analytical items that may be introduced from the national income series will illustrate the state of affairs of at least the accuracy of absolute levels and the year to year changes of national income aggregates. The first of these two items is the (simple) consumption function and the second the incremental capital-output ratio (ICOR). Both of these topics are of importance in discussions of economic development. The consumption function can say something about a country's capacity to *save*, since what is not spent on consumption is presumably saved. The value of the ICOR enables economists to say

something about the productivity of investment in terms of additional national income created. Therefore, in some respects the ICOR can also give hints as to the year to year changes in the increments to the economy's capital stock (investment) and to the economy's national income or output.

The series for personal consumption expenditure and for private disposable income will be studied first. The data will be limited to the years 1946 to 1960. In national income theory, it is assumed that private consumption expenditure is dependent on the level of personal disposable income. Taking this simple relationships, it is possible to estimate a consumption function.

The simplest consumption function is the linear form. Private consumption, C, in year t is a linear function of private disposable income, Y, in that year, except for a random error, u. Therefore this requires the estimation of two constants ("parameters") a and b from the equation

$$C_t = a + b\ Y_t + u_t .$$

The data on C and Y will lead to estimates of these constants when traditional statistical techniques of estimation are used.[11]

Since national income accounts are reported both in *current* prices and in *constant*[12] prices, estimates of the parameters are made from both sets of data. The following table shows the results of the calculation. The estimate of a and b for both sets of data are shown together with the correlation coefficient r and the simple consumption-income ratio, c/y. The derived consumption functions for both types of data fit very well as the very high estimates for r show.

TABLE 1
ESTIMATES OF CONSUMPTION FUNCTION

	a	b	r	c/y
"Current"	—465.4	1.069	0.99	1.004
"Constant"	—554.2	1.094	0.99	1.011

However, a quick reflection on the nature of the estimates reveals that they contradict empirically tested notions about the consumption function. (Picture the traditional graph for the consumption function with consumption on the vertical axis and disposable income on the horizontal axis and the so-called 45-degree line.) It is generally held that the intercept, a, is non-negative, more often positive in value and

that b is less than 1. At zero income, a person or country cannot save. The negative value of a exactly means that it can. Moreover, values of the estimates for b, which is equivalent to what is known as the "marginal propensity to consume," are not in keeping with the stability properties of any economic sector. The data that generated the estimates of b and c/y are for 14 years. It is highly doubtful that for such a period the household sector has been spending more than its additional income, in other words "dissaving." But this is exactly what a greater than 1 value of b and of c/y mean.

These results are difficult to accept considering that domestic generation of savings has been evident by the increase in the savings and time deposits of the commercial banking system and by the continuous survival of partnerships and individual proprietorships as business organizations.

The items on gross capital formation (or gross domestic investment) and changes in national income will now be examined by some attempts to measure the gross incremental capital-output ratio[13] for the Philippine economy. The ICOR is an important concept in models of economic growth. The Harrod-Domar model of growth has it as a major parameter that shows how much income growth can be expected from aggregate investment expenditures.[14]

The ICOR series is built on the assumption that it takes on the average at least one year for investment expenditures to yield increases in income. Therefore, the ICOR is quivalent to gross capital formation in year t divided by the change in gross national product from t to $t + 1$. Again computations for ICORs based on current and on constant prices are made.

Two estimates of the ICOR are made for each of the data using "current" and "constant" prices. The first one is a simple ICOR based on the yearly series of capital formation and gross national product and the second type is based on 4-year centered moving averages of gross capital investment and change in gross national product. The unreliability of the estimate is reflected by the high year-to-year fluctuations in the ICOR values. However, they show that computations of the ICOR based on the 4-year centered moving average removed all these fluctuations and stabilizes the nature of data.

Table 2 shows the estimates mentioned. For 1949-58 the moving average computations were based on data from 1946 to 1961. As would be expected, the simple ICOR is less reliable as an estimate of a *parameter* since it changes so often that it looks like a variable. Therefore, in view of the fact that the ICOR should eliminate fluctuations in income aggregates, the moving average computations are more re-

liable. "Reliable" here would be a relative matter. The average ICOR on the basis of current prices for the period under consideration is 1.51 and for constant prices 1.31. These estimates appear to be very low considering the *a priori* belief of most writers in economic development that the value of the ICOR is between 3.0 and 4.0.[15] Of course, much of the discussion about the ICOR is rather vague considering that it is not known whether the ICORs referred to are "gross" or "net".[16]

TABLE 2

GROSS ICORs

	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Current										
Simple	24.00	1.36	0.77	3.69	1.14	3.88	1.40	1.10	1.49	1.50
Centered	1.52	1.88	1.52	1.38	1.68	1.62	1.49	1.44	1.30	1.44
Constant										
Simple	1.93	1.39	2.00	0.80	0.74	1.36	1.09	1.14	2.43	4.23
Centered	0.84	1.44	1.27	1.13	1.05	1.04	1.22	1.56	1.83	2.16

In the ECAFE countries, the values of the ICOR are reported to be between 2.02 to 3.07.[17] However, the computed ICORs for the Philippines shown in Table 2 are lower. It is good for a country to have a low ICOR because this implies that it can get more additional output for less investment. But the question of data accuracy immediatey comes in considering that even early writers have said that the ICOR in the Philippines between 1950-54 was 0.67 and 1.2 for 1950-59.[18] It may be said at this point that the values of the net ICORs are much lower than the gross ICORs reported in Table. 2.[19]

Moreover, the data of other countries have yielded estimates of the ICOR much higher than the ones revealed for the Philippines by the national income data.[20] If the data are beyond suspicion, then it is easy to believe that the ICOR for the Philippines is really way below the usual expectations.

Such state of affairs in the national income accounts gives an inaccurate picture of the economy. How it can mislead economists is seen by the way even as distinguished an economist as P.N. Rosenstein-Rodan interpreted Philippine national income data. In an otherwise very important paper[21] Rosenstein-Rodan said in a footnote[22] that the Philippines has

> "a very low savings rate of 7½ per cent which, moreover, may still be a slight overestimate. [The] Investment and Savings

rates could and should be raised considerably by a more vigorous development policy."[23]

Thus, in two analytical examples, the national income data do not yield logically acceptable results. The computations of the ICOR and of the consumption function seem to suggest that the estimates of gross capital information, gross national product as well as other items do not reflect highly reliable results. Therefore, it is possible to begin with a hypothesis that the national income accounts do not yield relatively correct orders of relative magnitudes either in the totals or in the year to year changes.

A number of studies give corroborative evidence for this hypothesis.

Recent studies have shown the high margins of errors of several national income aggregates. They cast doubts on the estimated values of private consumption expenditures and saving and on domestic capital formation.

In March 1957 were published the results of a survey of family income and expenditures conducted by the National Economic Council and the Bureau of the Census and Statistics.[24] The PSSH study, as this is popularly known, reveals that the household has been on the whole doing substantial positive saving. The PSSH data have been used in the estimation of a consumption function for the Philippines.[25] The marginal and average propensities to consume were found to be 0.76 and 0.88, respectively. Although the PSSH data probably reveal more correctly the proper consumption-income ratios for the household sector, the absolute values of income and expenditures are somewhat underestimated.[26]

The pioneering work of Richard W. Hooley on saving in the Philippines[27] provides the most significant evidence on the inaccuracies of the national income accounts regarding saving and consumption expenditure.

Hooley compiled data on saving bringing together two sets of independent estimates. The first is based on changes in the net assets of households. The second is a direct estimate of household consumption using as much of the PSSH, foreign trade, and domestic production data in the estimation of consumption expenditure. Saving was computed as a residual from personal disposable income. Both methods did not yield identical estimates for household saving, but they show conclusively that the household sector has been generating substantial savings. Hooley estimates that the household has accounted for more than half of the saving generated yearly from 1951 to 1960, where-

as the national income accounts report that only the government and corporate sectors have been performing the function. From the time series he constructed, Hooley made an estimate of a linear consumption function based on per capita saving and personal disposable income. It turned out that the marginal propensity to save is equal to 0.22 (which implies a marginal propensity to consume of 0.78). This is rather close to the estimate based on the PSSH data.

It has been pointed out that private consumption is estimated as a residual of gross national product, after deducting estimates of government expenditure, gross domestic investment, and net foreign investment.[28] Hence any errors in the estimates of the three mentioned components of gross national product will naturally affect the value of the residual.

To take the nature of the estimates for only gross capital formation is enough to establish the point. If gross capital formation is *underestimated,* then personal consumption expenditure is *overestimated* provided that gross national product is a fairly correct estimate. The fact that gross capital formation estimates appear to be in error is an example of errors of the first kind for this particular sector.[29] Assume, however, that errors of the first kind are absent for gross national product estimates. The following will show whether or not such assumption is valid.

Certain studies give conclusive evidence on the underestimation of capital formation in the Philippines. Papers by R. F. Trinidad,[30] D. C. Cole, [31] and R. W. Hooley[32] have made this point.

Trinidad re-estimated the magnitude of gross domestic investment for the years 1956 and 1957, taking into account the suggestions of a United Nations group[33] regarding the underestimation of capital formation in underdeveloped countries. This was done, first, by increasing the *coverage* of estimation and, second, by adjusting capital goods prices due to undervaluation. Increased coverage was attempted to take account of (a) indigenously produced capital goods, (b) land development, (c) military construction for civilian purposes, (d) building construction activities not reported to the civil authorities, and (e) inventory changes in agriculture, government, corporation, and other industries. Trinidad's reestimation procedure is along the commodity-flow method, which is used in the Philippines.

He tried to overcome the difficulties of undervaluation by employing mark-up ratios derived from a survey of marketing mark-ups for capital goods — a mark-up of 103 per cent instead of 50 per cent on imported durables and 94 per cent instead of 25 per cent on indigenous capital goods.

From Trinidad's estimates, it can be shown that the undervaluation of durables in 1956 and 1957 was by as much as 51.4 per cent. The *underestimation* of gross domestic investment for the two years was around 35 per cent. And yet, it is Trinidad's belief that in spite of the significant adjustments he made, the level of investment in the Philippines is still not fully estimated and that a wider and better coverage can still be made possible.

Cole, on the other hand, tried to point out from a study of the financial structure of manufacturing that capital formation in manufacturing appeared to be underestimated. He did not point out the exact magnitudes of this underestimation.

Hooley criticized the commodity-flow method of estimating capital formation. By using the expenditure method in the examination of the income statements of mining firms, he was able to produce evidence on the underestimated levels of capital formation in mining as reported in the accounts.

One way of taking in this information on underestimation is by adjusting capital formation estimates upward. This would lead to new figures of consumption, a residual estimate. Suppose that on the whole gross domesic investment was underestimated by approximately 35 per cent.[34] Gross domestic investment is jacked up by a constant adjustment rate.

Table 3 shows the results of such adjustments on estimates of the "parameters" of the consumption function and the gross ICOR computed from the national income accounts.

With the adjustment of the aggregates on consumption, the estimated constants of the consumption function now become altered, but a comparison with Table 1 shows that such alteration is only very slight.

TABLE 3
ADJUSTED CONSUMPTION FUNCTION AND ADJUSTED ICORs

	a	*b*	*r*	*c/y*	Average gross ICOR (1949-58)
Current	—449.8	1.034	0.99	0.96	2.06
Constant	—563.8	1.051	0.99	0.97	1.77

The maginal propensity to consume, *b*, is still above 1.0 in terms of both current and constant price measures. But the consumption-income ratio is slightly less than 1.0, meaning that the household sector on the ave-

rage saves but only very little. Considering the evidence already cited, even this measure seems to be inaccurate. The ICOR values appear to be reasonably altered. However even these values are low when compared with the usual conjectures about the value of the ICOR. If the measure of ICOR is to be *net* rather than *gross,* the computed values after readjustment would be even less.[35] In the literature, the confusion on ICOR values is due to the fact that it is often not known which is meant, the gross or the net.

If the above evidence obtained in computing some parameters which are of *analytical* value to the economist are to be taken seriously, then it is not correct to assume that errors of the first kind do not exist even for the aggregate measures of gross national product. It is also foolhardy to assume the other way around: that all errors are of the first kind and no errors of the second kind — those due to breaking down national income in to different magnitudes not directly estimated. A mixture of errors is certainly responsible for the inaccuracies of the national income data. Unfortunately, it is almost impossible to tell which category of errors abound in greater degree.

4. GENERAL SUGGESTIONS FOR IMPROVED ESTIMATES

In this paper, some evidence regarding the unreliability of national income aggregates were presented. Defects in resulting statistics are due to the estimation procedures used. A sketch of these procedures was given in the second section. In view of the resulting crudeness in the national income data, there is even no need to touch on the finer points of controversies regarding national income estimation.[36]

Some general comments regarding the improvements of the estimates will be made in the space that remains.

On a general plane, it may be said that there is a serious need tc improve the sectoral measures. Precision in the sectoral accounts will improve the estimates of the national income aggregates. This will minimize the errors resulting from "adding up" sector accounts and those from "breaking down" large aggregates into sub-components.

The problem of utilizing better raw data and better statistical "parameters" — e.g., allocation ratios — arises. In this no other aid can be more useful than increasing the amount of meaningful statistical studies and maximizing information derived from existing studies and data so that the sector estimates of income will have sounder statistical bases. This is indeed a very general comment. Since the mid-1950's a lot of statistical surveys have bloomed mostly under the direction of the Office of Statistical Coordination and Standards of the National Economic Council and of the Bureau of the Census and Statistics.

Moreover, the year 1960 was a nationwide census year. These surveys and, more specifically, the census are going to be very important foundations for better national income estimates, if optimum use is made of them.

Some statistical surveys have been used in improving the estimates of national income. But there are important and specific cases in which little or no use has been made of the findings of the surveys. It appears that except for Hooley's direct estimates of consumption[37] with the help of the PSSH survey on expenditure and income, no attempt has been made to utilize the PSSH data for national income purposes. Instead, the National Economic Council continues to estimate consumption using the residual method. Moreover, the mark-up ratios used by Trinidad in revising investment estimates are not used. Instead the same unrealistic mark-ups are utilized so that little adjustment for undervaluation of capital is done. These are serious shortcomings in the national income estimates that can be improved. Yet, the latest accounts do not appear to have incorporated these important findings.

Much depends on statistical policy if the national income accounts are to be improved. Serious attempts should be made by the precision of the national income statistics by improving existing estimates and by increasing the coverage of the statistics. Perhaps, greater insistence on better national income estimates will have bigger pay-off than building altogether different statistical data — such as an input-output table. There is however the possibility that an attempt to build such a table might help to improve the income accounts. Even then, although there will always be some "region of ignorance" regarding sector or aggregative income accounts, putting emphasis on decreasing the size of this "region" would be much better than building other statistical measures in which some "region of ignorance" is just as large (if not larger) as that for national income estimates.

As a final remark, economists and users of income data should feel indebted to William I. Abraham in 1952 for building out a mass of unrelated statistics the first Philippine national accounts, to the Central Bank of the Philippines and, later, the National Economic Council for both continuing the work. It appears however that the performance of the statistical agencies in the succeeding years at least with respect to the improvement of the basic accounts is still wanting.

APPENDIX

TABULAR AND ALGEBRAIC SCHEMA USED IN THE NATIONAL INCOME ACCOUNTS

The national income accounts are built up from income originating from each industrial sector. In any one year, the key tables in the national income accounts would look as indicated in the tabular presentation below. The symbols after each item will be useful in the algebraic schema outlined hereafter. All items which have asterisks are *residual* items.

NATIONAL INCOME AND PRODUCT ACCOUNTS

Compensation of employees	(y_1^*)
(a) Agricultural	(y_{1a})
(b) Other	(y_{1n}^*)
Entrepreneurial and property income of persons	(y_2^*)
(a) Agricultural	(y_{2a})
(b) Other	(y_{2n}^*)
Private corporate income	(y_3)
Property income of government	(y_4)
Total: NATIONAL INCOME	$(Y = \sum_{j=1}^{4} y_j)$
Depreciation	(D)
Indirect taxes less subsidies	(T)
Total: GROSS NATIONAL PRODUCT At Market Prices	$(Y_{gnp} = Y + D + T)$
Private consumption expenditure	(C^*)
Government current expenditures	(G)
Gross domestic investment	(I)
Net export and investment income	(F)
Total: GROSS NATIONAL EXPENDITURES At Market Prices	$(Y_{gnp} = C^* + I + G + F)$

NATIONAL INCOME BY INDUSTRIAL ORIGIN

NATIONAL INCOME $(Y = \sum_{j=1}^{7} x_j)$

Agriculture	(X_1)
Mining	(X_2)
Manufacturing	(X_3)
Construction	(X_4)
Trade	(X_5)
Transportation and communication	(x_6)
Services	

$$(x_7 = \sum_{j=1}^{7} x_{7j})$$

Government services	(x_{71})
Personal services	(x_{72})
Recreational services	(x_{73})
Educational services	(x_{74})
Professional services	(x_{75})
Rental value of owner-occupied dwellings	(x_{76})
Others	(x_{77})

Let x_i be the net value-added, or income originating, from sector i. Therefore, national income at factor costs, Y, is the sum of income originating from all sectors, or

$$Y = \sum_{i=1}^{7} x_i$$

Let y_j be the amount received by factor j. National income at factor costs is also the sum of all the payments to the *factors*, so

$$Y = \sum_{j=1}^{4} y_j$$

In short the accounting relation is that income originating from all sectors is identical to the income received by all factors, i.e.,

$$\sum_i x_i = Y = \sum_j y_j$$

The estimates of y_3 and of y_4 are from actual data. But total private non-corporate income, $(y_1 + y_2)^*$, is estimated as a residual,

$$(y_1 + y_2)^* = Y - y_3 - y_4 .$$

Wages ("compensation of employees") and non-wage shares ("enterpreneurial and property income of persons") are divided by an allocation of 44-56 per cent. Wage share is therefore

$$y_1^* = 0.44\ (y_1 + y_2)^*$$

and non-wage share is

$$y_2^* = 0.56\ (y_1 + y_2)^*$$

Total personal income originating in agriculture (x_1) is divided also in terms of wage (y_{1a}^*) and non-wage shares (y_{2a}^*) by splitting income from agriculture in terms of an allocation ratio of 28-72 per cent. Thus, wage share in agriculture, y_{1a}, is

$$y_{1a} = 0.28\ x_1$$

and non-wage share is

$$y_{2a} = 0.72\ x_1,$$

so that

$$x_1 = y_{1a} + y_{2a}.$$

The non-agricultural shares are determined by a method of residuals. Non-agricultural wage income is

$$Y_{1n}^* = y_1 - y_{1a}$$

and the non-agricultural non-wage income is

$$y_{2n}^* = y_2 - y_{2a}$$

The gross national product, Y_{gnp}, is built up from national income at factor costs by adding estimates of depreciation, D, and indirect taxes minus subsidies, T, that is,

$$Y_{gnp} = Y + D + T.$$

The expenditure components of Y_{gnp} are now to be evaluated. With Y_{gnp} known, the statistical problem is to estimate the expenditure components. On the expenditure side Y_{gnp} is divided into four main components.

$$Y_{gnp} = C^* + I + G + F,$$

where C^* stands for private consumption expenditures, I for gross domestic investment, G for government expenditure, and F for *net* foreign investment (or the difference between exports and imports).

Of the expenditure components, I, G, and F are estimated from data made available to the National Economic Council. The manner of computing them has been described in the text briefly. C^*, the dominant component is estimated as a residual from Y_{gnp} after deducting all the other known components. Thus,

$$C^* = Y_{gnp} - I - G - F.$$

In the paper, attention was given to two types of errors: (1) those due to adding up sector aggregates that contain errors and (2) those due to breaking down large aggregates into smaller ones with the use of the residual method and of sector allocation ratios.

NOTES

[1] Although attempts to estimate 1938 national income have been made by Marvin E. Goodstein, *The Pace and Pattern of Philippine Economic Growth*: 1938, 1948, and 1956, Data Paper No. 48, Southeast Asia Program, Department of Asian Studies, Cornell University, 1962.

[2] *National Income of the Philippines and Its Distribution*, New York, U.N., 1952.

[3] "Technical Notes to the National Income Accounts for 1959-1961," *Statistical Reporter*, April 1963, p. 22.

[4] The main material from which this section is drawn are the "Technical Notes to National Income Accounts of the Philippines," *The Statistical Reporter*, April 1962 (pp. 22-30); April 1963 ("Supplementary Technical Notes," pp. 22-23). See also Ruben F. Trinidad, *An Inquiry into the Sources and Methods of National Income Accounting in the Philippines*, unpublished master's thesis, University of the Philippines, 1958.

[5] However, other sources of important data that have not been tapped fully, at least for the estimates made prior to 1963, are the Social Security System and the Government Service Insurance System, two agencies that have yielded important data on aggregate business and professional income, wages, and the like in the course of their work.

[6] See *Statistical Reporter*, *op. cit.*, Trinidad, *op. cit.*; Clarence L. Barber, *Report on National Income Estimates in the Philippines*, Statistical Center, University of the Philippines, June 1960, mimeo.; Kenneth W Masters, "Statistical Sources Used in National Income Estimates in the Philippines," *Statistical Reporter*, vol. 2, no. 2, April-June 1963, pp. 24-8; and Emmanuel Levy, *Review of Economic Statistics in the Philippines*, Interim Report, World Bank Resident Mission, Manila, May 1964. The works of Barber and Levy are particularly detailed examinations of overall national income estimation methods in the Philippines and contain concrete suggestions for improvements.

[7] *The National Income of the Philippines and Its Distribution*, *op. cit.*

[8] See Simon Kuznets, *National Income and Its Composition*, National Bureau of Economic Research, 1942, vol. 2, ch. 12; a discussion of this is found in Oskar Morgenstern. *On the Accuracy of Economic Observations*, Princeton, New Jersey, Princeton University Press, 1963, pp. 254-259.

[9] Kuznets, *op. cit.*, Morgenstern, *op. cit.*, p. 255.

[10] As a student unaware of the manner of estimating national income, I once tried to measure the share of wages in the national income at factor costs. To my surprise, I discovered that from 1946 to 1960, the share of wages remained almost unchanged and was always well below 50 per cent! Such results will be understood more if the procedures of income estimation were really known. Indeed it was a very foolish exercise knowing afterwards how the allocation ratios were applied on the aggregates that split income between wages and non-wages!

[11] In this case, the least-squares method was employed.

[12] The disposable income series was computed from the income accounts, since this is not available in final form. Disposable income was deflated using the deflators for gross national product, since no deflators for disposable income are available. The data compiled took account of the suggestions in the Technical Notes to the National Income Accounts regarding the updating of the yearly data.

[13] In a still unpublished and longer study by the author, the net ICORS were also computed, but for illustration, the gross ICORS are the only ones shown in this paper.

[14] Just as well known is the inverse of the ICOR, which is often called the "capital coefficient" in discussions of growth and development.

[15] Among those who share this view is W. Arthur Lewis; see his *Theory of Economic Growth*, London, 1956.

[16] "Gross" and "net" here imply the presence or deleting of depreciation in the magnitudes used.

[17] See United Nation ECAFE Survey of 1961, p. 96.

[18] *Ibid.*

[19] These results are contained in a yet unpublished paper.

[20] Benjamin Higgins, *Economic Development Principles, Problems, and Policies*, New York, W.W. Norton, 1959, p. 649.

[21] "Foreign Aid to Underdeveloped Countries," *Review of Economics and Statistics*, vol. 50, May 1961.

[22] *Ibid.*, 131.

[23] In another footnote (*ibid.*, 136), Rosenstein-Rodan said the following: "Some studies suggest that the present rate may not be more than 7 per cent, in which case higher amounts of [foreign] aid [are] required to secure a 3 1/2 per cent rate of growth .... It is ... a matter of policy judgment whether such a negative incentive [meaning, increased foreign aid] to an insufficient development effort should be given ..." Bracketed words inserted by the present author.

[24] *Philippine Statistical Survey of Households Bulletin*, March 1957, Series No. 4: "Family Income and Expenditures."

[25] In an unpubliished work by the author.

[26] For a very interesting review of the PSSH study, see Clarence L. Barber, "The Philippine Statistical Survey of Household (PSSH) Bulletin on Family Income and Expenditure: A Critical Appraisal," Statistical Center, University of the Philippines (no date, mimeo.).

[27] *Saving in the Philippines* 1951-1960, Institute of Economic Development and Research, University of the Philippines, 1963.

[28] See above, pp. 9-10.

[29] See above, p. 12.

[30] "Some Proposed Improvements in the Estimates of Capital Formation in the Philippines," *Statistical Reporter*, vol. 4, April 1960, pp. 28-40.

[31] "Growth and Financing of Manufacturing in the Philippines," Institute of Economic Development and Research, University of the Philippines, 1963.

[32] "A Critique of Capital Formation Estimates in Asia with Special Reference to the Philippines," *Philippine Economic Journal*, forthcoming and "Savings and Capital Formation in Mining; 1951-1959," Institute of Economic Development and Research (mimeo., 1961).

[33] *Report of the Second Working Group of Experts on Capital Formation*, Bangkok, United Nations Economic and Social Council, 1960 (E/CN. II/ASTAT. Conf. 3/L.2).

[34] Note that the assumption that errors of the first kind are absent from the gross national product estimates.

[35] From an unpublished study of the author.

[36] Such as those covered in *A Critique of the United States Income and Product Accounts*, Studies in Income and Wealth, vol. 22, National Bureau of Economic Research and Princeton University Press, 1958.

[37] *Saving in the Philippines, op. cit.*