NATIONAL INCOME AND INDUSTRIAL STRUCTURE

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I

Industries are ordinarily differentiated by the raw materials they use, their productive processes, and the finished products they turn out. The extent to which the raw materials are organic, mineral, or synthetic; domestic or foreign; perishable or durable, puts a stamp upon the economics and sociology of an industry. That the productive process lends itself to large-scale machine operation or requires the personal effort of skilled craftsmen; can be handled by private enterprise or must be entrusted to public agencies; does or does not require large capital investment—are also factors determining the economic and social patterns by which an industry is guided. Finally, the characteristics of the finished product—the type of want it satisfies, its dependence upon foreign or domestic purchasers, the extent to which its sale can be left to private markets or must be regulated by public agencies, the manner in which demand responds to fluctuations in the purchasing power of buyers—may serve to distinguish one industry from another, despite common raw materials and similar although not identical production processes. A country's industrial structure may be defined as the relative distribution of its resources and total output among the several industries differentiated in the manner just suggested.

However, in considering the bearing of the industrial structure upon the measurement of a nation's total output, *i.e.*, its national income or product, differences among industries must be viewed from a plane somewhat broader than the purely technical one of materials, processes, and products. That one industry consumes an organic and another a mineral material does not, in and of itself, raise questions bearing upon the measurement of the two industries in estimating national income. Important questions arise only when the purely technical characteristics spell major differences in the nature of the economic institutions under whose aegis the industry functions. To illustrate: if, because of the characteristics of its material, processes, and product, one industry is carried on as an integral part of the family economy, largely self-subsistent

and relying to only a limited extent upon the market, while because of the technical conditions of production, another industry is carried on by business enterprises organized with exclusive orientation to markets, questions arise as to how the net products of the two industries are to be measured so that their contributions to national income can be compared. Similarly it is only to the extent that technical differences between two industries compel one to be conducted under government auspices and another under free enterprise that important problems arise in measuring the two industries in national income; or in defining national income for two countries differing in their industrial structure with respect to the relative importance of business and government.

Thus, industrial structure has a bearing upon the concept of national income so far as differences among industries are viewed as differences in the basic pattern of social and economic institutions under whose aegis the industries are carried on. Viewed in this light, three basic contrasts in industrial structure may be suggested. The first, between self-subsistent and market-oriented structures, is largely identical with the widespread distinction between industrialized and nonindustrialized countries. From the viewpoint of conceptual problems, the difference between industrial and nonindustrial countries lies in the fact that major portions of the productive activity of the latter are likely to take place within the family and the community, not in business enterprises working for the market. National income is not difficult to define for a country that is predominantly agricultural, but in which agriculture is organized on a business basis (*e.g.*, New Zealand). But for a country like China or India, whose major emphasis is also on agriculture but in which a great deal of agriculture (and related processes) is carried on within the family and rural community, it is difficult to define and approximate national income in a way comparable with that for industrialized or market-bound economies. The second basic contrast—between domestically oriented industrial structures and those heavily dependent upon foreign economies—also gives rise to problems in defining national income, problems residing largely in a proper delimitation of the nation as a unit of measurement. The third contrast—between privately and publicly organized industrial structures—creates obvious problems of comparison.

This paper is confined to national-income problems involved in measurement for countries whose industrial structures exhibit the first type of difference—that between a relatively self-subsistent family or communal economy and one operated primarily by enterprises oriented to the market place. I assume that the third type of difference—between private and governmental industrial structures—is treated in Mr. S m i t h i e s' paper; and neglect the problems arising in the

second type of difference among industrial structures, largely because the problems it raises seem of less interest.[1]

II

Problems in national-income estimation for industrial and pre-industrial economies[2] can be appraised properly only if we seek in national income some measure of the *real* net volume of goods produced, undistorted by duplication and unaffected by purely monetary differences in price levels. If we accept the formal accounting practices followed in the several economies and do not concern ourselves with what in fact happens under the money surface of economic circulation, we avoid many of the problems involved. The results, however, will be of limited use, since at most they give us the volume of pecuniary transactions, corrected for some types of duplication. They will fall far short of what is ordinarily wanted, *viz.*, a comparison of the real, unduplicated volume of commodities and services yielded by the productive systems of the two countries.

The concept of national income we, therefore, adopt is the net output of commodities and services flowing during the year from the country's productive system into the hands of ultimate consumers or into net additions to the country's stock of capital goods. National income, thus defined, must be measured for two countries so that, despite differences in industrial structure, the real net output of commodities and services can be fairly compared.

When, with this definition in mind, we inspect current estimates for countries differing in industrial structure, we are forcibly struck by the large disparity in per capita real income. Colin C l a r k's compilation, *Conditions of Economic Progress* (London, 1940), illustrates the point. For 1925-34 income is measured in international units, defined "as the

[1] An interesting recent illustration of this problem is provided by the estimate of income for Northern Rhodesia (Phyllis Deane, "Measuring National Income in Colonial Territories," *Studies in Income and Wealth*, Vol. 8, National Bureau of Economic Research, 1946, pp. 147-174). National income estimated as the yield of local productive factors entering the income of residents amounted, in illustrative figures, to about £7½ million; but if income of foreign firms operating in the territory and services rendered abroad by the colony's residents are included, the total is £13.0 million—almost double. How the national income of Rhodesia is defined is obviously of great importance to the resulting total—a situation that might be true of any colonial territory that is small (with respect to population or total output) relative to its "mother" country.

[2] These terms are used below to denote, on the one hand, an economy dominated by business enterprises, using advanced industrial techniques and ordinarily with a large proportion of its population in large cities; and, on the other hand, an economy in which a large part of production is within the family and rural community, a minor share of resources is devoted to advanced industrial production, and a minor part of its population lives in cities.

amount of goods and services which one dollar would purchase in the United States of America over the average of the period 1925-1934" (pp. 39-41). In these units the picture is (pp. 54-57):

Per capita income for four countries designated by Clark as Great Powers (United States of America, Great Britain, Germany and Austria, France) is 408.

Per capita income for pre-industrial countries (China; British India; Dutch Indies; Africa, excepting Algeria, Egypt, South Africa, Morocco, Tunis; Asia, excepting China, India, Japan, Palestine, Turkey, Syria, Cyprus; and Oceania, excepting Australia, New Zealand, Hawaii, and Guam) is 43½.

The former category includes over 290 million people or somewhat less than 15 percent of the world's population as estimated by Clark. The latter comprises over 1,100 million, or well over one-half of the world's population. An even more extreme contrast is that between the United States and China. For the former per capita income is about 500 international units (see pp. 54 and 56); for the latter, about 40 (see p. 46).

A ratio of some 10 or 12 to 1 between the per capita product of the most advanced industrial country and that of countries well behind in industrial development sounds plausible. Anyone who has seen, smelled, and touched the tangible industrial power of the United States and compared it with the physical apparatus of a pre-industrial country may legitimately feel that the ratio should be much greater. But if one is not too misled by purely visual or sensual contrasts and considers the figures more closely, elements emerge that justify incredulity or at least searching questions.

First, in following his definition of international units Clark attempted to raise the estimates for pre-industrial countries for several elements missing in the figures ordinarily derived. Thus, for both China and India, food output (and consumption) was estimated not at producers' prices in the country but at retail prices in an industrial economy like Great Britain; and at least for India substantial corrections for differences in prices paid for other types of productive service, between India and Great Britain, were made. In other words, the figures are literally what they are intended to express—the bundles of commodities and services that could be purchased in the United States during 1925-34 with 40 odd dollars.[3]

[3] Clark's adjustment brings China's per capita income close to that shown by the recent, more detailed estimate of Mr. Ta Chung Liu in *China's National Income, 1931-1936* (Brookings Institution, 1946). Mr. Liu's figure, adjusted for comparability with the United States, yields a per capita gross product of $41 (see p. 85), quite close to Clark's figure of $40 in international units.

Second, with respect to economic conditions during the decade, the comparison favors the pre-industrial countries. One of the most severe industrial depressions on record obviously affected industrial much more than the pre-industrial countries and was reflected most sensitively in the more precise national income estimates for the former. The figures for the pre-industrial countries can scarcely be said to reflect transitorily unfavorable economic conditions.

Third, and most important, an average income, particularly the arithmetic mean, substantially exceeds the incomes of most individuals, since the customary size distributions are skewed to the right. Furthermore, what we know about the internal structure of size distributions suggests that while there is some mobility, the majority of units in any size group tend to remain in that group for several years. This means, in terms of Clark's figures, that: (a) more than half the population of pre-industrial countries receive a per capita income less than 40 odd international units; (b) of this half a substantial proportion, say two-thirds (or one-third of the world total) are in the income brackets well below 40 international units per year for a substantial period.[4]

Now, if we ask, could people live in the United States during 1925-34 for several years on an income substantially below $40 per capita, the answer would be "yes," if they were sufficiently wealthy to have lots of possessions to sell, sufficiently lucky to have rich relations, or sufficiently bold to rob other people. The one-third to one-half of the pre-industrial population of the world would scarcely be in that position; and if we assume that all they have produced and could consume per capita was less than 40 international units for several years, the conclusion would be all would be dead by now. One is thus forced to infer that: (a) either that the estimates, even after the customary adjustments for comparability with industrial countries, are still deficient in omitting many goods produced in pre-industrial countries; or (b) in fact the whole complex of goods produced and consumed is so different that we cannot establish any equivalence of the type represented by Mr. Clark's international units. We shall see from subsequent discussion that neither suspicion is unjustified.[5]

[4] The discussion is in terms of income produced per capita. While savings are quite limited in pre-industrial countries, some proportion of national income is ordinarily saved. The arguments in the text could be applied to the distribution of income consumed with the arithmetic mean say about 5 percent lower than mean per capita income. However, the distribution of income consumed is less unequal than that of income received or produced.

[5] Mr. T. C. Liu argues for the plausibility of a $37 per capita consumption for China by referring to the data for 1935-36 for the United States, according to which small percentages (5 to 6) of farm families in some regions had a family income of less than $250. But this is a comparison of *average* values with the extreme of an income-size distribution and overlooks the fact that this extreme is composed largely of families that may have sustained entrepreneurial losses in this single year, not of families that are at this level for any length of time.

The form in which the question was raised—how it is possible for a large proportion of the population in pre-industrial countries to survive on an income that produced, for several years, less than the equivalent of $40 per year—obviously reflects my bias as a member of an industrial society. Personal experience and observation tell me that such an annual product is well below the starvation level. But were I a member of a pre-industrial society I might well have asked how it is possible for the majority of the population in the United States to dispose of as much as $500 per year, or whatever its equivalent would be in international units of rupees or yuan. Especially, on being told that of this huge income less than 10 percent is saved for net additions to capital stock, I might well ask how the population manages to consume so much—given the limited amount of food one can eat, clothes one can wear, or houses one can inhabit. And a suspicion similar to that voiced above could be entertained, namely, that these income figures for industrial countries must include many categories of items that are *not* included in income as ordinarily conceived in pre-industrial countries; and that the whole pattern of consumption and living in industrial countries is so different as to explain the ease with which these huge quantities of goods are produced and especially consumed.

Let me turn now to a more direct exploration, first of the categories that may be omitted from the national income figures for pre-industrial countries but included in those for industrial countries; second, of problems involved in the basic differences in consumption and production levels in the two types of country.

III

In a decentralized, agricultural, self-subsistence economy many productive activities take place within the family or the local community without finding overt expression on the market. The range of such nonmarket activities is extremely wide, extending from the production of primary food and other materials, through their fabrication, to the provision of all kinds of services—personal care, household operation, recreation, education, religion. Short of an intensive study of the households and of the agricultural communities for a year or longer, it is extremely difficult even to identify the contents of this productive performance outside the market sphere; and after its contents have been ascertained, it is even more difficult to assign values that would put these productive activities on a basis comparable with their counterparts in an industrialized market-bound economy.

One is, therefore, not surprised to find that in the estimates for pre-industrial countries the statistical allowances ordinarily made to cover

the value of such hidden nonmarket services are far from adequate. For example, in the case of India, Colin Clark allows for the retail value (at the English price level) of wheat and other grains, using flour prices for conversion (*op. cit.*, p. 43). This means that the only domestic manufacturing of wheat and other grains allowed for is its milling into flour. But what about further fabrication carried on in the domestic economy into final consumable goods? Likewise, in the estimates of untraded goods and services for Northern Rhodesia, Miss D e a n e includes "corn as meal, ground nuts after being shelled, and so on" (*loc. cit.*, p. 155), but does not allow for the services involved in further conversion, cooking, baking, etc. Even in the case of China, the excellent field studies of J. L. B u c k, which provide many of the basic figures for prewar national-income estimates, do not include, and designedly so, all the productive activities carried on within the farm household. And in dealing with India's estimate, Mr. Clark excludes the services of women on farms in order "to obtain comparability with the figures of other countries"(p. 42).

While freely admitting the difficulty of including *all* the extramarket productive activities of a pre-industrial economy, I am inclined to argue that once a comparison between it and an industrial country is attempted, there is little justification in accepting the conventional rules of national-income accounting in industrial countries. In estimating income for the United States, we exclude the services of women on farms, as we do the services of urban housewives, partly because there is no good basis for valuing them, partly because they are governed by rules different from those guiding business enterprises, and partly because we assume that the omission is not too large as compared with what is included. But for a pre-industrial country the latter assumption is patently invalid; the acceptance of primacy of business enterprise is out of the question; and if national income is to be merely a measure of goods exchanged for money, an estimate had better not be attempted for pre-industrial countries at all.

Clearly the apparent consistency of applying the rules of national-income accounting in industrial countries to those in a pre-industrial economy is no consistency at all. For in scrutinizing the contents of the net output of industrial countries we find a surprising variety and volume of commodities and services that represent nothing but professional, *i.e.*, business pursuit of productive activities for which there is a clear counterpart within the family and community life of pre-industrial economies. The recent valuable publication of the United States Department of Commerce, *National Income* (supplement to *Survey of Current Business*, July, 1947), provides a wealth of data to illustrate the point. Table 30, pp.41-43, gives details of the finished commodities and services purchased by consumers—a total that constitutes the overwhelming proportion of national

income (as defined by the Department of Commerce) in any except the war years. Each commodity category, except those that relate to such products of industrial civilization *par excellence* as automobiles and radios, represents activities for which there is a clear parallel within the family and community life of pre-industrial societies. Manufactured foods and tobacco, clothing, shoes, furniture—all commodities that are common to both industrial and pre-industrial economies—have market values in the former that embody a great deal of family work in the latter. And the same is true of various services. Thus, according to the Department of Commerce estimates, consumers spent in 1929 over half a billion dollars on cemeteries and funerals; and while these functions are presumably performed satisfactorily in India and China, I can not find any allowance for them in the estimates. The American consumers spent close to one billion dollars on life insurance in 1929. What about the value of such insurance provided by the family system of China, where the family comes to the succor of a member who may have been afflicted by one of the bad turns of fortune for which life insurance is supposed to compensate in industrial societies?

But let us grant that a pre-industrial country, in adapting its resources and skill to needs, manages to develop, within the family or the community, many productive activities that are taken over, if in modified form, by market-bound business enterprises of an industrial society. What can one practicably do to provide for a fair inclusion of these nonmarket activities, or in some other way attain proper comparability of measurement between the two types of economy?

That one should try, by intensive field study, to get an inclusive picture of nonmarket productive activities in pre-industrial society is good advice, too obvious to be stressed. It is, however, a long-run measure likely to yield results but slowly—given the difficulties of proper study of pre-industrial economies and the eventual problems of assigning some magnitudes to the activities, once they have been identified.[6] When and if such studies accumulate for any country to a point of providing an adequate basis for inclusive treatment, the way will be open to adjust for at least the major omissions in current estimates. Even with perforce arbitrary valuations, the inclusion of these extra-market activities will result in a smaller error than is inherent in the current estimates for pre-industrial countries which tend to omit them almost completely, with the apparently single exception of foods (in raw or semicrude form) retained for consumption.

[6] However, during recent years several interesting studies have appeared; they are listed in the Bibliography in J. B. D. Derksen, "On Comparability of National Income Statistics," these *Proceedings* (II, United Nations World Statistical Congress), pp. 267-271.

While waiting for such intensive studies, we might consider short-term expedients. As a tentative suggestion, advanced for discussion rather than as a tested recommendation, I would like to make two points. The first concerns activities closely connected with commodities whose market value in industrial societies enters the value of the finished goods flowing to ultimate consumers. In the case of pre-industrial societies primary and semifinished commodities flowing into ultimate consumption should be given the prices in industrial societies of the finished, fully manufactured products they enter, not of their exact crude or semifinished counterparts. The second point concerns services rendered directly to consumers, not embodied in new commodities; of these services in an industrial society, specific magnitudes would be included only for those categories that represent definitely much greater contributions to consumers' welfare in industrial than in pre-industrial society or vice versa, while for all those in which differences in relative supply are at all dubious a proportionate relation to other services would be assumed. Let me try to clarify each suggestion.

The first means that, *e.g.*, the amount of wheat produced and retained for domestic consumption in a pre-industrial country should be valued at the retail prices in industrial countries, not of wheat or of flour, but of the fully manufactured foodstuffs of which wheat is the component; and likewise with corn, rice, cotton, wool, hides, etc. This suggestion is practicable to the extent that whatever scanty statistics are available for pre-industrial countries usually cover the production of primary and semifinished commodities, and ordinarily their exports and imports; consequently, the flow into domestic consumption can be estimated. Also, for at least some industrial countries, *e.g.*, the United States, it is possible to calculate the total spread between the value of primary materials at the producer's door and the value of the finished products they enter, at the cost to ultimate consumers. But while practicable, is such treatment justifiable?

It obviously assumes that the relative weight of fabrication and treatment that intervenes between the material in its crude form and the product in its most finished form (that is, in the form in which it flows to the household in the *industrial* society) is the same for the two economies. Yet one might argue that, by and large, the relative extent of such fabrication and treatment is greater in industrial than in pre-industrial societies. For example, the way in which primary foods are treated, packaged, etc. before they are sold to an urban family in Chicago represents a much more extensive fabrication of wheat than the operations performed on wheat on a North China farm before the Chinese housewife proceeds to do with it whatever the Chicago housewife does with the wheat product she buys. However, a large part of such treatment

in industrial society is merely an offset to the disadvantages of the centralization of production. Food products must be treated, packaged, etc. because they are produced thousands of miles from where they are consumed; and in a pre-industrial society the efficiency of production is much greater in respect of distance between producer and consumer—a point to be discussed further below. Above all, we assume that once the products are eventually consumed by the individuals and households of a pre-industrial economy they have attained the same satisfactory state of "finishedness" as the final products of an industrial economy.

At any rate, the acceptance of the suggestion advanced here, and it is advanced only as a tentative expedient, must be decided by weighing the error involved in following it against the error attached to estimates that fail to follow it. The error attached in not following the suggestion is twofold: (1) included in national income for industrial countries is an element of commodity production that is gross, rather than net, being merely an offset to the disadvantages of the concentration of manufacturing in centers distant from the centers of raw materials and of consumption; (2) omitted from national income for pre-industrial countries are many productive activities concerned with commodities, which, being carried on to a great extent by market-bound enterprises, are included in national income for industrial countries. The error implicit in following the suggestion would be to exaggerate the national income of pre-industrial countries to the extent that *productive* treatment of commodities in the latter is relatively less than in industrial countries. Of the two errors, that involved in following the suggestion seems much smaller than that in not following it; and we urge an attempt to apply and test it as a practical expedient.

The second suggestion refers to services not embodied in new commodities. Of these there are definite categories of which we can be sure that the relative, per capita supply, is of greater economic magnitude in industrial than in pre-industrial societies, and vice versa. For example, the supply of qualified medical or educational services is definitely greater in industrial than in nonindustrial societies, in the sense that the tangible benefit to consumers, measured by any standard, is greater in the former than in the latter. But can we say the same of religious services, or of such services as are provided by funerals, recreation activities or barber shops and beauty parlors? Many of these are provided within the family or community in pre-industrial societies, while they are sold on the market in industrial societies. They are therefore likely to be included in national-income estimates for the latter, and omitted, in good part, from the estimates for the former. There is no basis for assuming that the per capita supply differs among the two types of

economy; and there are great difficulties in establishing any comparability between these types of activity in countries that differ greatly in their social organizations and patterns of life.

With respect to this category, which for convenience can be described as culture myth services, one of two practical expedients may be adopted. The first would be to omit them from national-income estimates for both types of country, thereby reducing the totals for industrial countries relatively more than the ordinary estimates for pre-industrial countries. The second would be to assume that the supply of such services in pre-industrial countries is in the same proportion to all other consumer services as it is in industrial countries—an assumption that perhaps results in too moderate an adjustment. The advantage of the second expedient is that, unlike the first, it permits us to leave the comparison between the two types of country on as inclusive a basis as is permitted by national-income estimates for industrial countries.[7]

IV

We have discussed so far extra-market productive activities, a substantial part of which is likely to be omitted from national-income estimates for pre-industrial countries while they are fully included in those for industrial countries. We are now ready to consider several categories, still within the area of the flow of goods to ultimate consumers, that are fully represented in estimates for industrial countries and yet are costs rather than final products, in the sense that they serve merely to offset some of the disadvantages of industrial organization.

The first category was suggested in the discussion above of the degree of fabrication of consumer commodities in industrial societies. A characteristic feature of the latter is that production tends to be concentrated in relatively large units, at some distance from the consumers who ultimately use the finished products. Thus, from the completion of commodities by producers to the time they reach the hands of consumers

[7] Throughout we face the choice between "inflating" national-income totals for pre-industrial countries to make them as comprehensive and as "gross" as the estimates for industrial countries; and "deflating" national-income totals for industrial countries to make them as restricted and as "net" as the ordinary estimates for pre-industrial countries. The usual choice in the national-income literature, and followed in the illustrative calculation in the Appendix, is to "grossify"—bring the estimates for pre-industrial countries *up* to the level of comprehensiveness and grossness of those for industrial countries. A more desirable but more difficult solution would be to raise the estimates for pre-industrial countries only for such elements of real productive activity as tend to escape measurement and to reduce the estimates for industrial countries (and to a lesser extent those for pre-industrial countries) by omitting such elements as are not net, *i.e.*, represent merely offsets to the disadvantages of industrialized urban societies.

there is a long chain of transportation and distribution, just as there may be one between the origin of the raw material with primary producers and its use in the manufacturing or construction establishment. This can be clearly visualized by assuming in an industrial society a single shoe factory which, with the help of railroads and a whole network of trade, assembles raw hides from many livestock farms; then, with the help of transportation, trade, advertising, etc. manages to place the finished shoes at the disposal of the individuals and families that wear them. A hypothetical situation in an idealized self-subsistence economy is in sharp contrast: a handicraftsman residing in each village gets hides from the local farmers, converts them into shoes, and sells or barters them to local inhabitants—all without recourse to transportation, trade, advertising, etc. If the number of shoes and their quality are exactly the same, net product in the sense of the real flow to ultimate consumers is identical in the two situations. Yet in one; production, in the narrow sense of converting hides into shoes, accounts for merely a small part of the values of finished goods, whereas in the others it accounts for practically all of it. The transportation and distribution activities in an industrial society can thus be clearly seen as offsets to the disadvantages of large-scale, machine manufacturing, which, needless to say, are more than outweighed by its economies.

This problem is disposed of in current estimates for pre-industrial societies either by taking the finished consumer products at the *retail* prices of industrial societies, thereby allowing for the inclusion of all these transportation and distribution services (as Colin Clark does in the case of India or China); or by making a special adjustment for difference in the marketing structure of agricultural production (as T.C. L i u does for China). These are perfectly legitimate adjustments, and I have only a few comments.

First, the adjustments just described are *part* of the one suggested in the preceding section, in which not the finished product but the crude materials of pre-industrial societies are to be valued at the retail prices of the corresponding finished products of industrial societies. If the suggestion is accepted, the adjustments of the type made by Clark and Liu are automatically included. Second, even with the latter adjustments, revaluing to the price levels of industrial society involves "grossifying" the output of pre-industrial societies, to bring it on a par with the output of industrial countries. As already suggested, it would be just as valid to "nettify" the output of industrial societies to bring them on a par with pre-industrial societies, by omitting from national income all services embodied in the value of commodities that represent the extra transportation and handling. Third, while the adjustments discussed here are on the surface merely for differences in price levels,

they are in fact an application of the basic definition of national income; only when the latter is defined as the real flow of goods to ultimate consumers and of net additions to capital stock, does the need for the adjustments become apparent.

But there are several other categories of productive activity in industrial societies whose value does not enter the retail prices of consumers' finished commodities, and yet that are merely offsets to costs imposed by the organization of production. Such activities ordinarily enter income estimates for industrial countries in the form of direct services to consumers (rather than as the cost of commodities); and in some national-income concepts in the form of the purchase of commodities and services by the government (*e.g.*, in the Department of Commerce national-income total for the United States). Yet such activities are either absent from or present to only a limited extent in pre-industrial societies because their industrial structures impose no costs that have to be offset. And clearly the adjustment just discussed, of converting consumers' commodities to retail prices prevalent in industrial countries, does not dispose of the lack of comparability thus arising.

Three categories of such activities come readily to mind. The first is suggested by the fact that in industrial countries the dominant modes of production impose an urban pattern of living, which brings in its wake numerous services whose major purpose is to offset the disadvantages. A clear case is the transportation of employees to and from work—an activity that can hardly be said to constitute direct welfare to ultimate consumers and is merely an offset to the inconvenience that large-scale industrial production imposes upon the active participants in it. But what about the extra costs involved in providing urban consumers with the appurtenances of living? The costs are heavy exactly because the concentration of large numbers in limited areas raises geometrically the discomfort and the costs of offsetting it. For example, the Department of Commerce sets for 1929 the cost of space rent for urban and rural nonfarm dwellers at \$10·3 billion, which for a nonfarm population of 101 million works out to about \$100 per capita. For farm houses the total is \$829 million, which for a farm population of 30 million, works out to about \$27 per capita. Yet surely the real values of the two are scarcely in the ratio of 4 to 1. The costs of urban housing may well be high because of the technical problems created by dense aggregations of people.

The second category represents costs of participation in the complicated, technical, monetary civilization of industrial countries. Payments to banks, employment agencies, unions, brokerage houses, etc. including such matters as technical education, are payments not for final goods flowing to ultimate consumers, but libations of oil on the

machinery of industrial society—activities intended to eliminate friction in the productive system, not net contributions to ultimate consumption. And while identical or similar activities exist even in pre-industrial societies, particularly those in which the money economy has begun to spread, one might reasonably argue that their magnitude is much greater in the more complex industrial countries which make claims upon their members for a finer adjustment to the dictates of the market system.

The third category is represented by governmental activities. In any society the major part of governmental activity is devoted to preserving and strengthening the fabric of social organization and only to a limited extent to the provision of final services to ultimate consumers. The legislative, judicial, administrative, police, and military functions of the state are designed to keep society operating along accepted patterns, to create the conditions under which the economy can function, not directly to provide goods to ultimate consumers. The major yield of governmental activity is therefore indirect rather than direct goods, costs rather than net returns. Yet if we accept the concept at present followed by the Department of Commerce in this country (and the official estimates of Great Britain and Canada), the full magnitude of governmental outlay on commodities and services appears as part of the net output of society, of national income or product. It is quite likely that the necessary costs, which most of such activities represent, are absolutely and relatively much smaller in a pre-industrial than in an industrial society; consequently their full inclusion in national income introduces a greater element of grossness in the estimates for industrial countries.

In considering how to deal with the three categories of activities just noted, which may be interpreted largely as offsets to friction in the organization of economic society rather than as direct elements in net output, we are confronted with difficulties. The first is that activities of the three types described occur even in pre-industrial societies: in most of the latter, cities, a monetary and credit economy, and a central government are far from unknown. Hence if we are to omit some of these activities from the national income of industrial countries, we should be in a position to do likewise for pre-industrial societies. A more important difficulty is that in many activities the elements of net contribution and offsets to costs are inextricably interwoven, and can be disentangled only by intensive analysis. How much of the high price of urban housing is the high cost of offsetting discomforts of living in a densely settled community, and how much represents greater facilities and comforts? How much of the huge outlay on passenger automobiles in this country is an offset to the disadvantages of urban living

and how much a net contribution to welfare? What proportion of the cost of the telephone, telegraph, etc. is an offset to the obligations imposed by participation in a highly developed society, and how much a net contribution to the satisfaction of ultimate consumers *qua* consumers?

In the face of these difficulties it is not easy to indicate steps in the direction of attempting closer comparability. Yet three suggestions seem to be in order. First, such activities as beyond any doubt represent payments by consumers for services that are nothing but occupational facilities should be excluded from the estimates for both types of country. Clear examples are commutation to and from work and payments to unions and employment agencies; but one might add almost the entire gamut of what the Department of Commerce classifies as business services in its estimate of consumers' outlay (bank fees, brokerage fees, etc.). Second, where in industrial societies the costs of consumer services are inflated by the difficulties of urban life, some revaluation of these services by comparison with their costs in rural communities is in order. The magnitudes involved, especially in such an item as cash and imputed rent on housing are quite large. Finally, it seems indispensable to include in national income only such governmental activities as can be classified as direct services to ultimate consumers. This most important and inescapable step is urged here in full cognizance of the statistical difficulties, which are great. But if national-income figures are to retain any meaning as measures of the real flow of goods to ultimate consumers or to stock of capital, the huge duplication piled up by considering all governmental activity as a final product must be removed. Such a step is important and necessary even for intracountry comparisons over time; it is equally if not more important for comparisons between industrial and pre-industrial societies.

These three suggestions are a maximum program: their proper application requires information on and a functional analysis of the service sector of consumers' outlay and of governmental activities that are probably beyond the present supply of data and the present state of knowledge of the real contents of national product even for advanced industrial countries. As a more practical, if theoretically less satisfactory expedient, we may consider adjusting the national income of pre-industrial societies—as currently measured—for the elements of grossness that are present to a larger relative extent in the estimates for industrial societies. Thus, instead of excluding the service components of consumers' outlay that represent pure costs, revaluing inflated urban services, and reducing governmental activities to direct services to consumers, we can inflate the corresponding elements in the national incomes of pre-industrial countries to achieve a comparable level of

grossness. This is, in fact, the expedient adopted in the illustrative comparison of the national products of the United States and China in the Appendix. It has the advantage of being consistent with the application, to the commodity part of national product, of the raising ratio of finished products to crude materials derivable from the standard estimates of national income for industrial countries. But it is a temporary expedient; eventually it will be preferable to follow the suggestions in their original form, and to exclude from estimates for both industrial and pre-industrial countries such gross elements as occupational expenses of ultimate consumers, inflated costs of urban living, and intermediate product of governmental activities.

V

From the consumers' outlay component of national income, we turn to the treatment of capital formation.

a. Some of the elements omitted from national income estimates for pre-industrial countries and of grossness in the estimates for industrial countries characterize also the estimates of capital formation or investment. Thus a great deal of capital formation within pre-industrial economies takes place outside the market, *e.g.*, individual farmers' activities on improving the soil and buildings and communal construction activities. These are not likely to be covered fully in the estimates. Yet their relative share of total capital formation is likely to be larger in pre-industrial than in industrial economies.

Similarly, pre-industrial countries are likely to be characterized by a shorter distance between the producer and the user of capital goods (unless the goods are produced abroad). In an industrial economy labor is more extensively divided. Whatever we have said about consumer goods, in the illustration in terms of shoes, could be repeated in an illustration in terms of plows or farm carts. Here also, an advanced industrial organization may mean a considerable amount of extra fabrication, transportation, and trade that are not necessary in the simpler, decentralized structure of a pre-industrial economy.

However, quantitatively, such elements of both omission and grossness as tend to inflate the difference between totals for industrial and pre-industrial countries are likely to be relatively smaller for capital formation than for consumers' outlay. First, the real volume of *all* capital formation, whether market bound or not, is likely to be exceedingly small in pre-industrial countries living, as they do, close to the margin of subsistence. Second, in the case of capital formation, *i.e.*, construction machinery, and equipment, the relation between producer and consumer seems to be fairly close even in an industrial society. At any

rate, it appears to involve less of the cross-hauling, elaborate distribution, and advertising that tend to bring such large elements of grossness into the cost of consumers' commodities to ultimate consumers. And satisfactory use of at least industrial equipment and construction is not as subject to the inflation of costs by the difficulties of urban living as is true of the use of consumers' goods proper. These statements are particularly applicable to net capital formation, *i.e.*, if we exclude, for the purposes of the present analysis, the intermediate product of governmental activity. We thus deal only with net additions to the stock of capital goods, not with such gross volume as would include the contribution of governmental activities to the preservation and regulation of the society at large or of the economic system in particular.

b. What about such capital goods as serve only activities which, in the analysis of consumers' outlay, we characterized as representing offsets rather than net contributions to the flow of goods to ultimate consumers? If services of street cars and commuting trains are not contributions to the satisfaction of wants of consumers *qua* consumers, and, therefore, should be excluded from national product (the latter conceived as the sum of the flow of goods to consumers and capital formation), should we exclude from capital formation the additions to the stocks of street cars or of street railway trackage? Clearly, if the answer is "yes," a large proportion of capital formation in an industrial country will be omitted.

The answer, however, is "no." The addition to capital stock is part of national product properly defined, regardless whether the capital good in question will itself directly yield services to ultimate consumers in the future, or while not in itself capable of yielding such services, is still useful in keeping society going and thus avoiding future outlays. We consider a new blast furnace an addition to capital and a proper part of capital formation, even though the furnace in and of itself can not turn out final consumer goods. It will assist indirectly in turning them out and in its absence, a potential increase in the supply of finished products would be impossible without an additional outlay of resources. What is true of a blast furnace is true also of a street car, or of a battleship.

There is no inconsistency in excluding the *direct* services of capital goods from annual estimates of the flow of finished goods to ultimate consumers, and in including the tools that yield these services in capital formation. In measuring the flow of goods to consumers we are not justified in including goods that are wanted by consumers not as consumers but as producers. In measuring capital formation we are in fact estimating the future contribution—direct and indirect—of the goods in question to the ultimate satisfaction of consumers' wants. And so far as in

the technology of the economic system street cars are a useful and indispensable tool, we include them in capital formation.

VI

The last major problem of comparability, differences in the patterns of production in industrial and pre-industrial economies, is reduced by the suggestions advanced in the analysis above, especially by the omission of some commodities and services that in industrial society serve exclusively to offset disadvantages imposed by the productive system. But even with this and related suggestions pushed as far as possible, there will still be marked differences in the composition of the goods that constitute the national product of the two types of society.

The exact meaning of this difference for the problem of proper statistical measurement must be clearly seen. Assume that for all the goods that are in the comparison between two countries, A and B, prices can be established for each in both countries, even though some of the goods may not be produced or consumed in one. It would then be possible to estimate the total product of country A in prices of country B, and the total product of country B in prices of country A. Though all problems would not be solved thereby, the assumption serves to illuminate two points important in the analysis. First, the analysis can best be handled by dividing it into two parts; one is the difficulty or impossibility of securing prices in country B (A) for such goods as are produced only in country A (B); the second remains even if prices in both countries could be secured for all goods in the comparison. The second point is that the difference in the goods patterns can be discussed only in connection with the relative price patterns of the two countries.

The difficulty created by the fact that for goods produced only in pre-industrial countries it is often impossible to get a price in an industrial country (and vice versa) cannot in fact be resolved, short of a close analysis of the function of the good in question, finding a functional counterpart in the other country, and then finding a price for it by analogy. While in certain classes of goods (—how could one find the functional counterpart in the United States of, say, shark-fins soup or of the services of a Chinese fortuneteller?—) this may seem a counsel of despair, for simpler types of goods the task is not impossible (*e.g.*, for certain classes of food or clothing). But it is important to remember that the comparability to be established, the counterpart to be found, is not that of scientifically established physiological or medical service—but of position in the economic scale. At the present stage of our knowledge of industrial and pre-industrial societies, it is difficult to extend the range of price comparisons; and we have to accept the fact that prices will be found

only for such goods as are used in both types of country. This means that in practice price comparisons are established for only such goods as are common to both types of economy; and that the ratios are applied to the over-all totals with the implicit assumption that the price relations for the goods omitted are the same as those for the goods covered.

This resolution, by assumption, may be the only practicable. But it brings into comparisons of national income for industrial and pre-industrial countries a potentially large bias. Comparable prices in general can be found only for goods whose qualitative characteristics are easily recognized and comparable—commodities rather than services; simple crude materials rather than complex fabricated articles. And as between two countries comparable prices are most easily established for crude commodities that move freely in international trade, not between commodities, no matter how crude, that are peculiar to one country alone. But commodities that move in international trade are likely to show relatively narrow price differentials: were the differentials wide, foreign trade would tend to reduce them. Consequently, the selectivity of price comparisons, in their emphasis upon crude commodities with international markets, has an important bias—*understating* the price differentials between the two countries. How considerable the understatement is depends upon the factors that produce the price differentials. When one country is industrial and the other pre-industrial, the understatement can be large indeed.[8]

This observation applies to price comparisons for identical goods, at identical levels of fabrication and circulation. The bias is, therefore, over and above any of the other elements of disparity already discussed. Hence, it is not disposed of by the adjustments suggested, and cannot be mitigated except by extending the range of goods for which comparable prices can be found. Such extension, as already indicated, can be made only by dint of further analysis of the two types of society, and by a search for more common denominators than are evident on the surface. This is only one more argument for more intensive study, particularly of pre-industrial societies.

If we assume that prices can be found for all goods in both countries, the national product of country A can be valued in prices of country B and compared with national income of B; and the national product of country B can be valued in prices of country A and compared with the national income of A. Differences in the patterns of goods of the two

[8] See some observations in this connection in the Appendix. The examples given there could, I suspect, be easily multiplied by anyone who would take the trouble to compare prices first for internationally traded crude commodities, and then for nonexportable (or nonimportable) types of commodity and service.

countries then cease to make comparison impossible. But they introduce an entirely different type of difficulty, *viz.*, they give two measures of what is essentially one difference: for the ratio of national income of A to B, when measured in prices of A, may be different from the ratio of national income of A to B, when measured in prices of B.

It need not be labored here that the two ratios would differ only if the relative quantities of goods in the two countries differed. Were the goods structure of national product, *i.e.*, its percentage distribution among the various goods (including those with zero weight, *i.e.*, absent) exactly identical, then no matter how the price structure (*i.e.*, relative prices of goods) differed, the ratios would be the same in the two indexes. Similarly, were the goods composition of the national product of two countries different, but the price structures identical, the two ratios would be the same. In fact, in comparisons of industrial with pre-industrial countries, both the goods and the price structures are likely to differ materially; and as a result the ratio of the national products of the two types of country will differ as we weight the quantities by prices of the industrial or of the non-industrial economy.

Thus, given differences in price structure, those in the goods composition of the national products inevitably result in a lack of determinateness of the difference between the national products of the countries. Only the upper and lower limits are set—the ratios of the two national products weighted first by the price system of one country, then by the price system of the other. At present, we do not know how far apart the limits are; but further studies in the field would be well worth while.

One can do no more than suggest the direction of the bias involved in using as base the price system of one or the other type of country. In general, relative price and quantity differentials tend to be correlated negatively: if a good x is priced much more highly than a good y in one country, other conditions being equal, the quantities of x produced and consumed will be in a smaller ratio to the quantities of y in that country. In other words, there is some adaptation of the goods structure of a country to the relative price structure. This means that when we revalue the quantities produced in a pre-industrial country in prices of the industrial country, we tend to assign too high a set of price differentials to goods with relatively large quantity weights, and too low a set of price differentials to goods with small quantity weights. This tends to impart an *upward* bias to the national-income totals of pre-industrial countries; and since they are in general much lower than the totals for industrial countries, the ratio between the two tends to be reduced. Per contra, when we revalue the national product of an industrial country in the prices of a pre-industrial country, we impart an upward bias to the

national-income total of the former and thus tend to magnify the ratio between it and the national income of the latter.

Consequently, the common practice in current national-income literature of revaluing the national product of pre-industrial countries in prices of industrial countries tends to impart an upward bias to the former and to reduce the disparity.[9] In this sense, the bias is in the right direction in that it serves to reduce the downward bias implicit in confining the comparison of price *levels* to internationally traded crude commodities. But with limited coverage of the price comparison, the differences in the price *structures* of the two countries are also underestimated; so that the upward bias due to using the price structure of the industrial economy as a base is minimized. One may, therefore, reasonably argue that in current practice, the downward bias in the evaluation of national product for pre-industrial countries due to the limited coverage of price comparisons, is much greater than the upward bias resulting from using the price structure of the industrial country as the base.

The range between the limits within which the ratio of the national products of the two types of country falls is likely to be increased as the variety of goods for which price comparisons can be made widens. In other words, as the difficulties of proper comparison between the national products of industrial and pre-industrial countries, due to lack of comparable prices, are overcome, the second type of difficulty—associated with differences in price structure—is likely to become more prominent. This is as it should be: as our knowledge of both types of economy becomes more adequate, the problem of establishing unequivocal quantitative comparability should become more complex. As such knowledge accumulates, it will be seen that, by accepting the valuations implicit in the price system, we are in fact accepting two yardsticks which, each applied separately, naturally produce different results. The eventual solution would obviously lie in devising a single yardstick that could then be applied to both types of economies—a yardstick that would perhaps lie outside the different economic and social institutions and be grounded in experimental science (of nutrition, warmth, health, shelter, etc.).

[9] The discussion is in terms of the price *structure*, *i.e.*, of relative prices differentials among identical goods, not in absolute price levels. Prices of identical goods are in general much higher in industrial than in pre-industrial economies, higher than the official conversion rates of currencies indicate (with the exception of the highly complex products of industrial civilization). The adjustment for the *level* of prices, therefore, almost uniformly reduces the spread between the national products for the two types of country when measured in official currencies and converted by means of official exchange rates. It is the effect of the price *structure* that is different as we take the price system of the industrial or of the pre-industrial economy as the base.

This consideration brings us beyond the plane of intellectual discourse on which national-income estimates at present rest. But it is not irrelevant that the ease with which national-income comparisons, among countries with differing industrial and social structures are currently made, may largely be due to the shallowness of our knowledge and to our willingness to stay on the surface of social phenomena. As knowledge increases, it may be more rather than less difficult to make effective comparisons within the present frame of reference.

VII

In applying the above suggestions to an illustrative comparison of the national incomes of China and the United States (see the Appendix), we followed the path of least resistance. Rather than employ selective reduction and inflation, we raised the estimates for China to compensate for both possible omissions in them and the elements of grossness that are peculiar to the estimates for the United States. The purpose of this calculation is not to provide conclusive or even semiconclusive results, but to test the feasibility of the suggestions and to get some idea of the size of the adjustment involved.

In this comparison, which uses Mr. Liu's gross-national-product estimates for China for 1931-36, the adjustments applied to secure greater comparability with the United States figures, yield a per capita product for China of $73 (U.S.); and a per capita consumption of $65½ (U.S.). The latter figure can be compared with that established by Mr. Liu of $37 (U.S.) per capita after his adjustments for differences in price levels, in the marketing structure of agriculture, in the supply of unpaid domestic services, and in the ratio of consumption to gross national product. While the application of the adjustments suggested here raises the per capita figures by almost 80 percent, the calculation in the Appendix still takes no account of the downward bias implicit in the price comparison (we accepted Mr. Liu's estimate for this item); or of other sources of lack of comparability that might raise the figure for China even higher. Taking these into consideration could easily bring per capita consumption in China to over $75 (U.S.), or over twice Mr. Liu's adjusted figures. The experimental calculation yields, therefore, two significant conclusions: first, the adjustments suggested above are feasible and can be applied even with the present limited supply of data; second, the adjustments are sufficiently big to affect markedly comparisons between industrial and pre-industrial countries, and change materially the results of comparisons that have been made in the last two decades.

While the discussion, and the calculation, have so far been in terms of national-product totals alone, the points raised are relevant to every

important type of distribution. Thus, the usual industrial allocation of national income is affected by the fact that many extra-market activities in a pre-industrial economy elude measurement: these activities are in the nature of either manufacturing (or construction) or the provision of personal and other services. So far as they are omitted, and to an extent presumably greater than similar activities in agriculture, the industrial distribution of national income for a pre-industrial economy would show too large a share for agriculture and too small a share for other industries. The overinclusion of certain activities in national incomes for industrial countries would exaggerate the shares of some industries, *e.g.*, transportation, distribution, housing.

The distribution of income by size is also modified. Even pre-industrial countries have upper income groups that tend to be heavily concentrated in cities. In a national-product estimate that follows closely the conventional rules of industrial countries, the incomes of urban population are likely to be more completely covered than the incomes of rural; which means that there is more complete coverage of upper than of lower income brackets. Any more inclusive treatment of extra-market activities in pre-industrial economies or adjustments for the elements of grossness in the estimates for industrial countries are likely to shift the income distribution by size in favor of the groups at the lower end, thereby reducing the inequality of the income distribution as shown in unadjusted or incompletely adjusted distributions.

The effect on the percentage allocation of national product between the flow of goods to consumers and capital formation is somewhat different. As suggested above the elements of omission and grossness that affect comparability may well be relatively small for such items of capital formation as industrial construction or industrial machinery and equipment. If so, the adjustments advocated here, when applied in a specific rather than a crude wholesale fashion, may raise the flow of goods to consumers sector of national income of pre-industrial countries by a greater relative proportion than they would capital formation. Thus while the absolute magnitude of capital formation in pre-industrial countries and its ratio to capital formation in industrial countries may be raised, the ratio to the flow of goods to consumers within pre-industrial countries may well be lowered.

This suggestion applies to the real volume of capital formation or investment. A somewhat related point concerns the distinction between outlay and savings. In all countries, even advanced industrial, some categories of consumers' outlay include elements of savings in the sense that the purchase is guided, at least secondarily, by the utility of the good as a storage of value (luxuries that tend to have stable values). In pre-industrial countries, with the prevailing limits for safe productive

investment, such purchases of consumer goods, which in fact represent hidden savings, may well loom much larger, relative to total consumers' outlay, than they would in an industrial country. So far as they do, the volume of savings exceeds the volume of domestically financed productive investment or capital formation.[10]

These brief comments suffice to indicate that the attempt to introduce greater comparability between the national-product totals of pre-industrial and industrial countries affects also the comparisons of internal distributions by industrial source, by size classes, or by type of use. This is natural since closer analysis of the contents of the national products for the two types of country reveals differences that have to be recognized in a proper comparison, differences that have a differing impact upon the industrial, size, and use classifications, traditional in industrial countries and often applied without modification to pre-industrial economies.

VIII

In conclusion, I would like to stress what it is that we are *not* trying to measure by means of national-income estimates, and indicate why. Such comments may prevent misunderstanding as well as suggest lines of exploration other than those stressed here.

National income, as we conceive it, measures the flow from the productive system, but not the inclusive consumption totals for the economy. There is a significant difference between the flow of goods to consumers and what Joseph S. D a v i s calls the consumption level.[11] The latter includes, in addition to the current flow of goods from the productive system, the yield of goods owned by the consumers; and excludes from the current flow to consumers goods they do not actually consume during the period. With the much greater stock of goods in the hands of individuals and households, the consumption levels per capita in an industrial economy may well show a greater relative excess over per capita consumption levels in a pre-industrial economy than might be revealed by

[10] This is of importance for the analysis of the savings-potential of pre-industrial countries in connection with plans for industrialization. Since conditions of political security and extension of productive investment opportunities are involved in any effective industrialization, the savings potential is suggested not only by the past flow of savings into productive investment but also by such elements of consumers' outlay as would become unnecessary with the progress of industrialization. The latter comprise the purchases of luxuries intended largely as a storage of value; and expenditures closely connected with traditional pre-industrial culture (funerals, feasts, religious observances, etc.), whose practice is likely to be greatly reduced by the secularizing influence of industrialization.

[11] See his presidential address, "Standards and Content of Living," *American Economic Review*, Vol. 35, March, 1945, pp. 10-15.

a comparison of the flow of goods per capita—no matter how fully the latter is covered.

Nor are we trying to use national-income estimates to measure what Professor Davis calls the level or plane of living, which includes, in addition to consumption, working conditions, cushions against major and minor shocks, freedoms of various kinds, and other spiritual constituents of social life. These ingredients of living are extremely important in spelling happiness and unhappiness; and it is easy to conceive of situations where the consumption level rises yet the plane or level of living declines; *e.g.*, when the rise is attained by sacrifices in working conditions or by loss of freedom of a kind highly prized by the population.

Finally, we have not tried to push the analysis of national income estimates in the direction already mentioned, *viz.*, of gauging the degree of satisfaction of wants ascertainable by experimental and scientific methods and in disregard of purely economic valuation imposed by society. Thus, we accept the valuation of foods as provided by the markets, attempting only to make both terms of the comparison (*i.e.*, in an industrial and pre-industrial country) equally inclusive, and employing, for identical foods, the same prices. We are not trying to convert the foods into vitamin equivalents and thus translate physical quantities into vitamin content, completely bypassing the market valuation. Nor are we trying to do the same for clothing, fuel, shelter, and the like.

The refusal to extend discussion in these directions—of fuller coverage of consumption levels, of levels of living, and of experimentally established functional equivalents—is not due to the possibly low yield of such explorations. On the contrary, they promise results of great value. They might explain, more satisfactorily than can be done otherwise, the basic differences between industrial and pre-industrial economies, and the conditions which favor or disfavor industrialization. As already suggested, they might provide a more effective basis for comparisons and help overcome the difficulties imposed by differences in the goods composition of national product. Studies of nutrition indicate unmistakably that pre-industrial economies manage to obtain the basic vitamin supply at much lower economic costs, and hence at much lower prices, than a price comparison of *identical* commodities would indicate.

That we have paid little attention to these aspects of the comparison is due largely to a feeling that study has not advanced sufficiently to permit abandonment of the more traditional approach, via the customary definitions of national income or product. At any rate, I did not feel competent to discuss the problems that would emerge in any direct consideration of consumption levels, planes of living, and functional equivalents. It does seem, however, that as customary national-income estimates and analysis are extended; and as their coverage includes more

and more countries that differ markedly in their industrial structure and form of social organization, investigators interested in quantitative comparisons will have to take greater cognizance of the aspects of economic and social life that do not now enter national-income measurement; and that national-income concepts will have to be either modified or partly abandoned, in favor of more inclusive measures, less dependent upon the appraisals of the market system.

We can view national-income comparisons among countries in the light of an entirely different set of basic criteria. Rather than concern ourselves with national product as a flow of goods to consumers present and future, we can view it as a measure of a nation's power—defined broadly as power to impose upon the rest of the world conditions which, for one reason or another, are considered favorable to the given nation. Whether we further specify such power to consist of the ability to provide security, or to expand the area of sovereignty, both the concept and comparison of income between industrial and pre-industrial countries will differ widely from those used in the analysis above. Many elements of the industrial economy we considered gross because they represented an offset to extra costs of urban civilization are not gross from the viewpoint of national power; for in armed conflict, the crucial weapon in the exercise of such power, many appurtenances of urban civilization can be temporarily sacrificed and the resources used for them diverted into other channels. Many elements of pre-industrial economy whose inclusion in national product we urged because they contributed to the flow of goods to consumers should perhaps be excluded from national income as a measure of national power because these decentralized extra-market activities cannot be effectively mobilized or controlled by the state in case of an armed conflict (even though they may be immensely useful in passive defense). Indeed, for many aspects of national income as a measure of national power, the relative disparity between industrial and pre-industrial countries is very much greater than the customary estimates of national income indicate, even before the adjustments suggested above.

We did not touch upon this line of approach for two reasons: its application to income measurement has not reached a point where its potentialities and problems are clear, and it differs so sharply from the customary approach that to include both within the bounds of a single paper would be impossible. But it seemed important at least to mention the approach, to invite attention to its implications, and to suggest that the ordinary impressions of the vast relative difference between the economic performance of industrial and pre-industrial societies may well be colored by vague thoughts concerning differences in national power, rather than in supplying goods for the satisfaction of consumer wants.

These comments on the potentialities of explorations in the direction of a better analysis of the contents of living or of relevance to national power should not be interpreted as minimizing the importance and usefulness of national-income analysis on the more orthodox level discussed here. Granted that from the viewpoint of contents of living (or national power) national income, as ordinarily measured, stops halfway. It is a compromise in the sense that it accepts the valuation of the market place, with some adjustments, but without probing too deeply beneath the surface of economic phenomena; and if a national-income estimate for one country is a compromise, a comparison for an industrial and pre-industrial country is a compromise of compromises. Nevertheless, it is an enormously useful device for measuring, if proximately, the magnitudes of performance of the economies, and providing a quantitative framework within which the weight of significant sectors can be gauged. Nor does the realization that we deal with compromises free us from the necessity of looking closely and assuring ourselves that on the level of comparison accepted, the scope and basis of valuation are as truly comparable as they can be made. The major burden of this paper is that there is room for improvement even in such proximate measures as currently defined national-income totals, improvement for purposes of comparing the totals and their components for industrial and pre-industrial countries. These opportunities for improvement can and must be pursued, before analysis can be extended in any direction that transcends or differs materially from the level of current national-income estimates.

Appendix

Illustrative Calculation of the National Products of the United States and China on Comparable Bases

1. *General Plan*

We chose the United States and China largely because recent estimates for both are available, and particularly detailed ones for the former. The two main sources are: for the United States—the supplement to the July, 1947, *Survey of Current Business* (referred to below as *DCS*) and Ta-Chung Liu's *China's National Income, 1931-36* (Brookings Institution, 1946)

For the United States, gross national product is divided into: (a) commodities; (b) services not embodied in new commodities. For the former we calculate the over-all ratio of the final cost of finished commodities to the value of raw materials consumed, at producers' prices. Among

services not embodied in new commodities we segregate groups that are comparable with the measurable service performance in a pre-industrial economy like China. For these several groups, whose magnitudes are approximated in the United States estimates, we assume reduction ratios reflecting the extent to which such services in a pre-industrial economy are either carried on within the family and community or to which they are superfluous, being in fact but offsets to the disadvantages peculiar to a highly developed industrial society.

The two ratios derived for the United States—of finished commodities to raw materials and of the gross volume of services to a net volume representing comparable net coverage in a pre-industrial economy—are available for application to the data for China. Neither ratio allows, however, for differences in the price level between the United States and China for *identical* raw materials or *identical* services.

Our treatment of the data for China consists, therefore, of: (a) adjusting the raw-material flow for differences in prices; (b) raising the latter by a ratio of finished products to raw materials; (c) adjusting comparable services not embodied in new commodities for differences in prices; (d) raising the result under (c) by a ratio of gross to net services.

2. *Allocating United States National Product between Commodities and Services*

For 1931-36, the gross national product of the United States is estimated to be $68.26 billion per year (*DCS*, Table 2, p. 19). Of this total, net foreign investment, averaging $133 million is not easily allocable between commodities and services; we therefore omit it, reducing national product to $68.13 billion per year.

Commodities account for by far the major part. The commodity sector comprises (annual average for 1931-36): durable and nondurable products flowing to ultimate consumers—$31.92 billion (see *DCS*, Table 2, p. 19); gross private domestic investment—$4.14 billion (*ibid.*); and the commodities purchased by government. The latter can be approximately set at the amount governments purchase from business enterprises: these may include some services but probably relatively few. Government purchases from business enterprises are estimated to be $3.93 billion per year (see *DCS*, Table 9, p. 23). Thus the commodity total, per year, for 1931-36 is $40.0 billion. The service total comprises the service sector of consumers' outlay, averaging for 1931-36 $22.64 billion (*ibid.*, Table 2, p. 19); and payments by governments for services of employees —$5.45 (*ibid.*, Table 9, p. 23)—a total of $28.1 billion.

3. *Calculation of the Ratio of Finished Commodities to Raw Materials*

The raw materials that flow into finished commodities are the products of agriculture and mining. Their basic components for 1931-36 are, therefore, approximated by taking the gross income for these two industries (*i.e.*, gross sales and products retained, adjusted for intra-industry duplication alone). The annual averages involved are $8.3 and $2.3 billion, or a total of $10.6 billion (see Simon Kuznets, *National Income and Its Composition*, National Bureau of Economic Research, 1941; pp. 543 and 551).

However, some of these raw materials may go into exports and not become embodied in finished products purchased by consumers, by government, or by business enterprises (for capital formation); and, per contra, some of the finished commodities may be from imported materials. We must, therefore, adjust the total just derived for imports and exports. Imports of raw materials, raw foods, and semifinished manufactures averaged for 1931-36 $1.16 billion (see *Statistical Abstract of the United States, 1944-45*, Government Printing Office, 1946, pp. 532-533); exports, $0.99 billion (*ibid.*), the latter amount to be scaled down 10 percent to the level of producers' prices. The net balance of imports over exports is therefore $0.27 billion ($1.16 – 0.89). Hence, the crude-materials total, which forms the denominator of the fraction we are trying to estimate, is, for 1931-36, $10.9 billion per year ($10.6 + 0.3).

The numerator is the commodity total of $40.0 billion, derived above, also adjusted for imports and exports. Exports of manufactured foods and finished manufactures in 1931-36 averaged $1.07 billion, a total that need not be adjusted for transportation and distribution charges since the latter are part of the spread we are attempting to calculate. Imports of finished products averaged $0.67 billion (*Statistical Abstract, 1944-45*, pp. 532-533). The net balance of $0.4 billion added to the commodity total, $40.0 billion, yields a numerator of $40.4 billion. The ratio is, therefore, 3.71.

This ratio is for a commodity total that includes the elaborate items of producers' durable equipment and construction as well as highly fabricated consumers' durable products (automobiles, radios, household electrical equipment, etc.) that find little counterpart in pre-industrial economies. The ratio we need should have been calculated only for the sector of raw-materials and finished-commodity flow that comprises the simple types of product—foods, clothing, other nondurable goods, furniture, etc. A more elaborate calculation of this type, more directly relevant to our purposes, is beyond the scope of this paper. We therefore arbitrarily reduced the ratio from 3.71 to 3.25 to allow for the inclusion

of these more complex commodities specific to an industrial country alone. This is a fairly generous scaling down, in view of the fact that consumers' durable commodities (not all of which should be omitted), construction, and producers' durable equipment (averaging per year $4.8+2.1+2.9) amount to only $9.8 billion, less than one-fourth of the comprehensive commodity total of $40.0 billion. The reduction of the ratio by about one-seventh associated with a presumptive exclusion from the total of somewhat less than one-quarter means that the ratio for the excluded part is much larger than that for the nonexcluded part (indeed, the implicit ratio for the durable part is 6.6).

Both to check on the commodity ratio just derived for 1931-36 and to demonstrate what a large proportion of the difference between crude materials and final cost of finished products is due to functions other than manufacturing proper, we calculated the components of the difference. As already indicated, total finished commodities average $40.4 billion per year 1931-36; the cost of crude materials, $10.9 billion. The absolute difference, $29.5 billion per year, may roughly be accounted for as shown in Table 1.

TABLE 1

	Annual value per year, 1931-36 ($ billions) (1)	Ratio (2)	Total ($ billions) (3)	Source *DCS* Table (4)
A Net income originating in				
1 Manufacturing	11.27	1.0	11.27	13
2 Contract construction	1.35	1.0	1.35	13
3a Trade	8.08	0.8	6.46	13
b Rr. transportation	2.25	0 8	1.80	13
c Highway, water, pipe line & related transportation services	0.80	0.8	0.64	13
d Business, banking, legal, engineering services	1.90	0.8	1.52	13
B Depreciation & capital consumption	7.58	0.8	6.06	4
C Business & sales taxes	2.52	0.8	2.02	8
Total	35.75		31.12	

The deduction of 20 percent for items A3, B, and C is intended as a rough allowance for the part relating to crude materials proper and entering their value, or to services not embodied in new commodities and hence not relevant to commodity-ratio calculation.

The total for comparison is $31.12 billion (col. 3). No precise check is attempted here, nor is one feasible. But the rough congruence of the totals shows that the huge difference between the value of crude materials

and the cost to ultimate users of the finished commodities they enter can easily be accounted for by the totals of net income originating in the industries handling them and the additional items of depreciation and taxes.

Of more interest in the present connection is the fact that of the total spread, production activities proper account for little more than half. If of the depreciation total (item B) we allow about one-half as chargeable to products of manufacturing and construction (before they are transported and distributed), the strictly fabricating functions account for $15.65 of the total, $31.12 billion. The rest is associated with transportation, trade, and other services. These figures make it easier to see that the very high commodity ratio characterizing a highly developed industrial economy is due in only small part to more elaborate fabrication; a great deal of it is accounted for by extensive transportation and intensive handling in distributive, credit, and other service channels.

4. *The Analysis of Services*

Of the total volume for services, $28.1 billion, 1931-36, the major item is services flowing to ultimate consumers, $22.6 billion. The details in *DCS* Table 30 suggest the following rough functional classification.

The first group are services for which there is a clear counterpart in a pre-industrial economy, but of which a large proportion is carried on within the family and the community and perforce escapes measurement —domestic service, personal care, recreation, religion, funerals, etc., care of clothing and furniture, etc. For this category, labeled A, a rough calculation (for 1931-36) suggests that they amount to 21 percent of all services flowing to ultimate consumers. Allowance must be made for the fact that many of them are performed within the family economy and are not reflected in orthodox estimates; and others (such as religion and recreation) are of a type, as suggested in the text, in which no clear case of greater per capita supply can be made between countries differing widely in social pattern. For purposes of comparison with a pre-industrial country the value of the services can at least be halved.

The second category, B, is the part of service flow to ultimate consumers that represents chiefly adjustments to the money economy. The foremost example is the large group of business services in the Department of Commerce classification (brokerage and bank fees, union dues, employment-agency fees, insurance, foreign transaction, etc.). This category accounts for roughly 17 percent of total consumers' outlay on services; and the reduction for the extent to which it represents costs of an industrial economy rather than net returns must be large. We set the reduction at eight-tenths of the total.

The third category, C, comprises expenditures of urban populations on services whose value is grossly inflated by the extra problems and difficulties of urban life. The most conspicuous example is urban rents (cash or imputed). Others are commutation, communication costs, and the like. This category accounts for 50 percent of total services to consumers, and it should be cut at least in half if the real-net-product element in it is to be comparable with that in an essentially nonurban society—still disregarding price differentials for *identical* goods.

The fourth category in consumers' outlay on services, D, comprises services that contain no element of grossness, and that, on the whole, are likely to be as fully recorded in the ordinary estimates for pre-industrial countries as they are for industrial. The foremost examples are medical services or services of education. This category accounts for roughly 12 percent of total outlay by consumers on services, and no reduction should be made in it.

Finally, we come to services purchased by government rather than by ultimate consumers. As argued in the text, a major part of governmental activity is intermediate rather than final product; hence this category, E, contains elements of grossness not unlike those in category B. However, similar elements of grossness may also be included in the estimates for pre-industrial countries; and while in any comparison between the two some reduction may be in order, it should be fairly small—about one-fifth.

TABLE 2

Service category	% of total flow to consumers, 1929, U.S. (1)	Reduction ratio suggested (2)	Col. 1 reduced (3)
A	21	0.5	10.5
B	17	0.8	3.4
C	50	0.5	25.0
D	12	0.0	12.0
E	24	0.2	19.2
Total	124		70.1

The following items were included in each category (the numbers for A–D refer to those shown for various service groups in *DCS*, Table 30).

A: II–5, 6, 7, 8, 9, 10, 11; III–2, 3, 4; V–10, 11, 12, 26, 27, 28; VI–7, 9, 12, 13, 14, 15, 16, 17; IX exclusive of all commodity components; XI.

B: VII–3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18; XII–1 excluding 1c.

C: IV–1, 2, 4, 5; V–20, 21, 22, 23, 24, 25; VIII–1d, 1f, 1g, 2, 3.

D: II–13; IV–3; V–13; VI–3, 4, 5, 6, 8, 10, 11; X.

E: *DCS*, Table 9, compensation of employees.

The ratio of the total flow of services to that considered truly net and comparable is as of 124 to 70.1 or 1.77. For purposes of comparison, any standard estimate of services for a pre-industrial country like China should be raised by some such ratio, even if price differentials for identical service items are disregarded.

5. *Recalculation of the Estimates for China*

We may now apply the results to the estimates for China, taking advantage of the data in Mr. Liu's book and the similarities in the concepts used by him to that of the Department of Commerce.

Crude materials flowing into domestic consumption can be estimated first. The average per year, 1931-36, of the gross value of agricultural products and of mineral and metallurgical output, for the 22 provinces amounted to 16.89 billion yuan (for the former see Liu, Table 11, pp. 35-40; for the latter, Table 19, p. 51). With the allowance of 11 percent for the missing provinces, the total amounts to 18.75 billion yuan per year. Let us assume further that no raw materials were imported and that all commodity exports were raw materials—an assumption that tends to minimize the value of raw materials flowing into domestic consumption and hence the value of the national product. The average annual total of exports, including the adjustment for undervaluation, is 771 million yuan; deducting 10 percent for the adjustment to the level of producers' values (a patently small deduction) the figure becomes 694 million yuan per year (see Liu, Table 28, p. 69). Subtracting it from the already derived annual average output of crude commodities, 18.75 billion yuan, leaves 18.06 billion per year.

According to Mr. Liu's calculation, the difference between prices of identical commodities in China and the United States, estimated from a comparison of crude commodities alone (rice, wheat, other grains, beans and peas, sweet potatoes), 1931-36, resulted in undervaluing Chinese commodities 47 percent (see pp. 73 and 75). Before any conversion by means of the customary exchange rates, the value of Chinese crude material in yuan must, therefore, be raised 47 percent. The next step is to allow for the ratio calculated above of finished commodities to crude materials, 3.25. Hence, for an estimate in yuan, directly convertible by means of official exchange rates, the value of finished commodities in China's gross national product must be derived by multiplying the value of 18.06 billion yuan per year, first by 1.47, then by 3.25. The result is 86.28 billion yuan.

The service component of China's gross national product can also be derived from Mr. Liu's figures. The average annual value of professional and domestic service, 1931-36, is approximately 3,438 million yuan (see Table 27, p. 66); of value added by governmental and educational

institutions, 882 million yuan (see Tables 23 and 24, pp. 55 and 58); of imputed house rent (farm alone), 1,620 million yuan (see Table 11, pp.35-40). For 22 provinces the total of these services not embodied in new commodities is therefore 5,940 million yuan per year; and with the 11 percent increase for omitted areas, becomes 6.59 billion yuan.

This total must be raised to adjust for the differences in prices for identical services in the two countries; and further for the ratio calculated above, of the gross to the net element in the services. Mr. Liu has no data for prices of services, and in fact employs the price differential derived from a comparison of crude commodities. For lack of information we follow his practice. The adjustment then consists of multiplying 6.59 billion yuan, first by 1.47, then by 1.77. If the result, 17.15 billion yuan, is added to 86.28 billion, the total derived above for the commodity component, annual gross national product is 103.43 billion yuan.

These are yuan that are directly convertible to United States dollars by the official rate of exchange: 1 yuan = $0.2886. The total $29.85 billion, can be compared with that derived by Mr. Liu as a result of his adjustment for differences in price levels, in the marketing structure of agricultural production, and in the extent of of unpaid family services. With these adjustments Mr. Liu raises China's gross national product, 1931-36, to $16.68 billion per year (see p. 85). The present adjustment thus raises Mr. Liu's adjusted total by $13.2 billion, or another 79 percent.

In passing from gross national product to consumers' outlay, we may accept Mr. Liu's figure of 10 percent for gross savings (see pp. 86-87). Consumers' outlay per year amounted, in terms of equivalent purchasing power in United States dollars to $26.87 billion. With a population taken at Mr. Liu's figures of 410 million, per capita consumption is $65.5, rather than the $37 derived by Mr. Liu. For the same period, consumers' outlay per capita in the United states was estimated by the Department of Commerce to be $433.

6. *Concluding Comments*

The experimental calculation above is admittedly susceptible to criticism, and particularly to revisions entailed by a more specific and elaborate application of the basic assumptions. But if the latter are granted, one is justified in claiming that the magnitudes assigned to the adjustments are moderate. The ground for increasing them, thereby reducing the difference between the national products of United States and China even further, are:

a) The coverage of crude materials in the estimates for China may well be less complete than in those for the United States, partly because,

some agricultural and mining crude materials escape measurement in China to a greater extent than in the United States.

b) The ratio of finished products to crude materials, 3.25, may be on the low side. An increase would add proportionately to the commodity sector, and to national income.

c) The price differentials between China and the United States are probably underestimated, largely because the figure used by Mr. Liu is heavily dominated by basic foods freely entering international trade. The crude materials that do not move as freely, either because they are too perishable or bulky or because they supply local demand primarily, are likely to exhibit much greater price differentials. Even in Mr. Liu's five agricultural commodities, those moving in international trade—rice, wheat, other grains—show price differentials of from 27 to 50 percent of the price in China; whereas beans and peas and sweet potatoes, which are of more local use, show differentials as large as 80 and 118 percent. A simple recalculation, in which the combined differential for beans and peas and sweet potatoes is given the full weight of all agricultural products except grains, would raise the five-commodities price differential from the 47 percent calculated by Mr. Liu to 70 percent. This adjustment alone would raise the national product for China 15 to 16 percent beyond the $29.85 billion established in our calculation.

d) The price differential for services is likely to be greater even than the 70 percent just suggested. Mr. Liu estimates per capita income for professional services to average roughly 105 yuan per year (Table 26, p. 65). This, for a family of six, works out to 630 yuan per year, or at official exchange rates, to about $180. In the United States per capita compensation of employees in professional activities would average well over $1,000 and of entrepreneurs in a field like medical service well over $2,000. It is difficult to assume that the quality differential is such as to bridge the difference between some $300 ($180 × 1.7) and say $1,500 to $2,000.

These considerations suggest that further analysis might bring the per capita estimates for China and the United States even closer.

Résumé

1. L'examen des comparaisons courantes du revenu national pour les pays industriels et les pays pré-industriels, même après l'ajustement pour assurer la comparabilité des estimations, montre que les chiffres des pays pré-industriels sont trop bas. Les estimations pour les pays

pré-industriels excluent une grande partie de ce qui devrait être inclu; celles des pays industriels incluent une grande partie de ce qui devrait être exclu; lorsque leurs capacités respectives ont été rééquilibrées, il devient difficile d'établir un dénominateur commun.

2. Une partie importante du travail productif de l'économie pré-industrielle est effectuée au sein de la famille ou de la commune, indépendamment du marché. Ceci peut comprendre des travaux aussi apparents que la fabrication de matières premières, ou des services aussi effacés que ceux d'un système familial étroitement uni pour protéger ses membres individuels contre les désastres, ou leur donner des secours relatifs à leur bien-être spirituel. Il est douteux que les calculs puissent tenir compte de la pleine valeur de ces services qui n'ont aucun rapport avec les marchés; dans l'économie industrielle, cependant, ils dépendent presque tous des maisons de commerce et des éléments destinées au marché et doivent être compris dans les estimations du revenu national.

3. Dans l'économie industrielle, une grande partie du travail est dirigée en vue de parer aux désavantages de l'organisation économique et sociale, inconnus dans l'économie pré-industrielle. Le produit de ces travaux est plutôt intermédiaire que final et devrait être exclu de tout calcul du produit national net employé aux fins de comparaison. On peut distinguer les catégories suivantes: (a) la fabrication au dehors, le transport, les services de distribution rendus nécessaires par la concentration géographique de l'industrie et des distances à couvrir entre les producteurs et les fournisseurs de matières premières et entre les producteurs et les consommateurs; (b) les frais supplémentaires que la vie urbaine impose aux consommateurs, ceux-la constituant l'accompagnement indispensable de l'organisation productive de l'économie industrielle (déplacements réguliers, transport, coût de la vie plus élevé, etc.); (c) les frais extraordinaires occasionnés par la participation à une économie monétaire et de crédit compliquée indispensable à une structure industrielle progressive (frais de banques et autres, cotisations à verser syndicats, et autres dépenses plus ou moins en rapport avec les affaires); (d) le total du revenu national qui comprend toutes les dépenses gouvernementales pour les produits et les services, les frais gouvernementaux extraordinaires causés par la gestion et la préservation de la structure économique complexe de l'économie industrielle.

4. Il est impossible d'obtenir les prix comparatifs dans les pays industriels et les pays pré-industriels lorsqu'il s'agit de marchandises qui ne sont produites et consommées que dans un seul type de pays. On peut ordinairement résoudre ce problème en cherchant le prix de quelques produits identiques et en appliquant aux autres produits le rapport ainsi obtenu. Les produits dont on peut facilement établir les

prix comparatifs sont ordinairement des produits bruts avec marchés internationaux très vastes; il s'agit des produits pour lesquels la différence de prix est maintenue aussi petite que possible par l'influence compensatoire du commerce international. Il s'ensuit que les différences de prix entre les pays industriels et les pays pré-industriels sont ordinairement sous-estimées et que les comparaisons basées sur cette technique amplifient l'inegalité des revenus totaux et des revenus par tête d'habitant. Même s'il était possible d'obtenir le prix de toutes les marchandises produites dans les deux types de pays, le rapport entre les revenus nationaux évalués d'après les prix des pays pré-industriels différerait du rapport de ces mêmes revenus nationaux évalués d'après les prix des pays industriels. Ainsi la comparaison des deux revenus nationaux ne donnerait pas un seul chiffre, mais se trouverait en quelque sorte placée entre les limites constituées par les deux rapports.

5. Des calculs expérimentaux sont faits avec les données pour les Etats-Unis et pour la Chine, afin d'illustrer comment on peut faire disparaître quelques-uns des éléments de non-comparabilité avec les renseignements disponibles.